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AND

PROCEEDINGS

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PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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Notes on Thymalus fulgidus Er., and Its Fungus Hosts in New Jersey (Col.).

By HARRY B. WEISS, New Brunswick, New Jersey.

This species, described by Erichson in 1844 (Germar. Zeits., bd. 5, p. 458), has long been known to breed in *Polyporus betulinus* (Bull.) Fr., a fungus which occurs only on species of birch and which attacks weakened trees with great rapidity. G. Dimmock (Direct. Collect. Coleop. 1872, pp. 19, 20) writes: "The larvae feed upon a fungus (*Polyporus betulina*) which is parasitic upon the trunks of white birch trees." According to Packard (Fifth Rept. U. S. Ent. Com., 1890, p. 510) the beetle is common in New England and a large number of larvae taken in Belmont, Massachusetts, produced beetles after a short period of pupation, on or about June 27, 1878. Smith (Ins. N. J. in State Mus. Rept., 1909) states that it occurs throughout the state of New Jersey

in May and June, being usually found on a white birch fungus and that Mr. Daecke bred it from such a fungus.

During the winter of 1918–19, the larvae of this beetle were very abundant in *Polyporus betulinus* at Morristown, Oradell and Monmouth Junction and in *Daedalea confragosa* (Bol.) Fr., at Monmouth Junction and High Bridge, all localities in New Jersey. Both of these fungi are members of the family *Polyporaceae* and are common in New Jersey, the former occurring on birch and the latter on dead wood or on living trees, especially of willow. *Polyporus betulinus* on account of its white color is more conspicuous and not as likely to be overlooked as *D. confragosa*.

Both the larvae and adults feed on the context and tubes and when numerous the fungus is completely riddled. Pupation takes place in the context in a little chamber excavated by the larva and requires about ten days, usually occurring during the last of April or in May. On account of its hairiness, the larva is usually covered with particles of fungus as is also the beetle as it works in the context. Beutenmueller (Entomologica Americana VI, 1890, p. 57) states that eggs are deposited during the fall and that adults emerge the following spring, the larvae becoming full grown in May. Beutenmueller also describes the larva and pupa and his descriptions may be supplemented by the following additions:

Larva. Cervical shield and anal process sometimes brownish. Head sparsely hairy. The fork-like process on the posterior extremity consists of a pair of prominent tubercles borne on a suboval, dorsal, chitinous plate on the ninth abdominal segment; each tubercle consists of a thick, central spine bearing five smaller ones; a long hair arises from the bases of the smaller ones. The chitinous plate is edged with minute tubercles each bearing a long hair and minute, similar tubercles occur on its surface.

Thoracic legs sparsely hairy and armed with a sharp claw at tip. Abdominal segments somewhat produced laterally into tubercles. Each thoracic and abdominal segment bears a thin, transverse, dorsal row of comparatively long hairs, with the lateral hairs longest; these rows of hairs are continued on the ventral abdominal surface. All hairs arise from somewhat tuberculate bases. Abdominal stigmata are located just above lateral tubercles. Length 6 to 9 mm. Width 2 to about 3 mm.

Pupa with body tapering to a blunt point at the posterior extremity, which is provided with two short tubercles terminating in sharp spines. The head bears several stiff hairs; anterior and lateral margins of thorax bear row of stiff hairs; dorsal surface of thoracic and abdominal segments bears transverse row of stiff hairs; all hairs arising from tuberculate bases.

An Undescribed Species of Ptychoptera from the Western United States (Ptychopteridae, Diptera).

By CHARLES P. ALEXANDER, Urbana, Illinois.

The undescribed species of the genus *Ptychoptera* Meigen that is described herewith has been confused in collections with the much larger and darker *P. lenis* O. S.

Ptychoptera minor n. sp.

♂ Length, 9 mm.; wing, 8.6 mm. Rostrum and mouth-parts yellow; palpi yellow, the last segment dark brown. Antennae with the basal segment yellow, the second segment brown, the flagellum dark brown. Head black, shiny.

Pronotum yellow. Mesonotum black. Pleura black, gray pruinose, the dorso-pleural membranes bright yellow. Halteres yellow. Legs with the coxae yellow, marked on the outer face with purplish brown, the fore coxae with a basal band and an apical spot, the middle coxae with a basal and an apical band, the hind coxae with the outer face largely brown, only the apical margin yellowish; trochanters light yellow; femora yellow, the tips scarcely darkened; tibiae and metatarsi yellow, the tips darker; tarsi brown. Wings with a strong yellowish gray suffusion, the costal and subcostal cells and along vein *Cu* more yellowish; narrow, indistinct brown seams along the cord and at the fork of R_4+_5. Venation: *Sc* long, ending about opposite three-fourths the length of R_4+_5; *Rs* moderately long, in alignment with R_4+_5, sometimes spurred at origin.

Abdominal tergites black, segments three to nine with the lateral margins broadly reddish, this color increasing in amount on the terminal segments, the hypopygium entirely reddish; sternites black, broadly ringed caudally with yellowish. Male hypopygium with the ninth tergite massive, deeply notched medially as in *P. lenis* but the lateral lobes only moderately slender, their apices widely separated, quite far before the tip on the ventral face with a small, blunt reddish lobe. Penis-guard not narrowed at the tip, the apex broadly rounded.

In *P. lenis* the hypopygium is black, the lobes of the ninth tergite slender, very narrowly separated at their apices, close before the tip

with an appressed blackened spine; penis-guard conspicuously narrowed at the apex.

Habitat: Western United States.

Holotype, ♂, Monterey County, California, July 22, 1896. *Paratype*, ♂, Juliaetta, Idaho, May 3, 1904. Type in the collection of the author.

This new species seems to be about as common as the only other western species of the genus, *Ptychoptera lenis* O. S. The two species are closely related but may be separated by the following key:

Size larger (male, wing over 11 mm.); abdominal tergites black, including the hypopygium; lobes of the ninth tergite of the male hypopygium with a subapical black appressed spine on the ventral surface. *P. lenis* O. S.

Size small (male, wing under 9 mm.); abdomen with the sides of the tergites and the hypopygium reddish; lobes of the ninth tergite of the male hypopygium with a blunt reddish ventral lobe some distance before the tip. *P. minor* n. sp.

Notes on Buprestidae with Descriptions of New Species (Coleop.).

By Josef N. Knull, Bureau of Plant Industry, Harrisburg, Pennsylvania.

The following is a list of host-plants and emergence records of *Buprestidae* collected by the author and reared at Hummelstown, or Harrisburg, Pennsylvania. In all cases, the material was caged under out-of-door conditions.

Chalcophorella campestris Say. At Harrisburg, Pa., ninety living adults were chopped from their pupal cells in a dead beech (*Fagus americana*) about 14 inches in diameter on March 13, by Mr. H. B. Kirk and the author. The adults, which appear in the spring, transform in the fall and pass the winter in the pupal cells. The species was also reared from dead willow (*Salix nigra*) and buttonwood (*Platanus occidentalis*).

Buprestis rufipes Fab. Pupae of this beetle were observed in the heart-wood of a dead American elm (*Ulmus americana*) at Hummelstown, Pa., June 28, and on July 10 the adults were mature. Adults were also reared July 5 from the wood of a dead sour gum (*Nyssa sylvatica*) collected at Hummelstown, Pa. Beetles were also reared from dead beech (*Fagus americana*) and hickory.

Buprestis lineata Fab. Adults were reared from dead Virginia pine (*Pinus virginiana*) collected at Rockville, Pa.

Buprestis consularis Gory. Remains of adults were found in the wood of a dead pitch pine (*Pinus rigida*) at Charter Oak, Pa.

Buprestis fasciata Fab. Adults were found in abundance on freshly cut pine log at Endeavor, Pa., July 30.

Buprestis striata Fab. Breeds in dead soft and pitch pines. Adults which appear in the spring transform in the fall and pass the winter in the pupal cells.

Dicerca prolongata Lec. Was found breeding in the wood of a dead large-toothed aspen (*Populus grandidentata*) at Charter Oak, Pa.

Dicerca divaricata Say. This species does not seem to prefer any particular host-plant, and can be found breeding in a great variety of forest trees. Adults were reared from the dead wood of the following trees, collected at Hummelstown, Pa.: black birch (*Betula lenta*), ironwood (*Ostrya virginiana*), linden (*Tilia americana*), white ash (*Fraxinus americana*), sugar maple (*Acer saccharum*), redbud (*Cercis canadensis*), black ash (*Fraxinus nigra*) and American elm (*Ulmus americana*).

Dicerca pugionata Germ. On July 19, adults of this species were reared from witch-hazel (*Hamamelis virginiana*) collected at Manada Gap, Pa. Many of the witch-hazels in this section have been killed by this insect.

Dicerca obscura Fab. This species breeds in the dead wood of persimmon (*Diospyros virginiana*), although adults were reared from the dead wood of staghorn sumach (*Rhus typhina*) collected at Hummelstown, Pa.

Dicerca lurida Fab. The common host-plant of this insect is hickory, although it will breed in a great variety of dead trees. Adults were reared from dead blue beech (*Carpinus caroliniana*) and alder (*Alnus rugosa*) collected at Hummelstown, Pa.

Dicerca lepida Lec. This beetle breeds in dead ironwood (*Ostrya virginiana*). From material collected at Hummelstown, Pa., adults emerged from July 11 to July 29.

Dicerca scobina Chev. Breeds in the dead wood of sour gum (*Nyssa sylvatica*). Adults were reared August 5 from material collected at State College, Pa. The adults emerge late in the season and hibernate through the winter. On March 24 a living adult was taken under the loose bark of a sour gum at Hummelstown, Pa.

Dicerca americana Hbst. Two living adults were found on December 13 and January 9 at State College, Pa., hibernating under the loose bark of a dead pine.

Dicerca punctulata Sch. Found breeding in pitch pine (*Pinus rigida*) at Hummelstown, Pa.

Poecilonota cyanipes Say. An adult was reared June 6, from a *Saperda concolor* Lec. gall on a branch of large-toothed aspen (*Populus grandidentata*) collected at Milford, Pa., by Mr. H. B. Kirk.

Cinyra gracilipes Melsh. Adults were reared from dead white oak (*Quercus alba*), swamp white oak (*Quercus bicolor*) and ironwood (*Ostrya virginiana*) collected at Hummelstown, Pa. Mr. A. B. Champlain informs me that he has reared this species from dead ash collected at Harrisburg, Pa.

Melanophila fulvoguttata Harr. At Hummelstown, Pa., this insect was found breeding in the bark of dead and dying hemlocks (*Tsuga canadensis*). The work was confined entirely to the bark, and none of the larvae had entered the sapwood.

Anthaxia viridifrons Lap. Was reared during June from the sapwood of dead American elm (*Ulmus americana*) and hickory branches.

Anthaxia quercata Fab. *Anthaxia cyanella* Gory can well be united with this species, as both forms are often reared from the same stick of wood. Adults were reared May 30, from the sapwood of dead redbud (*Cercis canadensis*) branches collected at Hummelstown, Pa.; also on May 29, from the sapwood of dead (*Crataegus coccinea*) branches collected at Harrisburg, Pa., and from the sapwood of a dead white pine (*Pinus strobus*) branch collected at Manada Gap, Pa.

Anthaxia flavimana Gory. Breeds in white oak.

Chrysobothris femorata Fab. Breeds in the bark and sapwood of a great variety of dead and dying fruit and forest trees. In Pennsylvania it seems to be largely secondary in its attack.

Chrysobothris dentipes Germ. Was reared from the bark of a dead white pine (*Pinus strobus*) collected at Dauphin, Pa.

Chrysobothris blanchardi Horn. A number of adults were reared June 11, from the bark of a dead pitch pine (*Pinus rigida*) collected at Hogestown, Pa.

Chrysobothris scabripennis Lap. & Gory. Adults chopped from the sapwood of dead white pine at Charter Oak, Pa., in June.

Chrysobothris pusilla Lap. & Gory. Reared May 15 from the sapwood of a dead pitch pine (*Pinus rigida*) branch collected at Hummelstown, Pa.

Chrysobothris sexsignata Say. From material collected at Hummelstown, Pa., adults were reared as follows: On May 29, from the sapwood of dead hemlock (*Tsuga canadensis*); on July 12, from the bark of dead black ash (*Fraxinus nigra*); on June 11, from the sapwood of dead white ash (*Fraxinus americana*); on July 3, from the sapwood of a dead red maple (*Acer rubrum*); on July 17, from the sapwood of a dead swamp white oak (*Quercus bicolor*) branch. It also breeds in the sapwood of dead walnut (*Juglans nigra*) and in the injuries made by the larvae of *Agrilus juglandis* in the bark of living butternut (*Juglans cinerea*), the eggs being laid in the emergence holes of the *Agrilus* adults.

Chrysobothris azurea Lec. Breeds in the sapwood of dead alder (*Alnus rugosa*) and swamp white oak (*Quercus bicolor*) in the vicinity of Hummelstown, Pa.

Chrysobothris harrisii Hentz. Adults were reared in June from small branches of Virginia pine (*Pinus virginiana*) collected at Hummelstown, Pa.

Actenodes acornis Say. From material collected at Hummelstown, Pa., adults were reared as follows: On June 15, from the wood of dead red maple (*Acer rubrum*); on June 24, from dead beech (*Fagus americana*); on June 6, from dead black birch (*Betula lenta*); on June 10, from dead hickory branch; on June 15, from dead black oak (*Quercus velutina*). The larvae work through the heart-wood of the host-plants, often entirely riddling them.

Acmaeodera culta Web. On September 7, a living adult was chopped from a dead hickory branch at Cresco, Pa. Adults were reared August 10 from dead white oak (*Quercus alba*) branch collected at Hummelstown, Pa.

Ptosima gibbicollis Say. In the vicinity of Hummelstown, Pa., this species breeds in redbud (*Cercis canadensis*), often attacking living trees, hastening their death and decay. The larvae work in the heart-wood of the tree and the adults which appear in the spring mature in the fall and pass the winter in the pupal cells.

Eupristocerus cogitans Web. Forms galls on alder (*Alnus rugosa* and *A. incana*). The egg, which is covered with a chitinized protective covering, is deposited at a node, or at a point where the bark is rough. The egg hatches and the young larva goes beneath the bark after which it works down the stem for a short distance. It then encircles the stem, which injury later forms a gall on the plant. The life history extends over a period of two years, and the pupa cell is made at the top of the gall.

Agrilus juglandis n. sp.

Form and color of *A. masculinus*. Antennae greenish, not quite reaching beyond the middle of the prothorax, serrate from the fourth joint; head slightly convex, a feeble occipital impression, more distinct in the female; front densely punctate, becoming slightly strigose on occiput, middle of front to clypeus covered with long white pubescence.

Prothorax wider than long, narrowed at base, sides in front arcuate, lateral margin sinuate, hind angles with a well defined carina in both sexes; disk convex, with an oblique lateral depression on each side, two depressions on median line as in *A. otiosus;* surface transversely strigose. Scutellum transversely carinate, surface granulate. Elytra slightly sinuate behind the humeri, dilate behind the middle, apices separately rounded and serrulate; disk with a faint costa on each side, basal depressions shallow, sutural margin elevated behind the middle; surface closely imbricate-granulate. Body beneath more shining than above, prosternal lobe broadly emarginate; prosternal process broad, slightly narrowing, acute at tip. Pygidium without a projecting carina. First joint of hind tarsus as long as the following three joints; tarsal claws deeply

cleft, the lower portion turned inward, nearly touching that of the opposite side, claws on all three pairs of feet in both sexes similar. Length 55 mm.; width 1 mm.

♂.—All three pairs of tibiae mucronate on the inner side.

♀.—Only anterior and middle tibiae mucronate on the inner side.

Described from a large series of adults, most of which were beaten from the foliage of butternut (*Juglans cinerea*). *Type* collected by the author at Hummelstown, Pa., June 9, on butternut. *Allotype* reared from the outer bark of living butternut (*Juglans cinerea*) collected at Linglestown, Pa., by the author. Both types in the author's collection.

The beetle breeds in the outer bark of living butternut (*Juglans cinerea*). The injury made by the larva makes the tree susceptible to attack of other insects and *Chrysobothris femorata* Fab. and *Chrysobothris sexsignata* Say are often found working together with the above species.

In the vicinity of Hummelstown, Pa., the pupal stage was observed on May 15, and the first adults appeared about May 25. Mr. Champlain states that the beetle causes considerable damage to the butternut in the vicinity of Lyme, Connecticut.

In general appearance this species resembles *A. masculinus*, but according to Dr. Horn's key* it should be placed next to *A. otiosus*. It has been confused with *A. otiosus* in collections, but the males can easily be separated from the males of this species by the lack of the median line of pubescence on the ventral surface.

Agrilus otiosus Say. Hickory seems to be the common host-plant of this species, although on June 5 adults were reared from a dead branch of persimmon (*Diospyros virginiana*) collected at Rockville, Pennsylvania.

Agrilus frosti n. sp.

Form of *A. otiosus*. Antennae greenish; reaching beyond the middle of the prothorax, serrate from the fourth joint; head convex, densely punctate, becoming strigose on occiput.

Prothorax wider than long, narrowed at the base, sides feebly arcuate, more strongly in the female, lateral margin sinuate, hind angles of male faintly carinate, carina sometimes nearly obliterated in the female; disk

* G. H. Horn. The Species of Agrilus of Boreal America, Trans. Amer. Ent. Soc., V. 18, p. 277–336, 1891.

convex, two median depressions with an oblique lateral depression on each side, surface transversely strigose. Scutellum transversely carinate, surface granulate. Elytra sinuate behind the humeri, dilate behind the middle, apices separately rounded and serrulate; basal depressions slight, sutural margin elevated behind the middle, surface closely imbricate-granulate. Body beneath more shining than above, prosternal lobe with slight emargination, prosternal process slightly narrowing, acute at tip, median line of pubescence lacking in both sexes, first two ventral segments of male flat, but not pubescent, Pygidium without a projecting carina. First joint of hind tarsus as long as the three following joints; tarsal claws deeply cleft, the lower portion turned inward, nearly touching that of the opposite side, claws on all three pairs of feet in both sexes similar. Length 4 mm.; width .75 mm.

♂.—Front bright green, tibiae on all three pairs of feet mucronate.

♀.—Front bronze, posterior tibiae not mucronate.

Described from a series of three males and seven females. *Type* male and *allotype* collected at Framingham, Massachusetts, May 28, by Mr. C. A. Frost; two paratypes at Charter Oak, Pennsylvania, June 21, by Mr. H. B. Kirk and the author; one from Berks County, Pennsylvania, June 1, without collector's label; one Harrisburg, May 24; one Chambersburg, Pennsylvania, June 6; and one Hummelstown, June 2, by the author. Type material in the author's collection, two paratypes in the collection of the Bureau of Plant Industry.

I take pleasure in naming this species after my friend, Mr. C. A. Frost, who has determined much material for me and given me many valuable suggestions.

The species has been confused with *A. otiosus* in collections, but the lack of the ventral median pubescent stripe in the male will at once separate it from this species. The male genitalia are also different from those of *A. otiosus* and *A. juglandis*, being flattened and flared at the apex. The sides are densely punctate above and below. In *A. otiosus* and *A. juglandis* the sides of the male genitalia are nearly parallel near the apex.

The male also lacks the ciliate antennae of *A. crinicornis* and the fimbriate and truncate last ventral segment of *A. defectus*. According to Dr. Horn's key, it would come after *A. otiosus*.

The following table will serve to separate the males of the of the eastern species of the *otiosus* group.

Tibiae of male on all three pairs of feet mucronate at the inner apical angle.
Male pubescent on the median line of under side.....*otiosus* Say.
Male not pubescent on the median line of under side.
Male with the sides of the genitalia nearly parallel at apex, flared in middle, sides sparsely punctate.....*juglandis* n. sp.
Male with sides of genitalia flared near apex, sides densely punctate. *frosti* n. sp.
Male with the last ventral truncate and fimbriate:.....*defectus* Lec.
Male with antennae long, slender and ciliate on the posterior side with relatively long hairs.....*crinicornis* Horn.

Agrilus masculinus Horn. Adults were reared on April 14 from the sapwood of dead box elder (*Acer negundo*) branches collected at Harrisburg, Pa.

Agrilus defectus Lec. On May 29, adults of this species were reared from the dead branches of white oak (*Quercus alba*) collected at Hummelstown, Pa.

Agrilus arcuatus Say. Adults were reared from girdled branches of the following trees: On July 18, from black oak (*Quercus velutina*) collected at Manada Gap, Pa.; on May 31, from beech (*Fagus americana*) collected at Harrisburg, Pa.; on June 7, from hickory (*Hicoria ovata*) collected at Hummelstown, Pa. The egg seems to be laid on a small twig, where it hatches and the small larva enters the bark, working its way down the cambium to the branch. Later the branch is girdled and the larva, still in the girdled part, travels from one to six inches from point of girdling, where it enters the wood and forms a pupal cell. The girdled branch falls in the spring, after which the adult emerges.

Agrilus vittaticollis Rand. Was found breeding in the living stems of shadbush (*Amelanchier canadensis*) at Dauphin, Pa.

Agrilus bilineatus Web. Breeds in oak and chestnut, often causing the death of unhealthy trees.

Agrilus anxius Gory. Breeds in various species of birch. At Speeceville, Pa., it was found to be killing the poplars (*Populus grandidentata*) which had been attacked by the poplar borer (*Saperda calcarata* Say).

Agrilus cephalicus Lec. Was reared from the sapwood of dead dogwood (*Cornus florida*). This species is often confused with *A. otiosus*, but can easily be separated by the tarsal claws.

Agrilus politus Say. Breeds in living willow and striped maple (*Acer pennsylvanicum*).

Agrilus fallax Say. Adults were reared by Mr. H. B. Kirk, from dead branches of honey locust (*Gleditsia triacanthos*) collected at New Cumberland, Pa.

Agrilus obsoletoguttatus Gory. Was reared from the dead branches of the following species, collected at Hummelstown Pa.: On June 15, from beech (*Fagus americana*); on June 2, from blue beech (*Carpinus*

caroliniana); on June 12 from ironwood (*Ostrya virginiana*); on June 9, from red oak (*Quercus rubra*); on June 17, from hickory.

Agrilus subcinctus Gory. Mr. H. A. Wenzel informs me that he takes this species on the foliage of poison ivy (*Rhus toxicodendron*), and the numbers taken indicate that poison ivy is the host-plant.

Agrilus lecontei Saund. Breeds in the wood of dead hackberry (*Celtis occidentalis*) in the vicinity of Harrisburg, Pa.

Agrilus egenus Gory. Breeds in the wood of dead black locust (*Robinia pseudacacia*) in the vicinity of Harrisburg, Pa.

Agrilus celti n. sp.

Form and color of *A. egenus*, males often more greenish. Antennae greenish, reaching the middle of the prothorax, serrate from the fifth joint, serrate joints longer than wide; head convex, with faint median impression, front densely punctate, becoming strigose on occiput, middle of front to clypeus covered with long white pubescence.

Prothorax wider than long, sides not strongly arcuate, hind angles rectangular, with a well-defined carina in both sexes; disk convex, median impressions light, lateral depressions well-marked, surface transversely strigose. Scutellum transversely carinate, surface granulate. Elytra sinuate behind the humeri, dilate behind the middle, apices separately rounded and serrulate, basal depressions slight; disk depressed, surface imbricate-granulate. Body beneath more shining than above, prosternal lobe strongly emarginate. Pygidium without a projecting carina. First joint of hind tarsus as long as the following three joints; tarsal claws broadly toothed at base, claws similar on all three pairs of feet in both sexes. Length 4.5 mm.; width 1 mm.

♂.—Front more densely pubescent, greenish; prosternum densely pubescent, with pubescence extending on the second abdominal segment, first and second abdominal segments broadly but not deeply channelled; sides of genitalia nearly parallel.

♀.—Front less densely pubescent and less bright, without the stripe of dense white pubescence on under side, first and second abdominal segments without channel.

Described from a large series of adults reared from dead branches of hackberry (*Celtis occidentalis*), collected at Hummelstown, Pa., by Mr. H. B. Kirk and the author.

Type male and *allotype* in author's collection and reared June 3, from dead hackberry (*Celtis occidentalis*) branches collected at Hummelstown, Pa., by the author.

This species has been confused with *A. egenus* in collections, and although it is hard to separate the females from those of *A. egenus*, the males may be easily separated by an examination of the genitalia.

In *A. celti*, the sides of the male genitalia are nearly parallel, while in *A. egenus* there is a decided flare near the apex.

According to Horn's key, this species would come after *A. egenus*.

Pachyscelus laevigatus Say. At East Falls Church, Virginia, the larvae of this species were found mining in the leaves of *Lespedeza virginica*, *Meibomia obtusa* and *M. viridiflora*. The larva makes a small round cell between the layers of the leaf, where it passes the winter. In spring transformation occurs, and the adult emerges by the lifting of a small hinged lid.

New or Interesting Psyllidae of the Pacific Coast (Homop.).

By D. L. Crawford, College of Hawaii, Honolulu.

Mr. W. M. Giffard, of Honolulu, has during the past few years collected a considerable number of Psyllidæ in California and Oregon, representing some twenty-four species, one of which is new and another represents a new variety of a previously known species. Several others are more or less interesting because of the added distributional data furnished.

The types of the new species and variety are deposited in the Museum of the California Academy of Sciences, San Francisco, by request of Mr. Giffard.

Aphalara (Anomocera) anomala Crawford, U. S. Nat. Mus. Bul. 85, p. 37, 1914.

This anomalous species of *Aphalara* with nine-segmented antennæ and a supernumerary marginal cell in the forewings was described from three females from northern California. Mr. Giffard has collected three additional females from Niles Canyon, Alameda County, California. These are closely similar to the type.

Euphyllura arctostaphyli Schwarz. Crawford, U. S. Nat. Mus. Bul. 85, p. 116, 1914.

There is a good series of this species and its variety *nivipennis* Schwarz in Mr. Giffard's collection. Eight specimens

from Placer and Sonoma Counties, California, typically represent the species and seven from Placer and Lake Counties, California, represent the variety, while there are 36 others from Placer, Lake and Sonoma Counties which are more or less intermediate in the color of the fore wings and dorsum. As most of these latter approach the variety more closely than the species, I have grouped them with the former, but the standing of this variety appears now to be less certain. From the distributional data it appears that the variety *niveipennis* is not a regional one but rather a case of albinism occurring wherever the species is found.

Euphyllura arctostaphyli bifasciata new variety.

This variety resembles the species in size, structure of body and general appearance, but differs in wing colors. The forewings have a conspicuous white or pale band transversely at base and another near apex which is more or less angled and does not extend entirely across wing. The color of the remainder of the wing varies from dark as in the species to very light brown as in the darker representatives of the variety *niveipennis*.

In the series of specimens from which the writer prepared the description of this species in his monograph were a few specimens with this type of wing but it was deemed advisable not to separate these few into a variety. However, Mr. Giffard now presents seventeen specimens of both sexes and no truly intermediate forms to indicate that this is a variable characteristic. The statement, therefore, in the monograph (U. S. Nat. Mus. Bul. 85, p. 116), "forewings . . . often with a prominent white fascia at basal third and sometimes a whitish area or fascia subapically," should be omitted from the description of the species and applied to the variety *bifasciata*.

Described from seventeen males and females collected by W. M. Giffard at Donner Lake, Placer County, California, August 24, 1917, and at Summit in the same county.

Holotype, female (No. 463), in the collection of the California Academy of Sciences.

Arytaina montana new species.

Length of body 1.6 mm.; length of forewing 1.9 mm.; width of head 0.6 mm. General color brown to black; vertex, dorsal surface of genal

cones and pronotum dirty white; dorsum of thorax with pale streaks and spots; in the lighter forms the dorsum is light with darker streaks and spots; antennae pale on basal portion, remainder dark; forewings whitish, with brown spots scattered over surface.

Head not strongly deflexed; vertex with a foveal impression discally on each side of median line; genal cones nearly as long as vertex, rounded at apex, slightly divergent. Forewings rounded at apex, conspicuously spotted, pterostigma very small, short.

♂.—Anal valve longer than forceps, broad at base and tapering toward apex somewhat. Forceps broader and shorter than in *A. ceanothæ* tapering gradually to a blunt point at apex. ♀.—Genital segment not as long as rest of abdomen, thick at base and tapering to acute apex and slightly upcurved.

Described from four males and four females all collected at Fallen Leaf Lake, El Dorado County, California, August 21, 1916, by W. M. Giffard.

Holotype, male (No. 464), in collection of the California Academy of Sciences.

Of the species previously described, *A. ceanothæ* Crawford (U. S. Nat. Mus. Bul. 85, p. 130) appears to be most closely similar in structure and appearance, except that in the species referred to the wings are perfectly clear.

A New Parasitic Cynipid Reared from a Clover Aphid (Hym.).

By L. H. Weld, Bureau of Entomology, U. S. Department of Agriculture.

Through Mr. H. L. Viereck of the Biological Survey there came into my hands recently for examination a series of parasitic Cynipidae reared from a clover aphid at Twin Falls, Idaho, by Mr. Ralph H. Smith. The species runs to the genus *Charips* (formerly known as *Allotria* or *Xystus*) and seems to be new. An examination of the literature shows that only eight American species of this genus have been described, one in the subgenus *Bothrioxysta* and the rest in the typical subgenus. From the published descriptions and from a study of the types of four of the species in the United States National Museum, the following synopsis may indi-

cate the relation of the species. The size and shape of the radial cell seem to give good specific characters and it is best studied of course in balsam mounts, but a two-thirds objective and ocular micrometer will serve the purpose on well mounted pinned specimens. As here used the "radial cell ratio" is the length of the radial cell divided by the width (inside measurements) and the "cell to wing ratio" is the maximum width of the front wing divided by the greatest width of the radial cell.

Genus CHARIPS Haliday.

Scutellum with 1–2 pits.....subgenus *Bothrioxysta* Kieffer.
♀; bred from *Siphonophora ambrosiae* on *Ambrosia;* Massachusetts
ambrosiae Ashmead.
Scutellum without pits.....subgenus *Charips* Haliday.
"Head higher than broad."
♂ and ♀; bred from an aphid on *Tanacetum;* Massachusetts
areolata Kieffer.
♂ and ♀; bred from *Aphis atriplicis;* Massachusetts
hayhursti Kieffer.
Head broader than high or not stated.
♀ antennae 14-segmented.
♂ and ♀; bred from aphid on pine in Florida..**lachni** Ashmead.
♀ antennae 13-segmented.
"Radial cell almost twice as long as broad"; female; California
bakeri Kieffer.
Radial cell ratio 1:2.14; cell to wing 1:5.4; male; reared from orange aphis, Florida.....**xanthopsis** Ashmead.
Radial cell ratio 1:2.3; cell to wing 1.5.0; segments 3, 4, 5 in male antenna all excised; male and female.....**brassicae** Ashmead.
Radial cell ratio 1:2.3; cell to wing 1:8.6; female; reared from tomato aphis in Florida.....**megourae** Ashmead.
Radial cell ratio 1:2.4; cell to wing 1:7.0; segments 3, 4, 5 in male antenna not excised; male and female .....**leguminosa** Weld.

Charips (Charips) leguminosa new species.

♀.—Polished black, legs and first five segments of antenna testaceous. Head broader than thorax with scattered white hairs; facial line .8 and axial .56 of transfacial; lateral ocelli farther from each other than from eye; interocular area slightly broader than high; malar space equal to ocell-ocular; antennae 13-segmented, first and second stout and subequal, 3–5 slender and becoming shorter, 6–13 incrassated and increasing in length to 12th with last one and one-half times preceding, all last eight showing in balsam about four longitudinal ridges in the middle of each of which is an elliptical clear spot.

Pronotum with scattered white hairs. Mesoscutum broader than long, without trace of grooves but a few microscopic white hairs. Scutellum half as long as mesoscutum, conical in outline but rounded behind, no pits at base. Propodeum with two outwardly bent carinae enclosing a

smooth area broader than high, lateral areas pubescent. Legs slender, femora infuscated, all tarsi longer than tibiae, claws simple. Wings longer than body, with distinct dark veins, radial cell closed, its length divided by width (inside measurements) gives a quotient of 2.4, maximum width of wing divided by width of radial cell gives 7.0, second abscissa of radius one and one-half times first, from bottom of radial cell a spur sticks straight downward two-thirds as long as first abscissa of radius, a perpendicular line erected at middle of longitudinal axis of wing would just touch apex of radial cell, surface pubescent with dark hairs, margin ciliate.

Abdomen nearly as long as thorax, longer than high, with ring of hairs at base. Using width of head as a base the length of mesonotum ratio is 1.0, antennae 2.6, wing 3.4.

♂.—Antenna 14-segmented, less abrupt change in size and color between segments 3–5 (which are not excavated) and the last nine, length 2.6 times width of head.

Length of five males .55–.9 mm., average .7 mm. Length of eight females .7–.9 mm., average .8 mm.

Type: Cat. No. 22589 U. S. Nat. Mus. Type female, allotype and one male and four females paratypes. One pair paratypes with Acad. Natl. Sci. Phila., one pair in Coll. Biol. Survey, and two females (one in balsam) and one male with author.

Type-locality: Twin Falls, Idaho.

Biology: Reared from *Aphis bakeri* Cowan, the clover aphis, June 15 and in July, 1919, by Mr. Ralph H. Smith, who says he has made repeated unsuccessful attempts to rear this Cynipid as a parasite of the aphid but on two occasions reared them in cages along with *Aphelinus lapsiligni* Howard, the most important parasite of this aphid. He is therefore inclined to believe that the *Charips* is not a primary parasite but is a parasite of *Aphelinus lapsiligni* Howard instead.

Labenidae, a New Family in the Ichneumonoidea (Hymen.).

By Henry L. Viereck, U. S. Bureau of Biological Survey, Washington, D. C.

Labena Cresson, the following new genus and possibly *Apechoneura* Kriechbaumer differ from *Grotea* Cresson and most other, if not all other, Ichneumonidae in having the

abdomen inserted high up on the propodeum, like genera in the Evaniidae, and are for this reason referable to a separate family.

PSILOPARIA new genus.

Presumably related to *Apechoneura* Kriechbaumer, of which it may prove to be a synonym but from which it appears to differ in its armed cheeks. Has also characters in common with *Labena* Cresson, *Grotea* Cresson, and *Megarhyssa* Ashmead.

Type: Psiloparia maculata new species.

Psiloparia maculata new species.

Type: No. 4119, The Academy of Natural Sciences, Philadelphia, Pennsylvania.

Type locality: Quebrada, Hacienda Guachipelin, Guanacaste, Costa Rica, Jan. 15, 1910 (Tristan and Calvert).*

♀.—Length 16 mm.; sheaths of the ovipositor 16 mm.; antennae 13 mm.; body polished, head and thorax mostly yellow with reddish and black marks, abdomen mostly reddish with a blackish tinge. Facial line: transfacial line : : 44 : 55, eyes slightly emarginate on the inner margin opposite the upper edge of the antennal fossa; antennocular line: facial line : : 3 : 44; front mostly reddish, with an impression on each side back of the antennal fossae, the impressions separated from each other by a median longitudinal crista that extends down between the antennal fossae where it is best developed a short distance below the upper edge of the face; front on each side elevated into a welt, along the eye margin, that is higher than the adjoining edge of the eye and provided with a few coarse pits; face yellow except for a submarginal, longitudinal, dark stramineous stripe on each side, covered with large, shallow adjoining or nearly adjoining punctures the diameter of some of which : the antennocular line : : 2 : 3; face elevated above the edge of the adjoining eye margin along which it is transversely striate, and slightly convex, separated from the clypeus and the malar space by a furrow that is deepest between the malar space and the face; width of clypeus : length down the middle : : 15 : 6; basal half of clypeus transversely oblong, transversely striate and separated from the apical half by a transverse carina, the apical half smoother than the basal half but yellow like the basal

[* For notes on this locality see Calvert, A. S. and P. P.: A Year of Costa Rican Natural History (New York, Macmillan, 1917), pp. 433 et seq. The "Quebrada" referred to above is the "ablution brook" mentioned on p. 435.—P. P. Calvert.]

half except for a median blackish spot; mandibles black and polished, heavier than in *Labena grallator* Say, their teeth poorly developed, rudimentary and rounded, greatest width of under side of mandibles : greatest length of mandibles : : 8 : 14; outer surface of mandibles triangular in outline, the height of the triangle : the length : : 6 : 14; labrum visible between the mandibles and the clypeus, cheeks yellow, rectangular beneath and back of the eye, more highly developed than in *Megarhyssa lunatrix* Fabricius, occipital carina represented only by a band-like carina on the lower third of the cheeks and extending to the gular carina which it meets almost at the insertion of the mandibles; at the lower posterior angle of the cheek half way between these two carinae is a broad, flattened, rounded tooth; palpi similar to the palpi in *Megarhyssa lunatrix* Fabricius; occiput black and reddish; antennae much the same as in *Megarhyssa lunatrix* F., except in the terminal joint which in this species is shaped more like the end joint of the index finger than in *M. lunatrix* F.; antennae mostly dark reddish, the apical fourth mostly yellowish, contrasting with the darker tip and darker basal three-fourths, third, fourth and fifth joints of the flagel blackish above.

Pronotum mostly reddish, its sides partly yellow, partly black, its hind margin straight, a tooth near its lateral margin and half-way between the anterior margin and the tegulae, directed outward and backward; dorsulum reddish except for a yellow anterior margin, a median, longitudinal yellow mark and a posterior black mark, uniformly, coarsely and transversely ribbed, notauli completely wanting, mesopleurae mostly yellow, anterior margin and prepectus black, a reddish and black mark on each posterior, upper fourth, scutel yellow with its posterior margin black, with three transverse carinae, the first and second arcuate, the third straight; metanotum yellow, with a reddish and black posterior margin and with an almost semilunar area bounded by an arcuate ridge anteriorly and a straight ridge posteriorly, tegulae oblong, yellowish and brownish stramineous.

Wings almost colorless except as follows: apical eighth of wings mostly covered with an almost circular dark brownish macula; venation much as in *Megarhyssa lunatrix* F., notably differing in the absence of a ramellus, in the recurrent vein being received by the areolet before but near the middle and in the submedian vein joining the nervulus at the junction of its upper third with its middle third, nervellus not interstitial with the transverse cubitus, veins blackish, except for the costa which is dark stramineous and concolorous with the stigma.

Legs short, mid and hind tarsi hardly longer than their tibiae, fore tarsi nearly twice as long as their tibiae, legs mostly yellowish, tarsi dark with yellowish tips except for the mid and hind onychii which are black or blackish like their claws, hind coxae, trochanters femora and tibiae reddish, hind tarsi with the basal joint mostly blackish.

Metapleurae almost square, yellow, reddish and black along the anterior edge; propodeum with its upper aspect mostly reddish on the basal half

and mostly yellow on the apical half, posterior face yellowish except for a median blackish and reddish area, distance from metanotum to coxal line as viewed from behind: distance between coxal line and abdominal line : : 34 : 16; distance between coxal line and abdominal line : length of hind coxae : : 16 : 50.

Abdomen petiolate, length of first tergite : its width at apex : : 70 : 19; length of first tergite : length of second : : 70 : 45; abdomen beyond fifth tergite almost bulbous, abdomen reddish stramineous throughout, more or less covered with blackish stains, first tergite with a yellow streak down the middle on its basal two-thirds, lateral margins of tergites, like the sternites more or less yellowish, sheaths with their apical fifth pale yellow, rest of sheaths black, ovipositor castaneous.

To Proposers of New Genera.

[The following has been received through Dr. L. O. Howard.]

This ought to be quoted in every entomological journal on earth and special "marked copies" sent to men of Walkerian tendencies.—C. F. BAKER, Los Baños, Philippine Islands.

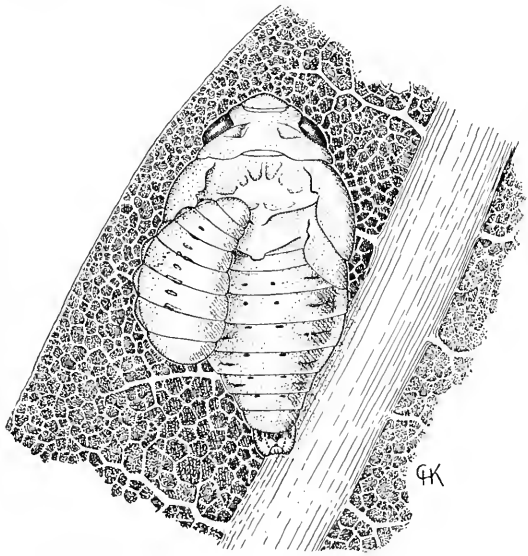
REMPHAN

"The remarks of M. Guerin Meneville on this genus are so apposite, and are so much more applicable at the present time, that we think we are doing some service in calling attention to them here. He says, 'The genus *Remphan* of Mr. Waterhouse, it seems to us, ought to be placed near *Macrotoma*. The author has forgotten to state its affinities, after having given its generic characters, commencing with the head and finishing with the abdomen, just as is the custom with many entomologists, and which is very convenient for celerity. In fact, in thus freeing one's self from the researches which ought to be really made in order to fix the place of a new genus, the task is reduced to almost mechanical work; for it is only to say all or almost all that can be seen of an insect to describe it, and leave to the poor reader the care and perplexity of picking whatever seems good to him.' Mr. Waterhouse is, however, one of the last that we can complain of in this respect; but the systematic determination of some to content themselves with the barest descriptions, without giving the slightest clue to the position of their new genera, ought to disentitle them to the right of priority in the event of any of these genera being afterwards described in a conscientious and recognizable manner. Of course, it is a different matter when it is stated of any new genus that its affinities are doubtful or unknown to its author. As M. Guerin Meneville observes, these mechanical descriptions can be done by any one; the real test of competency will be found in the observation which every conscientious writer will feel it his duty to make in instituting, or proposing to institute, a new genus."—1866, Pascoe, Proc. Zool. Soc., 535.

An Unusual case of Parasitism on Clastoptera obtusa Say (Hemip., Cercopidae; Dip., Drosophilidae).*

By W. J. Baerg, Fayetteville, Arkansas.

In the summer of 1917, during the first two weeks in July, when I was collecting the nymphal stages of *Clastoptera obtusa* on alder, *Alnus americana*, I found the spittle masses produced by these nymphs inhabited by small dipterous larvae. Many of these larvae I found attached to the nymphs of the *Clastoptera*. Some of them I found lying around loose in the spittle masses. As a rule I found but one dipterous maggot to one spittle mass. No maggots were found outside of the spittle.



On taking one of the maggots and placing it near a *Clastoptera* nymph, it would immediately proceed to attach itself on the side of the abdomen and then bring up its caudal end and place it on the back of the nymph. See the accompanying text-figure.

The maggots attach themselves by means of the mandibular hooks. As a rule I found but one maggot attached to one host, in a few instances I found two maggots attached to one nymph. The place of attachment on the spittle

* From the Entomological Laboratory of Cornell University, Ithaca' New York.

insect is usually on the side of the abdomen between the 4th and 5th segments. After examining about a hundred specimens I failed to find that the maggots were causing any injury to the nymphs of the *Clastoptera*, with one exception. This nymph appeared to be considerably bruised and irritated on the sides of the abdomen where the attachment is usually made.

The maggots that I brought into the laboratory pupated in a day or so, and the adults emerged about a week later. These were identified by Dr. A. H. Sturtevant as *Drosophila inversa* Walker. The pupae of the *Drosophila* I found in both the spittle masses and in dry places on the twigs and leaves of the alder.

Upon placing a number of the pupae of *Drosophila inversa* in a vial, I succeeded in rearing along with a number of the corresponding adults a few Hymenopterous parasites. Mr. L. H. Weld identified the parasite as a "parasitic Cynipid, one of the Eucoilinae." Lacking adequate material, Mr. Weld was unable to place it definitely.

The *Drosophila* seems to specialize on *Clastoptera obtusa*. There were numerous nymphs of *Clastoptera proteus* on Dogwood and Viburnum bushes in the immediate vicinity of the alders on which I collected, but I failed to find any maggots in the spittle masses of *Clastoptera proteus*.

According to all the observations that I was able to make, *Drosophila inversa* in its feeding habits marks no exception to the other members of the genus. It apparently feeds on plant sap in the form of spittle produced by the *Clastoptera*. It seems to be parasitic only in so far that it utilizes the excess of the sap drawn from the plant tissues by the spittle insect, and in that it uses the spittle insect as a means of transportation.

Observations similar to the ones given in this paper are recorded by C. N. Ainslie, Canadian Entomologist, 38: 44.

I wish to thank Dr. Sturtevant and Mr. Weld for the identification of material. The drawing was made by Mr. C. H. Kennedy, then of Cornell University.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JANUARY, 1920.

SOME NEW YEAR'S RESOLUTIONS FOR THE ENTOMOLOGIST

1. Label *legibly* all specimens as to locality and date of capture and collector's name; any other data that bear on the insect's relations to its environment are also desirable.

2. When about to send insects by mail or express, first read the editorial in the NEWS for January, 1915, page 33.

3. Check up identifications of material with the original descriptions as far as possible.

4. When writing a paper for publication see that it is easily legible and leave a blank margin of half an inch or more on the left edge.

5. Follow the Wistar Institute's or Muttkowski's (*Annals Ent. Soc. America*, iv, 194–217) suggestions for the preparation of scientific papers.

6. Add the names of the Order and the Family, to which the insects treated belong, to the title of your paper.

7. Follow the International Rules of Zoological Nomenclature in the forming of new generic and specific names.

8. Specify the genotype of each new genus you propose.

9. Specify the individual type or types (preferably a single type), the type locality and the museum or collection in which the type or types are located, whenever describing a new species.

10. Label specimens which have served as types, or as originals of published figures or descriptions, with brief but sufficient references to the place of publication.

11. When identifying a specimen, add your name, followed by the abbreviation "det." and the year to the label bearing the generic and specific names.

Notes and News

Changes of Address.

Mrs. Annie Trumbull Slosson has removed to 36 Gramercy Park, New York City.

The address of Mr. Edward A. Klages has been changed to 95 Belvidere Street, Crafton Station, Pittsburgh, Pennsylvania.

A Biography of Miss A. M. Fielde.

Helen Norton Stevens is the author of a Memorial Biography of Adele M. Fielde. Published by The Fielde Memorial Committee, New York, Philadelphia, Chicago, Seattle. Press of Pigott Printing Concern, Seattle, 1918. 8vo, pp. 377, illustrated. Miss Fielde, it will be recalled, published a number of papers on the habits and faculties of ants, as mentioned in an obituary notice in the NEWS for April, 1916, pages 191–2.

Sentiment For and Against the Metric System.

Apropos of our editorial in the NEWS for June, 1919, page 175, the World Trade Club of San Francisco states that, up to October, 1919: "Out of 58,226 petitions relating to exclusive use of metric weights and measures in U. S. America, now in the keeping of the Bureau of Standards, Department of Commerce, 57,800 petitions or 99.27% favor this progress, and only 426, or less than 1%, oppose it.

"New petitions are coming every day. The classification to date shows the following distribution of petitions: Manufacturing concerns, engineering concerns, engineers, architects, contractors were 9968 in favor and only 154 against meter-liter-gram. Chambers of commerce, trade organizations, exporters, importers were 9974 in favor and only 51 against meter-liter-gram. Educational institutions, beneficent organizations, individuals in professions were 22,443 in favor and only 74 against meter-liter-gram. Similarly, in all other vocations, although petitioners were free to declare for or against meter-liter-gram, less than 1% objected; and over 99% favored metric standards exclusively."

Increase Asked to Fight Mosquitoes (Dip. Culicidae).

Under this heading the Philadelphia *Public Ledger* of December 8, 1919, says: "The Atlantic County [New Jersey] Mosquito Commission will ask the Board of Freeholders for an appropriation of $30,000 for the work mapped out for next year. The sum appropriated last year was

$26,000, and the increased cost of labor, material and appliances, it is said, necessitates a larger sum.

"New drainage contemplated includes the meadows south of Middle River above Sedge Creek and between Middle River and the Great Egg Harbor River, and also for the salt marsh on Brigantine Island. The new road across the meadows from Absecon will make it necessary to change the system of drainage in that vicinity.

"Among the plans of the commission is the stocking of the meadow streams with fish that subsist on the larvae of the mosquito."

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **12**—Journal of Economic Entomology, Concord, N. H. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **17**—Lepidoptera, Boston, Mass. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **53**—Nature Study Review, Ithaca, N. Y. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **89**—Zoologische Jahrbucher Jena. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **101**—Journal of The Linnean Society of London.

GENERAL. Diven, E. L.—Obituary note. **10,** xxi, 177–8. **Erhardt, E.**—Zur kenntnis der innervierung und der sinnesorgane der flugel von insecten. **89,** xxxix, Abl. f. Anat., 293–34. **Loeb, J.**—Natural death and the duration of life. **91,** ix, 578–85. **McAtee, W. L.**—Piscatorial entomology. **4,** 1919, 257–8. **Mottram, J. C.**—Some observations on the feeding-habits of fish and birds, with special reference to warning coloration and mimicry. **101,** xxixv, Zool., 47–60. **Swynnerton, C. F. M.**—Experiments and observations bearing on the explanation of form and coloring. **101,** xxxiii, Zool., 203–385.

GENETICS, ETC. Lancefield, D. E.—Scarlet an autosomal eye color identical with sex-linked vermilion. **100,** xxxv, 207–10.

ARACHNIDA, ETC. Downing, E. R.—The burrowing spider of the dunes and its chief enemy. **53,** xv, 317–21.

NEUROPTERA. Macnamara, C.—Further remarks on Collembola. **4,** 1919 241–5 (cont.).

ORTHOPTERA. Cuenot, L.—La coaptation des femurs anterieurs et de la tete chez les Phasmes. **69,** clxix, 835–8. **Lucas, W. J.**—Orthoptera in Captivity. Preserving Orthoptera. **9,** 1919. 249–52.

HEMIPTERA. Baker, A. C.—Wilsonia—A correction. **4,** 1919, 253. **Davis, J. J.**—Correction (Aphididae). **4,** 1919, 263. **Ferris, G. F.**—Notes on Coccidae—IV. **4,** 1919, 249–53. **Riley, C. F. C.**—Some habitat responses of the large water-strider, Gerris remigis. **90,** liii, 483–505.

Davidson, W. M.—New aphids from oaks. **4,** 1919, 245–8. **Poppius, B.**—Uebersight der Pilophorus arten nebst beschreibung verwandter gattungen. **33,** lviii, 237–54. **Poppius, B.**—Einige neue Miriden gattungen und arten aus Nord-Amerika und Cuba. **33,** lviii, 255–61. **Swain, A. F.**—A synopsis of the Aphididae of California (Univ. California Pub., Ent., iii, 1–221).

LEPIDOPTERA. Dean, F. R.—A freak Catocala palaeogama var. phalanga. **17,** iii, 84. **Gunthrop, H.** A butterfly new to Kansas. **4,** 1919, 257. **Mosher, E.**—Notes on the pupae of the European corn borer, Pyrausta nubitalis, and the closely related species, P. penitalis. **12,** xii, 387–9. **Strand, E.**—Lepidopterorum catalogus. Pars. 22. Arctiidae. Subf. Arctiinae. 416 pp.

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Libellulinen Monographisch bearbeitet von Dr. F. Ris, of Rheinau, Switzerland. Being Fascicules IX–XVI (2e partie) of the Collections Zoologiques du Baron Edm. de Selys Longchamps, Catalogue Systématique et Descriptif. Bruxelles, Hayez, Impr. des Académies, 1909–1919. 4to. 1278 pp., 692 text-figs., 8 colored plates.

This is one of the most extensive taxonomic, entomological works of recent years. Its completion has been delayed by the war, for while fascicules IX–XVI (1re partie) were published in 1909–1913, the second part of fascicule XVI, comprising pages 1043–1278, although printed in 1916, was not distributed, even in Belgium, until March 1, 1919. The cause of this delay has been explained by a note by M. Severin, in the News for October, 1919, pages 229–230. While part 1 of fascicule XVI terminated the main text, this last installment of 1919 forms a supplement (pp. 1043–1228) to all the preceding fascicules,* gives a Verzeichniss der Literatur of the subfamily (pp. 1229–1245), a systematic list, with page

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*The largest collections furnishing the supplementary material are those of Mr. E. B. Williamson, of Bluffton, Indiana, made in Guatemala in 1909 and (with his father, Mr. L. A. Williamson, and Mr. B. J. Rainey) in British Guiana and Trinidad in 1912.

references, of the 120 genera and 556 species recognized (pp. 1247–1258) and an alphabetical index of the taxonomic names (pp. 1259–1278).

It is distinctly astonishing to find that as far back as 1893 the known genera and species of this subfamily were already reckoned at 104 and 525, respectively.* Dr. Ris has admitted many species and genera described since that time, but he has also relegated many of the earlier names to the synonymy or to the rank of subspecies, for which latter he has employed trinomials.

It is of interest to note the different bases upon which successive writers have founded their classifications of the subfamily Libellulinae, which, even in Burmeister's *Handbuch* of 1839, was represented by the single genus *Libellula*. Newman, indeed, in 1833, proposed a subdivision into genera differing in the shape of the abdomen. Rambur, in 1842, disregarding these, used a venational character for his first dichotomy of the Libellulides, followed in the next four by differentials drawn from the abdomen and the eyes; the four genera still remaining were then distinguished by three venational, one vulvar and one thoracic character. The classification of the Libellulines of Europe into two genera by de Selys and Hagen, in 1850, is primarily venational, while the 12 genera employed by Hagen in his *Synopsis of the Neuroptera of North America* (1861)—9 of them new—were largely founded on characters drawn from the eyes, the posterior lobe of the prothorax, the abdomen, the legs and the external genitalia and only to a slight degree from the wings. Brauer (1868), dealing with the world fauna, raised the number of genera to 40 and, although making an increased use of the venation, relied to a greater extent on the other Hagenian differentials. The diagnoses of the 88 genera recognized by Kirby (1889) are predominantly venational, much more so than his Table of Genera, and Karsch (1890) emphasized the same feature, while the reviewer, in the *Biologia Centrali-Americana* (1905), made the hind prothoracic lobe the primary character, closely followed by venation.

Dr. Ris has placed the genera of the Libellulinae in ten groups,† designated by numbers and based chiefly on the arrangement of the wing-veins, although other features are by no means disregarded. He expressly says: "Die folgende Gattungs-tabelle ist fast ausschliesslich auf die Flügeladerung aufgebaut; von andern Merkmalen ist nur noch der Bau des Prothorax in grösserm Umfange herangezogen." It is in the resemblances of the venation of such a Libelluline as *Hypothemis* to that of the

* Trans. Amer. Ent. Soc. XX, p. 207.

† To three of these groups Dr. Ris gives names: VIII. Die *Trithemis*-Gruppe, IX. Die *Macrothemis*-Gruppe, X. Die *Tramea*-Gruppe. Dr. Tillyard (*Biology of Dragonflies*, 1917, pp. 269–273) has a synopsis of these groups, which he calls tribes; he has, however, united Dr. Ris's groups IV and V into one tribe and VIII and IX into one tribe, thus 8 tribes in all; to these tribes he gives names.

Gomphine *Agriogomphus* and to that of the Corduline *Cordulephya* that he finds preserved the remains of a common primitive form of the Anisopterous wing and which, in addition to the similarity of front and hind wings, offers him a starting-point for a phylogenetic arrangement of the Libelluline genera. He has chosen to put the generic table in a form "more difficult to use, but giving a truer presentation of the natural system, rather than to construct a dichotomous table for mechanical identification," as the realization of the former idea seemed to him to be more important than to help the beginner. It must be admitted that, in practice, the reference of an unfamiliar form to its proper group by this table is not always easy.

Very full bibliographical references for the genera and especially for the species are given up to 1915, so that for this subfamily the catalogues of Kirby and of Muttkowski are superseded by the present work. After each reference under a species the locality or country to which that citation applies is given in parentheses, a very useful addition. The material studied for this monograph is listed under the museums or collections to which it belongs, so that the geographical distribution of any species can only be ascertained by collating and rearranging these data—a feature which can not be praised. Special attention has been paid to pointing out any differences found between specimens of the same species from different localities, even where such are not given subspecific rank.

Dr. Ris has rightly perceived that a most important task called for in the execution of this monograph, where so many forms had already been described, was that of critical comparison to determine the status of those previously named and he has exercised this function throughout, not hesitating to express in the supplement views different from those put forth in some earlier fascicules.

The typography is very clear. Dr. Ris's photographs of wings and M. Menger's drawings of genitalia and other details are reproduced as excellent half-tones in the text. The colored plates show entire insects in most cases. The paper is of a finish correctly designated as elegant, but, alas, with a weight which is serious when the fascicules are handled together.

The last words of the introduction to fascicule XVI, part 2, may be freely rendered thus: "As I now give out this great work from my hands, I am very conscious—more so than at its beginning—that it is not a conclusion but a commencement, a foundation on which more can be built, more easily and more safely than before the extensive material was collected and sifted." For that collecting and sifting we offer our thanks and our praise to the author, our hearty congratulations for his execution of the "legacy" received from the great Belgian master. Only after we have studied his work in detail, by comparisons with the insects of which it treats, can we presume to fully appreciate its value.

Philip P. Calvert.

Obituary

GEORGE BRINGHURST CRESSON, son of Ezra Townsend Cresson and the late Mary A. (Ridings) Cresson, died at his home in Swarthmore, Pennsylvania, on October 18, 1919. He was born in Philadelphia, November 15, 1859, and attended public and private schools in that city. It is natural to think that an inherited tendency from his father, the well-known pioneer in American hymenopterology, and from his maternal grandfather, James Ridings, collector of insects, as well as home environment, led him to become conservator of the Entomological Section of the Academy of Natural Sciences of Philadelphia in 1880–81 and 1886–89, and Curator of the American Entomological Society in 1888–89. From 1883 to 1886 he printed volumes XI–XIII of the Society's *Transactions*. It was during his custodianship that the writer of these lines, then a high school boy, first made acquaintance with the library and study collections of the Academy. I had gathered various insects, but was more particularly devoted to butterflies, of which, in 1886, I was making colored drawings. Mr. George Cresson found me delving into the entomological books and my diary for December 18, 1886, records: "Mr. Cresson of the Academy of Nat. Sci. first began to aid me, about this time." I recall distinctly that he told me that so many were interested in Lepidoptera and Coleoptera that I could do more and find more new things if I studied some other group of insects. I had a few dragonflies and the effect of his advice is to be seen from another note in my diary: "Jan. 28, 1887. About this time I commenced the study of the Neuroptera."

While he was interested in natural history in general, he was especially concerned with ants and formed a representative collection, secured through exchange with prominent Europeans, such as Professors Emery, Forel and others. He appears never to have published on entomology.

After leaving the entomological custodianship in 1889, he engaged in the insurance business and was for many years with the Franklin Fire Insurance Company of Phila-

delphia, of which his father was secretary, and later with the People's National Fire Insurance Company. He served on the School and Public Health Boards of Swarthmore. He was a member of the Academy of Natural Sciences and of the American Entomological Society from 1879 to 1883, when he resigned, but was subsequently reëlected to both of them in 1887, retaining his membership until his death. He was librarian of the Society 1892–96.

PHILIP P. CALVERT.

HEREWARD CLUNE DOLLMAN, who was Entomologist to the Sleeping Sickness Survey of the British South Africa Company in 1913 and subsequently, died in London, January 3, 1919, from that disease whose ravages he had sought to combat. While in Africa he made excellent collections of Coleoptera, Lepidoptera and other insects which, with his drawings of larvae, notes on life histories, etc., have been presented by his father to the Natural History Museum at South Kensington. He was born March 10, 1888, and was educated at St. Paul's School and St. John's College, Cambridge. (*Ent. Mo. Mag.*, London, June, 1919.)

The same Museum has also received collections from New Zealand, Africa and Samoa, made by HAROLD SWALE, M.D., born at La Verie, near Dinant, Brittany, of English parents, died in England, May 3, 1919. He occupied various medical posts in the tropical regions named above. (*Ent. Mo. Mag.*, June, 1919.)

The death of FREDERIC HOVA WOLLEY DOD, of Midnapore, Alberta, Canada, on July 24, 1919, in a hospital at Chanak, [Macedonia?], is announced in *The Canadian Entomologist* for October last. His articles on the Noctuidae in that journal and in the NEWS are well-known and well appreciated. At the time of his death he was Second Lieutenant in the Yorkshire Light Infantry, attached Macedonian Labor Corps.

The NEWS for December, 1919, was mailed at the Philadelphia, Pa. Post Office on December 20, 1919.

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From Colombia, So. America:

OVER 10,000 BUTTERFLIES, INCLUDING

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" sulkowskyi
Morpho amathonte
Caligo spp.

From Cuba:

1500 BUTTERFLIES AND MOTHS, INCLUDING

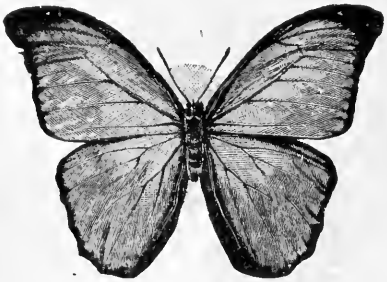
Papilio columbus
" andraemon
" celadon
" devilliersi
Urania boisduvali
Erinyis guttalaris
Protoparce brontes, etc.

From Venezuala:

Over 5000 Lepidoptera
200 Dynastes hercules

From New Guinea:

2000 Coleoptera
200 Orthoptera



From Assam, India:

1200 BUTTERFLIES AND MOTHS, INCLUDING

Papilio arcturus
" philoxenus
Kallima inachis
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FEBRUARY, 1920

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AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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CONTENTS

Notes on the Lunate Onion Fly, Eumerus strigatus (Dip., Syrphidae)

By F. R. COLE, Bureau of Entomology, Palo Alto, California.

Several articles on the Lunate Onion Fly have appeared recently and Prof. Metcalf's paper (Ent. News, XXX, p. 170–174) gives a good summary of our knowledge of this potential pest in this country. In view of the possible importance of this fly it may be worth while to describe and figure the species and to give certain observations which have been made on its habits.

It is an European species and the larva was recorded in England as early as 1842 by Curtis (Gard. Chronicle, II, 1842). In 1845 Dufour described and figured the larva and two years later Bouché wrote a paper on the early stages, stating that the larvae often destroy whole crops of the common onion. Herold in 1915 (Zeitschr. fur wiss. Inseckten, XI, 345) records great damage to potatoes by the larvae of *E. strigatus*.

The history of *Eumerus strigatus* in this country is a brief one, the first written record being by C. W. Johnson in 1910, and the earliest known capture was at Ottawa, Canada, in 1904 by Dr. Fletcher. In addition to the records given by Prof. Metcalf there are specimens in Dr. Chittenden's collection at Washington, D. C., taken at Oyster Bay, New York, August 24, 1914, with a note "feeding on iris." There are several species common to Europe and the Pacific Coast, but it is very probable that *E. strigatus* is a recent arrival and was first introduced into the Atlantic states in shipments of iris and narcissus bulbs from Holland.

The genus *Eumerus* is a large one and occurs in many parts of the world, sixty species being listed by Kertesz in his Katalog, some of which may be synonyms. There are about thirty species in Europe; five species are known only from Africa and eight species are common to Europe and Africa, *strigatus* being one of these. Species of *Eumerus* have been described from India, China, Hawaii, Asia Minor, Canary Islands, Sicily, Celebes, New Guinea, Australia, Tasmania, Sardinia and St. Helena.

The systematic position of the genus is not very certain; it is near *Xylota* and *Syritta*, having the hind femora thickened, but is also near the *Pipiza* group, certain characters allying it to *Paragus*. The larval habits approximate those of *Merodon*. Verrall says that species seem to him to have some connection with small aculeate hymenoptera, with which they are often found, flying at the outskirts of woods over various flowers, usually in dry and sandy localities.

While at Hood River, Oregon, in 1917, the writer collected a small syrphid flying over grass and flowers at the edge of an apple orchard and it was rather a surprise to recognize *Eumerus strigatus* when sorting over the odds and ends in the killing bottle. It was subsequently noted that there was an onion patch not far from the place of capture. Mr. L. Childs and myself then examined a small onion bed at the Hood River Experiment Station and found in addition to the common onion maggot large numbers of syrphid larvae working in the bulbs. This was on July 20th and during the day

several adults of *E. strigatus* were observed flying about in the sunshine and alighting on the plants; several pairs were taken in copulation at this time. The females were seen crawling into crevices in the ground at the bases of the onion plants and ovipositing in the leaf sheaths just above the bulb. Onions taken from the ground at this time contained several sizes of larvae of both *E. strigatus* and *Hylemyia antiqua*. This material was kept in the laboratory and the surphid larvae pupated in March and April, emerging in late April, and early May, a little later than specimens of the anthomyid maggot from the same bulbs. The small onion bed at Hood River was almost entirely destroyed, an interesting fact, as it is the first recorded instance of this fly attacking onions in the United States. It greatly outnumbered the other onion maggot associated with it.

I have seen specimens of the adult of *E. strigatus* from Forest Grove and Corvallis, Oregon, and also in the collection at Vernon, British Columbia, the latter collected near the large onion farms at Kelowna, B. C., by R. C. Treherne. The species is very probably established as an onion pest in other sections along the Pacific Coast. There may be biological races of the species as in the case of the apple maggot; it has so far confined itself to iris and narcissus bulbs in this country. One of the specimens bred from iris at Oyster Bay, New York, mentioned above, is in the writer's collection; it is smaller than individuals bred from onions at Hood River, Oregon, and the colors are more blue and less green and coppery. The antennae in this specimen are lighter colored and the third joint is narrower.

The larval and pupal stages will not be described at length in this paper. The larvae are quite different in appearance from the common onion maggot, being pale green in color, rather flat and with an ornamented surface having projections along the sides. The posterior respiratory process is bright red. The pupa is light brown when mature and resembles that of *Pipiza*. A description of the adult is given below:

Eumerus strigatus Fallen.

Pipiza strigata Fallen. Dipt. Suec. Syrphici, 618, 1817.

Eumerus grandicornis and *funeralis* Meigen, Syst. Beschreib. III, 208, 1822.

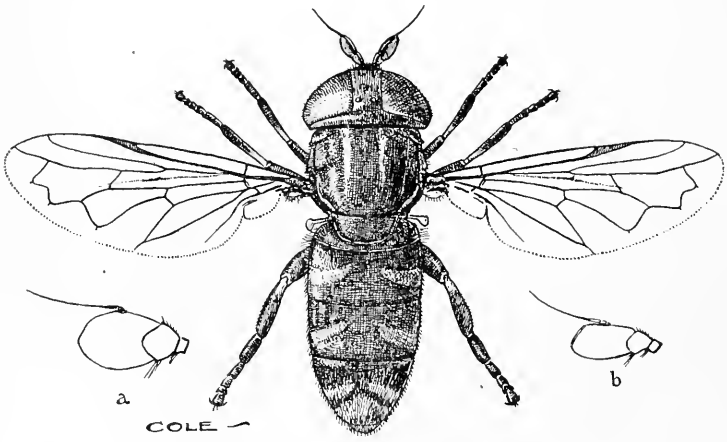
E. lunulatus and *planifrons* Meigen, l. c. III, 209.

E. aeneus Macquart, Soc. Sc. Lille, 269, 1827.

E. selene Loew, Programm Posen, V, 28, and Isis, V, 561, 1840.

Microxylota robii Jones, gen. et sp. nov., Annals Ent. Soc. of America, X, p. 230.

♂.—Vertex rather long, aeneous, with black pile in front a little longer than the second joint of the antenna; the rest of the pile on the head is sparse and yellowish. Eyes with a few very fine white hairs behind and below. Frontal triangle and epistoma gray pruinose, the ground color of the frons obscured. Face dark green in color and white pilose. Eyes touching for a short distance above the antennæ. Antennae blackish, the third joint more brown and distinctly longer than broad; thickly gray pruinose; the basal joints with bristles below (see figure). Occiput slightly swollen above.



Eumerus strigatus Fallen, female. *a*, antenna of female; *b*, antenna of male.

Thorax shining green, punctate, in some places more or less brassy. There are two narrow gray vittae on the dorsum abbreviated behind. The fine short pile of the thorax is yellowish in color. Scutellum colored as the thorax, punctate, the margin finely serrated and with longer pile. Pleura aeneous and white pilose.

Abdomen aeneous, distinctly punctate, with three pairs of lunules or oblique grayish white bands; the gray spaces are a little impressed. Pile of abdomen yellowish or whitish, longest at the anterior corners and at the apex of the fourth segment. Venter with very little green color and with pale hairs.

Legs blackish green, knees and bases of tibiae reddish yellow. Basal joints of middle tarsi with some reddish color. Hind femora much thickened and with two rows of short spines below near the apex; the hind tibiae and metatarsi noticeably thickened. Legs with fine pale hairs, longer on the upper and lower surfaces of the femora. Inner side of apex of hind tibiae with longer yellow bristly hairs. Wings grayish hyaline. Anterior cross-vein oblique and placed beyond the middle of the discal cell. Stigma pale brown. Halteres yellow.

♀.—Very similar to male (see figure). Vertex and frons broad, widening a little below. Frons gray pruinose along the eye margins; hairs black across the ocelli and at base of antennae, but pale elsewhere. Third antennal joint much broader than in the male (see figures) and darker in color.

Length 5.5 to 7.5 mm.

Habitat. This species is distributed through Europe down into Spain and Italy and goes north to middle Sweden and Finland. It is reported from northern Africa and Syria. In North America there are records from Maine, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ottawa and Quebec, Canada in the east; further west it is reported from Ohio and Colorado and is now known to occur all along the Pacific Coast from California to British Columbia.

Notes on Species of Halictus Visiting Evening Flowers (Hym).

By O. A. STEVENS, Agricultural College, North Dakota.

Halictus (Megalopta?) texanus (Cresson).

1872. *Sphecodes texana* Cresson, Trans. Am. Ent. Soc., v. 4, p. 249.
1887. *Parasphecodes texanus* Cresson, ibid., Supp. vol., p. 292.
1898. *Halictus texanus* Cockerell, ibid., v. 25, p. 185.
1899. *Sphecodogastra texana* Ashmead, ibid., v. 26, p. 92.
1913. *Megalopta* ——— Ducke, Zool. Jahr., v. 34, p. 85.

♀.—Mesonotum rather shining, punctures of moderate size (about 20 microns), separated by scarcely a puncture width laterally and from one and one-half to two times their width medially; basal area of propodeum with about 20 fine, irregular ridges, the angle and truncation smooth; inner spurs of hind tibiae with two to five (usually three, the upper at about the middle of the spur) slender teeth; scopa sparse, inner side of tibiae with rather sparse, long, nearly simple hairs, trochanter and lower edge of femur with only a row of simple bristles, the upper with rather shorter ones.

Blue Rapids, Kansas, June 19, 1919; many females sucking nectar at flowers of *Allionia nyctaginea* and collecting pollen of *Megapterium missouriense*; one female collecting pollen of *Hartmannia speciosa*. Oakes and LaMoure, North Dakota, July 17 to 26, 1919; occasional females sucking at *Allionia hirsuta*, collecting at *Anogra pallida* and *Onagra strigosa*. Sheldon, North Dakota, Aug. 10, 1919; one female at *Allionia hirsuta*. One male at *Helianthus petiolaris* (Sheldon) and one at *Onagra strigosa* (Oakes).

Halictus (Evylaeus) aberrans Crawford.

1901. *Halictus amicus*, var. α Cockerell, Ann. & Mag. Nat. Hist., ser. 7, v. 2. p. 126.

1903. *Halictus aberrans* Crawford, Can. Ent., v. 35, p. 336.

1903. *Halictus galpinsiae* Cockerell, ibid., p. 342.

♀.—Thorax with sparse pubescence which is griseous or somewhat ochraceous; sculptured as in *H. texanus*, the propodeum more finely wrinkled; mesonotum shining, the punctures of variable size (about 15 to 25 microns); pubescence of the abdomen of both appressed and erect hairs in variable amounts; segments 2 to 4 usually with both basal and apical bands, the basal of appressed hairs, the apical of both appressed and upright; second segment with basal patches at the sides; sides of the first and more or less all of the other with scattered upright hairs; first segment smooth and shining, appearing impunctate in some lights and very minutely punctate in others; posterior legs as in *texanus*, inner spurs of tibiae with about five teeth.

♂.—Puncturation similar to that of female, pubescence more sparse especially on the abdomen which is scarcely at all banded; face sometimes with appressed hairs and sometimes with erect hairs predominating; seventh segment of abdomen slightly indented at apex; tibiae and tarsi yellow, the median half of middle and posterior tibiae brownish black, the anterior more reddish brown.

North Dakota, 28 females, 48 males at various places from Valley City westward to Williston and Marmarth, June 16 to Sept. 20 (mostly in June and July); females collecting pollen from flowers of *Gaura coccinea*, occasionally from *Onagra strigosa*, and sucking nectar at flowers of *Gaura coccinea*, *Lactuca pulchella*, *Helianthus petiolaris*, *Grindelia squarrosa*, *Sideranthus spinulosa*, *Solidago mollis* and *Symphoricarpos occidentalis;* males at flowers of *Allionia hirsuta*, *Allionia lanceolata*, *Gaura coccinea*, *Brassica juncea*, *Symphoricarpos occidentalis*, *Chrysopsis villosa*, *Grindelia squarrosa*, *Helianthus petiolaris* and *Lactuca pulchella*.

My first specimens of this species were 2 females and 9 males taken at Dickinson, by Mr. C. H. Waldron, at flowers of *Helianthus petiolaris* on Aug. 13, 1912. These, together with a female from Valley City, Aug. 13, 1912, at *Sideranthus spinulosus* were determined by Mr. Crawford as *H. aberrans*. Later when females were found collecting pollen at *Gaura* in the evening, I suspected the identity of *aberrans* and *galpinsiae*. Cockerell has stated (Proc. Ent. Soc. Wash., v. 9, p. 119) that "the stigma (of *galpinsiae*) is a lighter, brighter orange than in *aberrans*." Crawford in his table of species of *Halictus* (Journ. N. Y. Ent. Soc., v. 15, pp. 183–189), has separated the females on slight difference in puncturation of mesonotum and first segment of the abdomen, the males upon the nature of the hairs of the face ("appressed scale-like" in *galpinsiae*).

The North Dakota specimens agree well with Cockerell's description of *galpinsiae* and I cannot separate the ones taken at other flowers in the daytime from those taken at *Gaura* in the evening. A paratype female of *galpinsiae* sent by Prof. Cockerell agrees with the North Dakota specimens. The Dickinson specimens are in rather poor condition, the hairs being more or less matted by moisture. A female taken at Sentinel Butte on *Grindelia* in mid-afternoon is indistinguishable from the *Gaura* specimens. Mr. H. L. Viereck has kindly examined a cotype of *aberrans* in the U. S. National Museum and finds the scopa as here described.

Halictus (Evylaeus) oenotherae new species.

♀.—Length 9 to 10 mm., black with sparse, short, pale pubescence, which inclines to yellowish, especially on the legs. Face subquadrate, the front closely and finely punctured, clypeus smooth and shining with sparse shallow punctures; antennae reddish beneath. Mesonotum rather dull, the punctures of moderate size, separated by less than a puncture width laterally and scarcely more than that medially; propodeum shining, with prominent, somewhat irregular, sharp ridges; laterally these continue over the rounded edge while medially they are interrupted by a ridge; the truncation rugulose and surrounded by a ridge. Posterior legs as in *texanus*, the hairs of the tibiae somewhat more numerous and a few longer ones on the femur; inner spur of tibiae with four slender teeth; wing nervures light brown, the stigma, subcosta and median dark; first recurrent received one-fifth basad of second cubital; second submarginal narrowed only slightly above. Abdomen smooth and shining the first segment very

minutely punctured, the sides of first and second, apex of second and all of the following with thin pubescence which forms faint apical bands.

Blue Rapids, Kansas, June 20, 1919; 5 females at flowers of *Megapterium missouriense*, nearly an hour after sunset.

Type No. 12033, will be placed in the U. S. National Museum. Paratypes in collections of Prof. T. D. A. Cockerell, Prof. M. H. Swenk, and the writer.

A species similar in appearance to *H. aberrans* Cwfd.; slightly larger, mesonotum a little more closely punctured, pubescence of abdomen more scanty, the appressed type nearly absent. Differing very much in the sculpture of the propodeum which is similar to that of *H. pectoralis* Smith, to which it would run in Crawford's table (Journ. N. Y. Ent. Soc. 1907). It is quite different from *pectoralis* in its larger size and characteristic scopa.

The sparseness of the scopa, especially that of the femur, which is characteristic of these three species is evidently an adaptation to the collecting of onagraceous pollen.

Halictus (Evylaeus) swenki Crawford.

1906. *Halictus swenki* Crawford. Ent. News. v. 17, p. 275. ♀

Truncation of propodeum with rounded angles, basal area medially with a few irregular ridges which reach about half way to the angle, laterally with faint striae which reach the angle. Second submarginal cell narrowed fully one-half above, first recurrent nervure interstitial, or very nearly, with second cubital.

♂.—Length about 7 mm. Similar to the female, thorax more smooth and shining. Face subquadrate, little narrowed below; clypeus not produced, only gently rounded; mandibles slender, their tips reaching nearly to the bases of the opposite ones; apical half of clypeus and basal middle, labrum and basal two-thirds of mandibles, pale yellow; antennae reddish yellow beneath for entire length, joint 4 as long as 2+3, the latter about equal. Legs reddish yellow, anterior and middle femora at base, most of posterior femora and tibiae, dark brown on outer side; tarsi pale.

In the sand hills near Sheldon, North Dakota, Aug, 6 to 21, 1916–19. Allotype No. 12317. About a dozen females and twenty males, chiefly at flowers of *Allionia hirsuta* and *Petalostemon villosum*, also at *Linum rigidum* and *Hieracium scabriusculum*.

The male is noteworthy for the low, broad clypeus. Of the species which I have, only *H. forbesi* Rob. is similar in this respect.

Generic Position of Halictus texanus

As shown by the synonymy, this bee has been referred to various genera by different writers. The manner of pollen collecting permits a reduction of scopa which may account for its being originally placed in *Sphecodes*. Ashmead created the new genus, *Sphecodogastra*, for it on account of the enlarged ocelli. Ducke has referred it to *Megalopta* Smith, together with about a dozen little known South American species.

If we reduce *Evylaeus*, *Chloralictus*, etc., to subgenera I think *Sphecodogastra* also should be reduced. Except for the large ocelli it would not be separated from *Evylaeus*. This character has been associated with its crepuscular habits and similar examples in other genera cited. The other species here discussed, however, do not show such a character altho they have similar habits; it may be noted also that the bumblebees of the subgenus *Bombias* have larger ocelli than those of the subgenus *Bombus*. Ducke separated *Megalopta* from *Halictus* on the characters of enlarged ocelli and night flying habit, altho he does not separate *Agapostemon*, *Augochlora* and other groups. Such disposition seems scarcely tenable.

The ocelli of *texanus* are about twice the diameter of those of other *Halicti* of similar size. Those of *aberrans*, *oenotherae* and *swenki* seem a trifle larger but not appreciably so. I have examined several species (females) with the following results.

Approximate lateral diameter of anterior ocellus:

H. texanus (Cress.)	400 microns	*H. forbesi* Rob.	200 microns
H. aberrans Cwfd.	200–220 microns	*H. swenki* Cwfd.	180 microns
H. oenotherae Stevens	200 microns	*H. ligatus* Say.	150–200 microns
H. lerouxii Lep.	180–200 microns	*H. provancheri* DT.	150 microns

Visits of Halictus texanus to Flowers.

I had been very much interested in Graenicher's account (Bul. Pub. Mus. of Milwaukee, v. 1, pp. 222–225, 1911) of the unusual habits of *Sphecodogastra*, and an opportunity to verify them came on June 20, 1919, at Blue Rapids, Kansas. I found many females sucking nectar at flowers of *Allionia nyctaginea*. The time was not noted but must have been about an hour before sunset. The principal evening prim-

rose flowering there at that time was *Megapterium missouriense*. The flowers of this are yellow, 10–15 cm. wide; anthers about 1.5 cm. long, the pollen grains large and so well joined by cobwebby threads that they may be brushed off easily in one mass.

No exact time was obtained for either the first or last opening of the flowers or visits of the bees, but the flowers seemed to begin opening a little after sunset and many times bees were seen flying about the flowers not yet opened. Most of the flowers observed, opened in the earlier part of the evening. The stigma is exserted some minutes before the flower opens and the bees crawl about it searching for an opening in the bud, so that ample opportunity for cross pollination is provided. In case of one flower, at least ten or twelve visits were made before the flower opened; at one time three females were on the bud, one attacking and driving away another. They attempted to force their way into the apex and sides of the bud, flying away after some seconds. In no case was there any evidence of biting into the flower.

As soon as a small opening appeared at the tip of the flower, a bee would force her way in and begin collecting. Often they forced only a partial entrance and then withdrew. The flowers were quickly stripped of pollen so that after one or two bees had collected at a flower, later visitors flew away after a brief inspection. The pollen was gathered into a large mass which seemed to be carried chiefly between the posterior legs. On account of the darkness it was impossible to follow the flight of the bees. The last visits were about an hour after sunset (8:40 P. M. standard central time).

The principal other evening primrose flowering at that time in that locality was *Hartmannia speciosa*. The flowers of this species are white, 5–10 cm. wide, otherwise similar to those just described. They are not so strictly evening flowering as they open earlier and remain open longer in the forenoon. One trip was made to a place where these grew half a mile from where the other notes were taken. At sundown many of the flowers were open and their pollen undisturbed. During 15 or 20 minutes stay a single female was taken at the flowers collecting pollen.

At Oakes and LaMoure, North Dakota, July 17–26, 1919, several females were sucking nectar at flowers of *Allionia hirsuta*, about an hour after sunset. Searching the evening primroses for them I found females collecting pollen at *Anogra pallida*. Careful watching of a single large plant each of *Anogra pallida* and *Onagra strigosa* showed the flowers of the former beginning to open about 8:40 P. M. (sunset at 8:00), those of the latter about 9:00 P. M. A female flew about both plants 20 minutes before the flowers began to open. As soon as those of *Anogra* began to open the bees were at work quite as described at *Megapterium*. One female was taken collecting at *Onagra*, but this did not seem to be visited as much as *Anogra*. A brief visit at 9:30 showed no bees and the next morning I found that no flowers of *Anogra* had opened after that hour altho rather more of the *Onagra* flowers had opened later than before that hour. A male was found in an *Onagra* flower at sunrise on July 26th. Another had been taken in the early forenoon at Sheldon, N. D., Aug. 21, 1918, at *Helianthus petiolaris*.

Cockerell (Trans. Am. Ent. Soc. v. 25, p. 185, 1898) has recorded this bee at flowers of *Senecio douglassii* and *Pyrus communis* in New Mexico, and Crawford (Can. Ent., v. 35, p. 336, 1903) at *Grindelia*, but the time of day is not stated. At Manhattan, Kansas, Aug. 28, 1907, I took two females at flowers of *Mentzelia decapetala* (an evening flowering plant) at 7:30 P. M. This plant is not native there. At Williston, North Dakota, on Aug. 15, 1915, I visited this plant in the early evening but found none of these bees and scarcely any of other species.

Visits of Halictus aberrans to Flowers

In North Dakota this bee is a regular visitor of *Gaura coccinea* from an hour or more before sundown until dark. Both sexes visit it for nectar altho the males visit chiefly the flowers of *Allionia*. A few females have been taken collecting pollen of *Onagra strigosa* in the forenoon and visiting several other flowers for nectar both evening and morning or even well toward mid-day. At Oakes on July 18, 2 females and 9 males

were taken at *Symphoricarpos* an hour after sunrise; at the same place on July 24 one of each sex at the same flowers about half an hour before sunset. No females, however, were found at *Allionia* where most of the males were taken.

The flowers of *Allionia hirsuta* seemed to open about an hour before sunset and were withered by sunrise next morning. Those of *Gaura coccinea* open some time before sunset. They are white, about 6–8 mm. wide, petals narrow, anthers only about 2 mm. long, the pollen scanty and not so well cohering as in the species previously described. *Meriolix serrulata*, a day-flowering species, has yellow flowers, the pollen scarcely at all cohering. A number of plants of it stood with open flowers and undisturbed pollen near the place where the bees were found at *Symphoricarpos* in the morning. In the case of *aberrans* the pollen is carried between the inner sides of the posterior tibiae and femora.

No observations were made upon *H. oenotherae* farther than that the females were visiting *Megapterium* in the late evening with *H. texanus*. Two specimens have some pollen on their legs.

Visits of H. swenki to Flowers

This species has been included chiefly because many of both sexes were found at *Allionia hirsuta* at Sheldon on Aug. 10, 1919. This was during the hour before sunset. Shortly after sunset a number of plants were examined and only a single female found. The first specimens taken were several males at the same place, Aug. 13, 1916, on *Petalostemon villosum:* I had collected nearly all day at these and other plants, but took none of *H. swenki* until these in the late afternoon. At the same place, Aug. 21, 1918, two or three of each sex were taken in the early forenoon at *Linum rigidum*.

Hours of Flight of the Species mentioned.

Further data are needed to show to just what extent these bees are "night flying." Those so far available tend to show that *texanus* extends its work farthest into the night, at least until quite dark. This, according to my observations, was necessitated by the time of opening of the flowers visited for

pollen. The bees were flying as much as an hour before sunset, and quite likely may be found occasionally still earlier. For *oenotherae* only the one record is available, two of the specimens having been taken as late as any of *texanus*.

The flowers of *Gaura* visited by *aberrans* open earlier, and the bees are able to complete their work earlier, their time of greatest activity seeming to be at about sunset. This species is found quite frequently at other times of day. For *swenki*, the hour preceding sunset appears to be the time of greatest activity, altho it may also be found at other times of day. I do not know where the females collect pollen, but do not believe it is from the *Onagraceae*, as their scopa is of the ordinary type, the femora having long hairs with slender branches, arising from the two edges and meeting over the posterior surface.

Other Visitors and Notes on the Flowers.

At Blue Rapids, I took also at *Allionia nyctaginea*, females of *Halictus forbesi* and both sexes of a *Chloralictus*. At Sheldon at *A. hirsuta*, *H. forbesi* and male of *Agapostemon texanus*. At Lisbon, North Dakota, Aug. 8, 1919, a worker of *Bombus separatus* Rob. collecting pollen of *Gaura coccinea* just at sunset; at Fargo, N. D., workers of *B. ternarius* Say. and *B. fervidus* Fab. sucking nectar at *Onagra strigosa*. *Gaura coccinea* is regularly visited at dusk by brown moths of medium size (*Noctuidae?*) and I have seen the ruby-throated humming bird at both *Onagra strigosa* and *Anogra pallida* in North Dakota.

An interesting point bearing upon the controversy of attraction by color or smell is brought to notice. The bees (*H. texanus*) were observed flying about the flower buds before any sign of opening was visible. It scarcely seems possible that they could then be attracted by either color or odor. The odor of the freshly opened flowers of *Anogra* is strong and heavy, quite noticeable at a distance of a meter. The opening of the flower was sudden, a small cleft appearing at the apex, increasing to 6 or 8 mm. in a few minutes, then suddenly opening wide (in perhaps 15 or 20 seconds).

A group of *Onagra* plants were examined at intervals at Fargo, North Dakota, on Aug. 1, 1919, the number of open flowers removed each time were:

8:30 P. M.—6	11:00 P. M.—0 (3 nearly open)
9:00 P. M.—48	Aug. 2.
9:30 P. M.—29	6:00 A. M.—28
10:00 P. M.—16	9:00 A. M.— 0
10:30 P. M.—12	12:00 M.— 0

No bees were seen and none of the species described are known to occur in that locality.

Some Notes on the Occurrence of Delphacinae (Hemip. Homop.)

By C. S. Spooner, Urbana, Illinois.*

During several years the writer has spent considerable time collecting Hemiptera, making a special effort to obtain specimens of Delphacinae. In the course of this collecting he has been impressed with the fact that the species of this sub-family usually occur in what might be termed "pockets"; small areas, differing but slightly from the surrounding environment, very rich in genera and species.

The following notes will serve to substantiate this. While collecting at Middletown, New York, in July, 1910, the writer took a number of species in a pasture east of the city. The pasture was bordered on the east and for a few yards on the south by woodland. In the southeast corner of the pasture the following species were taken: *Liburnia campestris* VanD., *L. lutulenta* VanD., *L. osborni* VanD., *Pissonotus brunneus* VanD., *P. marginatus* VanD., and *P. divaricatus* Spooner.

The species of *Liburnia* were found in fewer numbers over the rest of the pasture but the others were found nowhere else. Perhaps in this case, the increased shade afforded by the trees was responsible for the localized occurrence.

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*Contributions from the Entomological Laboratories of the University of Illinois, No. 60.

In July, 1911, while collecting in the valley of the St. Croix River in Chisago County, Minnesota, a small area embracing only a few square yards was encountered in which specimens of *Otiocerus degeeri* Kirby, *O. abbotti* Kirby, *O. coquebertii* Kirby and *Amaloptera uhleri* VanD. were taken. No derbids were taken at any other place during the trip and this particular spot differed in no essential particular from much of the ground covered.

The next and most striking example was seen at De Witt, Mitchell County, Georgia. The banks of the Flint River in this region are lined by timber for a distance varying from a hundred feet to several hundred yards from the margin. At one point a partial clearing had been made from the timber edge to about one-half way to the river, a distance of perhaps fifty feet. This clearing covered an area of from fifteen to twenty square yards. It had become overgrown with various weeds, shrubs and some rather young second growth timber.

In this clearing, on two consecutive days, July 23–24, 1912, the following Delphacinae were taken: *Phyllodinus flabellatus* Ball, *Liburniella ornata* Stål, *Amaloptera fitchii* VanD., *Cenchrea uhleri* Ball, *Oecleus sp.*, *Dictyophora florens* Stål, *Thionia bullata* Say, *Acanalonia conica* Say, *A. bivittata* Say, *Ormenis pruinosa* Say, *O. septentrionalis* Spin., *Pissonotus brunneus* Vand. var (?).

A visit was paid to this same spot the following year when most of the species were again taken. The most conspicuous difference noted was the total lack of specimens of *Phyllodinus flabellatus* Ball which were very abundant the previous year.

Other clearings, apparently similar to this one and only short distances from it, lacked all or most of these species. In my notes I designated this spot "Fulgorid Haven" and many subsequent trips were made to it. The majority of the pecies were again collected on these later trips.

Again at Thomasville, Georgia, a small locality rich in species of Delphacinae was found. Here a small stream widened into a pond with swampy banks, the banks rising

gradually through a narrow meadow to long-leaf pine timber land, some of which had been cleared. A small bridge crossed the stream at the east end of the pond. The eastern half of the meadow, north of the bridge proved a very fertile collecting ground. The collecting here extended over the whole season of 1915. The following insects were taken here: *Myndus* sp., *Oliarus* sp., *Bruchomorpha* sp., *Thionia bullata* Say, *Acanalonia bivittata* Say, *Cenchrea uhleri* Ball, *Stenocranus saccharivorus* Westw., *S. angustatus* Crawf., *Bostaera nasuta* Ball, *Pissonotus binotatus* Spooner, *Pissonotus* sp., *Phyllodinus brunneus* VanD. var (?), *Liburniella ornata* Stål, *Liburnia andromeda* VanD., *Liburnia slossoni* Ball, *Liburnia puella* VanD., *Liburnia magnistyla* Crawf., *Liburnia* sp., and *Dicranotropis* sp.

The insects in this unusual list were almost wholly confined to the north east side of the pond. A few species were found at other points around the pond but other ponds apparently similar and in the same general locality lacked the greater number of the species.

The explanation of these "pockets" is not at hand. The answer undoubtedly lies in the results of a very careful analysis of the environment. A plant census should be taken of one of these "pockets" and compared with similar areas which lack the insects; at the same time comparisons should be made of the humidity, rate of evaporation, light intensities and temperatures of the different localities.

On the next occurence of this kind which comes to the writer's attention, he hopes to be able to make a study of this character. These notes are published with the hope of stimulating investigation along these lines, since they appear to be most important in the study of insect distribution.

Specific, Subspecific and Varietal Categories of Insects and the Naming of them.

By W. L. McAtee, U. S. Biological Survey, Washington, D. C.

Current practice appears to recognize as satisfactory bases for the recognition of groups of specific rank, non-intergrading

differences in structure and in color pattern. Structural characters are preferred, those of the genitalia often being used; color is less reliable, for even strikingly different color patterns may prove to intergrade when an abundance of material is examined.

Species though they may not intergrade with each other, each may include a smaller or larger number of intergrading forms. It is with reference to these that nomenclatorial practice varies most. Entomologists will do well to profit by the experience of workers in ornithology and mammalogy, in which sciences the problems connected with taxonomic categories subordinate to the species have long received attention resulting in a generally accepted usage. The *subspecies* is freely used; it is a geographic race, a part of a species marked by average differences in characters which intergrade with those of subspecies occupying different, though usually adjacent parts of the general range of the species, along the common boundary of which intergradation is complete.

It has sometimes been urged that the amount of difference decides whether a form should be called a species or a subspecies, but this is hardly true except in cases where the differences are small and intergradation while not actually observed is *assumed* to occur. In general practice, intergradation clearly is the criterion. Even minute differences known to be non-intergrading are satisfactory for specific diagnosis, while characters apparently more important which vary so that intergradation is evident can be used only for the differentiation of categories of lower than specific rank.

These statements while in the form of dogmatic assertions are not so intended; they merely epitomize the practice that has grown up under the guidance of the Code of Nomenclature of the American Ornithologists' Union, which may be looked upon as a parent to the International Code. As a matter of fact individual systematists differ widely in the importance they attach to the various crtieria for the diagnosis of species and subspecies, as intergradation or the contrary, amount of difference, and geographical isolation or the reverse. Some discussion of these features may be profitable.

Since submitting the present paper for publication, an article on "Criteria for the Recognition of Species and Genera" by Dr. C. Hart Merriam* has appeared. In it the author says: "To my mind, the *criterion of intergradation* is one of the most pernicious that has ever been introduced into the systematic study of animals and plants" (p. 7); and he asks: "If species and genera *** are to be set aside because of the discovery of intermediate forms does it not follow that sooner or later our classification is doomed to destruction, chaos taking the place of system?" (p. 9). If I have properly gathered the message of Dr. Merriam's paper as a whole, it is, that since classification is an essentially arbitrary thing, it may as well be arbitrary throughout, including its principles and practices. We may all agree, or it would appear that we should be able to agree, that scientific classification is arbitrary, in that it consists of organized concepts, and that the concepts must have a certain definiteness. We may go further and say with respect to the systematist, that to avoid setting too high a value upon the characters of taxonomic groups, and to escape mistaking conceptions for realities, he must ever keep in mind that systems are essentially arbitrary or artificial. At the same time, paradoxical though it may seem, he must shun artificiality. It hardly requires stating that the more highly artificial (arbitrary) is the classification of any group the less satisfactory. A system which merely pigeon-holes specimens without taking into account their fundamental relationships and probable lines of evolution, is not a worthy contribution to modern taxonomy. An attempt must be made to reflect nature and this can be done only by full recognition of the facts of organic evolution, among which, one almost omnipresent, is intergradation, or if that term seems to exclude hybridism from a possible share in the intricacies of relationships, we may use the phrase approximating variations, of related groups.

But it is certainly unreasonable to apprehend that such recognition involves the end of everything like our present sys-

*Journ. of Mammalogy, Vol. 1, No. 1, Nov. 1919, pp. 6-9

tems of classification. Have we not, for generations, and in the face of a growing recognition of the principle of intergradation, retained as more or less definite conceptions, such bird families as the finches, and the tanagers,* and this despite the existence of forms so intermediate in their relationships that they have frequently been shifted from one group to the other? The intermediates may have been buffeted but the families have not been scrapped. Somewhat the same situation holds for the plant families, Rubiaceae (cleavers, bluets, etc.) and Caprifoliaceae (viburnums, honey-suckles and the like), two large and important groups, for the separation of which no absolutely trenchant character has as yet been pointed out; nevertheless lumping has not ensued. Citing an example among genera, who can say definitely where the crane-fly genus *Tipula* leaves off and its ally *Nephrotoma* begins? Yet they are kept as separate concepts by specialists in those flies, if for no other reason, than the convenience of reducing, in some way, the enormous *Tipula* complex.

The trend of modern taxonomy is so strongly toward subdivision that fears as to the linking up of numerous groups on account of the recognition of intermediates, are certainly premature. Indeed our present systems of classification have been built up with the principle of intergradation as one of the most important aids in the work. Both the original and the revised codes of Nomenclature of the American Ornithologists' Union, affirm *intergradation to be the touchstone of trinomialism*, yet the number of recognized forms of North American birds has not decreased, but on the contrary, has constantly grown. There has been a net increase of 42 genera, 34 species and 211 subspecies in forms recognized in the first (1886) to the third (1910) editions of the American Ornithologists' Union's Checklist of Birds. Evidently they have not been lumped wholesale because of the principle of intergradation. And why? precisely because it has been used

*For further data as to the intergradation of the families of oscine birds, which nevertheless retain their family rank, see Ridgway, R., Birds of North and Middle America, Part 1, 1901, pp. 17–18, and 24–25.

arbitrarily, or if you prefer, with discretion. It has been a guide not the commander of the advance.

Carried out logically, recognition in taxonomy of the principle of intergradation decides another much debated point—the status of island races, or even of those inhabiting separate continents. If individual variations are such that overlapping of all the differential characters occurs, the forms should be regarded as subspecies; if not, they are properly considered as species. These conclusions, also, are not universally accepted. To some naturalists, obvious isolation as of island forms, and real or assumed isolation of continental races, apparently is taken as proof of specific distinctness. For the purpose of throwing light on this view we may consider the case of certain birds of the perennially interesting Galapagos Islands. Within the limits of a single and evidently very plastic genus—*Geospiza*—there are species confined to a single island, or to two islands, and so on, up to 11 islands in the highest number recorded by Snodgrass and Heller.* What is a more cogent argument in the case, there are also *subspecies* that occur in just the same way, some of them upon only a single island, others upon two or more up to a maximum of eleven. Here is definite proof drawn from forms wholly of one highly plastic genus that a single subspecies actually ranges throughout a considerable number of well-separated islands, to certain of which at the same time, other subspecies and even species, among its congeners, are entirely restricted. In other words, the case proves, that isolation in itself is not admisssible as a decisive factor in giving specific rank to organisms.

If such is the case when the isolation is that of islands separated by stretches of water in some instances of considerable width; if such isolation is not accurately reflected in the relationships of the animal inhabitants, what weight can be given to alleged cases of isolation on continental areas, where knowledge that the isolation is real, is difficult if not impossible, to obtain?

*Proc. Wash. Ac. Sci. Vol. 5, pp. 231–372, January, 1904.

It would certainly seem that to use isolation as a reason for calling forms species, although they overlap through individual variations, is entirely out of harmony with taxonomic principles that must guide the student in cases where isolation does not enter into the equation. Rather the nature of the characters must be relied upon, and according to the general view, previously set forth, intergrading forms must be given no more than subspecific rank, even though they inhabit apparently isolated localities.

Subspecies have not been very extensively used in entomology, for the sufficient reason that existing collections, in most cases, do not furnish enough material to enable the student to decide whether intergradation in characters of recognizable forms does occur, or if it does whether the forms have more or less separable ranges. However, work should be directed toward the recognition of subspecies, for the subspecific system of nomenclature is of too great value in expressing the facts of relationship and geographic distribution to be ignored.

The category of variety has been very extensively used in entomology, but in a number of distinct senses; for instance, it has been used to designate variants in size, structure and color and varying ranks of all of these. Often no doubt the form so designated is a subspecies or geographic race, but information warranting a positive decision on this point is lacking. Care should be taken, however, to make sure whether the evidence will not permit a more definite disposition of the form.

Color forms that occur more or less throughout the range of a species are frequent among insects, apparently more so than in any other group of animals. In mammals melanistic forms occur, in birds these dark forms also are found, as well as in certain cases reddish and grayish forms, but the practice has been not to recognize these in nomenclature. In the case of color forms, however, it seems necessary to go a step farther in entomology than has been done in the taxonomy of the warm-blooded vertebrates.

A very cogent reason for believing certain types of color varieties of insects to be distinct in character from color phases

in vertebrates, and therefore requiring different taxonomic treatment, is the fact that the insect body is composed of highly distinct (and so far as normally colored surface is concerned of entirely separated) parts which may vary independently in color, and to which certain colors may be sharply restricted, conditions vastly different from what may be observed in connection with the continuous body covering of most vertebrates. Two individuals of the eastern ruffed grouse, for example, may agree in practically every detail of color pattern, yet one be distinctly gray, the other decidedly rufous in the general tone of its plumage. This type of color variation is represented among insects by the red and yellow color phases of various species of *Erythroneura* (Jassoidea; Eupterygidae). Nevertheless these very insects exhibit another type of color variation in which certain markings may occur on the pronotum, scutellum, or other division of the body, in a certain series of specimens of both sexes, and be entirely lacking in another series, all of which, however, belong to what is considered a single species.

It being true that very distinct color forms in a structurally homogeneous complex, the species, are not unusual in insects, sorting and naming them would seem to be demanded* by the practical considerations of making a collection appear to have really been classified, and to have names by which the forms can be referred to in exchanging and in recording notes upon them. If they are left unnamed no phase of studying them will advance so rapidly, nor will final understanding of them be reached so soon, as will be the case if they are described and named.

Naming these color varieties of insects is further desirable because of the fact that due to lack of material there is no certainty in many cases that the form may not be a subspecies. A characterization and a name which will enable others to record similar specimens will bring out facts necessary to decide

*See also Parshley, H. M. Psyche, Vol. 25, No. 3, June, 1918, p. 65, and Occasional Papers of the Museum of Zoology, University of Michigan, No. 71, August, 1919, pp. 5–6.

upon the subspecific rank or otherwise of the form, information that for lack of a name, and of point in publishing the records might not become available for years, if ever.

An apparent difficulty in naming color forms is that in a species having both subspecies and varieties, it is conceivable that the same color variety may occur in different parts of the range and therefore in more than one subspecies. This condition, if reflected in names, would require a quadrinomial nomenclature and it indicates that the color variety does not deserve taxonomic recognition similar to that accorded subspecies. However it seems more likely to the writer that this very difficulty points out the distinction between mere color phases and varieties as he has become acquainted with them among insects. If the color form does occur throughout the range of a species and is proved to exist in different subspecies, then it may be considered a color phase and left unnamed. If, on the contrary, the color variety does not cross subspecies, it is not a color phase, and may be named.

Summing up, a variety in entomology, actually of less than specific rank, may be one of three things: (1.) It may be a true subspecies or geographic race, present material being insufficient to decide the point; (2.) It may be a color phase, that is, albinistic, melanistic, erythroic or the like, an appearance it may assume anywhere in the range of the species that may affect all subspecies alike (proof of its nature) but which usually is recognizable as a phase of a simple color gradation, often as the alternative of two color states as albinism and melanism, and it should not have a name that will have to be reckoned with in scientific nomenclature; and (3) it may be a variety such as is known in many insects that cannot be subspecific in its nature, because unrelated to distribution, that does not answer to the definition of color phase, here given, but the real nature of which admittedly is not understood. It seems to the writer that these varieties have the importance, and in a way the attributes of subspecies except correlation with geographical distribution, and that they should be named. From a purely nomenclatorial point of view the fact that we do not know what color varieties really

are is unimportant, and the writer's contention is, that we shall be much longer learning what they are, unnamed, than if named.

Discovery of their real nature is work for an institution having extensive facilities for insect breeding, and is a project most systematists would like to see undertaken.

Some insect varieties may have a genetic significance which when understood will indicate the proper taxonomic treatment. It is possible, even probable, that some varieties may be found, also, to be correlated with definite food plants or peculiar local habitats. Proof of such a relation would call for recognition of a new type of subspecies in which the geographic element of subspecies, as at present recognized, would be replaced by an ecologic factor—in other words it may become necessary to recognize two sorts of subspecies—namely geographic and ecologic.

Some discussion touching upon personal experiences in connection with insect varieties may perhaps be pardonable. The writer has freely named color varieties and has had it called to his attention that others could not commend his activities in this direction. Regarding the varieties in question, the comment has several times been made: "But they all run together." Of course they do, otherwise they would have been ranked as species not as varieties. This remark illustrates the lack of definite conceptions on the part of some entomologists of the nature of the subordinate taxonomic groups, and is one reason for the writing of this paper.

When a large proportion often as high as 90% of the individuals of a color variety can be sorted out without any hesitation as to their similarity to each other and as to their distinctness from coordinate groups of the species complex, in the writer's opinion, they should be named. Intergrading specimens may be placed with the variety to which they are most similar, not left standing about like wall-flowers. Intergrades should bring consternation neither to the careful systematist nor to the neat curator. They are inevitable, should be taken frankly for what they are and treated accordingly. In all consideration of taxonomic categories, it should

not be forgotten that no one is bound to accept and use them any further than he likes. If he prefers to stop at good old-fashioned species (in some cases this means groups of modern species) he may do so, or if his taste permits he may go on to true subspecies; if constituted like the writer he will pursue differentiation (of categories not of individuals) to the limit the available material will permit, but will expect no one to follow beyond a point in harmony with his individual point of view.

So much off the text; returning to minor taxonomic groups, it is submitted that the following definitions appear to accord with the best modern usage. If a group of similar individuals, or an individual presumed to represent such an assemblage, is distinguished from another by one or more non-intergrading characters of whatever kind, it is regarded as a species, and its range may be anything that climate, geography, geological history, commerce or fate may have accorded it. If its essential characters intergrade with those of another form from which it has a more or less separate range, it is called a subspecies. If its characters intergrade and it occupies no definite area to the exclusion of related forms it is a variety. Simple melanistic and albinistic varieties or comparable forms, are called color phases and usually have not been recognized in nomenclature.

(*To be Continued*)

Coleophora apicialbella nom. nov. (Microlepid.)

The name *Coleophora apicialbella* is here proposed for the species of *Coleophora* described in this journal, Vol. XXX, p. 109, 1919, under the name *Coleophora apicella* preoccupied by *Coleophora apicella* Stainton of Europe. ANNETTE F. BRAUN, Cincinnati, Ohio.

A Correction in the Mecopodinae (Orthopt.)

Figure 10, pl. ii and fig. 1, pl. iii of Fascicule 171 of Wytsman's Genera Insectorum on the Mecopodinae are reversed. The first really represents the ♀ of *Mecopoda elongata* Linn. while the latter represents the ♂ of *Mossula basalis* Caud. A. N. CAUDELL, Wa-hington, D.C.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., FEBRUARY, 1920.

ENTOMOLOGY AT THE CONVOCATION WEEK MEETINGS OF 1919-20

The programs of the meetings of scientific societies held between December 29, 1919, and January 3, 1920, for which we have data, list 128 papers on entomology, or at least on insect material; 118 of these were to be given at St. Louis; 10 were read at Princeton, New Jersey.

Of the societies meeting at St. Louis, Section F of the American Association for the Advancement of Science and the American Society of Zoologists were jointly credited with 15, 1 of these (by invitation) being on polyembryony and sex, 2 on cytology, 6 on genetics, 4 on ecology and general physiology and 2 on comparative anatomy. The cytological papers were based on Tettigidae, those on genetics on *Drosophila*. As 1919 was a great event in the 17-year cicada calendar, this insect supplied material for one physiological and one anatomical paper.

The Entomological Society of America provided 11 titles on ecology and general physiology, 3 on comparative anatomy and 2 on taxonomic groups. Of special interest was the symposium: "The Life Cycle in Insects," treated by taxonomic groups, by nine speakers (Messrs. Folsom, E. M. Walker, Ball, Fracker, Chapman, C. L. Metcalf, Cockerell and Forbes and Dr. Edith M. Patch), and the annual address before the Society, this year by Dr. W. J. Holland, on "The Evolution of Entomological Science in North America."

The American Association of Economic Entomologists furnished the great bulk of entomological papers—73 including President W. C. O'Kane's address, "The Day's Work." Among these were 2 on mosquitoes, 1 on ticks and 1 on external parasites of stock and poultry, 2 on the pink bollworm, 3 on corn borers, 9 on insecticides, 12 on various aspects of beekeeping (in the Apicultural Section), 6 before the section of

Horticultural Inspection, 3 on the codling moth, 4 on leafhoppers, 1 on the chinch bug and 2 on the Hessian fly.

The Botanical Society of America listed two papers on ants (on their relations with fungi and on galls produced by them), The American Phytopathological Society one on leaf hoppers and hopperburn of potato leaves and the Ecological Society of America one on the ecological succession of insects in stored food products.

At Princeton, the American Society of Naturalists heard 2 papers on cytology (Orthoptera) and 7 on genetics (6 of them on *Drosophila*). The symposium was on "Some Relations of Biology to Human Welfare," to which Dr. W. M. Wheeler contributed an informing and highly amusing paper on "Biology and Society" in the form of a supposed letter to the speaker from a king of the West African *Termes bellicosus*, describing the social organization of his community and contrasting it with human society to the disadvantage of the latter.

In the Convocation Week meetings of 1918–19 but 64 entomological papers were presented, as a result of war conditions. This year's total of 128 is well up toward the previous high record of 139 papers for the New York meeting of 1916–17.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

A Suggestion for a Better Popular Name for the Fulgoridae (Hemip.).

So far as I am aware the only common name that has ever been suggested for members of the Family Fulgoridae is "lantern Flies," based upon the supposition that a large South American species emits light. Regardless of the merits of the arguments which have been advanced pro and con in this case, the members of this family generally do not emit light; the term lantern flies is, therefore, an evident misnomer. Therefore, regardless of the fact that the name lantern flies is rather well established for this family it would seem advisable to replace it by some other name and I would suggest Plant Hoppers as being perhaps the most suggestive name available, thus bringing the common name of the

family in line with the common names of other closely related families, *e. g.*, Tree Hoppers (Membracidae), Frog Hoppers (Cercopidae), and Leaf Hoppers (Cicadellidae). The only other use of the name plant hoppers, so far as I am aware, is as a general name for these four families, but it seems to me that each family is of sufficient importance economically, and sufficiently distinct taxonomically to command a separate name. The Family Fulgoridae is coming into such prominence economically that it would seem advisable to have a common name for the family as a whole, and, so far as is consistent with good usage, use this name in connection with the various species. Thus: Sugar cane plant hopper, not sugar cane leaf hopper; corn plant hopper, not corn lantern fly. It is not intended to imply, however, that all common names for members of this family should end with the expression plant hopper, for such names as cranberry toad bug are distinctive and having the right of priority might be used, although the name toad bug is suggestive of species of the subfamily Gelastocorinae (Galgulidae), and the name cranberry plant hopper is equally distinctive, equally short and even more suggestive of the character of the insect.—Z. P. METCALF, State College, West Raleigh, North Carolina.

Change of Name

We are requested to announce that Alex Kwiat, of Chicago, Illinois, has changed his name to Alex K. Wyatt. Address: 2445 Eastwood Ave., Chicago. Correspondents please note.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings of the Academy of Natural Sciences of Philadelphia. **2**—Transactions of the American Entomological Society, Philadelphia. **6**—Journal of the New York Entomological Society. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **13**—Journal of Entomology and Zoology, Claremont, Cal. **19**—Bulletin of the Brooklyn Entomological Society. **22**—

Bulletin of Entomological Research, London. **33**—Annales de la Societe Entomologique de Belgique, Brussels **50**—Proceedings of the United States National Museum, Washington. **62**—Bulletin of the American Museum of Natural History, New York. **85**—The Journal of Experimental Zoology, Philadelphia. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **102**—Broteria. Revista Lusco Brazileira. Serie Zoologica, Braga.

GENERAL. Cleare, L. D.—A useful breeding cage. **22,** x, 43–4. **Harris, E. D.**—Obituary by C. W. Leng. **6,** xxvii, 237–40.

GENETICS, ETC. Seyster, E. W. —Eye facet number as influenced by temperature in the bar-eyed mutant of Drosophila melanogaster. **100,** xxxvii, 168–80.

ARACHNIDA, &c. Brooks, F. E.—A migrating army of millepeds. **12,** xii, 462–4. **Ewing, H. E.** —Stable flies and chiggers. **12,** xii, 466.

NEUROPTERA. Calvert, P. P.—Gundlach's work on the Odonata of Cuba; a critical study. **2,** xlv, 335–96. **Kollmann, J.**—Termitengange im schadeldach zweier amerikanischer Pygmaen. (Arch. Anat. u. Phys., 1915, Anat. Abtg. Suppl., 20–32). **Lestage, J. A.**—Notes Trichopterologiques. **33,** lix, 130–5. **Murphy, H. E.**—Observations on the egg-laying of the caddice-fly, Brachycentrus nigrisoma, and on the habits of the young larvae. **6,** xxvii, 154–9.

HEMIPTERA. Baker, A. C.—The houghton gooseberry aphis. **12,** xii, 433–7. **Barber, G. W.**—On the bite of Arilus cristatus. **12,** xii, 466. **Dickerson & Weiss.**—Notes on the early stages and life history of Idiocerus cognatus, in New Jersey. **6,** xxvii, 129–32. **Haseman, L.**—Brood X of the periodical cicada in Missouri. **12,** xii, 467. **Knight, H. H.**—The genus Bolteria (Miridae). **19,** xiv, 126–8. **McAtee, W. L.**—Corrections and additions to an article on Leptoypha and Leptostyla. (Tingidae). **19,** xiv, 142–4. **Morrison, H.**—A new genus and species of coccid from Loranthus. **10,** xxi, 197–203. **Olsen, C. E.**—Idiocerus cognatus, established in North America. **6,** xxvii, 126–8. **Olsen, C. E.**—Kermeskingii, parasitized by a micro-lepidopteron. **19,** xiv, 141–2. **de la Torre-Bueno, J. R.**—Virginia Heteroptera. **19,** xiv, 124–5. **Weiss & Dickerson.**—The life history and early stages of Macropsis virescens var. graminea, a poplar leaf hopper in New Jersey. **12,** xii, 437–40. **Wellhouse, W. H.**—Lace bug hawthorn, Corythucha bellula. **12,** xii, 441–6.

Davis, W. T.—Cicadas of the genera Okanagana, Tibicinoides and Okanagodes, with descriptions of several new species. **6,** xxvii, 179–223.

LEPIDOPTERA. Botke, J.—Les motifs primitifs du dessin des ailes des lepidopteres et leur origine phyletique. (Tijds. Nederl. Dierk. Vereen., Leiden, xv, 117–260). **Dognin, P.**—Heteroceres nouveaux de l'Amerique de Sud. Fasc. xvii. **Frost, S. W.**—The function of the anal comb of certain lepidopterous larvae. **12,** xii, 446–7. **Haseman, L.**—

Swarms of cotton moths visit Missouri. **12,** xii, 467. **Schierbeek, A.**—On the setal pattern of caterpillars and pupae. (Tijds. Nederl. Dierk. Vereen., Leiden, xv, 261–412). **Seitz, A.**—Die grossschmetterlinge der Erde. Fauna Americana. Leif. 75–101. **Woodruff, L. B.**—Fall notes on some Alabama butterflies. **6,** xxvii, 159–61. **Zetek, J.**—The cocoanut butterfly, Brassolis isthmia, on banana. **12,** xii, 465.

Ottolengui, R.—Notes on the Plusiinae, with descriptions of new species and races. **6,** xxvii, 117–26.

DIPTERA. Alexander, C. P.—Records and descriptions of Neotropical crane-flies. I. **6,** xxvii, 132–54. **Alexander, C. P.**—The biology of the North American crane-flies. V. The genus Dicranoptycha. **13,** xi, 67–74. **Barber, G. W.**—A note on migration of larvae of the housefly. **12,** xii, 466. **Franca, C.**—Notes de zoologie medicale. Observations sur le genre Phlebotomus. **102,** xvii, 102–60.

Cresson, E. T.—Dipterological notes and descriptions. **1,** 1919, 171–94. **Malloch, J. R.**—The generic status of Zodion palpis, with generic key to the family. (Conopidae). **10,** xxi, 204–5. **Townsend, C. H. T.**—New genera and species of Muscoid flies. **50,** lvi, 541–92.

COLEOPTERA. Arrow, G. J.—Notes on Ruteline C. and descriptions of a few new species in the British Museum. **11,** iv, 379–85. **Malloch, J. R.**—Notes on some species of the chrysomelid genus Altica. **19,** xiv, 123–4. **Moznette, G. F.**—Notes on the bronze apple-tree weevil (Magdalis aenescens). **12,** xii, 426–9. **Timberlake, P. H.**—Notes on the North American species of Hippodamia. **6,** xxvii, 162–74. **Weiss, H. B.**—Notes on Ceracis sallei and Brachycis brevicollis, bred from fungi. **19,** xiv, 144–7.

Blaisdell, F. E.—Studies in Alaudes (Tenebrionidae). Synopsis and review of the species of Coelus. (Tenebrionidae). **2,** xlv, 307–313; 315–34. **Dawson, R. W.**—New species of Serica (Scarabaeidae)—II. **6,** xxvii, 223–5. **Notman, H.**—Records and new species of Carabidae. **6,** xxvii, 225–37. **Notman, H.**—Coleoptera collected at Mooers, Clinton Co., N. Y., with descriptions of n. sps. **19,** xiv, 129–41.

HYMENOPTERA. Bouvier, E. L.—Sur l'origine et les modifications de l'instinct des hymenopteres paralyseurs. ("Scientia," Bologna, xxvi, 449–59.) **Davis, W. T.**—A remarkable nest of Vespa maculata, with notes on some other wasps' nests. **19,** xiv, 119–23. **Frison, T. H.**—Report on the Bremidae collected by the Crocker Land Expedition, 1913–1917. **62,** xli, 451–9. **Gunthrop, H.**—Notes on the behavior of the social wasp Polistes. **13,** xi, 63–6. **Illingworth, J. F.**—A successful method of breeding parasites of white grubs. **12,** xii, 455–7. **Minnich, D. E.**—The photic reactions of the honey-bee, Apis mellifera. **85,** xxix, 343–426. **Smith, M. R.**—Occurence of the Argentine ant at Raleigh, North Carolina. **12,** xii, 465.

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ENTOMOLOGICAL NEWS

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXXI. MARCH, 1920. No 3.

CONTENTS

Specific, Subspecific and Varietal Categories of Insects and the Naming of them.

By W. L. McATEE, U. S. Biological Survey, Washington, D. C.

(Continued from page 55).

In naming taxonomic conceptions subordinate to the species it is important to bear in mind that they may not permanently be regarded of the same rank as that in which originally described. Thus a form first designated as a species may later be shown to be a subspecies; a variety may be found to be a subspecies, or a form assigned to either of these categories may later be given specific rank*. Precautions should

*The frequency of this occurrence should help students to realize to what an extent taxonomy deals with concepts rather than entities, that while the things may not change in measurable time, concepts of them certainly do, and that the present phase of the concepts is no more to be seriously accepted as fixed than were the half-century or century old views now discarded. Certainly a present change in an admittedly ever-changing concept should not inspire deep umbrage, especially as in the last

be taken, therefore, to avoid the use of preoccupied names. Every name used for any form, variety, subspecies or species of the same genus in any part of the world, should be taken into consideration, and a safer rule is to avoid using a name that has ever been used in the same family.

This requires many names, and the problem of finding them apparently has appalled various workers, as they have taken "the easiest way" and resorted to inordinate use* of names derived from those of the collector and place of collection. The idea of dedicating a species to another person as a mark of affection or esteem is commendable, but overdone it ceases to be a distinction. If you have named a form for some one as an expression of genuine respect or other form of real appreciation, do not cheapen your homage by subsequently naming numerous forms for mere collectors of material you chance to have in hand; it is entirely possible that the form may have been collected a century before by someone else. Another type of scientific name derived from personal names is that immortalizing an error or oversight on the part of the original author, resulting in use of a preoccupied name. This form of personal name is a doubtful encomium and perhaps in many cases is not intended as a com-

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analysis, it represents the views of another individual, between which and your views, posterity will be the final and no doubt just judge. In mathematics, the most exact of the so-called exact sciences, approximations are freely used, and some of them are among the most valuable possessions of the science. Surely taxonomists working in one of the most inexact of all fields of science should be satisfied with approximations, and what is more to the point, recognize that they are only approximations, and not to be taken as immutable entities, nor fit subjects for pedantic positiveness, when in both respects, they are the opposite.

*To cite, but not to identify, an instance of such overuse of geographic and personal names, reference may be made to a series of papers on exotic plants, in which 350 new species are named. Seventy-one of these specific names are of geographical derivation and 59 of them are based on the name of the single collector. Unfortunately there is no canon of nomenclature designed to curb such work, but *a priori*, one would expect that the naming by one author of 59 new species for a single individual collector in a single series of papers on organisms of a restricted locality would be prevented by the dictates of reason and good taste.

pliment. In case the author of the preoccupied name is living the ethical thing to do is to inform him of the preoccupation and let him propose a new name.

Names of geographic significance also should be used sparingly; their chief merit lies in carrying a reminder of the type-locality or even in some cases of the range of the form. Usually however, at the time of original description of a form information on its geographic distribution is too scanty to permit selection of a name that will broadly indicate the range. When the type locality only is commemorated, subsequent advances in knowledge may reveal that the type was collected in the outskirts of the range and that it does not belong to a really typical form of the species all forms of which nevertheless must thereafter appear with a misleading geographical body name. The name of the Golden plover, *Charadrius dominicus*, is an example of this, the type specimen for the earliest name being obtained on the island of Santo Domingo, where the species is only a transient, the summer home being in the Arctic Regions and the winter home in the Southern Hemisphere. For insects, Professor H. F. Wickham has kindly cited several geographically derived names of beetles which give no adequate idea of the range, for example, *Mantura floridana* ranging to California and Fort Simpson, *Aphodius aleutus* which occurs in mountains to Colorado and California, the wide-ranging "*pennsylvanicus*" species as of *Nyctobates*, *Chauliognathus*, *Chlaenius* and *Harpalus*, the comparable *carolinus*, *virginicus*, and *noveboracensis* species and so on. *Dorcatoma dresdensis*, named for the European city is an extreme example of this kind, the species occuring commonly over middle and northern Europe and from New England and Virginia to Missouri and Montana.*

*Assistance in gathering examples of misused geographic names has kindly been given by Messrs. H. L. Viereck, Alex. Wetmore and H. F. Wickham.

If the original locality datum is incorrect or is misinterpreted, of course worse consequences follow.* A few of the misnomers resulting from using such place names as the basis of specific names may be cited: the milkweed called *Asclepias syriaca* is an exclusively American plant; the parrot, *Coriphilus peruvianus* is really from the South Sea Islands; the tody, *Todus mexicanus* is a Porto Rican bird; while *Chrysobothris* and *Cicindela* yield sufficient illustration of similar happenings in insect nomenclature, each genus having a purely American species named *tranquebarica* from the supposed type locality in India.

Naming species after cities, as *baltimorensis*, *franciscana*, etc., is a particularly futile performance. It indicates nothing of permanent value in the nomenclatorial history of the species, and the city growing, as cities do, the collection of real topotypes, in time becomes an impossibility. Place names also are by no means permanent, and change in usage of them virtually robs of significance names of organisms based on the obsolete names.

To sum up: names should have an application that the shifts of time and accidents of circumstance are least likely to render void. At their best, names are seldom commemorative and then of eminently deserving individuals, rarely of places. Most naturalists prefer that names have a descriptive application, but this is not absolutely essential, meaning-

*With reference to a bird name of this category namely that of the red-shafted flicker (*Colaptes cafer*), Elliot Coues, the noted ornithologist, voices the following protest; "With every disposition to follow the dogma and ritual of the A. O. U., I cannot bring myself to call this bird *C. cafer*, for no better reason than because *Picus cafer* Gm. 1788, was mistaken for a bird of the Cape of Good Hope! Say what we please in our canons, there is something in a name after all, and 'the letter of the law killeth' when wrenched from its spirit, in defiance of science and common sense. Individually I cannot incur the penalty of deliberately using for a North American bird a name only applicable to one from South Africa. The fact that "*Cafer*" is a sort of Latin for Caffraria or Caffrarian makes its use in this connection as bad as "Hottentot Woodpecker" or "Zulu Flicker" would be; and how would such a combination sound in plain English?" (Key to North American Birds, Fifth Ed., Vol. 2, 1903, p. 601.)

less coined names being entirely acceptable. All classes of names should be short and euphonious. Systematic work on insects in most cases is a labor of love and as much care and genuine interest should be devoted to the selection or invention of names for new forms as to any other part of the work.

Descriptions of New North American Acalyptrate Diptera.—II.* (Trypetidae, Sapromyzidae)

By E. T. CRESSON Jr., The Academy of Natural Sciences, Philadelphia, Pa.

Rhagoletis juglandis new species

♂.—General color, tawny; with the following parts paler to nearly white; frontal orbits, face, occiput, mouth parts, broad stripe from humeri to base of wings, scutellum except base, squamae, apices of second to fourth abdominal segments, coxae, and tarsi except apices. Halteres lemon yellow. (Bases of second to fifth abdominal segments are dark. Probably due to decomposition of contents). Wings hyaline with black bands as follows: First band straight from costal cell over anterior cross-vein to beyond fifth vein; second band straight and parallel to first, from costa, midway between tips of first and second veins, to and including posterior cross vein and attaining inferior margin of wing; an apical marginal band from before tip of second to and beyond tip of fourth veins. Veins pale basally, becoming black apically. Generally subopaque species; facalia, mesonotum laterally, most of scutellum, abdomen and legs, shining. All bristles black except the post verticals and few others as in *suavis* Lw.

Structurally similar to *suavis* Lw. with similar chaetotaxy. The posterior cross vein is straight and perpendicular to fourth vein, and the wing is less tapering apically. Length 4 mm.

Type.—♂; Carr Canyon, Huachuca Mountains, Arizona, July to August, 1919, (C. R. Bierdermann; mining the exocarp of *Juglans regia* variety), [A. N. S. P. No. 6235]. *Paratypes.*—12♂; topotypical.

This insect was sent to Dr. Skinner by Mr. C. R. Biedermann, who calls it the "Black Walnut-fly." He says " . . it appears toward the end of June, deposits its eggs in the

* Part I. Ent. News. xxv, 457–460, 1914.

green hull [of a variety of the English walnut] which is mined by the larvae, coloring the nut black. No injury seems to be done to the meat. The earlier larvae go to the ground by a silk thread, for pupation, but most of them stay in the hull till the nut falls, and pupate in it."

The insect is a typical *Rhagoletis* except in color. However in this respect the color pattern is the same as that of *R. cerasi* Linné, except that the black is substituted by tawny. In general appearance similar to *R. suavis* Loew, but the two discal wing bands are straight and parallel in the present species, not convergent, thus suggesting *dubia* Johnson which has the subapical band incomplete, and has an additional subbasal band. The present species has only the two bands besides the apical marginal band.

Sapromyza blaisdelli new species.

Similar to *Minettia nigrans* Mel. in general appearance, but evidently more typical of *Sapromyza* according to Melander's diagnosis.* Possibly near *S. hyalinata* Meig. The face is noticeably short and concaved.

♂.—Black; anterior margin of frons, articulations of antennae, trochanters, knees, middle and hind tibiae, and their tarsi, brown. Halteres, squamae, wings and veins, yellow. Wings not blackened at bases. Shining to polished with slight metallic tinge; face medianly above, orbits including some parts of cheeks, grayish. Mesonotum and scutellum dusted with brownish pollen.

Head higher than long, broader than high. Frons more than one-third width of head, broader than long, convex, in profile, forming an obtuse angle with face. Face broad as frons, shorter, in profile concaved with slight carina; epistoma slightly projecting. Cheeks as broad as third antennal joint. Latter three times as long as the other short joints together, twice as long as broad; arista micropubescent. Three postdorsocentrals; acrosticals sparse; one stout mesopleural; two sternopleurals. Scutellum convex, with the stout apical bristles diverging. Abdomen ovate; marginal bristles two-thirds length of segments; genital segment very large dorsoventrally. Legs normal, with preapicals on all tibiae. Wing veins parallel; ultimate section of fourth vein two to three times as long as preceding (sometimes hardly twice as long).

♀.—Similar but second and third veins somewhat diverging at apices.

Length.—3-3.5 mm.

*Psyche, xx, 61, 1913.

Type.—♂; San Francisco, California, August 7, 1908, (F. E. Blaisdell), [A. N. S. P. No. 6219]. *Paratypes.*—2♂, 2♀; topotypical. 2♂, 6♀; same data, but collected May 27, 1908.

Sapromyza vanduzeei new species.

Very similar to *blaisdelli*, but upper part of face where it is dusted with gray, antennae except upper margin of third joint, legs including coxae but excepting fore tarsi are yellow. The ocellar bristles are stronger and divergent; third antennal joint more slender; apical scutellur bristles parallel. The second and third veins in the male are slightly diverging apically.

Type.—♂; McCloud, Siskyou County, California, July 23, 1918, (E. P. Van Duzee), [Cal. Acad. Sci., Coll.]. *Paratypes.*—4♂, 1♀; topotypical.

One male, Niles Canyon, California, July 10, 1916, (E. P. Van Duzee), [Cal. Acad. Sci.], is probably conspecific, but the anterior part of frons is more conspicuously yellow. The legs are more strongly marked with yellow, and the basal segments of the abdomen also are yellowish. There are no apparent structural differences except in the diverging apical scutellar bristles.

Sapromyza discolor new species

Similar in structure to the two preceding species but in color very distinct. Entirely yellow excepting the occiput above, a broad median mesonotal stripe attenuating anteriorly, and the entire abdomen, black. There are also suggestions, posteriorly, of two dark sublateral mesonotal stripes.

Type.—♂; San Francisco, California, July 7, 1908, (F. E. Blaisdell), [A. N. S. P. No. 6218].

Mordella marginata Melsh., Bred From Fungus (Coleop.).

By Harry B. Weiss, New Brunswick, New Jersey.

This species, which is common throughout New Jersey from June to August, was bred from the sporophore of *Lenzites saepiaria* Fries, collected on a piece of deciduous timber

along the canal at Uhlerstown, Pennsylvania, on June 11. Several larvae and pupae and one adult were taken from the fungus at this time and several days later another adult emerged. The feeding appeared to have taken place entirely in the contex of the fungus and it was here that the pupal cells were found. According to Overholts (Polyporaceae of Middle Western U. S., Wash, Univ. Studies, vol. III, Part 1, No. 1) *Lenzites saepiaria* occurs on the dead wood of coniferous (rarely deciduous) trees.

Very little appears to be known concerning the larval habits of Mordellids. Some live in old wood and others have been found in the stems of plants. Coquillett found larvae of *Mordella pustulata* in plant stems under circumstances that render it highly probable that they were feeding on a Lepidopterous larva contained in the stems. In view of the fact that numerous species of fungi have been examined in the past and no Mordellids found it is extremely probable that the fungus habit in this instance was accidental.

Full Grown Larva. Length 4 to 5 mm. Width 1.6 mm. Body white, mouth parts dark; somewhat grub-like, convex above, flattened beneath, skin wrinkled; sparsely hairy, hairs short; segmentation distinct; legs short, weak, subcylindrical, appearing as nipple-like protuberances on enlarged subglobular bases; last abdominal segment subconical, terminated by a short subcylindrical chitinous style with four somewhat weak points formed by the depressed end; anal segment supplied with minute chitinous spines which are more numerous and larger at its distal end close to the style; anal segment bears more hairs than other body segments.

Pupa. Length 5 mm. Width 1.6 mm. White, sparsely hairy, rounded anteriorly, tapering slightly to penultimate abdominal segment; ultimate segment tapering abruptly to rounded end; posterior end of body terminated by two somewhat transverse leg-like appendages, each with a sharp chitinized tip; head, thorax, wing cases and sides of abdominal segments supplied with minute spines.

Adult. Mordella marginata. This was described by Melsheimer in 1845 (Proc. Phil. Acad. Nat. Sci. II, 312). Blatchley, in his Coleoptera of Indiana, states that it occurs throughout Indiana especially on the flowers of dogwood, Jersey tea and wild hydrangea.

Notes on Psyllidae (Homoptera).

By D. L. Crawford, College of Hawaii, Honolulu

Two brief, pre-war papers on Psyllidae (Homoptera) contributed by two Germans, require a few notes of elucidation and comment.

One of these, contributed by Dr. G. Enderlein[1] describes several new genera and species from Formosa. One of these new genera, *Agonoscena*, appears to be identical with *Paurocephala* Crawford. Enderlein makes an old species of *Rhinocola* (*R. targioni* Licht.) the type of his new genus and includes, also, a new species from Formosa (*A. Sauteri*). The latter species seems to be identical with *Paurocephala psylloptera* Crawford, which is widely distributed over tropical Asia and the outlying archipelagoes, While I have seen no examples of Enderlein's Formosan species, his figures and description convince me of the identity of his and my species.

As *Paurocephala psylloptera*[2] antedates Enderlein's *Agonoscena Sauteri*, the latter should be sunk in synonymy.

Enderlein's genus *Agonoscena* retains its validity, however, until some other disposition is made of its type species. *Rhinocola* has been made to embrace a large number of unrelated species, many of which must eventually be referred to other genera. The type of this old genus, *R. aceris* Linn., is intermediate between *Livia* and *Aphalara*[3], but few of the other species can be retained properly in the genus.

For another species of *Rhinocola*, (*R. ericae* Curtis) Enderlein erects the new genus *Strophingia*. This seems scarcely justifiable since *R. ericae* and *R. targioni* are similar and not generically distinct.

The second paper[4] supplements Aulmann's very incomplete catalog of the psyllid species of the world. A few items in this supplement suggest some comment.

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[1]H. Sauter's Formosa-Ausbeute: Psyllidae, von Dr. Günther Enderlein. Entomol. Mitteilungen III, N. 7–8, pp. 230–235, July, 1914.

[2]Crawford, Phillipine Journ. Science, VIII (Sec. D): 293, August, 1913.

[3]Crawford—United States National Museum, Bul. 85: 24, 1914.

[4]Friedrich Zacher—Bemerkungen zur "Psyllidarum Catalogus" von G. Aulmann. Entomol. Mitteilungen II, pp. 148–153, 1913.

Phyllopecta, a nomen nudum of Riley's, is made by Zacher to replace *Trioza tripunctata* Fitch. This name can be given no consideration because the species is clearly a member of *Trioza*.

Psyllopa Crawford has been merged by its author with *Arytainia*.[5] Several species were described in *Psyllopa* but all are now referred to the European genus, *Arytaina*.

Zacher has tangled himself in the translation of the English language when he catalogs *Trioza tripunctata* Löw as a synonym of *Psylla Kuwayamai* Crawford. The synonymy of three specific names is correctly as follows:[6]

Psylla tripunctata Fitch (1851)—referred to *Trioza tripunctata* (Fitch) by Riley in 1893. This is a valid species.

Trioza tripunctata Löw (1877), preoccupied. Sulc has declared this species to be identical with *Trioza trisignata* Löw. Hence *T. tripunctata* Löw (nec Fitch) is a synonym of *T. trisignata* Löw.

Psylla tripunctata Kuwayama (1908), preoccupied by Fitch's old name for the American species now known as *Trioza tripunctata*. Hence, the *Psylla* species name has been changed to *Ps. kuwayamai* Crawford. This is NOT a synonym of *Trioza tripunctata*, as Zacher states.

Trioza sonchi is one of Riley's *nomina nuda* but resurrected by Zacher. The same insect (probably) was described in 1914 as *Hemitrioza sonchi* Crawford.

Undescribed Tipulidae Collected by Mr. H. S. Parish in Brazil (Dipt.).

By CHARLES P. ALEXANDER, Urbana, Illinois.

During the second half of the year 1919, Mr. Herbert S. Parish, the veteran collector of insects in tropical American countries, made a trip up the Amazon River. The crane-flies secured on this expedition to the present time were not num-

[5]Crawford—United States National Museum Bul. 85: 122, 1914.
[6]Crawford—Pomona Jr. Ent. 3: 430, 1911.

erous but represented some interesting species. A few species have been recorded in another paper but the more interesting forms taken on the lower and middle Amazon are herein described. A number of species hitherto known only from Guiana have been secured by Mr. Parish on this trip.

The types of the new species are preserved in the collection of the writer.

Teucholabis decora sp. n.

Rostrum longer than the head; head black; mesonotal praescutum reddish orange with three black spots; pleura orange with a large black area on the mesepisternum; fore and middle femora yellow basally, hind legs entirely black; wings subhyaline with cell *Sc*, a spot at the wing-base, narrow seams along the cord and outer end of cell *1st* M_2, and the wing-apex dark brown.

♂.—Wing about 6.8 mm. Rostrum long and slender, a little longer than the head, black; mouthparts black. Antennae with the scapal segments dark brown; flagellum broken. Head shiny brownish black, the occiput a little paler.

Mesonotal praescutum shiny reddish orange with three black spots representing the anterior ends of the usual dark stripes; median spot cuneiform, the smaller lateral spots more oval; remainder of the dorsum reddish orange. Pleura orange with a large, shiny black area occupying about all of the mesepisternum and the sides of the mesosternum; metepisternum black. Median area of the sternum orange.

Halteres brownish black. Legs with the fore and middle coxae and trochanters yellow, the hind coxae and trochanters black; femora black; the basal third (fore legs) to half (middle legs) obscure yellow; hind legs entirely black; tibiae and tarsi black.

Wings subhyaline, cell *Sc* dark brown; base of the wing, surrounding the humeral crossvein and arculus, dark brown; a narrow dark brown seam along the cord and outer end of cell *1st* M_2; wing-apex with a moderately broad brown band, this including about the outer quarter of cell *2nd* R_1, the outer third of R_3 and R_5; the outer half of *2nd* M_2 and M_3; veins dark brownish black. Venation: Sc_1 ending before *r*; *r* in direct alignment with the inner ends of cells R_3 and R_5; cell *1st* M_2 irregular, the distal end strongly widened, *m* arcuated, a little longer than the deflection of M_3; basal deflection of Cu_1 about one-half its own length beyond the fork of *M*.

Abdomen destroyed by ants, only the black hypopygium remaining. Male hypopygium with the pleurites short, stout, with three pleural appendages, two of which are setigerous and with the apices acutely pointed, the larger of these two with a powerful lateral spine and a fringe of long reddish hairs between this spine and the apical point; the third and largest appen-

dage is a curved, heavily chitinized arm whose apex terminates in two powerful, slightly divergent points or teeth and which bears a cylindrical arm near midlength, this latter with several long setae.

Holotype: ♂, Igarapé-Assú, June 25, 1919 (H. S. Parish).

Gnophomyia bisecta sp. n.

General coloration reddish brown, the mesonotal praescutum with a single median brown stripe; pleura with an interrupted dorsal band, most noticeable as a velvety black spot on the sides of the postnotum and another on the episternum; wings with a single dark brown band along the cord; vein R_2 very short as in the *hirsuta* group; Sc_1 ending nearly opposite *r*; *r* at midlength of R_{2+3}; basal deflection of Cu_1 at midlength of cell *1st* M_2.

♀.—Length 6 mm.; wing 5.4 mm. Rostrum obscure yellowish; palpi dark brown. Antennae with the scapal segments brownish yellow; the flagellar segments dark brown. Head brownish yellow; eyes large.

Mesonotal praescutum reddish brown with a narrow, dark brown median stripe, indistinct anteriorly, this stripe very indistinctly split by a pale line; scutum similar, each lobe with a small dark brown spot; scutellum and postnotum pale brownish yellow, the latter with two rounded dark brown spots at the posterior margin. Pleura reddish brown with a broad interrupted dorsal stripe, appearing as a large deep black spot on the mesepisternum and another larger black area occupying the lateral sclerites of the postnotum dorsad of the base of the halteres; on the propleura and on the mesopleural epimera this band is paler, brown.

Halteres obscure yellow, the knobs dark brown. Legs with the coxae, trochanters and femora yellow; tibiae brownish yellow with the tips a little darkened; tarsi brown, the distal segments black. Legs short and hairy as in this group of species.

Wings subhyaline with a single, narrow, dark brown band along the cord, beginning at the costal margin, ending at the fork of *M*; wing-apex very slightly darker than the rest of the membrane; veins brownish black, those at the wing-base and in the costal region paler.

Venation: *Sc* rather long, Sc_1 ending just beyond *r*; Sc_2 far from the tip of Sc_1, the latter vein alone being about three-quarters the length of *Rs*; *Rs* long, gently arcuated; R_{2+3} short, bisected by *r* which is nearly twice its length from the tip of R_1; R_2 short and almost straight, as in the *hirsuta* group, shorter than cell *1st* M_2; vein R_3 very long, deflected toward the wing-tip so that cell R_2 is by far the broadest of all the cells at the margin; inner ends of cells R_3 and *1st* M_2 far proximad of R_5; cell *1st* M_2 closed, the inner end somewhat narrowed; basal deflection of Cu_1 at midlength of cell *1st* M_2.

Abdominal tergites dark brown, the basal segments a little paler medially, ventral surface lighter brown; genital segment and ovipositor obscure yellow, the valves of the latter horn-colored; tips broken in the unique type. The abdomen of the type is filled with large eggs.

Holotype: ♀, Parintins, October 3, 1919 (H. S. Parish).

Gnophomyia bisecta is closest to *G. pervicax* Alexander (Peru) from which it differs in the single praescutal stripe, the wing-pattern and the details of venation.

Psaronius pallipes sp. n.

Head light brown with a darker median line; mesonotal praescutum light brown with three dark brown stripes; metatarsi whitish; wings with a strong brown tinge, the veins conspicuously seamed with dark brown; cell *2nd* R_1 of nearly uniform width for its entire length.

♀. Length 20–20.5 mm.; wing 14.5–15 mm.; abdomen alone 16.5 mm. Rostrum and palpi dark brown. Antennae with the scapal segments light brown; flagellum dark brown. Head light brown; a rounded, dark brown spot on the vertex between the eyes; a brown median stripe.

Mesonotal praescutum light brown with three conspicuous darker brown stripes; median stripe split for about the anterior half by a still darker brown capillary line; pseudosutural foveae dark brown; scutum brown, the lobes darker brown; a small dark brown spot at the end of the transverse suture; scutellum and postnotum light grey with a capillary brown median vitta. Pleura light grey, indistinctly marked with brown.

Halteres dark brown; basal half of the stem pale. Legs with the coxae and trochanters pale brown; trochanters pale brown; femora and tibiae obscure yellow, the tips narrowly dark brown; metatarsi whitish, the tips and the remainder of the tarsi dark brown.

Wings with a strong brown tinge, the costal cell darker, the subcostal cell more yellowish; small dark clouds at the origin of *Rs*, fork of *Rs*, fork of R_{2+3}; longitudinal veins with distinct, broad seams; wing-margin broadly infuscated; wing-base proximad of arculus darkened. Venation very similar to *P. obscurus*, differing as follows: R_2 running almost parallel to R_1 so cell *2nd* R_1 is of almost uniform width to the margin; fusion of Cu_1 and M_3 slightly more extensive,

Abdomen dark brown, the tergites darker medially; sternal valves of the ovipositor almost black.

Holotype: ♀, Prata, June 30, 1919 (H. S. Parish).

Paratopotype: ♀, July 5, 1919.

Psaronius pallipes is one of the medium-sized species of this interesting Neotropical genus. By means of the author's key to the species of *Psaronius* (Trans. Am. Ent. Soc., vol. 40, p. 250; 1914) this fly would run to *P. fuscipennis* Alexander, a larger fly with the coloration and wing-pattern distinct. Attention should perhaps be called to the fact that the abdomen is very long and contributes most to the length of the insect; for this reason a better idea of size is conveyed by the length of the wing.

Psaronius brevitibia sp. n.

General coloration light brown; head and mesonotal praescutum unmarked with darker; metatarsi whitish; tibiae short; wings pale yellow, sparsely marked with darker; vein R_2 entirely atrophied.

♀.—Length 24 mm.; wing 14.4 mm.; abdomen alone 19.5 mm. Rostrum and palpi dark brown. Antennae with the scapal segments light brownish yellow; flagellum broken. Head rufous brown, narrowly silvery adjoining the eyes; occiput and adjoining parts of the vertex dull brown.

Mesonotal praescutum light brown without distinct stripes; scutum and postnotum with a very indistinct median line. Pleura pale without distinct markings.

Legs with the femora and tibiae light brown, the tips of the latter narrowly dark brownish black; metatarsi whitish, the base and apex narrowly darkened; remainder of the tarsi dark brown; tibiae comparatively short (hind tibiae 11.5 mm.; in *P. pygmaeus* 14.2 mm.).

Wings pale yellow, the costal and subcostal cells deeper yellow; small dark brown seams at the origin and fork of *Rs*, and as very narrow seams along the cord and outer end of cell *1st* M_2; wing-apex in cells R_2, R_3, R_5 and M_1 faintly darkened; veins dark brown, *C*, *Sc*, *R*, *Rs* and R_3 yellow. Venation: vein R_2 entirely atrophied, quite as in *P. abnormis* Alexander; cell M_1 about equal to or a little shorter than its petiole.

Abdominal tergites brown, the sternites more yellowish.

Holotype: ♀, Obidos, August 28, 1919 (H. S. Parish).

By means of the author's key to *Psaronius*, cited under the preceding species, *P. brevitibia* would run to *P. abnormis*, of Paraguay, a greyish fly with the costal margin of the wings conspicuously infuscated. It much more resembles *P. pygmaeus* Alexander (Guiana–Brazil) which has vein R_2 imperfectly preserved, being represented by a short spur that is fused with R_1 at the tip; this species has the tibiae considerably longer as given above, and the details of venation and coloration are slightly different.

Polymera conjunctoides sp. n.

General coloration light brown; thoracic pleura with a narrow, black, longitudinal stripe; wings grey; cell M_1 deep; ovipositor with the valves long and straight.

♀.—Length about 3.5 mm.; wing 3.8 mm. Rostrum and palpi dark brown; flagellar segments in the female long-oval. Head brown.

Pronotum testaceous. Mesonotum light brown. Pleura pale brownish testaceous with a narrow black longitudinal stripe continued from the head to the base of the abdomen, passing just beneath the halteres.

Halteres dark brown, the extreme base of the stem pale. Legs with the coxae testaceous; trochanters pale brown; remainder of the legs pale brown; no tibial spurs.

Wings with a strong grey suffusion; veins brown. Venation; almost as in *P. conjuncta* but R_{2+3} a little longer; R_2 before r a little longer; basal deflection of Cu_1 some distance beyond the fork of M and cell M_3 much deeper, vein M_3 alone being longer than the fused portion of M_3 and Cu_1.

Abdomen dark brown, the sternites a little paler. Ovipositor with the valves horn-colored, long, straight, the tips acute.

Holotype: ♀. Itacontiara, October 16, 1919 (H. S. Parish).

The lack, or apparent lack, of tibial spurs would refer this fly to the genus *Erioptera* rather than *Polymera*, yet the appearance of the insect is so very similar to species of this latter genus that it is referred here, at least provisionally. Whether the tibial spurs are similarly lacking in *P. conjuncta* Alexander cannot be determined at this time as no specimens are at hand.

Brachypremna uniformis sp. n.

Close to *B. dispellens;* femora and tibiae uniformly dark brown, the tarsi fading into cream-color.

♀.—Length 15 mm.; wing 14.2 mm. Generally similar to *B. dispellens* (Walker), differing as follows: Palpi with the first segment dark brown the apex narrowly pale; segment two entirely pale yellow; segment three black basally, about the outer third obscure yellow; last segment black with the extreme tip conspicuous yellow. Mesonotal praescutum with the intermediate pair of brown stripes broader. Legs with the femora and tibiae of all the legs uniform brown; tarsi pale brown, the distal segments passing into cream color. Abdominal sternites one to eight with an elongate-oval black dash near the center of each segment.

Holotype: ♀, Parintins, October 8, 1919 (H. S. Parish).

Brachypremna uniformis differs conspicuously from all the known species of the genus with the exception of *B. unicolor* Osten Sacken (Antilles) in the uniformly dark femora and tibiae. By means of the author's key to the species of this genus (Journ. N. Y. Ent. Soc., vol. 20, p. 228; 1912), *B. uniformis* would not run past the initial couplet because of the combination of venation and leg-coloration. The venation is quite as in *B. dispellens* and related species but the entire absence of white on the femora and tibiae precludes its reference to any of these species. *B. unicolor* differs from all other species of the genus as known, including this new form, in the very curious wing-venation.

New Species of Lyonetiidae (Microlepidoptera).

By ANNETTE F. BRAUN, Cincinnati, Ohio.

The types of these new species are in the writer's collection. Paratypes of *Bucculatrix errans* and of *Coptodisca negligens* will be placed in the collection of the Academy of Natural Sciences of Philadelphia.

Bucculatrix fusicola n. sp.

Head white, occasionally a few fuscous scales in the middle of the tuft; antennae white, shading to pale fuscous toward the tips.

Thorax and fore wings pure white, the wings marked with ocherous streaks, which are sometimes slightly dusted with brown. There is a median streak from base, often faint in the male; an oblique streak from middle of costa, soon bending to become parallel with the median streak (part near costa usually obsolete in female); a second, straight and less oblique brownish costal streak passing across the wing and meeting on the termen the end of a line of black scales which extends along the termen to the apex; beyond the second costal streak a patch of slightly dusted ocherous scales whose inner edge is parallel with the second costal streak and nearer to it than the second is to the first costal streak; a faint ocherous streak along the dorsum is deflexed beyond the middle and passes obliquely upward joining the second costal streak; a line of black scales in the cilia from apex to tornus diverges slightly from the line bordering termen. Hind wings pale grayish ocherous in male, fuscous in female.

Legs whitish, tips of tarsal segments spotted with black in female. Expanse: 12 mm.

Type (♀), reared from a spindle-shaped gall on stem of *Helianthus tracheliifolius* at Cincinnati, Ohio; in addition to the type, a large series of captured specimens, taken in patches of this species of sunflower.

The gall is usually situated toward the upper part of the stem and averages about 2 cm. in length, with a greatest diameter of .5 cm. The cavity in the gall within which the larva feeds, is of about the same proportions. The larva finishes eating in the latter part of September, but remains in the gall throughout the winter, escaping in the spring through a minute circular aperture. The cocoon is dark brownish fuscous, *smooth* and flattened, and closely appressed to the surface on which it is spun, resembling not at all the usual *Bucculatrix* cocoon. The imagoes appear from the end

of May to early July. Apart from the anomalous habits of the larva and peculiar cocoon, this species shows no divergence from the usual *Bucculatrix* type.

This species is closely related to Chamber's *B. magnella* and has been known as that species in some collections. There are several large species of this general appearance, of which the species described below is one.

Bucculatrix montana n. sp.

Head white, with a few fuscous hairs in the tuft; antennal stalk pale fuscous.

Thorax and fore wings shining white; three equally spaced oblique and parallel ocherous-dusted costal streaks, the first before the middle bending below costa to join the second, which runs into some pale dusting on the termen, the third the broadest. From just before apex a brown streak runs to tip of apical cilia and is met at about half its length by a line of dusting extending through the middle of terminal cilia; a curved dorsal streak just beyond middle of wing bends backward along the fold. Hind wings pale grayish ocherous.

Legs pale whitish ocherous, with the tips of tarsi darker. Abdomen ocherous, fuscous toward tip above. Expanse: 11 mm.

Type (♂), Mountain Lake, Virginia, June 18.

The specimen emerged from a rather large cocoon of the usual *Bucculatrix* type; food plant unknown.

Bucculatrix errans n. sp.

Face and head pure white, middle of tuft dark brown; antennal stalk brown, becoming paler toward tip.

Thorax white. Fore wings dark brown; just within the costa, a broad white streak from base, broadening outwardly, shortest along the costa and prolonged on the disk nearly to the middle of the wing; base of wing below the fold white, this white sometimes increased in extent to occupy the entire base of dorsum when it is then connected at the base with the aforesaid white streak; just below the middle a curved white costal streak, and a little nearer the base a large half-crescent-shaped dorsal streak; a narrow costal streak at two-thirds and opposite it at the tornus a pair of white spots of which the posterior one points inwardly; a triangular white spot in costal cilia at apex, bordered outwardly by an oblique line running out into the cilia; a line of dark scales through middle of cilia to tornus. Occasionally the white marks are so increased in extent that the apices of the spots and streaks in the basal half of the wing coalesce. Hind wings and cilia dark brownish gray.

Legs except tarsi dark brown outwardly; abdomen dark brown. Expanse: 10–10.5 mm.

The type series was reared from larvae feeding on *Aster shortii* at Cincinnati, Ohio. The larva makes a long, transparent, linear, contorted and sometimes spiral mine in the leaves in the autumn. In early November, in a slight enlargment at the end of the mine, the larva spins a flat, yellow, circular, wintering cocoon, similar in appearance to the moulting cocoon, but of denser texture, within which it lies curled during the winter. In March of the following year, it leaves this cocoon by a circular opening, and bores into a growing shoot just below the growing tip, hollowing out the stem, so that the tip of the shoot dies. It feeds downward, usually eating out the whole contents of the stem for about an inch; when full grown it escapes by a circular hole near the lowest part of the burrow. Larva yellowish white, with two black spots on dorsum of first thoracic segment; head yellowish. The white or pale yellowish cocoon, which is of the usual *Bucculatrix* type, with a series of slightly raised longitudinal ridges, is spun on dead stems or twigs lying near the food plant, but apparently never on the food plant. Imagoes in the latter part of May.

Although the mines are present in immense numbers on the leaves in the fall, probably not more than one per cent of the larvae reach maturity.

Tischeria nubila n. sp.

Face and head whitish straw-colored with a few fuscous scales on the sides behind; antennae whitish, in male fuscous beneath.

Thorax darker, on the sides more ocherous than the head; fore wings with the ground color sulphur yellow, the color deepening on the margins and in the apical fourth to reddish or brownish ocherous; on these darkened areas there is scattered dark dusting, which usually forms a distinct dark line at the base of the cilia around the apex and a rather large dark spot at the tornus, and follows the dorsal margin to the base; under side of base of costa of male fuscous. Hind wings pale ocherous, slightly deeper at apex.

Legs ocherous dusted with fuscous outwardly. Expanse: 7.5 mm.

Type (♂), and seven paratypes reared from larvae mining leaves of white oak, *Quercus alba*, at Winnfield, Louisiana, (collected by G. R. Pilate). The mine is variously placed on the leaf, always elongate, with epidermis wrinkled and torn

ta pupation much as in *Coptotriche*. Mines received early in May produced imagoes during the latter half of that month.

This species is similar to *T. badiiella* in distribution of dark dusting, but the ground color is deeper and the base of the costa of the hind wing of the male is not thickened with dark fuscous scales as in that species.

Coptodisca negligens n. sp.

Face and head pale leaden metallic; antennae blackish.

Thorax and basal half of fore wings pale leaden metallic; apical half or more of wing bright orange yellow; the silvery costal and dorsal streaks at the apical third nearly opposite, of about equal size, their apices usually separated by the yellow ground color, rarely with their internal dark margins confluent. The outer dark margin of the dorsal spot forms part of the dark patch of scales which extends from it to the dorsum and termen, but is separated from the costal streak and apical dark patch by the orange yellow color. A perpendicular dark streak in the costal cilia beyond the costal silvery streak. Apical dark patch preceded by a minute silvery spot and broadly bordered on either side with silvery scales; from it a black pencil extends into the apical pale gray cilia. Hind wings gray.

Legs silvery gray, tarsi fuscous. Expanse: 4–4.5 mm.

The type series, consisting of 55 specimens, was reared from mines on leaves of cranberry, *Oxycoccos macrocarpon*, from Cranberry Island, Buckeye Lake, Ohio. The species is peculiar in the genus in that it is single brooded: the cranberry plant from which the mines were obtained was brought from Cranberry Island about August 5, and there were at that time no mined leaves on the plant. Early the following spring the majority of the overwintering leaves were observed to be affected, a single leaf containing sometimes four or five mines. The mine is of the usual type; the pupal case is cut lengthwise in one-half the leaf and when completed measures 1 by 2.5 mm. The larvae were full grown early in May and produced moths during the first half of June. The moth apparently deposits its eggs on the leaves of the new growth, to remain without hatching until the following spring. The mined leaves of the preceding year's growth are lost early in the season.

This species is distinguished from others of the genus by the brighter orange color of the apical half of the wing. C.

magnella lives on a closely allied food plant (*Gaylussacia*) but even in its darker forms, can be separated easily from this species by the pale golden face and head, a constant character.

The Bembicine Wasps of North Carolina (Hym.).

By M. R. Smith, Raleigh, North Carolina.

While examining and reclassifying the wasps of this tribe in the collection of the Division of Entomology of the North Carolina State Department of Agriculture, the writer found a large number of specimens present, representing all the various genera known, except one. Therefore it seemed worth while to publish a paper making known the various species found in the state and their distribution.

In the preparation of this paper the writer has followed very closely, Parker's excellent work, "A Revision of the Bembicine Wasps of America North of Mexico."* The keys are, as a whole, adapted from his paper, as are also quite a few of the notes.

Collections were made in the state by the following men, their initials being given in the paper for the sake of brevity: Franklin Sherman, C. S. Brimley, A. H. Manee, R. S. Woglum, Z. P. Metcalf, C. L. Metcalf, R. W. Leiby, J. E. Eckert, Max Kisliuk and the writer.

To Messrs C. S. Brimley and Franklin Sherman much credit is due for their kind assistance in the preparation of this paper.

Key to Genera

1—Anterior ocellar cicatrix circular or elliptical in form, sometimes placed in a pit ..... 2.

1—Anterior ocellar cicatrix linear, transverse, straight, or curved, in a few species the ocellus not completely obliterated ..... 3.

2—Anterior ocellar cicatrix not placed in a pit; seventh tergite of males with lateral spines, eighth sternite ending in a single spine and middle femora with a strong curved tooth below near distal end ..... *Stictia*.

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*Proceedings of the United States National Museum, Vol. 52, pp. 1–55. No. 2173. 1917.

2—Anterior ocellar cicatrix placed in a pit; seventh tergite of male without lateral spines; middle femora without curved tooth below near distal end; eighth sternite ending in three spines, and in many species bearing a fourth discal spine.....*Stictiella.*
3—Posterior surface of thorax concave, its lateral angles prolonged, compressed and wedge-like.....*Bicyrtes.*
3—Posterior surface of thorax flat or convex, its lateral angles rounded..4.
4—Mandibles toothed; apical end of radial cell of anterior wing on costal border.....*Bembix.*
4—Mandibles not toothed; apical end of radial cell of anterior wing not on costal border.....*Microbembex.*

KEY TO SPECIES OF STICTIELLA.

Males

1—Middle femora smooth beneath: wings clear.....*pictifrons.*
1—Middle femora not smooth beneath, toothed; wings cloudy....*serrata.*

Females

1—Pulvilli distinct; band on scutellum sometimes interrupted narrowly on the median line.....*pictifrons.*
1—Pulvilli indistinct; no band on scutellum.....*serrata.*

Stictiella pictifrons Smith.

The markings are lighter on the male than on the female and are not so well developed. Length 12–15 mm.

Parker records this species from North Carolina in his paper, no specific locality being given. We have no specimens in our collection.

S. serrata Handlirsch.

As the specific name signifies, this species has prominent saw-like teeth beneath the middle femora of the male. Both sexes are generally smaller than are those of *S. pictifrons.* Length 11–13 mm.

No specific locality record is given for this species; it is recorded from North Carolina by Parker. We have no specimens in our collection.

KEY TO SPECIES OF BEMBIX

Males

1—Intermediate femora distinctly saw-toothed or toothed.....2.
1—Intermediate femora smooth, not distinctly saw-toothed or toothed..3.
2—Process on under side of the sixth abdominal segment a transverse ridge, not sharply pointed but slightly curved on either side of the midline.....*belfragei.*

2—Process on under side of the sixth abdominal segment not as above, relatively small, sharply pointed or if flattened, the sixth sternite lacks the lateral processes or ridges ..... *spinolae.*
2—Under side of second and sixth abdominal segments with processes, that on second more or less well developed, in exceptional cases lacking, that on sixth simple, median, pointed ..... *texana.*
2—Under side of second and sixth abdominal segments without processes ..... *pruinosa.*

Females

1—Neither post-scutellum nor dorsum of median segment (excluding posterolateral angles) marked with yellow ..... 2.
1—Post-scutellum or dorsum of median segment, or both, marked with yellow ..... *pruinosa.*
2—Last abdominal segment, strongly wrinkled dorsally ..... *belfragei.*
2—Last abdominal segment not wrinkled, punctate ..... 3.
3—Bands on dorsal abdominal segments sinuate but not greatly attenuated medially, body rather slender ..... *spinolae.*
3—Bands on dorsal abdominal segments wide laterally and much attenuated medially or reduced to widely separated lateral spots. body relatively robust ..... *texana.*

Bembix texana Cresson.

This species in a general way, may be distinguished by the fasciae being so attenuated and sinuated medially as to enclose more or less well marked black spots on the dorsum of the abdomen. On the second segment of the abdomen this marking is particularly more striking than on the other segments. The markings should not be relied upon too much, however, as specific characteristics, since they are variable. Length 15–18 mm.

Specimens were collected at Raleigh M. July, 1912, C. L. M; M. July and E. August, 1902, F. S.; Overhills, L. August, 1919, J. E. E.; Princeton, L. July, 1902, F. S. 6 specimens: 4 females, 2 males.*

B. pruinosa Fox.

This rather large, handsome species may be easily distinguished by the dense pubescence on the head, thorax and base of the abdomen, particularly by the pubescence of the former two. The transverse bands are large and broad. Length 16–19 mm.

The two specimens, a male and a female were collected at Beaufort, L. June, 1903, F. S.

(To be Continued)

*The letters E., M., and L., prefixed to dates, refer to early, mid, or late, for example, early August, mid August, late August.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MARCH, 1920.

A FIFTY YEARS' EDITORSHIP AND ARTHROPODS.

It is always a good thing for the entomologist to look outside his own subject and its special literature if with no other hope than that of obtaining some new ideas with which to illuminate his own studies. *The Quarterly Journal of Microscopical Science* (London) for October, 1919, contains an article by one of its cooperating editors on "Fifty Years of the 'Quarterly Journal of Microscopical Science,' under the Editorship of Sir E. Ray Lankester." In it a brief sketch of the foundation of the Journal in 1853, with Dr. Edwin Lankester as one of its editors, is given. "In 1869 E. Ray Lankester, then a newly graduated B. A. of Oxford, joined his father in the editorship" and became chief editor in 1872. The most important articles in various biological fields which have appeared in the Journal are enumerated, as, for example, "the extremely interesting memoirs on the natural history of Termites by Grassi and Sandias in 1896 and 1897," translations, however, from publications in the Italian. It would appear from this list that contributions on the insects have not been so numerous or important to receive much attention. But there is this paragraph:

> The series of articles by Sir Ray Lankester, beginning in vol. 21 (1881) with the memoir, "Limulus an Arachnid" are now among the classics of zoological literature, and to this day stand as an example of the way in which a morphological problem may be followed up in detail by critical analysis of every organ in the bodies of the animals brought into comparison. The paper on the minute structure of the lateral and central eyes of Scorpio and Limulus was written in conjunction with A. G. Bourne, and marks a great advance in our knowledge of the structure and genesis of the Arthropod eye. In later years (vol. 48, 1904) these memoirs were summed up and extended in a masterly review of the structure and classification of the Arachnida. As a parallel piece of research we may notice Lankester's illuminating memoir, "Observations and Reflections on the Appendages of *Apus cancriformis*, vol. 21 (1881), followed by P. Pelseneer's more detailed study of the same species (vol. 25, 1885), and the whole sub-

ject of Arthropod structure and classification is summed up in Sir Ray's essay in vol. 47 (1904) to which G. H. Carpenter's notes on the segmentation and phylogeny of the Arthropoda in vol. 49 (1905) is a fitting pendant.

We may also include the series of memoirs on *Peripatus*, "no less famous in the annals of the Journal."

A preceding number of the Journal (April, 1919) contained a brief article by Sir Ray on the "Terminology of Parthenogensis" in which the case of the "greenflies or Aphides" is used as an illustration.

It is not often that an editor is still active after fifty years' association with the same journal and we may fittingly join the British zoologists in offering Sir Ray our "cordial congratulations on the achievements of past years coupled with best wishes for those that are to come."

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Pseudagenia capella nom. nov. (Hym., Psammocharidae)

In "Philippine Wasp Studies" (Bull. No. 14, Ent. Ser.; Report of the Work of the Experiment Station of the Hawaiian Sugar Planters' Association, Published in Honolulu, Hawaii, December 31, 1919), on pages 45 and 46, I described a psammocharid wasp under the name of *Pseudagenia caerulescens*, and further referred to the species on page 100. As *caerulescens* has long ago been used by Dahlbom for the specific name of an American wasp belonging to the genus *Pseudagenia*, my Philippine species is a homonym and its name must be changed. I therefore change the name of my Philippine species from *Pseudagenia caerulescens* Williams to *Pseudagenia capella* Williams.—Francis X. Williams, Honolulu, Hawaii.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in Heavy-Faced Type refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—Canadian Entomologist, London, Canada. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **16**—The Lepidopterist, Salem, Mass. **17**—Lepidoptera, Boston, Mass. **39**—The Florida Buggist,

Gainesville. **42**—Entomologiske Meddelelser udgivne af Entomologisk Forening, Kjobenhavn. **43**—Proceedings of the Entomological Society of British Columbia, Victoria, B. C. **50**—Proceedings of the United States National Museum, Washington. **52**—Zoologischer Anzeiger, Leipsic. **54**—Proceedings of the Biological Society of Washington, D. C. **59**—Journal of Agricultural Research, Washington, D. C. **61**—Proceedings of the California Academy of Sciences, San Francisco. **67**—Le Naturaliste Canadien, Quebec. **72**—The Annals of Applied Biology, London. **76**—Nature, London. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **80**—Revue Suisse de Zoologie, Geneve. **82**—The Ohio Journal of Science, Columbus. **89**—Zoologische Jahrbucher, Jena. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **103**—Biologisches Centralblatt, Leipzig. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **105**—Proceedings of the Iowa Academy of Sciences, Des Moines.

GENERAL. Buddenbrock, W.—Einige bemerkungen zu Demoll's buch: Die sinnesorgane der Arthropoden, ihr bau und ihre funktion. (Biol. Zentralb. xxxviii, 385–91.) **Crampton & Hasey.** The basal sclerites of the leg in insects. **89,** xxxix, Abt. f. Anat., 1–26. **Dewitz, J.**—Bedeutung der oxydierenden fermente (Tyrosinase) fur de die verwandlung der insektenlarven. **52,** xlvii, 123–4. Aussere merkmale der geschlechter bei insektenlarven. **52,** xlvii, 124–26. Untersuchungen ueber geschlechtsunterschiede. **52,** xlvii, 126–132z. **Escherich, K.**—Zeitschrift fur angewandte entomologie, III, Heft 1–3, 1916. **Heikertinger, F.**—Nomenklatorische reformen. Das systemzeichen im gattungsnamen. **52,** xlvii, 198–208 (cont.). **Houser, J. S.**—Destructive insects affecting Ohio shade and forest trees. (Bul. Ohio Agric. Exper. Station, No. 332, 165–487.) **Kahn, R. H.**—Zur physiologie der insektenmuskeln. (Pfluger's Archiv f. Phys., clxv, 285–336.) **Phiar, A. W. A.**—Three years' collecting in the Lillooet district. **43,** N. 12, 34–36. **Stellwaag, F.**—Wie steuern die insekten wahrend des fluges? **103,** xxxvi, 30–44. **Stellwaag, F.**—Wie steuern die insekten im flug? (Die Naturwissenschften, 1916, 270–2.) **Toldt, K.**—Insektenfahrten im ladenstaub naturwissenschaftlicher sammlungen. **52,** xlviii, 122–38. **Tothill, J. D.**—Natural control investigations in British Columbia. **43,** N. 12, 37–39. **Wasmann, E.**—Nachtrag zum Mendelismus bei ameisen. **103,** xxxv, 561–4. **Wheeler, W. M.**—The Termitodoxa, or biology and society. **91,** x, 113–124. **Willers, W.**—Cellulare vorgange bei der hautung der insekten. **104,** cxvi, 43–74.

GENETICS, ETC. Ballowitz, E.—Spermiozeugemen bei libellen. **103,** xxxvi, 209–16. **Goldschmidt, R.**—Notiz ueber einige bemerkenswerte erschienungen in gewebekulturen von insekten. **103,** xxxvi, 160–7. **Hajime, U.**—On the relations between blood color and cocoon color in silkworms, with special reference to Mendel's law of heredity. (Genetics, iv, 395–416.) **Morgan, Bridges & Sturtevant.**—Contributions to the

genetics of Drosophila melanogaster. (Pub. No. 278, Carnegie Inst., Wash.)

ARACHNIDA, ETC. Ewing, H. E.—The life and behavior of the house spider. **105,** xxv, 177–204. **Hamrurger, C. K.**—Zur kenntnis des mitteldarmes der spinnen. **52,** xlviii, 38–46. **Hartzell, A.**—A preliminary list of the Acarina of Iowa. **105,** xxv, 205–12. **Ressler, I. L.**—Spiders of the family Attidae collected in the vicinity of Ames, Iowa. **105,** xxv, 221–34. **Verhoeff, K. W.**—Bronn, Klassen des Tier-Reichs. Bd., v, Abt. 2, Klasse Chilopoda, p. 313–393. **Voges, E.**—Myriapodenstudien. **104,** cxvi, 75–135.

Marshall, R.—New species of water mites of the genus Arrhenurus. (Trans. Amer. Microscopical Soc., xxxviii, 275–282.) **McGregor, E. A.**—The red spiders of America and a few European species likely to be introduced. **50,** lvi, 641–79.

NEUROPTERA. Ferris, G. F.—Contributions towards a monograph of the sucking lice, Pt. 1. (Leland Standf. Univ. Pub. Univ. Ser., 41.) **Moll, Dr.**—Der schutz des bauholzes in den Tropae gegen die zerstorung durch die Termiten. (Der Tropenpflanzer, xviii, 591–605, 1915.) **Porter, C. E.**—Los Tisanopteros. (Act. Soc. Scient. du Chili, xxv, 64–83.) **Priesner, H.**—Zur entwicklungsgeschichte der turbanaugen von Cloeon dipterum. **89,** xxxix, Abt. f. Anat., 485–514. **Schmidt, E.**—Ueber das schwimmen der Libellenlarven. **52,** l, 235–7. **Schmidt, E.**—Vergleichende morphologie des 2 und 3 abdomenalsegments bei mannlichen Libellen. **89,** xxxix, Abt. f. Anat., 87–200. **Strindberg, H.**—Konnen die Mallophagen sich auch vom blut ihrer wirtstiere ernahren. **52,** xlviii, 228–31. **Strindberg, H.**—Zur entwicklungegeschichte und anatomie der Mallophagen. **104,** cxv, 383–459. **Treherne, R. C.**—Notes on the Aeolothripidae. **43,** N. 12, 27–33.

Watson, J. R.—The native host-plant of the camphor thrips. **39,** iii, 25–7. A new Physothirps from Oregon. **39,** iii, 32.

ORTHOPTERA. Hebard, M.—A plea for more accurate taxonomy in morphological and other studies. **4,** 1919, 278–9. **Walker, E. M.**—The terminal abdominal structures of Orthopteroid insects: a phylogenetic study. **7,** xii, 267–326.

HEMIPTERA. Baker, A. C.—Apple-grain aphis. **59,** xviii, 331–24. **Dickerson & Weiss.**—The life-history and early stages of Platymetopius hyalinus, a Japanese maple leaf-hopper in New Jersey. **7,** xii, 369–372. **Downes, W.**—Notes on a collection of Hemiptera. **43,** N. 12, 13–16. **Emeis, W.**—Ueber cientwicklung bei den Cocciden. **89,** xxxix, Abt. f. Anat., 27–78. **Peterson, A.**—Some studies on the eggs of important apple plant lice. (New Jersey Agric. Exper. Sta., Bul. 332.) **Riley, C. F.**—Some habitat responses of the large water strider, Gerris remigis. **90,** liv, 68–83. **Weiss, H. B.**—Notes on Corythuca bulbosa. **82,** xx, 17–20.

Drake, C. J.—An undescribed Teleonemia from Florida and Jamaica. **89,** iii, 24–5.

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Obituary

George Macloskie, professor of biology at Princeton University from 1875 to 1906 and emeritus professor since 1906, died at Princeton, New Jersey, January 4, 1920. To Professor Conklin of that University, we are indebted for copies of a notice of Prof. Macloskie's life, which appeared in *The Princeton Alumni Weekly* of January 14, and of the resolutions adopted by the University faculty, January 5, published in the *Princeton Packet.* From these the following abstract has been prepared. To Professor W. M. Rankin, of the same institution, we owe the list of Prof. Macloskie's entomological papers printed below.

George Macloskie was born at Castletown, Ireland, September 14, 1834, received the A. B. and A. M. degrees from Queen's University, Belfast, in 1857 and 1858, and LL. B. and LL. D. in course from London University in 1868 and 1871. Ordained a minister of the Presbyterian church in 1861, he was pastor at Ballygoney, Ireland, from 1861 to 1874. The interest he displayed in natural history caused President McCosh of Princeton, at one time his teacher, to call him to the chair of that subject, in the recently established John C. Green School of Science, in 1875.

The resolutions of the faculty referred to above, prepared by Professors W. B. Scott and Rankin, state

Through . . . [thirty one] . . . years he gave his energies with scarcely an intermission to the teaching of Botany and Zoology as long as they were required studies, and then to smaller and specialized classes in elective biological subjects. Not only was he an enthusiastic teacher of Natural History but he also taught the formerly required subject of the English Bible, and was also the examiner of the Latin required of the entering School of Science students . . . Bred as a theologian he was nevertheless in sympathy with the then new doctrine of Evolution, and throughout his life was a firm upholder of the essential harmony of Science and Religion.

He is described as an omnivorous reader, having a keen interest in mathematical, physical and linguistic studies, a promoter of Esperanto, author of an *Elementary Botany* and of a *Flora of Patagonia* in three volumes, based on material collected by Princeton expeditions.

In entomology his interest was chiefly morphological and anatomical, as the following list shows.

PAPERS ON ENTOMOLOGY BY GEORGE MACLOSKIE

From *The American Naturalist*: The Proboscis of the House-fly, March 1880.—The Endocranium and Maxillary Suspensorium of the Bee, May, 1881.—The Structure of the Tracheae of Insects, June, 1884.—Kraepelin's Proboscis of Musca (An abstract & review), Dec., 1884.—Embryology of Aphides by Witlaczil (a review and abstract), Feb., 1885.—Witlaczil on Psyllidae (abstract and review) March, 1886.—Grosse's Classification and Structure of the Bird-lice or Mallophaga (Abstract), April, 1886.—The Poison-apparatus of the Mosquito, Oct., 1888.

From *Science*: The Structure of Insect Tracheae (Abstract of a paper read before the American Society of Naturalists, Dec., 1891), Feb., 1892.

From *Psyche*: Pneumatic Functions of Insects, Nov., 1882.—Gills of Insect Larvae, Dec., 1883.—Head of Larval Musca,—Preliminary note, Dec. 1884.

Seitz: Palaearctic Geometridae (Lepid.)

[3]EDITOR, ENTOMOLOGICAL NEWS: The publishers of Seitz, Macrolepidoptera, ask me to send you the enclosed note, which is of interest to the subscribers to the work. Perhaps you can find room for the note in your next issue. K. JORDAN, Tring, England[4]

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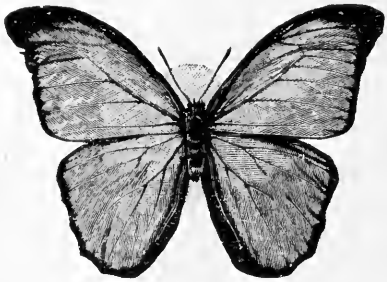

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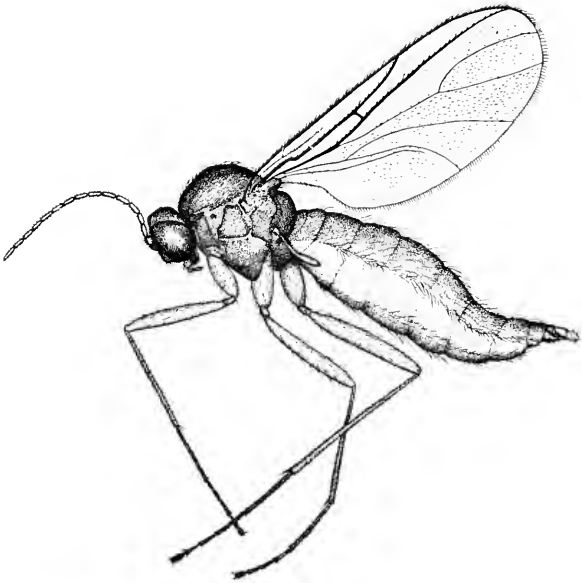

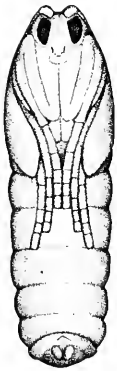

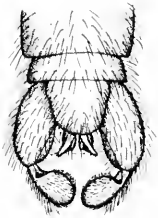

NEOSCIARA MACFARLANEI.—JONES

ADULT FEMALE, PUPA, EGG, MALE HYPOPYGIUM, LARVA.

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AND

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CONTENTS

Another Pitcher-Plant Insect (Diptera, Sciarinae).

By FRANK MORTON JONES, Wilmington, Delaware.

(Plate I.).

The captures of *Sarracenia*, especially those of the larger southern species, offer many surprises: as we pass from one tall "pitcher" to another, lifting their lids and peering down the narrowing tubes, we find recent captures,—moths, beetles, flies, wasps, grasshoppers, representatives of most of the principal orders of insects,—attempting to scale the vertical walls which have already proved fatal to the earlier victims whose remains fill the lower tubes; we recognize the usual guest insects, *Exyra*, *Sarcophaga*, *Isodontia*, or the indications of their presence; and if the season and locality be favorable, we may soon find a "pitcher" whose tube, some inches below the top, is closed by a mass of whitish froth-like filaments

suggestive of a mold or fungus, but which closer examination shows to be the product of certain slender yellowish white or yellow larvae which are feeding upon the captured insects, the froth-like mass being spun by those about to pupate, usually on the upper surface of the accumulated insect remains. Attention to this insect was first called (in 1909) by Dr. John M. Macfarlane, who has so ably monographed the *Sarraceniaceae;* at that time, in the Sarracenia-house of the Botanical Laboratory of the University of Pennsylvania, the presence of these insects occasioned some alarm for the safety of the plants, until their feeding habits were determined; subsequent observations in the field have resulted in the discovery of this insect in the pitchers of *S. sledgei* in southern Mississippi, in *sledgei* and *drummondii* in southern Alabama, in *S. rubra* and *S. flava* in North Carolina, and in *S. minor* and *S. flava* in South Carolina. Thus widely distributed, and associated with every species of *Sarracenia* whose structure is favorable to its presence, this insect is probably, like the associated Sarcophagid flies (Aldrich, Sarcophaga and Allies in North America, Thomas Say Foundation, 1916, pages 88, 89), exclusively a pitcher-plant insect; Dr. Johannsen has kindly determined that it belongs to an undescribed species, in Pettey's key (Annals Ent. Soc. Am., XI 319) going with *Neosciara coprophila* and *N. caldaria*, from which it is readily separable by the ♂ hypopygium, which in the new species resembles that of *jucunda* (Johannsen's figure 123), though lacking the transverse row of setae, and in wing venation having the petiole of the cubitus longer and R^1 shorter than in *jucunda;* its description follows:

Neosciara macfarlanei nov. sp.

Egg.—Pear-shaped, .38 mm. long, .21 mm. greatest width; translucent, polished, pale yellow; deposited on inner leaf wall above the insect remains.

Larva.—Of the usual *Sciara* form, with brownish-black chitinized head; in color varying individually from yellowish white to rather bright yellow; the dark contents of the digestive tract, in which insect fragments are recognizable, showing through the translucent integument; segments 6, 7, 8, and 9 of almost uniform diameter, from these tapering somewhat anteriorly and posteriorly; eight pairs of spiracles marked by minute pol-

ished black rounded protuberances; length before pupation 10 mm.; usually from three to a dozen or more larvae occupy an infested pitcher.

Pupa.—Suspended among or imbedded in froth-like white filaments; often several pupae in close proximity in a common froth-mass which is denser about each pupa, thus approximating a frail cocoon-like structure, from which the pupa pushes its way before emergence of the fly; pupa yellowish white, soon darkening, especially the eyes, with the pigmentation of the imago; base of antennae prominently arched over the eyes, but not in contact medially; abdominal spiracles marked by minute concolorous pointed projections; length about 4 mm.

Imago, ♂ and ♀.—Length 3 to (♀) 3.8 mm., dry; live females often slightly exceed 4.5 mm.; fuscous black to black; head and thorax denser in color than the abdomen, somewhat polished, finely punctate, hairs black. Eyes black, finely pubescent, their finger-shaped frontal projections failing of contact by less than width between antennae; lateral ocelli remote from eye-margins, inclined on a rather prominent ocellar protuberance. Palpi and antennae smoky; intermediate joints of the flagellum twice as long as wide, last flagellar joint elongated; antennae of ♀ about one-sixth shorter than those of the ♂.

Halteres slender, finely pubescent, smoky, the stems pale; coxae and femora brownish-yellow, with dark hairs; tibae darker, more smoky, and tarsi almost black; trochanters dark beneath; length of hind tibia to tarsus, as 100 to 85.

Wings brownish-hyaline; costa, radius, and R-M cv. setose; cubitus and media not setose, except that basal section of media of ♂ usually bears one or two setae; costa produced fully two-thirds of way from Rs to M1; Rs and M2 end about equidistant from the base of the wing; the base of Rs is slightly distad of the mid-point between the humeral cross-vein and the tip of R1; subcosta very faint, ends free, proximad of the origin of Rs; R1 ends slightly proximad base of fork of M (in measured wings, from one-twenty-sixth to one-tenth of the wing-length proximad); petiole of cubitus about same length as basal section of media.

Abdomen black-haired; lateral band (in fresh examples) yellowish brown; the distended body of the ♀ dries to an almost uniform smoky brown, paler than that of the ♂; hypopygium dark, claspers subglobose, shortly stemmed to and more than half as long as the preceding joint, and with no mesal processes or differentiated apical spines: lamellae of ♀ ovipositor about one and one-third times as long as broad.

Localities: Summerville, South Carolina; Southern Pines, North Carolina; Theodore, Mobile County, Alabama; Biloxi and Wiggins, Mississippi; Philadelphia Pennsylvania (introduced).

Described and illustrated from numerous examples from all of the stated localities; a male and female, mounted in

balsam, from Theodore, Mobile County, Alabama, are designated as the types, and with other type material are deposited in the Cornell University collection.

In 1910 at Biloxi, Mississippi, as early as March 10th, the larvae of this insect were abundant, the pupae occasional, in those pitchers of *Sarracenia sledgei* which had remained green throughout the winter; the earliest observed emergence of the fly occurred March 27th; the eggs are deposited in the new pitchers of the season, soon after these have commenced to capture insect prey, and the insect in its various stages occurs in the pitchers throught the summer months, no regular succession of broods being observed, though very irregular in its comparative abundance from year to year, and in its recorded localities.

The Bembicine Wasps of North Carolina (Hym.).

By M. R. Smith, Raleigh, North Carolina.

(Continued from page 82).

B. spinolae Lepelletier.

This is one of the most common species in North Carolina and may be generally recognized by the clear wings; short, fairly dense pubescence on the head, thorax and base of abdomen and by the white curved bands on the second, third and fourth abdominal segments. Length 14-17 mm.

Specimens were collected at the following localities: Raleigh, L. July, 1906, and E. August, C. S. B.; Landis, E. Sept., 1919, J. E. E. 11 specimens: 4 females, 7 males.

B. belfragei Cresson.

The specimen in our collection, a male, is rather robust, widest at the base of the abdomen and tapering apically. The bands on the first three abdominal segments are rather prominent, the first being the broadest. The bands on the second and third segments are widest laterally, arcuated and attennuated medially. All the bands are interrupted. The labium in both sexes, when viewed from the side, shows a distinct transverse impression. The last dorsal abdominal segment is wrinkled. Length 16–18 mm.

One specimen collected at Southern Pines, June 6, 1906, R. S. W.

KEY TO SPECIES OF BICYRTES

Males

1—Middle femora with distinct tooth at base; last dorsal abdominal segment black; bands on dorsum narrow.....*ventralis.*
1—Middle femora without tooth at base.....2.
2—Flagellum black.....*quadrifasciata.*
2—Flagellum not wholly black· legs black and ferrugineous, markings deep yellow, frequently with dashes of ferrugineous.....*capnoptera.*

Females

1—Mesopleurae black.....2.
1—Mesopleurae not black, marked with yellow. Discal spots on scutum absent or present in the form of narrow yellow lines....*quadrifasciata.*
2—Sixth dorsal abdominal segment with a well defined pygidial area, set off by distinct lateral ridges.....*capnoptera.*
2—Sixth dorsal abdominal segment without a pygidial area or well defined lateral ridges, underside of this segment without a median longitudinal ridge.....*ventralis.*

Bicyrtes quadrifasciata Say.

One of the largest species in the genus. The ground color of the body is black with a bluish iridescence. The bands are broad at the sides and narrowed medially; narrowly interrupted anteriorly, more widely posteriorly. Length 12–14 mm.

Collected at the following localities: Southern Pines, July, A. H. M; Swannanoa, M. July, 1919, R. W. L.; Wilson, E. July, 1906, R. S. W.; Statesville, M. July, 1919, F. S. 8 specimens: 5 males, 3 females.

B. ventralis Say.

♂—Black; Labrum, scape of antennae below, broad anterior and narrow posterior orbits, posterior margin of pronotum including lateral tubercles, rounded lateral spots on scutellum, band on metanotum, lateral angles of median segment, narrow band on dorsal abdominal segments 1–6 narrowly interrupted medially, yellow. The color markings and also the arrangement of the bands are variable and too much dependence should not be placed on them as specific characteristics.

One specimen, collected at Raleigh, M. June, 1906, R. S. W.

B. capnoptera Handlirsch.

The four specimens differ from Parker's description in that the labrum is black, the apical edge of the clypeus is fringed with black and there is no yellow spot between the antennae. In one specimen the antennae are more or less ferrugineous, and there are lateral lines on the scutum above the bases of the wings. Another specimen has black antennae and is devoid of the lateral lines on the scutum. The last dorsal abdominal segment in the four specimens has distinct lateral ridges; the mesopleurae are black and the bands on the abdomen are narrowed laterally. Length 10–15 mm.

Specimens were collected at: Cranberry, M. Oct. 1907, F. S.; Raleigh, E. July, 1911, Z. P. M.; Wilmington, M. Oct., 1919, M. R. S. 4 specimens, all females.

Stictia carolina Fabr.

This large handsome species is commonly known as the "Horse Guard," from its habit of being predaceous on horse flies. It is no unusual sight to see this wasp darting around horses in search of the flies that are such a nuisance to our faithful animals.

The males have fewer markings on their abdomens than the females, and are also more robust in appearance. They may be recognized by the curved tooth on the distal end of the middle femora and by the pair of lateral spines on the last dorsal segment of the abdomen.

The female has bands on the first five segments of the abdomen; the first two segments have the bands interrupted medially, the third segment has four yellow spots, while the fourth and fifth segments have a pair of lateral spots respectively. Length 24–28 mm.

Specimens were collected at the following localities: Greensboro, M. July, 1919, F. S.; Beaufort, E. August and L. June, 1903, F. S.; Wilmington, L. Oct., 1919, M. K.; E. August, 1919, R. W. L. 6 specimens: 4 females, 2 males.

Microbembex monodonta Say.

This is a very common species along the eastern coast of the State. In form the species is small, elongate, and has markings which are variable both in color and in their location on the body of the insect. The pubescence on the frons and clypeus of the male has a silvery reflection. On the under side of the second abdominal segment is a smooth median, longitudinal process that terminates posteriorly in a short curved point, which is not hairy.

The females may be distinguished from related species by the pubescence of the head, thorax and abdomen not being unusually long and dense,

and also by the scape of the antennae being black above. Rarely the scape is yellow below.

Length 8–14 mm.

Specimens collected at: Beaufort, E. Aug., 1902; June 15 and 24, 1903, F. S.; Nags head, L. Aug., 1919, F. S. 9 specimens: 5 females, 4 males.

The Eyes of Insects.*

By Alex. D. MacGillivray.

There is always difficulty in differentiating between the kinds of eyes of insects so far as their names are concerned. This becomes especially complicated when it is necessary to compare the eyes of adult insects as those of butterflies or moths with those of their larvae.

All are agreed in designating the large organs of sight composed of several or numerous independent parts as the compound eyes or simply as the eyes. But there is a lack of uniformity, when the names of the parts of a compound eye are considered. The early entomologist designated each of the component parts of a compound eye as an *ocellus*, plural *ocelli*. This led to confusion because the simple eyes of insects were also designated as ocelli. A compound eye is composed of a number of subdivisions, each considered as an independent eye and known as an *ommatidium*, plural *ommatidia*. Each ommatidium consists of an external usually more or less convex hexagonal area of cuticle, the cornea, the crystalline lens or cone, the rhabdome, the retinula cells, the pigment cells, and the nerve connections. Some writers apply the name of ommatidium to one of the entire subdivisions of a compound eye and also to the external area of the cuticle. Others have designated each of the hexagonal areas of the cuticle as a facet and applied the name of ommatidium to an entire subdivision of a compound eye only. It is desirable that these words should be restricted in their use and

*Contributions from the Entomological Laboratories of the University of Illinois, No. 64.

definite in their application; that facet be used for the external surface and that ommatidium be used for the entire element including the cornea and consequently the facet. This provides a taxonomic term, facet, and a morphological or histological term, ommatidium. It is not practical to exclude the facet from inclusion with the ommatidium since the facet is only the outer surface of the cornea which must be considered as a part of each ommatidium. Compound eyes are present in both nymphs and adults of ametabolous and exometabolous insects, but only in the adults of entometabolous insects. The developing compound eyes of the adult can frequently be seen in the pupa of entometabolous insects and rarely in their larvae, but these stages are never provided with functional compound eyes.

Many adult insects have a group of simple eyes located on the dorsal or cephalic aspect of the head. While there are usually three of these simple eyes arranged in the form of a triangle with the apex of the triangle directed toward the mouth, there are never more than three of these simple eyes, sometimes there are only two, rarely only one, and frequently all are wanting. The pair of cephalic discs described by Kochi as probably representing a primitive divided ocellus appears to be only discs for the attachment of muscles. Each of these simple eyes is universally known as an *ocellus*, plural *ocelli*. The ocellus forming the apex of the triangle is known as the median ocellus and each of the others as a lateral ocellus. When only two ocelli are present, it is the median ocellus that is wanting and when only a single ocellus is present, it is the lateral ocelli that are wanting. The ocelli are also known as *stemmata*, singular *stemma*. Ocelli are never present in ametabolous insects and only in the adults of exometabolous and entometabolous insects. They can sometimes be seen as black spots through the transparent cuticle of some nymphs and they have been described as ocelli, but functional ocelli are never present in nymphs, larvae, or pupae.

Ametabolous insects and those with exometabolous metamorphosis, as the nymphs and adults of Collembola, Mallophaga, etc., and the larvae of insects with an indirect meta-

morphosis usually have one or more simple eyes. These simple eyes are located on that portion of the head where, if compound eyes were present in the adult, they would be located. This would seem to be an ontogenetic proof of the contention of Lang and others that the compound eyes of insects are formed from "an increase in the number of primitive eyes, and their approximation, led to the formation of the compound facet eye." In the case of the adult male coccid, the eyes are compound in the four generalized subfamilies and represented by groups of simple eyes in the specialized subfamilies The number of simple eyes in each group is gradually reduced with specialization until in certain highly specialized wingless males, there is only a single ocellus on each side of the head. This is the number found in all adult and nymphal female coccids where eyes are present and in the first and probably some of the later nymphal male stages. A similar series of reductions can be shown from an examination of different genera of Collembola. The latter show a condition which is characteristic not only of nymphs of all stages but of adults, while the male coccids show a condition peculiar to the adult male alone. In the larvae of insects the compound eyes may be represented by groups of simple eyes, a single group may contain as many as twenty or be limited to a single simple eye on each side of the head, but the usual number is about six. The representation of compound eyes by simple eyes is peculiar in this group to the larval stages.

All these various types of simple eyes, those of the Collembola, of the coccids, and of larvae are also designated as ocelli. The use of the same name for two or more structures which are always different in position, whether they are different in structure or not, always leads to confusion. In order to differentiate between the simple eyes of the Apterygota and the ocelli and simple eyes of other insects it is suggested that each of the simple eyes of the Apterygota be known as an *ocellula*, plural *ocellulae*. The simple eyes of those insects with an exometabolous metamorphosis, whether found in nymphs or adults, to be known as *ocellanae* to distinguish

them from ocelli, ocellulae, and the simple eyes of larvae. The simple eyes of larvae, the immature feeding stages of entometabolous insects, are to be known as *ocellarae*.

Ocellulae and ocellarae of each side of the head are usually closely associated and are generally placed upon an area that is very different in color or is more convex or elevated above the adjacent parts of the cuticle. Each of these areas has previously been designated as an ocularium.

The pupae of insects with an entometabolous metamorphosis are never provided with eyes. In many species, where the cuticle is thin and transparent, the developing compound eyes and sometimes the ocelli of the adult, as already noted in the nymphs of exometabolous insects, can be identified through the cuticle. Such eyes or ocelli are never functional in pupae and are incorrectly described or designated as the eyes or ocelli of pupae as is sometimes done.

A Mexican Species of Agrilus found in Arizona (Coleoptera).

By W. S. Fisher, U. S. Bureau of Entomology, and Alan S. Nicolay, Brooklyn, New York.

This species was described by Waterhouse (1889, Biol. Centr.-Amer. Coleopt., vol. III, p. 119, tab. VII, figs. 7, 7a) from Pinos Altos, State of Chihuahua, Mexico, from a male specimen. This species is remarkable for its sexual color dimorphism, which as far as known, is not found in any of our other North American species. As the female has never been described and to assist those who have no access to the works in which the Mexican species, herein recorded, is described, we have given a description of the species, hoping it will prove more useful than simply recording its appearance in the United States.

Agrilus restrictus Waterhouse.

♂.—Moderately elongate as in *arcuatus*, head, thorax and beneath brassy; elytra slate color, shining. Antennae brassy, reaching to middle

of prothorax, serrate from the fourth joint. Head closely and coarsely punctured; front broadly and rather deeply longitudinally impressed.

Prothorax one-fourth wider than long, not narrowed at base; sides slightly arcuate; surface rugous, with coarse distantly placed punctures in the depressions; discoidal impression deep, broadly ovate behind, narrowed in front; the lateral impressions deep, extending from the anterior third, obliquely backward to middle of the disc; there is a round swelling at the posterior angles, with a round fovea behind it close to the base; posterior angles without any trace of a carina. Scutellum deeply impressed in the middle and finely rugous. Elytra slightly sinuate behind the humeri and dilated behind the middle, nearly concealing the abdomen; apices separately rounded, finely serrulate; disc slightly flattened at middle, basal impressions moderately deep; sutural ridge elevated behind the middle; surface densely imbricate, shining. Prosternal lobe broadly emarginate. Prosternum coarsely punctured, the punctures becoming denser on the intercoxal process, not pubescent; intercoxal process with its margins slightly raised, the apex obliquely narrowed.

Abdomen moderately strongly punctured, slightly rugous at the sides; lateral carina of the basal segment distinctly curved; first ventral segment roundly convex at middle, not pubescent; suture between the first two ventral segments entirely obliterated at the sides; vertical portions of all the segments, except the last, pubescent posteriorly; pygidium not carinate.

Anterior and middle tibiae arcuate, with a slight mucro at the inner apex; the posterior tibiae simple, flattened on the inner side, and with a row of stiff hairs on the posterior half of the outer edge. Claws broadly toothed. the lower portions not inverted, similar on all feet. Posterior tarsi not as long as the tibiae; the first joint one-fourth as long as the tibia. Length 8.5 mm.; width 2.2 mm.

♀.—Differs from the male as follows: More robust, head, thorax and beneath cyaneous; elytra cupreous, shining. Antennae shorter, only reaching a little beyond the anterior margin of the prothorax; vertical portions of the abdominal segments more distinctly visible frum above; tibiae not mucronate; fore tibiae slightly arcuate; middle and hind tibiae simple. Length 10 mm.; width 3 mm.

One pair of adults taken *in coitu* in the Huachuca Mountains, Arizona, August 2, 1905, and donated to Mr. Nicolay by Mr. Chas. W. Leng. Specimens in Mr. Nicolay's collection.

In Dr. Horn's table of *Agrilus* (1891, Trans. Amer. Ent. Soc., vol. XVIII, pp. 283–287) these specimens run to *concinnus* Horn, but differ from that species by the different coloration in the sexes; the last abdominal segment rounded

at the tip, while in *concinnus* it is truncate, and in numerous other characters.

This species has never been reported from the United States, but since the fauna and conditions of the country in the southern part of Arizona are very similar to those of Pinos Altos, Mexico, from where the species was originally described, it is not surprising that it should be found in our fauna. The specimens were sent to Mr. Gilbert Arrow, who has kindly compared them with the type in the collection of the British Museum, and has returned them with the following remarks:

"The male is like *A. restrictus*, except that the median fovea of the thorax is less broad behind in the unique type. Without examining a series of specimens I cannot tell whether this is of importance."

In examining a series of specimens of some of our other species which have the thorax deeply impressed, this character was found to vary considerably in the different specimens, so it is possible that the same condition will be found in *restrictus*.

A new Euphydryas from Nebraska (Lep.).

By R. A. Leussler, Omaha, Nebraska.

Euphydryas bernadetta n. sp.

♂.—Expanse 38 mm. *Upperside:* Primaries black, an irregular keystone-shaped white spot at base of cell, another large quadrate one in middle of cell, and three oblong conjoined ones at the distal end; between these several white spots in the cell are two red spots bordered with black; beyond the cell three irregularly curved rows of white spots, the inner row slightly tinged with red, and preceded on inner margin by a large white irregular spot, the outer row somewhat lunulate; all of the spots well separated from each other and from the other rows by the black ground color; a terminal row of small red spots; fringe black-and-white-checkered. Secondaries black, a median row of oblong white spots, beyond this a row of red spots, another row of white spots and a terminal row of red spots; an irregularly shaped white spot at end of cell; one near base of cell, another near base at costa, and a fourth above anal margin; beyond cell is a narrow red spot; all spots well separated by black ground color as on primaries; fringe black-and-white-checkered.

Underside: Primaries red, with the white spots all repeated, the subterminal ones enlarged, distinctly lunulate and separated by a heavy black line across apical half of wing; spots all well defined. Secondaries: red and white spots of upperside reproduced beneath greatly enlarged, the only black being the defining lines between spots; submarginal white spots lunulate. All the red on this insect is between Brazil red and scarlet (Ridgway Color Standards Pl. 1).

♀.—Expanse 47 mm. *Upperside:* Quite similar to ♂ in maculation but the white spots are larger, especially the outer row and these too are distinctly lunulate. *Underside:* Less red than ♂ with the white spots larger.

Described from 26 ♂ and 16 ♀ collected in Monroe Canyon near Harrison, Sioux County, Nebraska. Types in the collection of R. A. Leussler, Omaha.

This species is nearest *maria* Skinner; in fact examination of the genitalia places it very close to this species and it may prove to be a race of the same. It is quite variable in size, wing shape, color of spots, etc., but can be separated from *maria* by one very constant character, namely, the distinctness of white spots on underside of primaries, the outer rows being clearly defined by black borders of varying width.

A new Species of Coenosia from the Western United States (Diptera, Anthomyiidae).

By J. R. Malloch, Urbana, Illinois.

The species described herein has been in my hands for two years and the description is printed now to enable the subsequent publication of a key to the species from the United States.

There is no species with three bristles on the hind tibia which has the same color, and hypopygial and apical tergal characters as this.

Coenosia cilicauda sp. n.

♂ and ♀.—Black, opaque because of a dense coating of gray pruinescence; proboscis, femora and hypopygium shining. Antennae and palpi black. Thorax not vittate. Abdomen with two pairs of dorsal fuscous spots, on third and fourth segments, and sometimes a very indistinct pair

on second in male. Legs black, all tibiae yellowish testaceous. Wings and calyptrae whitish. Halteres yellow.

Each orbit with 4 or 5 bristles and a few hairs; cheek distinctly higher than width of third antennal segment, the apex of latter about one-third of the length from lower margin of face; arista short-haired. Acrostichals irregularly two-rowed; lower stigmatal bristle long, directed downward.

Abdomen of male longer than thorax, slender, cylindrical, basal hypopygial segment globose, subequal in length to preceding segment, forceps long, extending to base of fourth tergite, both forceps stout, slightly tapered apically, the superior pair fringed on sides with minute hairs; abdomen of female tapered apically, the fourth tergite with a rather dense fringe of stiff bristly hairs at apex.

Femora stout, mid and hind pairs with two or three long bristles on basal half of antero- and postero-ventral surfaces and the hind pair with two or three similar bristles on apical half of antero-ventral surface; in addition to those bristles there are some shorter setulae between them which are most noticeable in the male; fore and mid tibiae with the usual bristles, hind tibia with three bristles, one antero-ventral, one antero-dorsal, and one postero-dorsal; hind tarsus with the basal segment about one-third as long as tibia, a short setula near base on ventral surface. Lower calyptra much larger than upper.

Length, 3.5–4 mm.

Type, male, and *allotype*, Musselshell, Montana, August 30 and 17, 1917. *Paratypes*, two males, Huntley, Montana, July 23, 1917; one female, Miles City, Montana, July 21, 1915; one female, Bozeman, Montana, July 7, 1917; two males, Saguache, Colorado, September 3, 1917 (A. K. Fisher).

The type and allotype will be deposited in the collection of the Montana Agricultural Experiment Station. Paratypes will be deposited as follows: one male and one female, Illinois State Natural History Survey; two males, U. S. Bureau of Biological Survey; one male, Boston Society of Natural History; one female, Academy of Natural Sciences of Philadelphia.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., APRIL, 1920.

The Urgent Necessity of Higher Salaries for Entomologists.

We have received from "a group of younger Entomologists" a letter and a printed statement entitled "American Entomology: Its Present and Future Status as a Profession." The justness of the claims urged therein is so apparent and the emergency is so pressing that we reproduce a large part of the statement herewith.

That men of science, particularly those engaged in research and teaching, are greatly underpaid, is a fact so well known that it needs no setting out here. This applies, perhaps, more especially to Entomology than to any other one division of the basic Sciences.

We have in mind a case that came under our observation a short time ago, the case of a young man, very greatly interested in his work, capable, ambitious and diligent. The only misfortune that apparently handicapped this gentleman was a wife and two children. This young man entered the employ of a certain Department of Entomology four years previous at a salary of $1000 per annum, giving up a position of some importance and much larger remuneration for his services in doing so. After one year of faithful service he was raised to $1200 and had remained at this salary for three years. Apparently every effort had been made by his immediate superiors, without avail, to have his salary increased. Twelve hundred dollars is decidedly not a living wage for a family of four.

For several months the young man tried various enterprises outside of working hours to remedy the situation. These eventually encroached on official time as the situation became more and more acute. He gave less and less thought to his professional work and more and more to the question of making income and expenses meet. After a time the situation became so desperate that the young man resigned his position and entered business. At the present time he is enjoying considerable success in a commercial enterprise. Let us repeat that this young man was an excellent investigator and an Entomologist of great promise.

It may be pointed out by some that the case herein mentioned is an extreme case but we now have under observation several instances which are nearly parallel.

Now there are positions open for a certain number of Entomologists, positions which must be filled by someone, and which should be filled by those most fitted by training and experience. Yet many of these positions are filled by a shifting group of men, the cycle appearing to travel in some

such manner as this. A young man fresh from college, fired with enthusiasm and with ambition, enters one of these positions. He has no experience and little training, yet is possessed of great energy and is very industrious. He accepts the low salary offered in expectation that increases will be given as he becomes of greater value to his employer. He labors for from three to five years, we will say, under these conditions. Increases are extremely slow, yet at first his enthusiasm overcomes this drawback. Gradually his enthusiasm and ambition dwindle as the question of food, clothing and shelter becomes more and more pressing, and as he observes his former associates advancing in other lines of work. Finally he resigns and goes to more profitable employment, perhaps retaining Entomology as a hobby, his place being filled by a victim fresh from school who will unquestionably follow in his footsteps. These years of training and experience are lost to him and to the science in which he would make large sacrifices if it could but supply him with a compensation sufficient to enjoy the necessities of life.

A scientific field replete with a shifting group of workers reflects but little credit on any profession and we will emphatically say that teachers do wrong in urging students to take up the profession without presenting the whole truth.

A man who, in his heart, really wishes to be a Naturalist is willing to give up most of the best things that life has to offer, but by entering the field of Entomology one should by no means infer that he must become a vagabond. There are, to be sure, a few fairly well paid positions available, but these are filled by men who occupy them for long terms of years and usually nothing less than death renders the positions available for the younger men.

In the past Entomology has been as much a hobby for private workers as a profession wherein men might earn a living. A large proportion of the constructive workers in the subject have been dependent on other fields of endeavor for their financial support, and have turned to Entomology for their recreation. How much greater service they might have rendered to the science if it had been possible for them to devote all their energy to it. This condition still remains, perhaps to a less degree. As long as this continues it is doubtful whether Entomology will take its place among the greater sciences to which its importance entitles it. We are glad men have such attachments for a subject; we are glad ours is a study which can thus afford men a recreation and which is at the same time a distinct service. But we would lift it from the rank of a hobby into the status of a pleasant and fascinating profession.

How then is this condition to be remedied, for it must be relieved shortly. The younger worker can help himself but little. It remains, therefore, for the men in the highest positions to awaken to the conditions and bend every effort to raise the standard of the profession thru fair salaries for their assistants.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Callosamia carolina and Samia securifera (Lepid., Saturnidae)

Mr. W. C. Dukes of Mobile, Alabama, has sent me a cocoon of *Callosamia carolina*, described by F. M. Jones in this journal (Vol. XIX, p. 231, 1908). The type came from Berkeley County, South Carolina. In ENTOMOLOGICAL NEWS, XX, p. 49, 1909, Mr. Jones figured and fully described the species. It is probably quite distinct from *C. angulifera*.

In Beitrage Zur Schmetterlingskunde, Mossen and Weymer, (Elberfeld, 1872), there is figured, in both sexes, what they call *Samia securifera*, (figs. 50, 51) from Central America. This is probably the same species as *carolina*. Mr. Dukes has extended the range of *carolina* and it will be interesting to compare Central American species or specimens with *carolina* when they are found.—HENRY SKINNER.

Notes on the Oviposition and Food of the Wheel-bug (Arilus cristatus Linn.) (Hemip. Heter).

During the months of September and October, 1917, the wheel-bug' *Arilus cristatus* Linn. was very numerous on flowers, especially goldenrod' along the Potomac river near Williamsport, Md. Fifty specimens could easily be taken in the space of an hour—the females somewhat more numerous than the males.

On September 30, it was noticed that the adults were especially active in copulation, although they were observed thus engaged several weeks previous and somewhat later than this date.

Females oviposited readily and usually deposited all of their eggs at one laying and in one mass. For sixteen females that oviposited in captivity, the largest number of eggs was 182, the smallest 60 and the average was 130.6. The exact number of individual eggs per female was 118, 60, 132, 144, 137, 152, 90, 126, 169, 97, 171, 182, 103, 148, 136 and 126.

Eggs were deposited in rearing cages on the cover of salve boxes and on the sides or top of screen cages. Masses were found in the field only on the trunk and lower limbs of trees.

Adults were found feeding on honey bees and grasshoppers in the field. In cages they readily attacked and devoured kaytdids, adult Meloidae, adults of *Cyllene robiniae*, Arctiid larvae, Pentatomid adults, and several unknown Lepidopterous larvae. In addition, females were found to be very fond of devouring the males soon after copulation was complete.—GEO. W. BARBER, U. S. Bureau of Entomology, Arlington, Massachusetts.

Tinea acapnopennella Clem.* (Lepid.) Bred from Fungus.

This species was bred August 15, from the fungus *Polyporus tulipiferus* collected at Monmouth Junction, New Jersey, on an old stump. It is already recorded in Smith's "Insects of New Jersey" as occurring at Anglesea, June to August, Essex County (Kf.) and Wenonah, August 20 (Haim.), but no mention is made of the host, *Polyporus tulipiferus*, which is found on the dead wood of deciduous trees. The larva feeds on the fungus and when full grown pupates in the decayed wood to which the fungus is attached.

Full grown larva.—Length 5.5 mm., width 1.35 mm. Subcylindrical, whitish except for head which is dark and a dark, transverse, dorsal area on the first thoracic segment, this area being bisected by a light, median, longitudinal line. Antennae 3-jointed, third joint longest and bearing several fine hairs. Head bears several long, fine hairs. Dorsal surface of second and third thoracic segments transversely wrinkled. Dorsal surface of body bears four longitudinal rows of long, fine hairs, two rows on either side of middle with a few shorter, scattered hairs. Entire dorsal and ventral surface covered with a fine minute pile. True and prolegs well developed.

Pupa.—Length 6 mm., width 1.5 mm. Brownish, sparsely hairy. Dorsal surfaces of abdominal segments 3, 4, 5, 6, 7, and 8 each bear two transverse rows of minute, posteriorly directed spines, these spines becoming larger posteriorly and largest on eighth segment. Last segment bears a minute pair of ventral recurved hooks.

Adult.—This was described by Clemens in 1859 (Proc. Acad. Nat. Sci. Phil., p. 257). Dietz, in his revision of the Tineid subfamilies Amydriinae and Tineinae (Tr. Am. Ent. Soc., vol. xxxi, No. 1), gives a redescription which it is not necessary to repeat here. In this paper the distribution of the species is given as Pennsylvania, District of Columbia, Maryland and Louisiana.—Harry B. Weiss, New Brunswick, New Jersey.

Mr. E. B. Williamson Collecting Odonata in Venezuela.

Messrs. E. B. and J. H. Williamson left Bluffton, Indiana, on January 10, 1920, for a collecting trip in Venezuela, expecting to return about May 15. Writing from that South American country on February 8, in regard to Odonata, Mr. E. B. Williamson says: "One week's collecting at San Esteban, 50 species and about 1300 specimens. *Heteragrion chrysops* on every quebrada. Have a beautiful *Gynacantha*, a *Progomphus* and a *Gomphoides*. *Philogenia* very common, *Palaemnema* rare. *Neoneura esthera* and *Protoneura amatoria* here."

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*Kindly identified by Mr. August Busck.

†Kindly identified by Mr. Erdman West.

Ecology—a New Journal of Entomological Interest.

The Ecological Society of America, at its annual meeting in St. Louis, on December 31, 1919, decided, without a dissenting voice, to start its own serial publication. The Plant World has been generously offered to the Society free of liabilities and will be continued as the official organ of the Society, under the title of "Ecology." The new journal will begin as an illustrated quarterly of about 200 to 300 pages per annum, containing papers by workers in all branches of ecology. Dr. Barrington Moore, of the American Museum of Natural History, has been chosen editor-in-chief. In order to cover the cost of publication, it was voted that the dues of the Society be raised to $3.00 per annum; of this amount $2.00 will be for subscription to the magazine and $1.00 for the running expenses of the Society. It is believed that the new journal will not only be of great value to the members of the Society, but will be necessary to all workers in botany zoölogy, forestry, agriculture and other biological sciences.

French Grants for Entomological Study.

The awards of the Bonaparte and Loutreuil foundations of the Academy of Sciences of Paris, as published in *Science* for February 27, 1920, include one thousand francs to Emile Brumpt for continuing his work on parasitic haemoglobinuria or piroplasmosis of cattle, two thousand francs to P. Lesne for his researches on the insects of peat bogs and two thousand francs to A. Paillot for his researches on the microbial diseases of insects. Entomology will go on in France in spite of the war.

Furcaspis biformis (Homop., Coccidae.)

On July 7, 1892, when judging at a flower show at Kingston, Jamaica, I found a peculiar scale on leaves of orchids. The female scales were dark and round, the male scales equally dark, but elongate. I named it *Aspidiotus biformis*, and in 1908 Lindinger made it the type of a genus *Farcaspis*. Many years have passed since I met with it, but the other day, in a greenhouse at Boulder, Colorado, I found it in abundance on leaves of *Cattleya percivaliana* (Reichb.) O'Brien. The new host plant and entirely new locality are worth recording..—T. D. A. Cockerell

Mesocyphona rubia (Dipt., Tipulidae).

Last June two of my students, Miss N. Higgins and Miss K. Fitzgerald, captured specimens of an extraordinarily beautiful little Tipulid fly in Boulder. The wings are black, banded and spotted with pure white. I thought the species must be new, but Mr. C. P. Alexander, to whom I sent a sketch, at once suggested comparison with his *Erioptera* (*Meso-*

cyphona) *rubia*, described in 1914 from a unique taken in Arizona. Our insect is manifestly the same, and is a striking addition to the Colorado list. The original figure does not show clearly that the wings are broadly white at base. On the left side only, the specimen before me has an oval white spot at the origin of the sector; this is lacking in the type. It is a singular thing, that whi'e *Erioptera* and its various subgenera or closely related genera are today well represented in North America, no trace of them has been found in the rich Miocene deposits at Florissant, nor in the older Eocene rocks of Colorado and Wyoming. They are, however, found fossil in Europe, so it seems probable that the group originated in the Old World.

T. D. A. Cockerell, Boulder, Colorado.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natura Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in Heavy-Faced Type refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—Canadian Entomologist, London, Canada. **8**—The Entomologist's Monthly Magazine, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **14**—Proceedings of the Zoological Society of London. **16**—The Lepidopterist, Salem, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **21**—The Entomologist's Record, London. **22**—Bulletin of Entomological Research, London. **23**—Bollettino del Laboratorio di Zoologia Generale e Agraria, Portici, Italy. **28**—Entomologisk Tidskrift, Uppsala. **29**—Annual Report of the Entomological Society of Ontario, Toronto, Canada. **44**—Ectoparasites. Edited by Jordan & Rothschild, Tring, England. **59**—Journal of Agricultural Research, Washington, D. C. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **106**—Anales de la Sociedad Cientifica Argentina, Buenos Aires.

GENERAL. Anon—Entomology in the United States National Museum. **68,** li, 236–37. **Mallock, H. R. A.**—Some points in insect mechanics. **14,** 1919, 111–116. **Silvestri, F.**—Contribuzioni alla conoscenza degli insetti dannosi e dei loro simbionti. **23,** xiii, 70–192. **Tillyard, R. J.**—The panorpid complex. The wing-venation. **29,** xliv, 533–718. **Tragardh, I.**—On the use of experimental plots when studying

forest insects. **22,** x, 157–60. **Walsingham, Lord.**—Obituary. **8,** 1920, 25–28.

ARACHNIDA, ETC. Brade-Birks & Brade-Birks.—Notes on Myriopoda. Luminous Chilopoda, with special reference to Geophilus carpophagus. **11,** v, 1–30. **Willey, A.**—The house centipede, Cermatia forceps, in Montreal. **4,** 1920, 8. **Wood, H. P.**—Tropical fowl mites in the United States. (U. S. D. A., Dept. Circ., 79).

NEUROPTERA. Brocher, F.—Le mechanisme physiologique de la derniere mue des larves des Agrionides (transformation en imago). (Ann. Biol. Lacustre, Bruxelles, ix, 183–99).

Jordan & Rothschild.—On the species and genera of Siphonaptera described by Kolenati. **44,** i. 61–4. On American bird-Ceratophylli. **44,** i, 65–76. **Snyder, T. E.**—Two new termites from Arizona, **10,** xxii. 38–40.

ORTHOPTERA. Lizer, C.—Informe sobre la expedicion al chaco Boliviano. (Bol. Minist. d. Agric. de la Nacion, Buenos Aires, 45 pp., 1919).

HEMIPTERA. Hussey R. F.—The waterbugs of the Douglas Lake region, Michigan. **88,** No. 75, 23 pp. **Newstead, R.**—Observations on scale-insects (Coccidæ). **22,** x, 175–208. **Stoner, D.**—Notes on Scutelleroidea from Vancouver Island. **4,** 1920, 12–13.

Parshley, H. M.—On some Hemiptera from Western Canada. **88,** No. 71, 35 pp.

LEPIDOPTERA. Beutenmuller, W.—The larva of Datana palmi. The larva of Schizura apicalis and Euparthenos nubilis. **16,** iii, 127–8; 133–4. **Gibson, F. M.**—Note on the distribution of Atteva aurea. **4,** 1920, 15. **Hampson, G.**—A classification of the Pyralidae, subfamily Hyposthropinae. **14,** 1918, 55–132. **Joicey & Talbot**—New South American Rhopalocera. **14,** 1917, 259–64. New South American Arctiidae. **14,** 1917, 265–70. A gynandromorph of Papilio lucophron. Three aberrations of L. **14,** 1917, 273–76. **Keller, G. J.**—Notes on the ovum and larva of Catocala herodias. **16,** iii, 121–3. **Ljungdahl, D.**—Nagra puppbeskrivningar. **28,** xl, 97–119. **McDunnough, J.**—Remarks on Hubner's Tentamen. **21,** 1920, 11–13. **Mottram, J. C.**—Some observations upon concealment by the apparent disruption of surface in a plane at right angles to the surface. **14,** 1917, 253–57. **Turner, W. B.**—Lepidoptera at light traps. **59,** xviii, 475–81. **Wagner, H.**—Lepidopterorum catalogus. Pars 23; Sphingidae, Subfam. Choerocampinae.

Swett, L. W.—Some new Geometrids. **16,** iii, 123–5. **Swett & Cassino**—Some new Geometrids. **16,** iii, 128–33 (Cont.). **Wright, W. S.**—Geometrid notes and descriptions. **16,** iii, 125–7.

DIPTERA. Aldrich, J. M.—European fruit fly in North America. **59,** xviii, 451–74. **Bezzi, M.**—Una nuova specie Brasiliana del genere Anastrepha. **23,** xiii, 1–14. **Collins & Hood.**—Life history of Eubiom-

yia calosomae, a tachinid parasite of Calosoma beetles. **59,** xviii, 483–97. **McAtee & Banks.**—District of Columbia D.: Asilidae. **10,** xxii, 13–20. **Macfie, J. W. S.**—The chaetotaxy of the pupa of Stegomyia fasciata. **22,** x, 161–9. **Saunders, W. H.**—Fly investigations Reports. **14,** 1916, 465–518. **Smith & Maxwell Lefroy.**—A comparative study of certain sense-organs in the antennae and palpi of D. **14,** 1919, 31–69.

Dietz, W. G.—Three new crane-flies from eastern Canada. **4,** 1920, 5–8. **Malloch, J. R.**—Descriptions of new genera and species of Scatophagidae. **10,** xxii, 34–38.

COLEOPTERA. Achard, J.—Descriptions de Scaphidiidae inedits de la Republique Argentine. **20,** 1919, 350–2. **Blair, K. G.**—Further notes on the Fabrician types of Heteromera in the Banks Collection. **11,** v, 153–63. **Craighead, F. C.**—Biology of some C. of the families Colydiidae and Bothrideridae. **10,** xxii, 1–13. **Garnett, R. T.**—Variations of Buprestis viridisuturalis. **4,** 1920, 17–18. **Jeannel, R.**—Sur quelques Trechinae (Carabidae) du British Museum. **11,** v, 98–112. **Maulik, S.**—On Cryptostoma beetles in the Cambridge University Museum of Zoology. **14,** 1916, 567–90. **Strickland, E. H.**—The cottonwood leaf-mining beetles in southern Alberta. **4,** 1920, 1–5. **Weiss, H. B.**—Notes on Ischyrus quadripunctatus, bred from fungus. **4,** 1920, 14–15. Notes on Mycotretus pulchra and its fungous host. **4,** 1920, 18–19.

Swaine, Fall, Leng, & Sherman.—The C. collected by the Canadian Arctic Expedition, 1913–18. (Rept., Canadian Arct. Exp., iii, Part E, 24 pp.).

HYMENOPTERA. Grandi, G.—Contributo alla conoscenza degli Agaonini dell' America (Chalcicidae). **23,** xiii, 15–56. **Kieffer, J. J.**—Sur les hymenopteres parasites des ootheques de Mantides. **20,** 1919, 357–9. **Santschi, F.**—Nouveaux formicides de la Republique Argentine. **106,** lxxxvii, 37–57. **Schrottky, C.**—The bee genus Emphor in South America. **4,** 1920, 9–11. **Turner, R. E.**—Notes on the wasps of the genus Pison, and some allied genera. **14,** 1916, 591–629.

Doings of Societies

Entomological Section, The Academy of Natural Sciences of Philadelphia

Meeting of May 22, 1919. Twelve persons present, including Dr. Chi Ping, of Kai Fung, China, and Lieut. W. J. Chamberlain, of Corvallis, Oregon, visitors. Director Laurent presiding.

Hymenoptera.—Dr. Bradley said while on a trip to Langtry, Texas, he had seen a large colony of *Sphecius grandis* going into their burrows but had seen none carrying Cicadas, though a boy he had questioned said that he had seen them with their prey. He had also seen *Mutilla orcus* Cress.

going into these burrows and had reached the conclusion that they are parasitic on the *Sphecius*.

Homoptera.—Dr. Skinner exhibited a potted plant on which were many Aphids most of which he had killed by blowing tobacco smoke in a paper cone while covering the plant.

Coleoptera.—Mr. Chamberlain said that he had noticed in the eastern collections, specimens labelled *Acmaeodera pulcherrima* Du Val, distributed mostly by Mr. Beyer. This species is only found in Cuba and Florida and those examined were *A. cubaecola* Du Val.* Had seen a specimen of *Buprestis adjecta* LeC. in the Brooklyn Museum collected on Staten Island about ten days ago, and which he thinks is the most northern record. He has completed an index of all our Buprestidae including synonyms and all available records and where possible the locations of the types.

GEO. M. GREENE, *Recorder*.

Meeting of September 25, 1919, Vice-Director R. C. Williams presiding, and eleven persons present.

Mr. Rehn spoke about the impossibility of obtaining potassium cyanide for making killing bottles to be used on his western trip with Mr. Hebard, but found that sodium cyanide after severe trials proved to be as good, if not better, a killing medium. General discussion followed as to the merits of the various killing agents and of the methods of making killing bottles.

Mr. Rehn gave a brief account of his summer trip, accompanying Mr. Hebard, in the western states, and illustrating his remarks with some photographs projected on the screen.

Lepidoptera.—Dr. Skinner exhibited a gynandromorphic specimen of *Papilio turnus* with the right wings of a yellow male, and the left of a black female. This specimen was collected at Merion, Pa., July 5, 1919, by Geo. F. Pettinos, Jr. Mr. Baylis exhibited bred specimens of *Catocala minerva*, also beautifully executed colored drawings of its larvae showing various instars. Dr. Calvert exhibited pupal skin of *Catocala amatrix* Hüb. with bits of a decaying wooden hand rail in which its cocoon had been found near Cheyney, Pennsylvania, August 8, 1919, as well as the imago which had issued therefrom on August 23 or 24.

Odonata.—Dr. Calvert exhibited the type of *Erpetogomphus schausi* Calv., and the female of *E. diadophis* Calv. (?), both from Guatemala, collected by Messrs. W. Schaus and J. Barnes, described in Entomological News for March, 1919; an immature male of *Neoneura aaroni* Calv., from the same country and collection, a species hitherto unknown from elsewhere than Texas (Ent. News, June, 1919); *Gomphus furcifer* Hagen, a female found floating, headless, in a pond, Stockbridge township, Berkshire County, Massachusetts, July 28, 1917, by the speaker, the only specimen of this species he had met and but rarely recorded from New England.

[*Cf. Van Dyke, Ent. News, xxx, 190.—ED.]

Coleoptera.—Dr. Calvert also exhibited a female and two males of *Calopteron reticulatum* Fab., which latter were apparently attempting to pair simultaneously with the former, all pinned in approximately the positions in which they were found, the female with the four wings outspread, one male above, the other male on the right side of, her abdomen. The speaker had taken them near Cheyney, Pennsylvania, July 16, 1919.

E. T. CRESSON, JR., *Recorder protem*

Meeting of November 20, 1919. Fourteen persons present, including Mr. Allie M. Ross, visitor. Mr. R. C.Williams, Jr., Vice-Director, presiding.

Mr. Williams spoke of meeting C. J. Huguenin and C. L. Fox, while in California. The visitor, Mr. Ross, spoke about his intended work in Liberia, especially his desires of working up the fauna of that region in the Lepidoptera and Orthoptera.

Orthoptera. A series of Mantidae from the Sundan and Papuan regions were exhibited by Mr. Hebard. It was pointed out that many of the genera were new to Philadelphia collections and that some of the species had remained unknown to subsequent authors since their original description. Certain striking forms were discussed, and the difficulties experienced in studying the Orthoptera of the regions in question were pointed out. In determining large series from the regions under consideration, Mr. Hebard said that he had found such studies as Haan's "Bijdragen tot de Kennis der Orthoptera," published in 1842, of the utmost value, but that many contemporary authors were producing a far inferior literature, describing species with deplorable brevity and often giving no figures whatever.

Mr. Rehn exhibited a box containing a series of the West Indian forms of the genus *Eurycotis* of the family Blattidae. The speaker discussed the genus, its distribution, general morphological tendencies in the way of specific differentiation, color types developed in the genus, and the groups into which he had arranged the West Indian forms. Of the West Indian forms exhibited the majority were either recently described or are as yet undescribed.

Lepidoptera. Mr. Reyher exhibited type specimens of *Catocala sapho* var. *cleis*. (Cassino) from Florida, and said that he could find no characters by which to separate this variety from the type form.

E. T. CRESSON, JR., *Recorder pro tem.*

Entomological Workers in Ohio Institutions.

The annual meeting of entomological workers in Ohio institutions was held at the Ohio State University, Columbus, Ohio, January 29,1920. Morning, afternoon and evening sessions were held and the following program rendered.

Symposium: The functions and interrelation of the State Entomological Departments. H. A. Gossard, Entomologist, Experiment Station, Raymond C. Osburn—Head, Department of Zoology and Entomology, Ohio State University and E. C. Cotton, Chief, Bureau of Horticulture.

Herbert Osborn—Notes on Leaf-hoppers. H. E. Evans—The Effect of the Federal Plant Quarantine Act on the Nursery Business. W. M. Barrows—The Changes Which Take Place in Insect and Arachnid Muscle During Metamorphosis. T. L. Guyton—Results of the Use of Magnesium Arsenate as An Insecticide in 1919. W. H. Larrimer, LaFayette, Indiana—Army Worm Control Through County Organization. L. L. Huber—Two Parasites of the Resplendent Shield Bearer. Annette F. Braun—The Study of Microlepidoptera. C. L. Metcalf—The Use of Insect Genitalia in Classification. W. C. Kraatz—Remarks on the Insect Fauna of Mirror Lake. C. H. Kennedy—Life Histories of the Dragon Flies. H. A. Gossard—The Relation of Bees to Fire Blight. E. L. Wickliff—Insect Food of Young Bass. H. L. Dozier—Observations on Some Florida Insects. R. S. McKay—Observations on Orthoptera in Southern Ohio in 1919. E. W. Long—Apiary Inspection in Relation to Entomology. W. V. Balduf—Soy Bean Insect Investigations.

Round Table. The Hessian Fly in Ohio in 1919. T. H. Parks, Leader. R. C. Osburn—Some Remarks on the Genus *Syrphus*. F. H. Crecker—Distribution of Fresh Water Sponges by Caddis Fly Larvae. J. S. Hine—Blood-Sucking Insects Observed on the Katmai Expedition. E. A. Hartley—Some Observations on Bark Beetle Depredations in Western Yellow Pine in Oregon. P. R. Lowry—Remarks on the Dactylopiinae of Ohio. J. S. Houser—The Onion Maggot.

Exhibits: Microlepidoptera, with Examples of Larval Work—Miss Braun. Differentiating Muscle Cells and Developing Tendons in the Legs of Spiders—Prof. Barrows. 1. Lumbricus terrestris as an Onion Pest. 2. *Sphaerostilbe cocophila* destroying San Jose Scale—Mr. Houser. Map of Periodical Cicada in Ohio in 1919—Prof. Gossard.

New officers elected were as follows: President—J. S. Houser; Vice-President—H. J. Speaker; Secretary—T. H. Parks.

Obituary

Dr. H. C. Wood.

Horatio C. Wood, M. D., LL. D., emeritus professor of Materia Medica, Pharmacy and General Therapeutics in the University of Pennsylvania Medical School, died January 3, 1919. He was born in Philadelphia, January 13, 1841, was educated at the Westtown School and the Friends Select

School and was graduated from the Medical department of the University of Pennsylvania in 1862. He was the author of a number of important medical works and papers and in the beginning of his career devoted much time to natural history and wrote a number of papers on botany. He received honorary degrees from several universities and was a member of many learned Societies, including the National Academy of Sciences. Apparently he did not write on insects proper but the following list* shows his activity in nearly, related fields of natural history before he became active as a practitioner of medicine.

In the *Proceedings of the Academy of Natural Sciences of Philadelphia:*

Descriptions of new species of Scolopendra, in the Collection of the Academy. 1861, 10.

Description of a New Species of Thelyphonus. 1861, 312.

Description of New Species of North American Pedipalpi. 1863, 107.

Description of New Species of North American Polydesmidae. 1864, 6.

Descriptions of New Species of North American Julidae. 1864, 10.

Description of New Genera and Species of North American Myriopoda. 1864, 186.

New Polyzoniidae, Gervais. 1865, 172.

Descriptions of New Species of Myriapoda. 1867, 42.

Notes on a collection of California Myriapoda with the Descriptions of New Eastern Species. 1867, 127.

In the *Journal* of the same:

On the Chilopoda of North America, With a Catalogue of all the Specimens in the Collection of the Smithsonian Institution. V. 5.

On the Pedipalpi of North America. V, 357.

In the *Transactions of the American Philosophical Society:*

North American Myriapoda. 1865, 112 pp., 61 figs. and 3 plates.

On the Phalangia and Pedipalpi Collected by Prof. Orton in Western South America with Descriptions of New Species. 1869, pp. 7.

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*Taken from a privately printed *Bibliographical Record 1860–1890 Horatio C. Wood*, without date or place of publication, 24 and 2 pages, 8vo.; copies in the libraries of the Academy of Natural Sciences of Philadelphia and of the University of Pennsylvania.

Obituary notices of Dr. Wood relating chiefly to his medical career, have appeared in *The Pennsylvania Gazette*, Jan. 16, 1920, (largely reprinted in *Science* for Jan. 30) and *The Alumni Register* (Univ. of Pa.) for Feb., 1920, the last with a portrait.

In the *Proceedings of the Essex Institute:*
Phalangideae of the United States. 1867, 30 pp.

Dr. Wood was Recording Secretary of the Academy of Natural Sciences of Philadelphia, from October 31, 1865, to February 26, 1867.

HENRY SKINNER.

While, aside from his writings along pharmacological and medical lines, perhaps better known for his work on fresh-water algae, Dr. Wood was for a number of years in the earlier part of his scientific career an active and successful student of the Myriopoda and Arachnida. His work on the latter group was confined to the Pedipalpida, Phalangida, and Scorpionida. Beginning with the description of a new Japanese thelyphonid in 1861, he published in this field a number of papers of systematic character of which the most important are his "On the Pedipalpi of North America" (1863) and "On the Phalangeae of the United States" (1868), papers which, in presenting what had been learned of this part of our fauna up to his day together with his own material additions in clear and useful revisional form, have served as a stimulus and starting point for later work. His final paper touching these groups appeared in 1869 and was an account of new South American and African forms.

The period of Dr. Wood's activity on the Myriopoda, as indicated by published papers, extended from 1861 to 1867, apparently terminating with his call to the professorship of botany in the University of Pennsylvania in 1866. His descriptive papers on the North American Myriopoda, published during this period, were the first of importance by an American writer since Say's Myriapodæ of the United States (1821) and have formed the basis for subsequent work. The first paper (1861), an account of new, mostly exotic, species of Scolopendra in the collection of the Academy of Natural Sciences of Philadelphia, was followed two years later by an extensive paper on the Chilopoda of North America in which were listed or described also all the exotic species then in the

collection of the Smithsonian Institution. Four papers following this were descriptive of new North American diplopods. Wood's work on this group culminated in "The Myriapoda of North America" (1865), in which most of his previous work was incorporated and which is still the only single paper dealing with the North American Chilopoda or Diplopoda as a whole. This for the time was an excellent memoir, exhibiting accuracy of observation and a balanced systematic judgment, and showing careful attention to variability and an appreciation, e. g., of the prime importance of the copulatory organs of diplopods in the discrimination of species. Two brief supplementary papers descriptive of additional new North American species appearing in 1867 concluded Wood's work on the Myriopoda.

R. V. Chamberlain, Cambridge, Massachusetts.

In the summer of 1883, Dr. Wood was a member of an expedition to Texas under Colonel, then Major W. R. Livermore, his son, Dr. George B. Wood, writes us. "This was one of a series of explorations for the purpose of finding water, recommending places for roads and new army posts and a correction of old state surveys, when Col. Livermore was triangling the State of Texas west of the Pecos River." On this expedition, either, near El Paso or in the valley of "Tornellias" [Tornillo] creek in the great bend of the Rio Grande, more likely the latter,* Dr. Wood collected two specimens of a "bright brilliant green [beetle] with a slight golden lustre from the surface, tarsi violaceous, legs bright green, tibiae distinctly golden externally," described by Dr. George H. Horn in the *Transactions of the American Entomololgical Society*, xii, page 124, as *Plusiotis woodii*, and dedicated to his friend.

*See Ent. News. xvi, p. 290, xxii, p. 356. A brief account of this expedition, which started July 1 and broke up at the end of October, is contained in Major Livermore's report in the Report of the Chief of Engineers, U. S. Army for 1884, part III, pp. 2394–2395, Washington, 1884.

Oliver Spink Westcott.

Oliver Spink Westcott was born at Wickford, Rhode Island, December 15, 1834 and died at Oak Park, Illinois, July 31, 1919. He graduated at Brown University, Providence, R. I., 1857, and was the last surviving graduate of that year. He also held the degree of Doctor of Science from Brown University. He was a lineal descendant of Stukeley Westcote, who went with Roger Williams from Massachusetts to Rhode Island in 1638.

While he was an educator first, last and always, still he was a noted scientist, mathematician and student of foreign languages, ancient and modern. He was well known as an entomologist having collected for 51 years. It was his custom to spend his vacations from school in some corner of the country collecting insects for future study. He boasted that he had visited and made a stay in every state of the Union, in Mexico, Cuba, Hawaii, Alaska and the several provinces of Canada before he felt called upon to visit Europe. In fact he went to Europe only once. His insect collection of some 45,000 specimens has gone to the State College of Washington, Pullman, Wash. His Entomological Library was sold to John D. Sherman Jr., Mount Vernon, New York.

A notice of Dr. Westcott, with special reference to his connection with the public schools of Chicago, accompanied by a portrait, was published in *The Oak Parker* for August 9, 1919. From it we learn that that connection lasted for fifty-two years.

"Thirty-one years as principal of the old North Division High School, now known as the Robert A. Waller. At the age of 75, Mr. Westcott sent in his resignation to the school board, but was prevailed upon to reconsider. . . . Five years later, on his eightieth birthday, he withdrew from active service. At that time Superintendent Ella Flagg Young wrote: 'On your resignation from the principalship of the Waller High School I cannot refrain from writing you something of my appreciation of the power for intelligence and excellence that you have been in Chicago . . .'

We are indebted to Professor James G. Needham for the clipping from which we have quoted and through him to Mr. Charles Westcott, Dr. Westcott's son, for the biographical

data given above. Through Prof. Needham also, years ago, Dr. Westcott placed the Odonata which he collected on a trip to Tabasco and Chiapas, Mexico, at the service of the Editor for incorporation of the data accompanying them in the *Biologia Centrali-Americana*.

While Dr. Westcott apparently published no extensive papers on entomology, he contributed the following notes to ENTOMOLOGICAL NEWS:

Venturesome Insects [Butterflies], iv, 90–91, March, 1893.

[*Erebus odora* at Racine, Wisconsin], v, 71. March, 1894.

The Assembling of the Cecropia Moth, vi, 136–137, May, 1895.

The Distribution of some N. American Syrphidae, viii, 190–191, Oct., 1897.

Collecting Dragonflies by a Decoy, xvi, 209, Sept., 1905.

Note on *Anatis 15-punctata* and *A. caseyi* n. sp. [Coleop.], xxiii, 422, Nov. 1912.

Scarcity of Early Insects, xxiii, 328–329, July, 1912.

The 1912 swarming of *Aletia argillacea*, xxiv, 84–85, Feb., 1913.

Rarities (Hym., Neur., Odon.), xxvii, 85–86, Feb., 1916.

Misapplied Effort (Odonata), xxvii, 467, Dec., 1916.

Sex Attraction Overcome by Light Stimulation (Lepid., Col.), xxviii, 374–5, Oct., 1917.

Dr. C. G. HEWITT.

The daily papers announced the death of Dr. Charles Gordon Hewitt, dominion entomologist and consulting zoologist, at Ottawa, on March 1, 1920. He was born in Scotland thirty-five years ago and came to Canada in 1909. Previous to and after his settlement on this side of the Atlantic, he published several notable works on the house-fly. In 1913 he was elected a fellow of the Entomological Society of America, in whose meetings he took an interested part. As entomologist and zoologist he was very active in Canada and he will be greatly missed there, as well as on this side of the international line, where we deplore his early death. Detailed biographical notices will doubtless appear in the Canadian journals.

NEW ARRIVALS

From Colombia, So. America:

OVER 10,000 BUTTERFLIES, INCLUDING

Morpho cypris
" sulkowskyi
Morpho amathonte
Caligo spp.

From Cuba:

1500 BUTTERFLIES AND MOTHS, INCLUDING

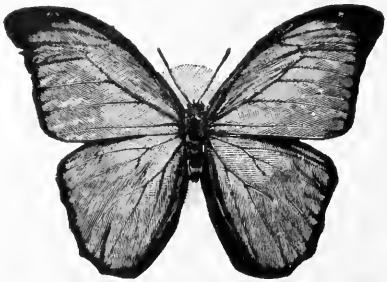
Papilio columbus
" andraemon
" celadon
" devilliersi
Urania boisduvali
Erinyis guttalaris
Protoparce brontes, etc.

From Venezuala:

Over 5000 Lepidoptera
200 Dynastes hercules

From New Guinea:

2000 Coleoptera
200 Orthoptera



From Assam, India:

1200 BUTTERFLIES AND MOTHS, INCLUDING

Papilio arcturus
" philoxenus
Kallima inachis
Brahmaea wallachi

And Many Other Showy Species

From Tibet (Bhutan)

Armandia lidderdalii
Parnassius hardwicki

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CONTENTS

Cotton Insects in Porto Rico.*

By E. GRAYWOOD SMYTH,

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Very little having been published concerning the insect pests of cotton occurring in Porto Rico, it is the object of this paper to present a brief discussion of the species that feed upon this crop, whose growing importance on the Island is recognized.

It should be said that no evidence has yet been found of presence of the dreaded pink boll worm, *Pectinophora gossypiella* Saun., though the pink scavenger worm, *Pyroderces rileyi* Wals., is frequent enough, and does no perceptible damage. The common boll-worm, *Chloridea obsoleta* Fab., while a not uncommon pest of corn on the Island, has not

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been observed by the writer attacking cotton. A report of severe damage from its attack reached the Station from the Haltillo district during July, 1919, but specimens accompanying the letter proved to be those of the leaf caterpillar, *Alabama argillacea* Hübn., the two species having been confused. Even as a pest of green ear-corn, the boll-worm is considerably less important on the Island than the southern grass-worm, *Laphygma frugiperda* S. & A., which in several islands of the West Indies is known locally as the corn ear-worm.

The cotton leaf caterpillar often becomes locally a serious menace to cotton raising. To combat it by means of arsenicals, by the dusting method, as is done in the Southern States, is too expensive for the average cotton grower of the Island, who is usually so lacking in funds as to be unable to buy even his seed, which must be furnished by contract. He is therefore advised to use a much cheaper but equally effective method of control, namely, the cutting down and destroying of the moth's wild food plants between cotton crops. Principal of these are two weeds, *Urena lobata* and *Malachra rotundifolia*, both Malvaceous, the former much the more abundant, and the more noxious from its habit of attracting large numbers of the fire-ant, *Solenopsis geminata* Fabr., because of the three small honey-ducts on the underside of each leaf. It is unfortunate that this plant is considered highly medicinal by the natives, and with difficulty are they persuaded to cut it down. The weed grows in considerable beds when permitted and the writer has collected as many as 52 larvae from four plants (on July 16, 1916), showing how the weed may facilitate the moth's multiplication. In many cotton sections of the States this moth breeds continuously upon cotton, hibernating over winter at end of the cotton season, and flying forth in spring in time to invade the new crop. There it needs no alternate host plant. But in Porto Rico conditions are different, there being a long period between cotton crops during which the moth cannot hibernate, so must breed on other plants. *Urena lobata* not only tides over this gap, but allows the moths to greatly multiply in numbers between cotton crops, it being in many regards a more favorable food plant for the larvae than cotton.

The common cotton stainer of the Island seems to be *Dysdercus andreae* L., which is much more frequently found in the drier northwest and south coast sections, than along the humid northeast and east coast. While the bug is sometimes locally abundant, it may at other times be entirely missing in a cotton field, so on the whole cannot be considered a serious pest of the crop.

During the past winter (December and January) the writer has had opportunity to make a close study of the cotton insects in a field on the Insular Experiment Station grounds at Rio Piedras. Needless to say, the pink boll worm and boll weevil have been entirely absent; and we have yet to discover these two pests on the Island. It was a surprise, however, to have found only two leaf caterpillars (*Alabama argillacea* Hubn.) on the plants in the whole winter, in view of the fact that *Urena lobata* has grown abundantly in the neighborhood through the summer, and was subject to considerable attack. The reduction of the pest may be accounted for by the prevailing dampness of the weather in conjunction with some disease. The common boll-worm has been another pest missing, although infected ears of corn have been found growing very near the cotton. An occasional larva of the tropical cutworm, *Xylomiges sunia* Guen., has been found attacking foliage, but this may be considered accidental, as the larva much prefers garden crops, amaranth and morning glory.

The most injurious pest has been the greenhouse thrips, *Heliothrips haemorrhoidalis* Burm. Larvae and adults gather in some numbers on the outside of bolls, underneath the calyx, where they scarify the surface and cause white scars that later turn brown, and seem to be immediately concerned in the attack of a disease that somewhat discolors the bolls and causes the calyx to cement itself to the outside of the boll, preventing the latter from bursting properly. The preceding generation of this thrips was found in November attacking the undersides of grapefruit leaves, where it occurred in all stages and caused a considerable scarring, and some malformation, of the foliage. A careful search for them on citrus, in latter part of January, revealed only four adults and no

young, and three of the adults were dead, adhering to lower surface of leaf. These have been confined, with the hope of rearing internal parasites. The greenhouse thrips has been reported attacking citrus foliage in Florida, California (on plants from Massachusetts), Demerara, and Sicily, but has not been previously reported as a cotton pest to our knowledge.

Another insect very common on cotton bolls, and infesting probably thirty per cent. of them, is the destructive mealybug, *Pseudococcus virgatus* (Ckll.), which during the summer very heavily infested lima beans on vine and leaves, and to some extent pepper foliage. It was at that time heavily parasitized by a small Cecidomyid, probably *Karschomyia cocci* Felt, the adults of which display the strange habit of hanging in rows festooned on strands of spider web, where they perform a rocking motion by means of the wings. On cotton the mealybug occurs in all stages, the egg masses and young being especially plentiful, protected beneath the base of calyx. One or two bolls were turned quite white beneath the calyx by their cottony secretions. A very few specimens of *Ps. citri* (Risso) were found on the bolls, and one specimen of *Ps. longispinus* (Targ.). A number of adults of an undetermined scale, very close to *Coccus mangiferae* (Green), were found infesting the inside of the calyx on cotton bolls.

The lace-bug, *Corythuca gossypii* Fab., has done injury to an occasional cotton leaf, but is very much more injurious to the foliage of adjoining castor-bean and lima bean plants. On the last two this insect is a pest of first importance, but on cotton it is of little consequence. More important than the Tingid has been the cotton aphis, *Aphis gossypii* Glov., though the attack is light and scattering, due to the activity of its natural enemies. They include the following, named in about the order of their importance: *Cycloneda sanguinea* L.; *Scymnus roseicollis* Muls.; a white fungus, *Agrostalagmus albus*; a Braconid parasite, that turns the body of the aphis light brown; a Chalcidid parasite, that turns the body jet black; a Chrysopid, and a species of *Hyperaspis*. In very wet weather, the white fungus usually becomes the most

efficient of the parasites, and preys upon all of the commoner aphides. The large lady-beetle, *Cycloneda*, is greatly hampered in its multiplication by the attack of an Encyrtid hyperparasite, *Homalotylus* sp., and the black, mummied larvae containing these parasites, or their exit holes, may often be found under the calyx on the boll.

The green flower beetle, *Diabrotica graminea* Balz., is often seen eating cotton blossoms or foliage, and the larvae doubtless attack the roots to some extent. This beetle is very fond of Malvaceous plants, and is a serious pest of okra blossoms and leaves in July.

Occasional nymphs and adults of a species of *Empoasca* not yet determined, have been found on foliage and bolls. Two adults of the Membracid, *Antianthe expansa* (Germ.), one adult of a species of *Agallia*, and occasional adults of *Oliaris* sp., which is a very general feeder, have been found on terminal stems.

Nymphs of the green bug, *Nezara viridula* (Linn.), in the early instars, were found under the calyx on many cotton bolls in early January, and the adults began to appear in latter part of the month. This bug was not noticed earlier in the year 1919. Although it is recorded as a pest of cowpeas and tobacco in Florida, and of tomato in Jamaica, it has not been observed in Porto Rico to attack any of these plants, which have been growing in immediate vicinity of the cotton. The presence of the green bug in a cotton plantation should be looked upon with apprehension, in view of the fact that it has been proven to be a purveyor of cotton anthracnose in Georgia, and of an internal disease of the cotton boll in Barbados and neighboring islands.

Lepidopterous larvae of small size have been found feeding and webbing beneath the calyx on cotton bolls, and are being reared for the determinations. None of them, however, resemble the pink boll worm.

The Genus Timema Scudder, with the Description of a New Species, (Orthoptera, Phasmidae, Timeminae.)

By Morgan Hebard, Philadelphia, Pa.

The genus *Timema* was described by Scudder in 1895,[1] based on a single species, *californicum*, from California. In 1903, Caudell furnished the first detailed description of the species, which had been sent him by Scudder, and proposed the subfamily name Timeminae, the subfamily being restricted to this single genus. He also discussed and figured material from Los Angeles County, California, the differences found being noted as possibly showing the presence of a distinct species, but the material at hand was considered in too poor a state of preservation to warrant description.

From the larger series now available, we find the southern Californian insect to be a distinct species, differing very strikingly in constant features of the genitalia.

The genus *Timema* was said to be closely allied to *Agathemera* by Scudder and characterized as "maxime affine" by Redtenbacher,[2] the latter ignoring Caudell's subfamily Timeminae.

Considering the complete median segment, which is in no way more closely attached to the metanotum than to the succeeding tergite; the three jointed tarsi, and the limbs so attached ventrad that the coxae can not be seen from above, we believe that the subfamily Timeminae is valid. In fact it may be characterized as the most aberrant subfamily from the conventional Phasmid type.

The genus does find nearest affinity with *Agathemera*, though the relationship is decidedly remote.[3] In addition to the features given above, *Timema* is distinguished by both sexes being completely apterous, the tarsal claws are slightly

[1]Can. Ent., XXVII, p. 30.

[2]Insektenfam. Phasmiden, p. 88, (1908).

[3]Comparison is made with more than one species of *Agathemera* in the collection of the Academy of Natural Sciences of Philadelphia.

asymmetrical and the large arolium is produced as far as the apex of the longer tarsal claw. The species of *Timema* are furthermore much smaller than those of *Agathemera*.

Timema californicum Scudder

1895. *T(imema) californicum* Scudder, Can, Ent., XXVII, p. 30. [Santa Cruz, California.]

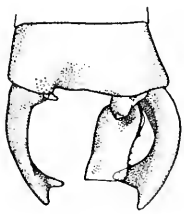
1903. *Timema californicum* Caudell, Proc. U. S. Nat. Mus., XXVI, p. 883, pl. LVII, fig. 5, pl. LVIII, fig. 7. (In part.) [♂, ♀; Santa Cruz Mountains, California.]

1903. *Timema californica* Caudell, Ent. News, XIV, p. 316. [[juv.] ♀; Humboldt County, California.]

1908. *Timema californicum* Redtenbacher, Insektenfam. Phasmiden, p. 88. (No additional material.)

1913. *Timema californica* Caudell, Proc. U. S. Nat. Mus. XLIV, p. 613. (No additional material.)

The species is best discussed by Caudell in his first paper in 1903, the detail figures there given being, however, very poor.



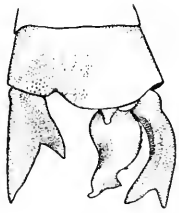


Fig. 1. *Timema californicum* Scudder. Mount Tamalpais, California, Male. Dorsal view of distal portion of abdomen. (Much enlarged.)

Fig. 2. *Timema chumash* new species. Los Angeles County, California. Male. *Type.* Dorsal view of distal portion of abdomen. (Much enlarged.)

Later that year Caudell gives all the data yet recorded as to the habits of this singular insect. According to that author, on June 9th to 16th, 1903, Mr. H. S. Barber beat nineteen females from fir trees (at Bair's Ranch on Redwood Creek) in Humboldt County, California, at an elevation of about 1400 feet. The individuals were reported to be green like the fir needles, which they resembled so closely as to be scarcely discernable as long as they remained motionless, which they did for some time after having been beaten into the net. All were taken from the lower branches of a clump

of large trees, which stood somewhat apart from the denser woodland.

Measurements in Millimeters

♂	Length of body	Length of pronotum	Width of pronotum	Length of caudal tibia
Mount Tamalpais, Cal....	12.5	1.9	2.7	3.4
Fairfax, Cal.....	14.5	1.9	2.7	3.8
Carmel, Cal.....	12.7	1.9	2.7	3.7
♀				
Guerneville, Cal.....	20.8	3.1	4.	6.
Fairfax, Cal.....	17.7	2.4	3.4	4.2
Oakland, Cal.....	19.8	2.6	3.4	4.7

The male genitalia and female penultimate tergite and cerci are distinctive for the species. The former are shown by text figure 1, while under *T. chumash*, here described, other features characteristic of this species are discussed.

In males some variation in the form of the genitalia is found, though the type is constant, showing no divergence toward that developed in *chumash*. Thus the disto-internal production of the cerci varies individually from the type figured to one in which these portions are broader, this portion of the sinistral cercus in a male from Monterey County being distinctly broader than long with margin convex to the rather broadly rounded apex. Furthermore the sinistral cercus is produced proximad near the base, so that the internal margin beyond the basal tooth is developed into a distinct flange, while the meso-dextral elongate plate is much constricted mesad. These differences we believe are of no further importance than indicating the degree of variation to be expected in the male genitalia of the species.

In females the cerci are elongate, leaf-like, cochleate plates, obliquely truncate at their apices, with internal surfaces roughly denticulate toward the dorsal margin. The distal margin is smooth.

We are consequently not fully satisfied that the female from Kings River, in Fresno County, represents this species. Though agreeing with the others here recorded in the form of the penultimate tergite, the cerci show a broader and less

oblique distal truncation, as found in *chumash*, the margin being there moderately denticulate, about intermediate between the typical conditions found in *californicum* and *chumash*. The presence of a geographic race or distinct species in the southern Sierras is a possibility which additional material, including adult males, alone can determine.

Though we have consistently endeavored to secure material of this genus whenever working on the Pacific Coast, all efforts have been unsuccessful.[4]

The species is now known from Bair's Ranch on Redwood Creek in Humboldt County, California, southward along the coast as far as Carmel in Monterey County. It is also found in the Sierras, being here recorded from the vicinity of Lake Tahoe, in Eldorado County, and from Kings River, in Fresno County. As is true for many secretive species, the actual distribution of this insect is probably considerably more extensive than as at present defined.

Specimens examined, in addition to 6 previously recorded: 28; 8 males, 17 females, 3 immature individuals.

CALIFORNIA. Corralitos, Redwood, Santa Cruz Mountains, May 13, 1907, (J. C. Bradley), 1 juv. ♀, [Cornell Univ.]. Guerneville, Sonoma County, May 31, 1910, (E. C. Van Dyke), 1 ♀, [Hebard Cln.]. southern Sonoma County, August 31, 1910, (J. A. Kusche), 1 ♀, [Cal. Acad. Sci.]. Fairfax, Marin County, May 7, and 11, 1911 and 1919, (E. C. Van Dyke; E. P. Van Duzee), 4 ♂, 4 ♀, [Cal. Acad. Sci., and Hebard Cln.]. Mount Tamalpais, June 20, 1909, (E. C. Van Dyke), 1 ♂, [Cal. Acad. Sci].. Niles Canyon, July 15, 1916, (E. P. Van Duzee), 1 ♀, [Cal. Acad. Sci.]. Oakland, May 14, 1911, (E. C. Van Dyke; hills back of city) 3 ♀; (C. D. Haines) 1 ♀, [Cal. Acad. Sci., and Hebard Cln.]. Corte Madero Creek, Palo Alto, April 4, 1915, (H. Morrison), 1 juv. ♀, [U. S. N. M.]. Carmel, Monterey County, May 19 and 21, 1911 and 1913, (E. C. Van Dyke), 2 ♂, 3 ♀, [Cal. Acad. Sci., and Hebard Cln.]. Monterey County, (M. K. Curran), 1 ♂, 2 ♀, [Hebard Cln.]. Fallen Leaf Lake, Lake Tahoe, Eldorado County, July 1, 1915, (E. C. Van Dyke). 1 juv. ♀, [Cal. Acad. Sci.]. Paradise Valley, Kings River, Fresno County, 6500 feet, July 23, 1910, (E. C. Van Dyke), 1 ♀, [Hebard Cln.].

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[4]From the data at hand the species of *Timema* appear to be spring forms, reaching their greatest numerical abundance in May or June. Our Californian work has all been accomplished much later in the season, this probably in large part accounting for our failure to find the insects.

Timema chumash[5] new species

1903. *Timema californica* Caudell, (in part not of Scudder, 1895), Proc. U. S. Nat. Mus., XXVI, p. 883, pl. LVIII, fig. 7a. [♂, ♀, Los Angeles County, California.]

Males of the present species agree closely with those of *T. californicum* Scudder, except in the strikingly different genitalia. In the female sex the genitalia likewise show differences, which, however, are by no means as distinctive.

The insect occurs in the mountains and adjacent regions of southern California, far south of the known limits of distribution of *californicum*.

TYPE: ♂; Los Angeles County, California. [Hebard Collection, Type No. 533.]

Agrees closely with males of *californicum*, differing only in the more robust structure and in the following genitalic features.[6] Penultimate tergite produced dextro-distad more than sinistro-distad, in such a way that the dextral margin is slightly more oblique to a medio-longitudinal line than the sinistral margin; distal margin broadly convex to a small but rather decided concave emargination, situated sinistro-mesad before the base of the sinistral cercus, the brief portion of this margin above the sinistral cersus straight, transverse, the surface of the plate toward the internal portion of this section supplied with denticulations in a small oval area. Sinistral cercus broad lanceolate with apex acute, lacking a basal tooth but flattened proximo-internally, this portion with lateral margin diverging and produced into a large acute-angulate projection mesad, about half as large as the remaining distal portion of the shaft. Dextral cercus a heavy, evenly in-bowed shaft of equal length, bifid distad with internal portion of this section and larger than the external portion; shaft bulbous proximo-externally. This cercus is much more like the dextral cercus of *californicum*, differing principally in the bulbous proximo-external section. Adjacent to and sinistrad of the dextral cercus is a large, lamellate plate, extending caudad almost an equal distance, irregular in contour and strongly constricted meso-distad, the dextral margin of this plate being armed with well spaced, sharp, recurved teeth. Above this plate is a very small irregularly rotundato-conical projection.[7] Me-

[5]The Chumash were an Indian tribe which, at the time of the Spanish conquest, inhabited the region in which this species is found.

[6]Reference to text figure 2 is advisable, due to the high specialization of these parts.

[7]In *californicum* the homologous projection is larger, more bulbous, with apex produced dorsad in a small conical process, as shown in text figure 1.

sad, from beneath the penultimate tergite, project two small, irregular, rotundato-trigonal plates. These are sometimes concealed and apparently represent the supra-anal plate (tenth tergite, not counting the median segment, which, in the species of *Timema*, is of the same form as the first tergite). Subgenital plate scoop-shaped, with apex weakly obtuse-angulate emarginate.[8] Styles absent.

ALLOTYPE: ♀; Los Angeles County, California. June. (D. W. Coquillett.) [United States National Museum.]

Very similar to females of *californicum*, apparently differing only in genitalic features. Size considerably larger than in male. Penultimate tergite roundly produced mesad,[9] so that only the distal portion of the very small trigonal supra-anal plate is exposed. Cercus elongate, cochleate, very broadly truncate at apex, this truncation very weakly oblique and with margin strongly but irregularly dentate.

MEASUREMENTS IN MILLIMETERS

	Length of body	Length of pronotum	Width of pronotum	Length of caudal tibia
♂				
Los Angeles County, Cal. *Type*...	14.	2.3	3.3	4.
Los Angeles County, Cal. *Paratype*	13.5	2.2	3.	4.2
Mount Wilson, Cal. *Paratype*.....	13.7	2.4	3.7	4.3
♀				
Los Angeles County, Cal. *Allotype*.	21.	3.	4.	4.8
Los Angeles County, Cal. *Paratype*	20.	2.7	3.9	4.8

From the available data the distribution of the present species would appear to cover the mountains in the Los Angeles region, extending down their eastern slopes into decided desert conditions, as is shown by material taken at Palm Springs, in the Mojave Desert at the foot of the San Jacinto Range.

Specimens Examined: 9; 3 males, 2 females and 4 immature individuals. CALIFORNIA. Los Angeles County, 1 ♂, *type*, [Hebard Cln.]; June, (D. W. Coquillett), 1 ♂, 2 ♀, 1 juv. ♀ *allotype* and *paratypes*, [U. S. N. M. and Hebard Cln.]. Mount Wilson, near summit, June 6, 1916, (H.

[8]In *californicum* the subgenital plate is weakly scoop-shaped, with apex broadly and weakly convex.

[9]In *californicum* the penultimate tergite is moderately angulate-emarginate, so that a larger portion of the very small trigonal supra-anal plate is exposed.

Morrison; swept from *Ceanothus*), 1 ♂, [U. S. N. M.]. Keen Camp, San Jacinto Mountains, June 6 to 12, 1917, (E. P. Van Duzee), 1 juv. ♂, [Cal. Acad. Sci.]. Palm Springs, May 21, 1917, (E. P. Van Duzee), 2 juv. ♀, [Cal. Acad. Sci., and Hebard Cln.].

Descriptions of New Species of Hesperidae (Lepidoptera).

By Henry Skinner, Philadelphia, Pa.

The types of the following species are in the collection of The Academy of Natural Sciences of Philadelphia.

Pyrrhopyge viriditas n. sp.

Head, collar and palpi red. Thorax blue above, black below. Abdomen and legs black. Anal tuft orange. Wings dark green above and below. Fringes yellow; very narrow on the primaries and a little more than 1.5 mm. wide on the secondaries. Expanse (one wing) 27 mm.

One specimen from San Pedro, Sula, Honduras. This species belongs to the group containing *telassa* and *hadassa* Hew.

Mimoniades aemulus n. sp.

Head, palpi, thorax and abdomen black. Patagia slightly tipped with orange. Primaries marked as in *pityusa* Hew. except that the two vitreous spots in the centre of the wing are differently shaped, the upper spot being elongate and the lower one has an indentation on the outer side. Inferiors as in *pityusa*. Underside as in *pityusa* except that the primaries have no markings other than the vitrous spots, and on the secondaries the narrow submarginal line is wanting. Expanse of one wing 31 mm.

One male specimen from Ambato, Ecuador. This species differs from its allies in the black body and abdomen and also in the character of the central vitreous spots.

Mimoniades amans n. sp.

Head, palpi, thorax, abdomen and legs mostly black with a few whitish hairs interspersed here and there on the underside. A broad orange, vitreous band extending from the costa to the submedian nervure, which is 6 mm. in width; the remainder of the wing is immaculate and black. The secondaries are black with blue scales extending parallel to the margin and 4 mm. from it, and also a faint line of these blue scales running the same distance from the interior margin. In the medial part of the wing

they extend about 13 mm. toward the base. The primaries below are dusted with blue scales and there are three white spots at the base of the wing. Secondaries covered with blue scales and with a white fascia near the base of the wing. Expanse of one wing 28 mm.

One specimen from Neiva, United States of Colombia. The species is related to *ocyalus* Hubn.

Proteides jamaicensis n. sp.

Closely related to *idas* Cramer and on the upperside marked in the same way. The vitreous spots are variable, in some cases large and in one specimen the wings are almost immaculate, as in some specimens of *sanantonio* Lucas. The differences are on the underside of the secondaries where markings are in general as in *idas* but the white scales are almost entirely lacking and this gives the wings quite a different appearance. It is a large form and in some of the specimens one wing measures 35 mm.

The *type* and four other specimens from Jamaica.

Thymele angustus n. sp.

Head green. Upperside of palpi brown, underside orange. Front femora orange. Thorax and abdomen green, below brown. The primaries have the usual diaphanous band of spots; two on the costa, a narrow hour-glass shaped one in the cell and a small triangular one below. Inner third of wings blue. Secondaries brown with inner third blue. Underside of primaries as above with secondaries brown, immaculate. Expanse of one wing 26 mm.

The *type* and two other specimens from San Domingo, West Indies. This striking species is related to *fulgerator* but may be readily distinguished by the very narrow diaphanous band of spots only 1 mm. wide.

Telegonus antiquus n. sp.

Head, palpi and underside of thorax brown. Upperside of thorax and abdomen green. Primaries brown with the basal third blue. Secondaries brown with the inner half blue. Underside brown with obscure darker markings and a few faint pink scales on the outer margins of the wings. Expanse of one wing 26 mm.

The *type* and one other specimen from San Domingo, West Indies. The species is related to *T. habana* Lucas but lacks the whitish border of the underside of the wings.

Bungalotis immaculata n. sp.

The whole insect is yellowish brown, nearly the color of *B. midas* Cramer and is without markings. The antennae, head, palpi, thorax, abdomen

and legs concolorous. Inserted near the base of the secondaries is a tuft of brown hairs. Expanse, one wing, 23 mm.

Type from Chanchamayo, Peru.

Bungalotis canalis n. sp.

A yellow-brown species the color of *ramusis* Cramer and the markings are of the same general color. The specimen is a male and has a costal fold. Antennae, head, palpi, thorax, abdomen and legs yellow-brown. Upperside: Primaries with a small, round, sub-apical vitreous spot and several very faint brown spots between the veins; the secondaries have a geminate brown spot at the end of the cell and five small brown spots half way between this and the border, and running parallel to the border. Underside of primaries much as above; secondaries have a medial row of three obscure, brown spots and a postmedial row of six brown spots. Expanse of one wing 28 mm. Costa of hind wing 21 mm. External margin 22 mm. Internal margin 23 mm. These measurements show that the species is different in shape from some of the species in the genus.

The *type* is from Gatun, Canal Zone, Panama. From D. E. Harrower.

Eudamus parvus n. sp.

Head, thorax and abdomen above, brown; below the palpi are covered with mixed brown and whitish hairs. Abdomen below brown. Upperside: Primaries dark brown and immaculate; secondaries brown and immaculate, terminating in short tails. Underside: The primaries show very faint mottlings; the secondaries have a faint central band, darker than the background and also a submarginal one of the same character. Expanse of one wing of male, 13 mm., of female 20 mm. Tail 5 mm. in length.

The *type* male has no vitreous spots and the type locality is St. Pierre, Martinque (J. M. Geddes, Dec. 8th, 1911.) *Allotype* from the same locality and paratypes from Antiqua, Dec. 23rd, 1911, (Geddes). English Harbor, Antiqua (Geddes) Dominica (Geddes). This little species has the same odd shape as *E. galapagensis* Williams, described in the Proc. Calif. Acad. Sci., 1911, p. 303, pl. 20, f. 6.

Callimormus dimidiatus n. sp.

Head black; antenna annulated, black and white; palpi with black and white hairs. Thorax and abdomen brown above, white below. Legs partly covered with white scales. Upperside: Primaries brown with three small orange lines near the apex and a subcostal one from the inner third to the base of the wing; secondaries brown, immaculate. Under-

side: Primaries brown with a very narrow yellow line below the costa and extending from near the middle of the wing to the base; on the outer half of the costal margin and on the outer margin are about ten yellow lines. Secondaries with a subcostal yellow line and below this is another one, bifid from the middle to the outer margin of the wing. The lower two-thirds of the wing is white with five or six narrow fuscus lines in it. Expanse of one wing 12 mm.

Type, a male from Huigra, Ecuador, (S. N. Rhoads). This is a very pretty and graceful little species. *Gracilis* Felder appears to be its nearest ally.

The known Membracidae of Ecuador (Homop.)

By Dr. FREDERIC W. GODING, Guayaquil, Ecuador.

During a residence of more than six years in Ecuador, collectors have been supplying material from which this list of forty-five species of Membracidae is based, while heretofore but eight had been recorded; those in my collection are indicated by an *. Representatives of the subfamily Centrotinae have not been identified from this Republic. Types of the new species here described are in my collection.

TRAGOPINAE.

***Horiola picta** Fabr. Coq. Ill. Ins. ii, p. 78, pl. 18, f. 10. *Hab.:* Ana Maria Farm, Province of Los Rios, (Rorer).

***Horiola lineola** Fabr. Syst. Ryn. p. 30. *Hab.:* Ana Maria Farm, Province of Los Rios, (Rorer).

***Horiola arcuata** Fabr. Syst. Ryn. p. 29. *Hab.:* Ana Maria Farm, Province of Los Rios, (Rorer).

SMILIINAE.

***Cyphonia clavata** Fabr. Mant. Ins. ii, p. 264. *Hab.:* Machala, Province of El Oro, (Rorer).

Antonae guttipes Walk. List Hom. Brit. Mus., Suppl. p. 157. *Hab.:* Napo River, Province of El Oriente, (Walker).

Centrogonia centrotoides Walk. List Hom. Brit. Mus., Suppl. p. 138. *Hab.:* Napo River, Province of El Oriente, (Walker).

***Centrogonia flavo-limbata** n. sp. (See description on another page.) *Hab.:* Pifo, Province of Pichincha, (Campos).

Acutalis (?) terminalis Walk. Ins. Saund. Hom. p. 76. *Hab.:* Province of Pichincha, (Distant).

*Polyglypta dorsalis Burm. Silb. Rev. Ent. iv, p. 178. *Hab.:* Province of El Oriente, (Goodfellow).

*Erosne bracteata Stal. Bid. Mem. K. p. 240. *Hab.:* Machala, Province of El Oro, (Rorer).

*Heranice miltoglypta Fairm. Rev. Mem. p. 306, pl. 5, f. 4 and 12. *Hab.:* Machachi, Corazon, Province of Pichincha, (Distant); Cañar, Province of Cañar, (Pachano).

Hille equadorensis Fowl. Tr. Ent. Soc. Lond. (1894), p. 420. *Hab.:* Ecuador, (Fowler).

*Hille sobria Walk. List. Hom. Brit. Mus. p. 523. *Hab.:* Quito. Province of Pichincha, (Walker); Province of El Oriente, (Goodfellow).

Hille perfecta Walk. List Hom. Brit. Mus., Suppl. p. 139. *Hab.:* Napo River, Province of El Oriente, (Walker).

*Ecuatoriana bactriana n. gen. et sp. (See description on another page.) *Hab.:* Zuñas, Province of Chimborazo, (Feyer).

*Oxygonia chrysura Fairm. Rev. Mem. p. 302, pl. 5, f. 18. *Hab.:* Province of El Oriente, (Goodfellow).

*Oxygonia erythropus Burm. Handb. Ent. ii, p. 139. *Hab.:* Province of El Oriente, (Goodfellow).

Oxygonia rufo-maculata Fallou. Rev. d' Ent. ix, p. 353. *Hab.:* Ecuador, (Fallou).

Oxygonia fasciata Fallou. Rev. d' Ent. ix, p. 353. *Hab.:* Ecuador, (Fallou).

*Adippe histrio Walk. Ins. Saund. Hom. p. 71. *Hab.:* Province of El Oriente, (Goodfellow).

Lucilla intermedia Fowl. Tr. Ent. Soc. Lond. (1894), p. 421. *Hab.:* Ecuador, (Fowler).

Darninae

*Aconophora pugionata Germ. Mag. Ent. iv, p. 20. *Hab.:* Ana Maria Farm, Province of Los Rios, (Rorer).

*Hyphinoe morio Stal. Bid. Mem. K. p. 257. *Hab.:* Posorja, Province of Guayas, (Campos).

*Tomogonia camposiana n. sp. (See description on another page.) *Hab.:* Posorja, (Campos).

Heniconotus aethiops Butl. Cistula Ent. (1877), p. 361, pl. 7, f. 13. *Hab.:* Ecuador, (Butler).

Hoplophorinae

*Triquetra bos Fairm. Rev. Mem. p. 282. *Hab.:* Province of El Oriente, (Goodfellow).

*Triquetra nigro-carinata Fairm. Rev. Mem p. 280. *Hab.:* Normandie, Province of El Oriente, (Feyer).

(*To be Continued*)

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MAY, 1920.

Remember the Veterans!

A correspondent writes:

It has occurred to me that the entomologists of this country should in some way show their appreciation of those men whose active work is ended, and not let them pass by, as is usually the case, until it is too late. Dr. Behr and Prof. Rivers both passed away apparently forgotten and (I cannot help feel) with just a little bitterness that their last days should be passed in utter oblivion. The ending of Rivers was especially sad for, after the death of his wife, to whom he was intensely devoted, he began drinking heavily, merely as a means to hasten the end. Perhaps just a bit of appreciation from those now active in the various fields of entomology would have brightened his days, lessened the great sorrow that came to him, and made him feel that his efforts had not been entirely in vain.

It seems to me that a day could be appointed when, each year, those who have done their bit for the advancement of science could be remembered and congratulated. A mere pittance from a few of us would be sufficient to send to those who have retired a tribute in the way of flowers and a two cent stamp would carry a written message of congratulation and appreciation. I sincerely hope that my suggestion will lead to something along this line.

We heartily approve of these sentiments and hope that they may be carried into effect by individual action, even if concerted effort does not obtain. The veteran to be cheered would be most appropriately remembered on his own birthday. If one day in the year were appointed for this tribute to all the workers, the first suggestion which comes to us is that of the birthday of Thomas Say, the "father of American Entomology," July 27. That his natal day falls in a period when many entomologists are in the field, away from home and therefore not situated as to conveniently carry out this kindly idea, makes the wisdom of such a choice doubtful. We shall be glad to receive suggestions.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Change of Address

Mr. Richard T. Garnett has removed to 625a 14th Street, Oakland, California.

Notes on the Habits of Promecognathus laevissimus Dejean. (Col., Carabidae.)

After noting several crushed *Scaphinotus* on the paths in a damp ravine on the campus of the University at Berkeley, I sank a Mason jar into the ground in a little runway that led down to the stream. This runway was surrounded on either side by a heavy carpet of English ivy. The trap was baited with scraps of meat, but in the three months that have elapsed not a single *Scaphinotus* has been taken; the only species that have fallen victims are *Promecognathus laevissimus* Dej., *Pterostichus vicinus* Mann., and *Omus californicus* Esch. The presence of *Promecognathus* in a trap in the open is surprising, insomuch as it is commonly supposed to lead a strictly subterranean life. Even when daily visits were made to the jar (whether it was baited or not) there were always at least a pair of them trapped, showing that this pugnacious Carabid is in the habit of taking nocturnal strolls. But one specimen of *Omus* was taken in this way.—RICHARD T. GARNETT, Oakland, California.

Notes on North Carolina Dragonflies (Odonata)

1. Enallagma geminatum. About three dozen specimens were taken by Prof. C. H. Kennedy and myself on June 17, 1919, on some old brickyard ponds near Raleigh. Among these were a number which had the sides of the second abdominal segment mainly black with an anterior wedge-shaped blue stripe and a posterior blue semicircle, which when enlarged and connected cut off the usual oblong black spot on the segment. Another specimen was taken on July 10 at same place.

2. Gomphus parvidens B. M. Currie. A male *Gomphus* taken at Southern Pines, April 29, 1908, and recorded by me as *G. brimleyi* in Ent. News for June, 1918, proves to be this species. The female from Raleigh referred to *brimleyi* in the same article also seems to be this species as does also a female from Lumberton, the only remaining one of the three Lumberton *Gomphus* referred to *brimleyi* in Ent. News, June, 1918, to *abbreviatus* in the News, March, 1906, and to *parvulus* in the News, March, 1904.

3. Libelula incesta. For several years I have noticed that along with the usual clearwinged *incesta*, there occurred a form similar in every respect, but with the basal streaks present or the postcubitals infuscated

or both, but I was not clear whether this was a mere variation of *incesta*, a dwarfed form of *axillena*, or something else, so having some spare time in the summer of 1919 I tried to settle the matter for myself.

Upon overhauling what Raleigh material I had both pinned, papered and wet preserved, I found that the dubious specimens had nothing to do with *axillena*, but were apparently only a variation of *incesta*, and that basal streaks were seemingly a normal condition of the females but not of the males, and that infuscation of the postcubitals, while not the regular condition in either sex, was not unusual in either males or females in this locality as the following table will show:

Wings wholly clear, males 16, females 1.

Wings with basal streaks only, males none, females 10.

Wings without basal streaks but with infuscated postcubitals, males 3, females 1.

Wings with both basal streaks and infuscated postcubitals, males 1, females 4.

Dividing the whole lot as to absence or presence of basal streaks, we find them present in 14 females and 1 male, and absent in 19 males and 2 females, showing that this particular variation is mainly a sexual one in Raleigh *incesta*.

The basal streaks varied a good deal in different specimens, extending as far as the 7th antecubital in all four wings in one, and in another only as far as the first in the hind wings and the second in the front wings, while others showed every gradation between these. One in which the basal streaks only definitely reached the 6th and 4th antecubitals in the front and hind wings, yet had all the postcubitals and all the antecubitals infuscated, altho there were clear spaces between the veins, so that there was an almost continuous stripe from the base of the wing to the stigma.

From *axillena* the infuscated *incesta* can be distinguished by smaller size, hind wing being about 40 mm. or less, while in *axillena* it seldom runs less than 43 mm., and by the thorax being dark blue pruinose on both sides and dorsum, while in *axillena* it is dark blue on dorsum bordered by black below on sides and below that by yellowish in younger, and by dark brown in older specimens. Also the infuscation is brown, not black as in *axillena*, and is usually more extensive.

C. S. Brimley, Raleigh, North Carolina.

The Cornell University Entomological Expedition to South America of 1919-20.

Under the leadership of Professor J. Chester Bradley, the Cornell University Entomological Expedition to South America of 1919-20 is carrying on entomological investigation and making collections in various South American countries.

Dr. Bradley sailed for Brazil early in September last on the steamship Vestris; owing to a fire developing in one of the holds of the steamer, a

delay of thirteen days occurred at the Island of Santa Lucia, where interesting and unexpected collecting was done. At Rio de Janeiro he was joined by a volunteer assistant, Mr. R. Gordon Harris.

After spending some time in Rio de Janeiro, a trip was made in company with Brazil's foremost entomologist, Dr. Adolph Lutz, to the State of Minas Geraes in the north, as far as to Pirapora, the head of navigation on the Sao Francisco River; some days were spent at Lassance on the Rio das Velhas as guests of the Institute Oswaldo Cruz. It was at this place that Dr. Chagas first worked out the details of the transmission by a Redwing bug (*Conorhinus*) of a trypanosome causing a very serious endemic disease of the region. Some days were also spent in the alpine meadows at Diamantina, Brazil's highest city, and also as guests of the State of Minas Geraes at the Capitol, Beldo Horizonte.

Returning to Rio de Janeiro, the party proceeded to cross the States of Sao Paulo and Matto Grosso by rail to Corumba on the Paraguay River, and thence to Urucum. Interesting collecting was encountered at various points along this trip, but especially at Urucum, 20 kilometers from Corumba, on an isolated mountain range at an elevation of 2200 feet, at the upper limit of a tropical forest. Here, despite continuous rainy weather, a very interesting and abundant fauna was encountered.

From Corumba they proceeded by rail via Sao Paulo to Uruguayana on the Uruguay River, at the Argentinean frontier, a distance of 2500 miles; from there they were about to proceed, when last heard from, to the falls of the Iguazu on the Alta Parana River.

The plans of the party contemplate spending a brief while in Argentina, at Buenos Aires, La Plata, Cordoba, Mendoza and possibly Tucuman, a visit to Montevideo, and then to spend from six weeks to two months in Chile, visiting several places, to as far south as Chiloe Island; thence to Oruro, Cochabamba and La Paz in Bolivia, and to Lima in Peru.

At Lima, Dr. W. T. M. Forbes and Jesse Williamson will join the expedition, which will, if conditions prove favorable, cross the Andes via the central route and down the Pichis, Pachitea, Ucayalli and Maranon Rivers to Iquitos; stopping at favorable points on the eastern side of the Andes. The party will return to New York in September next.

The Expedition is entrusted with the delivery of extensive collections of North American insects and of vertebrates to four scientific institutions in South America. While not neglecting general collecting, Dr. Bradley is devoting especial attention to the collecting of Hymenoptera, especially of the aculeates, and is endeavoring to obtain series of nests of Vespidae with their inhabitants. Mr. Harris is doing general collecting of insects. Dr. Forbes will devote his attention primarily to Lepidoptera, and relieve the other members of the necessity of devoting attention to this time-exacting group after he joins the Expedition. Mr. Williamson will collect Odonata.

C. R. Crosby, Cornell University, Ithaca, New York.

The Williamson Expedition in Venezuela

The following note from Mr. E. B. Williamson, dated Puerto Cabello, March 25, 1920, supplements that on page 108 of the April NEWS: "Arrived here this a. m. en route to Maracaibo. Have collected at San Esteban, La Mona, Bejuma, Nirgua, San Felipe and from Barquisimeto and Aroa to Tucacas, finding practically one fauna—one *Heteragrion* and one *Philogenia*. Have 119 spp., 8200+specimens. [Odonata.]"

Sciocoris microphthalmus Flor. in Northern Michigan (Heterop.)

This little pentatomid is one of the rarest and most interesting members of the North American heteropterous fauna but less than a half dozen definite locality records are known to me at the present time. Van Duzee (Trans. Am. Ent. Soc., XXX, 1904, 32) records a single specimen from the White Mountains in New Hampshire and Parshley (Fauna of New England, 14, 1917, 17) records a specimen from Maine. To these localities I am glad to add another thus making known the further distribution of this insect within our borders.

During the summer of 1919, I took four specimens of *Sciocoris microphthalmus* in the Douglas Lake region of northern Michigan. One of these, a male was taken in the sweep net on July 9, and again on July 18, a male and a female were swept from roadside weeds growing in a wooded area along the edge of a small stream. One nymph, a male about one-third grown, was also taken on July 29, in a similar situation.

Douglas Lake is located in the southern peninsula of Michigan about seventeen miles south of the Straits of Mackinac, the same distance from Lake Huron on the east and Lake Michigan on the west; it is about 200 feet above sea level.—DAYTON STONER, University of Iowa, Iowa City, Iowa.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of

Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **17**—Lepidoptera, Boston, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **24**—Annales de la Societe Entomologique de France, Paris. **39**—The Florida Buggist, Gainesville. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **46**—Contributions to the Natural History of the Lepidoptera of North America. Ed. by Wm. Barnes. **47**—Neue Beitrage zur systematischen Insektenkunde. Ed. by G. Paganetti Hummler, Voslau. **51**—Archiv fur Mikroskopische Anatomie, Bonn. **52**—Zoologischer Anzeiger, Leipsic. **59**—Journal of Agricultural Research, Washington, D. C. **64**—Parasitology, London. **68**—Science, Lancaster, Pa. **70**—Journal of Morphology, Philadelphia. **71**—Novitates Zoologicae, Tring, England. **82**—The Ohio Journal of Science, Columbus. **86**—The Quarterly Journal of Microscopical Science, London. **89**—Zoologische Jahrbucher, Jena. **103**—Biologisches Centralblatt, Leipzig. **104**—Zeitschrift fur Wissenschaftliche Zoologie. Leipzig.

GENERAL. Anon—The Cornell University entomological expedition to South America of 1919–20. **68,** 1920, 342. **Bervoets, R. E.**—Contribution a l'etude du vol des insectes (Ann. Soc. Roy. Zool. et Malacol. Belg., xlviii, 91–126). **Dewitz, J.**—Ueber kunstliche aufebung des spinnens der arthropoden. **52,** 1, 27–30. **Frost, C. A.**—Popular and practical entomology. A day's beating. **4,** lii, 25–9. **Heikertinger, F.** Exakte begriffsfassung und terminologie im problem der mimikry und verwandter erscheinungen. **45,** xv, 57–65 (cont.). Die metoke myrmekoidie. Tatsachenmaterial zur losung des mimikryproblems. **103,** xxxix, 65–102z. **Kathariner, L.**—Das sehen der insekten. **45,** xiv, 1919, 301–304. **Moznette, G. F.**—Annotated list of the injurious and beneficial insects of the avocado in Florida. **39,** iii, 45–48. **O'Kane, W. C.**—The day's work. The opportunity of the daily contacts in the life of a scientific worker. **12,** xiii, 44–59. **Pellett, F. C.**—Adapting system to locality. (Beekeeping.) **12,** xiii, 95–99. **Pierce, W. D.**—Commercial and professional entomology—the future of our profession. **12,** xiii, 117–23. **Stechow, E.**—Supplement zu den indices generum von Scudder 1882 und Waterhouse 1902 und 1912. **89,** Abt. f. Syst., xlii, 173–88. **de la Torre-Bueno, J. R.**—The growth of insect eggs after oviposition. **19,** xv, 24. **Walsingham, Lord**—Obituary notice. **10,** xxii, 41–3.

GENETICS, ETC. Nachtsheim, H.—Der mechanismus der vererbung. (Naturwiss. Wochenschift, 1919, 105–14.) **Schmidt, W. J.**—Ueber chromatophoren bei insekten. **51,** xciii, 118–136.

ARACHNIDA, ETC. Nuttall, G. H. F.—On coloration in ticks. II. Regeneration of the mouthparts and legs in ticks. **64,** xii, 1–26. Observations on the biology of the Ixodidae. **64,** xi, 393–404.

NEUROPTERA. Ballowitz, E.—Ueber die samenkorper der libellen. Die spermien der Agrioniden. **51,** xciii, Abt. 2, 1–14. **Karny, H.**—Synopsis der Megathripidae (Thysanoptera). **47,** i, 105–10, (cont.)

ORTHOPTERA. Jeziorski, L.—Der thorax von Dixippus morosus. Ueber das wachstum und wachstumskorrelationen bei Dixippus morosus. **104,** cxviii, 1–24. **Verhoef u. Kleine**—Kann Forficula auricularia fliegen? Hat Periplaneta orientalis einen stridulationsapparat. **45,** xiv, 1918, 85–86. **Yuasa, H.**—The anatomy of the head and mouth parts of Orthoptera and Euplexoptera. **70,** xxxiii, 251–307.

HEMIPTERA. Davis, W. T.—The seventeen-year cicada on Long Island, N. Y., in 1919. **19,** xv, 17–18. **Grove, A. J.**—The anatomy of the head and mouth parts of Psylla mali, with some remarks on the function of the labium. **64,** xi, 456–88. **Keilin & Nuttall**—Hermaphroditism and other abnormalities in Pediculus humanus. **64,** xi, 279–328. **Malloch, J. R.**—Notes on some species of the homopterous genus Gypona. **19,** xv, 22–3. **Nuttall, G. H. F.**—The systematic position, synonymy and iconography of Pediculus humanus and Phthirus pubis. **64,** xi, 329–46. **Picaud, A.**—Le cycle biologique du phylloxera. (La Nature, 1920, 65–8.) **Riley, C. F. C.**—Migratory responses of water striders during severe droughts. **19,** xv, 1–10. **Schumacher, F.**—Ueber Psociden-feinde aus der ordnung der Hemipteren. **45,** xiii, 1917, 217–18. **Strindberg, H.**—Zur entwicklungsgeschichte der oviparen cocciden. **52,** l, 113–139.

Drake, C. J.—An undescribed water strider from the Adirondacks. **19,** xv, 19–21. Descriptions of new North American Tingidae. **82,** xx, 49–54. **Osborn, H.**—Notes on the generic affinities of certain Cicadellidae. **82,** xx, 153–66.

LEPIDOPTERA. Busck, A.—Descriptions of new Central American microlepidoptera. **15,** viii, 83–95. **Cockerell, T. D. A.**—The generic position of Sphinx separatus. **4,** lii, 33–4. **Dyar, H. G.**—New moths from Mexico. A new noctuid from Colombia. **15,** viii, 30–5; 82. **Ehrmann, G. A.**—A new tropical American Papilio. **17,** iv, 13–14. **Frohawk, F. W.**—Retarded development of Coenonympha tiphon. **9,** 1920, 66. **Hampson, G. F.**—On new genera and species of L. Phalaenae, with the characters of two new families. **71,** xxvi, 253–82. **Kaye, W. J.**—A geographical table to show the distribution of the American Papilios. **71,** xxvi, 320–57. **McMurray, N.**—Calocampa nupera. **17,** iv, 14–16. **Moss, A. M.**—The Papilios of Para. **71,** xxvi, 295–319. **Mousley, H.**—The Rhopalocera or butterflies of Hatley, Stanstead County, Quebec, 1919. (Canadian Field Nat., xxxiv, 7–10.) **Prout, L. B.**—New moths in the Joicey collection. **11,** v, 286–93. **Stichel, H.** Nachtrag zu Genera Insectorum, Fasc. 63, Lepidoptera Rhopal. Fam. Nymphalidae, Subfam. Dioninae. **47,** i, 80. **Turner, W. B.**—Lepidoptera at light traps. **59,** xviii, 475–81.

Barnes & Busck—Notes and new species. **46,** iv, 211–78. **Braun, A. F.**—New species of Scythris. **4,** lii, 40–1. Notes on Elachista with descriptions of new species. **82,** xx, 167–72. **Dyar, H. G.**—A new noctuid from Arizona. Two new North American moths. **15,** viii, 100–2.

DIPTERA. Aldrich, J. M.—European frit fly in North America. **59,** xviii, 451–74. **Collins & Hood**—Life history of Eubiomyia calosomae, a tachinid parasite of Calosoma beetles. **59,** xviii, 483–98. **Dyar, H. G.**—A second Culex of the subgenus Transculicia. Note on the subgenus Neoculex of Culex. A new mosquito from Mexico. **15,** viii, 27–9; 36; 81–3. **Graham-Smith, G. S.**—Further observations on the habits and parasites of common flies. **64,** xi, 347–84. **Keilin, D.**—On the life-history and larval anatomy of Melinda cognata, with an account of the other diptera living upon molluscs. **64,** xi, 430–55. **Koch, A.**—Studien an larven von Culex pipiens bei der submersion. **52,** l, 105–111. **Lindner, H.**—Ueber die mundwerkzeuge einiger dipteren und ihre beziehungen zur ernahrungsweise. **52,** l, 19–27. **Loftin, U. C.**—Mosquitoes found about Gainesville, Fla. **39,** iii, 37–43, 48–50. **Miall & Hammond**—The structure and life history of the Harlequin fly (Chironomus). (Clarendon Press, Oxford, 1900, 196 pp.)

Dyar, H. G.—The mosquitoes of British Columbia and Yukon territory, Canada. The species of Choeroporpa, a subgenus of Culex. **15,** viii, 1–27; 54–81. **Johnson, C. W.**—On the variation of Tabanus atratus. **5,** xxvi, 163–65. A new species of the genus Ulidia. **5,** xxvi, 165–66. **Sturtevant, A. H.**—A new species closely resembling Drosophila melanogaster. **5,** xxvi, 153–55.

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Philippine Wasp Studies. Part I. Descriptions of New Species by S. A. Rohwer. Part II. Descriptions of New Species and Life History Studies by F. X. Williams. Report of Work of the Experiment Station of the Hawaiian Sugar Planters' Association. Entomological Series, Bulletin No. 14. Honolulu, Hawaii. December, 1919. 186 pp., 106 text figs.—These studies were carried on while Dr. Williams was in the Philippine Islands, from June, 1916, to September, 1917, associated with the work of securing natural enemies of the beetle *Anomala orientalis* and its white grub, a sugar-cane pest on Oahu. Mr. F. Muir discovered that *Scolia manilae* of the Philippines was a desirable parasite of the grub and was able to establish it in the Hawaiian Islands. Dr. Williams adds: "*Scolia manilae* is now far more abundant in the cane fields near Honolulu than we ever found it at Los Baños, Philippines. Indeed, in view of the rapidly disappearing *Anomala orientalis* beetle from the cane fields here and the scattered distribution of the rose-beetle (*Adoretus tenuima-*

culatus Waterhouse), one wonders how the wasp manages to remain so plentiful. Mr. O. H. Swezey has found it in the immature stages on *Anomala* grubs in the field, and we have found it in one or two cases on *Adoretus* grubs in a cane field. On Oahu we have caught for distribution many thousands of females" (p. 59).*

Approximately 182 species of Aculeate wasps (including a few Bethylidae), belonging to 18 families, are stated to have been collected in the Philippines; 52 are treated biologically in this paper by Dr. Williams, who describes 13 new species, while Mr. Rohwer describes 16; the new forms are Sphecidae, Psammocharidae (Pompilidae), Vespidae and Thynnidae. A general introduction to the life history and ecological relations of wasps is given by Dr. Williams (pp. 19-31), in which he also describes the locality, Los Baños, Luzon, as ideally situated for the study of insect life. The Philippine College of Agriculture is here and lies immediately at the base of Mt. Makiling, a well forested, ancient volcano, nearly 4000 feet high, with thermal springs flowing from its sides, and offering "at once a study of the lowland and generally more widespread fauna of the cultivated and semi-cultivated areas as well as that of the forest itself." Those who have had the opportunity of studying tropical insect life will congratulate Dr. Williams on the good fortune, which he recognizes, in being able to spend more than a year at such a place, "to make a resident study of many wasp activities and thus observe them from day to day or week to week" and to publish his interesting results. Except to a slight degree, he has not recorded experiments to determine the behavior of the insects under varied conditions—a single year would hardly suffice for this.

As is always to be expected the number of details concerning the life history and habits of the wasps studied which he has been able to record varies greatly from species to species. The fullest data are to be found in his accounts of the Methocas which lay their eggs on tiger-beetle larvae (pp. 69–79); *Macromeris*, *Paragenia* and *Pseudagenia* which provision their nests with spiders (83–103); the Ampulicid *Dolichurus* which gathers roaches (111–117); *Ammobia* and her locustid prey (128–131); the Larridae and crickets (132–139); the Eumenid, *Zethus cyanopterus*, which brings caterpillars to her offspring living in an elaborate nest of leaf-pulp (157–163). Among the Vespinae a description is given of the fragile, pendent nests of *Stenogaster*, that of *S. depressigaster* being of about the dimensions of an ordinary lead pencil, "made up of cells placed in irregular tiers, each consisting of four or five cells, arranged in more or less spiral fashion, the lowest and terminal open passageways or cells now being the only objects of the wasp's solicitude" (168). The nests of this species occur in the forest; " in one or two instances, so close were these frail non-waterproof nests to a waterfall, that the spray frequently struck them and forced the proprietors to edge around to the lee side of their dwellings, to which they habitually cling and where no doubt they rest at night; and after a heavy downpour the swollen stream so aug-

Cf. F. Muir, Ann. Ent. Soc. Amer. xii, 171, June, 1919.

mented the cataract, that the nests soaked with water broke up and were abandoned."

A list of more than 120 titles of books and papers bearing on wasp activities closes the 'Studies.'—P. P. CALVERT.

SOME HABITAT RESPONSES OF THE LARGE WATER-STRIDER, *Gerris remigis* Say by C. F. CURTIS RILEY. American Naturalist, vol. LIII, No. 628, pp. 394–414, 1919; vol. LIII, No. 629, pp. 483–505, 1919; vol. LIV, No. 630, pp. 68–83, 1920.—The late Dr. C. Gordon Hewitt in his presidential address before the members of the American Association of Economic Entomologists at their 29th annual meeting in 1916, called attention to insect behavior as a factor in applied entomology and to the need of further work along such a fundamental line. Papers on insect behavior are not common in entomological journals and for this reason, attention is hereby called to Prof. Riley's series of papers in *The American Naturalist*. These treat of certain habitat responses of apterous forms of the large water-strider, *Gerris remigis* Say, the observations and experiments having been made in Illinois and New York. Various observations are recorded on the responses of water-striders trapped in stream pools during a period of severe drought. It was found that during a severe drought, as food became scarce or when a scum formed on the surfaces of some pools, the gerrids migrated by way of the riffles to pools that were free of scum. As the drought progressed the striders congregated on the few pools that remained. After the pools dried up, the insects left them after a short length of time but not immediately and sought other pools. Frequently, shade and lower temperatures induced the gerrids to stay quietly but temporarily beneath clumps of dead leaves, stones, etc. They did not aestivate Riley states that the gerrids appeared to find other pools by a blundering method of trial and error.

Fifty percent of a total number of gerrids entrapped on the surface of a certain stream pool were successful in reaching water elsewhere ten yards away. On other occasions much smaller percentages were able to find water after the pools on which they were confined had become dry. In some cases the water was less than ten yards away and in others it was eleven, twelve and fourteen yards distant. During periods of long and severe droughts it is believed that large numbers of apterous individuals die. Various experiments were performed for the purpose of finding out whether water-striders were able to reach their habitat after having been removed from it and placed on the ground certain distances away. Individuals were headed away, toward and parallel to the water and in all cases up to certain distances, the majority of the insects reached the water. An experiment to discover whether moisture, vision, or both factors functioned as stimuli in influencing the water striders to find the brook was inconclusive, due to the failure of the barrier to shut off the view of the stream and this is the only defect, if it can

be called such, in Prof. Riley's interesting paper. The author realizes this but is strongly of the opinion that vision is the important factor, altho moisture also may have exerted an influence on their responses.

Prof. Riley's descriptions of the physical conditions surrounding the habitats of the insects and the photographs accompanying the papers help the reader to visualize the conditions under which the observations and experiments were made and are of considerable value for comparative purposes to other workers in animal behavior. In the entire paper the experiments are reported in some detail and the conclusions discussed at length, furthermore the observations are checked up and compared with those of other writers in the same field. The details are of considerable interest and value as is the entire paper, moreover such details are essential to a complete presentation of behavior studies. A bibliography of 18 titles accompanies the paper.—Harry B. Weiss, New Brunswick, New Jersey.

Obituary

Lord Walsingham.

Thomas de Grey, sixth Baron Walsingham, the great authority on the Microlepidoptera of the world, died on December 3, 1919, as the result of heart-failure, following pleurisy, due to a chill contracted in connection with going to Cambridge for the installation of Mr. Balfour as chancellor of the University. From obituary notices in *The Entomologist's Monthly Magazine* for February (with portrait) and *The Entomologist* for January, we summarize as follows: He was born in Mayfair, London, July 29, 1843, went to Eton in 1856, and to Trinity College, Cambridge, in 1860. The University made him B. A. in 1865, M. A. in 1870 and High Steward and LL. D., in 1891. He was a member of the House of Commons for West Norfolk, 1865-1870, succeeding to the title and estates of his father in the latter year. He was appointed a Trustee of the British Museum in 1876 and to it he gave his entomological library and collections in 1910. These consisted very largely of Lepidoptera, both imagines and larvae, especially of the Microlepidoptera.

He must have collected more than 50,000 specimens of Microlepidoptera in England, France, Monte Carlo, Italy, Spain, Sicily, Corfu, Germany, Austria, Algeria, Morocco, the Canaries, California and Oregon, Jamaica,

etc., breeding thousands of specimens, the life-history of many of which he discovered, and describing numerous new species and purchasing at various dates the "micros" in the Zeller, Hofmann, Christoph and other collections.

Commencing as a British Lepidopterist, he was undoubtedly influenced in his early studies in the Tineina by Stainton, who induced him to extend those studies beyond the British fauna. When preparing his North American Tortricidae (published 1879) Lord Walsingham had much correspondence with Professor C. H. Fernald, and being dissatisfied with the Wilkinsonian system was easily persuaded by Fernald to adopt that of Heinemann—and described many genera founded on secondary sexual characters. He was liberal minded enough in his 65th year, in association with Mr. August Busck and the writer to repudiate all such genera and they were freely sacrificed in the "Biologia!" Lord Walsingham readily accepted the more exact methods of study and classification which we owe to Mr. E. Meyrick, with a natural reservation as to matters of detail, such as sequence and nomenclature [J. H. Durrant in Ent. Mo. Mag.].

He was elected a Fellow of the Royal Society in 1887, and President of the Entomological Society of London, 1889-90.

As indicated above, he collected in California and Oregon. This was in 1871 and 1872. As a result of this expedition, the largest species of dragonfly known in the United States bears the name *Anax walsinghami*, given to it, in honor of the collector, by Robert M'Lachlan in the Ent. Mo. Mag. for 1883.

The Entomologist's Monthly Magazine also records the deaths of WILLIAM E. SHARP (1856-May 20, 1919), "one of the best of our British Coleopterists;" Major THOMAS BROUN, Coleopterist and for some time Government Entomologist of New Zealand at Auckland, August 24, 1919; BRUCE F. CUMMINGS, on the entomological staff of the British Museum, 1912–1917, and who wrote mainly on Anoplura and Mallophaga, on October 22, 1919; and FREDERICK HERSCHEL WATERHOUSE, coleopterist (Oct. 4, 1845–March 12, 1919), last surviving son of G. R. Waterhouse, and librarian of the Zoological Society of London, 1872–1912.

EMILY L. MORTON.

Emily L. Morton passed away at her home, New Windsor, New York, on the evening of January 8th, 1920, after an

illness of nearly six months. There she was born on the 3rd of April, 1841, on the beautiful estate overlooking the Hudson which had been owned by her family for four generations. Her whole life had been devoted to the study of Lepidoptera and, although she published nothing herself, her work lives after her in the writings of W. H. Edwards, Prof. A. S. Packard and others, particularly in illustrations of the larval stage of various butterflies and moths, for she was a very clever artist.

It was she who worked out the curious life-history of *Feniseca tarquinius* Fabr., the larvae of which feed upon the mealy bugs that inhabit the alder. She also was among the first to hybridize the Saturniidae.

Her sister, Miss Charlotte A. Morton, the sole surviving member of her immediate family, writes me as follows: "At your request I have written out briefly a short account of my sister's last days, but no one knows how patiently she bore the great suffering entailed by her illness. During the late summer of 1919, she began to suffer from the illness which afterward ended her life. Her ankles became swollen and gave her much pain and she grew very weak and thin and seemed in many ways older than her years. About the middle of December, she became too ill to do anything, tho up to this time she had made hundreds of picture puzzles for sick soldiers. Almost the last thing she did was to pack one of these for a sick friend. Altho carefully attended by her nurses and myself she grew rapidly worse, suffering greatly until the end."

An account of Miss Morton's early life and entomological studies will be found in the March, 1917, number of this publication.

She was almost the last of that brilliant group of Entomologists who did so much for this fascinating study in the latter half of the past century.

H. H. Newcomb, Pasadena, California.

NEW ARRIVALS

From Colombia, So. America:

OVER 10,000 BUTTERFLIES, INCLUDING

Morpho cypris
" sulkowskyi
Morpho amathonte
Caligo spp.

From Cuba:

1500 BUTTERFLIES AND MOTHS, INCLUDING

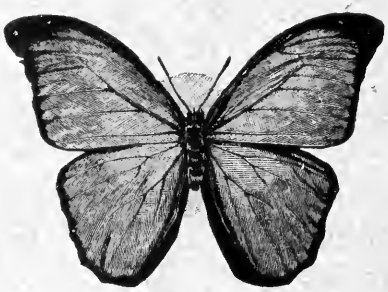
Papilio columbus
" andraemon
" celadon
" devilliersi
Urania boisduvali
Erinyis guttalaris
Protoparce brontes, etc.

From Venezuela:

Over 5000 Lepidoptera
200 Dynastes hercules

From New Guinea:

2000 Coleoptera
200 Orthoptera



From Assam, India:

1200 BUTTERFLIES AND MOTHS, INCLUDING

Papilio arcturus
" philoxenus
Kallima inachis
Brahmaea wallachi

And Many Other Showy Species

From Tibet (Bhutan)

Armandia lidderdalii
Parnassius hardwicki

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AND

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The Genus Pyrrhocalles Mabille with the Description of a New Form (Lepidoptera, Hesperidae.)

By HENRY SKINNER, Philadelphia.

The genus *Pyrrhocalles* was described in the Genera Insectorum (Hesperidae) in 1904. The only species mentioned is *Pamphila antiqua* Herrich-Schaffer and the localities given are the islands of Cuba and Haiti in the West Indies. We have in the collection of The Academy of Natural Sciences of Philadelphia three forms: one from Haiti and San Domingo, one from Cuba, and one from Jamaica. The insect from Jamaica was described by Mr. William Schaus as *Phemiades jamaicensis.**

This is a perfectly good species and shows no tendency to gradation. We have four specimens of a *Pyrrhocalles* from eastern Cuba which I have always taken to be *antiqua* Herr.-

* Proc. U. S. Natl. Museum, 1902, 24, 440.

Schaff., but they do not agree with the description of *antiqua*. The description of *antiqua* agrees perfectly with the specimens from Haiti, and Mr. Schaus suggests that Herrich-Schaffer may have had a Haitian specimen before him when he described *antiqua*. Mr. Schaus also says that his Cuban specimens all lack the small spots on the primaries and I think all his specimens were probably collected by himself in the Santiago region (Oriente). I have never seen any species of *Pyrrhocalles* from Porto Rico and I do not know whether there are any on that Island. Dr. C. T. Ramsden has a fine collection of Cuban Lepidoptera, and I wrote to him for information in regard to *antiqua*. His reply follows:

"My specimens certainly have not the spots you have drawn as on the San Domingo specimens, but mine are all from the environs of Guantanamo. Possibly those from western Cuba may have the spots. The question is to get some from western Cuba and I shall try to get them. The Herrich-Schaffer type may have come from around Havana as Gundlach did his first collecting in and about Matanzas Province. It is strange that Gundlach (Cont. Entomologia Cubana) does mention these spots, and probably did have a Cuban specimen before him. I have always been in doubt whether Gundlach made his descriptions from specimens before him and taken by himself, or whether he copied the Herrich-Schaffer descriptions. I am inclined to think, however, that he made his own descriptions from material before him. His descriptions in some cases are not quite complete, or at least not as complete as one should desire. I have never detected a mistake, nor noticed any kind of nature-faking. I notice he says he found the species only in western Cuba."

To try and clear up the matter for the present I propose the name **orientis** for the unspotted form found in eastern Cuba. The *type* is a male from Guantanamo (San Carlos ?), Cuba, taken June 25, 1910, for which I am indebted to Dr. Ramsden, in the collection of The Academy of Natural Sciences of Philadelphia.

It will probably be useful to have the original descriptions as the works in which they are contained are not commonly in libraries.

"*Pamphila antiqua* HS. One of the largest species, though with narrower wings than *statius*. Black brown, all wings as far as about the middle beautiful cinnamon-red, which color is finely divided by black ribs, on the anterior wing as far as branch 3 and on the back wing everywhere reaching

over the middle, in cell 3–7 of the primaries forms a bow-shaped row of little spots, on its costal half, however, reaches only to the middle of the wing. Underneath the ground-color lighter, and the wing strongly covered with cinnamon-colored scales, a bow-shaped row of still lighter spots behind the middle, one such spot on the middle. The spots of the under side lighter and larger than above."† [Translation.]

Dr. Ramsden kindly sent me the description of *antiqua* by Gundlach.

"Up to the present this species is known only from the Island of Cuba, western part. I do not know the larva or the chrysalis. I do not see any marked difference in the coloring of each sex. The insect is rare and visits the flowers. On the upper side the four wings are brown (dark brown), with their basal half of a pretty reddish cinnamon and a transverse line of spots of the same color on the anterior wings. Under side of anterior wings are dark brown with a band of spots which correspond to those on the upper side, this band of spots begins at the base of the anterior border then separating from it in a circle till it nearly reaches the anterior border. The posterior wings below are of ferruginous brown color with an arc-shaped series of cinnamon colored spots, as also a single central spot of this same color, all of which are barely visible. Between the wings 50 mm."§ [Translation.]

The Jamaican species is readily separated by the difference in the markings on the upper side of the secondaries. In the Cuban and Haitian forms the black color does not extend into the cinnamon color of the central area of the wing.

Remarks on Dr. MacGillivray's Paper entitled "The Eyes of Insects."

By G. C. CRAMPTON, PH.D., Massachusetts Agricultural College, Amherst, Mass.

In a class of animals like the Insecta, which includes such a diverse and multitudinous array of forms ranging from the extremely ancient and primitive types to the more recent and highly modified ones, it is extremely difficult to discover any features which are peculiar to one of the larger subdivisions of the class, and which are characteristic of all of its members without exception. Although it may be much simpler to ignore these exceptions when they occur only in a few scattered

† Corresp. Blatt Regensb. 1863, 17, p. 142.

§ Gundlach, Entomologia Cubana, 1881, p. 150.

instances, on the other hand, when such exceptions occur quite constantly throughout the members of an entire order, or similar larger subdivision of a group of insects, these exceptions become of sufficient importance to merit a reference to them, especially in an article intended for general reference, such as Dr. MacGillivray's paper on "The Eyes of Insects."* I would therefore call attention to one or two statements in Dr. MacGillivray's article which might be misleading to anyone not familiar with the subject, although the main points of the article are quite correct, and are well taken.

Dr. MacGillivray's claim that "the developing compound eyes of the adult can frequently be seen in the pupa of entometabolous insects and rarely in their larvae, but these stages are never provided with functional compound eyes" would appear to be too sweeping a statement, since exceptions to this rule occur quite constantly throughout the members of an entire order of insects, and a few scattered instances are to be found in other orders. Thus, all known larvae of insects belonging to the order Mecoptera have functional compound eyes, and in full-grown larvae of certain corethrid Diptera the compound eyes are so large and well-developed that it is difficult to believe that they are not functional.

It is evident that Dr. MacGillivray means *functional* ocelli when he states that ocelli are present "only in the adults of exometabolous and entometabolous insects," but when one examines the ocelli of a young grasshopper, for example, they appear to be quite as capable of functioning as those of the adult. While it is possible that the statement that "functional ocelli are never present in nymphs, larvae, or pupae" may be correct, it would have been much more convincing if some proof had been presented in support of this view. As was mentioned above, the ocelli of a grasshopper nymph have every appearance of being as capable of functioning as those of the adult, and it is difficult to believe that the ocelli of full-grown nymphs of our larger Plecoptera, certain mayflies, etc., are wholly functionless. The ocelli of the latter forms are quite large, and would appear to be capable of distinguishing light from darkness—which is the function as-

* Ent. News, xxi, 97–100, April, 1920.

cribed to the ocelli of adult insects (in addition to the function of distinguishing objects close at hand)—and if the ocelli of these nymphs are wholly functionless, the fact should be brought out by experiment before it is stated as though it had been conclusively proven.

Dr. MacGillivray's statement that "Ocelli are never present in ametabolous insects" appears to be entirely too sweeping. All of the insects belonging to the ametabolous group Machiloidea (which is considered as an order by many entomologists) appear to have exceptionally large and well developed ocelli. In fact, the ocelli of these insects are proportionately much larger than those of any other insects I know of, so that Dr. MacGillivray's statement in this matter can be accepted only with reservations.*

In calling attention to these exceptions to the general statements made in Dr. MacGillivray's paper, I would not minimize the value of the principal points brought out in his article, since in the main these points are quite correct, and are well taken. On the other hand, the exceptions to his general statements are in some cases of sufficient importance to merit mention, and should therefore be called to the attention of students who are referred to Dr. MacGillivray's paper in their general reading, or of anyone who contemplates making a much-needed study of the different types of eyes found among insects.

The known Membracidae of Ecuador (Homop.)

By Dr. Frederick W. Goding, Guayaquil, Ecuador.

(*Continued from page 136*)

***Triquetra inermis** Fairm. Rev. Mem. p. 280. *Hab.:* Province of El Oriente, (Goodfellow); Macas, Province of Chimborazo, (Feyer).

***Triquetra obtusa** Fowl. Tr. Ent. Soc. Lond. (1894), p. 417. *Hab.:* Province of El Oriente, (Goodfellow).

* In many ametabolous insects, as Dr. MacGillivray points out, simple eyes occur in the position which compound eyes occupy when present in higher insects. In the ametabolous group Machiloidea, however, there are well-developed compound eyes of the normal type, and in addition to these, the Machiloidea have three ocelli located on the frontal region as in higher insects.

*Triquetra grossa Fairm. Rev. Mem. p. 280. *Hab.:* Province of El Oriente, (Goodfellow).

*Triquetra virgata Fairm. Rev. Mem. p. 282. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Triquetra angustata Fairm Rev. Mem. p. 282. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Triquetra ustulata Fairm. Rev. Mem. p. 281. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Umbonia erecta n. sp. (See description on another page.) *Hab.:* Mangorisa River, Province of El Oriente, (Feyer).

*Umbonia ataliba Fairm. Rev. Mem. p. 278. *Hab.:* Canelas, Puyo, Province of El Oriente, (Feyer).

*Umbonia spinosa Fabr. Syst. Ent. p. 675. *Hab.:* Machala, Province of El Oro, (Rorer); Normandie, Province of El Oriente, (Feyer).

*Hoplophora gigantea Fairm. Rev. Mem. p. 269. *Hab.:* Province of El Oriente, (Goodfellow).

*Hoplophora vicina Fairm. Rev. Mem. p. 270. *Hab.:* Quito, Province of Pichincha, (Walker); Cuenca, Province of Azuay, (Pachano); Province of El Oriente, (Goodfellow).

MEMBRACINAE.

*Membracis jessica n. sp. (See description on another page.) *Hab.:* Canelas, Province of El Oriente; Lliquino, Province of Tungurahua; Yaruquies, Province of Chimborazo, (Feyer).

*Membracis mexicana Guer. Icon. Reg. Anim. p. 364, pl. 59, f. 1. *Hab.:* Machala, Province of El Oro., (Rorer).

*Membracis tectigera Oliv. Enc. Meth. vii, p. 668. *Hab.:* Mangorisa River, Canelas, Province of El Oriente, (Feyer).

*Enchenopa ignidorsum Walk. List Hom. Brit. Mus., Suppl. p. 124. *Hab.:* Machala, Province of El Oro, (Rorer).

*Sphongophorus ballista Germ. Silb. Rev. Ent. iii, p. 231. *Hab.:* Quevedo, Province of Los Rios, (Campos).

*Bolbonota pictipennis Fairm. Rev. Mem. p. 258. *Hab.:* Machala, Province of El Oro, (Rorer).

*Guayaquila roreriana n. sp. and gen. (See description on another page.) *Hab.:* Machala, Province of El Oro, (Rorer).

DESCRIPTIONS OF NEW ECUADORIAN MEMBRACIDAE.

Centrogonia flavo-limbata n. sp.

Black, roughly punctured, furnished with numerous strong black hairs. Head black, with two short vertical lines above middle, a longer line reaching apex, a small dot near each eye, lateral borders and a dot on each side of apex bright yellow; eyes prominent, pale yellow. Pronotum with dorsum convex in front and lightly sinuate posteriorly, apex deflexed; posterior process reaching tip of abdomen, lengthily deeply and broadly

compressed on each side from humeral angles halfway to apex; furnished with a strong percurrent median carina; a small tubercle and spot behind each eye, anterior border and a dot on each side just above it, a spot above each humeral angle, anterior two-thirds of lateral borders, and apex, yellow; elsewhere obscurely yellow mottled. Below, the chest and abdomen, femora except apices, black; apices of femora, and tibiae except apices sordid yellow; apices of tibiae, and the tarsi brown. Long. 5 mm.; lat. 2 mm.

Habitat: Pifo, Province of Pichincha, 2,588 meters, (Campos). Described from one female.

Differs from its congeners by the black color, yellow lateral borders, and strong percurrent carina. The apical fourth of the tegmina is wanting.

ECUATORIANA n. gen.

Ocelli equi-distant from the eyes and each other. Dorsum of pronotum moderately elevated, with numerous irregular longitudinal carinae, and bearing two large more or less quadrangular elevations, the first just behind humeral angles, the second at middle; humeral angles developed into large flat auricular processes; posterior process covering clavus and a small part of corium. Tegmina with distinct veins; basal half of corium coriaceous and punctured, emitting three longitudinal veins equi-distant from each other and costa, space between interior ulnar vein and interior border occupying half its area, third apical cell triangular, petiolate, one discoidal cell. Wings with four apical cells, second subtriangular, petiolate, third long, broad, sessile. Tibiae not broadened; tarsi of equal length.

The venation is nearly identical with that of *Oxygonia chrysura* Fairm., while the general facies is that of a *Telemona*.

Genotype: Ecuatoriana bactriana n. sp.

Ecuatoriana bactriana n. sp.

Black, mottled with yellow, pronotum with numerous irregular longitudinal carinae and others passing to the superior border of dorsal elevations; median longitudinal carina strong, percurrent. Head triangular, apex lightly produced. Pronotum convex in front; dorsal elevations with superior borders lightly rounded, front and hind borders perpendicular the latter of the second elevation lightly sinuate; sinus between ele-

vations about equal in size to the second; apex reaching tips of tegmina; anterior third of lateral borders, a broad band behind second dorsal elevation and other irregular marks, yellow. Tegmina with basal half of corium black mottled with yellow, extremities including first four apical cells smoky, fifth cell large, subtriangular; discoidal cells long, very narrow, base formed by a transverse venule between ulnar veins before middle, apex suddenly enlarged and curved to reach fifth apical cell. Below black, tarsi pale. Long. 10 mm.; lat. inter hum. 6 mm.; altitude of elevations 5 mm.

Habitat: Zuñas, Province of Chimborazo, 2,000 meters, (Feyer). Described from one female.

Tomogonia camposiana n. sp.

Head entirely yellow, eyes prominent, pearly color. Front half of pronotum bright yellow except as follows: two spots above each eye, humeral horns, a broad stripe passing from humeral angles above lateral borders for one-third their length, a broad longitudinal median stripe originating some distance from base of pronotum, and posterior half of posterior pronotal process, shining black; lateral borders from humeral angles half way to apex broadly pale yellow; apex far surpassing tip of abdomen, but not quite reaching apices of tegmina. Tegmina transparent yellow, with a broad stripe extending from base to apex of corium, interior border of clavus, and nearly all of apical cells nearly black. Wings with four apical cells, second small, sessile, fourth very small. Body below yellow, sides of abdomen splashed with fuscous; ovipositor black; legs yellow, tips of posterior tibiae and of tarsi black. Long. 10 mm.; lat. inter hum. 5 mm.

Habitat: Posorja, Province of Guayas, (Campos). Described from three females. This species is nearest to *vittatipennis* Fairm., from Guatemala.

Named in honor of Prof. Francisco Campos R.

Umbonia erecta n. sp.

Very similar to *ataliba* Fairm., from which it differs in the median and lateral lines being black none of which pass to apex of dorsal horn which is reddish testaceous; the dorsal horn is long, very slender and erect and placed behind humeral angles. Tegmina pitchy at base, with all longitudinal veins piceous, cells transparent yellow, apex of corium darker. Femora and tibiae testaceous, the latter with a fuscous stripe. Otherwise as in *ataliba*. Long. 15 mm.; lat. inter hum. 8 mm.; alt. cornu. 7 mm.

Habitat: Rio Mangorisa, Province of El Oriente, (Feyer). Described from two slightly mutilated females.

Membracis jessica n. sp.

Nearly identical in form and size with *foliata*, from which it differs in being yellow with a broad vertical band extending from lateral angles to middle of dorsum, and a large quadrangular spot before apex of posterior process, sooty black. Long. 15 mm.; alt. 8 mm.

Habitat: Canelos, Lliquino, and Yaruquies, Province of El Oriente, (Feyer). Described from four females.

Dedicated to the memory of my wife, one of the victims of yellow fever.

GUAYAQUILA n. gen.

Pronotum armed with a compressed porrect horn in front, destitute of lateral carinae but with a percurrent median carina; dorsum flat, broad at humeral angles, gradually attenuated to an obtuse apex which reaches tip of abdomen, but shorter than apices of tegmina. Generally golden silky pubescent. Tegmina similar in shape and venation to those seen in the genus *Membracis*. Wings with four apical cells, second broad and quadrangular, fourth minute. Front and middle tibiae broadly dilated, short; posterior legs three times the length of front legs, hind tibiae with strong sharp spines. Facies of *Aconophora*.

Genotype: Guayaquila roreriana n. sp.

Guayaquila roreriana n. sp.

Uniform cinnamon brown, silky pubescent. Front horn with a compressed broad edge, not pointed but rounded at apex, convex between superior and inferior borders longitudinally, with a median longitudinal carina, but destitute of lateral carinae. Tegmina semi-opaque uniform brown. Body below brown, posterior edges of abdominal segments and anal segment paler. Tibiae testaceous, spines of hind tibiae black. Long 9 mm.; lat. 3 mm.

Habitat: Machala, Province of El Oro, (Rorer). Described from one male of which the head is wanting.

This species is named in honor of Prof. J. B. Rorer.

I desire to express my gratitude to Professors Campos, Rorer and Pachano, and Messrs. Goodfellow and Feyer for a multitude of favors in my endeavor to make the entomology of Ecuador better known.

Thermotropism in Insects.

By WERNER MARCHAND, New York City.

While the phenomena of helio- and phototropism have been extensively studied, concerning thermotropic reactions we have practically no data. The consequences of uneven

heating on the plasmodia of Myxomycetes have been studied by Stahl (1884), who observed that the plasmodia will move when opportunity is offered, from water of 7°C. to water of 30°. In accordance with this reaction, the plasmodia of *Fuligo septica* will migrate in the fall, in consequence of the cooling of the air, several feet deep into the warmer layers of the tan bark where it hibernates. In the spring the movement is in the opposite direction, towards the now more strongly heated superficial layers.

For protoza, M. Mendelssohn (1895, 1902 *a*, *b*) has described, under the name of Thermotropism, the observation that *Paramecia* gather at a definite end of a trough when these ends have different temperatures. In the words of J. Loeb (1918): "the organisms were put into a flat trough resting on tubes through which water was flowing. When the water in the tube had a temperature of 38° at one end of the trough, while the tube at the opposite end was perfused by water of 26° the organisms all gathered at the latter end. If then the temperature of the water in the two tubes was reversed the organisms went to the other end of the trough. If one end had the temperature of 10°, the other of 25°, all went to the latter end." Mendelssohn's observations form the only case of thermotropism mentioned by Jennings (1906) and by Loeb. The latter author is of the opinion that in this case we are in all probability not dealing with a tropistic reaction but with a collecting of organisms due to the mechanism of motion described for *Paramecium* by Jennings. When these organisms come suddenly from a region of moderate temperature to one of lower temperature, the activity of their cilia is transitorily reversed, but owing to the asymmetrical arrangement of their cilia they do not go back in the old direction but deviate to one side. This can lead to a collecting of *Paramecia* such as Mendelssohn described.

No cases of thermotropism in higher organisms are mentioned by recent authors, and this should seem astonishing, since the effect of changing temperatures must be universal and ubiquitous. However, a tropistic action of heat upon the organism may be obscured by the direct action of temperature upon all life-processes.

Among insects, cockroaches are known to prefer warm places, and so undoubtedly do numerous other insects. In fact, an attraction by heat must be quite general, and is probably found at the bottom of such instincts as that of ants to bring their offspring to the surface of the earth when the stone covering the colony is heated by the sun's rays. Subterranean larvae also probably move upward and downward with regard to temperature. While roaches and domestic crickets seek the heat of the stove, the field crickets, ground beetles, etc., are found in places exposed to the full sunlight. Hairy caterpillars, like those of *Malacosoma*, seek the sunshine and apparently derive advantages from being heated by the sun's rays, but whether they are attracted by a purely thermal stimulus is doubtful (Howlett, 1910).

Graber (1882), to whom we owe so many fundamental observations concerning the function of sense-organs in lower animals, seems also to be the first to have noticed temperature reactions of insects. According to this author, who experimented with the cockroach *Blatta germanica*, the antennae of *Blatta* are more sensitive to certain extremes of temperature than are, for instance, the lips and finger-tips of man, which are the most sensitive parts of the human body as regards temperature.

If a specimen of the *Blatta* is blinded previously to the experiment, and then its antenna approached with a red-hot needle or with the point of a very cold object, the stimuli thus afforded will produce an effect even at a distance from which the human skin does not perceive any sensation, the effect on the animal being that the affected antenna is withdrawn.

Graber's observations show that there is in certain insects a highly developed sense of temperature, but the behavior of *Blatta* in his experiments cannot be called a tropism in the ordinary sense, which would involve oriented movements in which the orientation of the animal is affected by its reactions.

Observations on what appeared to be a negative thermotropism, were made by the writer (Marchand, 1917) on the

wingless Tipulid or snow-fly, *Chionea alpina* Bezzi, an insect which habitually lives on the snow, the species in question in the high mountains of Switzerland. If *Chionea* was kept in a glass tray, about one and one-half feet long, and covered with wire netting and with two glass-plates in such a way that the middle portion, at least one third of the whole length, was covered only by wire netting, the two ends in addition by the glass plates, and if the cage was oriented so that one end of the trough was directed towards the open air (of a porch) at about freezing temperature, the other end towards the heated room, the insect would come to rest at the underside of the free portion of the wire netting and at the extreme border of this free portion in the direction of the open air. Inasfar as it refused to go under the glass plate, positive phototropism (heliotropism) seemed to be excluded. If the cage was turned 180° the insect assumed the corresponding position on the other side of the tray. In addition, it could be observed that *Chionea* avoided the approaching finger at some distance, and that this effect could be increased if the hand was heated by means of an electric light bulb. In this case, the insect could be driven, by merely approaching it with the hand, under the glass-plate-covered portion of the tray. The negative thermotropism seemed stronger in the light than in the shade. If the animal was running over the snow, approaching it with the finger was sufficient to cause it to change its course but in this case an optic reaction is not excluded.

More characteristic cases of thermotropism are found among mosquitoes. Concerning mosquitoes, Howlett (1910) was the first to observe a positive thermotropism as underlying the biting instinct. This observer carried out a series of preliminary experiments and found that shed blood or human sweat did not attract the females of *Culex fatigans* or *Stegomyia scutellaris* any more than water. On experimenting with the effects of heat, however, it was at once found that the females of *Stegomyia scutellaris* were readily attracted by the hot air radiating from a test-tube containing hot water; the male mosquitoes, on the contrary, paid no attention to it.

As a result of a number of similar experiments he concludes that (*a*) the bite of a mosquito is a reaction to the stimulus provided by a hot surface, (*b*) that the mosquito is attracted to the hot surface mainly by the warm air rising from it, and (*c*) that the strength of the reaction is, within certain limits, proportional to the differential temperature of the surface, *i. e.*, the difference between its temperature and the general air temperature at the time, and that this difference must be positive.

Howlett's experiments were not known to the writer when in the fall of 1915 some observations were made on mosquitoes of the species *Anopheles punctipennis* Say, which confirm the results obtained by Howlett in *Stegomyia*, and render it probable that the basic tropism underlying the bloodsucking instinct is a thermotropism (Marchand, 1918). If female adults of *A. punctipennis* were placed in a lamp-chimney which on one end was closed by a covering made of cheese-cloth, and at the other end was brought in contact with a heated glass-plate, with a sheet of filter paper between serving as a foothold, the mosquitoes were seen immediately to go to that end of the lamp-chimney where the glass plate was and to alight on the filter paper. Here they began to attack the surface with their probosces, trying to bite through the glass plate. In fact they could be seen bending their probosces as a result of their strong efforts to pierce the surface. They consequently reacted to the heated glass-plate in the same way as if it were the skin of a vertebrate host. This experiment was repeated with different sets of mosquitoes, usually five or six at a time, and always with the same result. The number of specimens refusing to attack the glass-plate seemed not greater than that usually observed of specimens refusing to accept blood food when offered. Males showed the same reaction but much less strongly; in this respect my observation differs from Howlett's. Male *Anopheles* are also slightly attracted by human skin but are not able to pierce it. On the other hand, hibernating females of *Culex* did not show even a trace of this thermotropic reaction. These mosquitoes, however, also persistently refused to take

blood food. This fact is of some interest when compared with the behavior of *Chionea*. While *Chionea* as a winter insect is normally negatively thermotropic, in the mosquitoes the thermotropic reaction appears to be absent in the winter months, when the insects cannot fly about and therefore cannot obtain blood food. More observations, however, are necessary to gain a complete insight into these phenomena.

Concerning other bloodsucking insects, so far no data are available. Hog lice, *Haematopinus suis*, failed to give a thermotropic reaction but this appears not astonishing since these insects live permanently on their host, and being wingless, would hardly be able to find the host by means of a tropism.

A distinction should be made between a mere aggregation of insects in a definite temperature-optimum and a true thermotropism in which there is an oriented movement in the direction of the source of heat, or away from it. Olive C. Lodge (1918), found that house flies will congregate around a Bunsen burner in a definite circle, the size of which varied according to the distribution of the heat. This was tested by placing larger or smaller pieces of asbestos over the flame, when the flies arranged themselves in larger or smaller circles respectively. The temperature of these circles was very constant, varying between 42 and 44°C. If the gas was turned off the flies came nearer the burner and climbed up the stem of it, but when it was no longer warm they dispersed in all directions. Heated baits were visited most frequently when their temperature was at 38–48°C. The impression is gained that the flies prefer a definite optimum of temperature, but it remains to be seen whether there is any specific reaction to heat, as is apparently the case in the mosquitoes.

The problem, what particular sense-organs of the thermotropic insects are affected by the radiation of heat from objects producing the reaction, seems not yet entirely solved. According to Graber (1882), whose experiments were mentioned, the sense of heat (Wärmesinn) is developed, at least in *Blatta*, chiefly in the antennae, and to a lesser degree in the cerci (Analborsten). The functional interpretation of the well-known specific nerve endings of the antennae has there-

fore to reckon with the fact, that these appendages are not only organs of the tactile and olfactory sense but also of the sense of heat perception. It may be of interest in this connection that, at the moment of biting, the *Anopheles* mosquito will lift the two long palpi at right angles to the proboscis; these might be supposed to be the seat of heat-perception but according to Graber the function of the palpi is olfactory and this even to a higher degree than in the antennae.

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The Spider of Saltair Beach (Arach., Aran.)

By Ralph V. Chamberlin, Cambridge, Massachusetts.

About ten years ago the newspapers of Salt Lake City gave considerable space to accounts of what was characterized as "a plague of spiders" at the Saltair Beach resort, Great Salt Lake. At that time spiders were recorded as occurring

in countless numbers in and over all the buildings at the resort, stretching their webs on every available support. Each morning the attendants, armed with brooms, would endeavor to clear the webs and spiders from the dressing-rooms and other more used parts of the buildings; and each succeeding morning webs and spiders had reappeared as if by magic. The pavilion at this resort stands over the water on piles a considerable distance from shore; and the extensive spaces beneath the floor of the pavilion and on the piling in general harbored a seemingly inexhaustible supply of spiders which each night swarmed over the buildings, seeking unoccupied sites for their webs. For a year or two the plan of gathering and destroying the cocoons late in the season was tried in an effort to rid the place of the pest. Cocoons by the bushel were gathered by the attendants working systematically in and about the building and from boats beneath the pavilion. This is said to have relieved the situation. Evidently, however, the efforts were later abandoned; for, upon visiting the beach in 1918 and again in 1919, I found the spiders holding undisputed sway in their wonted places, they and their webs occurring everywhere. People have apparently become used to the sight and correspondingly tolerant of these feared but inoffensive creatures.

It is popularly believed that several kinds of spiders occur at Saltair, but I observed only one. Of this I collected several hundred specimens. In this species the males, as often, are formed differently from the females, are of a much lighter color, and would, by the layman, naturally be regarded as a distinct kind. The light abdominal markings, normally yellowish in color, are not uncommonly bright red, particularly in the males, giving thus the "red spider," commonly accounted as a third kind, which an employee at the beach assured me was especially dangerous!

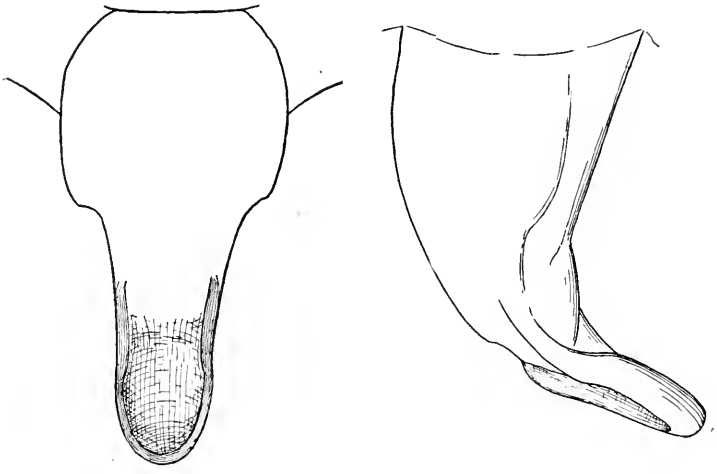
The spider is one of the orb-web weavers (Argiopidae), and belongs to the genus *Neoscona*, commonly included in *Aranea*. the *Epeira* of most earlier writers. In *Neoscona* it falls in the group in which the males have the coxae of the fourth legs armed beneath with a conical process. Hereto-

fore this group was known to include but two, or perhaps three, American species, namely *oaxacensis* (Keyserling) of Mexico and Central America and *vertebrata* (McCook) of the southwestern United States. In the *Biologia Centrali-Americana* F. O. Picard-Cambridge describes a species *conifera* from Mexico and Central America, and places *vertebrata* in synonomy with *oaxacensis;* but a study of material from the type locality of *vertebrata* (San Diego, California) and elsewhere in the southwest shows that *vertebrata* agrees in all details except in size with *conifera* as described by the author mentioned, and differs correspondingly from *oaxacensis*. *Conifera* is thus probably a synonym of *vertebrata*. The Saltair Beach spider is close in general structure to these forms; but it is an obviously distinct species, and one which seems never to have been named. It is a much more darkly colored species than *vertebrata*, with relatively longer legs, and differs in structural details as indicated in the description below. Thus far it has not been taken anywhere excepting at the Saltair Beach. The types of this species are in the collection of the Museum of Comparative Zoology, Cambridge, Massachusetts.

Neoscona salaeria sp. nov.

♀.—Adult females in full color have the integument of carapace and legs from mahogany to black, without any distinct markings. Sternum black with a narrow median longitudinal stripe of yellow. Labium and endites black with anterior and mesal borders, respectively,pale. The carapace and sternum clothed with gray hair, the legs with gray and brown hairs. Abdomen in general blackish, showing above a narrow median longitudinal stripe, much as in *oaxacensis*, formed by numerous small yellow dots but with no spots or marks of yellow as large as those occurring in *vertebrata* or *oaxacensis;* on the lateral parts of the dorsum, especially anteriorly, similar small yellow dots may occur in varying numbers, the median stripe sometimes dissolving in a larger anterior area formed by such dots. Very often the dorsal yellow markings are almost wholly obliterated. Venter with four yellow spots, two just caudad of the epigastric furrow and two in front of the spinnerets. Abdomen clothed with shorter gray hairs and longer, more sparse setae of brownish color. Younger and freshly molted females are light colored, with distinct markings like those of the males, a similar red color often showing on the abdomen.

Abdomen elongate oval. Femora of legs armed beneath with two widely-separated series of spines, the spines of these series on the anterior legs shorter and more slender than those of the anterior and caudal surfaces, and the spines of the anterior row more numerous than those of the caudal. Scape of epigynum geniculate at the beginning of the distal "spoon," the proximal division long, in profile a little curved, much as in *vertebrata*. In ventral view the scape is seen to be narrow, not at all or but weakly clavately expanding, not conspicuously so as it does in the other species, and it does not show the lateral lobes or tubercles at the sides of the main process. See figs. 1 and 2.



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Neoscona salaeria sp nov. ♀

Fig. 1. Ventral view, and Fig. 2. Lateral view of epigynum. (Setae not represented.)

♂.—In general obviously lighter in color than the female. Carapace fulvous to brown, with a median longitudinal line and a broader band above the lateral border on each side from choclate-colored to black. Sternum as in the female. Legs fulvous or brown, each tibia with a broad black annulus at each end and the metatarsus with a narrow annulus at proximal end and a broader and more distinct one near middle and at distal end, of which commonly only the distal one is distinct. Tarsi darker distally. Legs darkening and the annulations becoming more obscure in older specimens, and brighter and more strongly marked in newly-molted ones. Abdomen with the same coloration as in the female but the yellow pattern typically more strongly developed. Often the light markings of the dorsum of the abdomen are bright red in whole or in part instead of yellow. The yellow spots on the venter often connected along each side.

Ventral spines of femora of legs more strongly developed than in the female. Tibia of second legs beneath with the usual two stout basal spines, with no group of smaller ones distad of them such as found in *oaxacensis;* on the anterior face a double and in part triple series of short stout spines which are typically from thirty to forty in number. Coxae of fourth legs each with a prominent conical apophysis beneath. Coxae of first legs with the usual chitinous hook. The median apophysis (clavis) of the bulb of the male palpus formed almost exactly as in *vertebrata*, the larger lobe not expanded at all distally.

♂.—Length to 14 mm. Length of cephalothorax 7 mm.; width 6 mm. Length of tib. + pat. I, 11 mm.; of tib. + pat. IV 9.2 mm.

♀.—Length to 15 mm. Length of cephalothorax 7.4 mm.; width 6.2 mm. Length of tib. + pat. I 10.5 mm.; of tib. + pat. IV 10 mm.

Notes on Gonatopus ombrodes, a Parasite of Jassids (Hymen., Homop.)*

By C. N. AINSLIE, U. S. Bureau of Entomology.

On July 10, 1910, in Fort Collins, Colorado, a jassid, a female *Cicadula 6-notata*, flew to a lamp by which the writer was seated and attracted attention by her peculiar behavior. She seemed deformed, walked jerkily and was continually flipping her wings. A lens disclosed a small striped sac projecting from or attached to the abdomen between the fourth and fifth segments. This jassid was captured and mounted in balsam for future study.

Since that date a number of leaf hoppers aflicted in a similar manner have been taken in various parts of the middle west and a few adult parasites have been reared from these. The object of the present paper is to offer some facts that have been gathered regarding the habits of these parasites.

The writer is indebted to Mr. S. A. Rohwer, a systematist of the Bureau of Entomology, for a determination of the parasite and for helpful criticisms of this paper, and to Mr. D. M. DeLong of Harrisburg, Pennsylvania, who kindly determined the jassid hosts concerned in this study.

It may be said at the outset that while this parasite may possibly attack jassids more or less promiscuously, regard-

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less of species, no case has come under the observation of the writer in which any other species of jassid than this particular *Cicadula* has been taken with the sac of *Gonatopus ombrodes* attached. Perkins records *G. ombrodes* as reared from *Deltocephalus sp.* at Columbus, Ohio. Farther than this, no data are at present available to the writer regarding the range of victims attacked by this parasite.

The sub-family Dryininae, or Anteoninae, to which the parasite under consideration belongs, is a most interesting Mutilloid group of the Proctotrypidae. This group, recently has been most admirably treated both from a taxonomic and biologic point of view by Mr. F. A. Fenton.* Its members confine their attacks to certain homopterous insects belonging to the Fulgoridae, Jassidae and Membracidae. In most cases the larvae of these parasites live partly within the body of the host and partly within felt-like sacs that project between the abdominal plates of their victims. One most peculiar feature of this group of parasites is the chelate anterior tarsi with which the females of nearly all the species are armed, a character which, according to Ashmead, is found nowhere else among the Hymenoptera. This bit of apparatus, which closely resembles the finger and thumb of man or the opposing claws of raptorial birds, only much more viciously hooked and spined, proves a most successful and formidable weapon when employed in the capture of prey. And it must be borne in mind that this grasping appendage is supplemented by lightning-like activity on the part of its owner, making her more than a match for even the nimble jassids.

Comparatively little attention seems to have been given to this group of insects until recently. In Europe certain species have been given detailed study.

It is not an uncommon thing to find a *Cicadula* carrying two dryinid sacs, one on each side, attached to its abdomen. Usually these sacs are of equal size, indicating that the two eggs were deposited during the same attack. Occasionally one sac is noticeably larger than the other. More than two

*The Ohio Journal of Science, Vol. XVIII, pp. 177, 243 and 285. Numerous figures.

have never been found by the writer on a single individual of this species. It is more than probable that in such cases of double infestation one or both of the guests must perish, since it would be manifestly impossible for one small jassid to afford nourishment sufficient to carry two equally rapacious larvae to maturity. The survival of one larva in such a case would perhaps account satisfactorily for the disappearance of the other.

The dryinid sac referred to throughout this paper is rather short oval in form, is usually quite symmetrical and when mature measures about one millimeter in its major axis, the minor axis a trifle less. It is light brown in color and is barred transversely by several, three to five, narrow bands of darker brown that give it the appearance of having true segments. It has a dull surface, finely rugulose, projects from behind the second, third or fourth abdominal segment and is found most often on the left side of the abdomen although they occur on either side.

Adult *G. ombrodes* have been both reared and taken with a net. Only a few have been captured in the open and these on lawns where parasitized jassids abounded. It is probable that their activity and watchfulness would ordinarily forbid capture in the open, since they would naturally escape by falling to the ground on any sign of disturbance such as would be produced by the approach of a sweep net. Males are very uncommon and the females must outnumber them at least ten to one, judging from rearing results obtained by the writer.

It has been learned during these studies that in every case it appears to be the female jassids that fall victims to the attacks of the *ombrodes*. This may be due in some measure to the superior agility of the male jassids in eluding the spring of the parasite or because the females, being generally larger, are preferred as hosts because more likely to successfully nourish the young larvae. Nymphs so far as known are free from attack, since only adult females have been taken carrying the sacs.

These parasites are rare during the early summer and only begin to multiply towards autumn. They are seldom seen

before July. One parasitized jassid was taken by the writer June 1, 1915, the earliest date recorded during these observations.

Only the mature larval and the adult stages of the parasite are treated in this paper, since opportunities to acquire information regarding the appearance of the egg, time of incubation and the various instars of the insect have been impossible during the progress of fragmentary studies.

Emergence of the Larva.

August 6, 1914, a series of infested *Cicadula 6-notata*, all females, was captured and placed in a large tube vial with a supply of fresh grass blades. Only those were chosen that bore well-matured sacs as very poor success had been previously had in rearing parasitic larvae in captivity. Even when well supplied with abundant food the jassids would frequently die in the course of a few hours when confined in a cage, and when taken with small sacs would never survive to their maturity.

From this lot thus caged a number of dryinid larvae issued during the first day, wandered a while about the containing vial and finally established themselves on grass blades or in corners where they constructed cocoons. In order to secure more definite data, two jassids with single sacs in an advanced stage were then selected and placed in small shell vials with bits of fresh grass. These vials were kept under constant observation under a binocular with thirty diameter power.

For an hour or more these jassids were very uneasy, constantly on the move, flipping their wings and continually trying to disengage the sacs by kicking at them with their spiny hind tibiae. This nervousness becomes more pronounced as the parasitic larva nears maturity as jassids with small sacs seldom manifest distress in any manner.

At 10 a. m. a perpendicular rent or slit was noticed in the sac attached to one of these prisoners, and the white body of the larva in violent agitation was visible through this rupture. The opening was in the rear or pouch-like end of the sac, at right angles to the brown bands and was plainly

the result of the muscular contortions of the larva within. The membrane composing the sac seemed very tough and leathery but gave way slowly to the compelling force inside. When the delivery first began the jassid seized a grass blade firmly with its feet but soon let go and raced down the tube. It then forced its beak into another blade and with its claws took a firm grip that was never relaxed until death came nearly three hours later. In every case where an emergence has been witnessed, the host has always died during the final act, when the larva leaves its victim. And in each instance life continues with strange persistence to the very farewell move of the destroyer.

The struggles of the larva for freedom continued without cessation for an hour. At 12:15 it became quiet for thirty minutes, possibly for rest, withdrew into the host's body and the rent in the sac nearly closed. At intervals now the jassid moved its legs feebly. At 12:45 the larva again became active and for forty-five minutes labored most strenuously until it gained its entire freedom. Not all larvae are so fortunate for unless conditions are exactly right at this stage emergence is checked and death ensues.

The last few minutes were marked with extraordinary exertion. Peristaltic waves ran cephalad in rapid succession and each one served to propel the body an infinitesimal distance farther out. It will be understood that emergence was backward, for the tapering head was the last thing to appear. Even when finally free it seemed unwilling to leave its happy home for it remained for some little time thrusting its head again and again into the abdominal cavity of the jassid through the remains of the now much tattered sac. After about fifteen minutes of hesitation of this sort it moved away from the dead body of its host and began to travel.

The progress of the larva is peculiar. Its caudal end is first slightly advanced cephalad, then a constriction progresses anteriorly, this being followed in quick sequence by others, all this action tending to propulsion forward. Locomotion is certainly energetic even if not at all rapid.

(*To be Continued*)

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JUNE, 1920.

Entomology in the United States National Museum.

The combined report of the Committee of the Entomological Society of America on Entomology in the National Museum and of the Museum Committee of the American Association of Economic Entomologists, by its publication in *Science* for March 5, 1920, and elsewhere, has now been before the entomological public for three months. Doubtless, entomologists approve the report. The proceedings of the St. Louis meeting (December 29 and 30, 1919) of the Entomological Society of America, at which the Committee made its report, have been published since the preceding number of the NEWS was closed for printing. Those proceedings state that the National Research Council was to "be informed of the [presumably entomological] needs of the National Museum and their consideration and support be urged." Although we have no hint as to the action that will be taken by the National Research Council, we look to it for a favorable report. The Council's support alone will hardly accomplish the desired results and we imagine that much individual work in gaining the attention and aid of Senators and Representatives will be necessary. To be most effective these efforts should be completely organized and systematized by the Society and the Association named above.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

New Chief of Bureau in New Jersey.

We offer our congratulations to a valued contributor to the NEWS, Mr. Harry B. Weiss, who, on May 1, was appointed Chief of the Bureau of Statistics and Inspection in the New Jersey Department of Agriculture, to fill the vacancy caused by the death of Franklin Dye.

The Louisiana Entomological Society.

A note announcing the formation on March 5, at New Orleans, of a society under this name appeared in *Science* for April 16, 1920. It has a membership of about twenty-five and is domiciled at the Natural History Building of the Louisiana State Museum. The President is Edward Foster, the Secretary-Treasurer E. T. Holloway.

A New Variety of Lemonias (Lepidoptera).

Lemonias palmeri marginalis n. var.

The wings above have an orange marginal border about 1 mm. wide and the ground-color of the wings is lighter than in *palmeri* and the white spots contrast strongly with the background. This variety has quite a different facies from the species.

Type male and paratypes male and female from Acme, California, August 8, 1919 (Morgan Hebard). Types in the collection of The Academy of Natural Sciences of Philadelphia.—HENRY SKINNER.

Pamphila californica (Lepidoptera).

Pamphila californica Wright was described and figured in Wright's Butterflies of the West Coast, 1905, p. 241, pl. 31, f. 423, b, c. This is one of the numerous varieties of *Pamphila comma*.

Another *Pamphila californica* was previously described and it is a difficult one to make out from the description. The author of the species is P. Mabille, Bull. Comptes-Rendus, Soc. Ent. Belg. 1883, p. lxviii. This translation of the description will probably be of interest to the students of the Rhopalocera in California:

"*Pamphila californica* n sp.

Wings brownish, mixed with fulvous near the costa, with a thick oblique fuscous streak; end of cellule fuscous; fringe grayish. Wings beneath ochraceous.

"This species greatly resembles *P. linea* of Europe. Superiors brown, with bright fulvous spots on the costa and around a thick black streak running obliquely from the extremity of the cellule to the inner border.

"The end of the cellule is somewhat darker brown. Beneath, superiors ochraceous, with the middle of the disk brighter and the streak faintly reproduced. Inferiors ochraceous, one or two pale yellow dots faintly seen between the nervules. Underside of body yellow like the wings. One male from California."

Two new names are proposed by Mabille and Boullet for North American Hesperidae in the Bull Ent. Soc. France, 1917, page 100: *Pholisora pirus semicaeca* and *Hesperopsis arizonensis*. The former is described from one male from Utah, and the latter from one male from Arizona.

HENRY SKINNER.

A Rare Pamphlet (Hym., Lep., Neur.)

The Museum of Comparative Zoology has a copy of a reprint of an article which was to have been published in the Transactions of the Chicago Academy in 1870. But the big fire came and destroyed the stock, and few, possibly only this one, copy of the reprint was sent out. It is entitled "Notice of Hymenoptera and Nocturnal Lepidoptera collected in Alaska by W. H. Dall, Director Sci. Corps, W. U. T. Exp., by Dr. A. S. Packard, with a List of Neuroptera by P. R. Uhler and Dr. H. A. Hagen." Extract from Trans. Chicago Acad. Sci., vol. II, pp. 25-32, pl. 2. 1870.

In this article Packard describes *Vespa tripunctata* (p. 26), *Vespa alascensis* (p. 27), *Phragmatobia dallii* (p. 29) and *Gastropacha alascensis* (p. 29). Uhler describes *Perla* (*Nephelion*) *dallii* (p. 30) and Hagen *Cryptothrix insularis* (p. 31). Various described species are recorded. The plate figures *Bombus frigidus*, *B. occidentalis*, *B. flavifrons*, *B. lacustris*, *B. kirbyellus*, *B. nivalis*, *Vespa norvegica*, *V. arenaria*, *V. tripunctata*, *V. alascensis*, *Platarctia borealis*, *Arctia caja*, and *Phragmatobia dallii*. The new species have never been recorded in any catalogue, nor the paper referred to. Whether it can be considered as "published" depends, I suppose, on the existence of other copies. The "W. U. T. Exp." is the Western Union Telegraph Co. Expedition, and it was the expedition upon which Kennicott lost his life. Reports on the birds were published the preceding year, and Scudder noted the butterflies in Proc. Bost. Soc. Nat. Hist., in 1869.—Nathan Banks, Museum of Comparative Zoology, Cambridge, Mass.

Synonymy of Some Species of Thecla (Lepid.).

The following synonymy will be of interest to Lepidopterists. The first name has priority.

Thecla thordesca Hew.—*zenaida* Dyar.
" *elsa* Hew.—*primnoza* Dyar.
" *cambes* G. & S.—*syvix* Dyar.
" *philinna* Hew.—*greppa* Dyar.
" *uterkudante* Dr.—*elimes* Dyar.
" *bianca* Möschl.—*ostrinus* Druce.
" *proba* G. & S.—*climicles* Dyar.
" *xeneta* Hew.—*devia* Möschl.
" *atrox* Butl.—*gentilla* Schs.
" *canus* Druce.—*bunnirae* Dyar.
" *amphrade* Schs.—*posetta* Dyar.
" *autoclea* Hew.—*callides* Dyar.
" *serapio* G. & S.—*mesca* Dyar. ♀.
" *sabinus* Fldr.—*promissa* Möschl.
" *pan* Drury.—*tirrhaea* Möschl.
" *tella* Schs.—*castrena* Jones. ♀.

W. Schaus, U. S. National Museum, Washington, D. C.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **6**—Journal of the New York Entomological Society. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **9**—The Entomologist, London. **10**—Proceedings of The Entomological Society of Washington, D. C. **13**—Journal of Entomology and Zoology, Claremont, Cal. **17**—Lepidoptera, Boston, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **21**—The Entomologist's Record, London. **60**—Maine Agricultural Experiment Starion, Orono. **64**—Parasitology, London. **68**—Science, Lancaster, Pa. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **107**—Rivista del Museo de la Plata, Buenos Aires. **108**—Journal of Genetics, Cambridge, England.

GENERAL. Hewitt, C. G.—Obituary notice. **4,** lii, 96. Bureau imperial d'entomologie. (Le Natural. Canadien, xlvi, 221–6.) **Holland, W. J.**—The development of entomology in North America. **7,** xiii, 1–15. **Holloway, T. E.**—The Louisiana Entomological Society. **68,** li, 386–7. **Johnson, H. L.**—Methods of mounting insects. **17,** iv, 22–3 (cont.). **La, P.**—Le temps et les insectes. (Rev. Scient., 1920, 24.) **Maheux, G.**—Le Docteur Hewitt. (Le Nat. Canadien, xlvi, 195–199.) **Metcalf & Osborn.**—Some observations on insects of the between tide zone of the North Carolina coast. **7,** xiii, 108–20. **Stone, W.**—The use and abuse of the genus. **68,** li, 427–9.

ARACHNIDA, ETC. Chamberlin, R. V.—Some records of Canadian Myriopods. **4,** lii, 94–5. **Nordenskiold, E.**—Spermatogenesis in Ixodes ricinus. **64,** xii, 159–66.

Chamberlin, R. V.—New California spiders. Centipedes and millepedes from near Claremont. Spiders from the Claremont-laguna region. **13,** xii, 1–26.

NEUROPTERA. Sack, P.—Aus dem leben unserer einheimischen libellen. (Bericht Sencken. Naturf. Gesell., Frankfurt a. M., xlv, 110–25.) **Smith, R. C.**—The process of hatching in Corydalis cornuta. **7,**

xiii, 70–4. **Williamson, E. B.**—Notes on a few species of Progomphus. **88,** No. 77.

Banks, N.—A revision of the Nearctic Termites. (U. S. Nat. Mus., Bull. 108.)

ORTHOPTERA. Caudell, A. N.—An economic consideration of Orthoptera directly affecting man. (Smithsonian Rept., 1917, 507–14.) **Davis, W. T.**—A dark form of Stagmomantis floridensis. **6,** xxvii, 341. **DuPorte, M.**—The muscular system of Gryllus assimilis. **7,** xiii, 16–59. **Schmidt, P.**—Catalepsy in Phasmidae. (Smithsonian Rept. 1917, 501–5.)

Hebard, M.—A revision of the N. Am. species of the genus Myrmecophila. **2,** xlvi, 91–111.

HEMIPTERA. Breddin, G.—Neue oder wenig gekannte neotropische Hemiptera. (Abh. Senckenb. Naturfors. Gesell., Frankfurt a. M., xxxvi, 50–9.) **Davis, W. T.**—A belated Tibicina cassinii. **6,** xxvii, 341. Some records of Polyctenidae. **6,** xxvii, 261–3. **Ferris, G. F.**—Notes on Coccidae VI. **4,** lii, 61–5. **Funkhouser, W. D.**—New Neotropical Membracidae. **6,** xxvii, 267–77. **Nuttall, G. H. F.**—On Fahrenholz's purported new species, subspecies and varieties of Pediculus. A criticism of methods employed in describing Anoplura. **64,** xii, 136–53.

Ball, E. D.—A review of the species of the genus Gypona occurring in N. Am., north of Mexico. **7,** xiii, 83–100. **Davis, W. T.**—A new cicada of the genus Melampsalta. **6,** xxvii, 340–1. **Foot, K.**—Preliminary note on the spermatogenesis of Pediculus vestimenti. Determination of the sex of the offspring from a single pair of Pediculus vestimenti. **100,** xxxvii, 371–84; 1 385–87. **Malloch, J. R.**—A new species of Typhlocyba. **4,** lii, 95. **Parshley, H. M.**—Hemiptera from Peaks Island, Maine, collected by G. A. Moore. **4,** lii, 80–7. **Patch, E. M.**—Three pink and green aphids of the rose. **60,** Bull. 282. **Woodruff, L. B.**—A review of our local species of the membracid genus Ophiderma. **6,** xxvii, 249–60.

LEPIDOPTERA. Dattin, E.—Sur la classification de Tortricides. **20,** 1910, 78–80. **Drz, 4.**—Les mechanismes qui provoquent l'eclosion des papillons. Rev. Scient., 1920, 52–3. **Ehrmann, G. A.**—Papilio pyrholochus n. sp. [S. Amer.] **17,** iv, 20–1. **Harrison, J. P. H.**—Genetical studies in the moths of the geometrid genus Oporabia, with a special consideration of melanism in the L. **108,** ix, 195–280. **Lloyd, J. T.**—(See under Diptera.) **McDunnough, J.**—Notes on the life history of Phyciodes batesi. Notes on the larvae and pupae of certain pterophorid species. **4,** lii, 56–9; 87–95. **McMurray, N.**—Papaipema impecuniosa. Collecting notes. **17,** iv, 17–19; 26–7. **Verity, R.**—On emergence of the Grypocera and Rhopalocera in relation to altitude and latitude. **21,** xxxii, 65–70 (cont.).

Rothke, M.—Two new forms of Lumenaria. **17,** iv, 29–31.

DIPTERA. Carter, H. F.—Descriptions of the male genital armatures of the British anopheline mosquitoes. (Ann. Trop. Medicine &

Parasitology, xii, 453–7.) **Curran, C. H.**—Observations on the more common aphidophagous syrphid flies. **4,** lii, 53–5. **Ferris, G. F.**—The first stage larva of Cuterebra americana. **5,** xxvii, 13–14. **Lloyd, J. T.**—An aquatic dipterous parasite, Ginglymyia acrirostris, and additional notes on its lepidopterous host, Elophila fulicalis. **6,** xxvii, 263–5. **Morley, C.**—Collecting fungus gnats. **9,** liii, 83–9.

Alexander, C. P.—Two undescribed Pediciine crane flies from the United States. **4,** lii, 78–80. **Banks, N.**—Descriptions of a few new Diptera. **4,** lii, 65–7. **Bequaert, J.**—A new nemestrinid fly from central Texas. **6,** xxvii, 301–7. **Cresson, E. T., Jr.**—A revision of the Nearctic Sciomyzidae. **2,** xlvi, 27–89. **Felt, E. P.**—New gall midges or Itonididae from the Adirondacks. **6,** xxvii, 277–92. **Johnson, C. W.**—A revision of the species of the genus Loxocera, with a description of a new allied genus and a new sp. **5,** xxvii, 15–19. **Parker, R. R.**—Another new sp. of Sarcophaga from Niagara Falls. **6,** xxvii, 265–7.

COLEOPTERA. Bruch, C.—Descripcion de un Cerambicido extraordinario de la Rep. Argentina. Nuevas especies C. hidrofilidos. **107,** xix, 340–5; 445–70. Catalogo sistematico C. de la Republica Argentina. **107,** xix, 235–339; 346–441; 471–526; 538–73. **Burke, H. E.**—Collecting some little known Buprestidae. **10,** xxii, 72–6. **Csiki, E.**—Coleopterorum catalogus Pars 70, Scydmaenidae. **F. A. W.**—The meaning of continuous variation in color. (Jour. Heredity, xi, 84–5.) **Grouvelle, A.**—Description des Clavicornes nouveaux de la Rep. Argentine. **107,** xxiii, 234–56. **Hays & McColloch.**—Some observations on the genitalia of Lachnosterna. **7,** xiii, 75–82. **Herrick, G. W.**—The winter of 1918–19 and the activities of insects with special reference to the clover leaf weevil (Hypera punctata). **7,** xiii, 101–7. **Johnson, C. W.**—Variations of the palm weevil. (Jour. Heredity, xi, 84.) **Pic, M.**—Sur Baeocera argentina. **20,** 1910, 49–50.

Blackman, M. W.—Two new species of Pityophthorus from Colorado **5,** xxvii, 1–5. **Casey, T. L.**—A revisional study of the American Platyninae. Random studies among the American Caraboidea. Some descriptive studies among the American Barinae. (Mem. Coleoptera, ix, 1–529.) **Notman, H.**—Notes and new species of Bembidium. **6,** xxvii, 292–7. **Schaffer, C.**—Synonymical and other notes on some species of the family Chrysomelidae and descriptions of n. sps. **6,** xxvii, 307–40. **Timberlake, P. H.**—Correction of two generic names in Coleoptera and Hymenoptera. **4,** lii, 96.

HYMENOPTERA. Ainslie, C. N.—A remarkable case of homing instinct. **4,** lii, 50–2. **Bruch, C.**—Un nuevo gorgojo del Prosopanche. Contribucion al estudio de las hormigas de la provincia de San Luis. **107,** xxiii, 231–3; 291–357. Catalogo sistematico de las formicidos Argentinos. Contribucion al conocimiento de los Bethylidae Argentinos y descripcion de una neuva especie. Suplemento al catalogo de los formicidos Argentinos. **107,** xix, 211–341; 442–6; 527–37. **Cushman, R. A.**—

Viereck's family Labenidae with the description of a new species of Apechoneura. **10,** xxii, 76–80. **Jordan, H. E.**—Studies on striped muscle structure VI. The comparative histology of the leg and wing muscle of the wasp. (Amer. Jour. Anatomy, xxvii, 1–66.) **Spooner, C. S.**—A note on the mouth parts of the Aradidae. **7,** xiii, 121–2.

Bequaert, J.—Hymenoptera collected near Boston, Mass., with description of a variety of Bombus affinis. **5,** xxvii, 6–12. **Cockerell, T. D. A.**—The bees of Peaceful Valley, Colorado. **6,** xxvii, 298–300. **Fouts, R. M.**—Some new parasites with remarks on the genus Platygaster. **10,** xxii, 61–72. **MacGillivray, A. D.**—Two new species of Platycampus (Tenthredinidae). **4,** lii, 59–61. **Timberlake, P. H.**—(See under Coleoptera.)

Obituary

The *State Gazette* of Trenton, New Jersey, for April 19, 1920, recorded the death of FRANKLIN DYE on April 18, at Trenton, at the age of 84 years, after a brief illness. A very good account was given in this paper, of Mr. Dye's activities and public services while secretary of the New Jersey State Board of Agriculture from 1887 to 1916. From 1916 until his death he was Chief of the Bureau of Statistics and Inspection in the New Jersey State Department of Agriculture. While secretary, Mr. Dye was responsible for the first official document on entomology published by the state of New Jersey. This appeared in the 15th Annual Report of the New Jersey State Board of Agriculture, 1887, pp. 485–535, and consisted of material taken from Riley's "General Truths in Applied Entomology," which Mr. Dye assembled as being of interest to New Jersey farmers and fruit growers. This account appeared under Prof. Riley's name. Late in 1887, the first state entomologist, Rev. George D. Hulst, was appointed. He resigned the following year, 1888, and was succeeded by Dr. John B. Smith during the same year. While Mr. Dye apparently published no papers on entomology, he was interested in its economic side and recognized its importance. During his long years of service he did all that he could to advance such work in New Jersey.

HARRY B. WEISS, New Brunswick, New Jersey.

NEW ARRIVALS

From Colombia, So. America:

OVER 10,000 BUTTERFLIES, INCLUDING

Morpho cypris
" sulkowskyi
Morpho amathonte
Caligo spp.

From Cuba:

1500 BUTTERFLIES AND MOTHS, INCLUDING

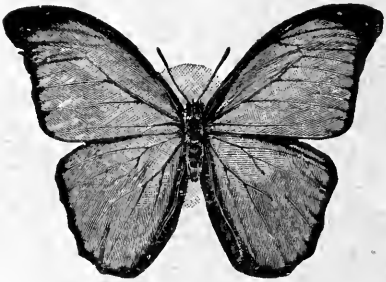
Papilio columbus
" andraemon
" celadon
" devilliersi
Urania boisduvali
Erinyis guttalaris
Protoparce brontes, etc.

From Venezuela:

Over 5000 Lepidoptera
200 Dynastes hercules

From New Guinea:

2000 Coleoptera
200 Orthoptera



From Assam, India:

1200 BUTTERFLIES AND MOTHS, INCLUDING

Papilio arcturus
" philoxenus
Kallima inachis
Brahmaea wallachi

And Many Other Showy Species

From Tibet (Bhutan)

Armandia lidderdalii
Parnassius hardwicki

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Department of Natural Science
G. Lagai, Ph.D.

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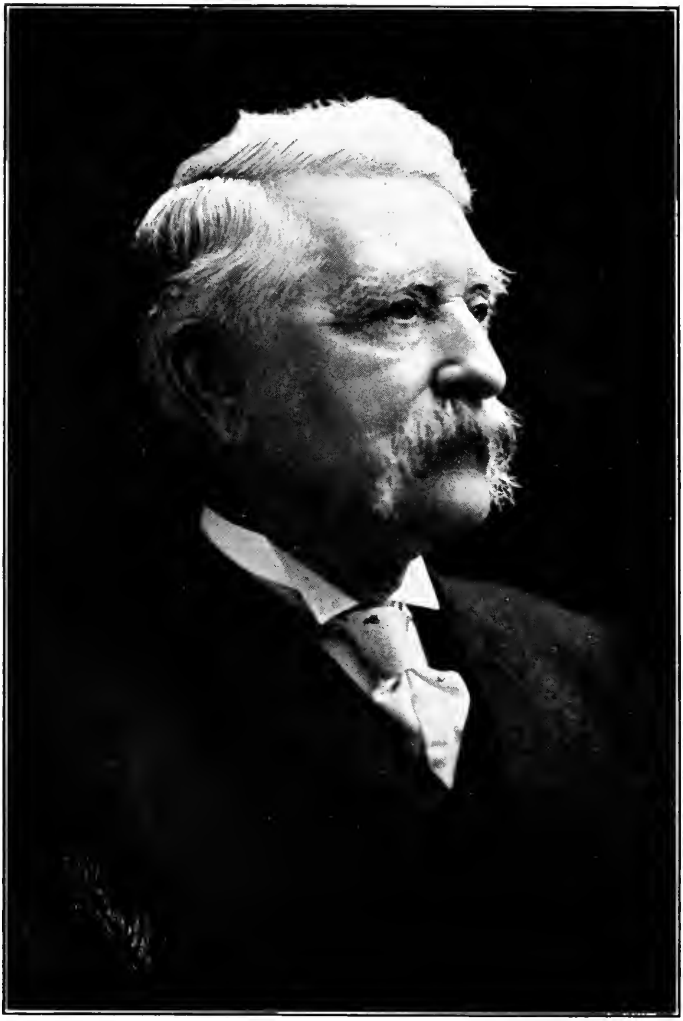

RICHARD H. STRETCH.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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Richard H. Stretch---An Appreciation.

By KARL R. COOLIDGE and H. H. NEWCOMB,

Los Angeles, California.

(Plate II)

There remain today but few of the pioneer lepidopterists who, mostly under great handicaps, laid the ground work for this study in America. Grote, Behr, Henry Edwards, Scudder, William H. Edwards and others have passed to the Great Beyond, leaving behind them writings and memories that will forever be monuments to their genius. An associate of these men, and himself *the* pioneer lepidopterist of the Pacific Coast, is Richard H. Stretch, who for some years has been living at 2657 37th Avenue, S. W., Seattle, Washington. As he has been wintering at Pasadena, California, we have been privileged to make his personal acquaintance, and from

him we have gleaned the following facts of his life. And when but recently he remarked to us that he could hardly understand why any one should be interested in his life's work, that—"I have done so little"—we were amazed. But let us sketch briefly the busy career of this man, whose labors are still far from being ended.

Richard H. Stretch was born November 25th, 1837, at Nantwich, England, five miles from the Crewe Station in Cheshire. His father died when he was eight years old, and two years later he was sent to a Quaker boarding school at Ackworth. At fourteen he attended the Friends' School at York. Even in these early years he had an intense interest in Natural History, but especially insects.

In 1853 he went to Banbury as an apprentice in a draper's shop, remaining there until 1859. But this existence did not appeal to him (he states now that he had as much interest in dry goods as a fly) and the following year he held a position as cashier and book-keeper in a manufacturing company. In the winter of 1861 came an invitation to visit relatives in Illinois, and always eager to travel, and seeing an opportunity to study new forms of insect life, he quickly accepted this chance, soon leaving for Boston on the old Cunard side-wheeler "Canada," the passage consuming twenty-one days. Reaching Boston, he proceeded to New York, and from there by steamer to Panama. There he did considerable collecting in all lines, and became acquainted with Dr. White, of the Panama Railroad Company, the pioneer coleopterist of Central America. Leaving Panama, he made New Orleans his next stop, remaining there several weeks sight-seeing and, as always, collecting. Thence to his uncle's home, near Adrian, Illinois, where he remained about a month. Deciding to return to England, he made hurried visits to Philadelphia and Washington and then voyaged to Europe.

The following year he devoted himself to architecture and building, but was dissatisfied with conditions and again came to the United States. He visited once more his uncle in Illinois, making considerable collections in all lines of biology. In 1863 he joined an emigrant party bound for California, and it was during this that a curious incident occurred.

Mr. Stretch's party consisted of but five, a very insufficient number in view of the numerous hostile Indian bands. But while other and larger emigrant groups were attacked, and in some cases, wiped out, this small party passed unmolested. At the outset of the journey one of Mr. Stretch's collecting bottles, containing a various assortment of insects in alcohol, had rolled from one of the wagons unobserved. A friendly Indian had found and returned it. Mr. Stretch displayed his entomological wares to this red skin, who viewed them with intense interest, but not in a scientific way. And all along the line of the emigrant trail word was passed among the Indians that a Big Medicine Chief was coming, and apparently orders were given that no harm should befall him.

Arriving at Salt Lake City, Mr. Stretch altered his plans and proceeded to Virginia City, then a rip-roaring frontier mining camp. First employed as a cook, he later ran a saw mill, and after that became associated with a Mr. Chapman in a land office business.

Here again his entomological knowledge served him well, for his eye, trained in the discrimination of minute differences, also permitted him with ease to grade the various types of ore. And then, to his astonishment, he was elected state mineralogist of Nevada. He says now that it was with many misgivings that he undertook the duties required of this office, for his knowledge of mining was very scanty. But close observation and study overcame that, and eventually he became known as the best maker of mining maps in America.

In 1867 he journeyed on to California, being among the earliest of the emigrants to cross the fearful Death Valley, meeting with Indians who had never before encountered white men. It was in this year that he introduced the method of making squares on maps, marked A. B. C. and 1, 2, 3, etc., now used the world over. He visited San Francisco, and also descended into Chihuahua, Mexico, to examine an old mine. Those were the days of hardships in travel, and Mr. Stretch recalls now, laughingly, one incident in particular when the food supply gave out, and he and the other members

of his party were forced to subsist for two weeks on lizards and prickly pears.

In the winter of 1868–69 he returned to Virginia City for the U. S. Geological Survey to make a study of the famous Comstock lode. His celebrated maps of this lode are to be found in the Encyclopedia Brittanica. But, with all his pressure of business, his interest in entomology never flagged, and many new and interesting species resulted from his Nevada stay.

Returning to San Francisco, he spent the next few years in surveying, in 1870 becoming City Surveyor of San Francisco, Near Fresno, he sank the first artesian well in California, reaching a depth of 500 feet. He also put in the headgate of the first irrigation ditch in the state, this near Kingsbury.

In 1874, Mr. Stretch paid a visit to his old home in England but returned to California in the following year, spending the next two years at Havilah, in Kern County. Here the dainty *Philotes speciosa* was discovered and named by Henry Edwards, as were a number of other butterflies taken at Havilah. In 1888 he removed to Seattle, Washington, and from there mining engagements took him to nearly every state in the west, as well as to British Columbia. He laid out West Seattle, was chief engineer of the Seattle and Southern Railroad, and also, in later years, spent some time at Skaguay, Alaska, as engineer for the White Pass and Yukon Railroad.

In 1885 his wife, whom he had married at Virginia City, passed away and shortly after Mr. Stretch donated his entomological library, rich in valuable works, to the Mechanic's Institute in San Francisco. His magnificent collection, replete with many types and rarities, and numbering about thirteen thousand specimens, he gave to the University of California, at Berkeley, California.

Through all these busy years, Mr. Stretch kept up a world-wide correspondence with entomologists. He was elected a member of the California Academy of Sciences and the Philadelphia Academy of Natural Sciences. A constant contributor on entomological subjects, his many papers are

to be found in Papilio, Canadian Entomologist, Entomologica Americana and other journals. He was called, while at San Francisco, to investigate the Cottony Cushion Scale, then present in but one spot in California, at San Mateo, and his exhaustive report of this was published by the California Academy of Sciences. In a recent letter Mr. Stretch writes concerning the warning note he gave in this paper: "This warning was utterly disregarded, when if appreciated it would have saved millions, as I pointed out what might be the result of inaction to prevent spread."

Though Mr. Stretch knew the butterflies and collected many new species, his greatest interest was in the moths, and his "Illustrations of the Zygaenidae and Bombycidae of North America," published in 1872 and 1873, will remain as a classic of those groups.

He knew intimately not only the other early entomologists of the west, but many other men of note. Edison he visited when that genius was at work on the first phonograph. He was well acquainted with Mark Twain, and recalls with mirth the celebrated lecture by the famous humorist upon his return from the Hawaiian Islands—in which not one word was uttered of the islands he had just visited, the announced subject of the lecture. But Henry Edwards was Mr. Stretch's closest friend and companion, and when, in the early nineties that perfect gentleman passed on, Mr. Stretch's active entomological studies practically came to an end.

At the present time, at the age of eighty-two, he is engaged upon a mining hand book. A former treatise of the same subject is still the standard in many universities.

And yet, with so much accomplished, Mr. Stretch confesses that his ONE GREAT AMBITION was never realized—to collect tropical butterflies. "Ah, the dreams of youth departed" he said regretfully as he looked upon some gay exotics, but we are not so sure—it would not surprise us at all should we learn that Mr. Stretch had gone to the tropics to perch in tree tops, and as he had once hoped to do, to shoot with a blow pipe the gorgeous Morphos!

The Genus Choranthus Scudder, with a Description of a New Species (Lepidoptera.)

By Henry Skinner.

This genus was proposed by Dr. Scudder in the Annual Reports of the Peabody Academy of Science, 1871, p. 79. The genus was not described. The type cited was *Hesperia radians* Lefebv. in Sagra Hist. L'Ile de Cuba, 1857, p. 650. Watson in his "A Proposed Classification of the Hesperidae," Proc. Zoological Soc. Lond., 1893, p. 130, did not know the genus. Mabille in the Genera Insectorum (Hesperidae), 1904, does not mention either the genus or species. The original description of *radians* is not very good but there is no doubt about the species intended. A description of the species will probably be useful as the genus and species have been confused with the genus *Atrytone* Scudder and its species.

Choranthus radians.

♂.—Expanse (one wing) 14 mm. General color of wings, body and legs, above and below, fulvous. Antennae fuscous above and on the underside of the ends of the club; inner half of the club below, fulvous; underside of the shaft annulated. Palpi above fulvous, mixed with black, below tawny. There is a patch of yellow hairs at the base of the antennae.

Upperside. The primaries have a v-shaped black line at the end of the discoidal cell. The stigma is a narrow black line 4.5 mm. in length, the upper end pointing toward the apex of the wing and the lower end resting on the submedian nervure. A fuscous border 4 mm. wide on the costa and 2.5 mm. wide at the middle. The fulvous of the wing extends into the border finely dentate. The secondaries have the same fuscous border, 2.5 mm. wide on the costa and 1 mm. wide on the outer and inner margins.

Underside. Primaries: The base, except on the costa, fuscous. Marginal band as above, but olive green, with the nervures extending into it as rays. Inner margin olive green. Secondaries olive green with the nervures fulvous, except the space between two of the median nervures, which is fulvous.

The female is marked like the male but it lacks the sex brand and it is a little larger.

The species is found in Cuba and I collected some specimens of it during the month of February near Guantanamo. I described the species as *streckeri* in Ent. News, 1893, IV,

211, the specimen having been said to be from Florida. See Ent. News, 1917, XXVIII, 82. Dr. F. D. Godman, Ann. Mag. Nat. Hist., 1907, XX, 144, cites *magica* Ploetz, as a synonym of *radians*.

Choranthus haitensis n. sp.

The description of *radians* will answer for this species. It differs as follows. *Upperside*: Primaries: Nervures black, the fulvous not dentate into the fuscous border. Secondaries: Fuscous border entire. *Underside*. Primaries entirely fulvous, excepting the base and the border of the inner margin. Secondaries entirely fulvous.

Described from a number of specimens from Haiti and San Domingo. The only definite localities are Samana Bay, San Domingo, (Dr. W. L. Abbott) and the *type* male from Port de Paix, Haiti, VII, 27, 1917, (Dr. W. L. Abbott) and a female with the same data.

The sex mark distinguishes these two species from any Pamphilinae known to me. *Type* in the collection of The Academy of Natural Sciences of Philadelphia.

Notes on Gonatopus ombrodes, a Parasite of Jassids (Hymen., Homop.)

By C. N. Ainslie, U. S. Bureau of Entomology.

(Continued from page 173).

It may be worth while to note here that the body of the larva after emergence is so much greater in bulk than the capacity of the sac that it is plainly evident it must occupy much of the abdominal chamber of the jassid, using the sac possibly as a spare room into which to expand as growth adds to the volume of the body.

The Cocoon

When ready to construct the cocoon, and this usually follows closely on emergence, the larva seems best satisfied to select the groove of a curled grass blade or even to locate on a flat blade, and there, with its body parallel to the axis of the leaf it makes its cocoon. The silk of which the cocoon

is fashioned is of such very fine texture that a single thread is almost invisible except when placed in a strong light. When the larva leaves its host it sometimes spins a few threads as it moves away, but these are meaningless and are soon abandoned. After more or less travelling about, in captivity, a location for the cocoon is decided upon and a first move made by fastening a few delicate threads in front of the head. The silk issues from a spinneret near the mouth. By swinging the head backwards and sideways, points of contact for more threads are secured and soon a filmy fabric or awning begins to envelop the larva. Hour after hour the spinning progresses on the inside of the chamber without a minute's delay as if the naked helpless larva were making frantic efforts to clothe itself as soon as possible. The spinner reverses ends within the cocoon whenever necessary to distribute the silk properly. When complete the cocoon is quite dense, nearly or quite opaque and is snow white. It measures, over all, about 6 millimeters long and 1 millimeter broad at the widest part. The cell proper that contains the larva and afterwards the pupa is only 4 millimeters in length. On each end of this is a sloping addition more transparent than the main structure, a tapering web, the entire affair somewhat resembling an inverted hammock in shape.

These cocoons are not difficult to find in the open since they are very white and are usually placed prominently near the tips of grass blades in plain sight, on the upper side of the leaf. Occasionally they are found attached to stems of grasses or among the vegetable rubbish near the ground. On one occasion an *ombrodes* larva emerged in captivity and locating on a grass blade spun for itself a very fine, nearly transparent screen of silk. Two very minute ants that happened to have been introduced into the cage with some earth were seen feeding upon this silk fabric and they nearly denuded the larva before they could be driven off. The larva did not mature but gradually dried up without moving.

The adult emerges through an irregular opening that is chewed in one end of the cocoon. A period of ten to twelve

days elapses from the emergence of the larva to the appearance of the adult.

The Adult

August 21, 1914 an adult emerged from a cocoon that was begun August 10th. She was black, wingless, had enlarged anterior femora and the usual chelate tarsi. At first glance she exactly resembled a very active ant. When first seen she was racing wildly about the vial, pausing at times for a careful preening. To see what would happen I introduced three living and active *Cicadula 6-notata* into the tube with this adult. As the three moved down the cage toward the lighter end of the vial the dryinid sprang at them and captured the least active individual. She caught it at right angles, bent her body around beneath the body of the jassid and apparently attempted oviposition. She soon left this one, approached one of the others with her antennae in rapid motion before her, touched it with the tips of the antennae and threw the antennae back against her thorax, stiffly for a second or two, repeating this operation several times. This backward antennal gesture gave her a startlingly fierce and tigerish expression. Presently she made a spring, grasped her victim with her jaws and chela and curved her abdomen under its body as if searching for a place to penetrate with the ovipositor. Beginning at the neck she gradually worked down across the thorax until she reached the opening between the second and third segments of the abdomen when the tip of her abdomen was thrust in and held there for at least a minute. Meanwhile the jassid was lying limp and helpless, and without any effort to escape. While ovipositing the parasite appeared to be chewing on the jassid's thorax but seemingly did no harm. When released the jassid shook itself, seemed much disturbed by the attack, but in a few minutes was as lively as ever. Time did not permit of dissection to learn if an egg had actually been placed.

Similar attacks have several times been observed. The parasite usually steals slowly up on her prey with quivering antennae, at times throwing these rigidly back against the

thorax, giving her a most vicious expression. When near enough she makes a quick spring and seldom misses. All these observations were made on individuals in captivity. Without doubt the same method is used in the open, her resemblance to an ant perhaps making approach more easy. In a number of instances these adults have been seen to feed on jassids after capture, sinking their jaws into the thorax of the captive and devouring ravenously, killing it in the operation.

From an economic standpoint this species must be regarded as distinctly beneficial although as a control measure it can be of little real value since it normally occurs in very limited numbers.

Oviposition by a Cockroach, Periplaneta americana Linn.* (Orth.).

By V. R. Haber, Research Assistant in Entomology, University of Minnesota.

Little detailed information concerning the egg placing habits of our common cockroaches is recorded. For this reason it seems desirable to record these observations made upon the oviposition habits of the American cockroach, *Periplaneta americana* Linn.

As is characteristic of most of the species of cockroaches or Blattidae, *Periplaneta americana* Linn. is nocturnal. Thus it was necessary to continue observations during the entire night.

A cage was provided in which to confine the roaches during observation. It consisted of a wide mouthed candy jar of about two gallons capacity. Inside upon its bottom rested small slabs of corrugated pasteboard, each leaned slantwise against the wall of the cage. During observation the cockroaches were fed with freshly killed individuals of the same species, bread and water.

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Into the cage thus provided were placed four females, each bearing an egg mass or oötheca protruding from the external genital orifice of the female reproductive tract. The mouth of the jar was completely covered with a slab of cardboard. Observations made during three successive nights failed to yield results, but on the fourth night the following observations were made.

At approximately 2:50 A. M. an individual with her mandibles began to scar and roughen the surface of the pasteboard slab which had been introduced into the cage to serve as material upon which to oviposit. She chewed and munched at the upper surface of the pasteboard until she had made quite an appreciable dent or groove there, not dropping the bits of pasteboard upon the bottom of the cage but mixing them by means of the mouth parts with a secretion from the mouth until they became a damp mass. This mass of finely chewed pasteboard stuck to the surface of the pasteboard from which it was chewed.

At about 3:20 A. M. she crawled *forward* over the scar with her abdomen bent anteriorly and ventralward, probing about with the protruding oötheca until she located the scar which she had made. Then she dragged the oötheca into it, but the scar being too shallow the oötheca rolled out and fell to the floor of the cage. The female turned about and with her palpi sought for the oötheca. Finding it missing, immediately she ran down the pasteboard, seized the oötheca by its flanged edge with her mandibles, straddled it with her front legs, and thus carrying it returned to the scar. Upon replacing it into the scar again she was unsuccessful at keeping it there, for the oötheca dropped to the bottom of the cage. A second time she ran down, seized the oötheca as she previously had done and set out to locate the scar. She ran up almost to it, then becoming confused ran around to the opposite side of the pasteboard, ran confusedly about, stopping at intervals and holding the oötheca clasped between the femur and tibia of one front leg, seemingly to rest. Again the oötheca slipped from her grasp and fell. This time it bounced to the far side of the cage. She ran down and rather promptly

located it. By this time she seemed to have decided that it was futile to attempt to place it in the originally selected location. She cleaned it (?) with her mouth parts, coated its exposed side and ends with a secretion from her mouth and from the bottom of the cage picked up loose bits of trash, attempting to conceal the oötheca by covering it over with them. Next she attempted to cover the oötheca with a piece of paper. It did not suit her so she discarded it. At about 3:45 A. M. she ran over to the opposite side of the cage and ate bread. After about forty-five seconds she ran up the pasteboard to the scar which she had made, chasing other females away if they ventured too near. In the meantime one of the other females began to chew at the oötheca as it lay unprotected upon the floor of the cage. Being anxious to preserve it, I opened the cage, carefully lifted the oötheca out, immersed it into water and placed it into the scar, for the mother had left the scar when I opened the cage.

At about 4:30 A. M. she returned to the oötheca in the scar, discovered its presence there by feeling about with her palpi, remained near it for several miutes, then left it and stood more or less at one place upon the floor of the cage, seemingly unconsciously gazing into space, occasionally rubbing the cerci and the valves of her external genitalia with the tibia of either hind leg.

Often in the natural habitat I have observed the oöthecae of this species pasted to rafters or sills and covered with bits of wood fibre which the mothers has chewed off with the mandibles. Of those species among which it is customary to deposit their oöthecae, the oöthecae are retained until places of favorable moisture and thermal conditions are found. Thus if a cage is too cold, too damp, too well lighted or too poorly provided with material suitable upon which to oviposit and for concealing of the oötheca, the mother bearing it may retain it for several days. The following observations upon retention of oöthecae by *Periplaneta americana* Linn. were made by the author of this article.

In cages in which very favorable environmental conditions prevailed ten oöthecae were deposited each one day after external appearance.

In another cage one was deposited two days after external appearance.

In another cage one was retained for six days after external appearance.

Egg masses unfavorably deposited usually are devoured by other cockroaches or even by the mother.

Not one cockroach of this species deposited an oötheca upon thin paper. I have had some imbedded into the larger pores of sponges kept saturated with water as a source of moisture in the cages. Such oöthecae were packed over with bits of sponge torn from the large piece precisely for the purpose of concealing the deposited oöthecae. Often bits of rag or bread are utilized and in several instances I have seen oöthecae of this species completely covered over and concealed by fine bits of dried cockroach dung. When no covering material is available the oöthecae may be dropped at random or simply pasted to articles and not covered.

Notes on American Rhynchophora (Col.).

By J. Wagener Green, Easton, Pennsylvania.

The Texan material cited in the following pages was collected during an expedition to that State in 1911 by Mr. H. A. Wenzel, of Philadelphia, and myself. Several weevils taken at that time have remained unnamed in our cabinets. Descriptions of these are herein presented, together with notices of two other new species and some miscellaneous observations.

Rhynchites tricarinatus new species.

Form of *bicolor*, bluish black, disk of thorax black with aeneous lustre, legs black. Body above with short erect pubescence as in *bicolor*. Head between the eyes coarsely densely punctured and longitudinally rugose; occiput smooth, with few coarse punctures; genae transversely wrinkled. Beak as long as head and thorax; coarsely, densely, rugosely punctured throughout; sulcate at the sides; tricarinate above from base to antennal insertion. Antennae inserted before the middle of beak; as compared with those of *bicolor*, joints three, four and five are more slender and elong

ate, seven and eight are much wider, the club is shorter, its joints all strongly transverse, the terminal joint being small and triangular in profile.

Prothorax slightly wider than long; shining; coarsely, irregularly and not very closely punctate; widest at basal third; apical constriction not evident; sides straight and oblique from apical angles to middle, then strongly arcuate to base. Proepimera separated by centro-sternal piece.

Elytra with indistinct and confused rows of moderate punctures, the intervals flat and sparsely finely punctate.

Tarsi slender; third joint small, its lobes very narrow, about half as wide as the terminal joint at apex; nodiform enlargement at the base of the terminal joint nearly attaining the apex of the third joint. Length (excluding beak) 4 to 4.8 mm.

Described from a series of nineteen specimens collected by Mr. John Woodgate in the Jemez Mountains, New Mexico, May 20 to June 10. Related to *bicolor* but very distinct in antennal and tarsal structure.

Rhynchites bicolor Fab.

It is my opinion that some of the forms listed as varieties of *bicolor* by Pierce are capable of specific definition by means of constant structural and sculptural differences. An examination of *wickhami* and *bicolor* in my limited material shows the terminal joint of the antennal club to be consistently more elongate in the latter. Also the outer funicular joints exhibit considerable variation, some of which is probably sexual. This I have been unable to determine. In addition to the differences pointed out by Cockerell, *wickhami* has the sides of the thorax more strongly rounded and converging toward base and apex, and the femora smooth, shining and more sparsely punctate. There is room for further investigation in this group by those possessing sufficient material, and especial attention should be given the secondary sexual modifications of the antennae and rostrum.

LeConte states that the beak of the female of *bicolor* is shorter than that of the male. I have noticed that specimens with the longer beaks always have a more convex abdomen, and if these are males it is certainly contrary to the usual rule in the Rhynchophorous series.

Minyomerus conicollis new species.

Elongate, convex, densely covered with gray and darker scales which

completely conceal the surface sculpture, scales white on the declivous sides of the pronotum. Head and beak very broad, convex; surface apparently smooth; sparsely clothed with minute, suberect, squamiform setae; eyes small, rounded, rather prominent, coarsely granulated. Beak with an inverted V-shaped impression, the branches directed toward the apical angles; apex trisinuate; scrobes long and well-defined, somewhat S-shaped, becoming shallower posteriorly, terminating below the front margin of the eyes. Mentum large, transverse, completely filling the gular cavity, a small punctiform impression each side. Antennae dark, sparsely setose; scape abruptly clavate, reaching nearly to middle of eyes; funicle seven-jointed, first joint elongate, feebly clavate, equal in length to the two following joints, second joint longer than third, last four subequal, as wide as long; club elongate-oval, pubescent.

Thorax slightly wider than long; without ocular lobes, vibrissae not prominent; sides feebly arcuate, widest just before middle, thence straight to base; apex arcuate-truncate, base squarely truncate, distinctly narrower than apex. Disk of thorax vaguely rugulose, a transverse impression faintly indicated at apical fourth; suberect scales very small and inconspicuous except a basal and apical fringe.

Elytra elongate, oval, as wide as the thorax at base; widest at middle where they are nearly one-half wider than the thorax; humeri broadly rounded, angles absent; sides regularly arcuate; striae indicated by a feeble convexity of the intervals, these each bearing a single row of distant, semi-erect, setiform scales; strial punctures scarcely evident; elytral declivity oblique. There is a small shallow pit near the side margin of the elytra in front of the hind coxae which appears to be for the reception of the middle knees.

Legs and abdomen with semi-erect scales similar to those of the upper surface. Legs short; basal joints of tarsi subequal, second shortest, third broader and bilobed, fourth nearly as long as the others together. Length 2.9 to 3.2 mm.

Described from three specimens taken in the arid region south of Alpine, Texas, toward the Chisos Mountains, July 15. This species has the appearance of a small *Elissa*. The shorter basal joint of the tarsi and less prominent vibrissae, however, indicate its position in *Minyomerus*. The two genera are very feebly differentiated by the published characters. *Conicollis* may be distinguished from our other two species of *Minyomerus* by the shape of the thorax. There are undoubtedly a number of still undescribed species in this genus.

Pandeleteius spatulatus new species.

Form nearly as in *robustus*. Upper surface with pale gray and darker scales intermixed, the gray usually predominating, the elytra sometimes

show a pale transverse fascia each side just before the middle; setae exceedingly minute and inconspicuous. Beak triangularly emarginate at apex, with distinct nasal plate which is asymmetrically emarginate apically; beak feebly concave above and with median impressed line; scrobes short, directed at lower edge of eyes but not attaining them. Funicle seven-jointed, first joint slightly longer than the two following joints.

Thorax convex, as long as wide, with feeble basal and apical constrictions; sides strongly arcuate.

Elytra one-fifth wider than the thorax at base, gradually increasing in width to just beyond middle, thence narrowing to apex; humeri not at all prominent.

Fore coxae separated by about twice the distance between the middle coxae, more distant in the female. Fore femora very stout, the tibiae bent inwardly at apex, their inner margins denticulate and not appreciably sinuate. Scales of under surface mostly gray. Length 4 to 5.3 mm.

♂. Hind tibiae clavate, widest at apical third; lower surface of tibia convex and normally clothed with scales, basal half of upper surface squamose, the apical half with a large smooth concavity bearing a few scattered hairs. First ventral suture nearly straight, last segment normal.

♀. Hind tibiae unmodified. First ventral suture angulate at middle, ast segment strongly convex in transverse section.

Eleven specimens taken in the Chisos Mountains, Texas, July 19. There are two males in the collection of the Philadelphia Academy of Natural Sciences donated by Mr. Wenzel. Very distinct by the secondary sexual characters from anything heretofore described. It belongs near *robustus*, which is a larger, more mottled species and has the pronotum bisinuate in longitudinal profile, while in *spatulatus* this is evenly arcuate.

Pandeleteius defectus new species.

Much like *hilaris* in size and general appearance, mottled with gray and brown scales, darker each side of the scutellum and on an indistinct fascia beyond middle of elytra. Upper surface with inconspicuous recumbent setae, more noticeable on elytral apex. Beak very feebly concave, with median impressed line; apex slightly emarginate, the nasal plate prolonged forward between the mandibles as in *hilaris*, but larger and more obtuse; scrobes arcuate, passing beneath the eyes. Antennae with six-jointed funicle, the joints all elongate, first subequal to next two, last nearly as wide as long; club as long as five preceding joints.

Thorax longer than wide, with distinct subapical and basal constrictions; sides moderately rounded.

Elytra much wider at base than the thorax, humeri prominent. Fore coxae separated by a distance which is somewhat less than twice the dis-

tance between the middle coxae. Fore tibiae denticulate within, not sinuate, slightly bent at apex, the femora only moderately enlarged. Length 4.8 mm.

One specimen, Chisos Mountains, Texas, July 22. According to the latest synoptic table of *Pandeleteius*, *defectus* would be placed near *rotundicollis* Fall, on account of the six-jointed funicle. Otherwise the two species have nothing in common. In *rotundicollis* the anterior femora are much more strongly dilated, the corresponding tibiae longer and more slender, the head more concave, and the outer funicular joints transverse and moniliform. In habitus the two species are altogether dissimilar. It would seem a better plan to subdivide the genus primarily on the form of the nasal plate, thus establishing a number of groups and giving a more natural arrangement of the species. By this method such aberrant forms as *submetallicus* would be isolated and the species described above would be associated with *hilaris*, which it closely resembles.

Isodrusus debilis Sharp.

This species was described from San Geronimo, Guatemala. I have eight specimens of an *Isodrusus* from the Davis Mountains, Texas, July 9, which agree in every particular with the description of *debilis* in the "Biologia." *Debilis* has the appearance of a small *Pandeleteius* with the body above and the legs sparsely clothed throughout with short recurved setae. The legs are short, the fore tibiae normal and not denticulate within, and the claws are connate at base.

Otidocephalus ruficornis Casey.

Three specimens apparently belonging here were taken in the Chisos Mountains, Brewster County, Texas, July 18. They fit Col. Casey's description completely as to size, vestiture and sculpture but are differently colored. The body is black; the head, beak, antennae and prothorax dark rufous; the legs very dark ferruginous with the femora, especially the first two pairs, paler on basal two-thirds. I can find no tangible difference between this series and authentic speci-

mens of *ruficornis*, so conclude that they are only entitled to varietal rank. I propose the name **semirufus** for this form.

Tychius armatus new species.

Elongate-oval, convex, robust, black, moderately densely clothed with narrow grayish scales not concealing the surface sculpture above, the scales of elytra being longer and more slender, those of the striae very fine and setiform; erect setae absent. Beak stout, one-fifth shorter than prothorax; feebly arcuate, slightly tapering and flattened towards apex; densely squamulose below antennal insertion, glabrous at tip; punctures confluent longitudinally; apex smooth at middle. Antennae inserted at apical two-fifths of beak; color dark, scape reddish, not attaining the eyes; funicle seven-jointed, second joint two-fifths shorter than first, longer than third, outer joints subequal, last two slightly transverse; club elongate-oval, scarcely pointed, nearly as long as five preceding joints.

Prothorax slightly wider than long; sides nearly straight and subparallel from base to beyond middle, thence strongly converging to apex; apical constriction indicated by a feeble sinuation; base twice as wide as apex; disk with large, circular, moderately dense punctures.

Elytra nearly one-half longer than wide, more than twice as long as the pronotum and one-third wider at the humeri; sides parallel, broadly rounded behind; tip of pygidium visible, the elytral apices being very feebly separately rounded; disk striate, the intervals finely irregularly punctured; vestiture nearly uniform in distribution, a little denser on the sutural interval.

Femora strongly clavate, deeply notched within at apex, the middle and hind pairs distinctly toothed, the fore pair feebly so. Length 3.8 mm., width 2 mm.

Six specimens from Graybeard Mountain, North Carolina, June 19 to 25, in the cabinet of Mr. Wenzel, who has kindly permitted me to retain a pair in my own collection. They were collected by Mr. Wm. Beutenmuller. *Armatus* belongs to Casey's Group I and is easily distinguished from the other species assigned thereto by all the femora being toothed. It should follow *sordidus* in a cabinet arrangement. The type described above is a male. The rostrum of the female is as long as the prothorax, more slender, nearly cylindrical, very feebly tapering at apex, and the point of antennal insertion is a little less apical.

Tychius suturalis Schaeffer.

Specimens collected in the Davis Mountains, Texas, July 9, were identified as *T. suturalis* for Mr. Wenzel by Col. Casey.

They correspond closely with Mr. Schaeffer's description with one exception: the antennal funicle has six instead of seven joints. A single example from the Huachucha Mountains, Arizona, shows the same structure.

Aulobaris elongatus new species.

Elongate-oval, shining, black throughout. Head finely punctulate. Beak a little shorter than head and thorax, regularly arcuate, finely punctured, coarsely at the sides below antennal insertion. Second joint of funicle one-half as long as the first, scarcely as long as the two following joints together; joints three and four, slightly longer than wide, five and six shorter and quadrate, seven transverse; club as long as four preceding joints.

Prothorax one-sixth wider than long, the apical constriction almost obsolete; apex one-half the basal width; sides nearly straight and feebly converging from basal angles to middle, thence strongly arcuate to apex. Disk of thorax with coarse, deep, rounded punctures separated by their own diameters or less and becoming obliquely confluent at the sides; median impunctate line not distinct; basal lobe very small. Scutellum coarsely punctured. Prosternal groove normal, the sides not produced inwardly before the coxae.

Elytra three-fourths longer than thorax, widest at the humeri where they are slightly wider than the thorax; sides straight and feebly converging two-thirds to apex; disk moderately striate, intervals three to five times as wide as the grooves, each with a single fairly regular series of coarse rounded punctures but little smaller than those of the thorax. Length 3.5 to 4.1 mm.

Three specimens, Macdona, Texas, July 29. *Elongatus* would be placed near *ibis* in a synoptic arrangement of our species. The latter is easily separated by the distinct subapical constriction and the much finer elytral punctures.

Centrinus falsus Lec.

I have taken two specimens of this species at Mauch Chunk, Pennsylvania, August 10, which agree in every respect with the form so named in the Horn collection. My specimens are both males and have the antennal formation of *Odontocorynus*, namely the enlarged and concave apical funicular joints and the polished basal area of the club provided with a dentiform process. On each side of the prothorax immediately behind the apical margin there is a small polished tubercle. This character is unique among our species of

Odontocorynus, although it occurs in the Mexican *creperus* Boh. and *latiscapus* Champ. Blatchley and Leng accord *Odontocorynus* generic rank and separate it from *Centrinus* by the exposed pygidium and the modified male antennae. The pygidium in *C. falsus* is as completely hidden as in any true *Centrinus*, hence *Odontocorynus* must be considered merely a subdivision of *Centrinus*, as treated by Casey in his revision of the Barini, unless a third genus be erected for *C. falsus* based on the tuberculate thorax. This, of course, is not advisable.

Zygobaris centrinoides new species.

Body entirely black, shining, subrhomboidal. Head finely, sparsely punctulate, beneath with a punctiform fovea near base. Beak long and slender, regularly arcuate, nearly cylindrical; very little enlarged at base and less so at apex; finely and sparsely punctured, more coarsely and densely behind antennal insertion, an impunctate median line on basal half, a small longitudinal impression above the base of each mandible. Beak equal in length to the head and prothorax, separated from the head by an abrupt bisinuate declivity. Mandibles stout, curved, notched within. Antennae inserted just behind middle of beak; scape almost attaining the eyes; first joint of funicle a little longer than the next two joints combined, second joint one-half longer than the third, three to seven subequal, the outer joints transverse; club elongate-oval, pubescent throughout, more sparsely so at base, as long as the preceding five joints, first joint comprising much less than half of mass.

Pronotum wider than long, as wide as the elytra at base; sides regularly arcuate; subapical constriction feeble; apex much less than half as wide as base, the latter nearly straight and with a small ante-scutellar lobe; disk glabrous at middle, sparsely punctured, more densely toward base, median line smooth; pronotum at the sides coarsely closely punctate, each puncture bearing an elongate, white, decumbent, hair-like squamule arranged transversely; a few small scattered scales along the middle of the basal thoracic margin. Scutellum quadrate, glabrous.

Elytra more than twice as long as the pronotum; widest at basal tenth, thence straight to beyond middle, then evenly rounded to apex; apices conjointly rounded, completely concealing the pygidium; striae regular, entire, moderately deeply impressed, very minutely and distantly punctulate; intervals flat, much wider than the striae, each with a single irregular series of shallow punctures, becoming confused and somewhat biseriate toward base; each puncture of the intervals bears an elongate white scale similar to those at the sides of the prothorax.

Body beneath sparsely squamose, scales smaller and more slender than those of the upper surface, condensed on the prosternum before and be-

tween the coxae. Prosternum abruptly deeply sulcate on the apical constriction, with distinct delimiting lateral ridges; convexly prominent each side before the coxae; the median sulcus becoming gradually evanescent posteriorly so that the prosternum is only very slightly concave between the coxae. Ventral segments 2, 3 and 4 abruptly declivous on hind margin, the segment following each commencing on a lower plane.

Fore coxae separated by about half their width, the others more widely distant. Tibiae carinate externally; middle and hind tibiae slightly expanded at tip, the latter pair with a small tooth on the inner side at apex, the others strongly mucronate. Tarsi long and slender, densely pubescent beneath; subequal to the tibiae; third joint bilobed; last joint elongate, nearly as long as the remainder, bearing two claws which are connate at basal third, the suture evident. Length 3 mm., width 1.8 mm.

The specimen described above is a female taken at Marfa, Texas, July 12. Mr. Wenzel has a male from Davis Mountains, Texas, which differs in the shorter, stouter, more coarsely punctured beak, the antennae inserted at the middle, where there is a very slight lateral enlargement; the front coxae more widely separated; the first ventral segment somewhat concave at middle; and the pronotum more coarsely punctured.

Centrinoides is a more squamose species than any previously described *Zygobaris* and may possibly not be congeneric with *nitens* Lec. and *xanthoxyli* Pierce, which I have not seen.

The type of this species as well as the types of the other new species described in this paper are in my cabinet.

An Appreciation (Diptera).

The work of Dr. Alvah Peterson on *The Headcapsule and Mouth-parts of Diptera*, in the Illinois Biological Monographs, vol. iii, No. 2, has received an appreciative notice from Dr. A. D. Imms in the *Entomologist's Monthly Magazine* (London) for May, 1920.

Sad but Familiar.

A recent number of the Bulletin of the Entomological Society of France (1920, No. 4) announces that, as a measure of economy, it has been decided to reduce the covers to four pages and to replace the table of contents with advertisements; that in the future the Society can only accept line drawings; photographs and drawings necessitating half-tones will be reproduced only at the expense of the authors.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JULY, 1920.

LABELS ON SPECIMENS.

Insects at the present time have so many relationships to other objects that it is important to know the exact locality and date of capture of a given specimen. The altitude and any other available information is also important for proper study and the altitude should also be given, when not readily ascertainable from other sources. These days few of us are satisfied with a specimen without locality and "Africa" or the "East Indies" hardly suffices. The museum curator has many troubles in regard to data. Specimens come to us without data, with insufficient data and with inaccurate dates and localities. Often the writing on the labels or papers is only translatable by the person writing them and possibly not even by the one writing them. In papered specimens it is a great convenience to have the data on each paper so that they may be arranged in various boxes systematically, to be spread at a later date.

The rule should be to place on each specimen or each papered specimen, the exact locality, date of capture, altitude and name of the collector, and any or all data should be legibly written and if you can't write legibly print them. The name of the month should be written in full or expressed in Roman numerals, otherwise there is uncertainty and trouble. When the collector is spending days or weeks in the field, time may be saved by dating specimens and keeping a combined itinerary and diary and adding full data when there is more leisure. It is by no means uncommon for authors and collectors to give the names of obscure places, omitting the country, and thus making it difficult and wasteful of time to find out whence came the specimens. There are few of us that know where all the towns, villages and hamlets of the world are located and it is a double disappointment not to find some of these names in the gazetteer or on the map.

There is a large amount of carelessness in regard to data and much time is wasted owing to slipshod methods, not to speak of the possibility of introducing profanity into the vocabulary of your correspondents or among those who eventually must receive and care for the specimens.—H. S.

Prof. V. L. Kellogg to leave Stanford University

It is announced that Prof. Vernon Kellogg will resign his professorship of entomology in Stanford University, July 1, 1920, in order to undertake the permanent secretaryship of the National Research Council, to which latter organization he will thereby insure some degree of administrative continuity. It will be recalled that Prof. Kellogg took an active part in relief work in Europe preceding and during the recent war, to which Minister Brand Whitlock pays an appropriate tribute in his recent book on Belgium. It is to be hoped that this change will not withdraw Prof. Kellogg permanently from entomology.

Return of the Williamson-University of Michigan Expedition from Venezuela.

The *Evening News* of Bluffton, Indina, for May 17, 1920, announces the return to that city of Mr. E. B. Williamson, whose expedition to Venezuela has been mentioned in earlier numbers of the NEWS for the present year (pages 108,141). With E. B. and J. Williamson, were associated H. B. Baker, of the University of Michigan, who collected reptiles, snails, shells, ants and other insects, and Will Ditzler, of Bluffton. Mr. Williamson experienced several attacks of malaria and of fly larvae in the intestines. In addition to the localities already noted in the NEWS, collections were made at Boqueron, Maracaibo, Encontrados, Tachira at the foot of the Andes, La Fria and El Guayabo on the Rio Zulia. The Odonata brought back consist of 158 species and 12,411 specimens.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of the American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge,

Mass. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **17**—Lepidoptera, Boston, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **32**—Insecta, Revue Illustree d'Entomologie. Rennes. **34**—Bulletin de la Societe Entomologique de Belgique, Brussels. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **52**—Zoologischer Anzeiger, Leipsic. **67**—Le Naturaliste Canadien, Quebec. **69**—Comptes Rendus des Seances de l'Academie des Sciences, Paris. **77**—Comptes Rendus des Seances de la Societe de Biologie Paris. **81**—The Journal of Parasitology, Urbana Illinois. **86**—The Quarterly Journal of Microscopical Science, London. **87**—Arkiv for Zoologi K. Svenska Vetenskapsakademien Stockholm. **89**—Zoologische Jahrbucher, Jena. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Holc, Mass. **108**—Journal of Genetics, Cambridge, England. **109**—Annales Historico-Naturales Musci Nationalis Hungarici, Budapest. **110**—Naturwissenschaftliche Wochenschrift, Jena.

GENERAL. Andrews, H. V.—Amyl acetate [for mounting and sugaring]. **17,** iv, 33–4. **Chodat et Carisso.**—Une nouvelle theorie de la myrmecophilie. (Com. Rendu, Soc. Phys. Hist. Nat., Geneve, xxxvii, 9–12). **Crampton, G. C.**—A comparison of the external anatomy of the lower Lepidoptera and Trichoptera from the standpoint of phylogeny. A comparison of the genitalia of male hymenoptera, Mecoptera, Neuroptera, Diptera . . with those of lower insects. **5,** xxvii, 23–34; 34–45. **Curran, C. H.**—A plea for definitiveness. **4** lii, 120. **Heikertinger, F.**—Exakte begriffsfassung und terminologie im problem der mimikry und verwandter erscheinung. **45,** xv, 162–74. **Hewitt, C. G.**—Obituary and bibliography. **4,** lii, 97–105. **Krogh, A.**—Studien ueber tracheenrespiration. (Pfluger Arch. Ges. Physiol. Mens. u. d. Tiere, Berlin, clxxix, 95–120.) **Merle, R.**—Production de mouches a cornes. (La Nature, Paris, 1920, 143 –4). **Step, E.**—Insect artizans and their work, (New York, Dodd, Mead & Company, n. d.) **Warren, E.**—(see under Neuroptera.

ARACHNIDA &c. Emerton, J. H.—Catalogue of the spiders of Canada known to the year 1919. (Trans. Royal Canadian Inst., xii, 309–338). **Gunthrop, H.**—Summary of Wood's Myriapoda papers. **4,** lii, 112–14. **Hirst, S.**—Studies on Acari. The genus Demodex. (Br. Mus. Nat. Hist., 44 pp.).

NEUROPTERA. Ast, F.—Ueber den feineren bau der facettenaugen bei neuropteren. **89,** xli, Abt. f. Anat., 411–58. **Enderlein, G.**—Ueber einige subantarktische Mallophagen. **52,** xlix, 241–51. **Howe, R. H.**—Odonata of Chatham, Mass. **5,** xxvii, 55–8. **Lacroix, J. L.**—Sur quelques anomalies dans la nervulation chez les Chrysopides. **20,** 1920, 85–7. **Warren, E.**—Termites and termitophiles. (South African Jour. Sci., 1919, xvi, 92–112).

ORTHOPTERA. Beck, H.—Die entwicklung des flugelgeaders bei Phyllodromia germanica. **89.** xli, Abt. f. Anat., 376–410.

Enderlein, G. Neue, neotropische Pseudophyllinen **52,** xlix, 17-20.

HEMIPTERA. Barber, G. W.—Concerning the distribution of the North Am. Cicadellidae. **4,** lii, 116-18. **de Bergevin, E.**—Note sur un Jasside, Eutettix osborni, de l'Amerique du Nord. **20,** 1920, 82-3. **Distant, W.L.**—On a small collection of Homoptera from British Guiana. **9,** liii, 124-6. **Doncaster & Cannon.**—On the spermatogenesis of the louse (Pediculus) with some observations on the maturation of the egg. **86,** lxiv, 303-28. **Enderlein, G.**—Psyllidologica. **52,** xlix, 344-52. **Horvath, G.**—Analecta ad cognitionem Cydnidarum. **109,** xvii, 205-73. **Leon, N.**—Quelques observations sur les Pediculides. **81,** vi, 144-7.

LEPIDOPTERA. Dognin, P.—Heteroceres nouveaux de l'Amerique du Sud. Fasc. 18. **Eggers, F.**—Das thoracale bitympanale organ einer gruppe der L. Heterocera. **89,** xli, Abt. f. Anat., 273-376. **Onslow, H.**—The inheritance of wing colour in L. **108,** ix, 339-46. **Shufeldt, R. W.**—The fall web worm and the swallowtails. (Amer. Forestry, xxvi, 364-69).

DIPTERA. Chapais, J. C.—Une courte etude concernant quelques cecidomyies. **67,** xlvi, 247-53. **Collin, J. E.**—Eumerus strigatus and tuberculatus. **8,** 1920, 102-6. **Edwards, F. W.**—"Collecting fungus-gnats": Remarks on C. Morley's paper. **9,** liii, 126-7. **Enderlein, G.**—Dipterologische notizen. **52,** xlix, 57-72. **Garrett, C. B. D.**—East Kootenay diptera. Tipulidae—1. **4,** lii, 108. **Hearle, E.**—Notes on some mosquitoes new to Canada. **4,** lii, 114-16. **Imms, A. D.**—Recent . . research on the head and mouth parts of Diptera. **8,** 1920, 106-9. **Lichtwardt, B.**—Die Nemistriniden des Ungarischen national museums in Budapest. **109,** xvii, 274-8. **Lutz & Lima,**—Contribuicao para estudodas Tripaneidas (moscas de frutas) Brazileiras. (Mem. Inst. Oswaldo Cruz, x, 5-15, 1918). **Pantel, J.**—Precisions nouvelles sur la region posterieur du vaisseau dorsal des larves des muscides. (La Cellule, Lierre, xxix, 381-88). **Thompson, W. R.**—Sur les dipteres parasites des Isopodes terrestris. **77,** lxxxiii, 450-1.

Alexander, C. P.—New Nearctic crane flies. **4,** lii, 109-12. **Malloch, J. R.**—Descriptions of new North American Anthomyiidae. **2,** xlvi, 133-96.

COLEOPTERA. Aurivillius, C.—Wissenschaftliche ergebnisse der schwedischen entomologischen reise des A. Roman in Amazonas. **87,** xii, No. 11. **Bertin, L.**—Remarques sur pieces buccales et l'alimentation des Coleopteres Lamellicornes. **69,** 1920, 1131-33. **Bordas, L.**—Considerations generales sur la biologie du Rhynchites conicus et anatomie de la larve. **32,** 1919, 196-201. **Hess, W. N.**—Notes on the biology of some common Lampyridae. **100,** xxxviii, 39-76. **d'Orchymont, A.**—Remarques au sujet des premiers etats du genre Brachynus. **34,** ii, 59-61. **Spaeth, F.**—Neue Cassidinen aus der sammlung von K. Brancsik &c. (Some Neotropical). **109,** xvii, 184-204.

Chittenden, F. H.—Description of a new species of Sphenophorus from Florida. (Jour. Wash. Acad. Sci., x, 313–14).

HYMENOPTERA. Brues, C. T.—The braconid genus Trachypetus. **5,** xxvii, 59–62. **Brunnich, K.**—Zur frage der geschlechtsbestimmung bei den bienen. **45,** xv, 188–9. **Hase, A.**—Ueber den putzvorgang bei der schlupfwespe Lariophagus distinguendus. **110,** xix, 81–7. **Smith, E. J.**—Removing pollen from bees. **4,** lii, 116. **Wheeler, W. M.**—The subfamilies of Formicidae, and other taxonomic notes. **5,** xxvii, 46–55.

Bradley, J. C.—Descriptions, records and notes on North American Nyssonidae. **2,** xlvi, 113–32.

Insect Behavior. By Paul Griswold Howes. With illustrations from Photographs by the Author. Richard G. Badger. The Gorham Press. Boston. $6.00 net.—This work is printed in large readable type and contains 172 pages and a large number of admirable halftone illustrations (114) which are original. The author mentions the work as being written in a light enough vein to be entertaining to the reader, however casually interested he may be in insect life, but at the same time, one that is in every way scientifically accurate. Chapters two to eight inclusive treat exclusively of South American insects, studied in the jungles of British Guiana. This is the most valuable part of the book. The remainder of the work is nearly all devoted to the insects of the Eastern United States. There seems to be a tendecy in such books to become a bit poetical and overlook sometimes that which is in "every way scientifically accurate," for instance "when the eggs have given birth to their curious children." "The chrysalis of a butterfly . . . a species of *Vanessa* . . . it cannot thrash around and make a demonstration." What the chrysalis of *Vanessa antiopa* really does when disturbed is thrash around and make a big demonstration. The lay reader might infer that the great cecropia moth feeds on the newly opened blossoms, but the ones we have seen had no mouth parts for such a purpose. We are quite sure that its eggs do not "split open in the center," at least ours never did. We have never seen "the convenient spot in the corner or the under side of the piece of old lumber where the cecropia makes its cocoon." In spite of some poetical (?) licenses the book is an excellent one in its field. H. S.

Manual of the Odonata of New England by Dr. R. Heber Howe, Jr. Memoirs of the Thoreau Museum of Natural History: II. 1917–1920. Concord, Massachusetts. $1.35.—In this handy manual nature lovers in the northeastern states have now a brief introduction to the dragonflies of their region which makes a knowledge of the names of these interesting insects available to any who may wish to be properly introduced to them.

In its first form Dr. Howe's "Manual of the Odonata of New England" appears in six parts totaling one hundred and two pages and having over three hundred illustrations. The outstanding excellencies are the following:

1. It is the first manual of the Odonata in the United States that covers more than a single state.

2. It is the first manual of Odonata of any extensive region that seriously attempts to give adequate figures of all the species listed.

3. It has an illustrated key, such as some popular ornithologies have found useful, which illustrates the characters that it uses, *where they are used.* This brings the key directly down to the reader as nothing else does and next to the figures of specific characters, this is the most valuable feature of the work.

Under each genus Dr. Howe gives a table showing the New England States from which each species has been recorded. The reviewer wishes to suggest that such a table can have little value as these are political regions while it is the physiographic and climatic areas that control distribution. The same amount of space devoted to remarks on the faunas represented in New England and their distribution would at least have been more interesting reading.

This distributional problem is one of peculiar interest in New England as it lies where four fairly definite faunas overlap. The one hundred and fifty-six species listed by Dr. Howe can be divided roughly among these faunas about as follows:

1. Canadian fauna, forty-four species. These genera are holarctic in distribution and probably Eurasian in origin perhaps having spread into North America during recent interglacial epochs. This was probably the first fauna to appear in New England after the retreat of the ice and is characterized by *Lestes* 4 spp., *Aeschna* 10 spp., *Somatochlora* 10 spp., *Leucorhinia* 5 spp., and *Sympetrum* 5 spp. It occupies the hilly back bone of the region.[1]

2. Transition fauna, twenty-five species. These genera occupy rough country and rapid gravelly streams of boggy land. These are characteristic of the central Appalachian System and among them are many rare and odd species as this is the oldest North American fauna, possibly a relic of pre-Pliocene times, whose species manage to hang on by living in special habitats that as yet are not seriously invaded by more modern faunas. In it are *Chromagrion, Tachopteryx, Cordulegaster,* 2 spp., *Ophiogomphus,* 5 spp., *Lanthus,* 2 spp., *Gomphaeschna, Didymops, Williamsonia, Helocordulia* and *Dorocordulia.*

---

[1] This and the following statements of distribution and habitat are obviously of necessity very broad. Any local fauna will give various apparent exceptions.

3. Upper Austral, sixty-eight species. This is the great Mississippi Valley fauna of ponds and muddy streams, a very modern fauna of close species, which is at present overflowing into the warmer parts of New England. It is characterized by *Argia* 2 spp., *Enallagma* 12 spp., *Gomphus* 12 spp., *Libellula* 4 spp., and *Tetragoneuria* 3 spp., *etc.*

4. Lower Austral, nineteen species. All are odds and ends, the pioneers of a very modern fauna such as *Ischnura ramburi*, *Micrathyria*, *Libellula* and *Tramea*, which have slipped up the narrow, warm coast from the semi-tropical gulf. In this group are a few species which are interesting because they are able to inhabit brackish water alongside a true marine fauna of crabs and other hideous creatures. Such are *Enallagma durum*, *Ischnura ramburi*, *Micrathyria berenice*, *Anax junius*, etc. This Lower Austral fauna scatters into southern New England and a few species manage to round the cape and get as far as the coast of southern Maine. This fauna must be increasing at present.

Opportunities at such problems on faunas, which are undoubtably shifting, make all Odonate records in New England of great value, for which reason Dr. Howe's manual is especially opportune.

The reviewer feels that in any manual of this type there should be added to the key and illustrations brief descriptions that contain the more conspicuous specific characters to satisfy that innate craving of the human mind for a check on the correctness of an identification. Such descriptions are lacking, probably through necessity. Further, in some of the genera, particularly *Enallagma* and *Gomphus*, the figures are hardly sufficient to positively identify some of the difficult species, for in these genera species are difficult even when illustrated with the clearcut line drawings so well developed in the writings of Calvert and of Williamson.

Altogether the Manual is a credit to the industry of Dr. Howe and undoubtably pleasing to the spirit of the critical Thoreau.—C. H. Kennedy, Ohio State University, Columbus, Ohio.

An Introduction to Entomology by John Henry Comstock, Professor of Entomology and General Invertebrate Zoology, Emeritus, in Cornell University. Second Edition, entirely rewritten. Ithaca, N. Y. The Comstock Publishing Co. 1920. Part I, 8vo. Pp xix, 220. 220 text figs. $2.50.

Professor Comstock is, we believe, fully entitled to the first place in Entomology in America. He has signalized his Emeritusship and the years immediately preceding by the publication of a surprising number of important and comprehensive texts and handbooks. It is sufficient to mention *The Spider Book* (1912), *The Wings of Insects* (1918) and now the present volume. In the preface to the last, dated from Cornell, June, 1919, he writes:

"The following pages constitute the first part of a text book of entomology that the writer has in preparation. This first part is published in advance of the completion of the entire work in response to the request

of some teachers who desire that it be available for the use of their classes. The early publication of this part of the book will not only render it immediately available but will also afford an opportunity for the suggestion of desirable changes to be made before it is incorporated in the complete work. Such suggestions are earnestly invited by the writer. In writing this text-book much use has been made of material published in my earlier works, notably in 'An Introduction to Entomology' published in 1888 and long out of print, 'A Manual for the Study of Insects,' in the preparation of which I was aided by Mrs. Comstock, and in 'The Wings of Insects,' more recently published. The more important of the other sources from which material has been drawn are indicated in the text and in the bibliography at the end of the volume."

A comparison of the scope of the present work with that of the *Manual* is at once suggested. In the fourth edition (1901) of the latter, chapters I, Zoological Classification and Zoological Nomenclature; II, Insects and their Near Relatives and as much of III, Class Hexapoda or Insects, as deals with the characteristics of the class and the external and internal anatomy of insects, occupy 76 pages, the following 600, as far as the index, treat successively of the different orders. If from those 76 pages we subtract 8, or chapter I, the remaining 68 will in subject matter correspond to the present work. Each topic, consequently is considered here in much greater detail and one is naturally led to another comparison—with the late Professor Packard's *Text Book of Entomology*, which is very similar in its scope and still more detailed in virtue of its 729 pages and 654 text figures.

The special title of the present Part I is "The Structure and Metamorphoses of Insects." There are four chapters, each with many subdivisions: I. The Characteristics of Insects and Their Near Relatives (28 pp.); II. The External Anatomy of Insects (66 pp.); III. The Internal Anatomy of Insects (73 pp.); IV. The Metamorphosis of Insects (38 pp.).

An excellent selection of topics treated and topics omitted has been made, the typography is pleasing and Professor Comstock has with good reason expressed his appreciation of his artists, Miss Stryke and Miss Edmonson. Some of the familiar figures of the *Manual* reappear, rather the worse for wear, but most of the illustrations have been newly drawn.—P. P. Calvert

A Little Gateway to Science. Hexapod Stories. By Edith M. Patch. With illustrations by Robert J. Sim. The Atlantic Monthly Press. Boston, 1920. Pp., xvii, 179. 43 illustrations. School edition 90 cents, library edition $1.25.—The publishers state that this "little volume contains twelve stories about six-footed insects, told very simply for the very young, by a scientist who thinks that the child should be approached with the same standards of honesty as the most learned society, and that natural history facts are themselves so full of dramatic interest that they need no garnish of fiction.

The first story, "Van, the Sleepy Butterfly who was Wakened by a January Thaw," tells of Van's January experiences, of her laying eggs in May from which hatched Sister Essa and Essa's brothers and sisters; how Essa in her turn laid eggs in June from which came Opie, and of many other happenings to the three generations.

This may be taken as typical of the book which is neither technical nor sentimental and surely should appeal to the child as far as an Olympian (*sensu Kennethi Grahami*) can see. The author is the well known entomologist of the Maine State Agricultural Experiment Station so that the non-entomological public may be assured of the reliability of the book.—P. P. CALVERT. (Advertisement).

Obituary

The Reverend HENRY STEPHEN GORHAM—author of the sections on Malacodermata (1880–86) and Erotylidae, Endomychidae and Coccinellidae (1887-1889) in the Coleoptera volumes of the *Biologia Centrali-Americana*, died at Great Malvern, England, March 22, 1920. He was born in 1839, educated at Rugby under Arnold and was a civil engineer before he became a curate in the Church of England, in 1865. His entomological writings deal with British and exotic Coleoptera. His extensive collections of beetles have been widely dispersed in various public and private museums, some data on which are given in a notice in the *Entomologist's Monthly Magazine* for May, 1920, from which the above details are taken.

The same issue of the *Magazine* announces also the death of EDMUND REITTER. author of "innumerable papers" on Palaearctic Coleoptera, at Paskau, Moravia, March 15, 1920, aged 75. He was one of the original editors of the *Wiener Entomologische Zeitung* from its foundation in 1891 to his death.

The deaths of two entomologists are announced in a recent number of the *Bulletin de la Societé Entomologique de France:* EMILE BOUDIER, member of the Institute of France and oldest member of the Entomological Society in point of election (1857), who studied European Coleoptera: and J. PANTEL known for his work on comparative anatomy and general biology, especially of Orthoptera, and for his monographic essay on the parasite Tachinid larva of *Thrixion halidayanum*, (1898), at Toulouse, February 7, 1920, aged 67.

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OVER 10,000 BUTTERFLIES, INCLUDING

Morpho cypris
" sulkowskyi
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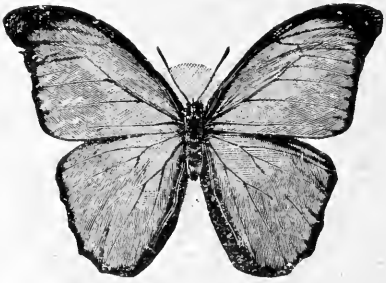
" andraemon
" celadon
" devilliersi
Urania boisduvali
Erinyis guttalaris
Protoparce brontes, etc.

From Venezuela:

Over 5000 Lepidoptera
200 Dynastes hercules

From New Guinea:

2000 Coleoptera
200 Orthoptera



From Assam, India:
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" philoxenus
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OCTOBER, 1920

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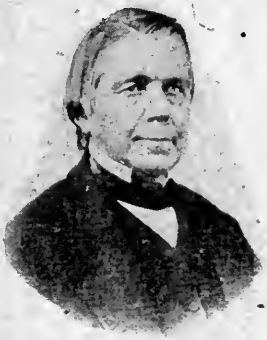

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXXI. OCTOBER, 1920. No. 8.

CONTENTS

Description of a New Species of the Asilid genus Pogosoma (Diptera).

BY E. T. CRESSON, JR., Philadelphia, Pa.

The species of this genus are always interesting. They seem to be distributed in most of the world faunas. Kertesz, in his *Catalogus Dipterorum*, lists eleven species: Four from Europe, four from the East Indies, two from North America, and one from Mexico. In working over the collection here, in connection with some material collected by F. M. Jones in the western states, this genus was brought to my attention by a female from California. On comparing this specimen with another female without data, a male from Colorado, and another male from New Jersey, I found many disagreements in characters which seem worth while consider-

ing. Through the kindness of Prof. J. G. Sanders and Mr. A. B. Champlain of the Bureau of Plant Industry, Harrisburg, Pennsylvania, I am enabled to examine their collection in this genus, consisting of two males and one female from Pennsylvania and Virginia, and two males from Colorado. Of the above material from the Bureau of Plant Industry, Mr. Champlain writes: "I wish to call your attention to the fact that all were collected from Pine. Knull took the Virginia specimens from pine; I got the Colorado specimen flying around cut and infested pine logs, and Sanders collected the Pennsylvania specimens flying around cut white pine, the latter being attacked by *Monohammus*, *Ips*, and other pine insects. It is probably a predator on pine insects in both adults and larval stages."

Critical examination of the above material, supported my earlier supposition that there were two distinct species represented respectively by the eastern and western specimens. They are all typically *Pogosomae* and possess the following characters in common which may be considered of generic or subgeneric importance:

Shining, sparingly pilose species. Head twice as broad as high, deeply excavated between the eyes above; ocelli on a prominent, conical tubercle; antennae inserted near ocellar tubercle, far above center line of eyes. Facial profile produced in form of an obtuse cone to opposite the end of first antennal joint, but leaving a space below antennae straight and nearly vertical. First antennal joint twice as long as second; third as long as first and second together. Proboscis straight, conical, pilose at apex above. Scutellum without true macrochaetae. Abdomen elongate; segments somewhat constricted at incisures. Femora thickened beyond middle; fore tibiae without spur. First submarginal cell divided by a cross vein from anterior branch of third vein; first posterior cell narrowed or closed at margin; posterior cross vein and apical cross vein of fourth posterior cell parallel but not continuous.

Genotype.—Asilus maroccana Fabricius, 1794, [Original designation].

The two species credited to North America are *Laphria dorsata* Say (1824) and *Laphria melanopterum* Wiedemann (1828). The former is cited as "taken near Philadelphia"; the latter as "Vaterland?" but credited by all students to North America. Williston notes what he considers Wiedemann's species from Florida, and states that it differs from *dorsata* in having the wings black and broader, the face being clothed with black, and the dorsum being shining. I cannot distinguish *melanoptera* from *dorsata* either by descriptions or notes relative to these supposed species. The former is probably a very dark form of the latter, and as the material before me shows much variation in the wing color, I do not think that Wiedemann's name can be retained for any North American species or variety.

Pogosoma dorsata Say.

1824. *Laphria dorsata* Say, Amer. Ent., i, pl. vi, page 5.
♀ 1828. *Laphria melanoptera* Wiedemann, Ausser. Zweifl. Ins., i, 514.

Say's description agrees so well with my eastern material that I do not doubt the determination. As there is very much variation in the color of the wings, this character cannot be taken seriously. What I consider *dorsata* may be described as follows:

♂. Black entirely, except more or less brown on post alar calli and on the pleural and ventral sutures. Shining to polished, with some bluish metallic or grayish reflections. Face especially below, occiput especially post orbits, one or two pairs of spots on mesonotum (one at each dorsal end of the two sutures, the anterior pair being most pronounced), suture above base of wings, pleura especially towards pectus, silvery according to the angle of vision. All true bristles black. Pile or bristle-like hairs black as follows: on first and second joints, face above and upper part of mystax, occiput above, palpi, apex of proboscis, prothoracic collar, humeri, mesonotum posteriorly, sometimes a few on margin of scutellum, pleura, and abdomen. Pale (white) pile on frons, around base of antennae, lower part of mystax, lower occiput, proboscis below, mesonotum anteriorly, disc of scutellum and all coxae. Pile long and mixed on legs, but paler on femora becoming black on tarsi. The pile is long and abundant on the lower surfaces of head and legs; long and woolly and rather sparse on scutellum. Wings very variable, from evenly subhyaline, grayish to densely fuscous with lighter areas in the cells especially along the inferior margin.

There are only two bristles in the supra-alar region, one each side of the sutural depression; two or three on the post-alar callus; one, strong, on post margin of mesopleura. Hypopygium complicated; claspers with numerous long bristles along the sublateral margin; between the bases of claspers is a broad appendage with a rounded, laterally directed, tooth-like projection.

♀. Similar. Wings generally darker, more blackish. Pile mostly black; that on cheeks, base of proboscis, and on scutellum generally, remaining pale; it is also less abundant especially on the legs. Length—18 mm.

I have examined the following material: 1 ♂, Browns Mills, New Jersey, June 15, (H. Skinner), [A.N.S.P.]. 2 ♂, East Falls Church, Virginia, July 1–8, (J. N. Knull), [Penna. Dept. Agric.]. 1 ♀, Drumgold, Pennsylvania, July 16, (J. G. Sanders), [Penna. Dept. Agric.]. 1 ♀, without data, [A.N. S.P.].

Pogonosoma ridingsi new species.

♂. Similar to *dorsata* but more robust. Mesonotum and scutellum not shining but subopaque. Color of bristles and pile similar except on the face where they are pale (yellowish not white) with several long black bristles on the prominence medianly; of the scutellum and postcoxae, black. The facial pile is more abundant than in *dorsata*, and along the alar margin of the mesonotum and on the postalar calli there are numerous black bristles, while the scutellum has some erect bristle-like hairs of the disc. The vestiture of the pleurae is more abundant than in *dorsata* and the pile on the fore legs is very dense, noticeably more so than on the middle and hind legs. The wings, although probably they will show much variation, seem to be fairly constant in having the fuscous clouding confined to the veins, even those near the costal margin (none of the specimens showing the density of *dorsata*). The hypopygium more robust, similar in general form; but the appendage between the bases of the claspers is tooth-like, not developed laterally into tooth-like lobes. The bristles of the claspers are stronger and fewer in number.

♀. Similar, but as in *dorsata* the pile is mostly black, being pale (brownish) on the cheeks only. The wings as in the male. Length 20 mm.

Type.—♂. Colorado, (J. H. Ridings?), [A.N.S.P. No. 6343]. *Paratypes.*—1 ♂; Florissant, Colorado, June 24, 1914, 82 (A. Champlain), [Pa. Dept. Agr.]. 1 ♂; El Paso County, Colorado, August 5, 1911, (A. Champlain), [Pa. Dept. Agr.]. 1 ♀; Keddie, Plumas County, California, July 4, 1918, (F M. Jones), [A. N. S. P.].

The subopacity of the mesonotum, abundance of bristles along the alar margin, the more abundant and pale facial pile, the more abundant pleural pile, the hypogygial tooth, as well as the more robust habitus and its western distribution, are characters of seeming specific importance.

Undescribed Crane-flies from Argentina (Tipulidae, Diptera)

By Charles P. Alexander, Urbana, Illinois.

The species of crane-flies described below were sent to me for naming by Señor Charles Bruch and Señor Pedro Jorgensen-Hansen. Some of the species were taken in the "Puna" or highlands of the Province of Jujuy by Vladimir Weiser, a civil engineer engaged in surveying this country, and kindly included in the material sent me by Señor Bruch. The types of *Tipula moniliferoides* were taken at the Estancia of Mr. B. M. Barrett, at Monte Veloz, about 150 kilometers south of Buenos Aires, where most of them were found in the houses in the morning, presumably having been attracted to lights earlier in the evening. The types are preserved in the writer's collection, paratypes of some of the species in the La Plata Museum. I am greatly indebted to the gentlemen above mentioned for the interesting material described at this time and elsewhere.

Gonomyia (Gonomyella) weiseri new species.

General coloration gray; antennae black throughout; mesonotal praescutum with three brown stripes; pleura grayish with a conspicuous yellow ventral stripe; halteres elongate, pale, the knobs brown; wings subhyaline, the stigma brown; *Sc* elongate; male hypopygium with the largest pleural appendage bifid.

♂ Length about 5.5 mm.; wing 7.2–8 mm. ♀ Length 6.8 mm.; wing 8–8.2 mm.

Rostrum and palpi black. Antennae black, the flagellar segments cylindrical. Head light gray.

Pronotum dull gray, the lateral margins narrowly yellowish, broadest on the scutellum. Mesonotal praescutum light gray with three conspicuous brown stripes; pseudosutural foveae conspicuous, oval, jet black; tuberculate pits at the extreme cephalic margin of the sclerite, separated

from one another by a distance a little greater than the diameter of one; scutum gray, each lobe with a brown mark continued backward from the lateral praescutal stripes; scutellum gray, broadly margined with pale; postnotum light gray. Pleura grayish, a conspicuous yellowish longitudinal stripe across the dorsal portion of the mesosternum and the ventral portions of the mesepimeron, beginning as a narrow point behind the fore coxa, broadest above and immediately behind the middle coxa. Halteres long and slender, pale, the knobs dark brown.

Legs with the coxae dark grayish brown; trochanters brown; remainder of the legs brown, the tips of the femora, tibiae and tarsi darker.

Wings comparatively long and narrow, subhyaline, the stigma conspicuous, oval, brown; veins dark brown. Venation: *Sc* long, *Sc1* ending just before midlength of the long *Rs; Sc2* removed a short distance from the tip of *Sc1*, *Sc1* alone being about equal to the basal deflection of *Cu1; Rs* very long, almost straight, longer than the combined *R2+3* and *R3* beyond it; *r* on *R2+3* nearer the fork of *Rs* than to the fork of *R2+3; R2* approximately equal to *R2+3;* cell *1st M2* open by the atrophy of the outer deflection of *M3;* basal deflection of *Cu1* a short distance before the fork of *M*.

Abdomen dark brown, sparsely pruinose, the caudal margins of the segments narrowly pale. Male hypopygium with the pleurites stout, the appendages inserted near midlength of the inner face; three pleural appendages, the largest heavily chitinized, bifid, the outer arm again slightly split at the tip so that the entire appendage appears indistinctly trifid; inner pleural appendage a flattened blade that is slightly dilated distally and provided with rather numerous sense setae; outer pleural appendage about as long as the second appendage, heavily chitinized, sinuous, narrowed to the blunt apex. Penis-guard long and narrow, the apex indistinctly trifid. Ovipositor with the valves slender, acute, strongly upcurved.

Habitat: Argentina.

Holotype: ♂; Cueva Iturbe, Province of Jujuy, altitude 3700 meters, November 10, 1919 (Vladimir Weiser). *Allotype:* ♀, Hornadita, Province of Jujuy, altitude 3400 meters, November 30, 1919 (Weiser). *Paratypes:* 1 ♀, with the allotype; 7 ♂ 4 ♀, Tilcara, March 20, 1920.

This interesting fly is dedicated to its collector, Señor Vladimir Weiser, to whom we are indebted for considerable assistance in determining the range of distribution of Tipulidae in Argentina.

Gonomyia (Gonomyella) argentinensis new species.

General coloration light brownish gray; antennae dark brown, mesonotal praescutum with three brown stripes; pleura dark brown with a

conspicuous light yellow longitudinal stripe; wings with a faint brownish tinge, the stigma very faint; male hypopygium with the intermediate pleural appendage narrow basally, gradually widened, the acute outer angles subequal.

♂. Length about 5 mm.; wing 5.5 mm.

Rostrum and palpi dark brown. Antennae dark brown. Head light gray, with an indistinct, darker, median line.

Pronotum dark brown, the lateral margins narrowly pale yellow. Mesonotal praescutum light brownish gray, with three dark brown stripes; scutum brownish gray, each lobe with two brown spots; scutellum and postnotum dusted with gray. Pleura dark brown; a conspicuous light yellow longitudinal stripe across the dorsal portions of the mesosternum, extending from behind the fore coxae to dorsad of the hind coxae; cephalic portion of the mesepimeron yellow; dorsal pleurites dusted with gray. Halteres light yellow, the knobs brown.

Legs with the coxae reddish brown; trochanters dull yellow; remainder of the legs obscure yellow; the tarsi darker.

Wings with a faint brown tinge; stigma very faint, slightly darker brown; veins dark brown. Venation: *Sc2* some distance from the tip of *Sc1*, immediately beyond the origin of *Rs; Rs* but slighly arcuated, about as long as *R2+3* and *R2* taken together; *r* indistinct, inserted at about midlength of *R2+3;* cell *1st M2* open; basal deflection of *Cu1* before the fork of *M*, this distance being about one-half the deflection.

Abdomen dark brown, the posterior margins of the segments indistinctly paler. Male hypopygium with the pleurites having three appendages, the outermost flattened, the short apex produced into an acute point that is directed at a right angle to the remainder of the blade, somewhat like the beak of a bird; the intermediate appendage is slender basally, gradually dilated into a fanlike structure, the outer margin concave, the lateral angles thus formed produced into acute or subacute, subequal points; inner pleural appendage a pale, flattened lobe that is gradually widened to just before the apex, the tip obtuse. Penis-guard distinctly trifid at apex.

Habitat: Argentina.

Holotype, ♂, Rioja, February, 1915, (E. Giacomelli). *Allotopotype*, 1 ♀, in poor condition.

This fly is allied to *G. velutina* Alexander, *G. weiseri* new species, and other members of the subgenus in the Neotropical fauna but is readily told by the structure of the male hypopygium.

Gonomyia (Leiponeura) bruchi new species.

Antennae black, the scapal segments largely yellow; head yellow, the vertex with a brown blotch; thorax yellow, marked with brown; thoracic

pleura yellow with two brown longitudinal stripes; halteres brown, the knobs yellow; legs brown; wings yellowish gray, the stigma indistinct; male hypopygium with the outer pleural appendage a chitinized hook with a short horn near its base.

♂. Length about 4 mm.; wing 3.8 mm.

Rostrum brown; palpi dark brown. Antennae of the male provided with very long verticils as usual in this group of species; first scapal segment yellow; second scapal segment enlarged, dark brown, margined with yellow; remainder of the antenna dark brown. Head light yellow with a large brown blotch on the vertex.

Pronotum whitish yellow. Mesonotal praescutum with three dark brown stripes that are sparsely purplish gray pruinose, entirely confluent in front, separated behind to show the yellow ground-color; lateral margins of the praescutum broadly yellow; scutum yellow, the center of each lobe purplish brown, this color produced by the backward extension of the lateral praescutal stripes; scutellum yellow, with a conspicuous brown median blotch at the base; postnotum brownish. Pleura yellow with two conspicuous brown longitudinal stripes, the more ventral suffusing the sterno-pleurites; mid-line of the sternum yellow. Halteres pale brown, the base of the stem and the base of the knobs darker; remainder of the knobs conspicuously light yellow.

Legs with the coxae and trochanters pale; remainder of the legs pale brown, the distal tarsal segments darker.

Wings with a strong yellowish gray tinge; stigma barely indicated by a long, dusky suffusion in cell *R1;* veins pale. Venation: *Sc* rather short, *Sc1* ending a short distance before the origin of *Rs; Sc2* removed from the tip of *Sc1* to a distance that is but little shorter than *r—m; Rs* rather short, almost square at origin; cell *1st M2* broad, the basal deflection of *Cu1* at or immediately before its fork.

Abdominal tergites dull yellow, with a broad, brownish median stripe; sternites yellow. Male hypopygium with the pleurites moderately stout, the outer angle produced into a long, stout, fleshy lobe; outer pleural appendage a long, chitinized hook that is broad at the base, narrowed gradually to the sinuous, acute tip, beyond the base with a short, stout horn; inner pleural appendage very small, fleshy, provided with stout bristles and tipped with a powerful spine. Penis-guard formed as two parallel flattened blades, the tips blackened and produced into a short beak that is directed cephalad; gonapophyses black, bent slightly at their tips which are minutely and irregularly toothed.

Habitat: Argentina.

Holotype, ♂, Province of Buenos Aires, October 11, 1919, (C. Bruch). 1 ♂, 2 ♀, La Aranja, Alta Gracia, Prov. de Córdoba, April 1–8, 1920 (C. Bruch).

This beautiful little fly is respectfully dedicated to its collector, Señor Charles Bruch, to whom I am greatly indebted for many Argentinian Tipulidae.

Holorusia catamarcensis new species.

Antennae naked, the basal half yellow, the distal half passing into brown; mesonotal praescutum brownish buff with three conspicuous gray stripes that are narrowly margined with dark brown, the median stripe bisected by a narrow line of this color; legs yellow, the tips of the femora and tibiae dark brown; wings brownish yellow, the stigma and a spot at the origin of *Rs* darker; abdominal tergites yellow, trivittate with dark brown.

♀.—Length about 19 mm.; wing 20.5 mm.

Frontal prolongation of head brownish yellow, narrowly dark brown laterally; nasus long and slender; palpi dark brown. Antennae with the basal seven segments light yellow, the flagellum thence passing into brown; flagellar segments cylindrical with microscopic verticils only, as in the genus; first flagellar segment very long and slender, nearly as long as the succeeding three taken together. Head pale brownish testaceous, sparsely gray pruinose.

Mesonotal praescutum pale brownish buff with three conspicuous gray stripes that are narrowly margined with dark brown, the median stripe split by a conspicuous brown stripe; scutum pale grayish testaceous, the lobes largely gray; scutellum and postnotum testaceous, sparsely whitish pruinose, the postnotum with a capillary brown line. Pleura pale brown, sparsely pruinose, the dorso-pleural membranes dull yellow. Propleura dull yellow, with an indistinct brownish spot above the fore coxa. Halteres pale, the knobs slightly darker.

Legs with the coxae yellow, sparsely pruinose; trochanters yellow; femora dull yellow, the tips conspicuously dark brown; tibiae similar, the tips narrowly darkened; tarsi pale brown, the distal segments darker.

Wings with a strong brownish yellow tinge, the subcostal cell yellow; stigma oval, brown; a brown cloud at the origin of *Rs*, a brown seam below vein *Cu;* obliterative areas before the stigma in cell *1st R2* and across cell *1st M2*, the basal deflection of *M1+2* and the outer deflection of *M3+4* being largely pale; cell *C* above the stigma pale; anal cells darkened distally, cell *1st A* with a pale triangle at the apex, slightly before vein *2nd A;* veins dark brown. Venation: *Rs* rather long, exceeding *R3*, slightly angulated at origin; vein *R3* not strongly arcuated; cell *1st M2* narrow; petiole of cell *M1* about one-half as long as *m*.

Abdomen yellowish, the tergites trivittate, a narrow brown median stripe, the apical segments with the caudal margins narrowly darkened; sublateral stripes broader; lateral margins pale gray; second sternite with a large brown blotch at the base. Ovipositor with the tergal valves long, straight, compressed.

Habitat: Argentina.

Holotype, ♀, Esquina Grande, Catamarca, April 7, 1915. (P. Jorgensen-Hansen).

Holorusia jujuyensis new species.

General coloration dark brownish black, pruinose; nasus bifid; antennal segments with short bristles; legs dark brown; wings gray, the veins seamed with subhyaline; *Rs* short, petiole of cell *M1* short; abdominal tergites reddish brown with sublateral brownish black stripes.

Length 18 mm.; wing 16 mm.

Frontal prolongation of the head comparatively short, dark reddish brown; nasus broad, distinctly bifid at apex, clothed with long yellow bristles; palpi brownish black. Antennae with the first segment dark brown, sparsely pruinose; second segment brownish yellow; flagellum uniformly brown, the outer segments darker; but ten evident flagellar segments, the first segment a little less than the succeeding two taken together; flagellar segments cylindrical with comparatively short verticils. the first and second flagellar segments with numerous such bristles. Head dark brown, narrowly gray along the inner margin of the eyes.

Mesonotal praescutum grayish brown, with three dull gray stripes that are margined with dark brownish black, the median area of the sclerite discolored in the unique type; humeral regions and lateral margins obscure yellow; scutum blackish with two large gray areas; scutellum and postnotum dull gray with a narrow blackish median line. Pleura dull gray, indistinctly marked with blackish; a conspicuous whitish area on the lateral sclerites of the postnotum, immediately cephalad of the base of the halteres. Halteres dark brown, paler basally.

Legs with the coxae and trochanters dark brown, the former dull gray pruinose, remainder of the legs dark reddish brown, the tips of the femora, tibiae and all the distal tarsal segments black.

Wings broad, dull gray, the veins broadly seamed with subhyaline, isolating the ground-color to the centers of the cells; a nearly continuous subhyaline streak along vein *M*, passing into cell *R* near its end, crossing cell *1st M2* and into cell *M4* where it forks before the wing-margin; similar forks are found in cells *R5*, *M1* and *2nd M2*, leaving gray triangles in the apices of these cells; stigma large, dark brown; cell *R2* pale, centered with gray; cell *R3* gray, the outer end pale; vein *1st A* is bordered on either side by a broad subhyaline space; veins reddish horn-color. Venation: *Rs* short, a little longer than *R2+3; R3* rather strongly arcuate; cell *1st M2* comparatively broad; petiole of cell *M1* short, about one-half of *m;* fusion of *Cu1* and *M3+4* punctiform.

Abdominal tergites reddish brown, with conspicuous, sublateral brownish black stripes and narrow gray margins; segments narrowly ringed caudally with pale; sternites brown, the distal segments more blackish. Ovipositor with the tergal valves almost straight, long and slender.

Habitat: Argentina.

Holotype: ♂, Province of Jujuy, January 12, 1920 (V. Weiser). *Allotype:* ♀, Tilcara, Jujuy, January 12, 1920 (Vladimir Weiser). *Paratopotypes:* 1 ♂, 1 ♀; *paratypes*, 10 ♂, 2 ♀, La Granja, Alta Gracia, Prov. de Córdoba, April 1–8, 1920 (C. Bruch).

Tipula moniliferoides new species.

♂ Length 12–13 mm.; wing 13.6–14.3 mm.; antenna 10.2–11 mm. ♀ Length 18–19 mm.; wing 14.2–15 mm.

Similar to *T. monilifera* Loew, differing as follows:

Antennal flagellum beyond the first segment brownish black. The three thoracic stripes are present, the median stripe represented by broad margins that are a little narrower than the lateral stripes. Pleura uniformly light yellow.

Habitat: Argentina.

Holotype: ♂, Monte Veloz, Province of Buenos Aires, January 17, 1920 (C. Bruch). *Allotopotype:* ♀. *Paratopotypes:* 2 ♂'s, 5 ♀'s, Estancia B. Barrett, Monte Veloz, January 14–17, 1920 (C. Bruch). *Paratypes:* 4 ♂, 4 ♀, La Granja, Alta Gracia, Prov. de Córdoba, April 1–8, 1920 (C. Bruch).

Tipula mitua Alexander (Colombia) which has the antennal flagellum dark colored as in the present species, differs in the relative shortness of the antennae and the coloration of the thorax.

Cicindela nevadica LeConte (Coleop).

A series of ten specimens of this extremely rare Cicindela (six females, four males) was taken by Mr. Morgan Hebard, August 23, 1919, on alkaline flats near the Fairbanks Ranch, Ash Meadows, Nevada, at an elevation of 2300 feet. They were very wary and difficult to capture. There is only one specimen without even a State label in the Horn Collection; the species has evidently not been taken recently as no records are available other than Nevada from where the type was described. It is one of the few species not represented in the collection of Cicindelidae of the late Edward D. Harris. In company with *nevadica* LeC. was taken a series of *Cicindela haemorrhagica* LeC. (subsp.) var. *pacifica* Schaupp.—Frank R. Mason, Philadelphia, Pa.

Notes on the Genus Hetaerius and Descriptions of three New Species (Coleop.)

By J. O. Martin, Berkeley, California

During the past five years I have spent such time as I have been able to spare during the proper season in collecting the curious ant guests belonging to the genus *Hetaerius*. It is a rather laborious form of collecting as the ant nests in which these beetles are found generally occur under stones, many of which require considerable effort to overturn. Thus far in my experience, I have found them only during the winter months after the ground has been thoroughly wet by the rains. At such times the ants bring their eggs, larvae and pupae, as well as the Aphids they may possess, to the under side of the rocks to absorb the heat gathered by these stones on such days as the sun may be shining. Here too other guests may sometimes be seen and occasionally the desired *Hetaerius*. Once I found six specimens of *Hetaerius zelus* in a single day, often two and more often but one represented the spoils of a strenuous day's work. Far outnumbering these red letter days were those in which the only reward was an aching back and painfully worn finger tips.

As to the habits of these beetles I have been able to learn little, for during the excitement, due to the sudden flood of sunlight the main reaction seems to be toward escape to the underground galleries. Sometimes the *Hetaerius* may be found clinging to the under side of the stone, though more frequently he is jarred off by the over-turning process. He then feigns death as so many of the Histeridae do, but in a short time comes to life and straddles rapidly away on his clumsy appearing legs toward the gallery entrance. Twice I have seen an ant pick up the beetle and start under ground with him, but as a rule the *Hetaerius* makes off under his own power.

During a recent trip to Mill Valley, Marin County, California, I had the good fortune to take two specimens of *Hetaerius* which on examination turned out to be unde-

scribed. Dr. E. C. Van Dyke very kindly turned over to me for study the specimens of this genus in his collection as did Dr. F. E. Blaisdell. Among Dr. Van Dyke's material I found one each of the two species taken by myself at Mill Valley, and three examples of still another species which appears to be undescribed.

Up to the present there have been described thirteen species of the genus *Hetaerius* in the United States and of these seven are from the state of California.* The three included in the present paper make a total of ten for this state and sixteen for the United States. Beside these there are but five described from the rest of the World.

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* *Hetaerius*, Erichson, Klug. Jahrb. Ins. Vol. 1. p. 156. (1834).

blanchardi Le Conte, Proc. Am. Phil. Soc., Vol. XVII, p. 609 (1878). Tyngsboro, Massachusetts.

brunnipennis Rand, Bost. Jour., Vol. II, p. 40 (1838). Cambridge, Massachusetts; Pennsylvania; Ohio.

carinistrius Lewis, Ann. Mag. Nat. Hist. Ser. 8, Vol. XII, p. 85 (1913), Hartford, Connecticut.

minimus Fall, Psyche, Vol. XIV, p. 68 (1907). Colorado; New Mexico.

hornii Wickham, Psyche, Vol. VI, p. 322 (1892). Cheyenne, Wyoming.

exiguus Mann, Psyche, Vol. XVIII, p. 108 (1911). Pullman Washington; Kendrick, Idaho; New Mexico.

californicus Horn, Trans. Am. Ent. Soc., Vol. III, p. 137 (1870). Sonoma and Pasadena, California.

morsus LeConte, Proc. Acad. Nat. Sci. Phil. (1859), p. 70. Fort Tejon, California.

tristriatus Horn, Trans. Am. Ent. Soc., Vol. V, p. 21 (1874). Calaveras County, California; Pullman, Washington.

wheeleri Mann, Psyche, Vol. XVIII, p. 30 (1911). Palo Alto and Berkeley, California.

zelus Fall, Can. Ent., Vol. XLIX, p. 165 (1917). Pasadena and San Francisco, California.

strenuus Fall, Can. Ent., Vol. XLIX, p. 167 (1917). Santa Cruz Mts., Pasadena, California.

loripes Casey, Memoirs on the Coleoptera, Vol. VII, p. 236 (1916). Tulare County, California.

Terapus, Marseul, Ann. Soc. Ent. France, 4th ser. Tome 2nd, p. 682 (1862).

mnizechi, Marseul, ibid. Pasadena, California.

Synonym: *Melanetaerius infernalis* Fall, Psyche, Vol. XVI, p. 69 (1907).

In the preparation of this paper I have examined specimens of the following species, *brunnipennis*, Rand; *blanchardi* Le Conte; *californicus* Horn; *tristriatus* Horn; *zelus* Fall; *strenuus* Fall; and *wheeleri* Mann. I have also gone over the original descriptions of the thirteen species, a bibliography of which will be found in the first footnote for the convenience of the future students of the genus.

In studying the vestiture of these beetles it is evident that there are three different types of hairs: first, the ciliated or branched kind; second, flattened or squamose hairs with a border of cilia; and third, ordinary hairs. The California species may be grouped as follows on the basis of hairs found on the upper surface of the body.

Without squamose or branched hairs on thoracic disc or elytral spaces: *californicus, nitidus.*

With both squamose and branched hairs on thorax and elytra: *tristriatus, hirsutus, williamsi, morsus?, loripes, zelus.*

With majority of the hairs squamose ciliate: *strenuus.*

With a few minute fringed hairs on thorax and elytra: *wheeleri.*

The presence or lack of hair and its arrangement on the body seems to possess significant specific value and also the pygidium and flattened surfaces of the legs. As so many of the descriptions are silent on these points, as well as on many others of importance, I shall not attempt to construct a table of species at this time.

Hetaerius nitidus sp. nov.

Form oblong, moderately convex above, rufo-castaneous, smooth, shining.

Head smooth, shining; vertex viewed from above not concave but slightly convex, with three triangularly-placed setigerous punctures near caudal end of the margined area and three seta-bearing punctures in a transverse line at cephalic margin; front slightly rugose and with a vertical row of four to six setigerous punctures on each side of the impunctate middle space; clypeus sparsely, coarsely, and irregularly punctate with six setae bordering the apical margin.

Prothorax twice as broad as long, narrowed apically, lateral margin straight from apical angle to one-third the distance from base, where it becomes suddenly arcuate to basal angle; disc one-third wider than long, smooth, shining and bearing three or four setigerous punctures on apical portion which are not regular in position; the pentangular disc separated

from the slightly rougher lateral areas by a margined sulcus which begins at the basal angle and follows the basal margin for about one-fifth the width of an elytron, then, turning at nearly a right angle crosses the prothorax diagonally with a slightly sinuate course to its inflexed tip, where it dies out before reaching the apical margin; parallel to this sulcus and on the lateral margin of the disc is a broad shallow groove which at its basal end forms a broad foveate depression, is constricted at its middle, and broadens again at its shallow apical end; lateral area narrowest at base, widening to apex and divided at basal third by a broad foveate depression which is not a distinct groove as in other species of the genus examined by me; apical portion of lateral area has about eight setigerous punctures irregularly placed, the included setae reddish yellow and depressed; the basal portion of this lateral area is moderately tuberculate and has about six setigerous punctures; thoracic lateral margin bordered with six to eight black setae unequally spaced.

Elytra smooth, shining, slightly wider than thorax, about as wide as long, sides slightly arcuate, distinctly rounded posteriorly; first stria from the elytral suture reaching three-fourths of length of elytra, with two setae at basal end, none at tip; second stria nearly reaching apex, two setae at base and five along apical end; third stria not quite reaching apex, with an increasing number of setae from base to tip; subhumeral stria not quite reaching apex, with fairly evenly spaced hairs throughout its length; interspaces and disc smooth, shining; a row of setae on apical margin.

Pygidium and propygidium smooth, shining, moderately, evenly punctured, each puncture bearing a subulate seta.

Prosternum rugose, flattened, margined area on caudal end reaching to one-half its length, margin sinuate between the coxae, beyond arcuately convergent and meeting, completely enclosing the cephalic end of margined area which is smooth and shining.

Legs smooth, shining, sparsely punctured, punctures with setae, hind tibia not much wider than femur.

Meso- and metathoracic segments and abdomen smooth, shining without punctures. Length 1.5 mm.

Described from four examples; *type* in my own collection, from Mill Valley, Marin County, California; *paratypes* in the collection of Dr. E. C. Van Dyke, who kindly loaned them to me for comparison.

My specimen was taken from the nest of a small grey ant while those of Dr. Van Dyke came from the nest of a much larger species.

(*To be Continued*)

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., OCTOBER, 1920.

Shall the Subscription Price of the News Be Increased?

Since January, 1910, the subscription price of ENTOMOLOGICAL NEWS has been Two Dollars. In 1910, and for a number of years following, each monthly issue comprised 48 pages, and often one or more plates. The higher prices for everything, due to the war, gradually compelled us to drop to 30 pages per month and to discard illustrations, except where these were paid for by contributors. As a result, papers accepted for publication are often compelled to wait their turn for months before they see the light.

As a remedy for this condition it has been suggested that by raising the subscription price to $2.50 per year we may be able to increase the number of pages and perhaps furnish some illustrations and that a vote be taken of our subscribers to indicate their willingness or unwillingness to subscribe to the News at the higher figure.

At the back of this number there will be found a blank form to be torn out, filled in and mailed to us. We hope that all our subscribers will send us these cards as soon as possible, duly filled in and signed, that we may know their wishes in time to make necessary arrangements for the News for 1921.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Orthoptera: Tettigidae.

Dr. Joseph L. Hancock has found it impracticable to continue his studies in the Tettigidae. His collections are now being added to the material deposited at the Academy of Natural Sciences of Philadelphia by Mr. Morgan Hebard.

Correspondents or students wishing to have Tettigidae determined or studied will receive as prompt attention as can reasonably be given by writing Mr. Morgan Hebard, Chestnut Hill, Philadelphia, Pa.

Some Collecting Activities During the Summer of 1920.

Dr. Henry Skinner and Mr. R. A. Leussler, of Omaha, Nebraska, collected at Moab, Utah, and for shorter periods at Park City and Salt Lake City, Utah, and Evanston and Laramie, Wyoming, in July and early August.

Messrs. Morgan Hebard, J. A. G. Rehn and Frank R. Mason collected in the Santa Marta region of Colombia, South America, in July and August.

Mr. Charles Liebeck paid special attention to *Donacia* (Coleoptera) in New Jersey.

The Cornell University Entomological Expedition to South America of 1919-20.

This expedition (on which a note appeared in the NEWS for May last, pages 139–140) had, on June 17, reached Campamiento Colonia del Pereni, Peru, and had been joined by Mr. Jesse Williamson. Mr. Harris was recovering nicely from paratyphoid fever and about ready to sail for New York. Drs. Bradley and Forbes and Mr. Williamson were actively collecting. (From letters from Mr. Williamson.)

Jesse Williamson arrived home August 24. On June 22 he was taken ill with amoebic dysentery and was confined to his bed ten days. Drs. Bradley and Forbes left the Colony of the Perene on July 3 and he expected to follow as soon as he was able to travel. But on July 5 he was arrested as a Chilean spy and taken back to San Ramon, where he was detained five days. Bradley and Forbes made a seven days' mule ride to Bermudez on the Ucayali River and were to leave there July 17 for Iquitos. After Jess was released, he was still so weak that he decided he could not overtake them, so he returned home by the west coast and Panama. He has entirely recovered.—E. B. WILLIAMSON, Bluffton, Indiana.

Conference of Economic Entomologists.

An informal conference and field meeting of eastern entomologists was held in The Academy of Natural Sciences of Philadelphia and at the Japanese beetle laboratory at Riverton, New Jersey. on July 29 and 30, 1920. Various introduced injurious insects were discussed, certain recommendations made and the establishment of an Eastern Branch of the American Association of Economic Entomologists recommended. The proceedings of the meeting are given in some detail in the *Journal of Economic Entomology* for August, 1920.

Reorganization of Division of Entomology at the University of California.

A reorganization of the Division of Entomology at the University of California has been announced, taking effect July 1 of this year. The personnel of the Division consists of eight members and will hereafter be

known as the Division of Entomology and Parasitology, with Professor W. B. Herms as newly appointed Head. Professor Herms will continue his activities in the field of Parasitology, particularly Medical Entomology and Ecology, while Professor C. W. Woodworth will devote his time largely, if not wholly, to research. The new organization of the Division embraces three groups with Assistant Professor E. C. Van Dyke as chairman in supervision of activities in general Entomology and Taxonomy; Assistant Professor Essig, chairman in supervision of Agricultural Entomology, and Assistant Professor S. B. Freeborn supervising activities in Parasitology, particularly in relation to the animal industries. Dr. H. H. Severin will continue investigating *Eutettix tenella* in relation to sugar beet blight, while Messrs. E. R. de Ong and G. A. Coleman will continue their activities in their respective fields, namely University Farm School and Apiculture respectively.

The Gypsy Moth in New Jersey and Pennsylvania.

This European insect which has scourged much of New England for the past twenty years has now spread southward. The Newark (New Jersey) *Evening News* of July 27. 1920, published the following: "Staff Correspondence. Trenton, July 27.—Investigation of the outbreak of the gipsy moth on the Duke estate at Somerville by the State Department of Agriculture has revealed the presence of the moth at various other points, including Somerville, Manville, Millstone and Bound Brook. Further scouting, it is believed, will reveal additional infections.

Through the co-operation of A. F. Burgess, federal agent in charge of moth work, trained scouts were sent to the infested area. Thousands of caterpillars were found and complete defoliation had occurred over several acres on the Duke estate planted in blue spruces. It is feared that nursery stock shipped from the Duke estate to points both in and outside New Jersey may have carried the egg masses to various places. A small infection recently discovered at Deal was traced to blue spruce trees originating at the Duke estate. Other shipments from that point are now being traced."

The Philadelphia *Public Ledger* of August 7, 1920, contained a despatch from "Harrisburg Aug. 6—The gypsy moth one of the most destructive pests known in the Atlantic states, has been discovered upon spruce trees recently shipped to the Charles M. Schwab estate near Loretto from the Duke estate at Somerville N. J.

"For some time the moth has been prevalent in parts of New Jersey and the state Department of Agriculture has been conducting a campaign to keep it out of Pennsylvania. Reports of an insect damaging trees at Loretto reached the Capitol a few days ago and Director J. G. Sanders detailed one of the department experts to make an investigation. Word was received by Doctor Sanders today that the moth had been identified."

The same journal on August 27 1920, stated, "Harrisburg, Aug. 26.—

Agents of the Bureau of Plant Industry have found the gypsy moth in only two places in Pennsylvania as the result of an intensive inspection compaign. The moth was discovered first at Loretto and found later near Scranton. Both places were immediately isolated and precautions taken.

"Since then scores of shipments to this state have been traced, including many to the vicinity of Philadelphia, but no signs of the moth have been found."

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **6**—Journal of the New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **17**—Lepidoptera, Boston, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **30**—Tijdschrift voor Entomologie, The Hague, Holland. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **50**—Proceedings of the United States National Museum, Washington. **54**—Proceedings of the Biological Society of Washington, D. C. **57**—Biologisches Zentralblatt, Leipzig. **68**—Science, Lancaster, Pa. **71**—Novitates Zoologicae, Tring, England. **72**—The Annals of Applied Biology, London. **75**—The Anatomical Record, Philadelphia. **76**—Nature, London. **82**—The Ohio Journal of Science, Columbus. **88**—Occasional Papers of The Museum of Zoology, University of Michigan, Ann Arbor. **90**—The American Naturalist, Lancaster, Pa. **93**—Bulletin, Division of the Natural History Survey, Urbana, Illinois. **96**—Physis. Revista de la Sociedad Argentina de Ciencias Naturales, Buenos Aires. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **102**—Broteria. Revista Lusco Brazileira. Serie Zoologica, Braga. **103**—Biologisches Centralblatt, Leipzig. **106**—Anales de la Sociedad Cientifica Argentina, Buenos Aires.

GENERAL. C. G. H.—The imperial entomological conference. **76,** cv, 502–4. **Cockerell, T. D. A.** Eocene insects from the Rocky Mountains. **50.** lvii, 233-60. **Craighead, F. C.**—Direct sunglight as a factor in forest insect control. **10,** xxii, 106–8. **Dickerson & Weiss.**—The insects of the evening primrose in New Jersey. **6,** xxviii, 32–74. **Escherich, K.**—Zeitschrift fur angewandte Entomologie, vi, Heft 2. **Imms, A. D.**—The training of practical entomologists. **76,** cv, 676–7. **Imms & Husian,**—Field experiments on the chemotropic responses of insects. **72, 51,** 269–92. **Meyer, P.**—Art oder varietat? Eine auffassungs-und zweckmassigkeitsfrage der systematik, betrachtet vom standpunkt der biologie. . . . **49,** ix, 1–9. **Oberholser, H. C.**—The nomenclature of families and subfamilies in zoology. **68,** lii, 142–7. **Pierantoni, U.** Nuove osservazioni sulla luminosita degli animali. (Rend. Acad. Sci. Fis. e Mathe. Soc. R. Napoli., lvi, 24–7). **Poche, F.**—Zur begrundung dreier antrage zwecks einschrankung der zahl der namensanderungen und abschaffung des liberum veto in der Internationalen Nomenklaturkommission. (Arch. f. Naturges., lxxxiii, 75–155, 1917). **Weiss & West.** Fungous insects and their hosts. **54,** xxxiii, 1–20.

ARACHNIDA C. Glendenning, R. Some notes on the Eriophyidae in British Columbia. **4,** lii, 136–7. **Petrunkevitch, A.**—Description of Orchestina saltitans. **6,** xxviii, 157–60.

Chamberlin, R. V.—Canadian Myriopods collected in 1882–3 by J. B. Terrell, with additional records. **4,** lii, 166–8. A new diplopod from Texas and a new Chilopod from Alaska. **54,** xxxiii, 41–4.

NEUROPTERA. Campion, H.—Some new or little known Gomphine dragon flies from South American. **11,** v, 130–41. **Chaine, J.** L'attaque des vegetaux par les termites. (Revue Gen. Sci. Pures et Appli, Paris, xxxi, 250–55; 281–85). **Crampton, G. C.**—Some anatomical details of the remarkable winged zorapteron, Zorotypus hubbardis, with notes on its relationship. **10,** xxii, 98–106. **Needham, J. G.**—Burrowing mayflies of our larger lakes and streams. (Bull. Bur. Fisheries, xxxvi, 269–92). **Reijne, A.** A cocoonspinning thrips. **30,** lxiii, 40–5. **Snyder, T. E.**—The colonizing reproductive adults of termites. **10,** xxii, 109–50. **Williamson, E. B.**—A new gomphine genus from British Guiana, with a note on the classification of the subfamily. **88,** No. 80. **Wilson, C. B.**—Dragonflies and damselflies in relation to pondfish culture, with a list of those found near Fairport, Iowa. (Bul. Bur. Fisheries, Wash., xxxvi, 185–264).

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pard, L.—Diagnose d'une espece nouvelle du genre Hygronemobius. **20,** 1920, 120–2. **Cravero, A.**—Contributo allo studio dell'armatura genitale di alcuni Dermatteri. (Boll. Mus. Zool. Anat. Comp. Univ. Torino, xxxiii, No. 730). **Davis, W. T.**—The true katydid nearly extinct in New York City. **6,** xxviii, 78–80. **Morse, A. P.**—Manual of the Orthoptera of New England, including the locusts, grasshoppers, crickets, and their allies. (Proc. Boston Soc. Nat. Hist., xxxv, 197–556.)

Hebard, M.—Revisionary studies in the genus Arenivaga (Blattidae). **2,** xlvi, 197–217.

HEMIPTERA. Deletang, L. F.—Contribucion al estudio de los Cicadidos Argentinos. **106,** lxxxviii, 25–94. **Dozier, H. L.** Notes on the genus Platycotis. **82,** xx, 209–12. **Lahille, F.**—Nota sobre un nuevo genero de "Diaspinae". **96,** iv, 595–99. **Parshley, H. M.** Ethological remarks on some New England water striders. **19,** xv, 67–70. **Pennington, M. S.** Nota sobre las especies argentinas del genero Phymata. Descripcion de un nuevo hemiptero. Notas sobre las especies argentinas del genero Nezara. **96,** iv, 523–30. **de la Torre Bueno, J. R.**—Notes on the Heidemann collection of Heteroptera now at Cornell University. **19,** xv, 70.

Baker & Moles,—A n. sp. of Aleyrodidae found on Azalea. **10,** xxii, 81–3. **Davis, W. T.**—North Amer. cicadas belonging to the genera Platypedia and Melampsalta. **6,** xxviii, 95–135. **Drake, C. J.**—Water striders new to the fauna of Ohio, including the description of a new species. **82,** xx, 205–8. **Ferris, G. F.**—Scale insects of the Santa Cruz peninsula. (Stanford Univ. Pub., Univ. Ser., Biol. Sci., i, 1–57). **Hussey, R. F.**—An American species of Cymatia (Corixidae). **19,** xv, 80–3. **Knight, H. H.**—New and little known species of Phytocoris from the eastern U. S. **19,** xv, 49–66. **Malloch, J. R.**—A n. sp. of Typhlocyba from Illinois. **19,** xv, 48.

LEPIDOPTERA. Brues, C. T.—The selection of food plants by insects, with special reference to lepidopterous larvae. **90,** liv, 313–32. **Comstock, J. A.**—Butterflies of California (Bul. So. Cal. Acad. Sci. xix, 48.). **Ehrmann, G. A.**—A n. sp. of Pierinae from Honduras, C. A. **17,** iv, 43. **Lizer, C.**—Nota acerca de la presencia de la "Sitotroga cerealella" en la Republica Argentina. **96,** iv, 530–1. **Prout, L. B.**—New Geometridae. (Some Neotropical) **71,** xxvii, 265–312. **Raymundo, B.**—Noticia sobre algunos lepidopteros serigenos do Brasil. (Ann. Collegio Pedro II, iii, 29–95.) **Saunders, A. A.**—Notes on the life history of Eurema lisa. **54,** xxxiii, 35–6. **Schaus, W.**—New species of L. in the U. S. National Museum. (Neotropical.) **50,** lvii, 107–52. **Seitz, A.** Die grossschmetterlinge der erde. Fauna Amer. Lief. 102–114. **Simms, H. M.**—Butterflies observed in Dead Horse Canyon, Calif., during 1917 season. (Southwest Sci. Bull., Los Angeles, i, 9–12.). **Strickens, H.**—Collecting in February. **17,** iv, 43–4. **Wolff, G.**—Physikalisch-biologische beobachtungen an schmetterlingsflugeln. **103.** xl, 248–59.

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DIPTERA. Alexander, C. P.—New or little known crane flies from tropical America. **4,** lii, 141–4. Records and descriptions of Neotropical crane-flies. **6,** xxviii, 1–13. **Chandler, S. C.**—A study of the malarial mosquitoes of southern Illinois. **93,** xiii, 309–28. **Duda, Dr.**—Revision der altweltlichen arten der gattung Sphaerocera. **30,** lxiii, 1–39. **Edwards, F. W.**—Dimorphism in the antennae of a male midge. **8,** lvi, 135–6. On the use of the generic name Ceratopogon (Chironomidae). **11,** v, 127–30. The nomenclature of the parts of the male hypopygium of Diptera Nematocera, with special reference to mosquitoes. **98,** xiv, 23–40. **Hine, J. S.**—Descriptions of horse-flies from middle America. I. **82,** xx, 185–92. **Huxley, J. S.**—Intersexes in Drosophila and different types of intersexuality. **68,** lii, 59–60. **Lischetti, A. B.**—Algunas observaciones sobre la morfologia de los huevos de "Culex." Un verme del genero" "Planaria" enemigo natural de las larvas del mosquito. **96,** iv, 588–95. **Macfie, J. W. S.**—Heat and Stegomyia fasciata: Short exposures to raised temperatures. **98,** xiv, 73–82. **Tavares, J. S.**—Cecidologia Brazileira. **102,** xviii, 82–96. **Zetek, J.**—Anopheles larvae in salt water. **68,** lii, 15.

Alexander, C. P.—The crane flies [of the Katmai expedition of the National Geographic Society]. **82,** xx, 193–203. **Malloch, J. R.**—Some new N. Am. Sapromyzidae. Some n. sps. of Lonchaeidae from America. **4,** lii, 126–32.

COLEOPTERA. Angell, J. W.—Dorcus parallelus var. costatus. **19,** xv, 66. **Brethes, J.** Un nuevo genero "Philoscaptus" para "Podalgus bonariensis". **96,** iv, 602. **Bruch, C.**—Metamorfosis de Cotinis semiopaca. Descripcion de un nuevo criptofagio. Un nuevo coleoptero ecitofio. **96,** iv, 393–99; 522–3; 579–82. **Chamberlin, W. J.**—Notes on two little known wood boring beetles. Chrysobothris sylvania and Melasis rufipennis. (Buprestidae). **6,** xxviii, 151–7. **Davis, J. J.**—The green Japanese beetle (Popilia japonica). (New Jersey Dept. Agric., Circ. 30). **Doorman, G.**—Die mechanik des sprunges der schnellkafer. **57,** xl, 116–9. **Frers, A. G.**—Metamorfosis de coleopteros argentinos. **96,** iv, 565–73. **Hayes, W. P.**—The life histories of some Kansas Lachnosterna. **12,** xiii, 303–18. **Lucas, R.**—Catalogus alphabeticus generum et subgenerum Coleopterorum orbis terrarum totius. (Archiv f. Naturges, Berlin, lxxxiv, Abt. A, 1–696.) **Nicolay & Weiss,**—The group Traches in North America. Part 1. The genera Pachyschelus and Taphrocerus. **6,** xxviii, 136–50. **Poche, F.**—Ueber den wert von specialzeitschriften.

(Munchener Koleop. Zeit., iv, 344–48, 1914.) **Satterthwait, A. F.**—Notes on the habits of Calendra pertinax. **12,** xiii, 280–95. **Sharp, D.**—Studies in Rhynchophora. IX. The sexes of Conotrachelus brevisetis. **6,** xxviii, 74–8. **Wickham, H. F.**—An interesting Otiorhynchide weevil from Vancouver. **4,** lii, 134–5.

Barber, H. S.—A new tropical weevil from Florida and Cuba. **10,** xxii, 150–2. **Blatchley, W. S.**—Some new Rhynchophora from eastern North America with additions and corrections of the "Rhynchophora of Northeastern America." **6,** xxviii, 161–78. **Chittenden, F. H.**—A new species of Phyllotreta. (Jour. Washington Acad. Sci., x, 389–90.) **Garnett, B. T.**—A new Aphodius from British Columbia. **4,** lii, 139–41. **Hopping, R.**—A new sp. of the genus Pissodes. **4,** lii, 132–4. **Notman, H.**—Coleoptera collected at Schoharie, N. Y., with descriptions of n. sps. Legs in the Carabidae. Col. collected at Windsor, Broome Co., N. Y., with descriptions and notes. **6,** xxviii, 14–31; 80–9; 178–94. **Van Dyke, E. C.**—Description of n. sps. of Cerambycidae from the Pacific Coast of North Amer. with notes concerning others. New name for Nemosoma punctulata. **19,** xv, 33–48; 85.

HYMENOPTERA. Bequaert, J. A new host of Laboulbenia formicarum, with remarks on the fungous parasites of ants. **19,** xv, 71–79. **Bruch, C.**—Descripcion de una curiosa Ponerina de Cordoba. (Discsthyrea neotropica). Nidos y costumbres de hormigas. **96,** iv, 400–2; 539–41. **Cockerell, T. D. A.**—Eye-colour in bees. **76,** cv, 518. **Hogben, L. T.**—Studies on synapsis. I.—Oogenesis in the Hymenoptera. (Proc. Royal Soc. London, B, xci, 268–93). **Johnson, W. F.**—Hibernating ichneumon flies. (Irish Nat., Dublin, xxix, 65–6.). **Jordan, H. E.**—Studies on striped muscle structure. VII. The development of the sarcostyle of the wing muscle of the wasp. . . **75,** xix, 97–123. **Lowe, H. J.**—Bees and the scarlet runner bean. **76,** cv, 742. **Poche, F.**—Unberechtigte namensanderungen unter H. und prinzipielle bemerkungen uber einschlagage nomenklatorische fragen. (Entomol. Mitteil. Berlin, vi, 44–54. **Wheeler & Bailey.**—The feeding habits of pseudomyrmine and other ants. (Trans. Amer. Phil. Soc., xxii, 235–79.).

Cushman & Rohwer—The North Amer. ichneumon flies of the tribe Ecoenitini. Holarctic tribes of the ichneumon flies of the subfamily Ichneumoninae (Pimplinae). **50,** lvii, 379–96; 503–23. **Rohwer, S. A.**—Descriptions of 26 n. sps. of North Amer. H. The North Amer. ichneumon flies of the tribes Labenini, Rhyssini, Xoridini, Odontomerini, and Phytodietini. **50,** lvii, 209–31; 405–74.

Orthoptera of Northeastern America, with Especial Reference to the Faunas of Indiana and Florida. By W. S. Blatchley. Indianapolis. The Nature Publishing Company. 784 pp. 246 text figs.—The present work is the first effort which has been made to produce under

one cover a "Manual" of the Orthoptera of any very considerable part of North America. The part of the title "Northeastern America" is unfortunate, as America is made up of several major divisions and South America has, as well, a northeastern section. The words "Eastern North America" certainly should have been used, as the first sentence of the Introduction would indicate.

The manual is intended to treat of the order as found in "the United States east of the Mississippi River and Canada east of the 90th Meridian."

The volume is divided into the following major sections: Introduction, A Descriptive Catalogue of the Orthoptera of the Eastern United States and Eastern Canada, Bibliography, Glossary of Terms used in Text, Index to Synonyms and New Generic Assignments as Recognized in This Work, and General Index.

The Introduction states that the present work "is an outgrowth or expansion of my 'Orthoptera of Indiana' issued in 1903." The manual, as the author calls his study, is said to have been prepared to meet "the needs of the tyro and not those of the specialist in Orthoptera." The major sections of the Introduction discuss the classification followed, which we might add is not in toto that of any previous author, synonymy of species, explanations of the method of bibliographic quotation used in the body of the work, the habits and songs of Orthoptera, acknowledgments for aid received, relationship of the insects of the order to other animals, the general external anatomy of a locust, the enemies of Orthoptera, preventive and remedial measures against destructive locusts, and the collecting and preservation of Orthoptera.

Under "Classification" the author voices disagreement with the enforcement of strict priority and has little sympathy with the rigid interpretation of this fundamental of present day nomenclature. The author's belief in individual exceptions has led him into at least one blind alley, as he uses a family Acrididae, but does not like to use a restricted subfamily name Acridinae, derived from the generic *Acrida*, which must be the basis of the family name. Under "Synonymy of Species" (p. 6) we find a commendable analysis of the several variational factors which have been responsible for much of the synonymy in the order. The section criticizing the efforts of some present-day workers to locate certain of the older, briefly described species is quite out of place, and gives no consideration to earnest efforts which have been made in the way of studying itineraries of collectors, checking probable collecting dates and localities, etc., as well as in securing data from the original material when existent. These names were published, are generally recognizable when topotypic material is available and, under generally accepted codes of nomenclature, they cannot be cancelled until they are proven to be unrecognizable. Lack of the biographic, historical and other correlated information to make such locations excuses no one from making the proper effort when

studying a group, and certainly honest painstaking effort should not be called "guessing," unless the critic has a better interpretation to offer.

The author's attitude toward trinomials is not that taken in most present-day zoological works, and he has been led, by following a dogmatic conception of possible but unproven intergradation, into associating as "varieties" a large number of forms which are considered as distinct species by more than a few workers in the Orthoptera. This has been done, in a number of cases, without the study of sufficient material to gain a personal conception of the constancy or inconstancy of the features which are there denied specific weight. In many of his associations of forms as "varieties" or what not we cannot but feel Prof. Blatchley has acted without proper consideration of the facts known to exist, has permitted a mental bias to govern many of his decisions. His attitude toward geographic races (p. 7) shows a failure to grasp the true inwardness of original constancy as an index to racial recognition.

The section treating of the external anatomy of a locust is relatively full, but contains certain features worthy of note, one as an important correction, as on page 14 it is stated the labial palpi are attached to the "labrum." The slip for labium is, of course, evident to the initiated, but the text figure accompanying might readily convey to the tyro the same impression as the incorrect text. It is unfortunate that certain of the anatomical figures, taken from Lugger, contain reference symbols which are nowhere explained in the text before us, and it would have been more in keeping with the general plan of the anatomical section if the structure of the venation of the hind wings had been considered somewhat in detail, as the venation arrangement is known to be important in the classification of the Acrididae, to say nothing of certain of the other families.

In the "Descriptive Catalogue" we find the arrangement is under the form of suborders, i. e., Dermaptoria, Cursoria, Gressoria and Saltatoria; the first of these equals the Dermaptera of most present authors, the Cursoria comprise the Blattidae or cockroaches, the Gressoria are made up of the Mantidae and Phasmidae, while the Saltatoria are composed of the generally associated saltatorial families, the Acrididae, Tettigoniidae and Gryllidae. Under each family the general method is to give a summarized description of the physical form, special appendages, life history, approximate number of known species and number known from America north of Mexico, while the principal literature is cited and a key to the subfamilies given. Under the subfamilies the treatment consists of physical features, key to genera and other pertinent matter. The generic treatment is similarly made up of a summary of the features and a key to the species where more than a single species is treated. The specific treatment consists of a description, with measurements, a general statement of distribution within and outside of the territory covered, comments on habits, often accompanied by a word sketch of the insect and

its habitat, and occasionally by critical taxonomic information or discussion. In many cases we find much to criticize in the latter, which is, in a number of instances, too controversial for introduction in a work of this character. A book for the tyro is no place for the airing of moot points of relationship and nomenclature, and the average zoologist considers the critical matter accumulated in the composition of such a manual best published in advance in another paper, which action would remove the otherwise inevitable doubt and uncertainty from the mind of the "tyro" to whom the manual is addressed.

The keys are relatively full and the illustrations numerous, although very few are original and many of those taken from other sources are poorly reproduced, in some cases on account of too great a reduction.

In the Blattidae we find *Compsodes cucullatus* (Saussure and Zehntner) recorded from the United States for the first time.

In the summary of the Saltatoria the author gives the impression that all sound made by the insects of the suborder is produced by or with the wings, overlooking the remarkable abdominal and limb sound-producing specialization found in the Old World Pneumorinae and in which the wings have no part. The grouse-locusts are considered a family equivalent in rank to the remainder of the locusts, which are termed the family Acrididae. The author shows a peculiar perversity in many of his conclusions regarding the rank of forms treated, shutting his eyes to certain important structural features, often other than genitalic, which latter types of characters he frequently condemns although drawing upon them freely at other times. In more than one case he has fallen back upon a color feature to use in relegating a form to the limbo of a "variety," and has ignored in his argument a structural feature mentioned in the description preceding it, and which a previous author had utilized. The conclusions reached in the critical discussions of a number of species and races, as *Radinotatum brevipenne*, *Trimerotropis acta*, *Podisma glacialis variegata*, the relationship of certain forms of *Mermiria* and of *Chortophaga* are not sound and not supported by the facts in the cases. The conception formed relative to the position of certain species described as belonging to the genus *Eotettix* and also the conclusions on the relationship of many of the species of *Melanoplus* and certain of those of *Hesperotettix* are open to serious question. The naming of the form of *Eritettix simplex* which lacks supplementary carinae on the pronotum is unfortunate, as it opens to some workers the necessity for naming a number of similar forms in the Amblytropidi as found elsewhere. The author's desire to retain his "*sylvestrus*", one of these forms of *Macneillia* (there called *Pedeticum*), is possibly responsible for this attitude, which is quite out of keeping with his treatment of many other forms.

Under the Tettigoniidae we find many sharply criticizable points, the general conclusion reached in regard to the relationship of *Amblycorypha oblongifolia*, *A. floridana* and *A. floridana carinata* being entirely unsound and not supported by the known and published facts. The nomenclatoral

comments on the forms of *Orchelimum* are in some cases distorted by partial quotations from other authors and do not give a full consideration of all the points involved. Partial and incomplete quotation is a weakness of the author, a method unfair to all concerned. The study of the genus *Ceuthophilus* is one of the best pieces of work in the manual, particularly with the original illustrations. Two new species are described in this genus, one with the specific name of *rehebi*, an atrocious effort to associate the names Rehn and Hebard in one specific name. In the new tettigoniids described we are sorry to see no *single* types indicated, as has been recommended more than once by congresses of zoologists and is now pretty general entomological practice. These new forms are *Conocephalus viridifrons, Odontoxiphidium apterum affine* and *Diestrammena japanica* (error for *japonica*). In the case of the latter the recent Old World literature has been ignored.

In his treatment of the Gryllidae the author leaves much to be desired, and shows a lack of appreciation of tarsal characters in his presentation of the genus *Anaxipha*.

Vernacular names are given to most of the species, many newly coined and often mere translations or near translations of the technical specific names. Some new full synonymy has been established, and in some cases in a rather obscure way.

The type work leaves much to be desired as errors are numerous, although the press work, except on certain cuts, is good. Cuts on pages 223, 253 and 560 appear inverted through printer's slips.

Professor Blatchley has given to us a work of considerable usefulness, and one which must be in the hands of any student of our eastern Orthoptera. It contains much original matter and represents a vast amount of labor, while our one regret is that it most signally fails to be the impartial, evenly balanced and personally unbiased exposition of the subject a manual for the "tyro" should be. The entire work was done too hastily, without the proper examination of the larger collections upon which such a work must be grounded, if it is to be more than a summary of the past literature. The author was handicapped by lack of constant access to the material absolutely necessary for the critical type of work into which he unconsciously turned his manual, originally intended for the beginner. Many of the seeming inconsistencies of some previous work would have been apparent to him if the material in the Philadelphia collections alone had been given more than a several days' examination.

J. A. G. R.

Doings of Societies

Entomological Section, The Academy of Natural Sciences of Philadelphia

The annual meeting was held December 8, 1919, with Director Philip Laurent presiding and twelve persons present, including Mr. J. J. Davis and Mr. C. H. Hadley, of Riverton, New Jersey.

Lepidoptera. Mr. Williams exhibited some species of day-flying moths.

Diptera. Mr. E. T. Cresson, Jr., exhibited a small collection of Diptera presented to the Society by Mr. F. M. Jones, of Wilmington, Del., and collected by the donor in western United States and Alaska. Altho the collection contains only 95 specimens, it represents 49 determined, and about 17 undetermined species; ten of these are new to the collection, four of which were described as new to science. Particular attention was called to the excellent condition of the material. Special attention was also called to two of the new species. One belonging to the Leptid genus *Arthropeas* which contains only two other American species, differs from all known species by the entirely black legs and is further characterized by the globose facial swelling. The other species, belonging to the Tabanid genus *Silvius*, is especially interesting in that it differs so materially from the other representative of the genus, *gigantulus*, while having all the appearance of some of the species of *Pangonia*. However, in the structure of the antennae and in the absence of hind tibial spurs, supposedly generic characters, it is certainly typical of *Silvius*. The descriptions of the new species are published in the Proc. A. N. S. P. for 1919.

Orthoptera. A series of Orthoptera and Dermaptera was exhibited by Mr. Hebard, showing the largest and smallest species of the various families. It was pointed out that the largest known species of Orthoptera is the walking-stick *Phryganistria grandis* Rehn, the smallest is the cricket *Myrmecophila oregonensis* Bruner. The distribution and habits of the various species exhibited were discussed. Further remarks on the subject were made by Dr. Skinner, Laurent and Rehn.

Coleoptera. Mr. J. J. Davis exhibited, in Riker mounts, specimens showing the life history of the Japanese Scarabeid beetle, *Popila japonica*, and its ravages on plants (elm, willow, oak, 5-leaved ivy, fern, Norway maple, apple, grape, sweet cherry and smart-weed), and gave a short but interesting talk on its habits, distribution, destructiveness and the methods being pursued with a view to minimizing its ravages and prevent its spread. He stated that it seemed to be confined to Burlington County, New Jersey, appearing in June and continuing its activities into September. It had first been noticed five years ago, multiplied rapidly and was hard to control; the insect in its adult state skeletonizes the leaves of the plant it attacks and seems to eat everything. He spoke of the efforts being made for its reduction, as plowing the ground at the proper season, hand collecting, insecticides and salting, cutting the roadside growths, a difficult task as there were about 200 miles of road in the infested area.

There was discussion as to methods of capture by Messrs. Hebard, Skinner and Williams.

Mr. C. H. Hadley spoke of the quarantine established against these beetles and stated that they were sun-loving, active insects and did not appear in woods. The infected area is now about 25 square miles.

R. C. Williams, Jr., *Recorder, pro tem.*

Meeting of January 22, 1920. Six members and contributors and one visitor present. Vice-director, R. C. Williams presiding. Mr. A. B. Hiedemann was elected a contributor.

Lepidoptera. Mr. Williams exhibited a box of butterflies, being some curious aberrations of *Catopsilia agarithe*, *Zerene caesonia*, *Argynnis halcyone*, *Melitaea nubigena*, *quino*, and *fulvia*, *Plebeius saepiolus*, *Cyaniris argiolus echo*, *Everes comyntas*, *Heodes helloides*, and *hypophlaeas*. He also spoke about collecting in Connecticut, especially of the irregular appearance of some species, stating that he considered it impossible to plot the distribution of species by collecting in a single season.

Diptera. Mr. Cresson made some remarks on a new Trypetid injurious to the English walnut in Arizona.

Orthoptera. Mr. Rehn exhibited and made some interesting remarks on some Orthoptera of the southwestern portions of the United States. He took some exceptions to Mr. Williams' remarks on collecting, stating that by expert and constant collecting in one season, a good representative collection of the orthopterous species can be secured.

E. T. Cresson, Jr., *Recorder.*

Obituary

An obituary notice of Wilbur Ross McConnell, Assistant Professor of Zoology and Entomology at the Pennsylvania State College from 1907 to 1912, and subsequently connected with the Federal Bureau of Entomology, appears in the *Journal of Economic Entomology* for August, 1920. He was born at Whitesburg, Pennsylvania, in 1881, and died at Carlisle in the same state, June 23, 1920, and had paid much attention to the parasites of the Hessian fly.

The Bulletin of the Entomological Society of France (1920, No. 10) announces the death of J. R. Sahlberg at Helsingfors, Finland, on May 8, 1920, aged 80 years. He published on the Coleoptera and Hemiptera of Finland and on entomological collections, especially of Coleoptera, which he had made in conjunction with his son, U. Sallas, along the eastern and southern Mediterranean. His father and grandfather also were well-known entomologists. Since this note was written, an obituary notice has appeared in *Science* for Sept. 3, 1920, giving his age as 75.

An obituary notice of Joseph Pantel, whose death was mentioned in the News for July last, page 210, is accessible in *Science* for Sept. 17, 1920.

The death of LEONARD DONCASTER, Derby professor of Zoology in the University of Liverpool, on May 28, 1920, was reported in *Science* for July 2. Although chiefly a student of heredity and cytology, as evidenced in his two books *Heredity in the Light of Recent Research* (1910) and *The Determination of Sex* (1914), his research work was largely based on insects. He published on *Gametogenesis and Sex Determination in the Gall-Fly, Neuroterus lenticularis* (3 parts, Proc. Roy. Soc., 1910, 1911, 1916). *On the Relation between Chromosomes, Sex-limited Transmission and Sex-determination in Abraxas grossulariata* and *On the Chromosomes of Biston hirtaria, Nyssia zonaria and their hybrids* (Journ. Genetics 1914), and *On Some Gynandromorphic Specimens of Abraxas grossulariata* (Proc. Cambr. Phil. Soc. 1916). He was born at Sheffield, Dec. 31, 1877, attended the Leighton Park School at Reading, went to Kings College, Cambridge (of which he became a Fellow in 1910), and was Lecturer on Zoology at Birmingham University, 1906–1910. He was elected a Fellow of the Royal Society in 1915.

The Philadelphia *Public Ledger*, of August 30, 1920, published a despatch from "Tokio, Aug. 29. The Rev. HENRY LOOMIS, a pioneer missionary, is dead here. He was born in Burlington, New York, in 1839." We suppose that it was he through whom a number of American entomologists obtained Japanese insects, especially in 1888 and 1889.

Additions to the Recorded Illinois Reduviidae (Hem.)

Van Duzee's recent Catalogue of Hemiptera contains all the published records of Reduviidae from Illinois, but there are in the collection of the Illinois State Natural History Survey many species which are not included in that catalogue as occurring in the state. The following list supplies the omitted species. The nomenclature is according to Van Duzee's catalogue.

Ploiariola errabunda Say, *P. tuberculata* Banks, *Barce annulipes* Stal, *B. fraterna* Say, *Oncerotrachelus acuminatus* Say, *Pnirontis infirma* Stal, *Pygolampis sericea* Stal, *Stenopoda culiciformis* Fabricius, *Oncocephalus apiculatus* Reuter, *Narvesus carolinensis* Stal, *Reduvius personatus* Linne, *Melanolestes abdominalis* H.-S., *Sirthena carinata* Fabricius, *Rhiginia cruciata* Say, *Apiomerus crassipes* Fabricius, *Zelus exsanguis* Stal, *Pselliopus barberi* Davis, *Repipta taurus* Fabricius, *Fitchia spinulosa* Stal, *Arilus cristatus* Linne, *Acholla diadema* Fabricius, *Sinea spinipes* H.-S.

This brings the state list to a total of 30 species, three more than recorded from New Jersey in 1909. J. R. MALLOCH.

Holland. The Butterfly Book. New edition, 48 colored plates.

Holland. The Moth Book. New edition, 48 colored plates.

Humphrey and Westwood. British Moths. 1849. 124 colored plates.

Kirby. Catalogue of Diurnal Lepidoptera. Complete with supplement. 1871–77.

Lang. Rhopalocera Europæ. 1884. 82 colored plates.

Leech. Butterflies from China, Japan, and Corea. 1892–94. 43 colored plates.

Kershaw. Butterflies of Hong Kong and S. E. China. 1907. 23 plates (22 colored).

Lucas. Lépidoptères de Cuba. 1857. 4 colored plates.

Lyonet. Traité anatomique de la Chenille. 1762. 18 plates.

Mabille. Hesperiidæ. Genera Insectorum. 1903–04. 4 colored plates.

Morris. British Butterflies. 71 colored plates.

Oberthur. Etudes d'Entomologie. Livraisons 1–10, 1876–84. 58 colored plates.

Packard. Monograph N. A. Phalaenidæ. 1876. 13 plates.

Packard. Monograph N. A. Bombycine Moths. Three parts, 1895–1914. 232 plates (85 colored).

Rothschild and Jordan. Revision of the Sphingidæ. 1903. 67 plates (7 colored).

Stephens. Illustrations of British Entomology. Haustellata, Vols. 1–4 complete. 41 colored plates. Beautiful set.

Wood and Westwood. Index Entomologicus. (Lepidoptera of Great Britain.) 1854. 59 colored plates.

Wright. Butterflies of West Coast of United States. 1906. 32 colored plates, with complete text.

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This recent catalogue of 110 pages, issued May 1, 1920, contains 30 pages of titles on Lepidoptera, and many other items have since been purchased.

JOHN D. SHERMAN, Jr.

132 PRIMROSE AVENUE

MOUNT VERNON, NEW YORK

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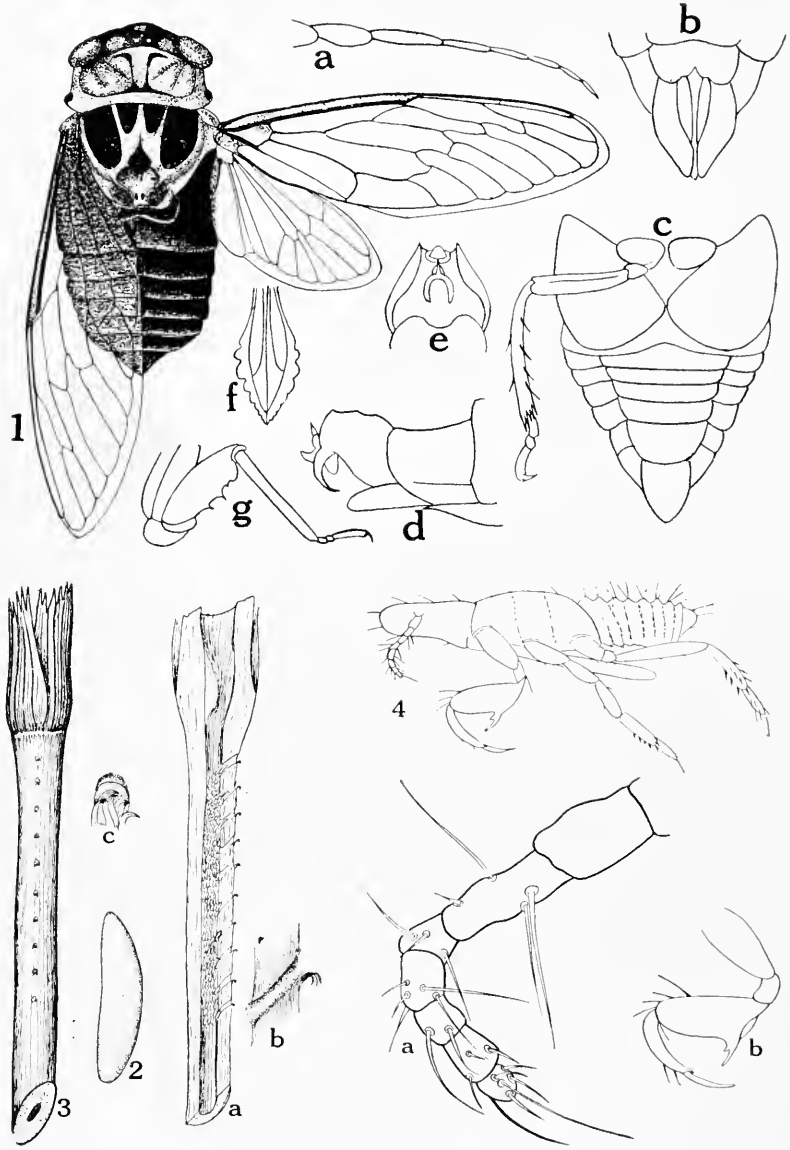

OSBORN AND METCALF—SALT MARSH CICADA.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXXI. NOVEMBER, 1920. NO 9.

CONTENTS

Description of One New Buprestid with Notes on Other Little Known Species (Coleop.).

BY W. J. CHAMBERLIN, Forest Entomologist, Oregon Agricultural College.

Cinyra robusta n. sp.

Form elongate, robust. Entire upper surface, head, thorax and elytra covered with scattered, short, fine, recumbent hairs, arising from the punctures.

Head same color as elytra, not shining, very coarsely punctured, with a faint median line running one-third from the thorax. Front rough with irregular callosities extending across the middle. Clypeus shallow, broadly emarginate. Antennae with the third joint twice as long as the second; from the fourth joint on, all joints are broad and flattened, entire antennae black not testaceous.

Thorax coarsely, moderately densely punctate with irregular smooth callosities, especially along the middle, sides of thorax slightly arcuate, widest just behind the middle and narrowing sharply at the anterior fourth. Scutellum semi-circular, small.

Prosternum dull black not shining, an irregular slight depression extending around the sclerite just inside the border (Fig. 1). From this

depression protrude many lines of long yellowish hairs. Metasternum with large shallow punctures and scattered pubescence.

Length of elytra 10 mm., apex quadri-spinose, finely rather densely punctate, costa apparent on the posterior half; an irregular network of callosities over the whole elytra. Color dull purplish black, the punctures giving a faint bronze reflection in the light. Elytra narrowing rather sharply at the apical fifth.

Abdomen dull black with a faint purplish tinge, sparsely punctate with intermediate, smooth elevations; last ventral truncate.

Length 14.5 mm.

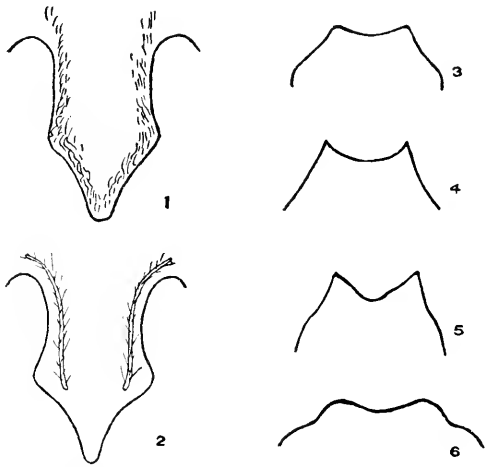

Fig. 1. Prosternum of *Cinyra robusta* n. sp.
Fig. 2. Prosternum of *Cinyra prosternalis* Schaeffer.
Fig. 3. Last ventral segment of *Cinyra robusta* n. sp.
Fig. 4. Last ventral segment of *Cinyra prosternalis* Sch.
Fig. 5. Last ventral segment of *Cinyra gracilipes* Mels.
Fig. 6. Last ventral segment of *Cinyra purpurescens* Sch.

One specimen Texas. Exact locality unknown. Type in the author's collection.

Abundantly distinct from its nearest ally, *C. prosternalis* Schaeffer, by its more robust form, darker and less shining color. In the specimen of *C. prosternalis* which I have, the *antennae* from the fourth joint on have testaceous lobes, (similar to *Chrysobothris dentipes*), a point not mentioned by Mr. Schaeffer. In *C. robusta* the joints are broad, flattened, uniform in texture and color. The border of hairs around

the prosternum as well as the shape of that sclerite (Fig. 1) is different. In *prosternalis* the depression near the border of the prosternum extends only down each side, the hairs are short and scattered, the surface is smooth and shining. In *robusta* the hairs are thick, extend entirely around and the surface lacks any luster.

The last ventral segment of *prosternalis* is stated to be truncate; in my specimen it is slightly sinuate, while in *robusta* it is squarely cut off, almost twice as broad as in *prosternalis* and lacks the definite spines of the latter. Our four* species are, I believe, very readily distinguished as follows:

1. Front coarsely, evenly punctate, metallic coppery color, with no prominent callosities. Clypeus broadly emarginate, rounded at each corner. Length 8 mm..... *C. purpurescens* Schaeffer
2. Front with scattered, coarse punctures, dull blackish violet with faint greenish tinge. A depression at the vertex and an irregular callosity extending across the middle. Clypeus broadly, slightly emarginate, corners angulate. Length 14.5 mm..... *C. robusta* n. sp.
3. Front coarsely punctate, shining green, with callosities more or less resembling an inverted W. Clypeus more deeply emarginate, angles sharper, edges thickened. Length: 13 mm.. *C. prosternalis* Schaeffer
4. Front densely, moderately coarsely, punctate. Coppery bronze, metallic, with a shining green callosity in the shape of an inverted Y. Clypeus triangularly emarginate. Length: 11 mm.
   C. gracilipes Melsheimer

There is, I believe, ample reason for separating the above species into different genera as suggested by Colonel Casey†, but this could only be done by one thoroughly familiar with exotic genera.

Ultimately the species mentioned above will probably fall into three separate genera. *C. gracilipes* Mels. in one, *purpurescens* Sch. in another and *C. prosternalis* Sch. and *robusta* n. sp. in the third.

Agaeocera scintillans Waterhouse.

This beautiful buprestid has not heretofore been reported as occurring in the United States. Dr. Frank Lutz kindly

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* I am unable to distinguish Col. Casey's *C. macilenta* from *C. gracilipes* Mels.

† Casey, Proc. Wash. Acad. Sci. XI, p. 176 (1909).

presented me with a specimen of *Agaeocera*, which I took to be *A. gentilis* Horn, but upon comparing it with the type, at Philadelphia, I found it was an entirely different species and have placed it as *A. scintillans* Water., previously recorded from Mexico. The specimen which I have, with another identical specimen in the American Museum, bears the following label: "Sabino Basin, Sta. Catalina Mts., Arizona. July 8–20, '16. 32°22′ N. 110°16.5′ W. About 3800 ft." Collected by Dr. Lutz.

The species is easily distinguished from *A. gentilis* by its prominent shining costae, narrower thorax, on which is a median sulcus extending two-thirds from the base towards the head and the presence of an elongated fovea on each side of the thorax, which are lacking in *gentilis*.

Dicerca pecterosa Lec.

This rare buprestid has been bred from both peach and prune, where the larvae work low down in the trunk, most commonly in trees attacked by the peach root borer (*Sanninoidea opalescens*). It has been submitted from Roseburg and The Dalles, Oregon, where it is causing considerable damage to orchard trees. Much of the damage in this state attributed to *Chrysobothris femorata* Fab. is in reality due to *C. mali* Horn and *D. pecterosa* Lec. The native host tree of *pecterosa* is not known with certainty, although the author collected one specimen in Grant County, Oregon, on lodgepole pine (*Pinus contorta*), where it was apparently ovipositing.

Melanophila pini-edulis Burke.

This rare species has been recorded from Utah, Colorado, Arizona, New Mexico, and California and Mr. H. E. Burke gives *Pinus edulis* and *Pinus sabiniana* as hosts. A specimen was taken from its cell in Jeffrey pine (*Pinus jeffreyi*) at Waldo, Oregon, in March, 1914, by Mr. J. M. Miller, thus giving a new host plant for the species and extending its range into another state.

Notes on the Genus Hetaerius and Descriptions of three New Species (Coleop.)

By J. O. Martin, Berkeley, California

(Continued from page 225.)

Hetaerius nitidus very closely resembles *brunnipennis* Rand; but in that species the lateral thoracic area is crossed at basal third by a distinct sulcus, represented in *nitidus* by a foveate depression. In *brunnipennis* the lateral thoracic area is coarsely punctate, in *nitidus* it is very finely so and the punctures are fewer in number. The interstrial spaces of the elytra in *brunnipennis* have coarse scattered punctures which are lacking in *nitidus*. The pygidium in *brunnipennis* is smooth, in *nitidus* punctate and hairy. They agree in having the margined area of the prosternum closed by the meeting of the marginal striae.

Hetaerius hirsutus sp. nov.

Body oblong, shining, castaneous, upper surface feebly convex.

Head piceous, vertex concave, punctate, portion next to thorax moderately, coarsely punctured, each puncture with a coarse branched hair, cephalic portion more finely punctured without hair; front smooth, shining, impunctate.

Thorax two-fifths wider than long, slightly narrowed in front, divided longitudinally by two suture-like diagonal grooves into a discal and two lateral areas; lateral areas again divided by a deep transverse sulcus at basal third; discal area slightly longer than wide, a little less than one-half as wide in front as at base, bordered laterally by a shallow sulcus which is smooth, shining and impunctate; central portion of discal area smooth, shining, impunctate, between this rounded impunctate portion and the impunctate bordering sulcus is a roughly triangular area with base at upper edge of elytra and extending slightly less than two-thirds the length of disc which is coarsely and thickly punctured, each puncture bearing a long branched hair, depressed and directed caudad, forming a brush-like bunch at its outer basal portion; along the apical border of discal area are ten to twelve punctures, each with a depressed, squamose, fringed hair; lateral area of prothorax widest at its cephalic end, thickly, coarsely punctured, apical punctures bearing depressed, squamose, fringed hairs; in the lateral and basal punctures the hairs are not squamose but are long, pointed and branched, forming at the edge of the transverse sulcus a brush-like tuft which nearly conceals the sulcus; posterior part of lateral area piceous, shining, tuberculate, lateral edge with numerous long,

branched hairs which are combed inward, partly covering the tuberculate portion.

Elytra shining, hairy, slightly wider than adjacent base of thorax, sides sinuate at base, nearly straight at middle, gradually curving inward to the obtusely rounded, outer apical angle, the truncate tips slightly arcuate; first stria from the suture nearly reaching to apical margin, sinuate, outer edge raised and densely covered with inward pointing, squamose, fringed hairs which at basal third become long, branched hairs directed inward and form at base a brush-like tuft which meets a similar thoracic tuft at an acute angle, their tips intermingling; second stria about five-sixths the length of elytra, broad, shallow and rounded at base, smooth and impunctate; third stria not as broad as second, nearly meeting second at tip, subhumeral stria extending two-thirds the length of elytra; the outer edge of all striae being raised; interstrial spaces moderately punctured, punctures bearing depressed squamose, fringed hairs and among them a few, long, simple hairs.

Prosternum punctate rugose, ventral surface two-thirds its length; area within the margin shining, sparsely punctate with two slightly converging ridges which are widest apart caudally and extend two-thirds the length of the margining striae; marginal striae bent inward at cephalic end but not meeting.

Thoracic and abdominal segments smooth, shining, sparsely microscopically punctured.

Legs smooth, shining, moderately punctured, punctures without hairs.

Propygidium moderately, thickly punctured, punctures with squamose fringed hairs. Pygidium smooth, shining, with a few microscopic punctures.

All hairs of the various parts described are yellow.

Length 2.5 mm. width 1.8 mm.

Described from two examples; one, the *type*, taken by myself at Mill Valley, Marin County, California, is in my own collection, the other, a *paratype*, is from San Francisco and is in the collection of Dr. E. C. Van Dyke.

This species resembles *loripes* Casey, but differs from it in elytral striation and the brush-like tufts of hairs. I have compared it very carefully with *tristriatus* Horn, from which it is distinct in elytral striation, its hairy tufts and the absence of hairs on the sides of the legs which in *tristriatus* are present though very small.

Hetaerius williamsi sp. nov.

Body oblong, one-third longer than wide, shining, castaneous, hairy.

Head shining; vertex concave, shining, evenly, moderately, coarsely punctured, each puncture with a stout fringed hair; front nearly smooth,

clypeus moderately hairy; genae and upper part of mandibles with numerous fringed hairs.

Thorax one-fifth wider than long, divided into a discal and two lateral areas by a suture-like groove which extends nearly to apical border and is paralleled by the shallow sulcus of the discal area, said sulcus being smooth, shining and impunctate; discal area twice as wide at base as at apex, moderately, thickly, coarsely punctured, each puncture with a slightly squamose, fringed hair which becomes longer and more pointed toward the base; lateral area widest in front, the apical angles obtusely rounded, divided at basal third by a deep, transverse sulcus; front portion moderately thickly punctured, punctures with fringed hairs which are longer at sides and edge of sulcus over which they project; basal portion of lateral area piceous, tuberculate with a few punctures on its surface, becoming more numerous on the outer side.

Elytra shining, moderately thickly punctured, hairy, coarsely striate; first stria from elytral suture nearly reaching apical margin, broad and shallow at base, becoming narrow at apex, outer edge raised and thickly covered with squamose fringed hairs; second stria almost as long as first and like it broad and shallow at base; outer edge raised and bordered with squamose fringed hairs which are not as dense as on first stria; third stria slightly shorter than second with raised edges, having fewer and shorter fringed hairs than second stria and likewise broadened at base; subhumeral stria extending two-thirds the length of elytra, also broadened at base; the broad basal part of all striae smooth, shining, impunctate; striae one and two with a few longer, branched hairs at base; interstrial spaces moderately, thickly, coarsely punctured, each puncture with a depressed, squamose, fringed hair and among them a few erect, long, simple hairs.

Prosternum opaque, rugose-punctate; margined ventral surface moderately punctate and with fringed hairs, marginal striae extending one-half length of prosternum, very slightly inflexed at cephalic end, not enclosing area.

Thoracic and abdominal segments shining, moderately punctate, punctures with fringed hairs.

Pygidium and propygidium moderately evenly punctured, punctures with fringed hairs.

Legs shining, moderately punctate, punctures with fringed hairs.

Length 3 mm., width 2 mm.

Described from three examples from the collection of Dr. E. C. Van Dyke, taken at Merced Lake, San Francisco, California, in the nests of a grey *Formica* by Mr. F. X. Williams, for whom I have named it. *Type* in the collection of Dr. E. C. Van Dyke, *paratype* in my own collection.

This species has the same form as that figured by Dr. Horn* as *morsus*, Lec. but the elytral striation is quite dif-

* Trans. Am. Ent. Soc. Vol. III (1870), Pl. 1.

ferent and the size much smaller. It resembles *loripes* Casey, but differs from it in having the whole of the discal area of the prothorax, excepting the sulcate lateral border, punctate and hairy. The elytral striae also differ from his description, as does the margined portion of the prosternum and the vestiture of the pygidium. Casey did not describe the vestiture of the leg surface.

Notes on the Life-History of the Salt Marsh Cicada (Tibicen viridifascia Walker) (Hemip.)

By H. Osborn and Z. P. Metcalf, North Carolina State College and Experiment Station.

(Plate III)

While collecting at Wrightsville Beach, North Carolina, on July 27, 1919, we had the fortune to collect a goodly number of the adults of the Salt Marsh Cicada (*Tibicen viridifascia* Walk.). We also made some observations on the life-history of this species which seem worth recording.

The adults were common on the beach, frequenting the tall dense grasses that abound everywhere in that region. They were especially common on the so-called Sea Oats (*Uniola paniculata*) which grows luxuriantly on the higher sand dunes on the Wrightsville Banks. The males were busily singing and usually half a dozen or more could be heard at one time. The song is a high pitched zing-g-g-g which is much prolonged. One male observed singing was clinging to a stem of the sea oats about five feet from the ground, head up and abdomen well elevated. Several other males were flushed from a coarse, densely matted, short grass which grows near the edge of the water at low tide. These were not singing and were only flushed when they were in danger of being tramped upon. All the females collected were found in this latter locality but a numbr of adults were flushed from the sea oats which did not give the peculiar startled zing given by the disturbed males and were apparently females.

A close examination of the stems of the sea oats revealed characteristic cicada egg punctures. These punctures were found principally on the old stems of last year's growth as well as on the growth of the current year. In one case old and new punctures were found in the same stem. These punctures were found at varying distances from the ground, some being about eighteen inches and others about four feet from the ground. The number of punctures found in any one group varied from one to at least ten. Examination showed that the punctures went right through the thick wall of the stem to the pith. The eggs are not placed in pairs as is the case with the periodical cicada, but several are placed in each puncture averaging 6–7 in the cases where the eggs were actually counted. What appeared to be fresh egg punctures were brought back to the laboratory and placed in cages on August 1. Owing to the writer' absence from the laboratory these eggs could not be examined again until September 2, when several larvae were found dead in the bottoms of the cages, so that they had evidently hatched some time previously.

The nymphal cast skins were found in various situations, clinging to the sea oats on the higher sand dunes, clinging to the short grass at water edge during low tide and in the drift cast up by the waves. Some, if not most, of the nymphs must pass their underground life in the between tide zones and be subject periodically to submersion during the incoming tide.

The following technical descriptions are appended.

The egg is pearly white in color and measures from 2.1 mm. to 2.2 mm. in length and .5 mm. in greatest diameter. The egg is slightly curved and tapers to blunt points at either end.

The first stage nymph. The recently hatched nymph is about 1.5 mm. long from tip of head to the end of the abdomen. The abdomen is slender and the head is somewhat flattened. The body is sparsely but rather uniformly clothed with long slender hairs. The hairs on the legs and antennae are somewhat shorter and much stouter. The general body color is chitin yellow with the eye spot dark red. The antennae are rather short, stout and seven-jointed. The first and second joints are subequal in length with the second much more slender. Joints three to six are

subequal in length and diameter. The seventh joint is shorter and subglobular in shape. The arrangement of the spines is shown in figure 4*a*. The beak is stout and reaches beyond the middle of the abdomen. The fore legs are well developed, with the coxa long; the trochanter about half as long as the coxa; the femur about as long as coxa, broad and heavy with ventral tooth well developed and provided with a prominent lateral tooth; the tibia is slender, about half as long as the femur, and the single tarsal claw is very long, nearly equalling the tibia in length. The middle and hind legs are slender with long coxae and single-jointed tarsi which are without claws at the tip.

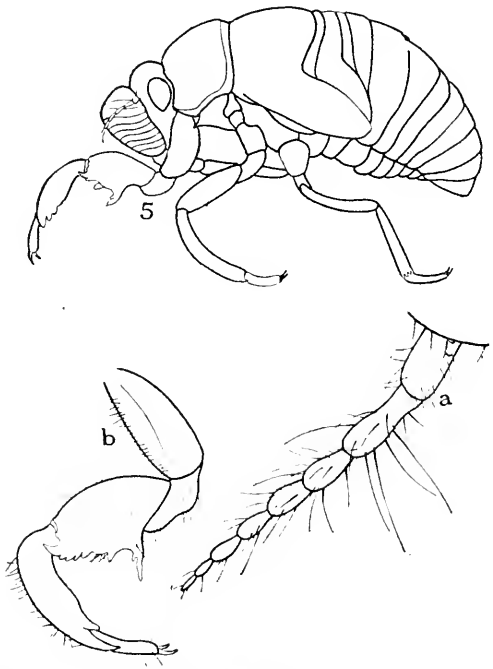

Fig. 5. Mature nymph. ×2. Fig. 5a. Antenna of mature nymph. ×15. Fig. 5b. Fore leg of mature nymph. ×4.

Last nymphal stage. Length of body 18 mm; in general appearance like other cicadas in the last nymphal stage; head large and robust, eyes large; frons well inflated, crossed by eleven rows of long hairs; antennae 3.1 mm long, eight-jointed, the first joint stouter than second about two-thirds as long, joints three to six gradually decreasing in length and diameter, the seventh and eighth abruptly so; beak stout reaching hind

coxae, three-jointed; all the coxae are very much elongate, and the femur of the front legs is thick and heavy with a long ventral tooth provided with an anterior tooth, secondary ventral tooth present; the femoral comb with seven teeth decreasing in size apically; the fore tibia is about as long as the femur, bifid apically; the fore tarsus is long, three-jointed and provided with two sub-equal claws, the median one smaller. The middle and hind legs are nearly equal in size, with the tibia provided with five, stout, black spines at the apex, the tarsi are one-jointed with two very unequal claws at apex, the outer claw about one-half as long as the inner.

The adult is a medium small cicada with a bright green collar, the costal vein brownish and sub-costa and radius bright green to the bend of the wing and the other main veins of the fore wing green to the cross veins, black beyond.

The head is black above, with fuscous spots at the inner angles of the eyes and a greenish stripe from the antennal ledges to the eyes, the frontal arcs are fuscous with the interspaces heavily pruinose; the antennae are eight-jointed with the two basal joints heavy, the others flagellate.

The pronotum is fuscous with narrow anterior border between the eyes and the collar green, two converging black spots continued posteriorly in a broad triangular black spot bordering the collar. The mesonotum is mostly black with fuscous markings. Legs yellowish fuscous with the spines and the tips of the tarsi black.

The abdomen is black above. Beneath, the head, thorax and lateral parts of abdomen are heavily pruinose, the central part of the abdomen lightly so, showing the pale fuscous ground color. The drums are short, broadly, roundly divergent, the uncus is wish-bone shaped with the prongs long, curved and sharp-pointed.

Length to end of abdomen, male 23 mm; female 24 mm; to tip of wings, male 38 mm; female 41 mm; width of collar 10 mm.

Previous records indicate a distribution restricted to the Atlantic and Gulf Coasts from North Carolina to Louisiana, but no suggestion of the adaptation to aquatic conditions appears in any record that has come to our notice.

Explanation of Plate III.

Tibicen viridifascia Walk.

Fig. 1. Dorsal view adult male. ×1½, showing characteristic color pattern and venation of fore and hind wing.

Fig. 1a. Adult antenna. ×15.

Fig. 1b. Female genitalia ventral view. ×2.

Fig. 1c. Ventral view of male abdomen, showing hind leg, opercula and male genitalia.

Fig. 1d. Male genitalia extended lateral view.
Fig. 1e. Male genitalia extended posterior view.
Fig. 1f. Tip of ovipositor. ×8.
Fig. 1g. Anterior leg. ×2.
Fig. 2. Egg. ×15.
Fig. 3. Stalk of sea oats showing characteristic egg punctures. ×½.
Fig. 3a. Stalk of sea oats cut longitudinally to show arrangement of egg punctures. ×1½.
Fig. 3b. Single egg puncture. ×15.
Fig. 3c. Single egg puncture. ×15.
Fig. 4. Recently hatched nymph. ×20.
Fig. 4a. Antenna of recently hatched nymph. ×120.
Fig. 4b. Anterior leg of recently hatched nymph. ×35.

The Occurence of Mallophaga on a Dragonfly (Odon.).

Mr. E. B. Williamson has recently sent me specimens of *Mallophaga*, several of a small species of *Gyropus*, and one *Trichodectes*, which he found at Quebrada La Camelia, Colombia (Feb. 18, 1917) attached to a dragonfly (*Ischnogomphus jessei* Williamson). The only recorded case of a Mallophagous insect found on another insect is that noted by Sharp (Proc. Zool. Soc. Lond. 1980, p. xxx) who found several attached, apparently by the mandibles, to a Hippoboscid fly, *Ornithomyia avicularia*. As this is also a bird parasite it is not surprising that the smaller Mallophaga should at times crawl upon it, but the occurrence of the Colombian specimens on the dragonfly seemed at first inexplicable, especially as the genus *Gyropus* lives exclusively on small terrestrial rodents. However Williamson, in his description of the dragonfly (Occ. Papers, Mus. Zool. Univ. Mich. No. 52, 1918, p. 44) shows that it is in the habit of alighting on the ground or on leaves near the ground, and one may reasonably suppose that the dragonfly had recently perched upon some dead agouti or similiar rodent and that the insects had then attached themselves to it. So while this case is very interesting, it is not an example of phoresy, but more properly belongs with other cases of insects being found in unusual situations, best explained by our genial E. A. Schwarz in words which formulate a simple yet indubitable biological law: "They must sit somewhere."

Wm. M. Mann, U. S. Bureau of Entomology, Washington, D. C.

Studies on Costa Rican Odonata.

IX. Sympetrum, with Description of a New Species.

By Philip P. Calvert, University of Pennsylvania, Philadelphia, Pa.

The only *Sympetrum* recorded from Costa Rica in the *Biologia Centrali-Americana* is *S. illotum virgula*, specimens of which were examined from San José, San Francisco and from an altitude of 6000–7000 feet on Irazú. Dr. Ris, in the *Catalogue, Collections Zoologiques . . . Selys** and in his *Libellen (Odonata) aus der Region der amerikanischen Kordilleren von Costarica bis Catamarca*,† has neither added any Costa Rican data for this form nor increased the number of species of *Sympetrum* from that country.

In the course of the year May 1, 1909,–May 10, 1910, we observed *Sympetrum illotum* in Costa Rica at Cachí, Paraiso, Cartago and vicinity, Laguna Ochomogo, on the mountain Carpintera, near Tres Rios and at Alajuela. These seven localities represent a range in altitude from 985 to 1600 meters (3230–5250 feet).‡ For the vicinity of Cartago, including San Isidro del Tejar, our notebooks record its appearance in every month except December and January (during the latter of which we were absent except for short visits by one of us), transformation to the imago on September 20, October 30, 31, November 12, 21, 29, and oviposition

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*Fasc. XIII. Libellulinen, p. 677, Bruxelles, 1911.

†Archiv f. Naturges. 82 Jahrg., Abt. A, 9 Heft., p. 180. Berlin, 1918.

‡Details as to altitudes, localities, etc will be found in "A Year of Costa Rican Natural History" by A. S. and P. P. Calvert, New York, Macmillan, 1917.

I have also one male, intermediate between *i. illotum* and *i. virgula*, sent by Mr. C. H. Lankester with specimens taken near the Rio Jesus Maria, on the Pacific slope, April 2–4, 1918. The altitude of this locality, less than 100 meters, is much below that in which this species has been observed elsewhere in Central America or Mexico. The specimen has been submitted to Mr. Lankester, who writes that it "conveys no memory of capture." The envelope in which it was originally sent to me is part of a printed page, another piece of which contained an *Erythrodiplax connata* whose occurrence at Rio Jesus Maria there is no reason to doubt.

on May 10, June 20, August 28, September 26, October 7, 11, 31, November 12, 21, April 5, 20. Specimens are not at hand for all the dates on which the species was noted, so that it is impossible to specify which subspecies was the form seen at each observation. Those which are accessible, irrespective of locality, are chiefly of the subspecies *illotum virgula*, or intermediates between *i. virgula* and *i. gilvum*, as these are defined in the *Biologia*, volume *Neuroptera*. There are before the writer 1 ♂ *i. virgula* and 2 ♀ intermediate between *i. virgula* and *i. gilvum*, all three taken at Cartago, May 10, 1909, over the same swampy place. Two males taken just above Cartago, May 24, 1909, are respectively intermediate between *i. illotum* and *i. virgula* and between *i. virgula* and *i. gilvum*. It seems unlikely, therefore, that the exact form of the species has any strict correlation with the habitat.

In Costa Rica we found this species in open swamps and open fields, at small pools (as in lanes at Cartago), on the banks of the Rio Reventazon (at Cachí), at a tank in a coffee plantation (Cachí). As in other species of this genus, the male and female fly around together while the latter is ovipositing, the male holding the female's head with his abdominal appendages.*

The occurrence of this species at a given station is erratic. Thus on the southern edge of the town of Cartago:

"The day . . . . was May 10, 1909. The rains of the two preceding days had changed the dusty roads to damp and produced little swampy spots in the pastures. Over one of these swamps a species of dragonfly (*Sympetrum illotum virgulum*) was swarming . . . . There was an exceedingly handsome frog here (*Agalychnis helenae*) . . The morning of May 11 was not so bright as that of the preceding day,

*Dr. C. H. Kennedy states that in California "Usually the female of this species oviposits unaccompanied by the male but here [Auburn in Placer County] I observed a pair working together." Proc. U. S. Nat. Mus. vol. 52, p. 609, 1917.

On all of the eleven dates mentioned above for oviposition in the vicinity of Cartago and also at Laguna Ochomogo on Sept. 25, our field note books expressly record that male and female were flying together, the male holding the female. We have no record of oviposition in any other way.

although the sun was shining. We revisited these same swampy spots but not a single individual of the bright red species of dragonfly nor one of the peculiar frogs was to be seen there . . . "†

On March 4, 1910, this species was at a tank in a coffee plantation at Cachí and on March 5, by stagnant pools near the bank of the Rio Reventazon near Cachí; on March 9 and 10 it was not found at these two places respectively although the days were sunny.

The dates at which this species was observed at localities other than the vicinity of Cartago and Cachí were: September 25, Laguna Ochomogo; December 4, La Carpintera; December 9, Alajuela and vicinity; March 17, east of Tres Rios.

On April 21, 1916, Professor Anastasio Alfaro, Director of the Museo Nacional de Costa at San José, who has done so much to advance scientific knowledge of that country, collected some *Sympetra* on the Volcano Poas. These at first sight appeared to be intermediate between *S. illotum virgula* and *S. illotum gilvum*, but a detailed study apparently justifies their recognition as a distinct species for which I propose the name

Sympetrum nigrocreatum n. sp.

Similar to *S. illotum virgula* Selys but differing as follows: Size larger. Range of length of abdomen ♂, 26–28 mm. (22–25*), ♀, 26–28 (21–23); average ♂ 27.045 (23.33), ♀ 27.14 (22.6) mm. Range of length of hind wing ♂ 30–33 (26–29), ♀ 31–34 (27–30); average ♂ 31.72 (27.41), ♀ 32.35 (28) mm.

No additional transverse carina on abdominal segment 4 in ♂, except in one ♂ in which it is low but distinct (present, distinct), but present in the ♀ (present, distinct).

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†A Year of Costa Rican Nat. Hist., pp. 73,74.

*The figures and other statements enclosed in parentheses in this description are those obtained from 12 ♂, 5 ♀ of *S. illotum virgula* and intermediates between it and *S. illotum illotum* on one hand and *S. illotum gibrum* on the other, from the seven Costa Rican localities mentioned on page 249. They are given immediately after the corresponding figures for *S. nigrocreatum* which latter are based on 11 ♂, 7 ♀. Where percentages of variation are given, as for venational characters, each wing, fore or hind, = 2.777 % for *nigrocreatum* and 2.941 % for *S. illotum virgula* and intermediates.

Apices of the femora and all of the tibiae and of the tarsi blackish brown (femora and tibiae luteous or reddish); some tendency toward paling of the legs is shown by one male which has all the tibiae with a superior luteous stripe, two males which have the third tibiae somewhat reddish superiorly and one female which has all the tibiae reddish.

Venation, especially near the front margin of both front and hind wings blackish brown (luteous or reddish except in three ♀).

Yellow coloring at the base of the wings reaching on the front pair to the first antenodal, less frequently to the arculus (most frequently to the level of the triangle), on the hind pair to the second, rarely the third, antenodal (to the nodus, less frequently to the second antenodal or triangle and then a nodal yellow spot is present); no yellowish spot at nodus of front wings (present). Dark brown streak at base of wing in subcostal and partly in costal area reaching distad on the front wings to one-third or one-half way to the first antenodal (one-fourth way or less to the first antenodal), on the hind wings to the arculus or, less frequently stopping at a point half-way from first antenodal to arculus (first antenodal, less often to arculus). Dark brown basal streak in cubital area of hind wings varying from a mere trace to reaching almost to the cubito-anal cross-vein or anal crossing.

Pterostigma uniformly luteous or even golden yellow, not paler at its distal end (luteous or ochre brown, paler at the distal end, but golden yellow in 1 ♂, 1 ♀, and not paler at distal end in 3 ♂, 3 ♀), longer, 2.66–3.26 ♂ (2.33–2.74), average 2.92 (2.51), 2.81–3.18 ♀ (2.52–2.81), average 2.97 (2.63) mm.*

Antenodals, front wing, 8½ 2.77%, 9½ 36.1%, 10 2.77%, 10½ 44.43%, 11½ 5.55%, the remaining 8.32% somewhat irregular (7½ 8.82%, 8½ 79.38%, 9½ 5.88%, 8¾ 5.88%); hind wing 6 22.17%, 7 72.2%, 8 5.55% (5 + ½ 5.88%, 6 91.14%, 6½ 2.94%). Two rows of cells between *M2* and *Rs* on the front wings begin at the following distances from the margin and extend thence distad: 2 cells 2.77%, 3 cells 8.33%, 4 cells 33.33%, 5 cells 33.33%, 6 cells 16.67%, 7 and 9 cells each 2.77%† (2 cells 41.16%, 3 cells 23.52%, 4 cells 5.88%, while 29.4% have but one row of cells here); marginal cells here 2 25%, 3 61.1%, 4 13.88% (1 5.88%, 2 82.4%, 3 11.76 %). Two rows of cells between *M2* and *Rs* on the hind wings begin at following distances from the margin and extend thence distad: 3 cells 22.21%, 4 cells 41.66%, 5 cells 27.77%, 6 cells 2.77% (2 cells 58.8%, 3 cells 8.82%, while 29.4% have but one row of cells here); marginal cells here 2 11.10%, 3 69.43%, 4 11.1%, 5 2.77% (2 88.2%, 3 11.76%).

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*The measurements for the length of the pterostigma and for the superior and inferior appendages of the ♂ were made with an eye-piece micrometer in a Zeiss binocular microscope fitted with eyepieces 4, paired objectives F 55.

†Portions of the hind margin of two wings have been injured, = 5.55 %.

Double cells between *Rs* and *Rspl*, front wings, 0 11.11%, 1 11.11%, 2 22.22%, 3 22.22%, 4 30.54%, 5 2.77% (0 97.03%, 1 2.94%); hind wings 0 36.11%, 1 19.44%, 2 16.66%, 3 13.88%, 4 13.88% (0 100%). Marginal cells between *Rs* and *M*3, front wings, 17 13.88%, 18 22.21%, 19 30.54%, 20 16.66%, 21 2.77%, 22 8.33% (13 5.88%, 14 14.7%, 15 5.88%, 16 47.05%, 17 20.58%, 18 5.88%). Marginal cells between *M*4 and *Cu*1, front wings, 4 36.1%, 5 36.1%, 6 13.88%, 7 8.33%, (2 5.88%, 3 52.94%, 4 38.23%, 5 2.94%).

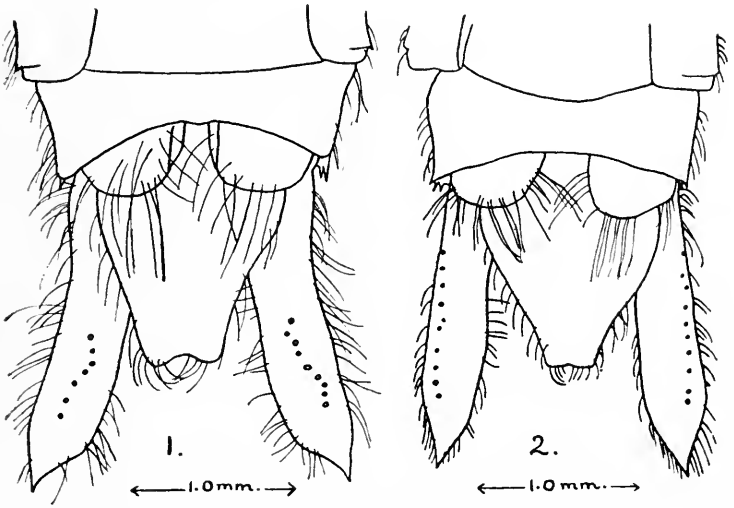

Fig. 1. Ventral view, apex of abdomen *S. nigrocreatum*, ♂, no. 5, Volcan Poas, alt. 2500 m., April 21, 1916, A. Alfaro. Camera lucida, card at stage level, Zeiss stand, comp. micros. oc. 2, obj. A, lower lens off.

Fig. 2. Ventral view, apex of abdomen *S. illotum* intermediate between subspp. *virgula* and *gilvum*, ♂, no. 53, Cartago, February 19, 1910, Calvert. Same lens and camera lucida outfit.

♂. Inferior denticles of the superior appendages, viewed from below, tending to form a reversed curve as shown in text figure 1 (line of denticles almost straight, see fig. 2) and occupying .28–.416, average .353 (.409–.532, average .461) of the total length of the appendage as measured in profile.

Inferior appendage .89–1.11 mm. (.89–1.04) wide at base, average 1 mm. (.96), .30–.44 mm. (.22–.30) wide at apex, average .37 (.28) mm. Ratio of apex width to base width .333–.435 (.229–.337), average .368 (.295).

Locality. Poas Volcano, Costa Rica, 2600 metres [8530 feet], April 21, 1916, by Professor A. Alfaro. 12 ♂, 8 ♀

sent for examination, 1 ♂, 1 ♀ returned to him. *Type* ♂ in the writer's collection at the Academy of Natural Sciences of Philadelphia. As to the type locality Professor Alfaro wrote, July 22, 1916:

"Durante la semana santa estuve en el Volcan de Poas y colectado muchas libéllulas en el Potrero del Alto, cerca del crater; alli hay un Hotel y junto a los desagües de la casa me pareció distinguir tres especies, lo mismo que en la zanja del Potrero; la especie de mayor tamaño no dejaba arrimarse y de la tercera solamente un ejemplar vi; creo pues que mis ejemplares colectados en numero de 40 son ♂ y ♀ de una sola especie . . . las libéllulas del Volcan de Poas, por ser esa la mayor altura en que he colectado Odonatos: 2600 metros."

Mr. E. B. Williamson, at my request, has examined a pair of these specimens collected by Prof. Alfaro and independent of any suggestion from me has also reached the conclusion that they represent a new species allied to *Sympetrum virgula*.

Several features of *S. nigrocreatum* described above are of special interest. According to Dr. Ris,* but three species of *Sympetrum* possess an additional, or supplementary, transverse carina on abdominal segment 4: *dilatatum* Calvert of St. Helena, *illotum* Hagen and *corruptum* Hagen of (chiefly North) America. *S. nigrocreatum* is clearly closely related to *illotum*, yet the male, in the majority of specimens examined, lacks this carina, although the female possesses it distinctly developed. In the male, the appearance is as if the carina had been smoothed out, its site being indicated by a slight difference in the surface of the segment. Whether the presence or absence of such transverse carinae has any correlation with the internal anatomy has not been determined, apparently.

Assuming that *S. illotum* is the nearest ally of *S. nigrocreatum*, the latter is larger and has a greater number of cross-veins (e. g. antenodals) and of cells on its wings. As *nigrocreatum* inhabits a higher, and presumably cooler, station than does the Costa Rican *illotum*, a causal relation is

*Libellulinen Monographisch bearbeitet. Cat. Coll. Zool. Selys, fasc. XIII, pp. 617–624, 1911.

suggested when similar conditions existing in highland and lower land individuals of *Ischnura ramburi* and *I. denticollis** are recalled. Similarly individuals of *Erythrodiplax berenice* from the northern Atlantic coast of the United States are larger and more densely veined than those of the coasts of Florida, the West Indies and Central America.† The question needs much further investigation to determine whether a presumably lower temperature is a cause of larger size and denser venation. If this be so, one would expect individuals of *S. illotum* from British Columbia and the northwestern United States to exceed those of corresponding or lower altitudes in Mexico for example. It is to be hoped that some one with sufficient material will study it from this point of view. A number of the venational features of *nigrocreatum* given above are not in themselves sufficiently diagnostic to distinguish this form from *illotum* and its subspecies. They do, however, show the tendency to vary away from the conditions to be found in *illotum*.

A New Kricogonia from Cuba (Lep., Rhop.)

By Chas. T. Ramsden, Guantanamo, Cuba.

While on a recent visit to the Academy of Natural Sciences of Philadelphia, Dr. Henry Skinner generously called my attention to specimens of *Kricogonia* from Guantanamo, Cuba, I had sent him some years before. These differ so much from individuals of other localities that they seem to belong to a new form and may be known as:

Kricogonia cabrerai n. sp.

♂ *Upperside.* Primaries: Yellowish white; costa from insertion of wing to one-quarter of its length is lemon yellow, the remainder slightly tinged with yellowish.

Secondaries: Same colour as primaries except for a black band 8 mm. long and 3 mm. wide which begins at the costa running toward end of

*Biol. Centr.-Amer., Neur., pp. 387–389, 1907.

†Ibid., p. 268.

discal cell. This band is unbroken by the nervures while in *terissa* it is broken.

Underside. Primaries: Pearly white, base of wing lemon yellow, apices straw color and marbled.

Secondaries: Straw colour having a marbled appearance produced by short brown lines except where the black band shows through.

♀ *Upperside.* Primaries: Same as male, the lemon yellow parts being more intense.

Secondaries: Also as in male but with the outer margins and base suffused with yellow. Black band lacking.

Underside. Primaries: As in male, lemon yellow base more intense.

Secondaries: Straw colour entirely marbled with short brown lines.

Expanse one wing, ♂ 27 mm., ♀ 26.5 mm.

Male and female, Guantanamo, Cuba, May 27th, 1914. Collected by the author.

Type and *allotype* in the collection of The Academy of Natural Sciences of Philadelphia. Paratypes in collection of the same Academy and also in that of the author.

This form is larger than any I have seen from any other locality.

It differs from *terissa*, on the upperside, in having the black band longer and wider, extending in this form to nearly the middle of the wing, while in *terissa* it hardly extends to more than one quarter. The base of the primaries is not orange as in *terissa* and differs on the underside, by the marbled appearance of the secondaries.

I take pleasure in naming it after don José Cabrera of El Cotorro, Cuba, a tireless and unassuming student of Cuban Entomology.

Indiana Insects

It is the plan of the department of Entomology of Purdue University and the Agricultural Experiment Station to build up a collection of insects which will satisfactorily represent the insect fauna of the Central West, east of the Mississippi, and particularly that of Indiana. Records, publications dealing with Indiana insects, and specimens themselves are solicited.

Careful records of occurrence and economic importance will be kept with a view to publishing the "Insects of Indiana" at a future date. Records should, therefore, include name, authority for determination, exact locality, date of capture, stage, host if known, collector and other pertinent data.

Your coöperation is earnestly solicited.—JOHN J. DAVIS, Agricultural Experiment Station, Lafayette, Indiana.

On Scolia bicincta Fab. and Scolia undata Klug (Hymenoptera, Scoliidae).

By C. S. Brimley, Division of Entomology, North Carolina Department of Agriculture, Raleigh, N. C.

On looking over our specimens of *S. bicincta* and *S. undata* I find that they grade into one another and that no definite line of demarcation can be drawn between them.

In addition to the usual white cross bands on the second and third abdominal segments above, which may be without any interruption whatever, even in otherwise typical *undata*, there are present in two-thirds of the males examined and in one-third of the females, white markings of some sort on either the pronotum, post-scutellum, first abdominal segment above or second abdominal segment below, or on all of these or in any combination.

The spots on the pronotum are usually a small round spot on each side in front; one specimen, however, has a spot on only one side and another has an enlarged transverse wedge-shaped spot on each side. Present in five males.

The marking on the postscutellum is usually a small roundish dot, elongate in one specimen. Present in nine males and three females.

The marking on the first abdominal segment is either a roundish dot or a transverse stripe; in the latter case it may be either short and narrow, extending on about the middle fourth of the segment, or it may be broader and extend right across the segment. In two cases there is a roundish dot on one side of the middle, instead of in the middle. Present in some form in twenty-seven males, and three females.

On the underside of the second abdominal segment there is, in seventeen males, a roundish or oval spot not far from the lateral margin of the segment. These spots vary a good deal in size and but little in shape.

The following table shows the number of specimens showing the various combinations of the above markings:

With usual white stripes on segments 2 and 3 only, males 16, females 11.

With additional markings as below:	males	females
1 A spot or stripe on seg. 1 above only	9	2
2 A pair of white spots on seg. 2, below only	1	0
3 A white dot on postscutellum only	2	2
4 On seg. 1 above, and seg. 2 below only	10	0
5 On seg. 1 above, seg. 2 below and postscutellum only	1	0
6 On seg. 1 above, seg. 2 below, postscutellum and pronotum	3	0

7	On seg. 1 above, seg. 2 below and pronotum only....	1	0
8	On seg. 2 below and postscutellum only.....	1	0
9	On seg. 1 above and postscutellum only.....	1	1
10	On seg. 1 above, and pronotum only.....	1	0
11	On seg. 1 above, pronotum and postscutellum only..	1	0
	Total.....	47	16
	With white crossbands only on segs. 2 and 3 above..	16	11
	With additional white markings.....	31	5

Specimens examined, Raleigh: 33 males, 9 females; Elizabeth City: 6 males, 1 female; Andrews: 4 males, 1 female; Jefferson: 1 male; Blowing Rock: 1 male; Bushnell: 1 male; Statesville: 1 male; Greensboro: 2 females; Durham, Blantyre and Whittier: 1 female each. All localities in North Carolina and all specimens taken between mid-July and mid-September.

House Flies in Court.

One of the noblest decisions on record, so far as bald-headed men are concerned, has been handed down by the Supreme Court of Maine. It is notorious that a bald head has a peculiar attraction for the common house fly. He prefers to roost there or promenade there to any other place in the neighborhood. Now the high court has declared the bald-headed persons are entitled to protection. In the case of Williams vs. Sweet, a hotelkeeper sued because the defendant, who had contracted for accommodations for a certain period, left the hotel before the time had elapsed. The defendant said he was pestered by flies, which were particularly numerous in the dining room.

The august court held that the fly is a nuisance and its disease-carrying characteristics are well known. A patron of a hotel was warranted in leaving the establishment, regardless of a contract for a longer stay, if the dining room was infested with the pests. An innkeeper, it declared, agreed by implication to furnish accommodations compatible with the prices paid, the standing of the hostelry and the class of persons invited to become patrons. "Accommodations," the judges asserted, included apartments, dining service and sanitary conditions, and if the hotelkeeper failed to maintain these in inviting and wholesome manner the patron was warranted in seeking quarters elsewhere, regardless of an engagement to remain for any specified time.

Hotel men had better get busy with their fly swatters. Restaurant people also.—RICHARD SPILLANE in the *Public Ledger*, Philadelphia, Aug. 4, 1920.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., NOVEMBER, 1920.

Mental Attitudes toward Insects.

Among other occupations, the editor of the NEWS gives a course of lectures and readings to university students on the history of entomology. The other day they were reading Otto Keller's *Die Antike Tierwelt*, which called his attention again to the long period in the history of civilized peoples in which progress in zoology, and hence in entomology, was very slow. It may seem difficult for a zoologist to realize what must have been the mental attitude of many a cultured Egyptian, Greek or Roman toward insects. But while the editor was in this frame of mind (he is one unit of the fifty millions who make up the rural population of these United States), the butcher came. His business transacted, the butcher observed that the coming winter was likely to be cold only in its latter part—because he had been feeling the caterpillars along the road and they were hard to the touch *only at their hind ends!*

Anent an Increased Subscription Price.

In the October NEWS (page 226) we asked all our readers to fill in and mail to us a card, from a page near the back cover, stating their willingness or unwillingness to subscribe for the NEWS for 1921 at $2.50. About eighty replies have been received, but we urge all others to whom the October number has gone to send us their message on this question at once, as we must hear from all our subscribers in order to make our plans for 1921.

Two Syntomidae New to Mississippi (Lep.).

Mr. W. C. Dukes, of Mobile, Alabama, has recently sent me two species of Syntomidae (Lep.) from a new locality. They were taken on Cat Island, Mississippi, in the Gulf of Mexico. The species are *Cosmosoma auge* Linn. and *Didasys belae* Grote. The former is found in Florida, West Indies, Central America and South America, and the latter, so far as I am aware, has not been recorded outside of the State of Florida.—HENRY SKINNER.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **17**—Lepidoptera, Boston, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **31**—Proceedings of the Entomological Society of Nova Scotia, Truro. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **39**—The Florida Buggist, Gainesville. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **49**—Entomologische Mitteilungen Berlin-Dahlem. **50**—Proceedings of the United States National Museum, Washington. **53**—Nature Study Review, Ithaca, N. Y. **62**—Bulletin of the American Museum of Natural History, New York. **68**—Science, Lancaster, Pa. **76**—Nature, London. **81**—The Journal of Parasitology, Urbana, Illinois. **82**—The Ohio Journal of Science, Columbus. **90**—The American Naturalist, Lancaster, Pa. **103**—Biologisches Centralblatt, Leipzig. **110**—Naturwissenschaftliche Wochenschrift, Jena. **111**—Archiv fur Naturgeschichte, Berlin. **112**—Entomologische Berichten, The Hague, Holland.

GENERAL. Blackmore, E. H.—Rare and uncommon insects taken in Br. Columbia during 1919. (Rept. Prov. Mus. Nat. Hist. Br. Columbia, 1919, 17–23.) **Bouvier, E. L.**—Revue d'entomologie pour les Annees 1910–1914. Part 1, Biologie; Part 2, Structure et physiologie, developpement et adaptation. (Rev. Gen. d. Sci. Pures et Appl., xxxi, 410–18; 155–62.) **Bouvier, E. L.**—The psychic life of insects. (An. Rept., Smiths. Inst., 1918, 451–9.) **Chetverikov, S. S.**—The fundamental factor of insect evolution. (An. Rept., Smiths. Inst., 1918, 441–9.) **Crampton, G. C.**—Remarks on the basic plan of the terminal abdominal structures of the males of winged insects. **4**, lii, 178–83. **Dixey, F. A.**—The geographical factor in mimicry. (Rept. Br. Assoc. Adv. Sci., Bournemouth, 1919, 201–7.) **van Eecke, R.**—Varia entomologica. **112**, v, 153–5. **Folsom, J. W. et al.**—Symposium on "The life cycle in insects." **7**, xiii, 133–201. **Gibson, E. H.**—Professional entomology: the call and the answer. **12**, xiii, 355–7. **Lyon, M. W.**—Family and

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Manual of the Orthoptera of New England, including the Locusts, Grasshoppers, Crickets and their Allies. By Albert P. Morse. Proceedings of the Boston Society of Natural History, vol. 35, no. 6, pp. 197–556, pls. 10–29, 99 text figs. April, 1920.—It is a rare occasion in the experience of any student of a special field in zoology or botany when he is able to pick up a new comprehensive work, purporting to be both technical and popular, written by a brother specialist, with almost all of whose conclusions and methods the reader finds himself quite in accord. Usually there will be found a number of rocks upon which the conformity of opinion is shattered, some radical innovation which is untried and frequently unwarranted. Morse's "Manual" is clearly one of these rare studies, a painstakingly accurate and thorough piece of work, a model of its kind and fully in keeping with the high plane achieved by that author in his previous memoirs.

The style is attractive, literary and where needed is scientifically concise, the illustrations are generally well selected and carefully executed.

The first paragraph of the Introduction (p. 207) fully deserves quotation, as it epitomizes the order better than we have seen done by any previous author:

"The Orthoptera form a group of insects whose members touch upon man's interests in a variety of ways. Some are among the scourges of the earth, devastating wide areas, reducing the inhabitants to penury and starvation and leaving in their wake misery and pestilence. Others of obnoxious character enter dwellings in search of food and shelter, and though acting in part as scavengers destroy large quantities of food-stuffs and defile the premises. Wherever he wanders, whether on some nameless peak of the farthest ranges or in the less inviting vacant lot next door, by seabeach, grainfield, alkali desert, or mangrove swamp, on city pavements or yielding footpath to the spring, these little creatures are his companions; whether he sleep in hut or palace or beneath the stars their voices soothe his rest."

The "Manual" is made up of five major divisions: Introduction, The Orthoptera of New England (treated in systematic fashion), Accented List of Scientific Names, Glossary and Index. The introductory division

is made up of eighteen major sections, all of interest, very well presented and taken as a whole the best presentation of the subjects there treated we have ever seen in a work of this character. We feel called upon to comment upon certain of these sections, largely to direct the inquiring student to their contents. The "History of New England Orthopterology" is well and concisely presented, the author, however being too modest to give his own most valuable published work its proper emphasis. Under "Classification" there is reviewed that published by Brues and Melander, and a modified form of the classic arrangement of the order, as influenced by the work of Brues and Melander, is followed in the Manual. Under "Anatomy," the external structure is clearly discussed and explained, with the aid of numerous figures, and the basic internal structure is briefly summarized. Under "Habits" we find egg-laying, situations for egg placing, hatching, moults, maturity, food and migration discussed; while under "Songs" we find a careful exposition of the three methods of sound production in the Orthoptera. Under the third method it might have been well to have considered the possibility of the thickened radiate veins of the wings of certain Oedipodinae producing sound in display flight or direct flight by rubbing one over the other, as their surfaces possess accessory modifications in certain species.

"Coloration of Orthoptera" is treated in a very careful summary, in which there are discussed the types of colors in insects, relative predominence of "sympathetic and protective" coloration in the Orthoptera, the principles of "counter-shading," display coloration, "contrast-mimicry" or "signal coloration" as it has been variously called, the seasonal deepening of color in certain locusts, the rare albinistic and melanistic conditions, pink katydids, dichromatism, and the uncertainty and unreliability of color shade and markings in general as diagnostic features in New England Orthoptera. The author's suggestion as to the signal value of the conspicuous wing colors in the Oedipodinae is clearly logical and fits in with our own field experience. Dr. Phineas Whiting has contributed a section giving a summary of his experimental work on color determination in the green-striped locust (*Chortophaga viridifasciata*), from which it appears that temperature rather than light or humidity is the important factor in color determination in that species, and that certain "so-called color varieties . . . are but color phases dependent to a large extent at least upon environmental conditions." This is an interesting piece of evidence, making less secure the position of those workers who would name all such probably purely physiological forms.

Under "Geographical Distribution of New England Orthoptera" we find a discussion of the New England life zones, analyses of the more typical species of the three zones, *i. e.* Boreal, Transition and [Upper] Austral, with a classification of the remainder of the Orthopterous fauna into such categories as "Domiciliary—all introduced" and "Adventive or introduced." The Orthopterous "Colonization of New England" and

"Dispersal Routes" are very well presented and the effect of the disappearance of the one-time extensive coastal sandy plain on the range of certain Orthoptera, which now have discontinuous or localized distributions, is considered. The importance of the influx of campestrian sand-loving species from the southwest is emphasized, and a comprehensive summary of locust habitats or societies is given, the groups being those already used by the author. Morse's attitude toward certain of the present day ecological work is a just one and his footnote on page 260 is well worth reading by those interested.

In the section on "Wingless and Vestigial-winged Orthoptera" the author reaffirms his previously expressed hypothesis on the correlation of long and short-winged locusts in general with definite types of habitat.

In his table of the species recorded from New England the author gives 132 species as recorded from New England, 104 of these native and 28 introduced purposely or accidentally.

In the discussions of locust injuries and other matter of economic importance the fact is emphasized that in New England severe outbreaks usually have been local in area and of comparatively limited extent, although, as the context shows, occasionally of great severity. Methods of control and natural enemies are discussed and it is shown that such enemies are numerous and varied, ranging from fungus to the lowly farmyard cat. There is a most useful section on "Methods of Collecting and Preservation," which gives a summary of the procedure followed by the author, and also draws upon the experience and practice of other workers.

The division of the work treating systematically of the New England Orthoptera follows in general the following method: discussion of each family, general character, summary of development, food, general distribution, key to species; under species, leading references, brief description, measurements, habits and life period, distributional notes and records in New England, and generally one or more figures. Under families such as the Blattidae and Gryllidae established exotic species and adventive species are each properly treated separately from native forms. English names are given in all cases for species, the majority newly coined; the results are not always happy, as for example the "Broad-shouldered Angulate Pygmy Locust," although as a whole the names have been more carefully selected than is usually the case. The author avoids initiating nomenclatoral novelties, which is greatly to be commended, as a work intended as a manual for the student is no place for the airing of innovations or controversial matter, but should, instead, be founded on previously published conclusions.

We find the earwig *Euborellia annulipes* reported as introduced in New England for the first time. Brief analyses of the variant color patterns of the species of *Orphulella* and of *Chorthippus curtipennis* are given, and these are particularly timely and useful. The word pictures of habitats and actions of *Arphia xanthoptera*, *Psinidia fenestralis*, *Trimerotropis*

maritima, *Circotettix verruculatus* and *Melanoplus punctulatus* are particularly fine, although all of such verbal sketches are good. The data presented (pp. 481 to 482) on the probable stridulation of species of spine-breasted locusts (Locustinae) is interesting and should stimulate further observation along these lines.

The author's picture (p. 495) of the repopulation of glaciated land, in treating of *Podisma variegata*, well deserves quotation. "Not by extended flights of many miles at a time was the land in the wake of the retreating ice-sheet repeopled by this species, but by hopping, hopping, hopping, a foot or a yard at a time, pressing northward as the vegetation and circumstances permitted, clambering up the mountains as fast as the forest line advanced, dying out in the southern areas and on dry slopes as 'the fatal sea of warmth filled the valleys below' and swept onward far to the north, until now such colonies as that on the summit of Ascutney Mt. are forever cut off from their kind."

Another species definitely and correctly recorded from New England for the first time is *Melanoplus dawsoni*, while some additional light is given upon the surprising occurrence of the western *Phoetaliotes nebrascensis* in New England.

The Glossary is most useful and quite extensive, the "Accented List of Scientific Names" is welcome and the "Index" quite full.

Of the twenty plates, three are originals in color, eight are black and white plates of details, in large part original, one plate of crickets is taken from a paper by E. M. Walker, three plates in colors of tree crickets are from Fulton's study, a set most desirable to have republished in a work of this character, and five plates are of habitat photographs.

The author has labored for years in his all-too-few spare hours on this splendid paper and his fellow students have eagerly awaited its appearance. We need say in summarizing only this—it has met every expectation in scholarly, dignified fashion, it is more than a "Manual," it is instead a monograph. It will soon be one of the much thumbed works of constant reference in the library of the student of the order.

J. A. G. R.

Correction

On page 235 of the October, 1920, NEWS, in the review of Blatchley's "Orthoptera of Northeastern America," the words "original constancy" are used in the fifteenth line. The words intended were "regional constancy," and the line as printed might convey a meaning quite the reverse of that intended by the reviewer.

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AND

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CONTENTS

Hemipterological Notices I. (Tingidae).

By H. M. PARSHLEY, Smith College.

There is no more splendid instance of the scientific value of careful collecting than that afforded by the work of Mrs. Annie Trumbull Slosson. For many years specialists in every order of insects have made free use of her materials, and still the riches of her collection are by no means exhausted. The following notes on groups which have recently received general treatment are based for the most part on material which Mrs. Slosson has been kind enough to send, in spite of difficulties due to ill health; and I would express my sense of obligation for these and many other favors.

Gargaphia bimaculata sp. nov.

Head, disc of pronotum with basal one-third of angulate process, and body black; antennae yellowish brown, the first segment except toward

apex and the fourth darker brown; frontal spines yellow. Median line of hood, anterior two-thirds of median carina, and antero-lateral margins of paranota dark brown; reticulate portions of pronotum otherwise yellowish. Costal and most of sutural areas of hemielytra with hyaline, iridescent areoles, the veinlets largely yellow, a few brown; subcostal area, discoidal area, and two rows of sutural areoles next to discoidal area, opaque white; apical one-third of discoidal area largely occupied by a depressed, triangular, dark brown spot, on each hemielytron. Legs yellowish.

Frontal spines stout, crowded, about one-half as long as the first antennal segment; basal spines vestigial. Pronotum sparsely hairy; the carinae low, uniseriate; hood about one-half longer than broad (14–10), well inflated, almost as high as median carina; paranota moderately reflexed, acutely angulate, at most three areoles wide, anterior margins slightly concave, posterior margins convexly rounded and nearly vertical above bases of hemielytra; width across paranota almost equal to entire length of pronotum (48–50). Costal area of hemielytra triseriate for a short distance (about equal to three aeroles) at widest part, otherwise biseriate; subcostal area biseriate; discoidal area one-half as long as hemielytra, about four areoles wide at most.

Length 2.7 mm.; width 1.2 mm.

Holotype ♀, Biscayne Bay, Florida (A. T. Slosson) in Mrs. Slosson's collection.

This species is especially distinguished by the hemielytral markings; it runs in Gibson's key[1] to *iridescens* Champion, from which it differs in the structure of the head spines, width of pronotum, and most other details, in addition to coloration. This is the first species of the genus to be recorded from Florida. I am indebted to my friend Gibson's kindness for the opportunity of examining certain related species not represented in my own collection.

Corythucha cyrta Parshley.[2]

Having had occasion recently to determine a good many specimens belonging to the genus *Corythucha*, I am more than ever impressed with the difficulties involved in the study of the group. Gibson's review is a most creditable pioneer work, but there are certain aspects of the subject which re-

[1]The genus Gargaphia, Trans. Am. Ent. Soc., XLV:187–201, 1919.

[2]*In* Gibson, The Genus Corythucha Stal, Trans. Am. Ent. Soc., XLIV: 86, 1918.

quire further investigation, especially the determination of the limits of variation within the species, and there are some synonymic adjustments to be expected, as in the case under consideration. Through the kindness of Professor Drake I have had for study a long series of *C. betulae* Drake,[3] and I find that it is identical with *C. cyrta* Parsh., as we have suspected for some time. The latter was described from a considerable number of specimens, collected in various parts of New England where birch is abundant, but none of them bore a food-plant label, and the former has been found in Maine as well as in New York. The lack of data in the case of one series, together with a moderate degree of variability characteristic of the species, should probably be held accountable for the original failure to appreciate the relationship involved.

Corythucha salicis Osborn & Drake.[4]

Through the kindness of Mr. W. Downes I have recently received a long series of this species collected on *Salix*, at Vernon, and at Mission, British Columbia. Comparison of this new material with specimens of *salicis* O. & D. from the type locality in Massachusetts and with the type specimens of *canadensis* Parsh. shows conclusively that the latter cannot be maintained as a distinct species and must stand as a synonym of *salicis*. In this species the hood is always at least twice as high as the median carina, according to my observations, and hence the species is not correctly located in Gibson's key. The markings vary considerably in distinctness. Mr. R. F. Hussey has sent me specimens of *salicis* which he collected in Michigan and the species is now known to occur across the northern part of the continent from Maine to British Columbia. How far its range extends southward has not been determined, but there is a Florida record, which, I believe, requires confirmation. The dis-

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[3] *Id.*, pp. 86–87.

[4] *C. salicis* Osborn & Drake, Ohio Jour. Sci. XVII: 298, 1917.

C. salicis Gibson, Trans, Am. Ent. Soc., XLIV: 85, 1918.

C. canadensis Parshley, Occas. Papers Mus. Zool. Univ. Mich., No. 71: 18, 1919.

tinctive characteristics and relationships of this species are discussed in connection with my proposal of the synonymous name, *canadensis*.

Alveotingis grossocerata O. & D.

Osborn and Drake described this remarkable species from a brachypterous example[5] and later[6] I published an account of the macropterous form, although the specimen lacked the characteristic antennae, except for the basal segments. It is, therefore, a pleasure to record another example of this long-winged phase, which still retains its antennae, shaped just as in the brachypterous form, and which agrees in every particular with the mutilated specimen formerly described. This individual, labeled probably by Uhler with the MS name "Rhombodia areolata Uhl.," was collected by Mrs. Slosson at Franconia, N. H., and is preserved in her collection.

Melanorhopala clavata Stal.

During the summer of 1919 I met with numerous specimens of this species, the sexes occurring together and in approximately equal numbers. In every case the male individuals exhibited the characters on which I based *M. obscura*, and thus the synonymy proposed in a recent paper[7] of mine is corroborated. No material variation tending to obliterate this unusual sexual dimorphism has been observed.

Melanorhopala infuscata Parshley.

Gibson has recently sent me for determination an example of this species, which merits notice since it is the only known specimen beside the type series. It was taken by R. C. Shannon near Plummer's Island, Maryland, August 5, 1914, at "tulip poplar sap." The scant evidence at hand indicates that this species, unlike most Tingids, lives on the bark of *Liriodendron*, subsisting, perhaps, on sap from the trunk rather than from the leaves.

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[5]The Tingitoidea of Ohio, Ohio Biol. Surv., II: 245, 1916.

[6]Notes on North American Tingidae, Psyche, XXIV: 25, 1917.

[7]Note on . . . M. clavata, Bull. Brooklyn Ent. Soc., XIV: 102–103, 1919.

The genus Aspistes Meigen in North America (Diptera, Scatopsidae).

By J. R. Malloch.

In his paper on the dipterous family Scatopsidae* Dr. A. L. Melander has recorded the European species *Aspistes berolinensis* Meigen as occurring in North America on the strength of a specimen taken by Dr. Aldrich at Lafayette, Indiana. I had some doubt about the correctness of the identification as I had a number of specimens of an *Aspistes* from Illinois, some of which had been in the collection of the Natural History Survey for a number of years, which though appearing to agree with the description of *berolinensis* yet did not do so in every essential, while evidently the same as that recorded by Melander. I deferred publishing anything on the species until I could obtain authentic specimens of the European species for comparison. These I have now obtained through my colleague Dr. C. P. Alexander who received them from Mr. M. P. Riedel. After an examination of the two series I am of the opinion that the North American species is undoubtedly distinct from the European and describe it below.

Aspistes harti sp. n.

♂, ♀.—Glossy black. Legs black, tibiae and tarsi yellowish testaceous, apices of hind tibiae and tarsi usually infuscated. Wings clear. Halteres black.

Antennae in male 10-segmented, in female 8-segmented, the apical three segments fused; frons, face, and vertex less conspicuously punctate than in *berolinensis;* sides of head behind eyes not striate. The elevation on anterior half of mesonotum less closely punctured than in that species and without the central longitudinal raised line which is always present in *berolinensis*. Abdomen in male as in *berolinensis*, the eighth sternite less distinctly punctate, and more pointed at apex. In other respects as in *berolinensis*.

Length, 1.5–2.5 mm.

Type, male, and *allotype*, Havana, Illinois, data lost. Paratypes, Havana, Ill., data lost, one male and one female;

*Bull. 130, Div. Ent. Zool., State Coll. Wash., 1916, p. 5.

Havana, Ill., three males, June 3, 1918; Meredosia, Illinois, four males, May 28, 1917; Oregon, Illinois, two males, June 19 and 21, 1917.

The type and allotype were taken in copula, and the data were lost for them and the other two from Havana several years ago when the catalog containing them went amissing. These specimens were taken by Mr. C. A. Hart, the others were taken by the writer.

Aspistes analis Kirby.

This species differs from the foregoing in having the antennae 7-segmented in both sexes, the media leaving radius very close to the cross-vein and in being larger, averaging 3.5 mm. in length.

Localities, Iditarod, Alaska, two specimens, July 3, 1917; Beaver Mts., Alaska, five specimens, October 14, 1917 (A. H. Twitchell).

The difference in the antennal structure and in the form of the hypopygium, which is quite marked, would suggest the propriety of the retention of the genus *Arthria* for this species.

A Webspinning Sarcophagid, Parasitic upon a Mantis (Dipt., Orth.).

At Wichita, Kansas, in the fall of 1919, a fly which was later identified by Dr. J. M. Aldrich as *Sarcophaga setigera* Aldrich, was reared from the female of *Stagmomantis carolina* Linn. The mantis was found upon a morning glory and clematis arbor on the afternoon of September 25th. The observer noticed a wound upon the abdomen of the mantis and thinking it the result of a bird peck, took the mantis into her hand to put it out of its misery. Just as the head was severed from the body, the maggot crawled from the abdomen of the mantis onto the hand of the observer. The maggot was transferred to a covered glass dish with a morning glory and a clematis leaf in it. Upon the morning glory leaf, the larva wove an irregularly shaped tubular web about 27 mm. long and 7 mm. wide. This web was composed of broken strands of white silk making a dense mass, but one transparent enough for the larva to be seen within. After remaining quiescent for three days within this web, the larva pupated at one end of the tube and the adult emerged in fourteen days.

How or where this form normally spins a web is a question which cannot be answered from this observation. Hazel Elisabeth Branch, Ithaca, New York.

Studies in the Genus Myodites Latreille (Coleoptera, Rhipiphoridae).

By W. Dwight Pierce, Denver, Colorado.

The following studies are based upon a small series of specimens, loaned me by Mr. Warren Knaus. This series is especially interesting becauses it furnishes a new type of female. In all species hitherto examined by myself the female antenna is monopectinate, and the male antenna is biflabellate, with very long rami of which the tips are about even at apex. In the species *Myodites knausi* described below the female antenna is monoflabellate, with the rami longest at base, diminishing in length toward the apex.

Table of American Species of Myodites.

1—First joint of hind tarsi elevated, obliquely truncate and emarginate at tip; elytra yellow 2

First joint of hind tarsi long, but slightly thicker, not obliquely truncate 10

2—Female abdomen black, or partly black 3

Female abdomen yellow or red, male abdomen?; or female abdomen? male abdomen dark brown or black 5

3—First joint of hind tarsi stout, not more than one-half longer than second; prothorax sparsely punctulate, smooth on each side and front; length 6 mm.; New York .....*luteipennis* LeConte

First joint of hind tarsi long 4

4—First joint of hind tarsi as long as fourth, slightly thicker than the second; prothorax sparsely punctulate behind, nearly smooth in front; female antennae black, pectinate; length 5 mm. Nevada ..... *nevadicus* LeConte

First joint of hind tarsi longer than the fourth, twice as long and thicker than the second and third combined; prothorax densely punctulate behind, nearly smooth on scutal area; abdomen of both sexes with considerable yellow. Female pygidium black; female antennae yellowish, flabellate; length 9 mm.; Utah *knausi* n. sp.

5—Prothorax sparsely punctulate or smooth on disc 6

Prothorax densely punctulate 9

6—Prothorax smooth on disc 7

Prothorax partially smooth on disc .....*vierecki* Fall

7—First joint of hind tarsi stout and thick, not more than one-half longer than the second; vertex sparsely punctulate, obtusely rounded 8

First joint of hind tarsi long, thicker than second and more than twice as long; vertex sparsely punctulate, not carinate; female abdomen yellow; length 7.5 mm.; Maryland. *semiflavus* LeConte

8—Color honey-yellow; prothorax with sides, median line and base black; prothorax smooth; male unknown; female abdomen yellow; length 7.3 mm.; Colorado..... *popenoi* LeConte

Color black; prothorax smooth on disc, coarsely punctulate at base on sides; male abdomen with dark brown luster; female unknown; length 4 mm.; Nebraska..... *minimus* Pierce

9—Female abdomen red or yellowish-red; pygidium reddish; first joint of hind tarsi very long, very little thicker than the second; prothorax and vertex densely punctulate, the latter carinate; length 8 mm.; Oklahoma and Kansas..... *scaber* LeConte

Female abdomen red, pygidium black; male abdomen black; first joint of hind tarsi stout and very thick, and more than twice as long as the second and the third joints together; male antennae honey-yellow (a variety from western Nebraska has the antennae orange color); length 8 mm.; Nebraska; plant host *Solidago* spp; insect host *Epinomia triangulifera* Vachal, *solidaginis* Pierce

10—Elytra shining yellow, or black only at base; head and prothorax densely punctulate..... 11

Elytra alutaceous, more or less blackish or piceous..... 13

11—Elytra entirely yellow; female black; hind tarsi with first joint as long as the others united, scarcely thicker, not emarginate at tip; length 5 mm; California..... *californicus* LeConte

Elytra black at base.....12

12—Body black; length 6 mm; Pennsylvania, Illinois, and Missouri; insect host *Chloralictus pruinosus* Robertson.... *fasciatus* Say.

Female abdomen dark brown; hind tarsi with first joint as long as succeeding three joints; about one and one-half as thick, and slightly emarginate, and obliquely truncate; length 6 mm. Nebraska..... *fasciatus* Say, var. *brunneus* Pierce

13—Hind tibiae slightly compressed..... 14

Hind tibiae strongly compressed; body black; elytra black with dark reddish-yellow spot; length 6 mm; Florida; insect host. *Augochlora pura* Say..... ♂ *schwarzi* LeConte

14—Vertex strongly elevated and compressed; length 6.5 mm.; New York (*zeschii* LeConte)..... ♀ *schwarzi* LeConte

Vertex feebly elevated..... 15

15—Pectus and abdomen densely punctulate; color black; antennae fuscous; legs fusco-testaceous; length 5 mm.; Illinois, New York and Massachusetts..... *walshii* LeConte.

Pectus and abdomen more strongly, less densely punctulate; body black; antennae fusco-testaceous; legs obscurely testaceous; length 2.5 to 3 mm; Canada, New York, and District of Columbia..... *stylopides* Newman.

Myodites knausi n. sp.

The specimens on which this description is based are from the collection of Mr. Warren Knaus, and include four females collected at St. George, Utah, June 10, 1919, at an altitude of 2800 feet; and two females and one male collected at Hurricane, Utah, June 14–18, 1919, at an altitude of 3200 feet. I have chosen as types the male and one female from Hurricane.

♀: Length 9 mm.; Head shining black, depressed, finely and evenly punctulate, clad with dense yellowish white perpendicular pubescence; vertex prominent, broadly rounded; eyes shining black, minutely facetted. Antennae ten-jointed, nine-flabellate, pubescent; joints honey-yellow, darkening toward apex, the last joints almost entirely brownish; the flabellae diminishing in length toward apex, but the flabella of the tenth joint equals the basis of the three preceding joints. Mandibles with the exterior side black, punctulate, densely pubescent, beyond which there is a slight reddish tinge; apices shining glabrous, acuminate. Palpi yellowish, tinged with brown, pubescent.

Prothorax black, shining, more or less denuded in scutal zone, densely pubescent at base, sides and in scutellar sone; irregularly punctulate, not carinate. Elytra honey-yellow with brownish base. Metathorax shining glabrous. The thorax beneath and on sides is minutely punctulate and densely pubescent. Wings hyaline, with large fuscous cloud on costal margin and on disc beyond middle.

Legs honey-yellow, with joints darkened at base and apex, tarsal joints darker. Femora stout, densely pubescent, shining and minutely punctulate. Tibiae straight, slightly enlarged toward tip, bi-unguiculate, densely pubescent, and rather c osely and minutely punctulate. Anterior tarsi with first joint slightly longer than following three, fifth longer than first, claws almost as long as first joint, and strongly pectinate. Middle tarsi with first joint as long as fifth joint, claws strongly pectinate, but not as long as first joint. Hind tarsi with first joint elongate, enlarged, and apically diagonally truncate, almost twice as long as the two following joints, and longer than the fourth joint; claws two-thirds as long as the fourth joint, and strongly pectinate.

Abdomen with dorsum of first five segments black, but with intersegmental skins yellow. The venters of these same segments are also black with yellow inter-segmental skins. The pygidial area is yellow with infuscation beyond the middle. The entire surface of the abdomen is sparsely punctulate pubescent.

♂: Length 9 mm. Similar to the female, with the following exceptions: antennae honey-yellow, bi-flabellate, with the tips of the rami about even. The abdomen is black with the base and apex of the first ventral segment yellow, and the prepygidial area yellow, but with the pygidium black.

Myodites solidaginis Pierce.

A female specimen from Tempe, Arizona, collected October 22, 1919, measuring 6 mm. answers in all other respects to the description of this species, and cannot be separated with sufficient characters from a specimen of the paratype series.

Myodites scaber LeConte.

A normal specimen of the female of this species from McPherson, Kansas, collected by Mr. Warren Knaus, is at hand.

A small specimen from Hurricane, Utah, collected by Mr. Knaus, June 14–18, 1919, at an altitude of 3200 feet, answers in general to the description and compares quite closely to the Kansas specimen, but measures only 7 mm. in length, and has the wings hyaline, with only a dark fuscous clouding in the form of fascia beyond the middle. It also differs by having the vertex not carinate. This may be a different species, but it is inadvisable to so describe it without the other sex.

The Eggs of Boletotherus bifurcus Fab. (Col).

While collecting fungi in a swamp at Union, New Jersey, on August 4, our attention was attracted by numerous, small, oval, discolored blisters on the upper surface of a specimen of *Fomes applanatus*. These blisters or egg capsules were composed of dark excrement-like material, each being oval or suboval in outline, about 3.5 mm. long, 2.5 mm. wide and from 1 to 1.5 mm. high in the centre, sloping toward the edges. The average thickness of the wall of a capsule was about 0.5 mm. Each capsule contained either a recently hatched larva or a single egg resting on its side. The translucent eggs were cylindrical with broadly rounded ends and varied in length from 1.7 mm. to 2 mm. and in width from 0.8 mm. to 1 mm. Several eggs were found which were only three-fourths of the above measurements. The outer covering of each egg was whitish and marked with slightly raised dots. Upon hatching, the larva bores directly into the fungus and in time, the capsule weathers away. Many of the capsules were placed in crevices or irregularities on the upper surface of the fungus.

Harry B. Weiss and Erdman West, New Brunswick, N. J.

The Santa Marta Region of Colombia from an Orthopterological Viewpoint, with Deductions relative to Tropical American Collecting.

By Morgan Hebard, Philadelphia, Pa.

In mid-July, 1920, Mr. James A. G. Rehn and the author landed at Santa Marta, Colombia, for a month's intensive collecting of Orthoptera. The conditions occurring in that region were studied as far as was possible in the time available, including intensive examination of the different types of environment found in each. The total number of specimens secured was over 3600, including 241 species.

The conditions examined may be roughly characterized as follows:

I. Vicinity of Santa Marta. Arid lowlands, generally covered with a low open forest, of which acacia and tree cactus are two conspicuous components. In this area irrigated meadowlands and cultivated shrubs and trees, many of which bear rich foliage, were also examined.

II. Vicinity of Aracataca. Hot and humid lowlands. In this region uncleared forested areas occur, which due to the very porous soil, are semi-arid, while in other parts a similarly semi-arid but low and heavily matted scrub is encountered.

In one extensive section of rich soil a magnificent and very high forest of huge macundo, ceiba and other trees is found, the undergrowth in some places high and thick, with scattered guarumo (*Cecropia* sp.), heavy stands of platanillo and a thorned palm.

Far reaching irrigated meadowlands of rich rank grasses and banana plantations are on all sides, while about the town are many vine-covered fences, groves of palma de vino, balsa, almond and other trees.

III. Vicinity of Hacienda Cincinnati, situated at an elevation of 4500 feet on the northeastern slopes of San Lorenzo, Sierra Nevada de Santa Marta. Comparatively open but lofty mountain forests with a dense and tangled undergrowth.

Here the well-kept coffee plantation and open areas of rank grasses and sugar cane were also explored, as well as the cut upper faces and surfaces of the trails through the forest.

IV. San Lorenzo, slopes above Cincinnati, from 5000 to 7900 feet. In lower portion clothed with a denser and wetter forest than below. In some parts, however, composed of much lower and smaller trees.

In upper portions still more water-soaked, with much vine bamboo and many tree ferns, the gnarled and lower trees heavily laden with bromeliads, the wax palm overtopping these and giving an added beauty to the upper slopes.

Small areas, cleared at some time, were found on these slopes, overgrown with a dense mat of bushes and vines, in some of which dead saplings were numerous.

The forest above and below differs greatly in appearance and species represented, but the transition is very gradual and we would consider that but a single life zone is represented between these elevations.

V. San Lorenzo, summit bald, 7900 to 8500 feet. This is an area which is now practically destitute of trees. The ground is covered waist to shoulder high with a dense growth of raspberry vines, bracken and many low bushes and plants, among which a bromeliad, similar to those which flourish on the tree trunks in the forest below, is abundant and a most striking feature.

The lower north slopes of San Lorenzo were also examined, conditions rather similar to those at Hacienda Cincinnati being found at Hacienda Victoria, 4100 feet, and down to Cinco Bocas, 3500. The heavily forested ravines at Minca, however, at an elevation of 2500 feet, showed a decided change, being in fact more like the high rich forest at Aracataca.

For the region, the lowlands south and east of the mountains, and the Sierra Nevada from 8500 to 17500 feet remain to be studied, including the distinctive zones of the paramo and of the snows.

It was noted that a move from one distinctive area to another was of primary importance in securing additional

species. Of nearly equal value, however, was the careful examination of different local environmental conditions, such as wet forest, dry forest, grassy open, dry scrub and even the varied vegetation about habitations.

In this way a fair representation could be secured, but it was the intensive examination of immediate environmental conditions which added the majority of the forms of highest value.

Thus in the heavy forect at Aracataca the following investigations proved of the utmost importance.

1. Beating the low foliage.

2. Beating the masses of vines occurring in small openings.

3. Beating the rank grasses and plants growing in wet open spots.

4. Close examination of tree trunks and peeling into beating net all loose patches of bark.

5. Shaking vigorously in the net the dead dry leaves of trees, found hung in the undergrowth, particularly those of the guarumo, and similar treatment of the dead leaves hanging on the platanillo.

Dead leaves on the ground were similarly treated but usually with much less success.

6. Close scrutiny and careful raking of the humus and leaf mould, particularly in the deepest recesses of the forest, in the twilight beneath the dense undergrowth.

7. Peeling into the net the wet rotting stems of dead platanillo.

An additional factor of importance was found to be the use of a bright light at night. To our light were attracted twenty-five species not found during our field work. A hand flash lamp was also of great value, many fine specimens being secured by its aid at night, located by their stridulation or revealed resting on the trail, on logs, tree trunks or more often on the upper side of leaves in the forest undergrowth.

The species taken were found as follows.

1. forest foliage	46	10. in bromeliads	9
2. from dead leaves	29	11. domiciliary	7
3. attracted to light	29	12. low herbage in open	6
4. grassland	25	13. on tree trunks	4
5. vine tangles	22	14. bushes in dry areas	4
6. under bark	20	15. bare banks along trails	3
7. in leaf mould	18	16. tree foliage in open	3
8. in debris in open	15	17. within decaying platanillo	2
9. on bare ground	14	18. in aloes	1

It is to be noted that of the forms secured as listed under numbers 2, 6, 7, 8, 10, 13, 15, 17 and 18, the majority, representing approximately one hundred distinct species, would not have been secured had not intensive work of particular character been undertaken. When we add to this total the twenty-five species secured only at light, the vital necessity for doing specialized field work is readily seen. The collector in the tropics otherwise can not hope to secure anything approaching a representative series, except as a resident, whose efforts have extended over many years at all seasons in the same locality.

From our observations we are convinced that, though it is of course a much longer process to secure a good representation of the species occurring at one locality in the tropics than in temperate regions, intensive collecting will be found to shorten enormously the time required for this. At Aracataca, much the richest locality examined, the number of species added each day to those previously secured was as follows: 35 (first half day), 29, 16, 16, 14, 8, 2, 4, 2, 2, 3, 5, 5. We believe that after two weeks, even at this exceedingly rich locality, great difficulty would have been experienced in finding additional species. The majority of those taken during the last week of our stay were secured only through most difficult and laborious intensive search.

As to seasonal diversity we have not had sufficient experience to say much. The rainy seasons in the tropics must be an important factor. However, in Cuba, Jamaica and Panama, just sufficient work was done to indicate that, as

in the Santa Marta region, Orthoptera would occur adult in the greatest diversity during the month of September. As a result we had difficulty up to mid-August securing any adults of a number of species of which immatures were numerous, while in the case of a half dozen rarer species immatures alone were found.

As would be expected, some species are apparently present as adults throughout the year, while the occurrence of others in the adult stage is variable in duration and time of first appearance, September being the month of maximum abundance of adults of the greater number of forms. This was somewhat of a surprise, as general insect collecting was said to be best at the beginning of the rains, and at Santa Marta the major rainy season usually begins in early July.

During our stay Lepidoptera were extremely abundant, but the butterflies were often rubbed or torn; light collecting at night brought in a great variety of small moths, though disappointing in that the larger moths were rarely attracted. Coleoptera were found in great numbers, but large and showy individuals were few and far between, while light collecting at night was as a rule poor. Hemiptera were likewise plentiful, but immatures of many species were more numerous than adults. Odonata were present in great diversity.

One factor we would emphasize. Comparing tropical with temperate regions, though the number of species which can be found in the former is much the greater, the numerical abundance of the great majority of species is vastly less. Very many tropical species are rarely encountered and the work necessary to secure individuals of these is very hard indeed.

Mosquitoes, ticks, plagas, leeches and other pests are ever present, while poisonous snakes, though in most regions seldom seen, must be considered, as well as the constant possibility of fever and other illnesses. Heat, reeking humidity and the constant attention necessary that the material secured be not destroyed, make the life of the collector in tropical lowlands a most arduous proposition. We fear that those who have spent the better part of their lives in such work are seldom fully appreciated by those at home.

New Predaceous and Parasitic Mites of the Superfamily Gamasoidea (Acar.).

By H. E. Ewing, Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

The gamasoid mites of America have received but little attention from mite specialists, although the group is represented by a fauna rich in species. Taxonomic difficulties, especially in regard to the genera have been largely responsible for this neglect. In the present paper eleven new species are described. The writer has followed largely Banks' interpretation of generic characters and his arrangement of the genera found in America. Some of the predaceous forms here described are of considerable benefit because of their attacks upon injurious insects.

Machrocheles bihastatus new species. (Text fig. 1).

A medium-sized, yellowish-brown species. Epistoma broad, rounded and concealing the chelicerae when the latter are held in repose; on its anterior border provided with a very long, sharp, central cusp and two small, sharp, inconspicuous lateral teeth. Hypostome consisting of two large, sword-like cusps that considerably surpass the central cusp of the epistome. Chelicerae stout, heavily chitinized, ventral arm of chela surpassing the upper arm and hooked around its distal extremity; both arms provided with well-developed teeth. Body oval, evenly rounded behind, and with shoulders well marked; clothed above with moderate setae, a rather conspicuous pair being situated on the shoulders. Anterior legs long and antenna-like; second pair stoutest and each provided with a conspicuous spine which is situated on the outside of tarsus near its tip; third pair distinctly smaller than adjoining legs; last pair extending slightly beyond the tip of body and with trochanters enlarged, being much stouter than the femora and almost as large as the same. Posterior coxae situated at the middle of the body. Length, 0.85 mm.; width, 0.50 mm.

From near Lake Keuka, New York; in leaf mold from gorge; by C. R. Crosby.

Description based upon the type, a well-preserved female specimen in the writer's collection, This species is quite distinct from our other described American forms on account of the large two-cusped hypostome.

Laelaps bermudaensis new species. (Text fig. 2.)

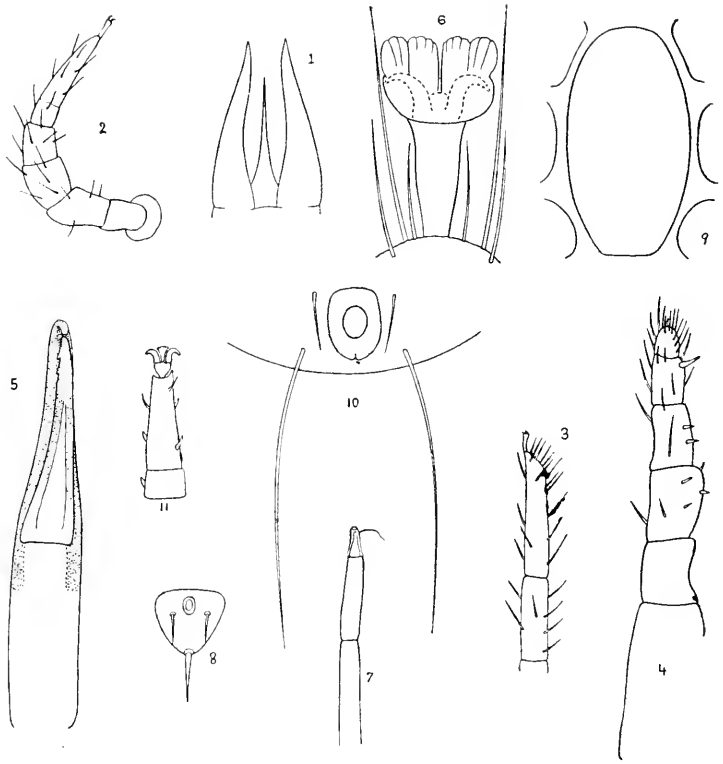
An oval-shaped, smooth, straw-yellow species. Chelicerae stout, with with upper chela almost straight and lower chela strongly curved and considerably surpassing the upper chela. Palpi prominent and about one-half as long as first pair of legs. Body broadest at its middle, evenly rounded behind, and sparsely clothed with rather long setae, a conspicuous one being situated at the median line along the posterior border. Peritreme extending slightly beyond the third pair of coxae, curved so as to follow the contour of the body margin and without sinuations. Anterior legs three-fourths as long as the body and antenna-like, tarsus scarcely equal to the tibia in length; second legs stoutest, trochanter stout, but not swollen; third legs the smallest, about four-fifths as long as the fourth pair; fourth pair reaching the tip of abdomen, trochanters swollen, much the stoutest of the segments and about two-thirds as long as the femur. Length, 0.54 mm.; width, 0.40 mm.

From Pembroke, Bermuda; collected in a banana orchard and cedar grove; by A. O. Gross.

Described from the type specimen, a female, in the writer's private collection. Of the species in the writer's collection this one is nearest *Laelaps flavus* Ewing. It differs from *L. flavus* in having a smaller and stouter body, in the possession of the large body setae and in several other details.

Seius safroi new species. (Text fig. 3.)

A small light yellowish mite. Chelicerae moderate, upper chela, which surpasses the lower, provided with two rows of teeth. The outer row is composed of fewer but slightly larger teeth than the inner row. Palpi about one-half as long as the first pair of legs, and each provided with a small spine on the inner side of the distal segment. Body with sides almost parallel behind the shoulders which are not pronounced; lateral margin in front of shoulders concave. Body sparsely clothed with moderate, simple setae, the pair on the shoulders and one of the pairs near the posterior margin being larger than the rest. All the legs about subequal in length except the third pair which is slightly shorter and smaller than the rest. Tarsus of leg I longer than the tibia, with its inner margin straight and outer margin curved near the tip; claws of tarsus I weak and borne on a small pedicel situated on the inner lower aspect of the tip of the segment. Segments of leg II stout, the trochanter and genual being equal to or broader than the femur. Last pair of legs extending beyond the tip of abdomen by about half their length; tarsi very long and tapering. Length 0.52 mm.; width, 0.25 mm.



EXPLANATION OF FIGURES.

Fig. 1. *Macrocheles bihastatus* new species; ventral view of hypostome and visible part of epistome, x 125.

Fig. 2. *Laelaps bermudaensis* new species; left second leg from above, x 125.

Fig. 3. *Seius safroi* new species; last two segments of right front leg from the inside, x 125.

Fig. 4. *Gamasus inarmatus* new species; left palpus of female from above, x 125.

Fig. 5. *Hologamasus quinquedentatus* new species; right chelicera from below, x 125.

Fig. 6. *Liponyssus setiger* new species; tip of tarsus I from above, x 500.

Fig. 7. *Liponyssus setiger* new species; right chelicera of female from above, x 125.

Fig. 8. *Liponyssus bermudaensis* new species; ventral view of anal plate of female, x 125.

Fig. 9. *Uropoda bermudaensis* new species; genital plate of female showing its relation to the last three pairs of coxae, x 125.

Fig. 10. *Uropoda longisetosa* new species; ventral view of tip of abdomen, x 125.

Fig. 11. *Cilliba robustiunguis* new species; last two segments of left second leg from above, x 125.

From Corvallis, Oregon; on bark of *Pseudotsuga taxifolia;* by V. I. Safro, in whose honor the species is named.

Described from several cotypes of the writer's private collection, all from Corvallis. This is the first species of the genus to be described from the North West.

Gamasus inarmatus new species. (Text fig. 4.)

♀: Medium sized, yellowish-brown species. Palpi fully one-half as long as the first pair of legs; next to last segment with a rather conspicuous spine on its inner aspect near the tip; the two segments proximad to this one, each with two smaller and less conspicuous spines on their inner aspects. Chelicerae large and when extended reaching or even surpassing the tips of palpi. Body somewhat pointed behind; sparsely clothed with inconspicuous setae above. Genital plate fully as broad as long with its base at the posterior margins of coxae IV, and apex, which is sharp and spine-like, at the level of the front margins of coxae of third pair of legs. Front legs slightly longer than the body; hind legs reaching slightly beyond the tip of abdomen, tarsi with prominent, long, spine-like setae. Length, 0.92 mm.; width, 0.50 mm.

♂: Male considerably smaller than female. Second pair of legs greatly enlarged, but without the tooth-like spurs found in other species of the genus. The setae or spines on all the legs somewhat stronger than in female. Length, 0.82 mm.; width, (about) 0.40 mm.

From Twin Falls, Idaho; on roots of red clover; by W. N. Birch, county agent.

Described from two females and one male sent to me by A. C. Burrill who received them from Mr. Birch. The absence of the spurs or chitinous teeth on the second pair of legs distinguishes this species from all others in this country. Cotypes at present in writer's collection.

Hologamasus quinquedentatus new species. (Text fig. 5.)

♀: A large chestnut brown gamasid. Epistome very broad, but rather short, thus the chelicerae are not covered when in repose. Along its front margin the epistome bears five, almost equal, sharp cusps or teeth spaced at about equal distances from each other. Chelicerae powerful, fixed chela surpassing the movable one and apparently toothless; movable digit provided with a few backwardly directed teeth. Abdomen broadest at the level of the coxae of legs IV, evenly rounded behind, shoulders weak but provided with the usual pair of setae. Body clothed above with small, inconspicuous setae. Epigynum triangular, its base behind the coxae of legs IV. Anterior legs longer than the rest; tarsi with straight, parallel margins, and weak claws which are situated on long, slender and weak pedicels. Second pair of legs enlarged, the trochanter being the stoutest of the segments; tarsi each with a pair of spines situated near the tip but distinctly below the base of pedicel; claws

only moderate. Last pair of legs extending for the full length of their tarsi beyond the tip of abdomen; trochanters swollen, much stouter than the longer femora; claws weak and situated at the tips of long pedicels. Length, 1.70 mm.; width, 0.90 mm.

From Ithaca, New York; under a stone; by the writer.

Described from female type, in the writer's collection. Its large size and epistome with five subequal teeth are the most significant characters of this species.

Liponyssus setiger new species. (Text figs. 6, 7.)

♂. Species yellowish brown and strongly spined. Palpi rather small and not more than one-half as long as anterior legs. Chelicerae not very stout but long and with sharp chelae; upper chela about one and one-half times as long as lower and sword-shaped. Body broadest at its middle and pointed behind, shoulders prominent. Above the body is well clothed with prominent, long, straight, spine-like setae; a rather conspicuous recurved pair is situated at the apex of the cephalothorax, and a single straight seta is situated at tip of abdomen. Peritreme slightly sinuous and ending at a level between coxae III and IV. Legs stout; last pair longest. Second pair of legs larger than adjoining pairs. Last pair extending for fully half their length beyond the tip of abdomen; trochanter stoutest segment; femur equal to patella in width and but slightly longer. Length, 0 64 mm.; width, 0.38 mm.

♀. Stouter than the male, with the setae of the body less conspicuous. Chelicerae of the generalized type; fixed arm with a rather conspicuous lateral seta. Posterior legs not enlarged as in male. Length, 0.68 mm.; width, 0.45 mm.

From Madison, Wisconsin; on a short-tailed shrew; by A. C. Burrill.

Described from several specimens all collected at Madison. The presence of the lateral seta on the fixed arm of chelicerae of female in this species is almost a unique character. In general appearance similar to *L. spiniger* Ewing, but without the enormous spines on the first and second pairs of legs. Cotypes in the writer's collection.

Liponyssus bermudaensis new species. (Text fig. 8).

♀. A medium-sized, light yellowish brown species. Palpi fully one-half as long as the anterior legs. Chelicerae moderate in size, not heavily chititinized. Body broadest behind the posterior coxae, almost evenly rounded behind, shoulders pronounced. Peritreme following the body wall for about one-half its length, then extending backward in a sinuous course to the stigma which is located at a level between the third and fourth

coxae. Anal plate roughly triangular with a stout spine at the apex about as long as the plate itself and two smaller spines situated on either side and slightly behind the anal opening. Legs short and stout; first pair about as long as the body is broad; second pair not swollen; third pair the smallest; fourth pair extending to the tip of the abdomen, trochanters equal to the femora in length and much stouter, each with a conspicuous lateral spine and near it a smaller spine. Length, 0.51 mm.; width, 0.34 mm.

From Bermuda; on a wood rat; by A. O. Gross.

Described from three females; all from same host individual, and in the writer's collection. Similar to *L. crosbyi* Ewing but with body setae much more prominent, anal plate of a different shape and apical seta of same fully twice as long.

Uropoda bermudaensis new species. (Text fig. 9.)

A smooth yellowish brown species. Body broadest in the middle and somewhat pointed at each end. It is very sparsely clothed with very minute hairs. Peritreme forming a conspicuous transverse loop towards its anterior end, and behind this loop sinuous, and at one place thrown into a minor fold. Genital plate of female extending from the front margins of the second coxae to the rear margins of the hind coxae evenly and broadly rounded in front and truncate behind. Legs short and stout; when flexed, neatly held in their excavations and concealed from above. Tarsus of leg I fully twice as long as tibia; inner margin straight, outer margin curved toward the tip where it is thickly beset with setae; claws and tarsal pedicel weak. Length, 0.57 mm.; width, 0.42 mm.

From Pembroke, Bermuda; in a banana orchard; by A. O. Gross.

Described from the female type, in the writer's collection. Related to *U. illinoiensis* Ewing but larger, less chitinized, with stouter legs and with body differently shaped; also differs in the shape of peritreme.

Uropoda robusta new species.

♀. A large, conspicuous, dark brown or black mite. Body almost twice as long as broad, evenly rounded behind and somewhat pointed in front; almost naked above but observed to be provided with a few very minute setae. Peritreme with prominent anterior loop and a short, slightly sinuous posterior part. Genital plate extending fromthe anterior margins of the second coxae to between the posterior coxae, about twice as long as broad. Legs moderate. Anterior pair when extended reaching for one-half their length beyond the front margin of body, tarsus

about three times as long as tibia and provided at its anterior end with a tactile seta as long as the tarsus itself. Posterior legs when extended not reaching tip of body. Length, 0.92 mm.; width, 0.78 mm.

♂. Very similar to female. Genital opening situated between third coxae. Length, 0.90 mm.; width, 0.75 mm.

From Guayaquil, Ecuador; on palm seeds; collected upon entry into the United States by H. L. Sanford.

Described from one female and two males. Similar in a general way to *U. folsomi* Ewing, but at once separated from this latter species by the absence of conspicuous body setae. Cotypes will be deposited in U. S. National Museum.

Uropoda longisetosa new species.

♀. Medium-sized, light chestnut brown species, with a pair of very long setae on the posterior margin of the body. Mouth parts rather weak. Body broadest at the middle, and broadly and evenly rounded in front and behind. Body with minute hairs above and a single large pair, equal to the width of the body in length, situated almost on the posterior margin; genital plate very large, triangular, with the base at the posterior margin of the posterior coxae and the apex in front of the front margins of the second coxae. Legs stout and when flexed covered above by the body; tarsi of leg I about two and one-half times as long as broad; tarsi of last three pairs of legs each provided with one or more spines. Length 0.76 mm.; width, 0.48 mm.

♂. Similar to female. Genital opening rounded in front and behind, but with straight sides; situated between the level of the third and fourth coxae. Length, 0.74 mm.; width, 0.48 mm.

From Leland Stanford University, California; in galleries of *Monarthrum scutellare* in *Quercus agrifolia;* by O. J. Gilliland.

Described from a single female and male; both taken in the same situation, and in the writer's collection. This species differs from most, if not at all, of the other species in the genus in the possession of the long pair of setae situated near the posterior margin of the abdomen.

Cilliba robustiunguis new species. (Text fig. 11.)

Medium-sized, yellowish brown. Body over two-thirds as broad as long, evenly rounded behind and somewhat pointed in front; above a few minute hairs. Legs short and not very stout. Tarsus I much weaker than tarsus II; the latter broader at its base and about four times as long as the tibia. This tarsus bears a few short spines and a large, conspicuous pair of claws that are rather strongly recurved and have between them the moderate empodium or pulvillus. Genital plate of female almost as broad as long. Length, 0.95 mm.; width, 0.65 mm.

From Ithaca, New York; in dead grass collected in a Berlese trap; by the writer.

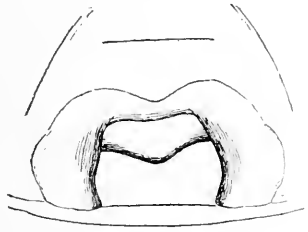
Described from a single female, in the writer's collection. This species is the first of the genus that the writer has reported from America.

A New American Amaurobius (Arachnida, Araneina).

By Ralph V. Chamberlin, Museum of Comparative Zoology, Cambridge, Massachusetts.

Amaurobius fractus sp. nov.

♀. Carapace, sternum, and legs fulvous, without markings. Abdomen above and at sides grey, a paler pointed mark at base and several indistinct chevrons behind, under the lens showing small pale dots and marks; venter dark in front of spinnerets, the other part lightened with larger yellowish marks. Eyes of the usual general relation. Anterior median eyes much smaller than the laterals. Posterior eyes subequal to each other and to anterior laterals; median eyes their diameter apart, two and two-thirds or more as far from the laterals. Clypeus narrower than diameter of an anterior lateral eye. Characterized by the epigynum which is wide open and much suggests that of *A. ferox* Bl., a much larger species. See accompanying figure.



Amaurobius fractus n. sp. Epigynum.

Length 5.5 mm. Length of cephalothorax 2.8 mm.; width 1.8 mm. Length of tib. + pat. IV, 2.9 mm.

Locality.—California: Claremont. *Type.*—M. C. Z. 501.

Changes of Address.

Mr. William Beutenmuller has removed to Highwood, Bergen County, New Jersey. His postoffice box there is No. 258. Will correspondents please notice.

As from January 1, 1921, the permanent address of the Publication Office of the Imperial Bureau of Entomology will be: 41, Queen's Gate, London, S. W. 7. All communications respecting subscriptions to or exchanges for the *Review of Applied Entomology* and *Bulletin of Entomological Research*, or to the Bureau Library, should be sent to the Assistant Director at above address.

A New Species of Dixa from Argentina (Dixidae, Dipt.)

By Charles P. Alexander, Urbana, Illinois.

Species of the family Dixidae from the South Temperate Zone are very uncommon. The only other species known is *D. chilensis* Alexander,* from Chile. The following species was taken in association with several interesting species of Tipulidae that are recorded elsewhere.

Dixa argentina, sp. n.

Rostrum obscure yellow; head black; mesonotum with three velvety black stripes, the anterior lateral margins yellow; pleura largely dark brown; knobs of the halteres brown; wings dusky, a conspicuous brown spot at *r-m;* abdomen brownish black.

♂.—Length about 2.3 mm.; wing, 3.2 mm. Rostrum obscure yellow; palpi dark brown. Antennae setaceous, black, the scapal segments slightly paler. Head black.

Mesonotum yellow on the antero-lateral angles; disk with three velvety black stripes, the interspaces dark brown; median stripe not reaching beyond midlength of the sclerite; remainder of the mesonotum black. Pleura yellow with a very broad brownish suffusion that covers all the sclerites with the exception of the sternum and the dorso-pleural membranes. Halteres dark brown, the base of the stem yellowish.

Legs with the coxae and trochanters light yellow; femora light brown, the tips narrowly blackened, most conspicuous on the posterior legs; tibiae and tarsi dark brown.

Wings with a strong dusky tinge, the costal and subcostal cells slightly more yellowish; a large brown cloud at *r-m;* veins dark brown. Venation: *Sc* ending just beyond the origin of *Rs; Rs* straight, very slightly sinuate, in direct alignment with R^{1+5}; R^{2+3} only moderately arcuated, much shorter than either R^2 or R^3; *r-m* at the fork of *Rs*; *m-cu* opposite or slightly before *r-m*.

Abdomen brownish black, the sternites a very little paler.

Habitat: Argentina. *Holotype*, ♂, La Granja, Alta Gracia, Province de Córdoba, April 1–8, 1920 (Charles Bruch). Paratopotype, ♂. Type in the collection of the author; paratype in the collection of the Museu La Plata.

Dixa argentina bears a certain resemblance to *D. centralis* Loew of the United States but the details of coloration are very distinct. The types were collected by my friend, Dr. Charles Bruch, to whom I am indebted for many favors.

*Entomological News, vol. 24, pp. 176, 177; 1913.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., DECEMBER, 1920.

Program and Price of the News for 1921.

In the October number we suggested raising the subscription price of the NEWS to enable us to increase the number of pages and possibly the illustrations. We have received a large number of replies from subscribers favorable to this suggestion. Unhappily, an increase in costs of printing for 1921 appears to be widespread and prevents us from enlarging the magazine to the extent to which we had hoped. We believe, however, that we are justified in promising thirty-two pages per month, instead of thirty, for the annual subscription of $2.50, and this is our program and our price for 1921. We shall try also to give a few additional plates or illustrations.

We hope that all our subscribers will remain with us and help us as they have done in the past. All the income from the NEWS goes into its printing and illustration and the postage and stationery necessary for its maintenance. No one receives any salary or compensation for work done on the journal. Sooner or later—and we hope sooner—a decrease in costs of printing is probable, and when this happens we shall enlarge the NEWS step by step with lowered expenses.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Meetings of Societies in the Christmas Holidays at Chicago

The seventy-third meeting of the American Association for the Advancement of Science and of the Associated Societies will be held at Chicago from December 27, 1920, to January 1, 1921. Dr. L. O. Howard, Chief of the Bureau of Entomology of the United States Department of Agriculture, is president-elect of the A. A. A. S. and will preside at the Chicago meeting. He has been permanent secretary for twenty-two years during which the membership of the organization has increased from 1,729 to over 12,000.

The Entomological Society of America will hold its annual meeting December 27 and 28.

The meetings of the American Association of Economic Entomologists will immediately follow those of the preceding society.

The thirty-eighth annual meeting of the American Society of Naturalists will begin on December 30; a symposium on "General Physiology" will be offered that afternoon and the annual dinner that evening.

The annual meeting of The Ecological Society of America will be held December 28 to 31, the annual dinner on the evening of the 28th.

Coleoptera Associated with Pleurotus ostreatus.

This fungus, commonly known as the oyster mushroom, appears to be more attractive to insects than any other member of the family *Agaricaceae* and for that reason it is desirable to call attention to it. It is an edible species and occurs from spring until late fall, either singly or in clusters on the limbs or trunks of dead or living trees. Patterson and Charles (U. S. Dept. Agric. Bul. 175, p. 13) give the following brief description by which it may be recognized, "cap either sessile or stipitate, shell-shaped or dimidiate, ascending, fleshy, soft, smooth, moist, in color white, cream, grayish to brownish ash; stem present or absent (if present, short, firm, elastic, ascending, base hairy); gills white, decurrent, somewhat distant, anastomosing behind to form an irregular network. Cap 3 to 5 inches broad; mostly cespitose, imbricated."

A related species, *Pleurotus sapitus*, upon which were found only a few species of Coleoptera, resembles *ostreatus* closely but is distinguished by its lilac-tinged spores.

As shown by the following table, 26 species are listed representing 10 families. Those species marked with an asterisk were taken on a single specimen of *Pleurotus ostreatus* by Mr. K. F. Chamberlain at Cornwall, Connecticut, June 27.

According to the table, the *Tenebrionidae* and *Staphylinidae* appear to be the best represented families. The *Staphylinidae* are commoner on gill fungi than on polypores but the *Tenebrionidae* are equally at home on either polypores or agarics. All of the species listed, except those belonging to predaceous groups such as the *Carabidae* and *Histeridae*, are probably fungus eaters.

CARABIDAE: *Pterostichus lucublandus* Say.* SILPHIDAE: *Necrophorus pustulatus* Hersch.* STAPHYLINIDAE: *Staphylinus maculosus* Grav.,* *Oxyporus vitta us* Grav., *O. lateralis* Grav., *O. major* Grav., *O. stygi us* Say. EROTYLIDAE: *Tritoma thoracica* Say,* *T. flavicollis* Lec.* MYCETOPHAGIDAE: *Mycetophagus flexuosus* Say,* *M. melsheimeri* Lec.,* *M. punctatus* Say.* HISTERIDAE: *Hister abbreviatus* Fab.,**H. interruptus* Beauv.* NITIDULIDAE: *Nitidula bipunctata* Linn.* *Phenolia grossa* Fab.* *Ips quadriguttatus* Oliv.* *Cyllodes biplagiatus* Lec. CISIDAE: *Rhipidandrus*

paradoxus Beauv. TENEBRIONIDAE: *Scotobates calcaratus* Fab.,* *Xylopinus saperdioides* Oliv.,* *Diaperis maculata* Oliv.,* *Platydema subcostatum* Lap.* *Boletotherus bifurcus* Fab.* *Helops micans* Fab.* MORDELLIDAE: *Tomoxia bidentata* Say.*

HARRY B. WEISS, New Brunswick, New Jersey.

The Crop Protection Institute.

An organization has been effected under the auspices of the National Research Council, by which it is proposed to bring together manufacturers of insecticides, fungicides and allied commodities with the scientific men in entomology, plant pathology and agricultural chemistry. The title of the organization is The Crop Protection Institute.

The question of bringing about such an organization has been under advisement by a number of entomologists and has been studied at some length by the Committee on Policy of the Association of Economic Entomologists. It is explicitly not the intent to duplicate existing organizations or agencies. Rather, it is the thought that this Institute can serve as the vehicle for accomplishing some things for which there is not at present any machinery, and may supplement on occasion the work of existing departments or agencies.

The greatest care has been taken to safeguard the activities of the Institute from suspicion of commercial influence. All of its affairs are entirely in the hands of the Board of Trustees of thirteen members, nine of whom must be scientific men without commercial affiliations. Definite provision is made for general publication of the results of research. Scientific members of the Association will receive publications of the Institute from time to time, in addition to sharing in other activities and helping to guide the Institute into useful endeavors.—W. C. O'KANE, Durham, New Hampshire, Chairman Board of Trustees of The Crop Protection Institute.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

7—Annals of The Entomological Society of America, Columbus, Ohio. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Wash-

ington, D. C. **12**—Journal of Economic Entomology, Concord, N. H. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **17**—Lepidoptera, Boston, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **21**—The Entomologist's Record, London. **25**—Bullettino della Societa Entomologica Italiana, Firenze. **26**—Boletin de la Sociedad Entomologica de Espana, Zaragoza. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **52**—Zoologischer Anzeiger, Leipsic. **64**—Parasitology, London. **68**—Science, Lancaster, Pa. **76**—Nature, London. **79**—Bulletin of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass. **85**—The Journal of Experimental Zoology, Philadelphia. **89**—Zoologische Jahrbucher, Jena. **103**—Biologisches Centralblatt, Leipzig. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **106**—Anales de la Sociedad Cientifica Argentina, Buenos Aires. **113**—Transactions of the London Natural History Society. **114**—Entomologische Rundschau, Stuttgart. **115**—Societas Entomologica, Stuttgart. **116**—Entomologische Zeitschrift, Frankfurt a. M.

GENERAL. Aue, A. U. E.—Der entomologe als postscheckunde. **116,** xxxiv, 25–6. **Brethes, J.**—Insectes du Perou. **106,** lxxxix, 27–54. **Cornelsen, H.**—Konnen die raupen horen? **116,** xxxiv, 36. **Demoll, R.**—Die bannende wirkung kunstlicher lichtquellen auf insekten. **103.** xxxvii, 503–6. **Dewitz, J.**—Die fur die kunstliche parthenogenesis angewandten mittel als erreger fur andere biologische vorgange. **103,** xxxvii, 498–503. **Donisthorpe, H.**—"The phoresy of Antherophagus" **21,** xxxii, 181–87. **Gotz, W.**—Zur bionomie der insekten. **115,** xxxv, 37–8. **Johnson, C. W.**—Entomological field work [in New England]. (Bull. Boston Soc. Nat. Hist., xxiii, 9–10). **Lloyd, J. T.**—Insects used in medicine. (Am. Jour. Pharm., xcii, 714–16). **Lohe, E.**—Praktischer thermostat. **116,** xxiv, 54–5. **Muttkowski, R. A.**—The respiration of aquatic insects. **19,** xv, 89–96. **Onslow, H.**—The iridescent colours of insects. **76,** cvi, 181–3; 215–18. **Reil, Dr.**—Quelques mots sur la recolte et la preparation des microlepidopteres, microneuropteres et microhemipteres. (Ann. Soc. Linn. de Lyon, lxvi, 41–43). **Szymanski, J. S.**—Das prinzip der kurzesten bahn in der lehre von der handlung. **103,** xxxvii, 282–7.

ARACHNIDA &c. Robinson, L. E.—Malformations in ticks. **64,** xii, 175–9. **Warburton, C.**—Sarcoptic scabies in man and animals. **64,** xii, 265–300.

NEUROPTERA. Howe, R. H.—Manual of the Odonata of New England. (Mem. Thoreau Mus. Nat. Hist., ii, 102 pp.). **Longinos Navas, R. P.**—Insectos de America. **26,** iii, 90–99. **Stringberg, H.**—Typstudien ueber die geschlechtsorgane einiger Mallophagengattungen. **104,** cxvii, 591–653.

Banks, N.—New neuropteroid insects. **79,** lxiv, 299–362.

OTHOPTERA. Jesiorski, L.—Der thorax von Dixippus morosus (Carausius). Part 1. **104,** cxvii, 727–815.

HEMIPTERA. Fenton & Hartzell—The life history of the potato leaf-hopper (Empoasca mali). **12,** xiii, 400–8. **Hungerford, H. B.**—The biology and ecology of aquatic and semiaquatic Hemiptera. The male genitalia as characters of specific value in certain Cryptocerata. (Kans. Univ. Sci. Bul., xi, 1–328; 329–36). **Jones, T. H.**—A peculiarly marked adult of Nezara viridula. **10,** xxii, 171–2. **Lawson, P. B.**—The Cicadellidae of Kansas. (Kans. Univ. Sci. Bul., xii, 1–376).

Barber, H. E.—A new member of the family Thaumastoceridae. **19,** xv, 98–104.

LEPIDOPTERA. Fassl, A. H.—Meine Bolivia Reise. **114,** xxxvii, 25–7 (Cont.). **Feuerborn, J.**—Duftorgane bei den schmetterlingsmucken. **52,** li, 279–85. **Hampson, G. F.**—Catalogue of the Lithosiadae (Arctianae) and Phalaenoididae in the British Museum. (Cat. Lep. Phal., Br. Mus., Suppl., ii, 619 pp.). **Johnson, H. L.**—Experiences with Utetheisa bella. **17,** iv, 77–8. **Kaye, W. J.**—New species and subspecies of S. American L. **21,** xxxii, 187–9. **Krueger, E.**—Ueber sekundare sexuelle organe der morphiden und anderer tagfalter-familien nebst angaben ueber den geruch einiger Kolumbianischer tagfalter. **114,** xxxvii, 35–6 (Cont.). **McMurray, N.**—Polyphemus notes. Catocala antinympha caterpillars. **17,** iv, 73–4; 76–7. **Mathew, G. F.**—On the abundance of the larvae of Pyrameis atalanta. **9,** liii, 230–3. **Robbins, R. W.**—Wing colour in butterflies and moths. **113,** 1919, 32–6. **Schaus, W.**—New species of neotropical Pyraustinae. **10,** xxii, 172–90. New sps. of Notodontidae from Central and South America. **15,** viii, 147–61. **Williams, H. B.**—Parallelism in variation in butterflies. **113,** 1919, 13–17.

Dyar, H. G.—A new noctuid from Oregon. **15,** viii, 146. **Heinrich, C.**—Coleophora notes with description of two new species. **10,** xxii, 159–62.

DIPTERA. Adolph, E. F.—Egg-laying reactions in the pomace fly, Drosophila. **85,** xxxi, 327–41. **Arias, J.**—Notas dipterologicas, VI, Una nueva especie Americana del gen. Ogcodes (Bol. R. Soc. Espanola Hist. Nat., xx, 191–3). **Austen, E. E.**—The house-fly: its life-history and practical measures for its suppression. (Br. Mus. (N. H.), Econ, Ser. 1 a.). **Duda, Dr.**—Vorlaufige mitteiling zur kenntnis der ausser-europaischen arten der gattungen Leptocera und Borborus. **89,** Abt. f. Syst., xliii, 433–466. **Enderlein, G.**—Zur kenntnis tropischer frucht-bohrfliegen. **89,** Abt. f. Syst., xliii, 336–60. **Engel, E. O.**—Studien ueber neotropische Hystriciidae sens B. et B. **89,** Abt. f. Syst., xliii, 273–328. **Hermann, F.**—Beitrag zur allgemeinen systematik der Asiliden. **89,** xliii, Abt. f. Syst., 161–194. **Howard, L. O.**—Swarming of Anopheles **68,** lii, 468–9. **Rennie & Sutherland.**—On the life history of Bucentes geniculata, parasite of Tipula paludosa and other species. **64,** xii, 199–211. **Sack, P.**—Die gattungen Sappingogaster und Meromacrus. **89,** xliii, Abt. f. Syst., 234–72. **Schmitz, H.**—Biologische veziehungen zwischen dipteren und schnecken. **103,** xxxvii, 24–43.

Sherman, F.—Notes on the mosquito fauna of North Carolina. (Jour. Elisha Mitchell Sci. Soc., xxxvi, 86-93). **Surcouf, J. M. R.**—Revision des Muscidae Testaceae (N. Arch. Mus. Hist. Nat., Paris. VI, 27-124, 1914).

Dyar, H. G.—The classification of American Aedes. The American Aedes of the stimulans group. The larva of Aedes campestris. A note on Aedes niphadopsis. The Grabhamia group of Psorophora. **15,** viii, 103-6; 106-20; 120; 138-9; 140-1. **Melander, A. L.**—Review of the nearctic Tetanoceridae. **7,** xiii, 305-32. **Parker, R. R.**—North American Sarcophagidae: New sps. from British Columbia and Alaska. **19,** xv, 105-110.

COLEOPTERA. Blunck, H.—Die schreckdrusen des Dytiscus und ihr secret. Part 2. **104,** cxvii, 1-129; 205-56. **Bruch, C.**—Cerambicidos Argentinos nuevos o poco conocidos. (Rev. Mus. de la Plata, xxiv, 1-27). **Calabresi, E.**—Contribuzione alla conoscenza dei Beloferini (Brenthidae). **25,** li, 57-72. **Champion, G. C.**—Some new C. from Costa Rica. **8,** lvi, 220-4. **Lameere, A.**—Prioninae nouveaux ou peu connus. **33,** lx, 137-45. **Parshley, H. M.**—Distributional note on two species of C. **19,** xv, 96-7. **Schaeffer, C.**—Change of names in C. **19,** xv, 117. **Speyer, W.**—Die pharynxmuskulatur der larve von Dytiscus marginalis. **52,** li, 243-50. **Teodoro, G.**—Alcune note sulle cause di variabilita delle colorazioni. **25,** li, 44-8. **Verhoef, K. W.**—Zur vergleichenden morphologie des abdomens der coleopteren und uber die phylogenetische bedeutung desselben. **104,** cxvii, 130-204. **Weiss, H. B.**—Notes on the fungous beetle, Cis cylindricus. **19,** xv, 110-11.

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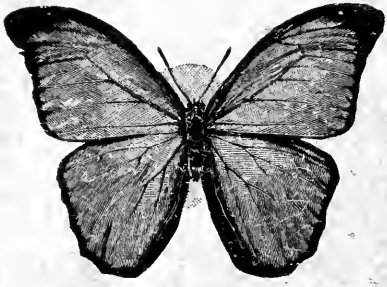

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