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ENTOMOLOGICAL NEWS

VOLUME LIV, 1943

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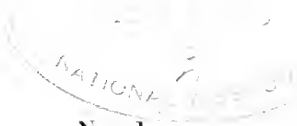


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ENTOMOLOGICAL NEWS

JANUARY 1943

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No. 1

Williamsonia fletcheri Williamson (Odonata: Cordulidae) from New England.

By B. ELWOOD MONTGOMERY, Purdue University,
Lafayette, Indiana.

A collection of dragonflies made during the summer of 1935 on Mount Desert Island, Maine, and sent for determination by the collector, Dr. William Procter, in October, 1935, contained a female of *Williamsonia fletcheri* Williamson. This specimen was retained for further study when the collection was returned to Doctor Procter, and no record of it was included in the 1938 list of insects of the Mount Desert Region (Procter, 1938). The specimen was soon "lost" and has been found only recently. Doctor Procter has graciously presented the specimen for my collection.

This specimen was collected June 6, 1935 along a carriage road of about three-quarters of a mile, between the Breakneck and Witches' Hole Pond. According to Doctor Procter, "both of these ponds are for the greater part bogs with quite a lot of sphagnum, but not what would be called true sphagnum bogs, and this carriage road between them is a favorite 'hawking' place for dragonflies."

Mrs. Leonora K. Gloyd kindly compared the specimen with a paratopotype female of this species in the Williamson Collection and found them to "agree quite well in every respect except the relative length of the vulvar lamina." In the Mount Desert specimen the lamina is longer than the ninth segment as in the drawing of the allotype female. Mrs. Gloyd's statement indicates that the vulvar lamina of the paratype is somewhat shorter and that there is some variation in this character, or, as she suggested, "apparently its position may change."

FEB 10 1943

W. fletcheri has been recorded from Quebec-Kazubazua and Lanoraie (Walker, 1934), Ontario-Mer Bleue, the type locality, and Lake Timagami (Walker, 1941), Michigan-Manistique (Gloyd, 1932) and Manitoba-Lake Winnipeg and the Saskatchewan River (possibly the same locality). The Manitoba specimens were listed, but not described, as *Diplax vacua* by Hagen in 1867. These specimens were not mentioned by Hagen in 1878 when he described *Cordulia lintneri* from material collected at Center, New York, by Lintner, but they were referred to that species by him in 1890. However, these specimens were said to be *W. fletcheri* by Howe (1923) in his paper on the history and distribution of *W. lintneri*. Although Howe did not state definitely that he had studied the specimens, his statement that specimens from Mer Bleue were intermediate between the Manitoba and the New York specimens, would indicate that he had. In order to remove all doubt concerning the identity of this material I asked Dr. Nathan Banks about the specimens of *Williamsonia* in the Museum of Comparative Zoology and he has kindly furnished the following information (in litt., Feb. 25, 1942).

"We have here six specimens of *Williamsonia*, three of each species. The female type of *lintneri*, another female from Blue Hills, Mass., and a male from Stony Brook, Mass., all have the face pale, the females with vulvar lamina short, the male with nearly straight, tapering appendages. Of *fletcheri* we have the two females that Hagen called *vacua*—Hagen's label "vacua" is still on the Saskatchewan specimen—and a male taken near Harvard, Mass., May 19, 1939 by E. M. Davis. All three have the face dark and slightly bronzy, the females with vulvar lamina nearly one-half longer than in *lintneri*, reaching the tip of segment 9, and the male with superior appendages (from above) elbowed or almost at an angle at basal third."

The capture of the male *fletcheri* near Harvard (Shirley), Mass., was described by Davis (1940) who referred the specimen to *W. lintneri*, however.

Howe (1923) compiled all the records of *Williamsonia* in literature prior to that time and listed additional records (of

lintneri). His data show the distribution of *lintneri* to include Massachusetts, Rhode Island, New York and New Jersey. The only references to new records for this genus since that time, all of which are included in references cited above, appear to refer to *fletcheri*. Dr. Banks wrote that "since then several students have taken one or two a year in the Blue Hills." As the two species now appear to have overlapping ranges in this region such specimens and any additional that can be secured in New England should receive critical study, to furnish further information concerning their relative abundance, etc., more especially as both appear to be very rare and quite local.

The 1935 collection included specimens of certain other rare or interesting species the records of which were not published although these species have since been reported from the Mount Desert region by another collector (Ahrens, 1941). These were *Lanthus albistylus*, 2 ♂♂, July 18, *L. parvulus*, 1 ♂, June 16, and *Ladona julia*, 1 ♀, July 2.

Since this note was written and accepted for publication I have had an opportunity to examine the specimens of *Williamsonia* in the museums and collections at Cambridge and Boston. Those studied included the six specimens in the Museum of Comparative Zoology, those in the Howe Collection (including in addition to several specimens of *lintneri*, two paratopotypes, a male and a female, of *fletcheri*), and a series of about 15 specimens of *lintneri* collected in the Blue Hills by Harry K. Clench and Kenneth Christiansen and in the collection of the latter. The distinguishing characters of the two species, as determined from the examination of this material, may be stated as follows:

Face and frons to base of antennae yellowish or olive brown; yellowish or light brown bands at apical margin on dorsum of abdominal segments 1-9; superior appendages of male almost straight in dorsal view; vulvar lamina of female not reaching beyond the level of caudal margin of tergum of segment 9 *lintneri*

Face and frons dark to black, with metallic purple or bronze reflections; light bands at apical margin of abdominal segments occurring on first four or five segments only and usually confined to intersegmental membrane; superior ap-

pendages of male quite arcuate in dorsal view; vulvar lamina of female reaching beyond the level of caudal margin of tergum of segment 9 *fletcheri*

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The Britton Laboratory.

The recently completed two-story brick building on the grounds of the Connecticut Agricultural Experiment Station, New Haven, will be named the Britton Laboratory, in memory of Dr. Wilton Everett Britton. Dr. Britton, until his death in 1939, was for about forty years entomologist of the Experiment Station and state entomologist. *Science*, Aug. 7, 1942.

Further Notes on Aero-Plankton of Kentucky.

By H. ELLIOTT McCLURE, Ord, Nebraska.

From May 3, 1934, to June 19, 1934, flying insects were collected twice a day, morning and evening, by means of a net attached to the fender of an automobile. Collections were made along a four-mile stretch of road east of Horse Cave, Kentucky. The pavement was 16 feet wide without broad shoulders which were overgrown with weeds and not mowed during the time of the collections. A few of the fields bordering the road were plowed, but the majority were unplowed and abounded with flowers, especially composites. At one point a woods of oak and maple came to within 100 yards of the route. This region of Kentucky is rolling and underlaid with limestone. There were no open streams along the route, but there were entrances to at least three caves. Most of the surface water drained or seeped into caves underlying this area. In three hollows near the road there was permanent standing water, and there were temporary pools in many others after heavy rains.

At the end of each collecting trip, the net was immediately turned inside out, and the insects dumped into a pint jar of alcohol. Later they were filtered from the liquid and put into a numbered vial. Because of the difficulties involved, several groups have not been determined.

I greatly appreciate the work of the following specialists for making the determinations in the groups indicated: Dr. C. P. Alexander, Amherst, Massachusetts, Tipulidae; Dr. L. G. Strom, Milwaukee, Wisconsin, Aphididae; Dr. J. B. Steinweden, San Francisco, Cal., Thysanoptera; Mrs. Arni Arnason, Saskatoon, Saskatchewan, Syrphidae; Dr. L. L. Buchanan, Washington, D. C., Carabidae; Dr. Dayton Stone, Albany, New York; Cydnidae; Mr. Eugene Ray, Chicago, Illinois, Mordellidae; Dr. W. J. Brown, Ottawa, Canada, Scarabeidae; Dr. H. R. Bryson, Manhattan, Kansas, Elateridae; Dr. W. M. Wheeler, deceased, Formicidae; Dr. L. Haseman, Columbia, Missouri, Psychodidae; Dr. M. W. Blackman, Washington, D. C., Scolytidae; Dr. F. P. Ide, Toronto, Canada, Ephemerida;

Dr. H. Morrison, Washington, D. C., Coccidae; Dr. A. P. Jacot, deceased, Acarina; Dr. J. W. Folsom, deceased, Collembola; Dr. Grace Sandhouse, deceased, Apoidea; Dr. Orlando Park, Evanston, Illinois, Pselaphidae; Dr. J. A. Reeves, St. Petersburg, Florida, Chrysomelidae; Dr. H. C. Fall, deceased, Coleoptera.

The length of day increased from 13.65 hours to 14.5 hours from sunrise to sunset during the seven weeks of observations. This was an increase of .85 hours, or 51 minutes. During May the daily increase in the length of day was greater than during June. On May 11 a heavy dust storm blew in from the west, making the sky hazy and visibility low for three days. There was rain during 14 of the 48 days of observations. Most of this came during the first ten days of June, eight of which had heavy rains. During the time of the evening collections temperatures averaged about five degrees higher than at the time of the morning collections.

There was a total of 16,687 specimens collected by 100 trips over the route during the seven weeks. The average collection included 166 insects, or one insect to 63 cubic feet of air, as the net strained approximately 10,500 cubic feet of air during each drive. The average morning collection included fewer insects, 70, and the average evening collection more, 262, or one insect to 151 cubic feet and 40 cubic feet of air, respectively.

There were two classes and 13 orders represented and, of these, 65 families have been identified. Of those specimens that have been identified to date, there were represented 131 genera and 196 species. Among this group there were 21 species of economic importance as listed by the Committee on Common Names of the American Association of Economic Entomologists. These were: *Anaphothrips obscurus* (Müll.), 30; *Frankliniella tritici* (Fitch), 95; *Thrips tabaci* Lind., 5; *Rhopalosiphum prunifoliae* (Fitch), 94; *Macrosiphum pisi* (Kalt.), 64; *Eriosoma lanigerum* (Hausman.), 2; *Aphis gossypii* (Glover), 5; *Aphis rosca* (Baker), 3; *Aphis baerki* (Cowan), 1; *Macrosiphum granarium* (Kirby), 13; *Aphis illinoisensis* (Thomas), 2; *Anthrenus verbasci* (Linn.), 1; *Stegobium paniceum* Linn., 1; *Ligyris gibbosus* DeG., 3; *Epitrix parvula*

Fab., 14; *Epitrix fuscula* Crotch, 1; *Epitrix cucumeris* Harr., 1; *Phyllotreta vittata* Chev., 8; *Diabrotica 12-punctata* Fab., 1; *Diabrotica vittata* Fab., 1; *Apis mellifera* Linn., 4. The economic species constituted 11 per cent of the identified species, but only 2.1 per cent of the individuals.

Many species were taken only occasionally, and of these 32, or 24 per cent, were taken only in the morning collections, and the remainder, 131, or 76 per cent, were taken only in the evenings. These 32 species included four spiders, one Collembola, two thrips, ten Coleoptera, one Diptera, and ten Hymenoptera. The spiders and Hymenoptera were apparently proportionally most active in the morning, as 75 per cent of the species of spiders were taken then, and 50 per cent of the species of Hymenoptera.

There were 163 species taken once, twice, or occasionally, and 33 species taken regularly or abundantly. Four of the abundant species were most active in the morning. These were the aphid, *Pemphigus lactucae* (Fitch), the coccid males, *Pseudococcus* sp., the ant, *Tapinoma* sp., and the bee, *Halictus illinoensis* Robertson. Six species were taken both morning and evening: two thrips, *Frankliniella tritici* (Fitch) and *Anaphothrips obscurus* (Müll.); one cydnid, *Annestus pusillus* Uhler; two aphids, *Rhopalosiphum prunifoliae* (Fitch) and *Toxoptera graminum* (Rondani); and one sciarid, *Sciara nacta* Johannsen. The remaining 23 species were taken entirely or mostly in the evenings.

A drop in temperature and cool clear weather seemed to limit or decrease flight activity, as the activity of 31 of the 33 species was reduced or ceased altogether during four cool days preceding May 26. The average temperature at the time of these collections was only 13° F., less than that of the preceding four-day period. Only two species increased in numbers in the collections during this cool period, and these were an aphid, *Macrosiphum pisi* (Kalt.), and a scarabeid, *Aphodius stercorosus* (Melsh.).

Five species showed an apparent increase in activity with rising temperatures and increasing humidity. In most cases the activity of a species fell off after several days of continued

high temperatures. The first ten days of June were wet, and four species showed a decrease during this period which might have been the result of the heavy rains. These were the anthicid, *Anthicus cervinus* Laf., the lathridid, *Corticaria elongata* Gyll., the ant, *Tapinoma* sp., and a psychodid, *Psychoda* sp.

On the basis of the species collected, in nine cases the flight activity of the family was the same as that of the most abundant species, and in three cases the flight activity of the genus was the same as that of the most abundant species in it.

Ten species reached the peak of their activity between May 1 and 15, seven species between May 15 and 31, and 16 species between June 1 and 19. As Table 1 indicates they followed each other in succession.

TABLE 1

Showing the succession of 31 species of insects flying in the air. Figures given are relative. Figure in italics indicates four days of greatest activity.

Rank	Species	May						June					
		6	10	14	18	22	26	30	3	7	11	15	19
1	<i>Tachistodes testaceus</i> Dej.	<i>13</i>	2	2	2	4	0	2					
2	<i>Amnestus pusillus</i> Uhler	<i>16</i>	<i>21</i>	3	2	5	0	0	2	1	0		
3	<i>Aphodius distinctus</i> Müll.	2	2	1	0	1							
4	<i>Biblopectus ruficeps</i> (Leconte)	48	<i>60</i>	24	46	22	0	8	24	30	12	8	6
5	<i>Heterocerus pusillus</i> v. <i>limbatus</i> Kies.	5	6	3	5	1	0	4	3				
6	<i>Anthicus cervinus</i> Laf.	1	4	1	3	2	1	4	3	0	2	1	0
7	<i>Pseudocleon</i> sp.	2	8	<i>10</i>	4	7	0	2	<i>10</i>				
8	<i>Frankliniella tritici</i> (Fitch)	1	6	<i>18</i>	6	4	0	5	1	5	10	6	<i>11</i>
9	<i>Rhopalosiphum prunifoliae</i> (Fitch)	18	13	<i>18</i>	6	4	0	5	4	6	7	6	7
10	<i>Psychoda</i> sp.	4	2	3	5	0	1	1	4				
11	<i>Toxoptera graminum</i> (Rondani)		1	1		<i>9</i>		5	7	2	5	1	2
12	<i>Monocrepidius bellus</i> (Say)	1	8	4	12	25		8	12	9	1	1	1
13	<i>Pseudococcus</i> sp.			1		<i>24</i>	1		1				
14	<i>Tomarus pulchellus</i> Pec.		1	3	1	5			2				1
15	<i>Aphodius stercorosus</i> Melsh.	2		1	2	1	4	1					
16	<i>Macrosiphum pisi</i> (Kalt.)	2	2	5	5	4	8	28	8	1	1		
17	<i>Pemphigus lactucae</i> Gyll.	5	2	5	9	7		2	<i>16</i>	2			
18	<i>Micratopus</i> sp.								5	3		2	
19	<i>Tachys laevus</i> Say		1			2			5	2			
20	<i>Corticaria elongata</i> Gyll.			1	2	0	1	6	<i>17</i>	6	3	16	2
21	<i>Catorama confusum</i> Fall.					2			8		1	1	
22	<i>Sciara nacta</i> Johannsen	40	60	24	28	256	12	204	<i>2340</i>		40	48	60
23	<i>Anaphothrips obscurus</i> (Müll.)	0	4	1	0	0	0	1	3	<i>13</i>	7	0	1
24	<i>Anchicera ochracea</i> Casey	1	0	2	1	4	0	3	2	5	2	1	1
25	<i>Typhea fumata</i> Linn.	1	1	0	1	1	0	2	1	8	2	2	1
26	<i>Monotoma americana</i> Aubé	2	4	2	2	6	0	4	5	10	12	2	2
27	<i>Melanophthalma simplex</i> Lec.	3	4	3	3	4	0	2	4	4	6	4	3
28	<i>Halictus illinoensis</i> Robertson		3	1							2	<i>9</i>	
29	<i>Tapinoma</i> sp.					1		0	3	3	1	0	4
30	<i>Pheidole pilifera</i> Robertson										2	5	<i>52</i>
31	<i>Ponera coarctata pennsylvanicus</i> Buckley										1	3	4

There was a progressive increase in the numbers of flying insects encountered in May until the four days preceding the twenty-sixth. During this time there was a drop in temperature and a corresponding drop in the numbers flying. There was a slight increase in numbers in the four days preceding May 22, and during this time there were increasing temperatures and decreasing humidity. In the eight days preceding June 3, with the climax on June 2, a heavy flight coincided with a period of increasing temperature and humidity. As the temperature remained warm and the humidity became variable, the size of the collections decreased.

Following is a discussion of the species collected and identified:

ARANEIDA. Dictynidae, *Dictyna* sp., 1; Linyphiidae, *Microneta* sp., 3; Argiopidae, *Araneus* sp., 1; Thomisidae, *Philodromus lineatus* E., 1; *Misumenops* sp., 1; Micryphantidae, 11. Only 18 spiders were taken during these collections, and most of these were juvenile. No statements can be made of their ballooning activity except that it was erratic at the time of the collections.

ACARINA. Trombididae, 2; Parasitidae, *Gamasus coleoptratorum* Berlese, 5. As mites have no means of flying but floating or riding on insects, they would be in the air only accidentally. The fact that more were taken early in May, whether riding or floating, seems to indicate that they were most abundant then. Furthermore, none were collected in the morning.

COLLEMBOLA. Entomobryidae, *Folsomia quadrioculata* (Tull.), 1, *Lepidocyrtus cyaneus* (Tull.), 1; Sminthuridae, *Bourletiella* sp., 1. Collembola probably were taken only when gusts of wind had knocked them from plants and carried them into the air.

EPHEMERIDA. Ephemeridae, *Pseudocleon* sp., 43, *Caenis* sp., 2; Baetidae, *Baetis* sp., 1, *Ephemerella* sp., 5. Of the 47 Ephemerida taken, only three were collected in the morning. During the first part of May Ephemerida in the collections increased and decreased at a constant rate. They were not taken during the May 26 cool period, and then for about two weeks they were encountered intermittently. After June 7 no more

were caught. The genus *Pseudocleon* was represented by 43 females, and all but two were taken in the evening.

PSOCOPTERA. Of the 133 unidentified psocids, only four were collected in the morning. The evening totals in the collections increased throughout May with but slight drops around the fourteenth and twenty-sixth. The peak came during the four days preceding June 3. From then they decreased rapidly to zero by June 19.

THYSANOPTERA. Thripidae, *Heterothrips* sp., 1, *Sciriothrips variabilis* (Beach), 1, *Anaphothrips obscurus* (Müll.), 30, *Frankliniella fusca* (Hinds), 6, *Frankliniella tritici* (Fitch), 95, *Frankliniella nervosa* (Uzel), 1, *Pseudothrips inequalis* (Beach), 1, *Plectothrips antennatus* (Hood), 1, *Thrips* sp., 4, *Thrips tabaci* Lind., 5; Tubulifera, 5; Phlaeothripidae, *Haplothrips leucanthemi* (Schr.), 1, *Phlocthris* sp., 1. Only 180 thrips were taken in flight during the seven weeks of collecting, but in near-by pastures of flowers and weeds it was estimated that there were 3,000 thrips to a square yard. At any one time, apparently, very few of these were flying, especially away from the plants. They seemed to be extremely sensitive to temperature changes, and the numbers declined during the cool periods of the eighteenth and twenty-sixth of May. The morning collections were greatest in May, and the evening total greatest in June. Toward the middle of June the abundance of thrips in the pastures became less, consequently the numbers taken in flight were reduced.

Frankliniella tritici (Fitch). Of the 95 specimens of this species, 47 were taken in the morning and 48 in the evening. The morning collections were highest in May and ceased by May 26, with but a few individuals caught afterwards. The evening collections were low and sporadic during May and gradually increased in June. It is probably that light conditions brought about this change in the time of flight activity.

HEMIPTERA. Enicocephalidae, *Systelloderus biceps* (Say), 7; Miridae, *Adelphocoris rapidus* (Say), 1; Cydnidae, *Annestus pusillus* Uhler, 52. The only hemipteran taken in any numbers was *Annestus pusillus* Uhler. They were most abundant in the collections early in May, and ceased to be collected by

June 11 in the evening, and May 26 in the morning. Morning numbers were very small and of no particular importance. The eight days preceding May 30 were cool and dry, but the increasing temperatures and humidity of the first of June apparently brought about a little more activity from the group and a few more were picked up.

(To be continued in February issue.)

A New Locality for a Rare Hairstreak (Lepidoptera: Lycaenidae).

Strymon ontario ontario has been found over a large area from Missouri and Arkansas to Ontario and Virginia at least on the southeast, in widely scattered localities; and is "one of the rarest and least known of our eastern butterflies."¹ I am glad, therefore, to report this hairstreak for the first time in Maryland. On June 17, 1942, while searching in company with Carroll E. Wood, Jr., and Neal W. Gilbert for *Strymon titus mopsus* near White Oak, Montgomery County, Maryland, I noticed a hairstreak flutter down into a patch of the milkweed, *Asclepias syriaca*. It crawled up the main stem where I caught it with my fingers and recognized it as a worn but perfect female *S. ontario*. The extensive area of light orange which characterizes the western subspecies *S. O. autolyca* was indicated by a small orange patch on the fore-wings.

A careful search the next day in the vicinity, particularly in the oak forests nearby, revealed no other specimens—a situation similar to that I experienced with *Strymon liparops strigosa*, a single specimen at Hyattsville, Maryland, and a lone *Chrysothamnus thoë* at Beltsville, Maryland; localities which were studied over a period of years. The Virginia *Strymon ontario* record was based on two specimens, however, both from near Difficult Run, Fairfax County, collected by Ernest Shoemaker. But like others of these elusive lycaenids, even though the place has been thoroughly scoured by collectors, it has not since been found there either. This species, then, like *Erora lacta*, either must be a stray from the West; or it must have a very local occurrence in peculiar habitats unknown to collectors.

WARREN HERBERT WAGNER, JR., Washington, D. C.

¹ Austin H. Clark, "The Butterflies in Virginia" in *Explorations and Field-Work of the Smithsonian Institution in 1934*. Caption p. 35.

New Food Records of Entomophagous Insects (Hym., Dip., Col., Orth., Hemip.).

By W. V. BALDUF, Urbana, Illinois.*

The miscellaneous annotated prey and host records presented below have been obtained (1) largely incidental to other field work I have carried on in recent years, and (2) from several of my associates in biology who generously permit me to include here their observations with mine. Unless noted otherwise, these records have reference to the vicinity of Urbana, Illinois.

HYMENOPTERA.

1. *TELENOMUS* sp., Scelionidae. A series of adults was reared July 1, 1941 from the egg masses of an undetermined tabanid fly on leaves of *Typha* growing at the margin of a small pond.

DIPTERA.

2. *PROMACHUS VERTEBRATUS* (Say), Asilidae. An adult feeding on a nymphalid butterfly, *Phyciodes tharos* (Dru.) in a field, West Lafayette, Ohio, Aug. 11, 1939: same, preying on an adult of the tephid wasp, *Mysine maculata* (Fabr.), Trelease Woods, Aug. 21, 1941; E. J. Koestner, collector.

3. *ASILUS NOVAESCOTIAE* Macq., Asilidae. An adult preying on a calliphorid fly, *Bufo lucilia silvarum* (Mg.), Mahomet, Illinois, June 22, 1940. J. S. Slater, collector.

4. *DESMOMETOPA M-NIGRUM* (Zett.), Milichiidae. On September 7, 1940, I found nine adults of this small fly running over and flying about the bodies of two dead honey bees, *Apis mellifica* L. In each case, the bee was dead and in the grasp of an ambush bug, *Phymata pennsylvanica americana* Melin, hiding in flowers. Small numbers of flies, presumably this species, were seen in 1939 and 1941 engaging in similar activities about dead honey bees killed by the same species of ambush bug. The publications of Frost, Knab, de Peyerimhoff and Clausen, cited below, make reference to the bionomics of several species of *Desmometopa*.

* Contribution No. 235 from the entomological laboratories of the University of Illinois. Specialists of the United States National Museum identified many of the insects named in this article.

COLEOPTERA

5. *CALOSOMA SCRUTATOR* Febr., Carabidae. I found an adult devouring an adult male of the thirteen-year form of the seventeen-year cicada, *Magicalcica septemdecim* (L.), in a haw tree at Monticello, Illinois, June 15, 1933: same, I noticed several adults in the same locality on May 13, 1942, on low-hanging branches of various species of roadside trees where they were probably preying on spring cankerworms.

ORTHOPTERA

6. *ORCHELIMUM VULGARE* Harris, Tettigoniidae. On October 17, 1938, I discovered an adult female *vulgare* sitting on an *Aster multiflorus* and feeding on an adult female of the syrphid fly, *Eristalis dimidiatus* Wied. Because the fly was dead when found, I can not state whether it was captured alive by the hopper or had been seized and killed previously by an ambush bug. The discarded prey of *Phymata* commonly remains lying in the flowers, axils or leaves of ambush plants when these plants are not shaken by winds. If this was an instance of scavengerism, it closely approached predatism, for the exposed muscles of the fly were still firm and flexible. The grasshopper had consumed the head, the venter of the thorax and its contents and the last two abdominal segments and their viscera when my arrival interrupted the meal.

HEMIPTERA.

7. *NABIS ROSEIPENNIS* Reuter, Nabidae. An adult male dangled an adult tarnished plant bug, *Lygus oblineatus* (Say) from the end of his stylets, October 20, 1938: same, an adult male preyed on an adult of another mirid bug, *Inacora stalii* Reuter, at light, June 8, 1941; J. S. Slater, collector: same, a female was observed introducing her beak into a flower head of *Aster multiflorus*, as if feeding, September 22, 1939. While not an instance of predatism, the latter suggests, as do several cases of similar activity I have noticed involving *Phymata*, that sucking entomophags resort to plant fluids, presumably when the preferred insect prey is not available in adequate amount.

8. *ZELUS EXSANGUIS* Stal, Reduviidae. An adult female simultaneously held two dead prey insects,—an adult ichneu-

monid, *Diplazon lactatorius* (F.) and an adult titaniid fly, possibly *Chloropsis* sp., June 20, 1941.

9. *LYGAEUS KALMII* Stal, Lygaeidae. On September 7, 1940, my attention was attracted by an adult of this common milkweed bug because it occurred on *Solidago* and stood astride a dead honey bee. Several times, in the course of a few minutes, the bug withdrew its stylets and again inserted them full length into the body of the bee. It is highly probable the bee had been killed by an ambush bug found close by, hence *Lygaeus* may not be classed as predatory, but as a scavenger, perhaps seeking the predigested fluids left by the ambush bug. The bee was stuck fast by its caudal end to the upper surface of a leaf, perhaps by viscid excreta.

10. *HETEROCORDYLUS MALINUS* Reut., Miridae. J. H. Bigger discovered an adult preying on a fairly large spring cankerworm, *Palcaecrita vernata* Peck, at Duncans Mills, Illinois, May 29, 1940.

11. *PODISUS MACULIVENTRIS* (Say), Pentatomidae. Twelve separate preying records are given here as follows: an adult female feeding on an adult female of the thirteen-year form of *Magiccada septemdecim* in a wild crabapple tree at Monticello, Illinois, June 15, 1933: same, an adult female holding on her stylets a 30 mm. long larva of the phalaenid moth, *Prodenia ornithogalli* Guen., on asparagus, September 25, 1935: same, an adult male holding to the caudal end of a geometrid larva which dangled from the beak; October 15, 1938: same, an adult female feeding on an adult of *Lygus oblineatus*, October 17, 1938: same, on July 25, 1940, I saw a three-fifths grown nymph project its proboscis and thrust its stylets into a 4 mm. long larva of the coccinellid, *Hippodamia* sp., on which it then fed: same, an adult preying on an one inch long phalaenid larva closely related to *Heliothia*, September 16, 1940: same, an adult female was taken in possession of an empidid fly, *Empis clausa* Coq., September 16, 1940: same, an adult preying on an one inch long larva of a *Phalaenidae* sp., September 30, 1940: same, an adult female feeding on an adult of the lacewing, *Chrysopa oculata* Say; taken at light, May 28, 1941, by J. S. Slater: same,

an adult female holding an adult of the chrysomelid beetle, *Trirhabda* sp., June 2, 1941: same, an adult male sucking on an adult of the braconid, *Rogas* sp.; taken June 8, 1941, at light, by J. S. Slater: same, an adult with a half-grown larva of the chrysomelid beetle, *Trirhabda adela* Blake, impaled on its stylets, June 1942; W. K. Bingman, collector.

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A New *Polydesmus* from Missouri and Oklahoma (Diplopoda).

By RALPH V. CHAMBERLIN, University of Utah,
Salt Lake City.

The specimens upon which the new species of *Polydesmus* here described is based were collected by Leslie Hubricht in March and April of 1936. These specimens, with the exception of paratypes deposited in the Academy of Natural Sciences of Philadelphia, are retained in the author's collection.

Polydesmus hubrichti new species.

General color of the dorsum brown, with the legs lighter and the antennae darker.

On the typical tergites the usual two series of well-defined tubercles back of the transverse sulcus, typically six tubercles in each series which extend between bases of the keels. Tubercles in front of sulcus not distinctly separated. Basal area of keels moderately swollen or convex, smooth. The serrations of the keels are sharply defined on anterior tergites but else-

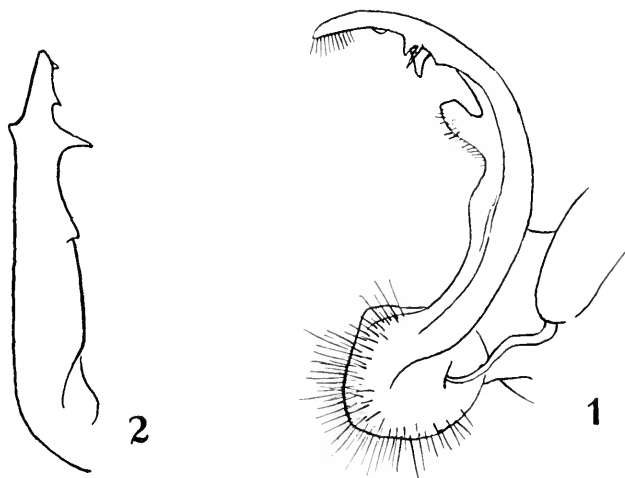
where are weak and on posterior segments almost obliterated; there are two lateral serrations behind that at anterior corner on the non-poriferous keels, three on the poriferous.

Best distinguished by the details of the gonopods of the male which are represented by the accompanying drawings.

Length, up to 17 mm.; width, to 2.7 mm.

Localities—MISSOURI: St. Louis County, University City, March 29, 1936, about 12 specimens, including ♂ holotype, ♀ allotype and ♂ and ♀ paratypes. 4.3 miles northwest of Glencoe Station, March, 1936, one ♀. Creve Coeur Lake Park, March 8, 1936, eight ♂ and ♀ specimens.

OKLAHOMA: Murray County, Arbuckle Mountains, near Latimer County, 2 miles east of Gowen, April 26, 1936, three ♂ and ♀ specimens.



Polydesmus hubrichti sp. n. 1. Right gonopod of male, mesal view. 2. Distal view of blade of same.

Insect Types in the Museum of Comparative Zoology, Harvard College.

The reports by Messrs. Banks and Carpenter in the Annual Report of the Director for 1941-'42 give the types of recent insects catalogued as 25,953 and of fossil insects (holotypes and cotypes) as 1376 species.

Two New Species of *Amblyscirtes* from Texas and Arkansas (Lepidoptera, Rhopalocera: HesperIIDae).

By H. A. FREEMAN, White Deer, Texas.

Amblyscirtes erna new species.

♂. Upperside. Primaries. Brown with fulvous overscaling over the entire surface. Two or three very indistinct fulvous subapical spots, otherwise immaculate. The stigma is well developed and is easily discernible because of the presence of lighter fulvous scales below and to the side of it.

Secondaries. Brown with an even overscaling of fulvous scales; some short concolorous hairs toward the base.

Underside. Primaries. Brown, lighter than above especially in the cell; apex and part of the outer margin is shaded slightly darker as is also the base of the wings. The subapical spots reappear as minute, sordid white, dots. Some specimens show two very indistinct spots near the stigma.

Secondaries. Ground color light brown, evenly suffused with gray scales. Some specimens show some very faint lighter markings but the majority are immaculate.

Fringes of both wings faintly checkered. Body above brown; beneath grayish; palpi, sordid white, intermixed with darker gray hairs; antennae, dark brown, ringed with sordid white; club, dark brown above, beneath sordid white.

♀. Similar to the ♂ except larger.

Expanse: ♂, 22-25 mm., average size 24 mm.; ♀, 24-26 mm., average size 25 mm.

Described from 29 specimens, 25 ♂ and 4 ♀. Of these 9 ♂ and 1 ♀ were collected by Don B. Stallings and Dr. J. R. Turner of Caldwell, Kansas, in the Palo Duro Canyon, TEXAS, during May and June, 1942. The remaining 19 ♂ and 3 ♀ were collected by the author at Palo Pinto, Palo Duro Canyon and Miami, all in Texas, during April, May, June, July and August, 1940 and 1942.

This species is named in honor of the writer's wife who has so generously assisted in his study of the Hesperioidea.

Holotype, ♂, Palo Duro Canyon, Texas; IV-25-42 (H. A. Freeman); and *allotype*, ♀, Palo Duro Canyon, Texas; IV-18-42 (H. A. Freeman); are in the collection of the author. *Paratypes*, 9 ♂ and 1 ♀ are in the collection of Stallings and Turner, Caldwell, Kansas; 15 ♂ and 2 ♀ will be disposed as follows: 2 ♂ to the American Museum of Natural History, New York; 1 ♂ to the United States National Museum; 1 ♂ to the Academy of Natural Sciences of Philadelphia; 1 ♂ to the collection of Mr. A. C. Frederick, Albany, New York; and 1 ♂ to the collection of Mr. Lowell Hulbirt, Glendora, California. The other 11 *paratypes* will remain for the present in the collection of the author.

Erna more closely resembles *aenus* Edwards than any other species of *Amblyscirtes*. In preparing this description *erna* was compared with 31 specimens of *aenus* from Colorado; Palo Duro Canyon and Alpine, Texas, and the following differences were noted: (1) *Aenus* always has three well defined subapical spots. These spots in *erna* are poorly defined or absent. (2) *Aenus* usually has a small spot in interspace Cu_1 and another slightly larger one in interspace Cu_2 . *Erna* does not have these spots. (3) The fulvous overscaling on the upper surface of the wings of *aenus* is brighter than it is in *erna*. (4) On the under surface of the primaries the cell area is bright reddish-fulvous in *aenus*, whereas in *erna* this area is scarcely lighter than the rest of the wing. (5) The ground color of the under surface of the secondaries of *aenus* is dark with the overscaling whitish. In *erna* the ground color is lighter than in *aenus* and the overscaling is darker, being grayish. (6) *Aenus* usually has a discal band of whitish spots and two basal spots of the same color on the under surface of the secondaries. These are absent in *erna* or else very poorly defined. (7) *Aenus* is a slightly larger species than *erna*. Comparative measurements show that the males of *aenus* average 27 mm. and the females 28 mm.; the males of *erna* average 24 mm. and the females 25 mm.

Genitalic resemblance in this genus is very great; however careful microscopic examination reveals slight specific differences in the valvae. In *erna* the tooth-like projection at the posterior extremity of the valve is short and serrate similar to

the same projection in *alternata* Grote and Robinson, whereas the general shape of the valve is similar to *cassus* Edwards.

Amblyscirtes linda new species.

♂. Upperside. Primaries. Dark brown with some fulvous overscaling toward the base and inner margin; the number of subapical spots variable, from three well defined to no spots at all. A few specimens show two poorly defined spots in the vicinity of the stigma, one in interspace Cu_1 and the other in interspace Cu_2 . The stigma is well developed.

Secondaries. Dark brown with the basal and discal areas of the wings overscaled with fulvous scales and hairs.

Underside. Primaries. Grayish-brown, lighter than above. The cell area is occupied with reddish-fulvous scales. The spots reappear and are better defined, the subapical spots are clear white and the two spots near the stigma are fulvous.

Secondaries. Ground color dark brown, evenly suffused with grayish-white scales; an irregular curved discal band of five or six grayish-white spots, two above the cell and a faintly lighter area near the base. The overscaling almost obliterates the discal band and basal spots in some of the specimens.

Fringes of both wings checkered. Body, above brown; beneath grayish-white; palpi, grayish-white; antennae, dark brown, ringed with gray; club, black above, beneath grayish-white.

♀. Similar to the ♂ except some of them have the discal band and basal spots on the under surface of the secondaries clear snow white.

Expanse: ♂, 24-27 mm., average size 26 mm.; ♀, 24-29 mm., average size 28 mm.

Described from 35 specimens, 24 ♂ and 11 ♀, collected by the author at Hope Hill Farm and Pinnacle Springs, Faulkner County, ARKANSAS, during June and July, 1941 and 1942.

I take great pleasure in naming this species for my daughter.

Holotype, ♂, Hope Hill Farm, Faulkner Co., Arkansas; VII-6-42; and *allotype*, ♀, Hope Hill Farm, Faulkner Co., Arkansas; VI-27-42; are in the collection of the author. *Paratypes*, 23 ♂ and 10 ♀, will be disposed as follows: one pair to the American Museum of Natural History, New York, New York; one pair to the Academy of Natural Sciences, Philadelphia, Pennsylvania; one pair to the United States National

Museum, Washington, D. C.; one pair to the Carnegie Museum, Pittsburgh Pennsylvania; one pair to the collection of Stallings and Turner, Caldwell, Kansas; one ♂ to the collection of Mr. A. C. Frederick, Albany, New York; one ♂ to the collection of Dr. G. W. Rawson, Detroit, Michigan; one ♂ to the collection of Mr. Lowell Hulbirt, Glendora, California; and one ♂ to the collection of Mr. Otto Buchholz, Roselle Park, New Jersey. The other 19 *paratypes* will remain for the present in the collection of the author.

The prevailing species of *Amblyscirtes* in Arkansas is *vialis* (Edwards). To this species and *aenus* Edwards *linda* bears the most resemblance. In preparing this description *linda* was compared with approximately 250 specimens of *vialis* from over most of the United States and several localities in Canada and the following differences were noted: (1) Although a dark species, *linda* is lighter than *vialis*. The tendency in coloration of *vialis* is toward black, whereas in *linda* the tendency is toward brown. (2) *Vialis* lacks the fulvous overscaling present in a large number of the specimens of *linda*. (3) The stigma is more prominent in *linda* than it is in *vialis*. (4) The cell area of the under surface of the primaries of *vialis* is dark and does not show the fulvous overscaling present in *linda*. (5) On the under surface of the primaries the subapical spots begin with three white streaks on the costa of the wing, whereas in *linda* these are never present. (6) *Vialis* lacks the discal band and basal spots present in *linda* and the overscaling is more restricted, while in *linda* it covers all the surface of the wing.

In comparing this species with *aenus* the following differences were noted: (1) *Linda* is a much darker species than *aenus* and the maculation is reduced. (2) The discal band and basal spots on the under surface of the males of *aenus* are better developed than in *linda*, whereas the females of *linda* have these markings better developed than the females of *aenus*. (3) The stigma is better developed in *linda* than it is in *aenus*.

The genitalia somewhat resemble the genitalia of *celia* Skinner, however the posterior projection on the valve is different.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

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(5): 758-761. LUTZ, ADOLPHO.—Necrologia do Dr. Adolpho Lutz 1855-1940. By Dr. Arthur Neiva. [111] 36 (1): i-xxiii, portrait, bibliography. METCALF, C. L.—Common names of insects. [12] 35 (5): 795-797. MORRIS, R. F.—The use of frass in the identification of forest insect damage. [4] 74 (9): 164-167, ill. (k). MUESEBECK, C. F. W.—Fundamental taxonomic problems in quarantine and nursery inspection. [12] 35 (5): 753-758. ROBERTS, T. W.—Behavior of organisms. [27] 12 (4): 339-412.

ANATOMY, PHYSIOLOGY, ETC.—CARLSON, F. W.—Refrigeration test of transforming codling moth larvae. [12] 35 (5): 787. GIRAL, F.—Sobre aceites de insectos. I. *Taenio-poda auricornis*. [35] 2 (4): 243-250. HEADLEE, T. J.—A continuation of the studies of the relative effects on insect metabolism of temperature derived from constant and varied sources. [12] 35 (5): 785-786. PARKIN, E. A.—Symbiosis and siricid wood wasps. [20] 29: 268-274. RICHARDS, ANDERSON & HANCE.—A microtome sectioning technique for electron microscopy illustrated with sections of striated muscle. [33] 51 (1): 148-152, ill. SWARTZ, G. E.—The course of dark adaptation in the anterior ommatidia of *Eristalis tenax*. [42] 91: 65-78. WIGGLESWORTH, V. B.—Some notes on the integument of insects in relation to the entry of contact insecticides. [22] 33 (3): 205-218, ill.

ARACHNIDA AND MYRIAPODA.—EDDY, G. W.—Notes on the seasonal history of the rabbit tick, *Haemaphysalis leporis-palustris*, in Oklahoma. [10] 44 (7): 145-149, ill. GERTSCH, W. J.—New American spiders of the family Clubionidae. [40] 1195: 1-18, ill. GOODNIGHT, C. J. & M. L.—New Phalangodidae (Phalangida) from the United States; Phalangida from Barro Colorado Island, Canal Zone. [40] 1188: 1-18, ill. (k); 1198: 1-18, ill. (*). HENDERSON & HOLLOWAY.—Influence of leaf age and feeding injury on the citrus red mite. [12] 35 (5): 681-686. HESSE, A. J.—See also the General Subject. JOYCE & EDDY.—*Inxodes dentatus* from Iowa. [12] 35 (5): 673. KEIFER, H. H.—Eriophyid studies XII. [11] 31 (3): 117-129, ill.

THE SMALLER ORDERS OF INSECTS.—AHRENS, C.—White-tails and amber-wings [Pennsylvania Angler, Harrisburg] 11 (11): 10-11, ill. CRAWFORD, J. C.—A new Heterothrips found on oak (Thysanoptera: Heterothripidae): Two

new South American species of *Merothrips* Hood (*Merothripidae*). [10] 44 (7): 140-141; 151-154. EWING & FOX.—New neotropical insects of the Apterygotan family *Japygidae*. [50] 92 (3151): 291-299, ill. FRASER, F. C.—A note on the wing-trichiation of the Odonata. [8] 78 (941): 235-236, figs. GOOD, N. E.—*Stenistomera* (Siphonaptera): a revaluation of the genus, with the description of a new subgenus and species. [10] 44 (7): 131-139, ill. HOLLAND, G. P.—Synonymy of some fleas from western North America (Siphonaptera). [4] 74 (9): 157-158. KIRBY, H.—Descovininid flagellates of Termites III. The genera *Foaina* and *Parajoenia*. [67 Zool.] 45 (3): 167-246, ill. KOHLS, G. M.—Siphonaptera: *Ptilopsylla dunni*, a new species of bat flea from Panama. [17] 28: 361-362, ill. LEPELLEY, R. H.—A method of sampling thrips populations. [22] 33 (3): 147-148. SCOTT, D. B.—Some *Collembola* records for the Pacific coast and a description of a new species. [55] 18 (4): 177-186.

ORTHOPTERA.—ROBERTS, H. R.—Two subspecies of *Melanoplus differentialis* and related new species from Mexico with discussion of their variations (*Acrididae*: *Cyrtacanthacridinae*). [1] 68: 151-156, ill. SEAMANS, F. M.—Protozoan parasites of the Orthoptera, with special reference to those of Ohio. III. Protozoan parasites in the relation to the host and to host ecology. [43] 41 (6): 457-464. SPRAGUE & RAMSEY.—Further observations on *Plistophora kudoii*, a microsporidian of the cockroach. [17] 28: 399-406.

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SPECIAL NOTICES.—Meterology of the Virgin Islands. By R. G. Stone. [*Sci. Surv. Porto Rico & Virgin Is. N. Y. Acad. Sci.*] 19 (1): 1-138.

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Exper. Biology & Medicine. 34.—Bios. Rivista Biol. Sperimen. e Gen., Geneva. 35.—Revista, Sociedad Mexicana Hist. Nat. 40.—American Mus. Novitates. 42.—Jour. of Experimental Zool. 43.—Ohio Jour. of Sciences. 47.—Jour. of Agricultural Research. 50.—Proc. U. S. National Mus. 55.—Pan-Pacific Entomologist. 62.—Bull., Amer. Museum Nat. Hist. 67.—Univ. of California Pub., Entom. 68.—Science, New York. 75.—Annals & Mag. Nat. Hist. 90.—The American Naturalist. 91.—Jour., Washington Acad. Sciences. 103.—Jour., Kansas Entom. Soc. 111.—Memorias, Inst. Oswaldo Cruz.

The Detroit Entomological Society.

After a couple of decades of informal fraternizing, the Detroit Entomological Society has just completed its first year of formal organization with fifteen members. Any entomologist who may visit Detroit is requested to communicate with the secretary, John H. Newman, 14358 Maddelein Ave., or the chairman, George Steyskal, 23341 Puritan Ave., Detroit, Michigan.

Asterocampa celtis in Michigan (Lepidoptera: Nymphalidae).

After returning home from a profitable day of research at the University of Michigan Museum of Zoology on August 23, 1942, the writer opened his front door for fresh air and noticed an unusual butterfly perched on the outside of the screen-door. He rushed around the house with a net and secured the insect, which was identified as *Asterocampa celtis* (Bdv. & Lec.), a species not previously recorded from Michigan. The specimen was turned over to Sherman Moore, who checked its determination and who will deposit it in the University of Michigan Museum of Zoology.—GEORGE STEYSKAL, Detroit, Michigan.

Entomological News for December, 1942, was mailed at the Philadelphia Post Office on January 26, 1943.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Arctic Lepidoptera especially **Noctuidae**—Wanted to hear from collectors who desire the Arctic Species. Have large collection. R. J. Fitch. Lloydminster, Saskatchewan, Canada.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

I shall be grateful to anyone who will give me any reference where insects taken on Mt. Desert Island, Maine, have been used wholly or in part in describing a species.

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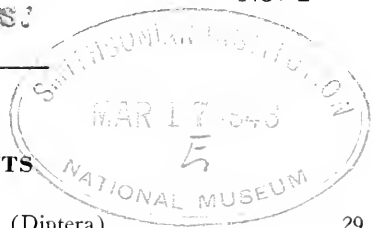
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No. 2

Some New American Syrphid Flies (Diptera).

By F. M. HULL, University of Mississippi.

Several new species of Syrphid flies have accumulated in the collections of the author and are here described. Types unless otherwise stated are in the author's collection.

Eristalis incubus new species.

Characterized by the black-velvet opaque mesonotum, the transverse suture linearly margined with brownish-yellow pollen. The hind femora are shining black, their tibiae dark brown, without apical spur. Related to *tachia* Wiedemann.

♀. Length 11 mm. *Head*: the cheeks are shining black; the face and lower part of the front are pale brownish-yellow and broadly over the sides are white pubescent and white pilose. Antennae and arista pale brown, the latter bare. The upper portion of the front is light brown pollinose with chiefly blackish pile throughout the middle and entirely black in front of the ocelli. Viewed dorsally there are three, narrow, linear black vittae on the upper part of the front. The occiput is dark brown pollinose, black margined, the immediate eye margins narrowly yellowish pubescent.

Thorax: mesonotum opaque black behind the suture and largely opaque black in front; the anterior margin of the suture linearly, the lateral margin, the humeri and the anterior margin are, light to dark brown pollinose. The scutellum is yellow; the base is very narrowly black, the pile of the basal half of the apex is long and yellow with numerous long black hairs across the posterior half. Pile of mesonotum yellow in front of the suture and immediately behind it; long and black on the remainder and upon all of the post calli except the anterior corner. The pleural pile is wholly pale; the squamae dark brown.

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Abdomen: first segment black and narrowly yellow in front on either side of the middle and upon the anterior and posterior corners. The second segment is pale yellow with a large posterior black triangle reaching more or less broadly to the anterior margin. Extreme posterior margin of the segment is yellow. The posterior corners of the segment are more or less black. Third segment similarly marked, the median portion of the central spot often much broader and extending widely upon the anterior margin. The lateral margin of the segment is widely black in the female and linearly black in the male. Fifth segment opaque black, yellow margined posteriorly with a central, narrow, medially interrupted, laterally expanded, shining black fascia.

Legs: shining black; the apices of the femora are reddish to yellow; the front and middle tibiae are light yellow basally, growing gradually darker apically where they are almost black. The hind tibiae are dark brown and paler at the extreme base; tarsi brownish black, the middle basi tarsi lighter.

Wings: hyaline.

Holotype: Female; Curityba, Paraná, BRAZIL, collector Clatiano, 10, 7, 1936 in the author's collection.

***Xylota althaea* new species.**

Hind femora only narrowly brownish at the base and less swollen than in *metallica* Wiedemann.

♀. Length 8 mm. *Head*: the face, front and vertex shining black, the former and a central transverse fascia across the middle of the front whitish pubescent. The pile of the front is white except in front of the ocelli and occupies all but a short distance in front of the antennae. The ocellar pile is black. Post ocellar pile white. Antennae brown, the third joint blackish above and light red below. Arista quite short, barely longer than the length of the antennae; its basal half is pale orange, then dark brown, the apex orange.

Thorax: mesonotum dully shining black with a coppery reflection; the pile is erect, short and whitish yellow with a small patch of black bristles above the base of the wing; the post calli pile is wholly pale, the scutellum concolorous, the pile white.

Abdomen: entirely black with faint bluish reflections; pile short, appressed in the posterior corners, erect in the basal

corners and black over the central posterior portions of the second and third segments, which together with the median vittae are more nearly opaque. The region of the usual spots of the second and third segments is completely shining bluish-black.

Legs: whole of first and second femora light reddish-brown; basal sixth of hind femora similarly colored, diffusely merging into the blackish remainder; the extreme apex of the hind femora is brown; front and middle tibiae and their first two tarsal joints brownish-yellow. Hind femora light brown at the base, dark brown elsewhere, their tibiae dark brown above, light brown below.

Wings: pale brown; stigmal cell darker.

Holotype: Female; Spartanburg, SOUTH CAROLINA, JUNE 5, 1917.

Lejops grisescens new species.

Related to *relictus* Curran and Fluke. It is smaller and distinguished by a blackish coloration and distinctly grey fascia.

♀. Length 6 mm. *Head:* the cheeks, face and front are black; the face is reddish-brown about the middle and covered with yellowish-white pubescence and sparse white pile. There is some sparse golden-brown pollen on the front which is almost bare in front of the antennae. The pile of the front and vertex is black; the extreme occipital pile yellowish. Antennae brown, the third joint light reddish, a little darker above. Arista light brown.

Thorax: mesonotum light grey pollinose with three opaque black vittae. The scutellum is shining black; the margin is quite narrowly yellowish-brown. Pile of thorax everywhere pale yellowish-white.

Abdomen: about two and one-half times as long as wide, black, shining upon the posterior margin of the second and third segment and subopaque upon the remainder of these segments where not covered by pale grey fascia. The whole of the first segment, a central, widely separated, transverse, sublunate grey fascia, its lateral ends reddish and extended to cover all the remainder of the anterior margin of the second segment only are light grey pollinose. Third segment with a similar pair of less widely separated sublunate fascia lying a little before

the middle, their lateral ends not reddish but extended forward to the anterior corners. There is a small, medial, apical grey triangle on this segment. Fourth segment, similar, the apical triangle expanded to cover all the posterior margin, but narrowly towards the sides. Fifth shining black on the base, widely pale grey on the remainder and narrowly divided by an extension from the basal black.

Legs: femora shining black, the anterior four more pollinose posteriorly, the hind pair yellowish narrowly upon the base and narrowly preapically; the others are yellowish upon the apex. The first four tibiae and their first four tarsal joints are light yellow. The hind tibiae are very dark brown, a little lighter at the narrow base and are almost yellow across the middle; they end in a rather blunt triangular scoop. Hind tarsi brownish.

Wings: pale yellowish-brown, stigma almost as wide as deep.

Holotype: Female; Riverton, NEW JERSEY, June 18, 1920. Paratype: a female. August 10, 1920; F. M. Hull collector.

Diagnosis, ***Sphaerophoria transversa*** new species.

Related to *micrura* O. S., the cheeks, and the whole of the femora are yellow; the pattern of the abdominal fascia is different; facial pile white.

♂. Length 8 mm. *Head*: the front, face and cheeks are pale yellow except for a hemispherical brown spot above the antennae and an elongate brown spot over the facial tubercle. The pile of the front and face is black and upon the latter limited to a narrow row along the outer margin. The antennae are orange-brown, the third joint dark brown except upon the base and ventral margin. Arista dark brown.

Thorax: mesonotum metallic brassy, the humeri, the notopleurae from humerus to suture, the posterior part of mesopleurae, the upper part of sternopleurae, a part of propleurae and the scutellum pale yellow. The mesonotal and pleural pile is yellow and the scutellar pile long and black.

Abdomen: elongate, rather flattened, and dark brown marked with yellow as follows: the anterior corners and most of the lateral margins of the first segment, a central, rather slender fascia across the middle of the second segment, slightly more narrow medially, a similar wider fascia on the third segment,

not narrowed in the middle, and each half of which is barely oblique. There is a still wider, slightly more oblique fascia across the fourth segment placed just before the middle of the segment; the fifth segment has four, small, obscure yellowish spots.

Legs: the femora and the first four tibiae and front coxae and trochanters are wholly light yellow, their tarsi pale brown almost yellow. The hind tibiae are pale brown on the apical third and subbasally, yellow between, their tarsi darker brown.

Wings: pale brown, the stigma light brown.

Holotype: Male; Near Portland, OREGON, July, 1926 (F. M. Hull).

Salpingogaster diana new species.

Related to *lineata* Sack. in the type of coloring upon the wing; the scutellum is brown and the pleura wholly dark brown.

♀. Length 13 mm. *Head:* the front and vertex are brownish-black, the lower protuberant part of the front is polished; there are two pairs of tiny eye-marginal yellow spots located in the front, a pair above, a pair below. The face is pale yellow and very broadly brown over the middle and tubercle as far as the antennae. The cheeks and the antennae are light brown.

Thorax: mesonotum dark chestnut-brown, the marking obscure because of the age and preservation but with a pair of widely separated velvet-black vittae that appear to be confined to the anterior half of the thorax. The pleurae are entirely brown, the scutellum brown, the disc diffusely darker.

Abdomen: petiolate and entirely brown, the first and second segment and extreme base of third light reddish-brown. The remainder of the abdomen is brownish-black. The second segment is elongate, quite slender, almost cylindrical, a little wider posteriorly and about seven times as long as its subbasal width. Viewed dorsally the cylindrical third and fourth segment is very strongly expanded just below its immediate base.

Legs: pale yellow, the anterior and middle femora brownish-yellow; the hind femora pale brown except the apex; the hind tibiae are brownish-yellow except for a pale brown annulus. Pile of hind femora black.

Wings: pale yellow, the costal and subcostal cell dilute brownish-yellow, the submarginal cell and basal anterior por-

tion of the first and second basal cell yellowish or brownish-yellow.

Holotype: Female; labeled BRAZIL, without further data; received some years ago in miscellaneous material from Brazil.

Mesogramma sylvatica new species.

Characterized by the spatulate abdomen, the slender connections of the geminate spots, the wide complete fascia on the second segment etc.; related to *musicus* Fabr.

♂. Length 7 mm. *Head*: front and face yellow, the latter very little produced forward; the cheeks are blackish; the antennae are light brown, darker upon the apical two-thirds of third joint.

Thorax: brassy black with thick golden-brown pollen. The humeri and the entire lateral margin are yellow. Scutellum yellowish-brown, the margin lighter, the disc darker, the sparse long pile black.

Abdomen: elongate, flattened, sub-spatulate, the apical segments very little wider than the basal ones. The first segment is yellow with narrow, shining black posterior margin, the black attenuated laterally. Second segment light orange-brown, the basal third brown except for the anterior corners and a narrow lineal anterior margin. The posterior third of the segment is black leaving a continuous middle stripe of yellow. Third segment is yellowish-brown with a pattern of black as follows: hind third of the segment in the middle, which expands to become a little deeper on the lateral margin, and sublaterally the black sends an anterior extension forward to within a short distance of the anterior margin; submedially the interrupted black posterior fascia sends forward paired lineal extensions that connect with prominent, almost equilateral, triangles of black whose upper angles touch the base of the segment and whose outer angles almost contact the sublateral extension; these triangles are concave on medial and basal margins. Fourth segment with a quite similar pattern, the sublateral black extensions except for small breaks reaching the anterior margin and the posterior black fascia is narrowly replaced by yellow along the central portion of the posterior margin. Fifth segment with a rhomboid, median, black triangle reaching from

base almost to apex and a pair of sublateral zig-zag vittae. Hypopygium with a large black spot.

Legs: yellow. Hind femora with a subapical black annulus, hind tibiae with a subbasal one.

Wings: grey hyaline, the alulae narrow and strap-shaped.

♀. Similar to the male. Face yellow. The abdominal pattern is similar, the sublateral black extensions of the third and fourth segments are short and broadly disconnected from a sublateral black spot lying between them and the anterior margin. Sublateral vittae of the fifth broken up each into two spots.

Holotype: Male; Baños, ECUADOR, July 5, 1938; W. C. MacIntyre. Type in the collection of Dr. C. L. Fluke.

Mesogramma sylpha new species.

Abdomen slender, narrow basally; the third and fourth segments with yellow crescents, median vittae and sublateral marginal markings; related to *M. tridentatum*.

♂. Length 6 mm. *Head*: the front is blackish except narrowly along the sides. Face greatly produced forward, its apex truncate and extending to or beyond the apex of the third antennal joint. The antennae are reddish below, blackish above.

Thorax: blackish upon the mesonotum with the humeri and lateral margins continuously yellowish-brown. Scutellum yellowish-brown, diffusely darker upon the disc.

Abdomen: spatulate. The first segment is dark brown except upon the sides, the second segment chocolate-brown with a yellow pattern as follows: a narrow median yellow vitta attenuated anteriorly and posteriorly and narrowly separated from an oval yellow spot near the middle of the segment on either side; each of these yellow spots is narrowly connected with a transverse, lateral extension of yellow. Third segment with similar attenuated median vitta and upon the anterior two-thirds of the segment a pair of crescentic yellow spots, their concave surfaces faced medially and which anteriorly connect with an oblique subbasal and sublateral yellow fascia; posteriorly the sublateral stripe of vittae is evanescent just beyond the middle of the segment. Fourth segment with similar pattern. Fifth segment with four slightly diagonal, yellowish vittae which reach and connect narrowly along the anterior margin and extend only through the anterior two-thirds of the segment.

Legs: light brownish-yellow, the hind femora and tibiae with wide apical and subbasal smoky bands.

Wings: nearly hyaline, the alulae wanting.

♀. Abdomen flattened, spatulate, wider and more oval, especially upon the posterior two-thirds. In general the pattern is similar, the submedial and sublateral yellow spots of the second segment are connected more broadly and the sublateral and submedial spots of the third and fourth segment are broadly connected by a basal yellow fascia. Spots of the fifth segment are more triangular and more broadly connected basally. Alulae narrow and strap-like.

Holotype: Male; Baños, ECUADOR, May 13, 1939, 2500 meters, W. C. MacIntyre. *Allotype*: female; same locality, July 9, 1938, 1800 meters, same collector. Types in the collection of Dr. Charles L. Fluke.

Mesogramma ornata new species.

Characterized by the yellowish-red pattern of the abdomen; related to *confusa* Schiner.

♂. Length 5 mm. *Head*: the face and front are yellow, the antennae orange, the cheeks blackish. Vertical pile short and black, vertical triangle brownish-yellow pollinose.

Thorax: posterior half of mesopleurae, upper part of sternopleurae, humeri, entire lateral margins and a wide margin around the scutellum, light yellow. Mesonotum brassy brownish-black, bluish on the anterior margin and upon a medial vitta which is greyish or brownish pollinose and is continued to the shining brownish-black scutellum. Scutellar pile long, erect, chiefly pale with a few brownish marginal hairs.

Abdomen: with nearly parallel sides; the first segment is blue-black, its anterior margin and corners yellow. Second segment sepia and opaque with a central, bilunate, narrowly divided, narrow fascia; apical margin reddish. Third segment with central lunate spots as in *confusa* Schiner; they are narrowly separated from the corner triangles whose medial margins curve; posterior portion of the segment widely reddish-brown, the medial, anterior center and the remaining area of the segment opaque brown; posteriorly this lateral extension of dark brown coloration extends medially inward to meet and con-

tinue upwards to the central brown spot. Fourth segment with a similar pattern, the basal triangles further apart from the submedial crescent-like spots. Fifth segment with a central, rounded, opaque brown spot and an obscure sublateral vittate spot on either side.

Legs: yellow. Hind femora with wide black subapical annulus, their tibiae dark brown through the middle, their tarsi brown.

Wings: hyaline, the alulae well developed.

Holotype: Male; Villarica, PARAGUAY, January, 1938, F. Schade collector. Type in the collection of Dr. Charles L. Fluke.

Further Notes on Aero-Plankton of Kentucky.

By H. ELLIOTT McCLURE, Ord, Nebraska.

(Continued from Page 11)

HOMOPTERA. Cicadellidae; Aphididae (see McClure, 1942); *Coccidae. *Pseudococcus* sp., 28. One hundred and sixty-four unidentified leafhoppers were captured in this series, and they proved to be most abundant in the collections at the beginning of May in both morning and evening. None were taken in the morning collections after the first week of June, but the evening numbers continued weakly after a small peak during the four days preceding June 7. The evening collections were generally greater than those of the morning.

Twenty-eight male coccids, thought to be nearly all of the genus *Pseudococcus*, were taken during these collections. Only one was taken in the evening, and all were collected during the four days preceding May 22, when the temperature was rising, the humidity decreasing, and the light intensity increasing.

* McClure, H. E., Spring Aphid Aero-plankton (Homoptera). Ent. News, LIII, pp. 67-70.

COLEOPTERA. Carabidae: *Agonoderus comma* Fab., 2, *Agonoderus pallipes* Fab., 5, *Tachistodes partarius* Say, 1, *Tachistodes indistinctus* Dej., 2, *Tachistodes testaceus* Dej., 25, *Stenolophus conjunctus* Say, 1, *Stenolophus ochropczus* Say, 9, *Stenocellus rupestris* Say, 6, *Micratopus* sp., 12, *Tachys incurva* Say, 1, *Tachys acnuscens* Lec., 2, *Tachys tripunctata* Say, 1, *Tachys laevus* Say, 11, *Tachys coruscus* Lec., 2, *Tachys* sp., 2, *Bembidion intermedium* Kby., 2, *Bembidion affine* Say, 3, *Schizogenius lineolatus* Say, 1, *Clivina impressifrons* Lec. 2, *Dyschirius haemorrhoidalis* Dej., 1.

Of the 88 carabids taken, only four were collected in the morning. They were abundant during the first of May, but fell off rapidly coinciding with decreasing temperature preceding May 14. They increased with increasing temperature to the twenty-second, and fell away again during the cool spell preceding the twenty-sixth. They were most abundant the four days preceding June 3, and disappeared after that peak.

Hydrophilidae: *Cercyon quisquilius* Fab., 7, *Cercyon haemorrhoidalis* Fab., 2, *Cercyon pygmaeus* Illig., 6, *Cryptopleurum americanum* Horn, 1, *Cynbiodyta vindicata* Fall, 1, *Pemelus costatus* Lec., 1, *Philhydrus nebulosus* Say, 1, *Ochthebius nitidus* Lec., 1. Only 14 specimens of *Cercyon* were taken and three species represented. They were more or less evenly distributed throughout the collections, but were apparently most active from May 18 to June 15. Most were taken in the evening.

Silphidae: *Anisotoma* sp., 2, *Anisotoma obsoleta* Melsh., 2, *Cyrtusa cgena* Lec., 4; Scydmaenidae: undetermined, 10; Orthoperidae: *Scricoderus flavidus* Dec., 2, *Scricoderus obscurus* Lec., 2, *Molamba* sp., 2; Staphylinidae: 3,389.

The morning and evening collections of staphylinids were apparently similar in response to the weather, but the evening population was always more than double that of the morning. The four days preceding May 22 and June 3 were the periods of greatest numbers, with low activity preceding and following them. The activity seemed to increase with increasing tem-

peratures. The numbers also apparently increased with changing humidity, following more closely rising than falling humidity. These 3,389 specimens were in the collection of Dr. Ralph Voris at the time of his death in 1940 and have as yet been incompletely identified. Any coleopterist wishing to examine these specimens is welcome to do so.

Pselaphidae: *Biblopectus ruficeps* (Lec.), 291, *Rhexius insculptus* Lec., 1, *Brachygluta illinoisensis* Brendel, 1. Almost the entire group of *Biblopectus ruficeps* was collected in the evening, as only four individuals were taken in the morning. Females made up 53 per cent and males 47 per cent of the group. The period of greatest flight was in May with a complete cessation of activity in the four days preceding May 26. The collections in June did not equal those in May, and dwindled toward the middle of the month.

Ptiliidae, undetermined. There were 161 ptiliids taken in the study. These minute beetles did not follow the general trend of the insect activity as indicated by the numbers caught. They were at a low ebb while most of the rest of the flying forms were numerous. The two peaks came in the four days preceding May 18 and June 11. Most of them were taken in the evening, but a few were collected in the morning.

Scaphidiidae: *Bacocera concolor* Fab., 1, *Scaphisoma terminatus* Melsh., 1; Histeridae: *Phelister subrotundus* Say, 8, *Acritus* sp., 6, *Aelctes politus* Lec., 1. There were three species and 15 specimens of histerids in the collections. Four specimens were taken in the morning and the remaining 11 in the evening. They did not appear until after May 10 and disappeared by June 15.

Cantharidae: *Cantharis* sp. 1.

Mordellidae: *Mordellistena nigricans* Melsh., 4, *Mordellistena liturata* Melsh., 1.

Anthicidae: *Malparus formicarius* Laf., 1, *Sapintus pubescens* Laf., 1, *Notoxus monodon* Say, 5, *Notoxus bicolor* Say, 2, *Anthicus cervinus* Laf., 22. The five species and 33 specimens of anthicids represented were all taken in the evening, and were

not abundant enough to be taken in very large numbers. They were more active in early May.

Elateridae: *Monocrepidius bellus* (Say), 85, *Hypnoidus pectoralis* Say, 2. The number of elaterids increased from the cool period preceding May 14 to a peak of activity in the four days preceding May 22. This accompanied a rise in temperature. None were collected during the cool period of May 26, but they again increased in numbers with rising temperatures to June 3.

Buprestidae: *Anthaxia quercata* Fab., 1; Heteroceridae: *Heterocerus pusillus* var. *limbatus* Kies., 33. During the collections 33 specimens of this species were taken, five of these in the morning. The evening activity was up during the four days preceding May 10 and then gradually declined to zero by June 7.

Helodidae: *Helodes pulchella* Guer., 1.

Dermestidae: *Anthrenus verbasci* (Linn.), 1.

Nitidulidae: *Epuraea labilis* Fr., 1, *Carpophilus antiquus* Melsh., 1.

Monotomidae: *Monotoma americana* Aubé, 57, *Monotoma picipes* Hbst., 2, *Monotoma fulvipes* Melsh., 1, *Bactridium striolatum* Reitt., 2, *Bactridium ephippigerum* Guer., 2. All but two of the *Monotoma americana* were taken in the evening, and their activity increased in progressive peaks from a low point in the first days of May to a peak on June 11.

Cucujidae: *Carthartus advena* Waltl., 8, *Pediacus depressus* Herbst., 1, *Laemophloeus testaceus* Fab., 1, *Laemophloeus pusillus* Schon., 1, *Silvanus imbellis* Lec., 1.

Cryptophagidae: *Tomarus pulchellus* Lec., 13, *Anchicera ochracea* Casey, 22, *Anchicera pusilla* Payk., 5, *Anchicera ephippiata* Zimm., 1, *Cryptophagus acutangulus* Gyll., 2. The cryptophagids were represented by 42 specimens. Most of *Tomarus pulchellus* Lec. were taken during May. *Anchicera ochracea* Casey was more abundant than *T. pulchellus* and all specimens were taken in the evening. These were more or less evenly distributed throughout the collections, with periods of activity preceding May 22 and June 7.

Mycetophagidae: *Typhaca fumata* Linn., 22, *Litargus balteatus* Lec., 1, *Litargus 6-punctata* Say, 3. *Typhaca fumata* was most active in the four days preceding June 7, and at other times was present in small numbers.

Colydiidae: *Synchita fuliginosa* Melsh., 2.

Lathridiidae: *Melanophthalma simplex* Lec., 46, *Melanophthalma distinguenda* Com., 5, *Melanophthalma villosa* Zimm., 1, *Corticaria elongata* Gyll., 53, *Corticaria ferruginea* Marsh., 3, *Corticaria serrata* Payk., 1. One hundred and four latridids were taken during the studies, and only three of these in the morning. They were not numerous until after the cool period of May 26, and then two peaks during the periods of June 3 and June 15 were noted.

Endomychidae: *Anamorphus waltoni* Blatch., 1.

Phalacridae: *Phalacrus simplex* Lec., 1.

Coccinellidae: *Scymnus terminatus* Say, 1.

Tenebrionidae: *Alphitophagus bifasciatus* Say, 1.

Melandryidae: *Canifa plagiata* Melsh., 1.

Anobiidae: *Stegobium panicum* Linn., 1, *Catorama confusum* Fall, 14. One specimen of the drug store beetle, *Stegobium panicum* Linn., was taken on June 7 in the evening. The species *Catorama confusum* Fall was represented by 14 specimens, two of which were taken in the morning. They were not abundant in any collection except one made at midnight of June 2.

Scarabeidae: *Aphodius stercorosus* Melsh., 13, *Aphodius distinctus* Müll., 7, *Aphodius lividus* Oliv., 1, *Aphodius granarius* Linn., 4, *Atacnius strigatus* Say, 6, *Ligyryus gibbosus* DeG., 3, *Onthophagus pennsylvanicus* Harold, 1. During the seven weeks 35 scarabeids were taken. Only four of these were caught in the morning. The activity was greatest early in May, and they had disappeared by the first week of June. The May 26 cool spell did not reduce their activity.

Chrysomelidae: *Epitrix parvula* Fab., 14, *Epitrix fuscula* Crotch, 1, *Epitrix cucumeris* Harr., 1, *Blyptina spuria* Lec., 1, *Phyllotreta vittata* Chev., 8, *Diabrotica 12-punctata* Fab., 1, *Diabrotica vittata* Fab., 1. Twenty-nine chrysomelids were

taken. *Epitrix parvula* was most active in the middle of May. *Phyllotreta vittata* was not taken until the first of June, and ceased flying by June 11.

Scolytidae: *Xyleborus pecanici* Hopk., 4, *Xyleborus affinis* Eichh., 3, *Xyleborus confusus* Eichh., 1, *Pityophthorus rhois* Sw., 2.

Coleoptera larvae. Two larvae of the first instar and probably telephorids were taken, both in the evening.

STREPSIPTERA. One male, undetermined, taken in the evening on the nineteenth of June.

MICRO-LEPIDOPTERA. Micro-lepidoptera as well as the Ephemera were mutilated by this method of collecting, and no attempt was made to identify them. Eighty-seven were taken, none in the morning. In general, except for a peak on June 11, the number of moths was smaller and smaller at 6 P.M. as the season progressed, probably because of the movement of the sun.

DIPTERA. Tipulidae: *Gonomyia subcinerea* O. S., 1, *Gonomyia kansensis* Alex., 1.

Psychodidae: *Psychoda* sp., 22, *Psychoda alternata* Say, 13, *Psychoda cinerea* Banks, 8, *Psychoda minuta* Banks, 2, *Pericoma* sp., 2. Forty-seven psychodids were taken, and five of these in the morning. The evening activity was constant during most of May, with a slight peak at the twenty-sixth, and a depression in the period of the thirtieth. This low point was four days later than that of the other insects. *Psychoda* sp., probably *alternata* Say, was represented by 11 females and two males, or 84 per cent females and 16 per cent males. *Psychoda* sp., probably *cinerea* Banks, was represented by six females and two males, a ratio of 3:1. Most of these specimens were taken in the latter part of May. *Psychoda* sp., probably *minuta* Banks, was represented by two females. A male and a female of a species of *Pericoma* were also collected. A fourth species of *Psychoda* was represented by 21 females and one male. This species was encountered during the first half of May and the four days preceding June 3.

Chironomidae. The movements of the chironomids preceded by several days those of the staphylinids. The morning collections showed three peaks of abundance. The evening numbers were not only more than double that of the morning, but the greatest collections were in the four days preceding May 14, a full two weeks before the greatest staphylinid flight. The total number of chironomids taken was 3,796. Because of the difficulties involved, no attempt has been made to identify the species.

Mycetophilidae: 14 specimens undetermined.

Sciaridae: *Sciara nacta* Johann., 3600, undetermined 109. Over 3,700 sciarids were taken and *Sciara nacta* Johann. made up 97 per cent of these. There were six times as many individuals taken in the evenings as in the mornings. Except for a small peak of May 22, they came forth in one sudden immense flight in the four days preceding June 3. The morning activity consisted of 17 per cent males and 83 per cent females. With rising temperature and humidity preceding June 3 there were great numbers of females flying, while the greatest number of males came four days later. The immense evening activity consisted of three per cent males and 97 per cent females. These percentages are misleading, for the males collected hardly varied from morning to evening there being a total of 101 specimens taken in the morning and 99 taken in the evening. The females taken varied greatly from morning to evening. The total for the morning was 470 and for the evening, 2,930. With the increasing temperature preceding May 22 there was a burst of activity of females, followed by a rapid decline during the four cool days following. With increasing temperature and humidity preceding June 3, the female activity again increased rapidly to a climax on June 2. The number immediately subsided, apparently in conjunction with continued warm weather. The male peak followed the female by four days.

Cecidomyiidae. The 508 cecidomyiids taken in this work seemed to show an entirely different response to the climate from that of the staphylinids and sciarids. The morning collections were low and with no peaks of activity. The evening

collections were high early in May and fell off rapidly to the four days preceding May 26, during which there was a sudden increase. The May 26 increase came at a time when most other forms were inactive.

Syrphidae: *Melanostoma mallinum* Linn., 1, *Metasyrphus zwickemanni* (John.), 2, *Metasyrphus meadii* (Jones), 1.

HYMENOPTERA. Ichneumonidea. Seventy-seven ichneumons were taken, and of those collected in the morning, the greatest abundance was in early June. Numbers flying in the evenings increased in the middle of May. The evening activity was double that of the morning.

Tiphiidae: *Tiphia* sp., 1.

Formicidae: *Ponera coarctata pennsylvanica* Buckley, 14, *Pheidole pilifera* Roger, 70, *Tapinoma* sp., 12, *Leptothorax curvispinosus* Mayr., 1, *Camponotus caryae* Fitch, 1, *Eciton schmitti* Em., 1, *Trachymyrmex septentrionalis* McCook, 1. During the seven weeks, 100 ants were collected, and 56 of these were taken on June 18 during a very heavy flight of *Pheidole pilifera* Roger. This flight occurred about 6:15 P.M., temperature 68° F., and immediately following a drenching rain. The clouds were breaking up and humidity was very high. Previous to June 15 there had been few ants encountered, but in the eight days preceding June 19 they increased, with June 18 as the peak. Apparently the collections were stopped just at the beginning of the early summer nuptial flights of ants. There was very little morning activity. *Ponera coarctata pennsylvanica* males were not taken until the four days preceding June 11, and the females until the four days preceding June 19. Flying males were more abundant than the females, being 73 per cent of the total. *Pheidole pilifera* was not collected until the four days preceding June 11. Both males and females were flying together, but there was ten per cent females and 90 per cent males in the air. During the peak of activity on June 18, there were 17 males to each female flying. *Tapinoma* sp. was active only in the mornings, and all taken were males.

Bethylidae: *Pseudoisobrachium myrmicophilum* Ash., 4, *Ateleopecterus* sp., 1, *Goniozus platynotae* Robertson, 1. Prosopidae, *Colletes brevicornis* Robertson, 1.

Halictidae: *Halictus illinoensis* Robertson, 18, *Halictus pilosus* Smith, 1, *Halictus sparsus* Robertson, 1, *Halictus versatus* Robertson, 6, *Halictus* sp., 3. *Augochloropsis cuprea* Smith, 1. Only five halictids were taken in the evening. No species was abundant until after June 7.

Apidae: *Apis mellifera* Linn., 4.

SUMMARY.

A net ten inches in diameter was attached to the right fender of an automobile and collections of flying insects were made morning and evening over a four mile stretch of road near Horse Cave, Kentucky, for the seven weeks from May 3 to June 20, 1934.

Of the determinations made to date, there were 196 species, 33 of which were taken abundantly or regularly and the remainder only occasionally. Of 65 families represented, the Sciaridae, Chironomidae and Staphylinidae were the most numerous. Over 3,000 specimens of each of these families were collected. Besides these three, 29 other families were frequently encountered and are discussed.

It seems apparent that there were more species and individuals flying, at the times of the collections, in the evening than in the morning. The response to the climate varied with each group, and a definite succession of forms is shown.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae). Part I.

By CHARLES P. ALEXANDER, Massachusetts State College, Amherst, Massachusetts.

Very intensive work on the rich Tipulid fauna of the western Nearctic Region has been done in recent years. During the course of these studies, many new species of these flies have been discovered and are being described. In the present article

I am discussing four species of Eriopterini that were included in an interesting series of these flies kindly presented to me by Dr. Henry K. Townes, who collected the specimens in Washington and California. I wish to express my deepest thanks to Dr. and Mrs. Townes for the privilege of retaining these specimens in my extensive collection of Tipulidae.

Erioptera (Hoplolabis) rainieria n. sp.

Erioptera (Hoplolabis) rainieria is readily distinguished from its nearest described relative, *E. (H.) dorothea* Alexander, of the central and southern Rocky Mountains, by the venation and, especially, the structure of the male hypopygium. I consider both of the above flies as being members of *Hoplolabis* Osten Sacken, but it is becoming increasingly difficult to separate members of this group from the more extensive subgenera *Psiloconopa* Zetterstedt, 1840, and *Ilisia* Rondani, 1856.

General coloration gray, the praescutum without evident stripes; wings pale yellow, heavily patterned with dark brown; cell *1st M*₂ unarmed, strongly widened distally; male hypopygium with the blackened dististyle of the male hypopygium unusually compact; phallosome with two arms, a slender spinous rod directed laterad and a more spatulate blade directed caudad.

♂. Length about 5.5 mm.; wing 6.3 mm.

Rostrum black, sparsely pruinose; palpi black. Antennae relatively long, black, the pedicel a little brighter; flagellar segments, especially the outer ones, elongate; longest verticils a little exceeding the segments. Head dark gray; anterior vertex moderately wide.

Pronotum dark brown, sparsely pruinose; extreme lateral border, together with the anterior lateral pretergites light yellow. Mesonotum almost uniformly dark gray, the praescutum without evident stripes; pseudosutural foveae and tuberculate pits black; central portion of scutum not brightened, each lobe with vague indications of a dusky line near its mesal portion. Pleura dark gray; dorsopleural membrane obscure buffy yellow, weakly infuscated at near midlength. Halteres yellow. Legs with the coxae dark plumbeous; trochanters obscure

brownish yellow; femora obscure yellow, the tips brownish black; tibiae obscure yellow, the bases and tips more darkened, the former somewhat more extensively so; tarsi passing into dark brown. Wings with the ground color pale yellow, the prearcular field more whitened; a conspicuous dark brown pattern, including spots arranged as follows: Arculus; origin of R_s ; Sc_2 ; a band along cord, extending from C to vein Cu , interrupted at vein M ; R_2 and R_{1+2} ; tip of R_3 ; two disconnected spots at outer end of cell $1st\ M_2$; smaller marginal brown spots at ends of all longitudinal veins, becoming larger on vein $2nd\ A$; veins pale brown, darker brown in the patterned areas. Venation: Cell $1st\ M_2$ unarmed, strongly widened distally, shorter than in *dorothea*; *m-cu* about one-half its own length before the fork of M , more oblique than in *dorothea*.

Abdomen, including hypopygium, brownish black. Blackened dististyle of male hypopygium unusually compact; two branches closely appressed, the more divergent inner arm a blackened cultrate blade. Phallosome with two arms, a slender spinous rod directed laterad and a longer more spatulate blade directed caudad.

Holotype: ♂; Mount Rainier, WASHINGTON, altitude 5,000 feet, July 14, 1940 (H. & M. Townes).

Ormosia (Ormosia) leptorhabda n. sp.

Ormosia (Ormosia) leptorhabda is entirely distinct from other generally similar species, such as *O. (O.) divergens* (Coquillett) and *O. (O.) flaveola* (Coquillett). The structure of the male hypopygium is entirely different from these allied forms having cell M_2 of the wings open by the atrophy of m , rather than the more common condition of being open by the atrophy of the basal section of vein M_3 .

General coloration brown; antennae short; wings with a strong brown tinge; cell M_2 open by atrophy of m ; anal veins divergent; male hypopygium with the inner dististyle a slender straight rod, the apex truncated and slightly expanded; phallosome consisting of a broad depressed-flattened plate, the

outer lateral angles produced into strong spines that are directed cephalad.

♂. Length about 4 mm.; wing 4.5 mm.; antenna about 0.8 mm.

Rostrum and palpi dark brown. Antennae dark brown throughout, short; flagellar segments relatively long, the more basal segments with very long verticils. Head gray.

Pronotum light brown, the pretergites restrictedly light yellow. Mesonotal praescutum brown, very sparsely pruinose, without pattern, the humeral region more reddish; posterior sclerites of notum brown. Pleura brownish yellow. Halteres with stem yellow, knob weakly darkened. Legs with the coxae and trochanters yellow; remainder of legs brown, the terminal tarsal segments brownish black. Wings with a strong brownish tinge, the prearcular and basal costal fields more yellow; stigmal region a trifle darker; veins pale brown, those in the brightened portions more yellow; macrotrichia brown, only moderately abundant but well-distributed over the surface. Venation: R_2 subequal to R_{2+3} ; cell M_2 open by the atrophy of m ; cell M_3 much longer than its petiole; $m-cu$ about one-fifth its own length beyond the fork of M ; anal veins divergent.

Abdomen dark brown; hypopygium more brownish yellow. Male hypopygium with the tergite large, subtriangular in outline, widely dilated outwardly, the caudal margin pale, truncated or very feebly emarginate. Outer dististyle a flattened dark lobe, the apical portion set with parallel rows of microscopic spines. Inner dististyle somewhat shorter, appearing as a straight slender rod, the apex slightly dilated and bluntly truncate, the lower or inner margin with a white membrane provided with several scattered small pale setae from conspicuous raised tubercles. Phallosome with the central portion a depressed-flattened heart-shaped blade, its apex obtusely rounded; behind this central blade a much broader, depressed-flattened plate, the caudal-lateral portions of which are produced into a strong spine directed cephalad and slightly outward.

Holotype: ♂; Crescent City, Del Norte Co., CALIFORNIA, August 1, 1940 (H. & M. Townes).

Ormosia (Ormosia) profunda n. sp.

Ormosia (Ormosia) profunda is quite different from the other members of the *manicata* group so far made known, in some respects tending to connect this group with others in the genus. The shape of the tergite and structure of both dististyles readily separate this fly from other related described species.

Allied to *manicata*; general coloration reddish brown, with three confluent darker brown stripes; antennae short, flagellar verticils very long; anal veins divergent; male hypopygium with lobes of tergite parallel-sided, not dilated or darkened outwardly, separated by a very deep and narrow notch; outer dististyle flattened, split by a narrow notch into two very unequal lobes; inner dististyle a flattened blade with a triangular flange on face; elongate blades of phallosome much shorter and stouter than in other members of the group.

♂. Length about 4.2 mm.; wing 4.8 mm.; antenna about 0.9 mm.

Rostrum and palpi brownish black. Antennae (♂) short, dark brown throughout; flagellar segments cylindrical to sub-cylindrical, with unusually long verticils, those of the subbasal segments exceeding three times the length of the segment or nearly one-third the length of the entire flagellum. Head dark brownish gray.

Pronotum infuscated, paler laterally; pretergites pale yellow. Mesonotal praescutum reddish brown with three confluent darker brown stripes; posterior sclerites of notum similarly darkened. Pleura obscure yellow throughout. Halteres with stem yellow, knob weakly darkened. Legs with coxae and trochanters light yellow; femora and tibiae pale brown, the tarsi passing into brownish black. Wings subhyaline, the stigmal region weakly darker; veins brown. Venation: R_2 nearly equal in length to R_{2+3} ; cell M_2 open by atrophy of M_3 ; *m-cu* erect, gently sinuous, just before fork of M ; Anal veins divergent.

Abdomen, including hypopygium, dark brown. Male hypopygium with the ninth tergite conspicuous, projecting caudad into a median plate that divides into two narrow lobes that are about parallel-sided for their entire length; tips of lobes paler, obliquely rounded, not expanded at tips as in *manicata* and allies; notch separating the lobes very deep and narrow, extending back to about the basal third of the tergal projection. Basistyle produced beyond point of origin of dististyles into a subacute lobe. Outer dististyle paler than the inner, flattened, split by a narrow notch into two very unequal lobes, the inner one short and obtuse. Inner dististyle of irregular conformation, appearing as a flattened blade, the base arcuate; face of expanded portion produced into a conspicuous triangular point or flange. Elongate blades of phallosome much shorter and stouter than in *manicata*, the blackened inner apophyses much as in members of the latter group.

Holotype: ♂; Crescent City, Del Norte Co., CALIFORNIA, August 1, 1940 (H. & M. Townes).

***Molophilus (Molophilus) rainieriensis* n. sp.**

Molophilus (Molophilus) rainieriensis suggests the Eastern *M. (M.) pubipennis* (Osten Sacken) and related forms but is well-distinguished by the short antennae in both sexes. From the regional members of the *pubipennis* subgroup having short antennae, such as *M. (M.) forcipulus* (Osten Sacken) and *M. (M.) paulus* Bergroth, it is readily told by the coloration of the body and wings.

Belongs to the *gracilis* group, *pubipennis* subgroup; general coloration yellow, the mesonotal praescutum with three confluent reddish stripes; antennae short in both sexes; scape and pedicel obscure yellow, flagellum black; head yellow; fore femora chiefly blackened, posterior femora yellow, the tips darkened; wings with a deep yellow tinge, the veins darker yellow; male hypopygium with the outer dististyle a long slender curved hook, the basal two-thirds nearly straight, with only three or four spinous points, all on basal portion.

♂. Length about 3.8 mm.; wing 4.5 mm.; antenna about 1 mm.

♀. Length about 4.5 mm.; wing 4.8 mm.

Rostrum yellow; palpi black. Antennae short in both sexes; scape and pedicel obscure yellow, flagellum black; flagellum (♂) with basal segments short and crowded, their ends truncated and closely applied to one another; outer segments long-oval; segments with relatively long verticils. Head shiny yellow.

Pronotum pale yellow, the lateral pretergites yellowish white. Mesonotal praescutum almost covered by three confluent reddish stripes, the humeral and lateral borders light yellow; posterior sclerites of notum reddish, the scutellum yellow, the postnotum variegated by yellow spots. Pleura reddish yellow, indistinctly patterned with yellow areas. Halteres uniformly pale yellow. Legs with the coxae and trochanters yellow; fore femora chiefly blackened, only the basal third brighter; fore tibiae light brown, the tips darker; tarsi passing into brownish black; posterior legs yellow, the tips of femora, tibiae and basitarsi narrowly darkened. Wings with a deep yellow tinge; veins darker yellow; macrotrichia brown. Venation: R_2 almost in transverse alignment with $r-m$; petiole of cell M_3 exceeding three times the length of $m-cu$; vein 2nd A long and gently sinuous, ending just before the level of $m-cu$.

Abdomen brownish yellow, the male hypopygium deeper yellow. Hypopygium with the outer lobe of basistyle ending about on a level with the tip of the inner dististyle. Outer dististyle a long slender curved hook, the basal two-thirds nearly straight, the distal portion bent at nearly a right angle into a long black spine; basal portion of style with three or four small spinous points and scattered setae. Inner dististyle a flattened darkened plate, covered with microscopic scabrous points, the obtuse apex directed strongly mesad. Basistyle with the spinous points relatively short and stout, appearing as long cones, about 25–30 in number.

Holotype: ♂; Mount Rainier, WASHINGTON, altitude 2,700 feet, July 8, 1940 (H. & M. Townes). *Allotopotype*, ♀, with the type.

A New Species of *Calendra* from Oregon. (Coleoptera, Curculionidae.)

By A. F. SATTERTHWAIT, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

Mr. Borys Malkin, University of Oregon, Eugene, Oreg., a successful collector of corn billbugs, included in his sendings of *Calendra* to the writer the following new species, which is similar to *C. venatus* (Say) except that it lacks the typical apical fossa of the pronotum.

Calendra eugenia, n. sp.

Male: Front tibia broadly rounded at outer apical angle. Third joint of front tarsus about one-half wider than second, that of middle and hind tarsi about same width as second, all glabrous beneath.

Elytra with the odd intervals 1, 3, and 5 slightly elevated and wider than the even intervals, punctures fine, uniseriate in 3 and 5, slightly confused in 1. Punctures very slightly coarser on even intervals. Strial punctures rather coarse, 10 or 11 in basal half of each of the first two striae.

Pronotum with median vitta slender at base and apex, widest before middle; lateral vittae well marked on basal half, with branches indistinct. Punctures largest and somewhat confluent in basal areas between vittae, confluent and nearly as large near apex though affecting much less area. Collar distinct, complete. No apical fossa.

Beak slightly compressed, three-fourths as thick at middle as it is deep at apex; not flattened above; lower apical angle obtuse; curvatures of upper and lower profiles fairly regular. Interocular puncture deep, not circular, about 3 times as long as broad, with a faint impressed line nearly as long as basal width of rostrum.

Pygidium with moderately coarse punctures beset with short setae on apical third, without keel or tufts. Apex broadly rounded. Depression of metasternum of first and second sternites well defined.

General color red, the head, pronotal elevations, and under parts nearly black. Coating thin, gray, largely abraded on the elevations.

Measurements of male (in mm.): Rostrum, width at middle 0.27, at apex 0.29, at base 0.58, depth at apex 0.40, length 1.95; pronotum, width 2.22, length 2.73; width of body 2.73, length of elytra 3.99, total length 8.10.

Type: male, and one paratype, female, deposited in the United States National Museum through the courtesy of Mr. Malkin. Other paratypes, five male and two female, all collected June 26, 1941, at Eugene, OREGON, were studied and measured before the particular male and female specimens were selected for description.

Female: Tibiae, tarsi, and elytra as in the male, except nearly all black. Pronotum with median vitta scarcely reaching to base, but median and lateral vittae reaching to apex, punctures of each fine to apex. Central area of median vitta impunctate. Lateral vittae with broad, short branch at middle. Punctures between median and lateral vittae coarse, confluent; between laterals and branches, less confluent. Punctures and setae of pygidium as in male, but apex narrowly rounded. Interocular puncture round, but with two rows of punctures cutting into it apically, suggesting the pattern of the male, in which the puncture appeared much longer than wide. No impressed line.

Measurements of female (in mm.): Rostrum, width at middle 0.28, at apex 0.35, at base 0.60, depth at apex 0.45, length 2.25; pronotum, width 2.47, length 2.81; width of body 2.92, length of elytra 4.00, total length 7.75.

In the nine specimens, the red color on the dorsum, especially on the elytra, was conspicuous in four males and one female, much reduced in two males, and lacking in two females. Total lengths ranged from 7.0 to 9.0 mm.

One male and one female are retained in the *Calendra* collection of the Division of Cereal and Forage Insect Investigations of the Bureau of Entomology and Plant Quarantine at Urbana, Ill., and four males and one female are returned to Mr. Malkin.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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ANATOMY, PHYSIOLOGY, ETC.—ANDERSON, & OLIVER.—Effect of double matings on the fertility of a mutant *Drosophila melanogaster*. [129] p. 60. ANDERSON, & RICHARDS.—An electron microscope study of some structural colors of insects. [Jour. Appl. Physics] 13: 748–758, ill. BODENSTEIN, D.—Hormones in *Drosophila*. [129] p. 12. CARLSON, J. G.—Immediate effects of 31r x-rays on the different stages of mitosis in neuroblasts of *Chortophaga*. [J. Morph.] 71: 449–461, ill. GOWEN, J. W.—On the genetic basis for hermaphroditism. (*Drosophila*.) [129] p. 8. GOWAN, & NELSON.—Predetermination of sex. [68] 96: 558. GRAY, I. E.—The normal changes in weight and water content during the life cycle of the wood-eating beetle, *Passalus cornutus* Fab. [129] p. 9. GUNN, D. L. & C. A. COSWAY.—The temperature and humidity relations of the cockroach. VI. Oxygen consumption. [33] 19: 124–132. JAHN, T. L.—The effect of temperature on the retinal action potential. [129] p. 85. LUDWIG, D.—Comparative effects of low humidities on water loss and reproductive capacity in two species of Saturnid moths. [129] p. 56. MARTIN, & HARE.—The nutritional requirements of *Tenebrio molitor* larvae. [92] 83: 428–437. PFEIFFER, I. W.—Suppression of metamorphosis in the grasshopper *Melanoplus differentialis*. [129] p. 36. PICKFORD, G. E.—Studies on the digestive enzymes of spiders. [Trans. Conn. Acad. A. & Sci.] 35: 33–72. POWERS, P. B. A.—Metrical studies on spermatogonial chromosomes of Acrididae. [J. Morph.] 71: 523–575, ill. SCHMIEDER, R. G.—The control of metamorphosis in Hymenoptera. [129] p. 64. TAHMISIAN, ALLEN & BODINE.—Endomitosis (?) in grasshopper serosa cells. [129] p. 52. VILLEE, C. A.—Tetraltera, a new homoecotic mutant in *Drosophila melanogaster*. [129] p. 48. WADDINGTON, C. H.—Some developmental effects of x-rays in *Drosophila*. [33] 19: 101–117. WOLF, E.—Spacial relations of ommatidia in insects and differential sensitivity to moving visual stimuli. [129] p. 19–20. WORLEY, L. G.—Amitosis in the malpighian tubules of *Melanoplus differentialis*. [129] p. 51. WULFF, & JAHN.—Intensity-EMF relations of the

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LEPIDOPTERA.—ANON.—Silk worm culture in the U. S. [Turtox News, Chicago] 20: 162. BELL, E. L.—New sps. of Venezuelan Hesperidae. [46] 1: 73-78, ill. BROWN, F. M.—Notes on Ecuadorian butterflies, V. [6] 50: 309-333, ill. (*k). BURDICK, W. N.—A new race of *Plebeius lupini* from the Olympic Mts. of Washington (Rhopal.). [4] 74: 195-196. The rediscovery of *Eumenis stretchii*. [4] 74: 204-5. DOS PASSOS & GREY.—Two new N. Amer. subsps. of *Argynnis* with some revisional notes. [40] No. 1214 (*). HOFFMANN, C. C.—El género *Rothschildia* en la Republica Mexicana [112] 13 (1): 163-194, ill. (*). Algunas observaciones acerca de los Saturniordea de Mexico. 194-204, ill. (*). Catologo de Lepidopteros Mexicanos III. 213-256. McDUNNOUGH, J.—Notes on the early stages of two *Eupithecia* sps. [4] 74: 202-3. MICHENER & DOS PASSOS.—Taxonomic observations on some N. A. *Strymon* with descr. of n.sps. (*Lycaen.*). [40] no.

1210, 7 pp., ill. MOOSER, O.—Esfingidos nuevos de México. [112] 13 (1): 205-211, ill. (*). SCOTT, H.—Larvae of *Pieris* spp. feeding on honesty and other Cruciferae. [8] 78: 282. SWEADNER, W. R.—Three miles up. The Avinoff collection of butterflies from Central Asia. [Carnegie Magazine] 16: 163-167. VAZQUEZ, L.—Estudio monografica de las Psychidae de Mexico, segunda parte. [112] 13 (1): 257-300, ill. (*).

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COLEOPTERA.—BLACKMAN, N. W.—New sps. of bark beetles (Pityophthorini) from Mexico and tropical Amer. (Scolyt.). [50] 92: 177-228, ill. BONDAR, G.—Notas entomologicae da Baia. IX. [105] 13: 1-39 (S*). BUCHANAN, L. L.—Four n.sps. of white-fringed beetles (s.gen. Graphognathus) from the southeastern part of the U. S. (Curculion.) [19] 37: 107-110 (k). HOPPING, G. R.—Apparent negative geotropism in the douglas fir bark beetle. [4] 74: 205. ISLAS, F.—Las especies mexicanas de los generos Canthon. Hffsg. y Phanaeus McLeay. [112] 13 (1): 301-340 (k). LEECH, H. B.—Dr. F. Guignot's syn. of *Agabus dispositus* (Dytisc.). [4] 74: 194. MANK, E. W.—A review of the gen. *Anelpistus* (Melandryidae). [4] 74: 186-193, ill. (*). SANDERSON, M. W.—A new sp. of ground beetle of the gen. *Rhadine* from an Arkansas cave (Carab.). [Proc. Ark. Acad. Sci.] 1: 39-40. SAYLOR, L. W.—Ten new Phyllophaga beetles from Panama and S. Amer. [105] 13: 154-166. VALENTINE, J. M.—(See under General Subjects).

HYMENOPTERA.—BEQUAERT, J.—New and imperfectly known Neotropical Polybiinae (Vesp.). [6] 50: 295-308 (k). CUSHMAN, R. A.—A new name for *Odontomerus*, a n.sp. and taxonomic notes (Ichneum.). [10] 44: 179-81, ill. DREYER, W. A.—Further observations on the occurrence and size of ant mounds with reference to their age. [84] 23: 486-490. FOUTS, R. M.—Desch. of a n.sp. of *Goniozus* from Oregon (Bethyl.). [10] 44: 168-169. MALLIS, A.—Half a century with the successful Argentine ant. [54] 1942, 536-545. MORRIS, R. F.—Preliminary notes on the natural controls of the European spruce sawfly by small mammals. [4] 74: 197-202. PATE, V. S. L.—On *Hoplocrabro*, a subg. of *Crossocerus* (Sphecidae). [4] 74: 177-185, ill. On *Quexua*, a n.gen. of Pemphiliine wasps from Tropical America (Sphec.). [105] 13: 54-75. RAU, P.—The sleep of *Chalybion zimmermanni*. [4]

74: 196. SMITH, F.—Polymorphism in *Camponotus* (Hymenoptera-Formicidae). [49] 17 (4): 367-373. WALLEY, G. S.—A new *Olesicampe* parasite of *pikonema* sawflies (Ichn.). [4] 74: 193-194. WEBER, N. A.—The genus *Thaumatomyrmex* with descr. of a Venezuelan sp. (Formic.). [46] 1: 65-71, ill. (k).

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4.—Canadian Entomologist. 6.—Journal, New York Entom. Society. 8.—Entom. Monthly Magazine, London. 10.—Proc. Entom. Soc. Washington. 13.—Journal of Entomology and Zoology. 17.—Journal of Parasitology. 19.—Bull. Brooklyn Entom. Society. 21.—The Entom. Record and Jour. of Var., London. 22.—Bull. of Entom. Research. 29.—Annual Rept. Entom. Society, Ontario. 33.—Jour. of Exper. Biology. 39.—The Florida Entomologist. 40.—American Mus. Novitates. 41.—Proc. Acad. Nat. Sci., Philadelphia. 45.—Univ. Kansas Science Bull. 46.—Bol., Entom. Venezolana. 48.—Trans., R. Canadian Institute. 49.—Jour., Tennessee Acad. Science. 50.—Proc. U. S. National Museum. 54.—Scientific Monthly. 60.—Smithsonian Miscell. Collections. 68.—Science, New York. 84.—Ecology, Brooklyn. 92.—Biological Bulletin. 105.—Revista, Entomologia, R. de Janeiro. 112.—Anales, Instituto de Biologia, Mexico. 116.—Parasitology, London. 117.—Microentomology, Stanford University. 129.—Anatomical Record, 84 (4):

NOTICE.

Owing to circumstances beyond our control, some of which we have mentioned in the December, 1942 issue, there may be considerable delays in the appearance of some numbers of the NEWS.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Arctic Lepidoptera especially **Noctuidae**—Wanted to hear from collectors who desire the Arctic Species. Have large collection. R. J. Fitch. Lloydminster, Saskatchewan, Canada.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

I shall be grateful to anyone who will give me any reference where insects taken on Mt. Desert Island, Maine, have been used wholly or in part in describing a species.

WILLIAM PROCTER, BAR HARBOR, MAINE

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WASHINGTON, D. C.

RED CROSS BLOOD DONOR PROJECT



Plasma, processed from blood donated to the Army and Navy through the Red Cross Blood Donor Service is proving to be a literal life saver to our wounded fighting men. Surgeon General Ross T. McIntire of the Navy recently asserted that, thanks to plasma and other improved methods of treating casualties, the Navy was losing less than one percent of those wounded on Guadalcanal. In the last World War more than seven percent died of their wounds.

In the tropic jungles of New Guinea and the Solomons, Army and Navy doctors have found another talking point for plasma. Should a regular blood transfusion be undertaken the donor might subsequently prove to be an unsuspected malaria case. The use of plasma eliminates this possibility.

This year the Red Cross has been requested to supply 4,000,000 blood donations. This and all other Red Cross work is financed through the 1943 Red Cross War Fund. A goal of \$125,000,000 has been set, to be raised in March.

Let that last year's collecting outfit
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ENTOMOLOGICAL NEWS

MARCH 1943

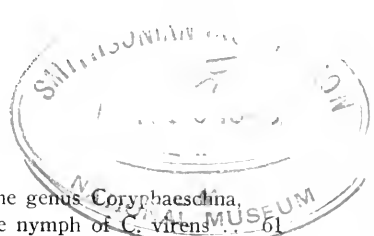
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No. 3

Notes on Odonata of Surinam.

III. The genus *Coryphaeschna*, with descriptions of a new species and of the nymph of *C. virens*¹

By D. C. GEIJSKES, Landbouw-proefstation, Paramaribo, Surinam.

The genus *Coryphaeschna* was proposed by Williamson (1903) on account of differences in the wing venation, found in the species *ingens*, *virens* and *adnexa* from other species of the genus *Aeschna*, in which genus they were placed before. Calvert (1905) has arranged under this group, beside the three mentioned species, also *luteipennis* and *perrensi*, but under the generic name *Aeschna*, while Martin (1908) included them under *Aeschna*.

Ris (1918) brings together under *Coryphaeschna* also the group *castor*, with the species *castor*, *januaria* and his new species *coronata*.

Later on Kimmins (1929) describes a new species of *Coryphaeschna* as *longfieldae*, a near relative of *januaria*.

By this, the total number of the known species of *Coryphaeschna* is increased to nine and with the new one described in this paper, the total amounts to ten.

This collection of species forms not a homogenous complex, but a composition of two groups viz: the *virens*-group and the *castor*-group. Each of them is characterized by the wing venation especially. Ris already noted, that *castor* probably represents a different genus, but without further data at hand, we are letting it remain under *Coryphaeschna*.

¹ I. *Rimanelia arcana* Needham and its nymph (Odon. Zyg.). *Revista d. Entomologia*, Vol. 11, fasc. 1-2, June 1940, Rio de Jan., pp. 173-179, 8 figs.

II. Six mostly new Zygopterous nymphs from the coastland waters. *Annals, Ent. Soc. America*, xxxiv, no. 4, Dec. 1941, pp. 719-734, 6 figs.

Nymphs of the species of *Coryphaeschna* are known only for *virens* and *ingens*, both belonging to *Coryphaeschna* s.str. How far those of the *castor*-group are different from these the future will show.

By this heterogeneous composition of the genus, it is difficult to give its generic characters. The following peculiarities may generally define the genus in its present form: *Rs* forked under the middle of pterostigma or 1-3 cells before, or at the level of its proximal end. In the fork of *Rs* mostly two cell rows. Between *Rs* and *Rspl* approximately 7 rows of cells (4-8), *Mla* arising from nearly one cell to more than one cell behind the pterostigma. Proximal side of triangle in hind wing usually, but not always (*januaria*), less than half as long as the posterior side. M_4 mostly broken. Anal triangle in male 2-celled, rarely 4-5-celled (*dentata*).

Against these characters, those of the genus *Aeschna* s.str. are as follows: Inner side of triangle of hind wing at least half as long as the outer side. Between *Rs* and *Rspl* at least three rows of cells in its widest part. *Mla* arising from just before to just behind the stigma. M_4 unbroken although more or less sinuate distally. Anal triangle in male mostly 3-celled, rarely 2-celled.

The nymphal characters of *Coryphaeschna* s.str. are: Nymph long and slender, mentum very long, reaching to or below the metacoxae; a long sharp tooth on either side of the mental cleft;² rear of head flat, hind angles square-cut; no dorsal hooks, lateral spines on abdominal segments 6-9; superior abdominal appendage not bifid, only slightly longer than the lateral appendages and nearly as long as the inferiors.

Phylogenetically Walker (1912) regarded *Coryphaeschna* as "a lateral offshoot from *Aeschna*, in which the specialization in wing characters has been carried a little farther than in the latter genus" (p. 22).

In its geographical distribution, the genus is confined to the Neotropical region. The *castor*-group occurs in the tropics only, with the exception of *januaria*, which is found also in Mexico;

² Known also from *Staurophlebia*, described by Needham (1904).

the species of the *virens*-group, however, live for the most part in the subtropical region and even in the temperate zones North and South of the equator (*ingens* in the U. S. and *perrensi* in Argentina).

The species known from Surinam are: *virens* Ramb., *adnexa* Hagen and *dentata* n.sp., the first two living along the coast in the north, the last one found at the southern border near Brazil. Martin (l.c.) notes also *castor* and *perrensi* from Surinam, but these records are obviously wrong.

<i>luteipennis</i>	Brazil (Rio d. J., S. Paulo), Colombia, Costa Rica, Mexico.
<i>ingens</i>	Panama, Cuba, Bahamas, Florida, Georgia (?).
<i>perrensi</i>	Argentina, Corrientes (Surinam?).
<i>adnexa</i>	Brazil (Amazonia), Colombia, Ecuador, Panama, Honduras, Mexico, Cuba, Haiti, San Domingo, Puerto Rico, Trinidad.
<i>virens</i>	Brazil (Matto Grosso, Amazonia), Bolivia, Surinam, Trinidad, Cuba, Haiti.
<i>januaria</i>	Brazil, Colombia, Mexico.
<i>longfieldae</i>	Brazil (Matto Grosso).
<i>castor</i>	Brazil (Rio d. J., Esp. Santo), (Surinam?).
<i>coronata</i>	Bolivia.
<i>dentata</i>	Surinam.

Key to the species

- A. Fork of *Rs* in front and hind wing at the level of the proximal end or under the middle of pterostigma (*virens*-group) 1
1. Thorax green with broad brown bands along the dorsal carina, the humeral and the second lateral sutures, abdomen brown or black for the most part 2
- Thorax green, only small brown lines on the sutures 3
2. Stigma in front wing 4 mm.; male superior appendages with a deep subquadrangular incision on the inner margin at three-fourths their length; those of the female very short. Cu_1-Cu_2 with two rows of cells in the proximal part of the field *luteipennis* Burmeister
- Stigma in front wing 6 mm.; male superior appendages with entire margin; female superior appendages very long *ingens* Rambur

3. Frons with a black T-spot, face blue or green4
 Frons without a black T-spot, face reddish, stigma in front
 wing 4.5-5 mm. *perrensi* MacLachl.
4. Smaller species, face blue, hind wing 40-43 mm.; male
 inferior appendage reaching to $\frac{2}{5}$ the superiors.
adnexa Hagen
 Larger species, face green, hind wing 48-54 mm., male
 inferior reaching to $\frac{3}{5}$ the superiors *virens* Rambur
- B. Fork of *Rs* 1-3 cells proximal to the stigma (*castor*-group)
 5
 5. Black T-spot on frons absent or incomplete, without stem
 and with a brown transverse band at the anterior frons
 angle. Male with last three abdominal segments with
 paler spots6
 Black T-spot on frons present, with or without stem. Male
 with last three abdominal segments dark, without paler
 spots7
6. Male superior appendages with an infero-basal tooth;
 abd. 54-58 mm., hdw. 53 mm. *januaria* Hagen
 Male superior appendages without an infero-basal tooth;
 abd. 57 mm., hdw. 53 mm. (female unknown).
longfieldae Kimmins
7. Black T-spot on frons with a rhomboidal stem, connected
 with the broad basal black line. Male superior appen-
 dages with an infero-basal tooth. Pterostigma in hind
 wing 4 mm., large species *castor* Brauer
 Black T-spot on frons quadrangular, largely situated on the
 apical part of frons without stem or any black connection
 with the narrow basal black line. Male superior appen-
 dages without infero-basal tooth, hind tips slightly
 acute, inferior appendage reaching at least to half length
 of the superiors. Pterostigma in hind wing 3.5 mm.
 (female unknown) *coronata* Ris
 Black T-spot on frons broadly connected with the broad
 basal dark line. Male superior appendages without
 infero-basal tooth, hind tips very acute, pointed; in-
 ferior appendage short, reaching to one-third length of
 the superiors. Pterostigma in hind wing 3.5 mm. (fe-
 male unknown) *dentata* n. sp.

Coryphaeschna dentata new species (Figs. 1, A-F.)

Total length incl. app. 72 mm.; abd + app. 56 mm.; app.
 sup. 6.0 mm.; front wing 50 mm., stigma 4.25 mm.; hind wing
 49 mm., stigma 3.5 mm.

A moderately large species, bluish green with the abdomen largely dark.

Labrum, clypeus and frons bluish green with orange yellow margins, mouth-parts brownish at the tips, otherwise pale bluish. Angle of frons black, widely fused by a broad somewhat diffuse stem with the black basal marginal area before the ocelli and the antennal bases; the pale area on each side of the stem yellow brown. Frons beset with soft black hairs, especially along the sides, front margin seen from above arcuated. Occipital triangle black, in the median line from half the length to the hind margin a yellow stripe. Rear of head black, a large pale spot each side behind the eyes in the lower half.

Thorax bluish green before, to green in the hind part with black or dark brown bands along the sutures. The middorsal carina forms the middle line of a black triangle, of which the top reaches the upper suture. Antehumeral stripe blue or bluish green, smaller than the dark humeral stripe, widest in the upper half and reaching to the upper suture line; narrowed below. Black humeral band broad, about two-fifths the width of mesodorsum, a small black stripe along the humeral suture in the upper mesepisternum. Mesepimeron and metepisternum bluish green, a much smaller dark brown line just before the stigma, running from wing base to the end of metepisternum below. Metepimeron green; a short dark brown stripe along the second suture in the upper fourth and a dark line along the suture of the wing base. Legs black, except ventral side of first femur which is largely pale greenish; claws with a well developed tooth halfway the length.

Abdominal segment 1: basal half brown, dorsum with a black triangle, the top reaching the hind margin in the median line; a green postdorsal spot connected with the green of the sides; lateral hind margin black. Segm. 2: dorsum largely black with a green to yellowish middorsal line not reaching the hind margin; dorso-lateral spot yellow, long, just before the latero-transverse carina and ending at the auricle. The dorso-apical spot small, half-moon shaped. Black of dorsum passing along and behind the auricle and obliquely running forward to near

the ventral basal corner of the tergite. Auricle small, green, tip yellow, with three teeth of which the inner tooth is the largest. Sides of segm. 2 green, hind membrane black. Segm. 3-7 largely dark brown or black, dorsum black, behind the transverse carina a medio-dorsal yellow stripe and a rounded small postdorsal spot apically. Sides with a large antero-basal spot, a medio-lateral spot at the carina and a small post-lateral

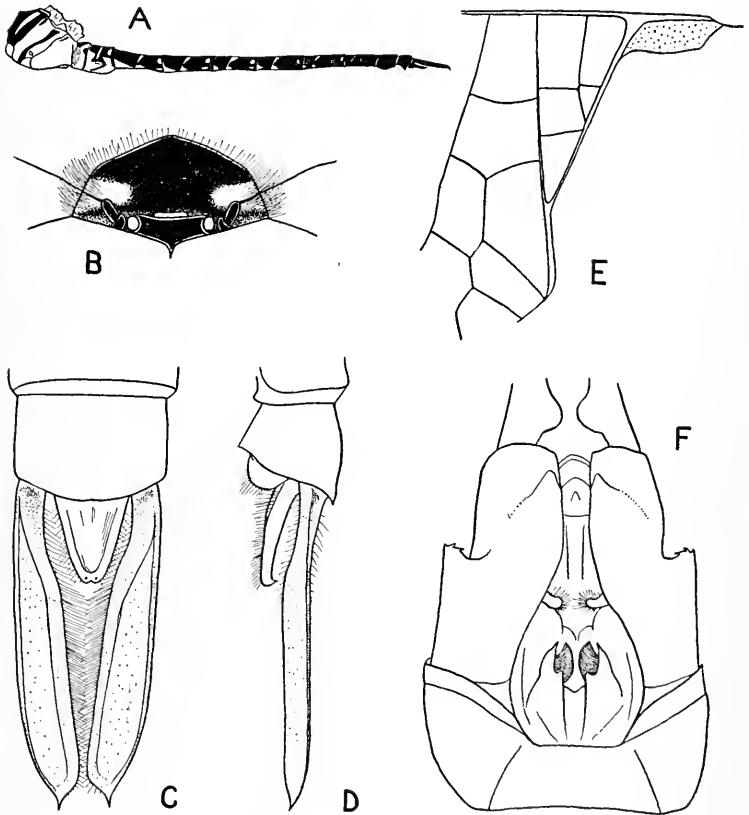


Fig. 1. *Coryphaeschna dentata* n. sp. male type. A. Color pattern of thorax and abdomen; B. black T-spot on the frons; C. dorsal view of appendages; D. lateral view of appendages; E. Anal triangle, right wing; F. ventral surface of abdominal segments 1 and 2.

spot to the hind margin. On segm. 6 and 7 the post-lateral spot absent. Segm. 8-10 black. Ventral surface of segm. 3-10 brown, except on segm. 9 where it is largely black with the genital valves yellow.

Appendages: superiors dark brown, inferior black, shining; superiors long lanceolate, flat with an acute pointed hind tip, basal third petiolated, innerside over its entire length beset with long black bristles. Inferior appendage short, broad and flat, the hind tip slightly incised and with two teeth directed upward, reaching caudad to the basal third of the superiors, beset with black bristles on the underside.

Sternites of segm. 1 and 2 without denticles, the end of the ventral edge of pleurite of segm. 2 bristled. The spines of the anterior lamina conical, directed caudad to just behind the anterior hamule. Anterior hamules triangular, the tips directed cephalad; posterior hamules small spatula-shaped, bristled at the anterior margin, the tips rounded and directed medio-caudad.

Wings slightly yellowish-tinged; pterostigma brown, membranule unicolorous gray. Fork of *Rs* in front wing at the level of one postnodal cell before the stigma, in hind wing 4 postnodal cells before the stigma. Fork of *Rs* enclosing 3-4 cell rows under the middle of stigma. *Rs-Rspl* very broad, from the beginning of furcation of *Rs* 6-7 cells broad; M_1 -*Mspl* broad, in the middle 4-5 cells broad; between M_3 and M_4 in the apical half 2 cell rows; M_4 forked in the hind wing, anal branch dilating and farther on parallel to M_3 , with 2 cell rows between M_3 and M_4 . Triangle long, in front and hind wing with a proximal longitudinal vein (in left front wing with two such veins) and 5 cross veins, number of cells in t 9.8/7.7; cubito-anal cross veins 6.7/5.5, ht 8.7/5.7 ti with one cross vein (left fr.w. with two cross veins). Anal loop with 3 cell rows against A, in total with 10-11 cells; between anal loop and hind margin of wing 2 cell rows; anal field in maximum 3 cell rows broad, anal triangle in left hind wing with 4, in right hind wing with 5 cells (see fig. 2, E). Number of antenodal cross veins (between costa and subcosta) 28.28/18.17, second thickened vein at 9.9/7.6; postnodal cross veins

17.19/22.21. There is one subbasal cross vein before the first thickened vein in the right front wing. Front wing with arculus between ant. crossv. 2 and 3 (left side), 3 and 4 (right side), in hind wing between 2 and 3.

SURINAM, Paloemeu River near Indian village Julu (Joeloe), 3. I, 1941 one male ad. (L. Schmidt) *holotype*, in the writer's collection.

This species belong to the *castor*-group by the position of the fork of *Rs* before the stigma and by the longitudinal vein at the proximal side of *t*. It is a near relative of *coronata* Ris, from which it differs however, beside the points mentioned in the key, in the wing venation as follows:

	<i>coronata</i>	<i>dentata</i>
Number of cell rows between <i>Rs</i> - <i>Rspl</i>	5	6-7
“ “ “ “ “ <i>M</i> ₄ - <i>Mspl</i>	3*	4-5
“ “ “ “ “ in anal loop	2	3
Internal triangle	free	1-2 cross veins
Anal triangle	2-celled	4-5 celled

CORYPHAESCHNA VIRENS, Rambur, Nymph (hitherto unknown), reared, Fig. 2, A-F.

A long slender pale light brown or black nymph.

Head as long as broad, the eyes not very prominent, hind lobes flat, hind angles right-angled or nearly so, occipital border slightly excavated. Sides of hind lobes straight, diverging cephalad slightly, about half as long as the eyes.

Antenna minute, seven-jointed, the first two segments swollen, the remaining part slender, the fourth joint the shortest; length of the segments: 0.45, 0.45, 0.74, 0.37, 0.53, 0.57, 0.53 mm.; apical end of segm. 3 and the basal three-fourths of segm. 4 and the middle part of segm. 7 darker, otherwise pale, segm. 2 hairy.

Mentum very long, reaching backward to the beginning of the hind coxae, basal two-thirds slender, length: width = 7:2;

[* In a male of *coronata* from Satipo, Peru, 14 November, 1940, *M*₄-*Mspl* has three rows of cells on both front wings and the right hind wing, 4 rows on the left hind wing, 3 vertical rows of cells in the anal loop of both hind wings.—P. P. Calvert.]

apical third considerably dilated, median border with a small cleft in the middle, on each side a long sharp-pointed tooth. Lateral lobes short, the movable hook very long, curved, with a row of short spines interiorly; terminal hook long, pointed, curved inward at an angle of about 100° , inner margin of lobe and front part of terminal hook finely crenulated.

Maxillae each with seven large teeth.

Mandibulae with strong teeth, left mandibula with 4 apical teeth (incisors), right mandible with 5 apical teeth; more basally a highly chitinized rib (molar) on either side with one tooth (left mandible) or on one side one tooth and on the other side two teeth (right mandible).

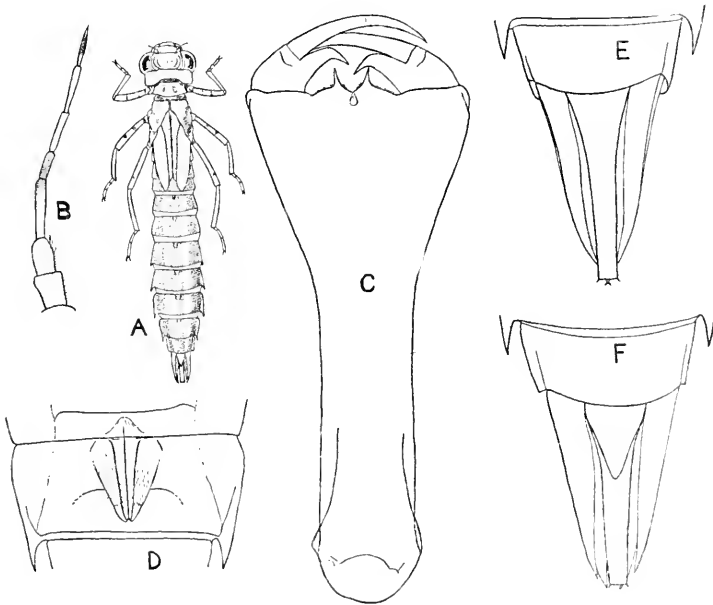


FIG. 2. *Coryphaeschna virens* Rambur. A, dorsal view of full grown male nymph; B, right antenna; C, mentum, innerside; D, gonapophyses, female; E, dorsal view of abdominal appendages of female; F, idem of male.

Prothorax broad, lateral angle of middle lobe bluntly pointed; supracoxal prominences minute, the frontal lobe smaller than the caudal lobe. Synthorax small, wingpads reaching to the beginning of abd. segm. 4. Legs relatively short; in the darker specimens four darker bands on the femora, or three lighter bands and a basal dark band on the tibiae. Apical end of tibiae beset with short thick simple spines and trident setae, tarsus first joint with simple and some trident setae, on second and third joints trident setae only.

Abdomen slender, broadest on segm. 6-8; a middorsal darker band (in the paler specimens diffuse) and on each side a broad darker band above the carinae; in the darkest specimens the whole abdomen black; lateral spines on segm. 6-9, those of segm. 6 minute. Female gonapophyses short, not reaching the end of segm. 9.

Appendages long and all of nearly equal length; tip of middorsal squarely truncate, not bifid; dorso-laterals (cercoids) slender, sharp pointed, as long as middorsal; ventrals (cerci) a little longer the pointed tips slightly curved inward; male triangle reaching to one third the length of the middorsal appendage.

♂. Total length 47 mm.; abd. + app. 33.5 mm.; appendages 4.2 mm.; hind femur 7.5 mm.; mentum 13 mm.; abd. widest segm. (6) 7 mm.; width of head across the eyes 8 mm.; across the hind angles 5.5 mm.

♀. Total length 49 mm.; abd. + app. 33 mm.; appendages 4.2-5 mm.; hind femur 7 mm.; mentum 13.5-14 mm.; abd. widest segm. (6) 7.5-8 mm.; width of head across the eyes 8.2 mm.; across the hind angles 5.7-6 mm.

(Examined one male and one female ult nymph and one male and 8 female exuviae).

The nymphs of *C. virens* were commonly found in swamps and ditches in the coastland and in the interior on the savanna (Paramaribo, Lelydorp, Zandery I and II, Nickerie). Six specimens have been reared, two from the 5 ult, two from the 4 ult and two from the 3 ult instar. The younger nymphs are green with a yellow middorsal stripe. Of the reared speci-

mens, the moulting dates and the number of days in the different instars are tabulated in the following:

No.	locality	collected	5 ult		4 ult		3 ult		2 ult		1 ult		imago sex
			days	moulting	days	moulting	days	moulting	days	moulting	days	moulting	
No. 1	Lelydorp	17.VII.1940	(6)	23.VII	7	30.VII	8	7.VIII	17	24.VIII	26	19.IX	female
No. 2	Lelydorp	17.VII.1940		(11)	28.VII	10	7.VIII	17	24.VIII	26	19.IX	female	
No. 3	Lelydorp	17.VII.1940		(13)	30.VII	10	9.VIII	15	24.VIII	28	21.IX	female	
No. 4	Lelydorp	31.VII.1940				(5)	5.VIII	21	26.VIII	29	24.IX	female	
No. 5	Pa-amariibo	5.II.1941				(12)	17.II	36	25.III	22	16.IV	male	
No. 6	Zanderij I	27.V.1941	(16)	12.VI	4	16.VI	10	26.VI	25	21.VII	52	11.IX	female

It is noteworthy, that the number of days for the instars are very inconstant among the reared specimens. The specimens are all bred at the same place in the laboratory and constantly fed with mosquito larvae. Nymphs of *Coryphaeschna* have been described by Kennedy (1919) and Byers (1930) for *C. ingens*. This nymph differs from those of *C. virens* only in the measurements. Total length of *ingens*: 62–65 mm.; abd. 42.5–44 mm.; hind femur 6.5–8 mm.; width of abdomen 10 mm.; mentum 14.5 mm.; extending well below the metacoxae.

Garcia Diaz (1938) has described by supposition the nymph of *Coryphaeschna adnexa* Hagen, but this is the nymph of *Gynacantha nervosa* Ramb. as suggested also by himself (p. 85), known to me by breeding.

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New Hesperioidea, with Notes on Some Others from the United States (Lepidoptera, Rhopalocera).

By H. A. FREEMAN, White Deer, Texas

Thorybes pylades albosuffusa new form

This new form differs from typical *pylades* (Scudder) in the following particulars: on the under surface of the secondaries there is a prominent submarginal suffusion of greyish-white scales. In *pylades* this is not present or else is very faintly indicated. The fringe of the secondaries is lighter than that of *pylades* caused by the presence of some white scales. The palpi beneath are grey and not concolorous with the under surface of the body. In *pylades* the palpi are concolorous with the under surface of the body.

Described from 5 specimens, 2 males and 3 females, collected by Mrs. H. A. Freeman and the author at Ft. Davis (type locality) and Alpine, TEXAS, during June of 1940 and 1942.

Holotype male and *allotype* female are in the collection of the author. *Paratypes*, 1 male and 2 females, will be disposed as follows: 1 male to the United States National Museum; and 1 female to the Academy of Natural Sciences, Philadelphia. The other female paratype will remain for the present in the collection of the author.

Although it is not always advisable to name forms of most species of butterflies, occasionally one appears that causes difficulty in correctly determining the species. The writer believes

this to be the case in the above described form as some of the specimens somewhat resemble *drusius* (Edwards). However, *albosuffusa* is a much browner insect than *drusius* and the fringes are not nearly so white.

ERYNNIS PERSIUS (Scudder)

Typical *persius* can readily be determined in the north central and eastern states by the abundant hair on the base and disc of the primaries and the general smooth appearance. Dr. W. T. M. Forbes figures the genitalia of this species in "The *Persius* Group of *Thanaos*," *Psyche*, vol. 43, pp. 104-113, December, 1936. The tip of the lower lobe of the left valve is without teeth or else there is the slightest indication of a roughened surface.

The range of *persius* consists of southeastern Canada, the New England states to Florida, westward to Arkansas, and northward through Kansas to Nebraska and Minnesota.

ERYNNIS PERSIUS PERNIGRA (Grinnell)

This is the high mountain subspecies that occurs in California and Utah. It can be recognized by the uniform, blackish-slate coloration of both wings above. There are very few grey hairs on the primaries.

Genitally *pernigra* differs from *persius* only in the presence of several teeth on the tip of the lower lobe of the left valve.

ERYNNIS PERSIUS AVINOFFI (Holland)

There has been some question as to the exact status of *avinoffi* for sometime. With this in mind the writer wrote Mr. W. R. Sweadner of the Carnegie Museum, Pittsburgh, Pennsylvania to see if it would be possible to borrow a paratype so as to make a slide of the genitalia. Mr. Sweadner kindly sent one male paratype and another male from the type series for that purpose. The genitalia revealed that *avinoffi* is a subspecies of *persius* and like *pernigra* it differs only in the presence of some teeth on the tip of the lower lobe of the left valve.

In general appearance *avinoffi* differs from typical *persius* in the following ways: the fringe of the secondaries is somewhat lighter. The hair of the primaries is not so thick nor as long. As a whole, most examples are slightly smaller.

Avinoffi is the arctic subspecies of *persius* as it occurs in northern Canada and Alaska.

***Erynnis persius fredericki* new subspecies**

This new subspecies differs from typical *persius* (Scudder) and its two other subspecies in the following particulars: the hair on both the primaries and secondaries is longer and thicker. There are more grey scales and hairs present on the primaries. The dark sagittate markings are very black, thus producing a greater contrast in the light and dark areas. The fringe of the secondaries is lighter than in *persius* and some of the specimens have the outer half clear white. *E. p. fredericki* can readily be identified by the shaggy appearance of the primaries and the lighter fringe of the secondaries.

Genitally *fredericki* differs from *persius* in the following ways: there are two to four teeth on the tip of the lower lobe of the left valve. There is a tendency for the lower lobe of the right valve to turn downward and the ventral surface of the right valve is very uneven, a tendency not noticed in most specimens of *persius*. The lower lobe of the right valve is also shorter than in *persius*.

Expanse: males 26–33 mm., average size 30 mm.; females 26–35 mm., average size 32 mm.

Described from 60 specimens, 44 males and 16 females. 29 males and 8 females were collected by V. H. & A. C. Frederick near Lead, Spearfish Canyon (type locality), Icebox Canyon and Terry Peak, all in SOUTH DAKOTA, during June of 1939 and 1942; 13 males and 2 females were collected by H. A. Howland at Polaris, Montana; 1 male and 5 females were collected by Dr. J. R. Turner at Beulah and Wolf Creek Pass, Colorado during June of 1942; 1 male from Lake Tahoe, Placer County, California, June 12, 1939 and 1 female Kings River, Fresno, California, September 30, 1941.

The writer takes great pleasure in naming this new subspecies for Mr. A. C. Frederick of Albany, New York, who, along with his wife, collected most of the specimens.

Holotype male and *allotype* female are in the collection of the author. Three male and 6 female *paratypes* are in the collection of Stallings and Turner, Caldwell, Kansas. Forty-nine *para-*

types will be disposed as follows: 14 males and 2 females to the collection of Mr. A. C. Frederick, Albany, New York; 2 males and 1 female to the American Museum of Natural History, New York; 2 males to the United States National Museum; 2 males to the Academy of Natural Sciences of Philadelphia; 2 males to the collection of Mr. Lowell Hulbirt, Glendora, California; and one pair to the collection of Mr. Otto Buchholz, Roselle Park, New Jersey. The other 22 paratypes will remain for the present in the collection of the author.

AMBLYSCIRTES SIMIUS Edwards

Edwards described this butterfly as *Amblyscirtes simius* in 1881.¹ Since that time it has been placed in the genus *Chacrophon* Godman & Salvin by Dr. A. W. Lindsey and in Mr. E. L. Bell's "The Hesperioidea," Bulletin of the Cheyenne Mountain Museum, vol. 1 (part 1) October 4, 1938, it was listed under the genus *Yvretta* Hemming along with *rhesus* (Edwards) and *carus* (Edwards). Mr. Edwards was correct when he described this species in the genus *Amblyscirtes*. The writer has examined five male and one female collected by Stallings and Turner, of Caldwell, Kansas, in the Palo Duro Canyon of Texas during May and June, 1942 and thirty-five males and four females collected by the writer at the same locality during May, 1942. *Simius* differs from members of the genus *Yvretta* in the following particulars: the third joint of the palpus is long and slender, whereas that structure in *rhesus*, *carus*, and *citrus* (Mabille) (a Mexican species) is short and rather stout. The antennal club in *simius* has a short reflexed apiculus. This is not present in any of the *Yvretta*. The reflexed apiculus is a characteristic of the genus *Amblyscirtes*. The long, slender third joint of the palpus and the manner with which it is upturned likewise associate this species with other members of the genus *Amblyscirtes*. The middle tibiae are spined.

Skinner and Williams in their study "On the Male Genitalia of the Hesperioidea of North America, Paper 111,"² state

¹ Trans. Amer. Ent. Soc., IX, p. 6.

² Trans. Amer. Ent. Soc., XLIX, 129-153, July 30, 1923.

on page 138 that the male has no stigma. Possibly this is a misprint or else an error because the males of *simius* do have a short, black stigma that is readily discernible.

Genitally this species is not like other members of the genus *Amblyscirtes*, however, the main characters are certainly nearer that genus than they are to members of the genus *Yvretta*.

Superficially on the under surface this species shows a decided relationship with *oslari* (Skinner) in the arrangement of spots on both the primaries and secondaries. In habits the two are very similar. The writer has collected both species at the same time and place as they rested on light colored soil and rocks. It was difficult to tell the two apart when they had their wings folded vertically above their bodies.

From the above information the writer is returning this species to the genus *Amblyscirtes* where it was first placed.

Megathymus yuccae alabamae new subspecies

This new subspecies resembles the subspecies *navajo* Skinner more than it does typical *yuccae* (Bdv. & LeC.). Typical *yuccae* from Florida and Georgia is deep umber-brown with the spots, base of primaries and marginal border of the secondaries decidedly yellow. On the under surface of the secondaries of *yuccae* there is usually a single crescent like spot near the costa. *Navajo* is the subspecies that occurs in New Mexico, Arizona and California and is characterized by the black coloration of the wings, the spots of the primaries and on the secondaries of the females are white or very light yellow and the marginal border is rather broad and is grey. *Navajo* is also characterized by the presence of two white spots near the costa on the under surface of the secondaries, one is crescent shaped and the other more or less oval.

Alabama differs from *yuccae* in the following particulars: the wings are black. All the spots on the primaries except the subapical ones are light yellow. The base of the primaries shows a very few yellow scales and hairs and the marginal border of the secondaries is light yellow with some grey scales intermixed.

Alabama differs from *navajo* in the following particulars: the spots on the primaries are a little larger and somewhat yellower. The marginal border of the secondaries is more yellowish and there is a single crescent shaped spot near the costa on the under surface of the secondaries.

Expanse: Holotype male 56 mm., paratype male, 50 mm.

Described from two males, received from Mr. A. C. Frederick, Albany, New York, and collected by Mr. M. E. Smith at Anniston, ALABAMA on April 12, 1937.

Holotype male and male *paratype* are in the collection of the author.

The editor of the Entomologist's Record and Journal of Variation, in his December, 1942 number, calls attention "to the loose way that the word 'type' is so frequently used of late . . . A large number of insects lie before me which bear the label 'type.' Not a single one of them is a 'type.' They are, in the opinion of the collector, specimens like the type, i.e. typical examples of the species and not the 'original specimen' or 'illustration' upon which the specific name was bestowed."

Adult and Immature Stages of *Cricotopus elegans* n. sp. (Chironomidae, Diptera).

By O. A. JOHANNSEN, Ithaca, N. Y.

Specimens of an undescribed species of *Cricotopus*, the larvae of which were found mining in the leaves of *Potamogeton*, were sent to me for determination by Mr. C. O. Berg of Ann Arbor, Michigan. The species most closely resembles *Cricotopus infuscatus* (*Trichocladus infuscatus* Malloch) and *C. politus* (*Orthocladus politus* Coq.) as well as the European *C. obnixus* (Walk.), differing from them in the deeper color of the abdomen and in leg or male antennal ratio, or in the structure of the terminalia of the male. The larva will find a place in my key (Aquatic Diptera, III, page 59) tracing to *Spaniotoma*, second paragraph of couplet 20, differing from the species in couplet 21

in antennal and labral structures. The pupa will find a place in the key to *Cricotopus* on page 52, in the second paragraph of couplet 4, differing from species given there in having smaller respiratory organs.

***Cricotopus elegans* n. sp.**

Male. Dark species with non-annulate dusky legs. Head yellow, antenna including basal segment, and mouth parts including palpi, dark brown. Thorax highly polished, yellow, the three broad mesonotal vittae, pectus, a pleural spot, scutellum, and metanotum, shining black. Halteres yellow. Tergum of abdomen dull, velvety black, hairs dark, venter and terminalia brownish. Eyes black, pubescent. Antennal ratio 1.4; ratio of fore basitarsus to its tibia 0.52; fore tarsi not bearded; spur of fore tibia about as long as the diameter of the apex of the tibia; empodium two-thirds as long as the claws; pulvilli vestigial.

Wings milky white, no microtrichia visible under 400 diameters magnification; veins pale yellowish, second branch of radius ending slightly beyond middle of distance between tips of anterior and posterior branches, costa distinctly produced beyond the tip of first branch of radius which ends well beyond the level of the tip of the anterior branch of the cubitus; cubitus forks slightly distad of the crossvein; anal vein ends slightly distad of the cubital fork; squamae fringed.

The hypopygium is of the normal *Cricotopus* type, the anal point lacking; basistyle with prominent basal lobe resembling that figured for *C. flavipes*¹ but more tapering toward the apex; apical spine of dististyle is about two-thirds as long as the diameter of the dististyle near the apex. Length of male 3 mm.; of wing, measured from the humeral crossvein, 1.5 mm.

Female. Similar to the male except for sex characters and that the wing veins are darker. Antennal ratio 0.4. Length 2.5 mm.

Holotype (♂) and allotype (♀) in the Cornell University Collection. Paratypes: 16 in the Cornell University Collection and 6 in the collection of Mr. C. O. Berg.

¹ Ent. News, LIII, p. 75, 1942.

Larva. Length 5.5 to 6 mm. Near each caudo-lateral margin of body segments 3 to 11 with a hair pencil as in *trifasciatus* and in addition with smaller pencils or single hairs at the middle laterally on all body segments except the first (thoracic) and last (abdominal) as well as with minute scattered bristles. Head brown, with margin of labial plate and the apical half of the mandible, blackish. Two nearly contiguous eye spots on each side of the head, the anterior one much smaller than the other. Antenna about a third as long as mandible, basal segment more than two-thirds of total length; ring organ located slightly below middle of basal segment; the longer blade not reaching the apex of apical segment. Ventral side of labrum with the usual bristles, but instead of the median bifid pair there is a pair of stout curved spines. Premandibles robust, blunt pointed, not toothed. Mandibles lack transverse furrows (wrinkles) on the convex side; accessory tooth and the usual two lateral bristles present; median brush terminating in 6 or 7 rays. Labial plate with 11 teeth, the first lateral notched on the outer side as in *C. trifasciatus*.² Prolegs, claws, and anal gills about as in the last mentioned species. Preanal bristle-bearing papillae not longer than broad with about 5 long apical bristles and one shorter one on anterior side.

Pupa. Length 4 mm. Thoracic respiratory organs transparent, 0.09 mm. long, four times as long as broad at widest part. Tergites 2 to 6 with shagreen, with two or four small, indistinctly defined circular clear areas at posterior fourth of segments 2 to 5; shagreen of sixth segment restricted to a central patch; segments 1, 7 and 8 nearly bare. Anal lobes with three moderately curved yellow spines which are three-eighths as long as the segment bearing them.

Adults reared from larvae collected in the Huron River, Washtenaw Co., Michigan, July 16, 1942, by Mr. C. O. Berg of Ann Arbor, Michigan.

² Aquatic Diptera, III, Fig. 186.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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 C.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—ALEE, W. C.—The social life of animals. [Norton & Co., N. Y.] 293 pp. BRIQUET, R., JR.—Bioluminescencia. [Ceres. Vicosá, Minas G., Brazil] 3: 272-99, ill. ENGELHARDT, GEORGE P.—Obituary by E. W. Teale, with port. [19] 37: 153-57. HUGGINS, M. I.—Grasshopper pets in China. [Nature Mag.] 36: 76-77, ill. SCHAUS, WILLIAM.—Obituary note by Heinrich and Chapin, with bibl. and port. [10] 44: 191-95. STEINHAUS, E. A.—Catalogue of bacteria associated with insects and ticks. [Burgess Pub. Co.] 206 pp. TRAVASSOS & TEUXERIRA DE FREITAS.—Relatorio da sexta excursao do Inst. Oswaldo Cruz, realizada a zona da Estrada de Ferro Noroeste do Brasil, em Nov. de 1941. [111] 37: 259-86.

ANATOMY, PHYSIOLOGY, ETC.—BIRMINGHAM, L.—Boundaries of differentiation of cephalic imaginal discs in *Drosophila*. [42] 91: 345-364. DEAN, R. W.—Development of the female reproductive system in *Rhagoletis pomonella* (Trypet.). [7] 35: 397-410, ill. EPHRUSSI, B.—Chemistry of eye color hormones of *Drosophila*. [Q. Rev. Biol.] 17: 327-338. LIGHT, S. F.—The determination of castes of social insects. [Q. Rev. Biol.] 17: 312-326. SMITH, S. G.—Polarization and progression in pairing. III. Pachytene observations in *Neodiprion*. [52] 20: 368-79.

ARACHNIDA AND MYRIOPODA—BRYANT, E. B.—*Descr. of certain Amer. Phidippus (Araneae)*. [119] 28: 693–707, ill. (*). GRAHAM & WACKERBARTH.—*Spiders go to war*. [Frontiers] Feb. 1943: 86–88. KURATA, T. B.—*A list of the spiders of Prince Edward County, Ontario*. [51] no. 48: 107–115.

THE SMALLER ORDERS—LIGHT, S. F.—(See under Anatomy, Physiology.) SWEETMEN & LAUDANI.—*Rearing of the damsel fly, Ischnura verticalis in the laboratory*. [7] 35: 387–88. WALKER, E. M.—*Additions to the list of Odonata of the maritime provinces*. [Nova Scotia Inst. Sci.] 20: 159–76. WERNECK, F. L.—*Sobre algumas esp. do gen. Gliricola (Mallophaga)*. [111] 37: 297–316, ill. (S.*).

ORTHOPTERA—JAMES, M. T.—*Earwigs in Colorado*. [19] 37: 180. URQUHART, F. A.—*An annotated list of the crickets and grasshoppers of Prince Edward County, Ontario*. [51] no. 48: 116–119.

HEMIPTERA—BALDUF, W. V.—*Bionomics of Catorhintha mendica (Core.)*. [19] 37: 158–66. DRAKE, C. J.—*Two new Amer. sps. of the gen. Aradus*. [105] 13: 151–154 (S). FUNKHOUSER, W. D.—*Note on Multareis planifrons (Membrac)*. [19] 37: 166. *New Ceresa from Arizona (Membrac)*. [19] 37: 181–82, ill. GORHAM, R. P.—*Simple method for use in staining living aphids*. [4] 74: 236. HUNGERFORD & SAILER.—*New Corixid from Minnesota*. [19] 37: 179–80. KNULL, D. J.—*The gen. Neocoelidia in the U. S. (Cicadel.)*. [119] 28: 680–92, ill. (*). TORRE-BUENO, J. R.—*A bibliographical note on aquatic Hemiptera used as food in Mexico*. [19] 37: 168–69. *Notes on Coreidae*. [19] 37: 180. *Note on distribution of Heteroptera*. [19] 37: 183–85. USINGER, R. L.—*Notes on the variation and distribution of Mesovela mulsanti (Mesovel.)*. [19] 37: 177–78.

LEPIDOPTERA—BEAMER, L. H.—*The buckeye butterfly (Junonia coenia) in Ontario*. [Can. Field-Nat.] 56: 113. BLANCHARD, R. A.—*Hibernation of the corn earworm in the Central and Northeastern part of the U. S.* [3] Tech. Bul.,

838. BRAUN, A. F.—A remarkable new Heliodinid (Microlep.). [7] 35: 373–78. CARPENTER & LEWIS.—A collection of Lepidoptera (Rhopal.) from Cayaman Islands. [Ann. Carnegie Mus.] 29: 371–96 (*). DETHIER, V. G.—Notes on the life histories of five common Geometridae. [4] 74: 225–34, ill. ELIOT, N.—Instinct and traveling butterflies. [9] 75: 236–44. FREEMAN, T. N.—A n.sp. of Pseudodexentera from apple, with notes on allied sps. (Olethreut.). [4] 74: 212–15, ill. KANE, H. B.—The tale of the promethea moth. [A. Knopf, N. Y.] 1942. KLOTS, A. B.—A newly imported European larvernid (Microlep.). [19] 37: 173. McDUNNOUGH, J.—Two undescribed Canadian Microlepidoptera. [4] 74: 224. McELVARE, R. R.—Domicile of the type of the heliothid moth, Melicleptria pulchripennis. [19] 37: 169. MATSCHAT, C. H.—American butterflies and moths. ill. [R. Freund, N. Y.] 1942. PUTMAN, W. L.—Host plants and parasites of some lepidopterous larvae [4] 74: 219–24. ROGERS, W. P.—*Incisalia henrici* in Fall River, Mass. [19] 37: 167–68. WARREN, B. C. S.—Genus Pandorian (new). A preliminary descr. (Nymphal.). [9] 75: 245–46. (European.)

DIPTERA—BEQUAERT, J.—Pigeon-fly, *Pseudolynchia canariensis* in New England and New York (Hippobosc.). [19] 37: 185–86. FAIRCHILD, G. B.—Genus *Tabanus* and resume of the Tabanidae of Panama. Notes of Tabanidae of Panama. [7] 35: 441–74, ill. (*). HART, T. A.—A descriptive study of the pilotaxy of a modal *Culex pipiens* fourth stage larva. [7] 35: 379–86, ill. KOMP, W. H. W.—*Anopheles clarki*, a n.sp. of *Nyssorhynchus* of wide distribution in S. Amer. (Culic.). [10] 44: 196–201, ill. KRAFCHICK, B.—The mouthparts of blackflies with special reference to *Eusimulium lascivum* (Simul.). [7] 35: 426–34, ill. MANGABEIRA, O.—Contribucao ao estudo dos Flebotomus, IX–XIII (Psychod.). [111] 37: 241–50; 251–58; 287–96; 327–31; 375–82, ill. MILLER, R. B.—A contribution to the ecology of the Chironomidae of Costello Lake, Algonquin Park, Ontario. [51] no. 49: 63 pp., ill. RUSSELL & RAO.—On relation of mechanical obstruction and shade to

ovipositing of *Anopheles culicifacies*. [42] 91: 303-329. VARGAS, L.—Notas sobre la terminalia de algunos simúlidos de Mexico. [56] 3: 229-49, ill.

COLEOPTERA—BARBER, H. S.—Some synonymy in Dermestes. [19] 37: 174-76 (*). BRIMLEY, J. F.—A list of the long-horned beetles of Prince Edward County, Ontario. [51] no. 48: 120-123. DIETRICH, H.—*Typhloglymma puteolatum* (Cosson.). [19] 37: 178. DORSEY, C. K.—Musculature of the labrum, labium and pharyngeal region of adult and immature coleoptera. [60] 103: no. 7, 42 pp., ill. KNULL, J. N.—Two new Bruprestidae. [7] 35: 390-92, ill. LA RIVERS, I.—A new *Trogloderus* from Nevada with a key to the known sps. (Tenebrion.). [7] 35: 435-440. PULIAN, R.—The larvae of the sub-family Orphilinae and their bearing on the systematic status of the family Dermestidae. [7] 35: 393-96, ill. REYNOLDS, J. M.—Effect of parental feeding on the rate of development and mortality of *Tribolium destructor* (Tenebrion.). [31] 151: 55. RINGS, R. W.—The external anatomy of *Sandalus niger* (Rhipicer.). [7] 35: 411-25, ill. SCHOOFF, H. F.—Genus *Conotrachelus* in the North Central U. S. [Ill. Biol. Monogr.] 29, (3), 170 pp., ill. (*).

HYMENOPTERA—BUTLER, C. G.—The honeybee. [31] 150: 759-60. COLE, A. C.—Synonyms of *Formica difficilis* (Formic.). [7] 35: 389. LIGHT, S. F.—(See under Anatomy, Physiology.) MICKEL & KROMBEIN.—*Glyptometopa* and related genera in the Brachycistidinae, with descr. of n.gen and sps. (Tiph.). [119] 28: 648-79, ill. MUESEBECK, C. F. W.—Two n.sps. of *Allotropa* parasitic on the Comstock mealybug. (Platygaster., Serphoidea). [19] 37: 170-73, ill. PARKER, J. B.—Notes on certain sps. of Bembicids. [10] 44: 202-8, ill. PATE, V. S. L.—Scientific name of the common blue wood-dauber (Sphec.). [4] 74: 217-18. SMITH, M. R.—New No. Amer. *Solenopsis* (*Diplorhoptrum*), (Formic.). [10] 44: 209-11 (k). WALLEY, G. S.—A new Canadian sp. of *Asphragis* (Ichn.). [4] 74: 234-36.

LIST OF JOURNALS CITED.

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According to the January 15th issue of Science, Dr. Sheffield A. Neave, of the Imperial Institute of Entomology, and editor of "Nomenclator Zoologicus," has been appointed honorary secretary of the Zoological Society of London. He succeeds Dr. Julian Huxley who recently resigned.

According to a note in Science, Dr. William B. Herms, professor of parasitology and head of the Division of Entomology and Parasitology of the University of California, has been called to active duty as Lieutenant-Colonel in the Sanitary Corps. He is to be instructor of tropical medicine at the Army Medical Field Service School, Carlisle Barracks, Pennsylvania. During his absence, Dr. E. O. Essig will act as head of the Division at the University of California.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Arctic Lepidoptera especially **Noctuidae**—Wanted to hear from collectors who desire the Arctic Species. Have large collection. R. J. Fitch. Lloydminster, Saskatchewan, Canada.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

I shall be grateful to anyone who will give me any reference where insects taken on Mt. Desert Island, Maine, have been used wholly or in part in describing a species.

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Plasma, processed from blood donated to the Army and Navy through the Red Cross Blood Donor Service is proving to be a literal life saver to our wounded fighting men. Surgeon General Ross T. McIntire of the Navy recently asserted that, thanks to plasma and other improved methods of treating casualties, the Navy was losing less than one percent of those wounded on Guadalcanal. In the last World War more than seven percent died of their wounds.

In the tropic jungles of New Guinea and the Solomons, Army and Navy doctors have found another talking point for plasma. Should a regular blood transfusion be undertaken the donor might subsequently prove to be an unsuspected malaria case. The use of plasma eliminates this possibility.

This year the Red Cross has been requested to supply 4,000,000 blood donations. This and all other Red Cross work is financed through the 1943 Red Cross War Fund. A goal of \$125,000,000 has been set, to be raised in March.

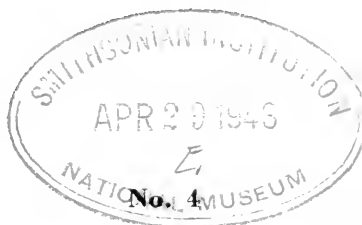
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ENTOMOLOGICAL NEWS

APRIL 1943



Vol. LIV

D. V. ...
U.S. MAIL, 1943

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Two New Species of *Lasiestra* from Colorado (Lepidoptera, Phalaenidae).

By A. GLENN RICHARDS, JR., University of Pennsylvania,
Philadelphia, Pennsylvania.

Lasiestra coloradensis new species.

Antennae of male serrate and fasciculate. Vestiture of head composed of light-colored hairs the apical portions of which are dark. Vestiture of thorax mixed hairs and narrow scales; mottled color due to the hairs and scales having light bases, darker apices and sometimes white tips. Basal abdominal tuft colored like thorax. Tibiae, especially of metathoracic legs, heavily fringed with long, light-colored hairs.

Fore wing brownish-grey, moderately infuscated. T. a. line black, excurved across cell and strongly angled in on anal vein. Claviform spot faintly indicated by black scales. Orbicular spot round, dirty white, with a darker center, and defined toward base and apex of cell by black. Reniform light, with dark center, and defined by some black scales. T. p. line light, defined by preceding black scales and succeeding fuscous line. Subterminal line grey, defined by preceding fuscous shade with black dashes between the veins. Narrow black terminal line. Cilia checkered fuscous and light brown, with a dark line through their center. Hind wing fuscous, the basal half slightly lighter; faint discal spot, lighter postmedial line, blackish terminal line, and cilia mixed fuscous and light brown with a trace of a dark line through their center. Beneath both wings lighter, with dark discal spots and postmedial lines; terminal part of fore wing and apex of hind wing fuscous; cilia as above.

Expanse: 26 mm.

Male genitalia: Essential characters shown in figure 1. Corona with 20–22 spines. Right harpé with subterminal prong on costal margin. Aedoeagus with some 70–75 simple spines in a row and three large tuberculate spines.

Holotype: ♂, Rock Creek, vicinity of Colorado Springs, Colorado; July 10, 1935 (Alexander B. Klots, collector). Dr. Klots writes that the specimen was collected in the neighborhood of the Fountain Valley School cabin at Rock Creek, about 10 miles west of Colorado Springs; altitude 8000–8500 ft., and that this region is a mixed *Pinus ponderosa*—spruce—fir forest that really represents Canadian zone with an abnormally high mixture of Transition zone due to aridity. Type (unique) in the collections of the Academy of Natural Sciences of Philadelphia.

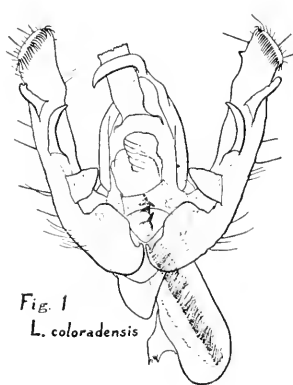


Fig. 1
L. coloradensis

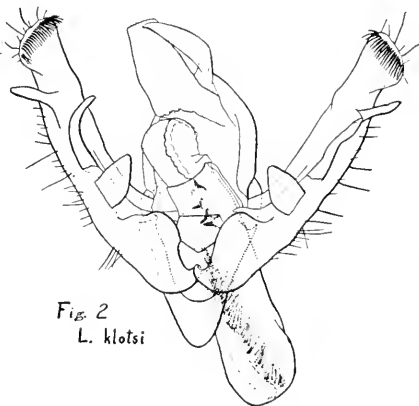


Fig. 2
L. klotsi

This new species closely resembles *L. leucocykla* Staudinger, races of which are found in Greenland, Labrador, New Foundland, the White Mountains of New Hampshire, Alberta and Alaska. In maculation and general appearance *L. coloradensis* is closest to *L. leucocykla poca* B. & Benj. from Alberta. From this (and the other races of *leucocykla*) it differs in its browner color, the absence of clear white, and especially the dark hind wings. On the basis of maculation alone, *L. coloradensis* would

probably be placed as a new southern race of *L. leucocycla*. It is described as a distinct species because of the male genitalia, particularly the three large tuberculate spines on the vesica; these tuberculate spines are totally lacking in the three races of *L. leucocycla* of which slides are available for examination (*preblei* Benj., *hampa* Sm., and *moeschleri* Staud.).

***Lasiestra klotsi* new species.**

Male antennae serrate and fasciculate. Vestiture of head, thorax and basal abdominal tuft composed of long hairs which are light-colored with darker apices and a general olivaceous appearance in mass. Tibiae heavily fringed with long hairs.

For wing grey with an olivaceous cast and with dark grey or black markings. Basal line black, interrupted on radial stem. A large yellowish-olive patch filling antemedial space below cell, this patch traversed by a line of fuscous scales along the anal vein. T. a. line black, erect through cell, then excurved with inward angulation on anal vein. Claviform spot absent. Orbicular spot represented by a light yellowish-olive area in cell just beyond t. a. line. Reniform spot a yellowish-olive line preceded by dark grey and black shading and defined outwardly by a black line. T. p. line grey, defined by preceding heavy black shading, angled out on veins. At inner margin t. a. and t. p. lines joined by solid black shading below anal vein. Sub-terminal line grey defined by preceding darker grey; incomplete, absent between veins 4 and 6 (M_1 to M_3) and for a short distance just below vein 2 (C_{11_2}). No terminal line. Cilia dark grey checkered by a few light scales at the ends of the veins. Hind wing fuscous, darker discal spot, dark postmedial line followed by a light line near costa and inner margin; cilia mixed and with white tips. Beneath both wings dirty white, basal and terminal areas suffused with fuscous-grey, dark discal spots, and fore wing with diffuse postmedial line, hind wing with clearer postmedial line.

Expanse: 32 mm.

Male genitalia: Essential characters shown in figure 2. Aedoeagus with a row of about 60 simple spines and four large tuberculate spines.

Holotype: ♂, Hall Valley, Park Co., Colorado, altitude 11,000 to 12,000 ft., July 13-15, 1935 (Alexander B. Klots, collector). [In the collections of the Academy of Natural Sciences of Philadelphia.]

L. klotsi is unmistakably distinct from all the other described North American species of *Lasiestra* (and *Lasionycta*). It can be readily recognized by the olivaceous cast and by the yellowish-olive orbicular and patch below the cell in the antemedial space. The best placement of *L. klotsi* in our present lists seems to be next *L. lutcola* Smith.

A New Cambalid Diplopod.

By RALPH V. CHAMBERLIN, University of Utah.

The new species of *Nannolene* here described is based upon five type specimens taken by H. H. Keifer near Sacramento, California, on April 30, 1942. They were found under an oak log along with several individuals of another member of the Cambalidae, *Titsona sima* Chamberlin, a species previously known only from the vicinity of Oroville.

Nannolene keiferi new species

Among known species nearest to *N. cincta*, occurring from northern California to Washington, but a much smaller species (13 mm. in length as against 25 mm.), consisting of fewer segments. It differs in gonopods from those of *cincta* as indicated below.

Body having the usual general proportions and appearance of species of *Nannolene*, but slightly constricted back of the first segment. Segmental furrows deep and rather broad.

Typically light brown, with darker, blackish annuli on most of the segments; lower surface and legs yellowish. Head with a dark band between eyes, yellowish below.

Ocelli forming a black triangular patch; ocelli typically in 4 vertical or transverse series; e.g., 8, 7, 5, 3, a total of 23.

Anal valves exceeding the caudal rounded end of the last tergite.

First legs of male moderately reduced, with terminal article short and distally rounded, its claw abortive.

Gonopods of male in structure closest to those of *N. cincta*. The anterior sternite with tongue similarly broad distally but proportionally longer. The coxal piece of anterior gonopod obliquely truncate distally, with distoectal angle similarly the more produced, but less so than in *cincta*, the distal edge being straight instead of incurved.

Number of segments, 46 to 53.

Length, about 13 mm.; diameter, .83 mm.

Locality.—CALIFORNIA: Sacramento district, April 30, 1942. Five specimens taken under an oak log by H. H. Keifer. Types in author's collection; paratypes in the Academy of Natural Sciences of Philadelphia.

New Species of Syrphidae (Diptera) of the Genera *Baccha* and *Mesogramma*.

By FRANK M. HULL, University of Mississippi.

In this paper I present the description of six new Syrphid flies from South America and the West Indies. The types, except where designated, are in the author's collection.

Baccha (*Mimocalla*) *polista* n. sp.

Related to *capitata* Loew. Face yellow, hind femora black on ventral surface; mesonotum with prominent yellow vittae.

Male. Length 15 mm. Head: face yellow, orange in the middle, sides and upper part of front yellow, broadly shining black around the protuberant antennal process. Black dot on lunula. Antennae blackish, lighter below. Thorax: mesonotum dull black with two, widely separated, wide, posteriorly attenuated golden pollinose vittae, a similar short one in front of the scutellum. Lateral margin in front of the suture, a yellow vitta in front of the post calli and all of the scutellum except the black central disk yellow. Mesopleura brown on anterior half, pro-, upper sterno-, anterior metapleura, the

squamae and fringe all yellow. Abdomen: elongate, pedicellate. First segment dark brown except anterior corners. Second segment medium brown, the base narrowly yellowish and hyaline. Third and fourth segments black, with rather narrow, basal, yellow fascia, complete to the margins. Fifth segment linearly yellowish on the basal margin except in the middle. A pair of apical transverse spots posteriorly. Legs: yellow, the femora more orange, the hind femora orange-brown and ventrally black throughout their length with black pile ventrally and laterally and reddish brown pile dorsally. Hind tibiae yellow on basal two-fifths, brownish in the middle, orange apically. Wings: hyaline; costal cell yellow, stigmal cell light brown, third vein and subapical cross vein with characteristic dip and flexure; alulae large.

Female. Similar to the male, the abdomen a little wider, the front black throughout the middle, widely yellow on the sides.

Holotype: male, allotype a female and four paratypes, Nova Teutonia, BRAZIL, (Fritz Plaumann), [Fluke collection].

Baccha zobeide n. sp.

Related to *sita* Curran. The mesopleura is metallic black, the wing nearly hyaline.

Male. Length 10 mm. Head: face and front yellow, the latter obscurely brown in the middle, with thick long black pile. Lunula with a black dot. Antennae orange-brown. Thorax: mesonotum metallic black with a pair of short anterior wide brownish pollinose vittae and the intervening black divided by a brownish line. Sides of mesonotum and humeri yellow, scutellum yellow with abundant long black pile, the disc a little browner and black ventral fringe. Pleura metallic black. Abdomen: moderately slender, elongate, dark brown, sides of the first segment yellow, second segment with a narrow transverse widely separated spot on each side past the middle and behind it an opaque brown spot meeting above. Third segment with larger, lateral yellow spot in the middle of each side. Fourth segment with a large irregular yellow spot on each side just before the middle. Fifth wholly shining black. Legs: yellowish, the femora light brown, hind pair darker, yellow just past

the middle and again at apex, their tibiae brown on discal half, their basitarsi dark brown and the remaining joints pale. Wings: nearly hyaline, stigma dark brown, costal cell pale, alulae well developed.

Holotype: male. Nova Teutonia, BRAZIL, (Fritz Plau-mann), [Fluke collection].

Baccha anona n. sp.

Near *crocata* Austen, but second abdominal segment at least twice as long as wide.

Female. Length 8.5 mm. Head: face and front light yellow, the latter with a linear brown line, black dot on lunula and black pile. Antennae orange, brown above, arista black. Thorax: mesonotum brassy black with a pair of moderately wide, well separated, pronounced yellow vittae over two-thirds the length of mesonotum and posteriorly with a short similar median streak; the lateral margins widely and the humeri and scutellum are pale yellow, the latter from a side view brown on disc with a few long black hairs and three or four black fringe hairs. Pleura yellow, broadly black behind. Abdomen: spatulate, the first segment yellow, brown posteriorly, the second is dark brown with beyond the middle a transverse yellow fascia not reaching the sides. Third segment with a pair of medial, narrowly separated, yellow vittae beginning at base, expanding posteriorly and just beyond the middle emitting a diagonal stripe to the lateral margins. Fourth segment similar, the vittae longer and the diagonal stripe is given off from the base. Fifth segment with a pair of complete central vittae, and shorter, sublateral, subbasal vittae. Legs: entirely pale yellow, the hind femora with a dark subapical annulus. Wings: pale brown, the alulae narrow, equally developed throughout.

Holotype: female. Puyo, Oriente, ECUADOR. Dec. 3-15, 1938, 1000 meters, (F. M. and H. H. Brown), [Fluke collection].

Notes on Some Cuculliinae (Phalaenidae, Lepidoptera). III.

On the Identity of *Glaea pastillicans* Morrison and the Species of the Genus *Chaetaglaea* New Genus.

By J. G. FRANCLEMONT, Ithaca, N. Y.

In the early winter of 1940 Mr. Henry Engel sent me specimens of a moth that some collectors were considering to be *Harpaglaea pastillicans* (Morrison). At that time, I had not decided as to what moth this name referred. Morrison's type of *Glaea pastillicans* being apparently lost, inquiries not having brought its whereabouts to light, I had only the original description to consider when attempting to identify this name.

After a careful study of the original description of *pastillicans*, it became evident that this name was a synonym of *Orthosia apiata* Grote. The most conclusive evidence for this synonymy was the reference to the red annuli surrounding the ordinary spots. Only three species of North American "Glaeines" have this feature, namely *Epiglaea apiata* (Grote), *Metaxaglaea inulta* (Grote) and *Metaxaglaea viatica* (Grote). The last species cannot be considered because the ordinary lines are dentate; only *apiata* and *inulta* have the lines more or less even; *inulta* likewise cannot be considered because the ordinary spots are extraordinarily large, and the reniform never has a dark punctiform spot in its base. Thus only *apiata* remains, and this variable species ranges in color from pale olive brown to deep purple brown, and the reniform either does or does not possess a dark punctiform spot in its base. Grote's type of *apiata* was reddish brown, a light phase, and possessed very evident ordinary lines and no dark spot in the base of the reniform. Morrison's type was of the other extreme, very dark, with obscure lines and with a dark punctiform spot in the base of the reniform; all this ample reason for Morrison to think that he had a different species; it also differed from typical *apiata* in the lack of the pale shade following the median part of the subterminal

line, but agreed with typical *apiata* in having that subterminal line reddish. The northern locality of Morrison's type precludes it being the species that Hampson called *pastillicans*, which is more southern.

I have examined over five hundred specimens of *apiata* from Maine, New Hampshire, Vermont, New York, Pennsylvania and New Jersey. These specimens showed all degrees of variation, some matching Grote's type exactly and others meeting exactly the requirements of Morrison's description.

From the foregoing discussion the following synonymy is at once apparent.

Orthosia apiata Grote, 6th Rept. Peab. Acad. Sc., 1873, 30, 1874.

Glaca pastillicans Morrison, Proc. Bost. Soc. Nat. Hist., xvii, 151, 1874.¹

New Synonymy!

Epiplaca apiata (Grote), Grote, Abhandl. Nat. Verz. Bremen, xiv, 95, 1895 (*apiata* herein designated type of *Epiplaca*!).

Epiplaca pastillicans (Morrison), Grote, Abhandl. Nat. Verz. Bremen, xiv, 95, 1895.

Epiplaca apiata (Grote), Hampson, Cat. Lep. Phal. B. M., vi, 433, pl. 106, fig. 11, 1906.

Epiplaca apiata (Grote), McDunnough, Checklist Lep. Can. and U. S., 85, 1938.

With the above synonymy a fact, it becomes obvious that *Harpaglaca* Hampson, "Cat. Lep. Phal. B. M., vi, 429, 1906," with type designated as *Glaca pastillicans* Morrison = *Harpaglaca pastillicans* (Morrison) by Hampson therein, is a synonym of *Epiplaca* Grote, "Bull. U. S. Geol. Geog. Surv., iv, 181, 1878," with type designated by Grote in the "Abhandl. Nat. Verz. Bremen, xiv, 95, 1895" as *Orthosia apiata* Grote = *Epiplaca apiata* (Grote), the generic names being isogenotypic. Since the above is so, it leaves the species placed in *Harpaglaca* by Hampson without a generic name; to remedy this condition the following generic name is proposed to replace *Harpaglaca*.

¹ It is quite evident that Grote's description appeared before Morrison's because the latter author makes reference to *apiata*, *inulta* and *viatica*, all described at the same time, in his description of *Glaca sericea*, which appears on the same page as the description of *pastillicans*.

CHAETAGLAEA gen. nov.

Genotype: *Chaetaglaca cerata* Franc. new species.

Proboscis well developed; palpi short, porrect, not exceeding the front, clothed with scales and moderately long hair, the third joint drooping; eyes moderate and round; antennal scape without lashes, antennae of male minutely ciliated; thorax clothed with hair and hair-like scales, with a triangular, knife-edge, anterior tuft, no posterior tuft; the fore legs with the first segment of the tarsus with 4 to 6 large spines on the outer side; abdomen distinctly flattened, fringed with lateral and anal tufts, no dorsal tufts, clothed on the dorsum with scales and hair; fore wing with the costa almost straight, the apex square.

The male genitalia of the three species of this genus vary from almost symmetrical to quite asymmetrical; this asymmetry being mostly in the sacculus. The tegumen is long and moderately broad; the vinculum is long and narrow; the valves moderately long and rather narrow in their distal half, the sacculus large and tending to be unlike on both sides, pollex present in two species, the clasper ranging from well developed to almost vestigial. The aedoeagus is quite long and rather stout, and the vesica is armed with a single, very heavy, bulbous-based spine.

This genus differs from all the "Glacine" genera but *Psectraglaca* by the few heavy spines on the first segment of the fore tarsus; from *Psectraglaca* it differs by its smooth and coarser vestiture and the simple antennae of the male, those of *Psectraglaca* being pectinate. The male genitalia are distinctive in the large size of the aedoeagus and the large spine of the vesica.

Three species are included in the genus.

Chaetaglaca cerata n. sp.

Head and thorax pale fawn color; the fore wing glistening, pale, pinkish fawn color; the basal line indiscernible; the antemedial line even, slightly curved, running obliquely outward from costa to inner margin, rust colored, with a narrow, pale shade on its inner side; the postmedial line even, excurved slightly from below costa to vein M_1 (Vein 6), then erect to inner margin, rust colored, with a narrow, pale shade on its

outer side; the subterminal line erect from below costa to vein R_5 (Vein 7), then sharply angled out and then running parallel to the outer margin; terminal line a series of small black dots in the interspaces; median shade very vague, just traceable as a faint line from below reniform to inner margin; reniform and orbicular about equal in size, the orbicular nearly circular, the reniform slightly more elliptical, both of the same color as the ground, and with pale annuli; the veins on the disk of the wing marked by pale lines; the fringe concolorous, edged with rusty pink; the inner margin edged with bright rust color. Hind wing pinkish fuscous, darker in the female; the fringe pinkish. The abdomen pinkish fuscous, concolorous with the hind wings; the caudal margin of each segment edged with pinkish fawn color; the lateral and anal tufts bright rufous.

Expanse: 46 mm. to 50 mm.

The male genitalia symmetrical; the uncus and tegumen moderate; the vinculum long; the valves moderately long and heavy; the clasper stout and sharply curved; pollex present, stronger on the left valve; corona evanescent; the aedeagus long and stout, the vesica armed with a very stout spine with a subquadrate base.

This species most closely resembles *sericea*, from which it may be distinguished by its lighter color, rust colored ante- and postmedial lines, and the lack of the black spot in the base of the reniform; from *tremula*, the third and most variable species in the genus, it may be distinguished by the presence of the rust colored lines, the lack of a tooth on the antemedial line at vein 2A (1b) and the absence of the black dot in the reniform. It is usually lighter than this last species in color and has a far greater sheen to the wings; however, *tremula* varies to such a degree, that it is not safe to use color in separating this species from it.

The male genitalia differ from those of the other two species in that they are practically symmetrical, those of *sericea* and *tremula* being asymmetrical, especially the sacculus; the clasper is poorly developed in *sericea* and *tremula*, in fact almost missing in the last species, while it is well developed in the new species; *sericea* has no pollex and *tremula* the last remnants of

one; the spine in the aedoeagus of *tremula* and of *sericca* has a rounded bulbous base, not quadrate.

Holotype: ♂, Mystic, CONNECTICUT, October 6, 1924 (Hermann Wilhelm), [in Coll. Franclemont].

Allotype: ♀, Finleyville, Pennsylvania, October 27, 1937 (Henry Engel), [in Coll. Franclemont].

Paratypes: 4 ♂♂, Mystic, Connecticut, October 7-26, 1924 (Hermann Wilhelm), [3 in Coll. Engel, 1 in Coll. Franclemont]; 1 ♀, Finleyville, Pennsylvania, October 19, 1936 (Henry Engel), [in Coll. Engel]; 1 ♂, 1 ♀, Nantucket Island, Massachusetts, October 10 & 19, 1939 (C. P. Kimball), 1 ♂, Nantucket Island, Massachusetts, October 1941 (C. P. Kimball), [in Coll. Franclemont, Brower and Kimball]; 1 ♀, Chilmark,

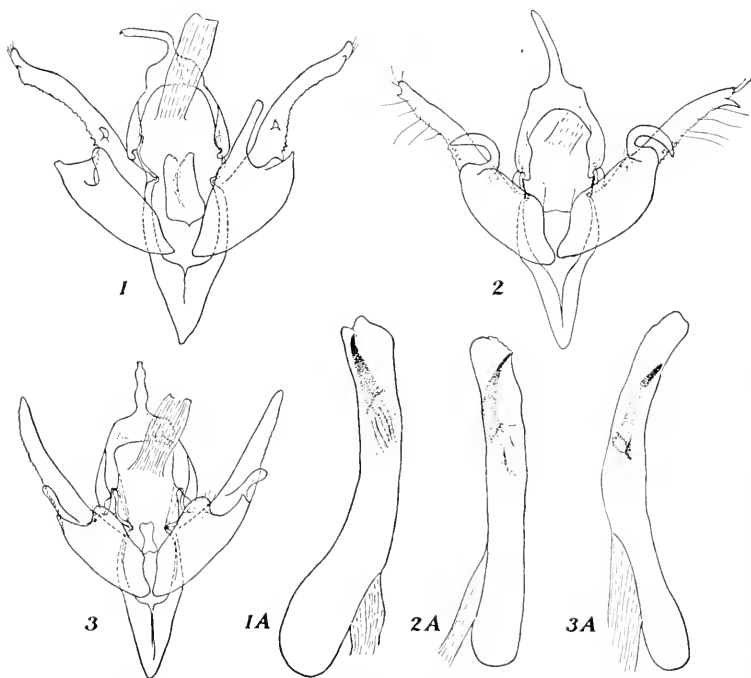


Fig. 1. Male genitalia of *Chactaglaca tremula* (Harvey). 1a. Aedoeagus of *C. tremula*. Fig. 2. Male genitalia of *Chactaglaca cerata* Franc. (Holotype). 2a. Aedoeagus of *C. cerata*. Fig. 3. Male genitalia of *Chactaglaca sericca* (Morrison). 3a. Aedoeagus of *C. sericca*.

Martha's Vineyard, Massachusetts, November 10, 1934 (Geo. D. Eustis), [in Coll. Brower].

CHAETAGLAEA SERICEA (Morrison)

Glaea sericea Morrison, Proc. Bost. Soc. Nat. Hist., xvii, 151, 1874.

Glaea venustula Grote, Can. Ent., vii, 84, 1875.

Epiglaea venustula (Grote), Grote, Bull. U. S. Geol. Geog. Surv., iv, 181, 1878.

Harpaglaea sericea (Morrison), Hampson, Cat. Lep. Phal. B. M., vi, 430, pl. 106, fig. 9, 1906.

Harpaglaea sericea (Morrison), McDunnough, Checklist Lep. Can. and U. S., 85, 1938.

As long as he lived, Grote was doubtful as to whether his *venustula* was synonymous with Morrison's *sericea*; it seems that the Morrison type disappeared rather early. Dr. K. L. Chamberlin of the New York State Museum at Albany, New York very kindly compared specimens of the species that it has been customary to call *sericea* with the Grote type of *venustula*, which is in the above museum, and reported them the same.

Like the type of *pastillicans*, the type of *sericea* is apparently lost, but the original description is quite adequate, and Hampson's figure of the species is good and will serve as a typical example of the moth. There can be no doubt that *venustula* is a synonym of *sericea*; the original descriptions are quite similar in context,—both authors overlooked mentioning the presence of a dark spot in the base of the reniform, this spot may be rather inconspicuous, but is nevertheless present.

237 specimens of this species from New York, Pennsylvania and New Jersey have been examined; these specimens showed some degree of variation in the depth of the ground color, the relative emphasis of the lines and the size of the ordinary spots.

CHAETAGLAEA TREMULA (Harvey)²

Glaea tremula Harvey, Bull. Buff. Soc. Nat. Sc., ii, 276, 1874.

Epiglaea tremula (Harvey), Grote, Bull. U. S. Geol. Geog. Surv., iv, 181, 1878.

²I have tried to definitely identify *Cerastis adulta* Guenée, "Spec. Gen. Lep., vii (Noct. iii), 393, 1852," but the original description is somewhat vague in places, nevertheless it leads me to believe that the Abbot figure of the moth, which I have not seen, is a species of the genus *Rhynchagrotis* or *Abagrotis*. For the time being the name may stand as a *nomen inquirendum* near *viatica* as suggested by Barnes and Benjamin in the "Contrib. Nat. Hist. Lep. N. Am. v (3), 141, 1924."

Harpaglaca tremula (Harvey), Hampson, Cat. Lep. Phal. B. M., vi, 430, pl. 106, fig. 10, 1906.

Harpaglaca ‡*pastillicans* Hampson (nec Morrison), Cat. Lep. Phal. B. M., vi, 431, text fig. 149, 1906.

Harpaglaca tremula (Harvey), McDunnough, Checklist Lep. Can. and U. S. 85, 1938.

This is the most variable species in this genus; it not only varies in the color of the ground and in the strength of the markings, but in the composition of the markings. The species reaches the maximum of variability in the southern part of its range; a series from north-central Florida presented some very striking color forms; I even suspected other species, but there was no variation in the genitalia of either sex, no matter how outstanding the color and pattern differences.

The ground color varies from pale lilaceous gray to deep purple gray, often heavily irrorate with black, and from pale lavender brown to intense russet brown, likewise often irrorate with blackish. The ordinary lines and the annuli of the ordinary spots may or may not be present and well defined; but the black spot in the base of the reniform is generally quite evident, whether the reniform is defined or not. The terminal area of the fore wing may be a glaucous white; such specimens present a very striking appearance. To attempt to name all the color forms would be an endless process and would only confuse the picture; being variations, there is every degree of intergradation between the numerous color forms. It was the custom, I think, following Hampson, to call the purplish gray forms *pastillicans* and the brownish forms *tremula*, treating them as separate species; this practice cannot be continued in anyway, not even as forms, as *pastillicans* Morrison is a synonym of *apiata* Grote. Thus only the name *tremula* remains, and under present conditions, it will be sufficient to place all the forms no matter how striking under this name.

I have examined over 700 specimens of this species; the specimens coming from New Jersey, Georgia, Florida, Texas and Arkansas; 109 genitalic slides were made of this species.

The three species discussed herein may be separated superficially by the following key.

- a. The antemedial and postmedial lines always present and evenly curved, preceded and followed respectively by a very evident pale shade.
- b. The reniform rather elongated, with a black spot in the lower part; the ante- and postmedial lines blackish
..... *sericea*
- bb. The reniform more contracted, tending to be circular, with no black dot in the lower part; ante- and postmedial lines reddish rust colored.....*cerata*
- aa. The antemedial line when present with a distinct tooth on vein 2A, the postmedial line slightly irregular, no evident pale shades preceding or following these lines; the lines tend to become obsolescent in some specimens, often almost wholly missing.....*tremula*

The following arrangement of the species may be substituted for that in McDunnough's Checklist, page 85, replacing *Harpaglaca* with *Chaetaglaca*.

CHAETAGLAEA Franc.

cerata Franc.

sericea Morr.

venustula Grt.

tremula Harvey

‡*pastillicans* Auct.

Corrections to "Notes on Some Cuculliinae (Phalaenidae, Lepidoptera) II, Ent. News, LIII, 31-35 & 63-66, 1942.

1. pages 31 and 63, the word "*Cuculliinae*" in the title should read *Cuculliinae*. 2. page 34, line 26, "*hemma*" should read *hemina*. 3. page 63, line 5 and page 64, line 13, the date "1883" should read 1893. J. G. F.

A New Species of Pholeomyia, with a Key to the North American Species (Diptera, Milichiidae).

By GEORGE STEYSKAL, Detroit, Michigan.

The apparently new species described below was included in a lot of flies submitted by C. S. Brimley, of the North Carolina Department of Agriculture.

***Pholeomyia decorior* new species**

Male. Length of body, 4.7 mm.; of wing, 4.2 mm. Wholly black.

Head: front matt black, parallel-sided, as wide as length of antennae, one-half the width of one eye; six incurved lower orbital bristles with small interspersed hairs; one proclinate anterior and two reclinate posterior upper orbitals; interfrontals very small and fine, numerous and scattered; a pair of long and fine approximate proclinate bristly hairs close before anterior ocellus; lunula shining piceous, about three-quarters as high as wide, with two proclinate bristles close together in the center; a pair of large parallel reclinate postverticals, one behind each posterior ocellus, and between them a pair of small closely placed proclinate divergent bristles in a line with the posterior margin of the posterior ocelli; a pair of strong proclinate ocellars midway between anterior and posterior ocelli, also a few small hairs on the ocellar triangle. Third antennal joint round, the bare arista 3.5 times its length. Face concave, parallel-sided, with median keel, about 1.5 times as high as wide, epistoma reaching upwards about one-third the distance from lower edge of eyes to insertion of antennae. Checks linear. Posterior margin of eyes continuous, the posterior orbital cilia close to eyes. Palpi black, narrow, slightly wider near tip, almost reaching epistoma and with a few short bristles. Proboscis geniculate, each section nearly as long as fore tibia.

Thorax: subshining with faint brownish pruinosity on dorsum; calypters and their fringe white; halteres black. Two dorso-centrals, a pair of prescutellars equally as strong as posterior dorsocentrals and dividing the space between them into three equal parts; two postalaris; two humerals; hairs of dorsum rather scattered, short and numerous. Three sternopleurals in horizontal row; four mesopleurals; one prothoracic bristle.

Legs with long and strong hairs, a fringe of 13-15 subequal slender bristles on posteroventral angle of middle femur about 1.5 to 2 times as long as thickness of femur.

Wings faintly brownish, veins brown; the costal incision two-thirds as long as greatest width of costal cell; anterior crossvein at middle of discal cell; posterior crossvein nearly vertical, its own length from wing margin measured on fifth vein.

Abdomen: dorsum subshining with faint brownish pruinosity and very narrow silvery uninterrupted fasciae on anterior margin of second, third and fourth tergites, widest on second and visible only with lateral lighting. The tergites are nearly equal in length and bear sparse coarse hairs on the posterior half only, except broadly on the sides of the second tergite; a ring of larger bristles near tip of abdomen. Hypopygium small, ventral.

Holotype: male, Orton Pl., Brunswick County, NORTH CAROLINA, May 2, 1939 (D. L. Wray), returned to Dr. Brimley.

As shown in the key below this species is apparently related to *pseudodecora* and *robertsoni*, but more than either of these it resembles the description of *quadrifasciata* Hendel (1932, *Konowia* 11: 139, Bolivia), from which species, however, it differs considerably, especially in the bristling of the head.

Key to Males of North American Species of Pholcomyia

1. With 3 or 4 dorsocentral bristles2.
- With 1 or 2 dorsocentral bristles4.
2. Abdomen, except first tergite, silvery; thoracic bristles strong, mesopleura with about 8 bristles; calypters brown, rim blackish. (1925, *Proc. U. S. Nat. Mus.* 66 (18): 1—Calif.)*expansa* Aldrich.
Abdomen not at all silvery3.
3. Sides of front nearly parallel, width of front at antennae equal to length of an antenna; abdomen concolorous with thorax or slightly more shining. (1896, *Berlin. ent. Zts.* 13: 50 [Cent. 8, no. 94]—eastern No. Amer., Nebr., Nev., Idaho; Tabasco [Mex.]; Puerto Rico) ..*indecora* Loew.
Front greatly narrowed toward antennae so that its least breadth is but little more than one-half the length of an antenna; abdomen with a dull red silky sheen. (1913, *Jour. N. Y. Ent. Soc.* 21: 238—Hayti) ..*myopa* Melander.

4. Abdominal tergites, except first, silvery; calypters pale ...5.
At least two tergites not wholly silvery6.
5. Second tergite longer than third and fourth together. (1861, Wien. ent. Monats. 5: 43—Cuba, St. Vincent Id., Ga., Tex.)*leucogastra* Loew.
Tergites of uniform length. (1907, Ann. Mus. Nat. Hung. 5: 524—Ga.)*leucogastra* var. *dispar* Becker.
6. Second tergite with a median crescentic blackish spot on the silvery ground, third and fourth tergites wholly silvery. (1867, Verh. zool.-bot. Ges. Wien 17: 903—Mex., So. Amer.)*leucozona* Bilimek.
Second tergite largely or wholly black, third and fourth not wholly silvery7.
7. Abdomen matt black except two large silvery lateral spots on fifth segment; hairs on posterior margin only of intermediate tergites; calypters whitish; halteres blackish. (1907, Ann. Mus. Nat. Hung. 5: 524—Ga., Ala.)
pseudodecora Becker.
Abdomen with silvery fasciae at anterior margin of some tergites (which may be difficultly visible); fifth tergite wholly black8.
8. Anterior portion of third, fourth and fifth tergites with silvery fasciae, that of fifth interrupted; length 1.5 mm. (1902, Jour. N. Y. Ent. Soc. 10: 187—Fla.)
robertsoni Coquillett.
Very narrow silvery fasciae on anterior margin of second, third and fourth tergites, widest on second and visible only with lateral lighting; calypters pale; halteres black; length 4.7 mm. (North Carolina) ...*decorior* new species.

The genus *Paramilichia* Malloch, the sole species of which, *longiseta* Becker, has been recorded from Nicaragua by Malloch (1913), may fall within the limits of *Pholcomyia*, according to Hendel (1932).

LITERATURE CITED

- MALLOCH, J. R. 1913. A Synopsis of the Genera of Agromyzidae, with Descriptions of New Genera and Species. Proc. U. S. Nat. Mus., 46: 127-154, pls. 4-6.
- HENDEL, F. 1932. Die Ausbeute der deutschen Chaco-Expedition 1925/26. Diptera. XXX-XXXVI. Konowia, 11: 98-110; 115-145.

Enallagma davisii, a New Species from Florida (Odonata).

By MINTER J. WESTFALL, JR., Cornell University.

In the Spring of 1941, while collecting around a lake in central Florida, three males and one female of a new *Enallagma* were taken. Later searches made in the same year and during the following Spring failed to disclose additional specimens. This new species is named for my good friend, Mr. Edward M. Davis, Director of the Thomas R. Baker Museum of Natural Science at Rollins College, Winter Park, Florida.

Enallagma davisii new species.

Color: blue and black.

Holotype, male: Head black, with blue markings; antennae blackish brown; labrum, anteclypeus, and postclypeus bright blue, except for a rather wide sutural band between the frons and postclypeus which extends over a large part of the postclypeus; frons blue to base of antennae; vertex black; post-ocular spots blue, rather large, almost circular, with a short arm projecting toward the midline; occiput black; rear of head blue.

Prothorax black on dorsum, with a transverse stripe across middle and two lateral spots on the anterior lobe, two on median lobe, and a small median spot and two lateral stripes on posterior lobe, all of these markings blue.

Pterothorax blue, black as follows: a wide, median, mid-dorsal line, narrowed posteriorly; a humeral stripe separated from middorsal by a pale stripe which is slightly wider than the humeral; a thread of black at second lateral suture and a larger elongated spot at base of third lateral suture followed by a hairstreak along it. Mesostigmal plates with large lateral blue spot separated from blue thoracic stripe by narrow black line. Legs brownish, femora and tibiae heavily streaked with black, appearing almost entirely black externally; coxae light, with large black mark at infraepisternal margin. Wings with veins and pterostigma dark brown or black; postnodals 11 in

front wings and 9 in hind wings; M_2 arising between 4th and 5th postnodals, almost at 5th, in one front wing, and half way between 5th and 6th in the other, in hind wings arising between 3rd and 4th, almost at 4th.

Abdomen with terga blue, marked with black as follows: large basal spot and two small lateral apical spots on segment 1, apical spot and marginal ring of 2, apical fourth to fifth of 3 to 5, two small dorsal spots located on segment 3 at about one-fourth and one-half the length of the segment from base, apical half of 6, all of 7 except an interrupted basal ring, and all of 10. Segments 8-9 blue except for an irregular, lateral, apical spot on each side of 8 which extends half the length of the segment, and a very small and hardly noticeable, lateral, apical spot on each side of 9. Superior anal appendages black, with dorsal

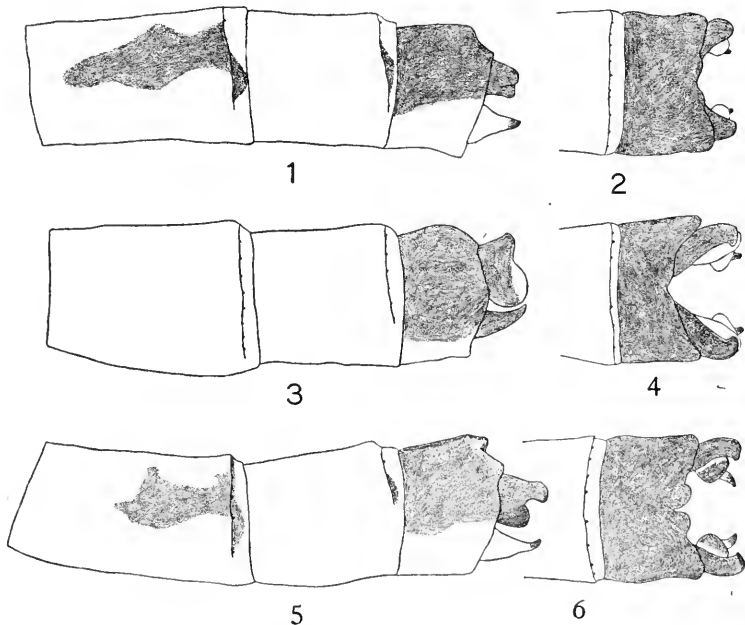


Fig. 1-2, *Enallagma laterale* Morse (Lateral and dorsal views of abdominal appendages of male). Fig. 3-4, *E. minusculum* Morse. Fig. 5-6, *E. davisi* new species.

and ventral arms, in profile view, about one-half the length of dorsum of 10; upper branch one and one-half times the length of lower, constricted before tip and knobbed; lower branch directed ventrally and medially, subrectangular in shape, with lower angles rounded, thicker than upper branch, although in strict profile view it may appear thinner because the lower branch is directed inward; inferior appendages as long as superiors, light brown, tipped with black.

Total length 31.5 mm.; abdomen, including appendages, 25; hind wing 17.

Allotype, female: In general, similar to male. Posterior lobe of prothorax without the small median spot (but this may not be constant); no dorsal pits on middle prothoracic lobes; black of legs very slightly if at all reduced; black spots present on coxae. Abdominal terga with black as follows: a large basal spot and two small lateral spots on segment 1, a median dorsal stripe on 2-10, narrowed abruptly at proximal end of 3-7 to form only a narrow streak and widened at distal end of segments. Sides of 8-10 pale, with the broad dorsal black stripe very noticeably reduced on the anterior half of segment 8. Superior anal appendages brown. Wings with light brown pterostigma; postnodals 11 in each front wing, 9 in hind wing; M_2 arising between 4th and 5th postnodals, almost at 5th, in front wing, and between 3rd and 4th in hind wing, almost at 4th.

Total length 31 mm.; abdomen, including appendages, 24; hind wing 18.

Paratype No. 1, male: Differs from holotype only in minor, variable details. Postocular spots more cuniform than circular; abdomen with an extra rounded dorsal spot at anterior third of segment 3; 5 with an extra projection of the apical spot extending anteriorly to cover at least a third of segment, and an irregular lateral streak on one side reaching from apical spot almost to middle of segment, as well as a small black spot slightly anterior to middle; apical three-fourths of 6, and all of 7 black, except for a complete basal ring on the latter; lateral apical spots on 8 slightly narrower than in holotype;

M₂ arising in front wings between 4th and 5th postnodals, almost at 5th, and in hind wings half way between 4th and 5th.

Total length 32 mm.; abdomen, including appendages, 25.5; hind wing 17.

Paratype No. 2, male: Postocular spots more cuneiform than circular; M₂ arising in front wings between 4th and 5th postnodals, almost at 5th, and between 3rd and 4th in hind wings, almost at 4th; apical two-thirds of abdominal segment 6 black; lateral apical spot of segment 8 slightly larger than in holotype.

Total length 31.5 mm.; abdomen, including appendages, 25; hind wing 17.

The specimens were collected by myself at a small grassy-edged lake about five miles north of Winter Park, Florida, just a few hundred feet west of the new Winter Park-Sanford highway. The second paratype was taken March 25, 1941, while the other specimens were collected March 21. Though the allotype was not found in copulation with the holotype, it was taken only a few feet away from it and is so similar that it can hardly be anything other than this species.

It may be worthwhile to note that the following species of Zygoptera were taken at the same lake with the types of *E. davisi*: *Enallagma sulcatum*, *E. laurenti*, *E. pollutum*, *E. concisum*, *E. doubledayi* (a single specimen), *Ischnura ramburii*, *I. kellikotti*, *Lestes vigilax*, and *Anomalagrion hastatum*.

The holotype and allotype are deposited in the Cornell University collection, while the first paratype is in the Williamson collection and the second in that of the Academy of Natural Sciences of Philadelphia.

Dr. Calvert informs me that there is a male specimen in the collection of the Academy of Natural Sciences of Philadelphia which is apparently of this new species. It was taken at Lake Ellis, North Carolina, May 14, 1906. He states that the pale postocular spots are smaller than those in paratype No. 2 of *E. davisi* which he saw, and elliptical instead of cuneiform. It is also a little smaller, abdomen, 23.5 mm. and h. w., 15.5 mm.

The following table of comparisons, made by Dr. P. P. Calvert in a study of types, is quoted from a letter:

	<i>E. laterale</i> paratype [?] ¹	<i>E. davisi</i> sp. nov. paratype	<i>E. minusculum</i> paratype [?] ²
Superior appendages (profile view)	$\frac{1}{3}$ as long as segment 10, the two branches subequal in length.	$\frac{1}{2}$ as long as 10, upper branch $1\frac{1}{2}$ times as long as lower branch.	" $\frac{1}{2}$ as long as 10"; "lower branch projecting a little beyond the upper, much expanded, directed downward and inward."
	Upper branch not constricted before its apex and therefore not knobbed. Lower branch not as thick as upper branch.	Upper branch constricted before its apex and knobbed at tip. Lower branch thicker than upper branch.	"Upper branch one-third as broad" (as lower).
Inferior appendages	Projecting distinctly beyond the level of the tips of the superior appendages.	Projecting only as far as the level of the tips of superior appendages.	"Equal in length to the superiors."
Coxae	With no black mark ³ (some brown on 3rd coxa).	With a black mark at the infra-episternal margin.	With a brown mark at the infra-episternal margin.
Stripes on legs	Pale brown	Black	Black
Wing-veins and pterostigma	Pale brown	Dark brown or black	Pale brown
Postnodals f.w.	10	11	10
Postnodals h.w.	8	9	9 (right), 8 (left)
Abdomen	20.5-22 mm. (Morse)	25	20 (Morse)
Hind wing	15-16 mm. (Morse)	17	14-15 mm. (Morse)

¹ While the type specimens of *E. laterale* and *E. minusculum* studied in this connection by Dr. Calvert are referred to as "paratypes," it should be noted that in Morse's collection at the Museum of Comparative Zoology at Harvard no holotypes of those species are designated. Dr. Nathan Banks tells me that the specimens are all cotypes.

² "Four terminal segments of abdomen missing. Characters taken from Morse's original description." P. P. C.

³ Four undoubted specimens of *E. laterale*, two of them cotypes, studied by the writer show dark marks at the bases of the coxae.

In studying a series of ten males of *E. minusculum*, all from Centerville, Massachusetts, August 4, 1941, several things of interest were noted. *E. minusculum* lacks the light spot on the dorsum of the median prothoracic lobe and also the dark mark on the side of abdominal segment 8 which is characteristic of both *laterale* and *davisi*. It is evident that there is great variation in the size and shape of the postocular spots, some being almost circular, while others are more nearly cuneiform or elliptical. In checking the number of postnodal cross-veins in this same series of males, I find that in 12 of 20 hind wings there are 8, while in the other 8 wings there are 9. Of 20 front wings there are 14 with 10 and 6 with 11 postnodals.

The female of *E. laterale* is unknown. Several differences have been noted between the allotype of *davisi* and females of *minusculum*. The dorsal pits on the median lobe of the prothorax are absent in both species, while the light dorsal spots present on this lobe in *davisi* are not found in *minusculum*, although one specimen of the latter species seems to show an indication of such marks. The black of the dorsum of abdominal segment one extends from the base to the apex in *minusculum*, while in *davisi* there is only a basal black spot occupying about one-half of the segment. In *minusculum* segments 8 to 10 are largely blue or brownish on the sides, the black of the dorsum having a uniform width, while in *davisi* the black of the dorsum of 8 is reduced on the basal half to a narrow streak. In *minusculum* there are 9 postnodals in the front wing, 8 in the hind; in *davisi* there are 11 in the front and 9 in the hind. The female of *davisi* is also much larger than that of *minusculum*; the measurements are, *davisi*, total length 31 mm. and hind wing 18 mm., *minusculum*, total length 25 mm. and hind wing 15 mm.

I wish to express appreciation to Mrs. Howard K. Gloyd, who compared *E. davisi* with all the species of *Enallagma* in the Williamson collection and decided it was new, and most closely related to *E. laterale* Morse; to Dr. P. P. Calvert, who compared it with type material of *E. laterale* Morse and *E. minusculum* at the Academy of Natural Sciences of Philadelphia; and to Dr. D. J. Borror and Mr. E. M. Davis for material in this genus.

The Unusual Capture of a Melanistic *Pieris Napi* L. (Lepidoptera).

By P. SHELDON REMINGTON and CHARLES L. REMINGTON,
Elsah, Illinois.

The family Pieridae exhibits more melanism and albinism¹ than any other family of Lepidoptera found in North America. In the genus *Colias* Fabr. the writers have taken albino females of seven species: *meadii* Edw., *curytheme* Bdv., *philodice* Godt., *interior* Scud., *alexandra* Edw., *scudderii* Reak., and *pelidne skinneri* Barnes. Other collectors have found albinism in several other species, and names have been given a number of such specimens. *Phocbis* Hbn., *Eurema* Hbn., and other pierid genera also show albinism. On the other hand, melanism is much more rarely seen. It has been found with *Colias curytheme* and *C. philodice*, and appears not infrequently as the dimorphic female form of *Ascia monuste* L., named *phileta* Fabr. As far as the writers know, no other melanistic Pieridae have been found, and a specimen in their possession seems worthy of recording.

First, a statement by Holland relative to albinos and melanistics should be quoted: "We do not yet entirely understand what are the causes at work to produce these changes in the color, and all such aberrant specimens have interest for the scientific man. However, to name them and give them standing as sub-specific forms is more or less objectionable, except in cases where they constantly occur."² It is to be added that such worthless naming merely encumbers the nomenclature. Consequently, the specimen here described is not given a name, and it is strongly urged that the practice of naming melanics and other freak or aberrant specimens be discontinued. These unique, or nearly so, individuals are better studied by geneticists than named by systematists.

¹ Some authors do not consider this to be true melanism and albinism. We take no stand on the question here.

² Holland, W. J., *The Butterfly Book*, revised, p. 17, 1940. [See also articles in earlier issues of this journal; i.e., vol. 41, pp. 298-302, 324-328, 1930; vol. 42, pp. 80-82, 213-216, 1931; vol. 44, pp. 239-245, 1933. The Editors.]

On June 23, 1941, the junior author netted a single perfect male of *Pieris napi* L. which shows marked melanism. The unique specimen was taken in a small swamp at about 9,000' alt., one mile east of Eldora, Boulder Co., Colo. The writers were in some confusion as to the identity of the strange specimen, and sent it to Mr. Cyril F. dos Passos, who kindly identified it as a melanistic *Pieris napi pseudonapi* B. & McD., the race commonly occurring in Colorado. It is completely and evenly suffused with a smoky gray. It is of a lighter shade and lacks the brownish cast of the "melanic" *Colias philodice* Godt. on Plate LXVIII, figure 13, of Holland's previously cited book. This capture is here recorded because of its unusual nature and in the hope that it may be of use to geneticists and other biologists studying melanism.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).
Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL.—CHAMPION, H. C.—Entomology and nature preservation in post-war reconstruction. [8] 79: 1-4. CLARK, W. A.—Dragonfly attacked by wasp. [9] 75: 263. DARLINGTON, P. J.—Carabidae of mountains and islands: Data on the evolution of isolated faunas and on atrophy of wings. [27] 13 (1): 39-61, ill. FARRAH & REED.—Insect survival in drying grain. [12] 35: 923-28. HARRIS, K. L.—Some applications of insect separation methods to entomology. [10] 45: 19-23. LIEBMANN, E.—A method for the study of invertebrate blood

in vitro. [68] 97: 146. McCLURE, H. E.—Aspection in the biotic communities of the Churchill Area, Manitoba. [27] 13 (1): 1–35, ill. MELENEY, H. E.—The rôle of parasitologists in World War II [17] 29: 1–7. PAX, JOS. C.—Necrologia. [104] 11: 382. PODTIAGUIN, B.—(See under Hemiptera.) PUTMAN, W. L.—Host plants and parasites of some lepidopterous larvae. [4] 74: 219–24. RILEY, N. D.—Methods of study of wild populations. [109] 8: 2. SMITH & DEBACH.—Measurement of the effect of entomophagous insects on population densities of their hosts. [12] 35: 845–49. WHITING, P. W.—The parasitic wasp *Habrobracon* as class material. [118] 16: 51–53, ill.

ANATOMY, PHYSIOLOGY, ETC.—BREHME & DEMEREC.—A survey of malpighian tube color in the eye color mutants of *Drosophila melanogaster*. [Growth] 6: 351–356. COOK, S. F.—Nonsymbiotic utilization of carbohydrates by the termite *Zootermopsis angusticollis*. [23] 16: 123–128. CROMBIE, A. C.—The effect of crowding upon oviposition of grain-infesting insects. [33] 19: 311–340. D'ROZARIO, A. M.—On the development and homologies of the genitalia and their ducts in Hymenoptera. [36] 92: 363–415, ill. FLANDERS, S. E.—Abortive development in parasitic Hymenoptera, induced by the food-plant of insect host. [12] 35: 834–35. GRAYSON & TAUBER.—Carotin—The principal pigment responsible for variation in coloration of the adult grasshopper *Melanoplus bivittatus*. [Iowa Sta. Col. Jour. Sci.] 17: 191–96. HICKIN, N. E.—The food and water requirements of *Ptinus tectus* (Ptin.). [107] 17: 99–108. HODGE, C. W. The internal anatomy of *Leptysmia marginicollis* (Serv.) and of *Opshomala vitreipennis* (Maroch) (Acridid). [57] 72: 84–124. HULLS, L. G.—Entomology in ultra-violet light. [9] 75: 250–54. JAHN & WULFF.—Electrical aspects of a diurnal rhythm in the eye of *Dytiscus fasciventris*. [23] 16: 101–109. KALMUS, H.—Narcosis and asphyxiation in some species and mutants of *Drosophila*. [33] 19: 238–254. KRALL & JONES.—Morphology of the digestive tract of *Cynaecus angustus*, a tenebrionid. [Iowa Sta. Coll. Jour. Sci.] 17: 221–26, ill. TIEGS, O. W.—The dorsal organ of the embryo of *Campodea*. [53] 84: 35–48.

ARACHNIDA AND MYRIOPODA.—BRANCH, J. H.—Notes on California spiders. [38] 41: 138–40, ill. DI STEPHANO, H. S.—Effects of silver nitrate on the pigmentation of *Drosophila*. [90] 77: 94–96. WHEELER, C. M.—A contribution to the biology of *Ornithodoros hermsi*. [17] 29: 33–41.

NEUROPTERA AND ORTHOPTERA.—JOYCE & EDDY.—Host and seasonal notes on the rabbit tick, *Haemaphysalis leporis-palustris*. [Iowa Sta. Col. Jour. Sci.] 17: 205–12. UVAROV & THOMAS.—The probable mechanism of phase variation in the pronotum of locusts. [107] 17: 113–18, ill.

HEMIPTERA.—BALDUF & SLATER.—Additions to the bionomics of *Sinea diadema* (Fabr.) (Reduviid). [10] 45: 11–24. CHRISTENSEN, J. R.—Algunos cicadelidos de la Argentina y Bolivia. [104] 11: 336–39. DA COSTA LIMA, A.—Percevejos de orquideas (Miridae). [Orquidae, Niteroi, Brazil] 4: 100–9, ill. (S*). HARRIS, H. M.—Concerning the Rhopalidae. [Iowa Sta. Col. Jour. Sci.] 17: 197–204, (k). KEVAN, D. K. McE.—Some observations on *Mononyx nepaeformis*, a toadbug (Mononych.). [107] 17: 109–10. LIZER Y TRELLES, C. A.—Apuntaciones coccidologicas. I. [104] 11: 319–35. (S). PODTIAGUIN, B.—Insectos, que atacan a las plantas cultivadas en el Paraguay. (Una n. esp. del Margarodes.) [Rev. Soc. Cien. Paraguay] 5: 53–64 (*).

LEPIDOPTERA.—BOURQUIN, F.—Metamorfosis de *Megalopyge lanata*. [104] 11: 305–16, ill. BREYER, A.—*Eroessa chilensis*, gen. y esp. n. para la Rep. Argentina (Pier.). [104] 11: 317–18. COMSTOCK & DAMMERS.—Notes on the life histories of two common moths. [38] 41: 172–78, ill. COMSTOCK & HENNE.—The early stages of *Arctonotus lucidus*. [38] 41: 167–71, ill. FORD, H. D.—Lepidoptera and human perspiration [9] 75: 260. FOX, R. M.—Catalogue of the types in the L. W. Mengel butterfly collection. [Reading Mus. Sci. Pub.] no. 4: 27 pp., ill. (*S). HAYWARD, K. J.—La potilla de la papa (*Gnorimoschema operculella*) y su control. [Rev. Indus. y Agric. de Tucuman] 32: 153–61, ill. HOFFMAN, C. C.—El gen. *Rothschildia* en la Rep. Mexicana. Algunas observaciones acerca de los Saturnioidea de Mexico. Catalogo siste-

matico y zoogeograficos de los lepidopteros Mexicanos. [112] 13: 163-94; 195-204; 213-56, ill. (*). KOEHLER, P.—Lepidopteros poco conocidos o nuevos para la Republica Argentina. [104] 11: 297-304. PODIAGUIN, B.—Notas lepidopterologicas. [Rev. Soc. Cien. Paraguay] 5: 64-72.

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Linnean Species and Manuscripts.

In an article in the January 29th issue of *Science*, Dr. E. D. Merrill calls attention to the delivery in this country of two sets of microfilm pictures of all the extant Linnean natural history specimens and manuscripts in the possession of the Linnean Society of London. The sets contain the insects as well as other groups of animals and plants. Each set contains approximately 60,000 exposures. These sets have been deposited at Harvard University (zoological material at the Museum of Comparative Zoology) and Smithsonian Institution.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

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I shall be grateful to anyone who will give me any reference where insects taken on Mt. Desert Island, Maine, have been used wholly or in part in describing a species.

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ENTOMOLOGICAL NEWS

MAY 1943

Vol. LIV

**DIV. ENT.
U.S. NATL. MUSEUM**

No. 5

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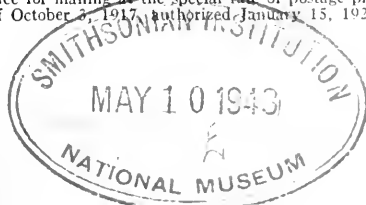
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THECLA LIPAROPS—FORBES.

Thecla liparops liparops Leconte ♀. × 1½.
Honey Island, Okefinoke Swamp, Georgia,
June 1, 1912.

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No. 5

What is *Thecla liparops*? (Lepidoptera: Lycaenidae).

By WM. T. M. FORBES, Department of Entomology, Cornell University, Ithaca, N. Y.

This name was proposed in 1833, in Boisduval and Leconte's "Histoire Générale et Iconographie des Lépidoptères et des Chenilles de l'Amérique Septentrionale." From the beginning it has been rather a mystery, for Boisduval, while publishing Leconte's description, apparently based on two or more specimens received from Abbot, and illustrating it by a figure copied from an Abbot plate, evidently had no personal knowledge of the butterfly itself, and suspected it was merely *favonius* Smith and Abbot;—while the latter name was misapplied by Leconte to *melinus*. Later references, so far as I know have been based wholly on the original publication, until Scudder in the "Butterflies of eastern North America" identified it as *Thecla strigosa* Harris; and that identification has stood until this year. Just recently Michener and dos Passos¹ have revived Boisduval's idea that it was probably a bad figure of *favonius* S. & A.

In evaluating Scudder's action we must remember that in that period races of butterflies were not generally considered worthy of a name, and his synonymizing of *strigosa* to *liparops* would by no means exclude a racial difference. Workers who have grown up with the recent code which subordinates other varietal to racial names should keep this fact in mind.

Let us then consider the differences between *favonius* and the species of which *strigosa* is the northeastern race, and compare with the differences given between Abbot's figures of

¹ Am. Mus. Nov., no. 1210, p. 2, Nov. 1942.

favonius (in S. & A.) and of *liparops* (in Bdv.-Lec.). The figures show the following differences which should be significant:

Thecla favonius: 1, upper side with double, sharply defined tawny patch on fore wing and 2, a similar and equally large patch on hind wing, 3, anal lobe tawny (shown on female but not male figure); 4, under side with a single even post-medial line, defined with black on each wing, 5, hind wing with tawny area continuous and extending far toward costa.

Thecla liparops: 1, upper side of fore wing with a single, simple oval tawny patch and 2, the tawny on hind wing much less extensive and submarginal only, 3, anal lobe black (mentioned in description, but incorrectly shown in figure of upper side, which has no anal lobe); 4, under side with four, wavy (according to description) white lines, not accompanied by black, and 5, hind wing with separate tawny patches on inner half and small separate spots on costal half.

If we examine specimens of *favonius* and *strigosa* we find exactly these differences, except that the tawny of *favonius* may be limited to the hind wing, and on *strigosa* is absent or represented by a few scattered scales on disc of fore wing and near margin of hind wing. But to confirm the original figure, the only specimen that I know of from lowland Georgia, a female in the Cornell Univ. collection from Honey Island, Okefinoke Swamp, collected by Bradley, has the large tawny patch on the fore wing, just as given in the original description and figure. The tawny on hind wing is reduced to a few scales, but this variation takes it even further from *favonius* in the proper direction (see figure). It also shows faintly the submarginal series of tawny spots on under side of fore wing so conspicuous in the Boisduval-Leconte figure. *Favonius* also may have tawny at this point, but it takes the form of a fine interrupted line, rather than a series of spots.

Our specimen is substantially larger than the original figure, which is, I believe, of a male. While the sex-spot, mentioned in Leconte's description, is not shown clearly in the figure, the latter belongs to the series that were tampered with by Bois-

duval (see his preface) and the great black sweep in front of the tawny patch (which is foreign to any *Thecla* pattern) may have covered its traces. The wing form, which I suppose Boisduval would not have dared to alter, also points to a male. I have no notes on other specimens, nor of any other "strigosa" form from the Gulf Strip, but have a dim memory of having seen another specimen or two.

My conclusion is that the current listing is correct, as in McDunnough's List under no. 389: *liparops liparops* from Georgia and *l. strigosa* from the North.

Another lost species in the same work, which has been universally misidentified, is *Melitaea ismeria*. This name is currently given to the common and wide spread but more western *M. carlota* Edw., but the original figure shows a quite different butterfly, with a much more normal *Melitaea* pattern above and no traces of the complex marginal markings so distinctive of *carlota*. A more important character would appear to be the presence of three separate brown bands on basal half of hind wing below, which separates it from all *Melitaeas* known to me, though they can be traced, partly fused, in *carlota*, and also in the exceedingly rare true *gorgone*. The latter is of course found along the southern Atlantic coast, and was doubtless based also on an Abbot specimen. *Carlota* may perhaps be a race of it, though it also lacks the distinctive marginal pattern. It exists in the National Museum and perhaps elsewhere, but has not been figured or even recorded as distinct from "ismeria" (i.e. *carlota*) since the original description.

Dr. Joseph L. Williams.

Dr. Joseph L. Williams, member of the American Entomological Society and associate professor at Lincoln University, has been elected a Fellow of the Royal Entomological Society of London—Science.

A New Dorilaidae¹ (Diptera).

WILLIAM F. RAPP, JR., Chatham, New Jersey

*Dorilas hertzogi*² n. sp.

Differs from *Dorilas varius* (Cresson) as described by Mr. E. T. Cresson, Jr.,³ in having the antennae with the third joint black; and no white spots on the first segment of the abdomen. The halteres are brownish-yellow and the abdomen is a polished, uniformly black, with the exception of the first segment which is silvery.

Type.—Male: Glassboro, Gloucester County, NEW JERSEY, June 21, 1942 (Collection of W. F. Rapp, Jr.). One male was taken while sweeping around in a small cat-tail (*Typha* sp.) marsh about a mile east of Glassboro on the Fish Pond Road.

In running the specimen over the table prepared by Mr. Cresson in the reference quoted above, it readily traces as far as *D. varius*. In the description of *varius* there are many characters in common with *hertzogi*. But the differences pointed out in the comparative description are decidedly too marked to pass under the same species.

The following key, based on Mr. Cresson's key to couplet 9, may be used to determine the species:

9. Halteres white or brownish yellow

Abdomen shining with bases of segments opaque; tibiae and tarsi yellow *mainensis* Cresson

Abdomen polished, with only apex of first segment silvery laterally.

Third joint of antennae yellow, 2 white spots on first segment of abdomen *varius* Cresson

Third joint of antennae black, no white spots on first segment of abdomen *hertzogi* n. sp.

¹ Pipunculidae of authors [Ed.].

² It gives me great pleasure to dedicate this species to Mr. P. H. Hertzog of The Peddie School, Hightstown, New Jersey, who has given me much encouragement in the study of entomology.

³ Trans. Am. Ent. Soc., XXXVI, p. 309.

Hyaliodinae, New Subfamily of Miridae (Hemiptera).

By HARRY H. KNIGHT, Iowa State College, Ames, Iowa.

The genus *Hyaliodes* Reuter (1876) represents a very distinctive type which has heretofore reposed in the Macrolopharia of Reuter (1910), and Dicyphinae in the Catalogue of Hemiptera by Van Duzee (1917). When the writer (1918) first published a subfamily key to Miridae it was not found practical to key out *Hyaliodes* in the same couplet with the Dicyphinae. The same was true as published in the "Hemiptera of Connecticut" (1923) and again, more recently, in "The Plant Bugs, or Miridae, of Illinois (1941). All along I have felt that *Hyaliodes* should stand as the type of a new subfamily but have delayed action until more study could be made of related genera of the Neotropical region.

Subfamily Hyaliodinae may be keyed out as was done with the type genus, *Hyaliodes* Reuter, in the keys referred to above. Distinctive characters for the group may be stated as follows: claws sharply bent near base, a prominent tooth on inner angle of base; arolia bristle-like, pseudarolia absent (see fig. 23, Knight, 1941). Hemelytra strongly translucent, embolium expanded, usually with thin sharp edge. Head projecting horizontally but with anterior portion before eyes sharply vertical in position. Subfamily Hyaliodinae is thus far recognized only from the Neotropical and Nearctic regions and includes the genera here listed. *Hyaliodes* Reuter (1876); five genera described by Distant (1884), namely *Annona*, *Antias*, *Neocarnus*, *Paracarnus*, and *Trygo*; also *Auchus* Distant (1893).

Among material collected in Ecuador by Dr. S. W. Frost, I find an apparently undescribed genus which is referable to the Hyaliodinae.

Hyaliodocoris new genus.

Allied to *Annona* Distant and *Hyaliodes* Reuter, but distinguished by the greatly narrowed anterior portion of prothorax, the much narrowed and confluent calli, and by the sharply con-

stricted collum immediately behind the eyes; basal carina fine yet distinct, collar flat, set off by a sharp, punctate stricture. Eyes large, set close to the base of head, posterior margins nearly transverse and in line with basal carina; vertex sloping forward, the frons sloping abruptly to base of tylus. First antennal segment in length not equal to width of head across eyes, length of segment II more than twice the length of segment I. Scutellum smooth, distinctly convex but not conical. Hemelytra translucent, embolium moderately expanded, reflexed sharply upward at an angle of forty-five degrees, embolar margins nearly parallel in position. Arolia bristle-like, pseudarolia absent, claws toothed at base and sharply angled, nearly as in *Hyaliodes*. Genital segment more like *Hyaliodes* than *Annona*, the anal tube projecting well to the rear, not unlike the exhaust pipe of the modern automobile. *Genotype*: *Hyaliodocoris frosti* n. sp.

Hyaliodes frosti n. sp.

Hemelytra translucent, clavus black but with a clear spot each side by apex of scutellum; a transverse mark across tip of clavus, one bordering base of cuneus, and cubital vein, black.

♂. Length 4.7 mm., width 1.6 mm. Head: width, .75 mm., vertex .30 mm.; basal carina fine yet distinct, eyes prominent, set close to base of head, posterior margins nearly transverse and in line with basal carina, collum moderately exposed; frons sloping sharply to base of tylus; dark brown to black, polished. Rostrum, length 1.43 mm., reaching to middle of hind coxae, yellowish. Antennae: segment I, length .60 mm., slender, brownish black; II, 1.47 mm., cylindrical, slightly more slender than I, black, clothed with prominent pale hairs; III, 1.08 mm., slender, black; IV, .40 mm., slender, black.

Pronotum: length .86 mm., width at base 1.21 mm., narrowed apically, anterior angles scarcely distinct; collar flat, width .43 mm., set off by a distinct punctate stricture. Disk strongly convex, impressed near basal angles, coarsely and rather closely punctate; calli narrowed, transversely confluent, convex, polished, delimited behind by punctures; lateral margins scarcely

distinct, rounded over to the punctate propleura; brownish black, collar and median area of disk yellowish, basal margin pallid. Scutellum strongly convex, impunctate, black, shining.

Hemelytra translucent, minutely punctate, sparsely clothed with suberect, pallid pubescence, hairs longer on clavus; clavus black, a clear spot each side by tip of scutellum; clear translucent, a transverse mark across tip of clavus and extending to middle of corium, anal ridge and basal area of membrane, a mark at tip of corium bordering cuneal fracture, and cubital vein in membrane, dark fuscous to black; cuneus and membrane clear. Legs pale to yellowish, apical half of femora more dusky brown. Sternum, pleura and venter brownish black, ostiolar peritreme pallid.

Holotype: ♂ November 20, 1937, Baños, ECUADOR (S. W. Frost); author's collection. *Paratypes*: ♂ Nov. 17, 3 ♂ Nov. 19, 1937, Baños, Ecuador (S. W. Frost). Named in honor of the collector, Dr. S. W. Frost, who kindly presented the author with this and a few other species of Miridae.

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Three New Western Aphids¹

By GEORGE F. KNOWLTON, Utah State College, Logan, Utah.

The following report includes descriptions of three apparently undescribed aphids, collected in Utah and Washington, with notes on a few additional species.

Kakimia utahensis n. sp.

Alate vivipara: Body 1.44 mm. long and .68 wide across the abdomen; antennae dusky beyond base of III; antennal III, .43 to .44 mm. long with 32 tuberculate sensoria; IV, .32 to .33 mm. with 10 to 12 sensoria; V, .3 mm. with 4 secondary sensoria; base of VI .114, unguis (?) broken; rostral IV + V dusky, .13 mm. long; legs pale to dusky, distal ends of tibiae and all of tarsi darker; hind tibiae 1.12 to 1.2; hind tarsi .085; cornicles pale to dusky, lightly imbricated to wrinkled, .35 mm.; cauda pale to dusky with 2 to 3 pairs of lateral hairs; abdomen with darker areas on sides, these being most conspicuous on segments I, II and III.

Apterous vivipara: Size 1.34 to 1.36 mm. long and .64 to .72 wide across abdomen; body generally pale; width through eyes .35; antennae pale to dusky, darker on distal ends of IV, V and all of VI; antennal III, .41 to .46 mm. long with 7 to 11 sensoria; IV, .27 to .3; V, .25 to .27; VI, .09 to .112 plus .35 to .37 mm.; rostral IV + V dusky, slenderly obtuse at tip, .13 to .16 mm.; legs pale, distal ends of tibiae dusky but paler than in alates; hind tibiae 1.2 to 1.29; hind tarsi dusky, .09 to .1; cornicles pale to slightly dusky, .25 to .33 mm.; cauda pale to dusky, .2 to .21 mm. with 3 to 2 pairs of lateral hairs; abdominal sclerites of cleared specimens without deeply pigmented large dorsal areas.

Collected on columbine, *Aquilegia rubicunda*, Vernon Canyon, UTAH, JUNE 19, 1940 (G. F. Knowlton). Type in the collection of the writer.

Taxonomy: *Kakimia utahensis* n. sp. keys to *K. houghtonensis* (Troop) in Gillette and Palmer's key² from which it differs

¹ Contribution from the Department of Entomology, Utah Agricultural Experiment Station, Logan.

² Ann. Ent. Soc. Amer., 27: 160, 1934.

in having longer cornicles and hind tibiae, more sensoria on antennae of alate and fewer on aptera. It resembles *K. essigi* (G.-P.) from which it differs in having paler antennae, legs and cornicles, shorter antennals III and unguis. *K. utahensis* differs from *K. castelleiae* Sampson in having dark lateral spots on sides of abdomen of alate, shorter antennal III and longer cornicles.

***Myzus harmstoni* n. sp.**

Alate vivipara: Body and appendages of cleared specimens largely brownish to dusky, with a large dorsal pigmented area on abdomen, caudad to the dusky bands which cross segments I and II; abdomen also possesses dusky lateral areas; body 2.34 to 2.45 mm. long; width through eyes .49; antennae blackish except paler base of III; antennal III, .6 to .63 mm. long, with 8 to 11 rounded sensoria in a row over most of the length of this segment; IV, .48 to .52, without sensoria; V, .4 to .43; VI, .145 to .16 plus .73 to .75 mm.; rostral IV plus V dusky, .12 mm. Hind femora dusky, paler at base; hind tibiae dusky, 1.52; hind tarsi .11. Cornicles dark, .56 to .6 mm. long, distal .13 mm. reticulated; cauda dusky, .26 mm. long, with two pairs of lateral hairs; anal plate broad, blackish, slightly pointed.

Collection: Specimens were collected on snowberry, *Symphoricarpos*, Naches Pass, WASHINGTON, June 18, 1939 (G. F. Knowlton). Type in the collection of the writer.

Taxonomy: The *M. harmstoni* n. sp. specimens key to *Myzus cecrasi* (Fab.) in Mason's³ key, from which it differs in having: Fewer sensoria on antennals III and these confined to a row, distinctly longer antennal segments, greater width across the head, longer cornicles having distinct reticulations. It resembles *M. lythri* (Schr.) in having the pigmented dorsal abdominal patch, but *harmstoni* differs in possessing longer antennal segments, cornicles and fewer antennal sensoria on III.

Myzus lythri (Schr.). On *Prunus mahaleb* at Springville, Utah, June 1942 (Knowlton); Declo, Idaho (D. E. Fox).

M. monardae (Davis). Murtaugh, Idaho, October 1930 (Fox).

³ U.S.D.A. Misc. Pub. 371, p. 4, 1940.

M. porosus Sand. (= *Macrosiphum zoorosarum* K.-S.). On rose at Naches Pass, Washington, July 18, 1939; Santaquin, Utah, June 1941 (Knowlton).

Phorodon menthae (Buckton). In Utah on *Mentha spicata* at Hooper, July 24, 1942, with *Orus tricolor* Wh. feeding on one of the specimens; Hurricane, Logan, Ogden, Providence, St. George and Santa Clara; on *Mentha penardi* at Mt. Timpanogos, July 26, 1942; also Logandale, Nevada, May 13, 1935 (Knowlton).

***Macrosiphum puyallupsii* n. sp.**

Alate vivipara: Body 3.12 mm. long and 1.32 wide across the abdomen; antennae 4.7 (+) mm. long, dusky; antennal III, 1.12 to 1.14 mm. long, with 82 to 88 scattered sensoria; IV, .93, without sensoria; V, .74 to .76 with 21 to 23 sensoria in a row on distal three-fourths of segment; VI, .19 plus unguis 1.43 + (tip broken off); rostrum reaching second coxae; rostral IV + V slenderly obtuse, .16 long; wing veins dusky; hind tibiae 2.7; hind tarsi .205; cornicles dusky, .6 to .64 mm. long with 6 to 8 rows of reticulations on distal .08; cauda dusky, .31 mm. long with 7 to 9 lateral and dorso-lateral hairs on each side; abdomen with dusky blotches forming broken patterns across the abdominal segments.

Taxonomy: *Macrosiphum puyallupsii* n. sp. runs to *Macrosiphum tenuitarsis* G.-P., in the Gillette and Palmer key,⁴ from which it differs in having more sensoria on antennals III, numerous sensoria on antennal V, larger size with longer antennal segments, shorter cornicles and less pointed and shorter cauda. From *M. albifrons* Essig it differs in possessing sensoria on antennal V and shorter cornicles.

Collections: Taken upon bush lupine at Puyallup, WASHINGTON, June 24, 1939, by Herald C. Bennion. Type in the collection of the writer.

⁴ Ann. Ent. Soc. Amer., 27: 170, 1934.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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 C.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keyt are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

- GENERAL—ALLAN, P. B. M.—Substitute foodplants. [21] 55: 1-3. BRAGDON, K. E.—Lets get closer to the farmer. [39] 25: 49-52. CABLE, R. M.—A handy enclosed mount for pinned insects. [Turtox News] 21: 49-50, ill. CURRAN & LUTZ.—Insects, ticks and human disease. [Amer. Mus. N. H., Guide leaf.] 113: 38 pp., ill. DAVIDSON & WILDING.—A quantitative faunal investigation of a cold spring community. [119] 29: 200-9, ill. EATON, T. H.—Six-legged army. [Fauna, Phila.] 5: 22-25, ill. FLETCHER, T. B.—Osmaterium or Osmeterium. [9] 75: 19. FORD, H. D.—Lepidoptera and human perspiration. [9] 75: 260. MOFFETT, J. W.—A limnological investigation of the dynamics of a sandy, wave-swept shoal in Douglas Lake, Mich. [Trans. Amer. Microscop. Soc.] 62: 1-23. MUNRO, J. W.—Place of research in the control of injurious insects. [31] 151: 157-60. AN OLD BOOKMAKER.—“An artist's note.” [Note on color printing processes]. [21] 55: 3-4. PARKER, G. H.—Coloration of animals and their ability to change their tints. [54] 1943: 197-210, ill. PENNAK, R. W.—Limnological variables in a Colorado mountain stream. [119] 186-99, ill. RAMALHO, G. R.—Sobre um novo capturador para a coleta de pequenos insectos. [126] 7: 109-111, ill. ROUDABUSH, R. L.—How to make whole mounts of small insects. [118] 16: 73. TEALE, E. W.—Pinhead portraits [of insects]. [Frontiers, Phila.] 7: 98-99, ill.

ANATOMY, PHYSIOLOGY, ETC.—ANDERSON & RICHARDS.—An electron microscope study of some structural colors of insects. [Jour. Applied Physics] 13: 748-58, ill. BODENSTEIN, D.—Factors influencing growth and metamorphosis of the salivary gland of *Drosophila*. [92] 84: 13-33. Hormones and tissue competence in the development of *Drosophila*. [92] 84: 34-58. THOMPSON, D'A. W.—On growth and form. [Cambridge Univ. Press] 1116 pp., ill. (pp. 525-44, "of the bee's cell").

ARACHNIDA AND MYRIOPODA—BOSHELL & KERR.—Veinticinco esp. n. de Trombidiideos de Colombia. [58] 5: 110-27, ill. CHAMBERLIN, R. V.—On Mexican centipeds. [Bull. Univ. Utah] 33 (6): 55 pp. (*k). TEMBE & AWATI.—External morphology and anatomy of scorpion (*Buttus tamulus*). [Jour. Univ. Bombay] XI, B: 54-76, ill.

THE SMALLER ORDERS—EDDY, G. W.—Some fleas collected from the Oklahoma cottontail rabbit. [103] 16: 1-3. EWING, H. E.—The fleas of No. Amer. [3] Misc. Pub., 500: 142 pp.

ORTHOPTERA—CANTRALL, I. J.—The ecology of the Orthoptera and Dermaptera of the George Reserve, Michigan. [Misc. Pub., Mus. Zool., Univ. Mich.] 54: 182 pp., ill. HAWKER-SMITH, W.—The food of the earwig. [9] 76: 63-64. KARANDIKAR, K. R.—External structure of the desert locust (cont.). [Jour. Univ. Bombay] XI, B: 1-29, ill. O'MAHONY, E.—Vitality of an earwig. [8] 79: 60-61.

LEPIDOPTERA—CAPPS, H. W.—Some American geometrid moths of the subfam. Ennominae, heretofore associated with or closely related to *Ellopiia*. [50] 93: 115-51, ill. (*). CORBET, & TAMS.—Notes on the nomenclature of the moths hitherto known as *Ephestia kuhneilla* and *Endrosis lactella* (Pyr. & Oecophor.). [9] 75: 15. FOX, R. M.—New and rare Ithomiinae in the Carnegie Museum. [Ann. Carnegie Mus.] 29: 397-406 (S). HEMMING, F.—Notes on the generic nomenclature of the Lepidoptera Rhopalocera, II. [108] 12, B: 23-30. MARIA, H. A.—Algo sobre Pieridos Colombianos. [58] 5: 102-9, col. pl. WILLIAMS, C. B.—The migra-

tion of butterflies. [Proc. Linn. Soc. London] 154 (2): 86. Notes on some monarch butterflies captured in Great Britain. [9] 75: 1-3. URQUHART, F. A.—Fritillary butterflies. [Can. Nature] 5: 78-79, ill.

DIPTERA—ALEXANDER, C. P.—Records and descr. of N. Am. crane-flies. III. Tipuloidea of the Upper Gunnison Valley, Colorado. [119] 29: 147-179, ill. (*). CORREA, R. R.—Das formas evolutivas aquaticas do *Anopheles eiseni*. [126] 7: 25-36, ill. CORREA & RAMOS.—Os anofelinos da regio meridional do Estado de S. Paulo. [126] 7: 37-60, ill. Relatorio das investigacoes entomologicas realizados na represa da light e ao longo da E. F. Sorocabana, Ramal Mayrink-Santos. [126] 7: 313-25, ill. Do encontro do *A. darlingi* E do *A. oswaldoi* var. *metcalfi*, naturalmente infetados com os parasitis malaricos, na regio sul do Estado de S. Paulo (Culicidae). [126] 7: 379-87. FONSECA, J. A. B.—Consideracoes sobre o *Anopheles eiseni* como transmissors da malaria humana. [126] 7: 75-90, ill. HARDY, D. E.—New Threvidae and Asilidae in the Snow Entomological Collection. [103] 16: 24-36, cont. HULL, F. M.—Some undescribed species of flies of the gen. *Baccha* (Syrph.). [91] 33: 72-74 (S). New sps. of syrphid flies in the National Mus. [91] 33: 39-43 (S). RAMOS, A. S.—Sobre uma variedade nova de *Anopheles oswaldoi*. [126] 7: 61-74, ill. (S). REES, D. M.—The mosquitoes of Utah. [Bull. Univ. Utah] 33: (7): 99 pp., ill. REINHARD, H. J.—New N. Amer. Muscoidea (Tachini.) [103] 16: 14-23. SCHWITZGEBEL & WILBUR.—Diptera associated with ironweed, in Kansas. [103] 16: 4-13, ill. SELLERS, W. F.—The Nearctic sps. of parasitic flies belonging to *Zenillia* and allied gen. [50] 93: 1-108 (*). UNTI, O.—Notas ecologicas sobre anofelinos do Vale do Paraiba. [126] 7: 13-21, 355-375, ill. (*). O pH dos colos e dos focos de *Anopheles* E A epidemiologia da malaria no Brasil. [126] 7: 123-158. UNTI & RAMOS.—Anofelismo das alturas no Brasil Medidional. [126] 7: 91-106. WOODHILL, A. R.—The oviposition responses of three sps. of mosquitoes (*Aedes aegypti*, *Culex fatigans* and *Aedes concolor*, in relation to the salinity of the water. The development of

A. concolor in relation to small quantities of salts in solution and to the temperature of the water. [Proc. Linn. Soc. N. S. Wales] 66: 287-92; 396-400.

COLEOPTERA—BLACKMAN, M. W.—Revision of the gen. *Phloeosinus* in N. Am. (Scolyt.). [50] 92: 397-474, ill. (*). BLACKWELDER, R. E.—Monograph of the West Indian beetles of the fam. Staphylinidae. [Bull. U. S. Nat. Mus.] 182: 658 pp., ill. (*). BLAISDELL, F. E.—Contributions towards a knowledge of the insect fauna of Lower California. No. 7. Coleoptera: Tenebrionidae. [61] 24: 171-288, ill. (*). DARLINGTON, P. J.—Carabidae of mountains and islands: Data on the evolution of isolated faunas and on atrophy of wings. [27] 13 (1): 39-61, ill. KING, E. W.—A taxonomic distinction between *Cyllene robiniae* and *C. caryae*. [119] 29: 180-82, ill. MUESEBECK, C. F. W.—New gen. and sps. of Neotropical bark beetles (Scolyt.). [91] 33: 34-38.

HYMENOPTERA—COLE, A. C., JR.—A new subsp. of *Formica moki* (Formic.). [119] 29: 183-84. GROSKIN, H.—Scarlet tanagers 'anting'. [The Auk] 60: 55-58. JONES, J. W.—Known distribution of the shining slave maker ant, *Polyergus lucidus* (Formic.). [119] 29: 185. MORLEY, B. D. W.—Observations on the nest odors of ants. [Proc. Linn. Soc. London] 154 (2): 109-14. PICKLES, W.—Further observations on the mound building of ants. [8] 79: 53-55. STRETTON, G. B.—Strange behaviour of a wasp. [8] 79: 49-52.

LIST OF JOURNALS CITED.

3.—United States Dept. Agriculture. 8.—Entom. Monthly Magazine. 9.—The Entomologist. 21.—Entom. Record & Jour. of Variation. 31.—Nature, London. 39.—Florida Entomologist. 50.—Proc. U. S. National Museum. 54.—Scientific Monthly. 58.—Revista, Acad. Colombia, Bogota. 61.—Proc., Calif. Acad. Sciences. 91.—Jour., Washington Acad. Sciences. 92.—Biological Bulletin. 103.—Jour., Kansas Ent. Society. 108.—Proc., R. Entom. Soc., London, (B). 118.—Ward's Nat. Sci. Bulletin. 119.—American Midland Naturalist.

GENERAL ZOOLOGY. By TRACY I. STORER. xii + 798 pages, 551 figures, 5 colored plates. McGraw-Hill Book Co., New York, 1943. \$3.75.

Professor Storer of the University of California at Davis has given us a notable new text for college courses in zoology. It is a book that can be recommended also to anyone that wishes a one volume reference book on animals for it contains an astounding quantity of information at a very modest price.

Part I begins with an account of the frog, chosen as the representative animal for detailed study. Then follow the chapters on the cell, on the organ systems of animals, on genetics, on ecology, on evolution, and on the history of zoology. Thanks to the very concise style of writing, this thorough outline of most of the phases of zoological science, together with over 150 figures, occupies only 237 pages.

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The illustrations are an outstanding feature of the book and set a new standard for texts of this kind. Most of them are original and the others are carefully chosen, redrawn and often rearranged so that the whole volume has a fresh, clean, uniform appearance. It is evident that real thought and care have gone into the preparation of these figures, including the numerous stereograms. The lists of references at the end of the chapters are well chosen and up-to-date. A useful glossary is provided and there are 40 pages of index, 3 columns to the page, with a total of about 7000 entries.—R. G. SCHMIEDER.

HOUSEHOLD PESTS IN CHICAGOLAND; How to Get Rid of Them. By Dr. Hugo Hartnack. Published by the Author, Chicago. 1942.—In *Entomological News* for November, 1939, there was published a review of Dr. Hartnack's "202 Common Household Pests of North America." The same author has lately published the ninth edition of his booklet on the household pests of Chicagoland; a bound pocket size booklet of 48 pages,

profusely illustrated. It gives short accounts of the habits, characteristics and control of rats, mice, roaches, silverfish, bedbugs, fleas, ants, termites, moths and several other less important pests. It should find a useful place in the households not only of Chicago, but of the northeastern portion of the United States. Although giving some methods for the control of the pests, it recommends the Dr. Hartnack Exterminating Service, Inc., Chicago, if the infestation cannot be easily controlled.—E. T. CRESSON, JR.

Dr. Alexander B. Klots.

Dr. Alexander B. Klots, Biology Department, College of the City of New York and Entomology Department, American Museum of Natural History, has been commissioned as captain in the Sanitary Corps and is now stationed at Camp Joseph T. Robinson, Arkansas—Science.

Conference of the North Central Entomologists.

The twenty-second annual conference of the North Central Entomologists is scheduled to meet at Purdue University. The program will deal with war problems in entomology, insect problems of the Armed Forces, Priority Chemicals and Insecticide Substitutes, and Protection of Crops and Animals Essential to the War Effort—Science.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

I shall be grateful to anyone who will give me any reference where insects taken on Mt. Desert Island, Maine, have been used wholly or in part in describing a species.

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DIPTERA

- 1098.—**Cresson** (E. T., Jr.)—Synopses of N. Am. Ephydriidae.
I. The subfam. Psilopinae, with descr. of n. sps. (68:
101–128, 1942)50
- 1103.—**Cresson** (E. T., Jr.)—The species of the tribe Ilytheini
(Ephydriidae). (69: 1–16, 2 pls., 1943)40

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- 1104.—**Westfall** (M. J., Jr.)—Synonymy of *Libellula auripennis*
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- 1100.—**Roberts** (H. R.)—Two subsps. of *Melanoplus differen-*
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of their variations. Acrididae: Cyrtacanthacridinae.
(68: 151–166, 2 pls., 1942)35
- 1101.—**Rehn** (J. A. G.)—On the locust gen. *Psoloessa* (Acri-
didae). (68: 167–237, figs., 1942) 1.75
- 1102.—**Hebard** (M.)—The Dermaptera and Orthopterous fam.
Blattidae, Mantidae and Phasmidae of Texas. (68: 239–
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(Acrididae). (68: 33–60, 2 pls., 1943)65
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ENTOMOLOGICAL NEWS

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No. 6

Strymon falacer ab. *Heathi* (Fletcher) (Lepidoptera: Lycaenidae).

DON B. STALLINGS & Dr. J. R. TURNER, Caldwell, Kansas.

In 1904 Fletcher described a specimen caught in southern Manitoba by E. F. Heath as a new species and named it *Thecla heathi*.¹ So far as we are able to determine no additional specimens have ever been recorded.

Dr. Holland in his Butterfly Book (Revised Edition) page 243, suggests that *heathi* may be a hybrid of *Strymon titus* (Fabr.) and some other species. Dr. A. H. Clark and William D. Field, after careful study of the type, are of the opinion that *heathi* is an aberration of *Strymon falacer* (Godart). In this we concur.

On May 24, 1942 at Cache, Oklahoma, Robert Whittaker captured a male specimen of *Strymon falacer* ab. *heathi* (See plate II, bottom row, from left to right, figure 3). This specimen was flying with normal *falacer* along with *Strymon ontario autolytus* (Edwards). Two weeks later these writers while collecting at the same place (June 2, 1942, Cache, Okla.) found that the flight of *autolytus* had been replaced with a flight of *Strymon alcestitis* (Edwards). *Strymon falacer* were still flying in fair numbers. At that time each of us was successful in capturing an aberration of *Strymon alcestitis* (See plate II, bottom row, from left to right, figures 1 and 2) which varied from the normal form of *alcestitis* in the same manner that *heathi* varies from *falacer*. Since then Cyril dos Passos advises us that he has a similar aberration of *Strymon alcestitis* captured at Taloga, Okla., on June 3, 1939. On July 6, 1942 near Beulah,

¹ For original description see *Canadian Entomologist*, vol. 36, pp. 125-127, May, 1904, one figure.

Colo. (elevation 7000 feet) Dr. R. C. Turner, Jr. captured a female aberration of *Strymon falacer godarti* (Field) (See Plate II, bottom row, from left to right, figure 4) that had *heathi* characters. This specimen was captured in flight with other *godarti*. No other species of *Strymon* were found flying in the vicinity. At the time of capture several normal males of *godarti* were attempting to mate with this specimen.

Comparing these aberrations with Holland's picture of *heathi* on his plate LXXVI, figure 16 it is readily seen that all of these specimens fall under the classification of *Albifusim* (From Gunder's Classifications) or white design radiation, as does the original specimen of *heathi*.

An examination of plate 49, figure 14 in Comstock's "Butterflies of California" discloses a specimen of *Strymon adenostomatis* (Hy. Edwards) which is an aberration varying in the same manner as *heathi* and the figured *alcestis* aberrations. We are advised by Harry K. Clench that a similar aberration of *Strymon ontario autolyceus* is in the Museum of Comparative Zoology at Cambridge, Mass.

From the foregoing it appears that *heathi*-like aberrations probably occur throughout the genus *Strymon*. We would be interested in data on other specimens that fall within this classification.

EXPLANATION OF PLATE II

Top row from left to right: Figures 1 & 2.—Normal specimens of *Strymon alcestis*, Cache, Okla. June 2, 1942. Figure 3.—Normal specimen of *Strymon falacer*, Cache, Okla. June 2, 1942. Figure 4.—Normal specimen of *Strymon falacer godarti*, Beulah, Colo. July 5, 1942. Bottom row from left to right: Figure 1 and 2.—Aberrations of *Strymon alcestis*, Cache, Okla. June 2, 1942. Figure 3.—Aberrations of *Strymon falacer*, Cache, Okla. May 24, 1942. Figure 4.—Aberration of *Strymon falacer godarti*, Beulah, Colo. July 6, 1942. Figures 1 $\frac{2}{3}$ natural size.



STRYMON FALACER ab. HEATH—Stallings and Turner.

Autumnal Migration of *Phoebis sennae eubule* (Lepidoptera, Pieridae).

By JOSEPH W. JONES, JR., Newbern, Tenn.

Recently the writer witnessed a pronounced autumnal migration of *Phoebis sennae eubule* (L.) (The Cloudless Sulfur) in northern Mississippi. This butterfly is ordinarily a rather common species throughout the lower Mississippi Valley in the late summer, often congregating in large numbers at certain spots on the damp sands of woodland roads and along stream banks.

The Cloudless Sulfur has long been known as a "wanderer." Charles Darwin reported a vast flight of these yellow butterflies at sea which appeared as a large yellow cloud and which is reported to have been over a mile wide and many miles long. Williams has named the species the "traveling butterfly," and Comstock relates incidents of its migration.

The movement with which this report is concerned was first noted on the morning of September 9th, 1942 just north of Oxford, Mississippi. The migration itself was apparent to some degree for more than two days; however, the movement was a general one for the most part. It is interesting to note that the observer first became aware of a migration while driving north on State Highway Number Seven from Oxford to Abbeville, Mississippi at nine o'clock in the morning. The butterflies were observed to be crossing the road with unusual frequency and all flying in the same direction. In the course of a mile, between twenty-five and thirty of these sulfurs would be "splashed" against the windshield. While the movement was diminutive when it first attracted the attention of the observer, it seemed to materialize over a period of several hours until by the noon hour the migration was impressive.

In order to obtain an approximate measurement of the migration, and having no standard by which to be guided, the writer established the following means. A line fifteen feet in length and lying perpendicular to the direction of flight was hypothesized in a grassy field typical of the region. By actually counting the number of butterflies passing over this line in periods

of one minute each three or four times on the half hour and calculating the average the writer was able to formulate the table which shows the average migration rate on the half hour.

<i>An Average One Minute Interval</i>	<i>Number of Individuals</i>
at: 9:30 am	1.3
at: 10:00 am	1.43
at: 10:30 am	1.85
at: 11:00 am	2.4
at: 11:30 am	3.0
at: 12:00 noon	3.7
at: 12:30 pm	4.1
at: 1:00 pm	4.17
at: 1:30 pm	4.19
at: 2:00 pm	4.16
at: 2:30 pm	4.0
at: 3:00 pm	3.79

The butterflies flew rapidly and in a characteristic erratic manner, always moving to the southeast and at a rate approximating five to eight miles per hour. The flight itself was a little over fourteen miles in width and passed a given point in noticeable numbers for over two days, always bearing to the southeast and with the individuals flying at varying heights but usually at about six to ten feet when undeviated by obstructing buildings and trees which they always seemed to pass over rather than to change the course and pass around. Individuals were not observed to halt for feeding or for rest during the day. One received the teleological impression that the insects knew where they were bound and that they were in a hurry to arrive at this set destination. Yet, with the coming of dusk, the individuals began to drop out of the flight and to fall to rest in the tall meadow grass where they were joined by others so that members of the flight rested in small clusters for the most part with relatively few butterflies resting individually.

The previous day had been very cloudy with rain and low temperatures for that time of the year. On the days of the actual migration humidity was high. At no time during observation of the migration was the sun visible since low clouds filled the sky for several days.

Another Sphecine from Florida (Hym., Sphecidae).

By H. T. FERNALD, Winter Park, Florida.

The following record should be added to the Annotated List of Florida Sphecinae published in Entomological News, Dec., 1942.

SPHEX PROCERUS (Dahlb.).

Ammophila proccra Dahlbom, Hym. Eur., I, 15, 1845.

Ammophila Gryphus Smith, Hym. Brit. Mus., IV, 222, 1856.

Ammophila conditor Smith, Hym. Brit. Mus., IV, 223, 1856.

Ammophila macra Cresson, Proc. Ent. Soc. Phila., IV, 460, 1865.

East Florida; Jacksonville; Gainesville, XI, 13, 1918; Apalachicola, VII, 21, 1909; Crescent City; Indian River City, IV, 23, 1932; Orlando, IV, 21, 1928; XI, 8, 1935; Winter Park, V, 22, 1942; VIII, 14, 1940; X, 28, 1933 (with larva of *Nadata gibbosa*); Conway, III, 30, 1927; Choloskee.

Apparently fairly common in northern and central Florida, but the Choloskee specimen is the only one I have found recorded from the southern part of the State. In spring it is taken on New Jersey Tea, in late summer on Goldenrod and in late fall on Garberia.

New Species of Baccha and Related Flies (Syrphidae).

By F. M. HULL, University of Mississippi

In recent studies of Syrphid flies some new species of *Baccha* from the Neotropical region were discovered. These species are described in this paper. The types, except where otherwise designated, are in the collection of Dr. C. L. Fluke whom I wish to thank for the loan of this material for study. Paratypes where available are in the author's collection.

Baccha scintillans n. sp.

Third and fourth abdominal segments with oval, pointed, oblique, paired yellow spots. Related to *B. variegata* Macquart.

Female: Length 9 mm. Head: face and the lower sides of the front yellow, the middle of front with an anteriorly expanded, opaque, black vittae giving way above to copper color, then violet and then to intense sapphire-blue. Antennae orange, narrowly black above, the arista black except at base. Thorax: mesonotum bright golden-brown or black with sparse yellow pile; nota and mesopleura yellow, golden pubescent. Pleura elsewhere metallic black. Scutellum opaque yellow, the posterior half brownish; squamae egg-yellow, the fringe reduced to a fragment. Abdomen: with parallel sides, first segment metallic golden on front margin and sides. The second segment is yellow with just before the middle a transverse, opaque, brown fascia; its apical margin is shining and in front of it there is an obtuse black triangle. Third segment black, the anterior corners and narrow base and wide posterior margin shining, the remainder opaque, with a pair of long, slender, oblique, leaf-like orange spots that are narrowly separated. Fourth segment similar, fifth segment with a pair of submedial vittae. Legs: yellow, the hind femora widely black in the middle, their tibiae wholly dark brown, their basi tarsi yellow and narrowly brown above. The remaining tarsal joints are dark brown. Wings: deeply tinged with brown. Alulae absent.

Holotype female, Morro Morro, ECUADOR, July 15, 1941, 1500 meters, D. B. Laddey. *Paratype*, a female with same data. [Fluke Collection.]

Baccha vanda n. sp.

Related to *B. para* and *B. ida* Curran. The vittae upon the abdomen are more slender and isolated, obscurely brown in color and absent on the third segment.

Male: Length 9 mm. Head: face steel-blue, this color extending up to the lower part of the front; the sides of the face

are narrowly yellow, the pile whitish below and black above and broadly white pubescent. Front dull black, somewhat brownish pollinose in the middle with long black pile; the lunula is yellow but black centrally. Antennae dark brownish-black. Vertical pile black placed in a single row; ocellar triangle raised. Upper occipital pile black, ocular fringe very long, a single row behind, white, a shorter anterior row white below, black above. Thorax: mesonotum dully shining, brassy brownish-black with dark brown pollen, with paler pollen on the lateral margins and a pair of reddish-brown vittae. Mesonotal pile black, pleura metallic black. Scutellum brownish-black with abundant, erect black pile and long black fringe. Abdomen: petiolate. First segment and the second metallic black, the latter with a wide, black, opaque, subapical fascia which is extended forward in the middle almost to the base. Third segment dark brown, lighter on the lateral margin; most of the segment is occupied by a large, central, opaque black, non-vittate triangle. Fourth segment with the lateral margins upon the basal half narrowly reddish, the basal triangles and the posterior margins shining and the remainder of the segment opaque black, with a pair of linear, dark brown vittae contained therein. On the fifth segment the vittae are still more obscure. Legs: dark brown, the hind pair almost black, their second to fourth tarsal joints pale yellow. The bases of the tibiae are narrowly light brown. Wings smoky brown throughout. Alulae well developed.

Holotype male, *allotype* female, and three male and two female *paratypes*. Nova Teutonia, Santa Catherina, BRAZIL. (Fritz Plaumann.) [Fluke Collection.]

Baccha (Mimocalla) erebus n. sp.

Related to *B. capitata* Loew. The face is yellow; thorax black with slender, inconspicuous, yellow vittae.

Male: Length 13 mm. Head: face yellow, dark brown in the middle, narrowly yellow on the lateral frontal margins above; front shining black and protuberant. Antennae almost

wholly black. Thorax: dull black with a pair of widely separated, inconspicuous yellow pollinose vittae, evanescent past the middle and a shorter, grayish, median vittae in front of the scutellum. Anterior end of post-calli and a confluent spot in front brownish yellow. Scutellum brownish yellow, faintly brown on the disk. Abdomen: quite pedicellate, the first segment dark brown, the second medium brown, its apical fifth dark brown and on either side basally, a large yellow hyaline triangle. Third segment with narrow, yellowish brown, basal fascia divided in the middle; a trace of a similar brownish one on the fourth segment; remainder of these segments shining black. Legs: the femora light brown, the ventral surface of the hind pair black with black pile, its lateral and dorsal pile reddish. All of the tibiae pale yellow with small brown spots in the middle, wider on the hind pair. Tarsi yellow, the hind pair orange, blackish on upper surface with golden pile. Wings: hyaline, stigma and costal cell yellow, third vein and subapical cross vein with characteristic dip and flexure; alulae large.

Holotype male, three male paratypes. Nova Teutonia, Santa Catherina, BRAZIL. (Fritz Plaumann.) [Fluke Collection.]

Baccha neptuna n. sp.

Characterized by the complete or narrowly interrupted fascia on the second and third abdominal segments. Related to *B. sepia* Hull.

Male: Length 10 mm. Head: face deep yellow, the front orange-brown with copious black pile, a linear brown stripe, and black spot over lunula. Antennae orange, the third joint brown above. Vertex shining blackish. Thorax: mesonotum brassy black or brown with a prominent pair of widely separated, diverging, posteriorly acuminate vittae of yellowish brown pollen that reach to the posterior third. Pile yellowish. Humeri, the lateral margins, the post-calli, the posterior half of mesopleura, and upper part of sternopleura, deep yellow. Scutellum yellow, broadly brown over the disc when viewed

laterally, it has a number of long black hairs and four long ventral fringe hairs, black. Abdomen: wide, elongate, flattened, with parallel sides, sepia-brown and marked with yellow. The whole of the first segment is yellow, except its posterior margin; most of its pile long and black. Second segment a little longer than wide with gently arched, central yellow fascia margined with opaque brown. Third segment square with central, transverse, linearly divided, yellow fascia not reaching the sides. Fourth segment with more widely separated, downward turned, comma-like spots. Fifth segment with slender, obscure, sub-medial vittae. Legs: yellow, hind femora brownish black, dark brown in the middle and apically, their tibiae black with black pile, their basi tarsi dark brown basally, brownish yellow on the remaining segments. Wings: deeply tinged with brown throughout; alulae narrow.

Holotype male. Japulyba, Angra, BRAZIL, March 23, 1940. (J. Lane, E. Lopez.) *Paratype* male, same data. [Fluke Collection.]

Rhinoprosopa flavophylla n. sp.

Related to *R. acnea* Hull, the face is extended much further, the black stripe is absent.

Female: Length 9 mm. Head: face and front brownish yellow, the latter with a narrow obscure brown stripe and blackish spot above the antennae, the lunula depressed on either side and brownish. The face is quite peaked and conical, in profile forming an equilateral triangle. The epistoma slants as much upward as downward. Antemal pits widely separated, the antennae orange, the third joint black narrowly above, the arista black. Extreme upper front and vertex metallic black. Frontal pile black. Thorax: mesonotum broadly black over the middle, vittae if present obscured by effects of preservation: humeri and the wide lateral margins, the whole of meso-, sterno-, ptero- and propleura yellow. Squamae dark brown with long brown fringe. Scutellum yellowish, the disc viewed

laterally, dark brown with sparse, long brown pile and no fringe. Abdomen: quite slender basally, dark brown with yellow markings. Second segment with an oblique, large, yellow lateral stripe meeting anteriorly. Third segment with a similar, central, oblique, large yellow stripe. Fourth segment with a still more oblique spot meeting near the base of the segment. Fifth segment obscurely yellow on the sides, apparently with a similar oblique spot. Legs: reddish yellow, the hind femora light brown on the apical half, their tibiae and tarsi light brown. Middle tibiae dark brown near the apex. Wings: deeply tinged with brownish yellow; apically, with ill-defined brownish spot. The alulae are well developed.

Holotype female, El Campaniento, Perené Valley, PERU, June 21, 1920, Cornell University Expedition. [In the Cornell University Collection.]

A Plea for Discarded Copies of Scientific Magazines

In response to the urgent call for paper salvage [in England] one hopes that no one will destroy copies, especially old ones, of our scientific magazines, many of which contain a large amount of valuable technical information. To throw away knowledge and aught that contains it should be looked upon as a sin. Numerous libraries have been destroyed and will want such magazines and books of similar contents to restart their useful work. We have heard of much destruction already and feel we must protest against such even at any time. Some of the smaller scientific periodicals and records of Natural History Societies are most valuable assets to a locality, a county, even it may be to the country.—Ent. Monthly Mag., Jan. 1943.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neopropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—AMADON, D.—Specialization and evolution. [90] 77: 133–141. ARMITAGE, H. M.—Possible economic relations of the Hawaiian insect fauna to California agriculture. [55] 19: 1–11. BALDUF, W. V.—Interrelations of insect-eating insects. [59] 35: 224–30. BARKLEY, F. A.—Classification. [63] 2: 73–75. BAUMHOFER, LYNN G.—Obituary by Orr, St. George and Wadley. [10] 45: 67–71 (portrait). BRACKHILL, H.—Birds' food in northern Baltimore. [Bull. Nat. Hist. Soc. Maryland] 13 (1): 5–10. HOOGSTRAAL, H.—Insect relations with plants. [59] 35: 231–35. LIGHT, S. F.—The determination of castes of social insects (concluded). [Q. Rev. Biol.] 18: 46–63. SMITH, S. G.—Techniques for the study of insect chromosomes. [4] 75: 4–34. TEHON, L. R.—Insects as vectors of plant pathogens. [59] 35: 237–43.

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—Effects of single genes on the behavior of *Drosophila*. [90] 77: 184-190. TAHMISIAN, T. N.—Enzymes in ontogenesis: Choline-esterase in developing *Melanoplus differentialis* eggs. [42] 92: 199-214. TAUBER AND GRIFFITHS.—Multinucleate hemocytes in the roach, *Blatta orientalis*. [Trans. Amer. Micros. Soc.] 62: 91-93. WILLIAMS, J. L.—A new relationship of the bursa copulatrix to the female reproductive system in Lepidoptera. [10] 45: 45-50.

ARACHNIDA AND MYRIOPODA—CHAMBERLIN, R. V.—On nine N. A. polydesmoid millipeds. [95] 56: 35-40 (*). CHAMBERLIN & MULAİK.—On a new family in the Notostigmata. [95] 55: 125-32, ill. (*). EWING, H. E.—The American chiggers (larvae of the Trombiculinae of the genus *Acariscus*, new genus). [10] 45: 57-66, ill. (*k). HOFF, C. C.—Locality records of some Hydracarina from Illinois. [59] 35: 205-6. MUMA, M. H.—An interesting scorpion record. [Bull. Nat. Hist. Soc. Maryland] 13 (1): 12. SCHLOSS, I. P.—Pseudoscorpions. [Bull. Nat. Hist. Soc. Maryland] 13 (1): 12-14. VENABLES, E. P.—Observations on the clover or brown mite, *Bryobia praetiosa*. [4] 75: 41-2.

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HEMIPTERA—CHEN, K. F.—New gen. and sps. of Chinese Cicadas with synonymical and nomenclatorial notes. [6] 51: 19-53, ill. FREDERICK, J. M.—Some preliminary investigations of the green scale (*Coccus viridis*) in South Florida. [39] 26: 12-15 (cont.) FUNKHOUSER, W. D.—Immature stages of *Bajulata bajula*. [19] 38: 44-47, ill. OMAN, P. W.—A new leafhopper of the genus *Helochara* (Ciccadellid). [10] 45: 74-75, ill. SLATER, J. S.—Developmental stages of *Catorhintha mendica*. [19] 38: 1-5, ill. TORRE-BUENO, J. R.—Remarks on the genus *Geocoris*. [19] 38: 25-27.

LEPIDOPTERA—CLARKE, J. F. G.—A new pest of *Albizzia* in the District of Columbia (Glyphipterygid). [50] 93: 205-8, ill. (*). FREEMAN, T. N.—Notes on the distribution of *Plebeius scudderi empetri* and *P. scudderi aster* (Lycaenid). [4] 75: 37-40. HEINRICH, C.—A n. sp. of *Laspeyresia*, a bean pest from tropical America (Olethreutid). [10] 45: 71-3, ill. KLOTS, A. B.—Extension of range of *Crambus teterrellus* (Zincken). [19] 38: 11. LEECH, H. B.—Fall flight of Bruce's measuring worm, *Oporophtera bruceata*. [4] 75: 20. McDUNNOUGH, J.—A note on *Prodenia ornithogalli* (Phalaenid). [4] 75: 1. Notes on the *Betulella* group of *Depressaria*, with descript. of n. sp. (Oecophorid). [4] 75: 34-36, ill. Hadenine notes and descriptions (Phalaenid). [4] 75: 43-57, ill. (*). POTTS, R. W. L.—Systematic notes concerning American *Acraeinae* (Nymphalid). [55] 19: 31-32 (S*). WIND, R. G.—Notes on *Apodemia* (F. & F.) and other southern butterflies occurring in northern California. [19] 38: 42-43. WYATT, A. K.—*Bomolocha bijugalis* and *toreuta*. [19] 38: 24.

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COLEOPTERA—BLACKMAN, M. W.—New gen. and sps. of bark beetles of the subf. *Micracinae* (Scolytid). [50] 93: 341-65, ill. DILLON, L. S. & E. S.—Supplementary notes on western hemisphere *Monochamini*. [6] 51: 13-18 (*). MALKIN, B.—Curious food-habit of *Carabus nemoralis*. [19] 38: 57. RIEGEL, G. T.—*Cyclocephala abrupta* in Illinois (Scarab.). [59] 35: 215, ill. SAYLOR, L. W.—Eight new Mexican scarab beetles collected by the Hoogstraal Expeditions. [95] 56: 21-28. SCHOOF, H. F.—The genus *Conotrachelus* Dejean (Curculionid) in the north central U. S. [Ill. Biol. Monographs] 19, no. 3: 1-170, ill. (*k). SCHLOSS, I.—Some blue-staining fungi of the gen. *Ceratoslomella* found in the U. S. [Bull. Nat. Hist. Soc. Maryland] 12 (5): list of beetles associated, page 67. TISSOT, A. N.—The Mexican bean beetle in Florida. [39] 26: 1-8. VAN DYKE, E. C.—New sps. and subsps. of N. Amer. Carabidae. [55] 19: 17-30, (k). WOLCOTT, A. B.—A second sps. of *Loedelia* R. Lucas. [19] 38: 17.

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4.—Canadian Entom. 6.—Jour. New York Entom. Soc.
10.—Proc. Entom. Soc. Washington. 19.—Bull. Brooklyn
Entom. Soc. 39.—Florida Entomologist. 42.—Jour. Experi-
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blica, R. d. Janeiro.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

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No. 7

New Species of *Crossidius* from Western North America (Coleoptera: Cerambycidae).

By E. GORTON LINSLEY, University of California, Berkeley

Crossidius ruficollis new species

Male:—Form elongate, narrow, subparallel; head, antennae, scutellum, legs, meso- and metathoracic sterna black, prothorax and abdomen rufous; elytra testaceous with a black sutural stripe over apical three fifths; pubescence short, fine, pale. *Head* coarsely, closely punctate, occipital region transversely rugose; antennae slender, much longer than body, black, basal segments sometimes vaguely piceous. Pronotum approximately one and one-half times as wide as long, sides tuberculate, surface coarsely punctate, interspaces feebly shining, very sparsely pubescent; prosternum very coarsely punctate, sparsely pubescent; meso- and metasterna finely punctate, more densely clothed with fine, appressed pale pubescence. *Elytra* two and one-half times as long as broad, wider at base than pronotum at middle, basal punctures smaller than those of pronotum, becoming finer apically; pubescence fine, sparse, appressed; apices subtruncate at suture. *Legs* slender, coarsely punctate, thinly clothed with moderately long suberect pale hairs. *Abdomen* with sternites finely punctate, thinly clothed with appressed pale pubescence; fifth abdominal sternite subtruncate or feebly emarginate at apex. Length 11–16 mm.

Female:—Form a little more robust; antennae distinctly shorter than the body, intermediate segments three or more times as long as broad; elytra with humeri and often basal margin narrowly black, and a broad black sutural band which covers about two-thirds of the width of the elytra over apical one-half then narrows anteriorly to suture at basal two-fifths; abdomen with fifth sternite broadly rounded at apex. Length 11–15 mm.

(147)

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Holotype: male (No. 5346, Calif. Acad. Sci., Ent.), allotype female (No. 5347) and twenty-one paratypes collected in Kern Co., CALIFORNIA, in September, 1931 by Mr. F. T. Scott, who kindly presented them to the writer. Paratypes are placed in the collections of the California Academy of Sciences, The Academy of Natural Sciences of Philadelphia, F. T. Scott, and the writer.

Compared with *C. punctatus* Lec., which has similar elytral markings, this species differs by having the pronotum rufous in both sexes, coarsely punctate and sparsely pubescent, the antennae of the male much longer than the body, those of the female with the intermediate segments three or more times as long as broad. It is also more slender, with the elytra two and one-half times as long as broad and the pubescence short.

Crossidius brunneipennis new species

Male:—Form very robust; color black or dark brown, elytra reddish brown; pubescence long, dense, whitish or ochraceous. *Head* coarsely, closely punctate, punctures obscured by pubescence; antennae slender, nearly one and one-half times as long as body. *Pronotum* wider than long, sides rounded, very coarsely punctate, densely clothed with long, coarse, erect and suberect pale hairs, sparser on disk; prosternum coarsely punctate, clothed with long, coarse, erect and suberect pale hairs; meso- and metasterna more finely punctate, clothed with long, appressed or suberect pale hairs; scutellum densely clothed with long, fine whitish pubescence. *Elytra* barely more than twice as long as broad, wider at base than pronotum at middle, surface densely punctate, basal punctures coarse, becoming finer apically; costae scarcely evident; pubescence moderately long, coarse, suberect, pale, rather uniform; apices subtruncate, suture armed with a short spine. *Legs* slender, coarsely punctate, thinly clothed with pale hairs; anterior tibiae with a dense pad of short, velvety pubescence on inner side. *Abdomen* with sternites finely, closely punctate, moderately densely and uniformly clothed with long, fine appressed pale pubescence which does not hide the punctuation. Length 18 mm.

Female:—Antennae about two-thirds as long as body; prosternum more finely punctate; elytral apices emarginate, sutural angle dentiform. Length 15 mm.

Holotype: male (No. 5348, Calif. Acad. Sci., Ent.), and allotype female (No. 5349) collected at Ash, NEVADA, Jan. 10, 1940, by Mr. Ira La Rivers, to whom the writer is indebted for the privilege of studying the specimens.

This is possibly the largest and most robust species of the genus and may be readily recognized by the form and coloration. It is related to *C. ater* Lec. from which it may be distinguished by the larger size, more robust form, reddish brown elytra, densely white-pubescent scutellum, more densely pubescent pronotum and abdomen and the form of the elytral apices.

**The Identity of *Neoempheria flavohirta* (Coq.) n. comb. and *Neoempheria digitalis* Fisher.
(Diptera: Mycetophilidae.)**

By ELIZABETH G. FISHER, Research Associate, The Academy of Natural Sciences of Philadelphia.

A rare species, treated by Johannsen as *Mycomya flavohirta*, I consider to belong to the genus *Neoempheria* because vein C ends at R_5 before the wing tip, a faint spurious vein is present in cell R_{5+6} , and the male terminalia are of the *Neoempheria* rather than the *Mycomya* type.

This species differs from all other Nearctic *Neoempheria* in the hyaline wings.

I have examined the type which agrees with the specimen figured here. The specimen in the Johannsen Collection (figured by the author in her thesis, Cornell University, 1937) is neither conspecific nor congeneric with this species. The only specimens known to the author have been examined and are listed below. The British Columbian females may possibly be distinct.

Neoempheria flavohirta (Coquillett) (Figs. 1 and 2.)

Sciophila n. sp., Slosson, Ent. News, ix, p. 252, 1898.

Sciophila flavohirta Coquillett, Proc. U. S. Nat. Mus., xxiii, 595, 1901.

Mycomya flavohirta Johannsen, Genera Insectorum, fasc. 93, p. 47, 1909. Johannsen, Maine Agr. Exp. Sta., Bull. no. 180, p. 182, 1910. Johnson, Occas. Papers Boston Soc. Nat. Hist., VII, p. 81, 1925.

Male: Total length 6 mm. Head black above; face and palpi yellow. Scape yellow, the distal edge of its basal segment with a ventral black streak. Flagellum yellow basally, black distally. Ocelli two.

Thorax entirely yellow with no indications of mesonotal stripes. Scutellum with four marginal setae.

Legs yellow. Fore basitarsus shorter than its tibia; microtrichia regularly arranged. No mesocoxal spurs.

Wings hyaline. C ends at R_5 but before the wing tip; Sc_1 ends in C; Sc_2 ends over the middle of small cell R_1 ; cell R_1 about three times as long as wide; a faint spurious vein in cell R_4 ; petiole of M shorter than M_3 ; Cu forks proximad of the base of R_5 . Microtrichia of the wing membrane irregularly arranged. Halteres yellow.

Abdomen yellow; the sixth tergite black. Terminalium yellow; unusually large; tip of ninth tergite black with strong black setae.

New Hampshire: Franconia, Grafton Co., (Mrs. A. T. Slosson). [1 ♂ *type*, U.S.N.M.]. Same data, [2 ♀, U.S.N.M.]. (Slosson, 1898; Coquillett, 1901; Johannsen, 1910; Johnson, 1925.)

British Columbia: Kaslo, (H. G. Dyar), [2 ♀, U.S.N.M.].

Washington: Swauk Creek, Kittias Co., June 28, (A. L. Melander), [1 ♂, A.L.M.].

Neocmpheria digitalis Fisher is the male of *Neocmpheria didyma* (Loew). The synonymy and known distribution are given below.

Neocmpheria didyma (Loew)

Sciophila bimaculata Loew (nec von Roser), Berl. Ent. Zeit., x, p. 6, 1866.

Empheria didyma Loew, Berl. Ent. Zeit., XIII, p. 136, 1869.

Ncoempheria didyma Johannsen, Maine Agr. Exp. Sta. Bull. no. 180, p. 160. Smith, Ann. Rep. N. J. State Mus., 1909, p. 723, 1910.

Ncoempheria digitalis Fisher, Jour. New York Ent. Soc., XLV, p. 390, 391, 1937.

I have examined specimens from: Ontario (English River, type locality); Maine; New Hampshire; Massachusetts; New York; Pennsylvania; Virginia; Michigan and Wisconsin. The species has also been recorded from Vermont and New Jersey.



Fig. 1. *Ncoempheria flavohirta* (Coq.). Mesal aspect of 9th tergum half, caustic potash preparation of male terminalium. Fig. 2. *Ncoempheria flavohirta* (Coq.). Lateral aspect of entire male terminalium, morphological dorsum on left.

The Group Behavior of 14,000 Insects to Colors

By HARRY B. WEISS, Highland Park, New Jersey.

During the course of experimental work, over a period of three years, involving the behavior of certain insects to light of various wave-lengths, the group behavior patterns of various species were observed and reported upon in the Journal of the New York Entomological Society.* The present paper is a report on the combined behavior of 23 species. The results of the tests made with each individual species were added together and utilized as if one large test had been made. As a matter of fact, 88 tests were actually made, using 23 different species. By combining the results of these we get a composite type of behavior, not for all insects, but for the 23 species that were actually tested. Such a composite picture is useful in that it furnishes one with a general idea of the group behavior of a large number of insects of various species. It should be kept in mind, however, that the group behavior of individual species, although following the trend of the composite picture, frequently deviates from it.

Briefly, the insects were exposed for from 15 to 30 minutes to 10 wave-length bands of light of equal physical intensities, from 3650 Å to 7400 Å, or from ultraviolet to infrared. The insects were placed in an introduction chamber six feet away from the color chambers. Upon leaving this chamber they were under the influence of 10 different wave-length bands or colors emanating from as many different chambers separated by as many black chambers. At the end of the exposure period all chambers were closed and counts were made. A full explanation of the design of the equipment and of the method for equalizing the physical intensities of the wave-lengths is given in the papers referred to in the footnote.

A total of 14,840 insects was used in the 88 tests. These consisted of 19 species of Coleoptera, 1 species of Diptera, 2 of Hymenoptera and 1 of Hemiptera. The species involved and the numbers of each that reacted positively to the various wave-lengths or colors are shown as follows:

* Weiss, Harry B., Frank A. Soraci and E. E. McCoy, Jr., Jour. N. Y. Ent. Soc., vol. XLIX, p. 1-20; p. 149-159, 1941. Vol. L., p. 1-35, 1942. Vol. LI, in press, 1943.

Species Involved	Numbers Reacting Posi- tively	
Coleoptera		
<i>Macrobasis unicolor</i> Kby.....	90	
<i>Celetes basalis</i> Lec.....	72	
<i>Coccinella 9-notata</i> Hbst.....	68	
<i>Disonycha quinquevittata</i> Say.....	62	
<i>Blepharida rhois</i> Forst.....	275	
<i>Chrysochus auratus</i> (Fab.).....	245	
<i>Lina lapponica</i> Linn.....	53	
<i>Galerucella xanthomelaena</i> Schr.....	74	
<i>Plagioderia versicolora</i> Laich.....	49	
<i>Crioceris asparagi</i> L.....	56	
<i>Tetraopes tetraophthalmus</i> Foer.....	84	
<i>Hylurgopinus rufipes</i> (Eich.).....	67	
<i>Scolytus multistriatus</i> Marsh.....	300	
<i>Serica iricolor</i> Say.....	146	
<i>Macrodactylus subspinosus</i> Fab.....	174	
<i>Autoserica castanea</i> Arrow.....	66	
<i>Galerucella notata</i> (Fab.).....	303	
<i>Leptinotarsa decemlineata</i> Say.....	1,178	
<i>Popillia japonica</i> Newm.....	1,034	4,397
Diptera		
<i>Drosophila melanogaster</i> Meigen.....	730	
Hymenoptera		
<i>Macrocentrus ancylivorus</i> Roh.....	32	
<i>Apis mellifica</i> L.....	181	
Hemiptera		
<i>Leptocoris trivittatus</i> Say.....	114	5,454

Of the total 14,840 insects, 10,150 belonged to the Coleoptera and the remainder, 4,690, to the Diptera, Hymenoptera and Hemiptera. In view of the fact that most of the insects were coleopterous ones, two sets of behavior figures and two behavior curves, based on the percentages of the total number reacting positively to the various wave-length bands, are presented. One set deals exclusively with 10,150 coleopterous insects and the other with the 14,840 insects of the four Orders mentioned.

The following table, shows the distribution of the coleopterous insects by themselves and of the coleopterous ones plus those of the other three Orders.

Numbers and Percentages of Insects Reacting and Not Reacting

Total No. Insects Utilized	10,150 (Coleopterous)	14,840 (Several Orders)
Percent remaining in introduction chamber	17	23
Percent in black chamber	7	9
Percent in center	33	31
Percent reacting positively to 10 wave-length bands	43	37
Number reacting positively to 10 wave-length bands	4,397	5,454
Number remaining in introduction chamber	1,719	3,351
Number in black chambers	651	1,445
Number remaining in centre	3,383	4,590
Total	10,150	14,840

Of the 10,150 coleopterous insects, 17 percent remained in the introduction chamber and exhibited no interest, either in colors or darkness. Seven percent went definitely to the black chambers. Forty-three percent reacted positively to the 10 wave-length bands or colors. Thirty-three percent were in the center of the testing equipment at the end of the tests and presumably were on their way to the ten wave-length chambers. However, because they did not reach these chambers they are excluded from further consideration.

It is with the 43 percent or 4,397 coleopterous insects and the 37 percent or 5,454 insects, that selected the various colors, or wave-lengths that we are particularly concerned, and the following table shows the distribution of these insects and the particular color chambers to which they were attracted. For example, 30 percent of the coleopterous insects and 36 percent of all the insects tested went to the ultraviolet band of 3460-3900 Angstrom units, the maximum transmission of the filters taking place at a wave-length of 3650 Angstrom units. Twenty percent of the coleopterous insects and 18 percent of all the insects tested went to the blue-blue-green band which had a maximum transmission at 4920 Angstrom units.

Distribution of Insects Reacting Positively to 10 Wave-Length
Bands of Light

Wave-lengths and colors	Wave-length of maxi- mum trans- mission in Å	Percent of 4397 coleop- terous in- sects reacting positively to wave-lengths	Percent of 5454 insects (several or- ders) reacting positively to wave-lengths
3460-3900 Å, ultraviolet ..	3650	30	36
4120-4760 Å, violet-blue ..	4360	12	11
4420-5000 Å, blue	4640	7	6
4700-5280 Å, blue-blue- green	4920	20	18
4940-5660 Å, blue-green ..	5150	14	13
5300-5760 Å, yellow-green.	5460	7	6
5550-6070 Å, yellow-yel- low-green	5750	3	3
5900-6420 Å, yellow-orange	6060	3	3
6120-6860 Å, orange-red ..	6420	3	3
6620-7400 Å, infrared ...	7200	1	1
		100	100

By plotting the percentages of response as shown on Figure 1, we get two curves, which are more or less identical and which show the composite qualitative group behavior pattern for the species under consideration. In both cases the peak response occurred at 3650 Å, with a secondary peak at 4920 Å. The color sensations which the particular wave-length bands give rise to in man are shown at the top of Figure 1, the ultraviolet, of course, being invisible to us.

It is not implied that these curves do anything more than suggest the type of group behavior pattern that exists for the species under consideration, when they are exposed to different wave-lengths of light of equal physical intensities. Within certain limits variations in group behavior are to be expected, especially when one considers the various factors that influence group behavior to light.

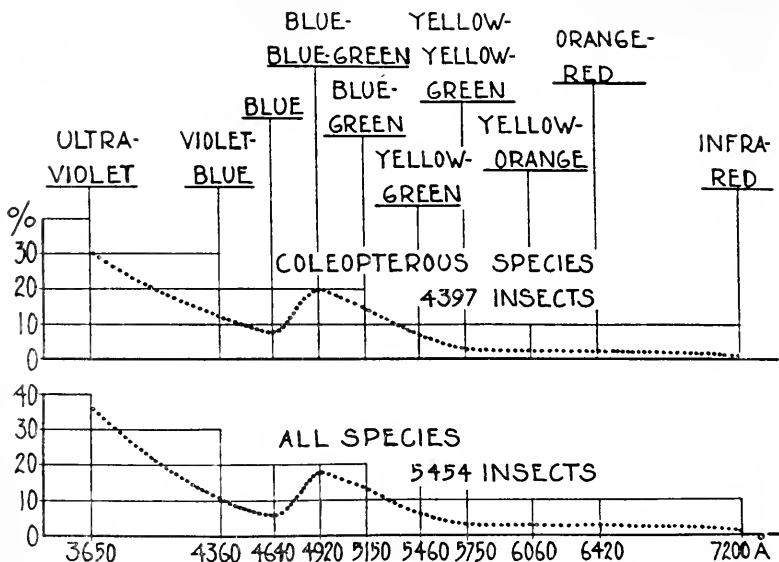


Fig. 1. Group behavior curves of insects to colors.

Ecologically Interrelated Insects on a Sunflower (Hymenoptera, Formicoidea, Ichneumonoidea and Chalcidoidea; Hemiptera, Membracidae and Aphididae; Diptera, Syrphidae.)

By C. BROOKE WORTH, Edward Martin Biological Laboratory,
Swarthmore College, Swarthmore, Pennsylvania.

During the late Summer and early Autumn of 1941 I found occasion to study a varied population of insects that had its basis in the presence of a large sunflower plant in a backyard of West Philadelphia. My observations extended from September 13 to November 16, during which time the levels of abundance of various ecologically interrelated insect-inhabitants of the plant underwent a series of interesting fluctuations. No attempt will be made here to contribute to the life history of any of the insect-species mentioned. This is, rather, a story of the struggle for survival waged by each species against- or in coöperation

with- each of the other species. So far as that struggle may be defined in terms of the numbers of each species present at any given time, this narrative will disclose the degrees of success or failure experienced by members of the insect-community during its last-minute stand against impending conditions of Winter.

A graph, showing how numbers of ants, membracids, aphids and syrphid maggots fluctuated in abundance during the two-month period of these observations, is presented for reference during perusal of the following text. It was not found expedient to include various species of hymenopterous parasites of the apids and syrphids in this text-figure.

On September 13 the sunflower plant bore about one hundred membracids, *Entylia carinata*, on its lower leaves. These were attended rather carelessly by a smaller number of ants. Subsequent observation showed that at this time the population of membracids was declining: the ants' desultory care may therefore have been occasioned by the membracids' senescence.

No evidence of insect-parasitization upon the membracids was observed. During the last week of September, when aphids first appeared on the plant, the remaining membracids were all but abandoned by their ant-hosts, with the result that the rapidly disappearing hoppers spent their last few days in ecologic isolation from other insects, both friendly and hostile.

Aphids were first noted on the sunflower plant on September 23. These were small wingless light-green forms, and in the beginning they were attended with great solicitude by the ants. Between September 23 and October 4 the ants were extremely busy setting out colonies of these tiny insects. During that period the ants reached the climax of their own abundance on the plant. The sunflower's condition at this time seemed ideal for the culture of aphids, its leaves and sepals exuding a syrupy secretion in great bounty.

No sooner had the apid colonies been established than hoverflies arrived to deposit eggs on the sunflower's leaves and stem. The resulting maggots did not fare well at first, possibly because the aphids were too small and too widely scattered on the plant. But during mid-October the aphids reproduced parthenogenetically until at least a thousand were present. Each leaf

was now heavily populated on its lower surface, and syrphid maggots could find prey that was universally distributed. The population of maggots rose abruptly. A concomitant decline in the numbers of aphids must have been due chiefly to their mechanical reduction by the voracious syrphids.

The ants in the meantime were steadily becoming less common on the plant. Some still visited the aphids, a few of the later being actually carried alive down the plant's stem to the ants' burrow. But in general the ants seemed to occupy themselves elsewhere, as if the aphid population had gotten so far out of hand that they eventually abandoned it. In reality, however, this late stock-project on the part of ants afforded provision for the natural feral perpetuation of aphids. Many late October ant-cows acquired wings, copulated and flew away. Thus a generation of wild aphids was assured for the following year, whether or not the ants succeeded in nurturing domestic aphids underground during the winter.

The beginning of November marked 1941's first severe frost in West Philadelphia. Ants had disappeared entirely a few days previous to this event. The few remaining aphids were killed by freezing, while the apparently hardy syrphid maggots starved to death shortly following the last aphid's demise.

The above populational changes are shown graphically in the text-figure that accompanies this report. Numerical abundance is shown in terms of the percent of maximum abundance of each of the four species mentioned on various dates. It is now of interest to see how these natural and interrelated events were modified through the agency of hymenopterous parasites that harried both the aphids and their syrphid enemies. No attempt to parasitize ants was seen.

The first evidence of aphid-parasitization appeared on September 28 in the form of a small and slender species of Ichneumon wasp. This was a nervous insect that darted frequently into the aphid colonies, "stinging" numerous victims by thrusting its abdomen forward between widely-spread legs and piercing the aphids with an ovipositor that was brought, through this antic, practically under the wasp's own nose! At times the ichneumon fled upon the approach of ants. But if the ants

surprised it in the act of oviposition, the wasp became immobile and suffered itself to be "nibbled" as if it were an aphid. The ants seemed to be deceived, for they never became hostile toward the wasps. Had the former possessed human intelligence, they would have recognized the deleterious import of ichneumons among aphids. The "freezing" behavior of the wasps, however, indicates that some intimation of wasp-undesirability has sometime impressed itself on the ant tribe; otherwise there would be no resultant advantage today in ichneumon's mimicry of aphids. The extent to which such conduct has advanced among parasites will be even more strikingly detailed below in the case of a chalcid hyperparasite.

An aphid's response to the onslaught of a slender ichneumon wasp was not highly specialized. It would "rear up" in reverse, waving the tip of its swollen abdomen as if in invitation to an ant's milking. Not attended in this way, it would quickly become passive, whereupon the wasp promptly accomplished its egg-laying purpose.

On October 6 I detected the presence of a stocky chalcid wasp in the aphid colony. This species was of the same size and color as its ichneumon cousin, but its visit was of deeply different significance. The creature exhibited remarkable behavior. Not only did it "freeze" when accosted by an ant, allowing itself to be nibbled and "milked" just as if it were an aphid itself, but upon the ant's departure it assumed that guardian's peculiar demeanor by nibbling and milking aphids in its own turn. The wasp's entire behavior signified confidence in the righteousness of its mission among the aphids and ants, for it was a super-parasite, bent on destroying ichneumons; it was therefore of benefit not only to the formicine herdmaidens but also to their flocks.

Deliberation was the keynote of its antics. I have indicated already the assurance with which it patrolled the aphid colonies. Its oviposition was likewise calmly accomplished. Approaching aphid after aphid, it stroked the proposed victims gently with its fore-legs. If an aphid reared up in defense, the wasp passed on in apparent dissatisfaction. But once in a while the wasp encountered an unresponsive aphid. This may have indicated

that the aphid was already suffering the effects of parasitization by an ichneumon larva. At any rate the chalcid now turned slowly until the tip of its abdomen touched the aphid and then "stung" it *from the rear*, quite opposite from the ichneumon's technique.

Chalcids "stung" aphids much less frequently than did ichneumons. This seems reasonable when it is remembered that chalcids must be much more selective in their choice of prey than ichneumons. It is more difficult to find parasitized aphids than healthy ones, when the aphid colony is made up largely of normal individuals.

The chalcid's deliberation probably stems from the care it must use in selecting its prey. This tactic has led it to mimic aphids in the ants' presence, just as is the custom of ichneumons. But in addition chalcids have learned *to mimic ants in the ants' absence*. Thus they are enabled to make detailed examinations of the aphids in order to discriminate between healthy ant-cows and ichneumon-infested ones.

The ants and aphids alike seem finally to have given up most attempts to distinguish among the supernumerary creatures that attend their society. As we have seen there is still some rudimentary hostility toward wasps, regardless of the latter's species. Toward syrphid maggots, however, there seems to be no reaction whatsoever. These should be the most deadly and terrifying enemies of all, yet they are permitted to occupy central positions in the aphid colonies and to share the ants' protection along with the mysteriously disappearing aphids. The ants "nibble" syrphid maggots frequently, being sometimes rudely lashed by the untamed carnivores. Many an aphid may also be disturbed by a maggot's lumbering changes of position, but on the whole there is no visible attempt by ants or aphids to escape from- or to eliminate- the ravenous nuisances in their midst.

Not that syrphids lead lives entirely free from trouble. On the contrary the maggots on this sunflower plant were harassed by three additional species of proportionately larger ichneumon wasps, a short account of which will now be given. I do not know if any of these wasps was hyperparasitic on either of the others: suffice it to say that all three were seen to "sting" syrphid maggots at every stage of the latter's existence.

The first two species were detected on October 16. One was an iridescent creature, brilliant green except for a golden-copper dorsal abdominal surface. The second was nondescript, more slender and nervous, possessing mottlings of black, white and brown on its body, legs and wings. Both these species "stung" many young maggots.

These two wasps were seen on several other occasions, the slender species being sometimes present in some number. On October 22 a third species was observed. This one was also slender, but it had a humped thorax, shining black abdomen and wholly unmarked transparent wings. It first *bit* a syrphid maggot, then turned and "stung" it.

During the era of the three syrphid-wasps' activities, hoverflies were abundantly present, laying their eggs promiscuously on all parts of the sunflower plant. The adult syrphids were tame, allowing me to watch them through a magnifying glass while they selected sites for their ova. The tips of their ovipositors pulsed rapidly before each egg appeared, delicately testing each locus as if by some refined tactile or gustatory sense.

A few additional insects occupied stations on the sunflower plant throughout this history, the only other species directly related to the ecologic complex being represented by a number of lady-bugs which systematically devoured a daily quota of aphids. The lady-bugs, however, came into contact with no other members of the insect-association.

It may now be profitable to inquire how these several organisms were economically related to one another and to their vegetable host, the sunflower plant. This may be done most readily by grouping the insects in a series whose classes progressively depend less and less upon the sunflower for direct nutrition and protection.

The sunflower plant itself suffered no apparent harm from the feasting of almost 1500 insects on its nutritive exudates. Whether it secreted these substances naturally or in response to repeated insect-bites I cannot say. The plant blossomed normally, however, and produced a large crop of seed which was subsequently proven to possess an average percentage of fertility.

Insects observed to derive direct benefit from the sunflower plant included randomly-appearing leaf-hoppers, spotted beetles, hunting spiders, house and green-bottle flies, as well as the constantly attending ants.

Insects of the second order were membracids, mentioned early in this report, and aphids. Both these species fed on sunflower-plant juices, but their presence was under direction of the ants and therefore not purely fortuitous. It is possible that all the species thus far mentioned were harmful—or at least not beneficial—to the plant.

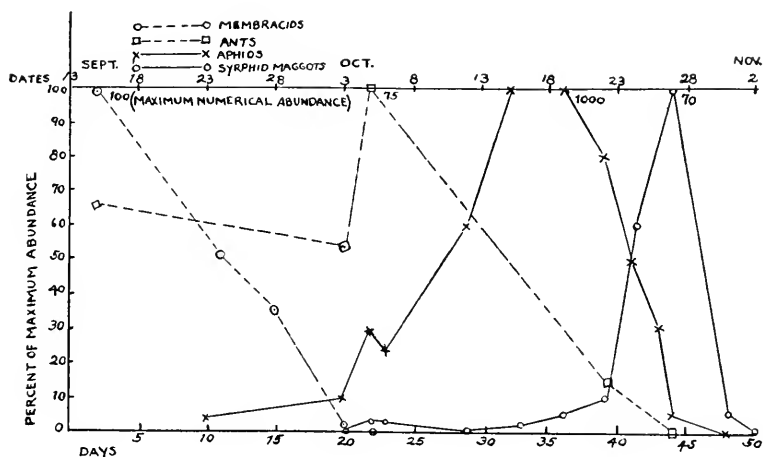
Insects of the third order were those attracted by the presence of aphids. These were small ichneumon wasps, syrphid flies and maggots, and lady-bugs. If it be assumed that aphids are detrimental to sunflowers, these three insects were beneficial to the plant and at odds with primary purposes of the ants.

Insects of the fourth order were those attracted to the plant by the presence of ichneumon-infested aphids and of carnivorous syrphid maggots. The first of these, a chalcid wasp, worked in favor of the ants and indirectly against the interests of the sunflower plant by parasitizing ichneumon-infested aphids. The same significance attends the presence of three larger species of ichneumon wasps, for these parasitized syrphid maggots which were hostile to aphids.

If one of the syrphid-parasitic wasps was in reality a hyper-parasite upon syrphid maggots that were already ichneumon-infested, a class of insects of the fifth order would have to be created to accommodate it. This conjecture was not established, however, in the above study.

It should be noted that no vertebrate animal entered into the scheme of ecologic sequences here outlined. In some locality more rural than West Philadelphia an exploring Vireo or Wren might have interrupted the course of these highly-tensed events, just as an inquisitive star might tomorrow sniff at our world and quickly notify us how puerile are our own attempts to write important human history.

I wish to thank Eleanor M. Paxson for preparing the graph that appears in this entomological note.



BIOLOGY THE SCIENCE OF LIFE. A GENERAL BIOLOGY TEXT FOR FIRST YEAR COLLEGE STUDENTS. By MARY STUART MACDOUGALL and ROBERT HEGNER. x + 963 pages. McGraw Hill Book Co. 1943. Price \$4.00. An extensive general survey text conveniently divided into sections: The Foundations of Biology, Plant Biology, Animal Biology, Organ Systems and their Functions, The Biology of Man, Biological Principles and Theories, Applied Biology, and The History of Biology. The Arthropoda are given a chapter of 57 pages with relatively detailed treatment of the Crayfish, Grasshopper and Honey Bee, and shorter survey of the entire group—A. G. Richards, Jr.

IN RETROSPECT

In 1876, the American Entomological Society became affiliated with the Academy of Natural Sciences of Philadelphia, and its members formed the Entomological Section of that institution. At the October 24, 1899, meeting of the Section, Mr. Eugene M. Aaron moved that "this Section shall, beginning with January 1890, publish its Proceedings, and such short notes as may be offered, at or near the first of each month, That all matters pertaining to this journal be referred to the entire Publication Committee, with full powers." This Publication Committee consisted of E. T. Cresson, Chas. A. Blake and Benj. H. Smith, representing the American Entomological Society, and Henry Skinner and Philip Laurent representing the Section. This Committee held a meeting November 28th with E. T. Cresson in the chair, and "duly considered the subject and [the members] are of the opinion that such a publication, if properly, wisely and economically managed, could be maintained and be made a useful and valuable adjunct to both the Section and Society. They would propose that at least 160 pages be published annually in ten numbers, monthly parts—omitting the months of July and August—of uniform size with the Transactions of the Society, and with the title of "Entomological News and Proceedings of the Entomological Section of the Academy of Natural Sciences of Philadelphia." The subscription price to be One Dollar per copy per annum, free, however, to members and associates of the Section. The expenses of publication to be defrayed by the receipts from subscriptions, advertisements, etc., and, whatever sum the Section can appropriate from its funds, and in case of a deficit, the same be met by a contribution—not to exceed \$100.00 per annum—from the funds in the hands of the Publication Committee of the Society. The new publication to be under the management of the Joint Publication Committee of the Section and Society, who shall elect an Editor and an Advisory Committee of four persons to conduct the publication, subject to such rules and regulations as the Joint Committee may establish, the said Committee to make a report of its proceedings to the Section at least four times each year. In

order to obtain, for the Library of the Society, certain publications for which it is not desirable to exchange its Transactions, it is proposed that the Publication Committee of the Society subscribe to say 50 copies of the new publication for use in making such exchanges for the Library of the American Entomological Society."

Eugene M. Aaron was elected Editor, E. T. Cresson, Treasurer, Geo. H. Horn, E. T. Cresson and Henry Skinner constituted the Advisory Committee. Dr. Horn moved that the Section be asked to allow Mr. Philip P. Calvert to associate with them.

At a meeting of the Committee, held Monday evening, December 9, 1889, it was agreed that the contract for printing 500 copies, complete, be awarded to P. C. Stockhausen, at \$27.00 per number. It was further agreed to have printed 250 extra copies of numbers 1 and 2 each for use as sample copies; and the Editor was authorized to have 2000 circulars printed, and "distribute them in one cent stamped envelopes to be addressed to those interested in Entomology." The first number appeared in the mails, January 14, 1890, and contained 16 pages. The first two pages carried the following Announcement:

It has for some time been apparent to Entomologists in this country that there was unoccupied room for a journal of Entomology devoted less to the dry details of descriptive and classificatory work and more to the news and gossip which is always of interest to entomological workers. The field of descriptive entomology is already well filled by journals published in Brooklyn, N. Y., and London, Ontario; that of economic entomology by a government publication at Washington, and the bibliographic department has received special attention at Cambridge, Mass. None of these journals allude systematically to the important work always in progress in Europe and elsewhere, nor do they by any means regularly notice such work appearing here from time to time. News of this sort is of great value to the student of Entomology even if he is near one of the large libraries; to those remote from these centres of information it can not fail to be of the utmost importance. A journal which will keep entomologists *en rapport* with what is being accomplished in serials and by monographs at home and abroad, and which will also give the items of interesting news concerning explorations and ex-

plorers, collections and collectors, will, it is believed, win its way into the good graces of the insect collecting fraternity. Such a journal is only possible where its conductors are in close communication with the literature of Entomology and the sister sciences. Philadelphia, the possessor of the public libraries of the Academy of Natural Sciences, the American Entomological Society and the American Philosophical Society and several private libraries rich in works on special branches of Entomology, is generally conceded to occupy a position in this field unrivaled in America.

With this in view the Entomological Section of the Academy of Natural Sciences of Philadelphia, with the co-operation and financial aid of the American Entomological Society, have decided to publish, beginning with this number, a journal to appear about the 1st of each month, July and August excepted, under the editorial and advisory direction set forth on the cover.

Besides such scientific papers as will naturally appear in a journal published under these auspices, there will be departments of "Notes and News," "Queries and Answers," "Exchange," "Doings of Societies," etc. Under the first it will be the object of its conductors to make ENTOMOLOGICAL NEWS deserve its name in the widest sense. Under the second, so far as may be possible, insects sent for determination will be named by members of the Section and the results announced therein. The department of "Exchange" will be free to all under reasonable restrictions. And, finally, it will be the aim to give a brief résumé of the proceedings of the various Entomological Societies throughout the world.

With liberal patronage and support from the Entomologists of America and elsewhere, it is intended that ENTOMOLOGICAL NEWS shall grow into an important factor in every entomologist's work. It will be enlarged, and its scope modified or increased, as its readers may seem to demand. This issue will give but a faint idea of what it is proposed shall be the scope of ENTOMOLOGICAL NEWS. Its conductors will be glad to receive from its readers, at any time, criticisms of its work and suggestions for its improvement.

Scientific papers, news-notes, reports of societies, etc., are needed from all sources to make this journal just what its name implies, a compend of entomological news.—EUGENE M. AARON.

Thus was Entomological News born. Some account of its subsequent growth and incidents in its life will be given in another issue of this journal.—E. T. Cresson, Jr.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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—The Entomologist. 10.—Proc., Entom. Soc. Washington. 12.—Journal, Economic Entom. 17.—Journal of Parasitology. 21.—Entom. Record & Jour. of Variation. 22.—Bulletin of Entom. Research. 23.—Physiological Zoology. 26.—Bull., Mus. Comparative Zool. 31.—Nature, London. 35.—Revista, Soc. Mexicana Hist. Nat. 40.—American Mus. Novitates. 44.—Revista Chilena Hist. Nat. 57.—Journal of Morphology. 64.—Bull., Acad. Sci., URSS., Biol. Ser. 70.—Entomologica Americana. 75.—Annals & Magazine Nat. Hist. 91.—Jour., Washington Acad. Sci. 103.—Jour., Kansas Ent. Society. 104.—Revista, Soc. Entomol. Argentina. 109.—Proc., R. Entomol. Soc. London (C). 117.—Microentomology, Stanford Univ. 128. Papers, Mich. Acad. Sci. Arts & Let.

OBITUARIES

Science for April 30, 1943, announced the death, on April 15, of Dr. Richard Anthony Muttkowski, head of the department of Biology of the University of Detroit since 1925. He was 56 years old, having been born in Milwaukee, Wisconsin, on March 4, 1887. He received an A.B. from St. Lawrence College, Colorado, in 1904 and again from the University of Wisconsin in 1913, and Ph.D. from the latter institution in 1916. He was assistant in the department of invertebrate zoology of the Milwaukee Public Museum 1906-12. Subsequent to his doctor's degree, he was successively in the zoological departments of the University of Missouri, Kansas State College, the University of Idaho and finally Detroit. He served as an instructor in the American Expeditionary Forces in France in 1919.

In his years at Milwaukee, under Brues and Graenicher, he gave much attention to insects and especially Odonata, and became best known to entomologists by his Catalogue of the Odonata of North America, issued as the first Bulletin of the Museum, June 27, 1910. Excluding handbooks, it is still the latest in this field. At that time Ris's monograph of the Libellulinae in the Catalogue of the Zoological Collections of Edmond de Selys Longchamps was in course of publication at Brussels. Some of us wondered why Muttkowski did not wait until this monograph was finished before issuing his Catalogue. It may be worth while to put on record here his reason: ". . . the reason

that I did not wait with the catalogue till Ris' Libellulinae was published, is that notwithstanding its great scientific importance, this monograph will not be available to the average entomologist, but to those only in the very largest and most important centers of scientific work. The limited circulation [of Ris's Libellulinae] (180 copies M. Severin wrote me) and the rather high price will prevent its general use. This is unfortunate, since the monograph is so valuable." (Letter of September 13, 1910.) This was before the breaking out of World War I, which seriously delayed the publication of Ris's work; for while the first eight fascicles were issued in 1909-13, the final one (No. 16, part 2) was not distributed until March 1, 1919. To have waited for this last would have postponed the appearance of Muttkowski's Catalogue for nine years, so that his decision not to wait was justified by events which he could not have foreseen.

Muttkowski's published work on Odonata, other than his Catalogue, dealt mainly with the Wisconsin fauna and a study of the genus *Tetragoneuria* (1911, 1915). Two of his later papers, including Odonata and other insects, were ecological: The Fauna of Lake Mendota (1918) and The Ecology of Trout Streams in Yellowstone National Park (1929). He also studied the blood of insects while at the University of Idaho (three papers in the Bulletin of the Brooklyn Entomological Society 1923-24). We understand that his latest work was in experimental zoology.—Philip P. Calvert.

Science for June 11, 1943, announces that Wesley P[illsbury] Flint, chief entomologist of the Illinois State Natural History Survey and of the College of Agriculture of the University of Illinois, died on June 3, at the age of sixty-one years. He was joint author, with C. L. Metcalf, of the favorably known texts, Destructive and Useful Insects and Fundamentals of Insect Life. He was born at South Hampton, New Hampshire, May 4, 1882, and served with the Massachusetts Gypsy Moth Commission before going to Illinois in 1908.—Philip P. Calvert.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

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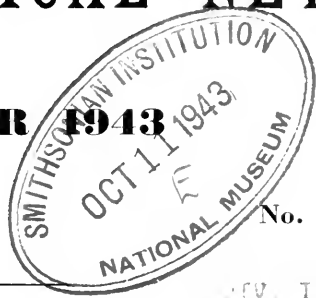
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Insects

news

ENTOMOLOGICAL NEWS

OCTOBER 1943



Vol. LIV

No. 8

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Antennal Anomaly in *Nomada vicina* Cresson (Hym.: Apoidea).

By HUGO G. RODECK, Univ. of Colo. Museum,
Boulder, Colorado.

In Cresson's catalog of his types of Hymenoptera in the Academy of Natural Sciences (p. 133) the female lectotype of *Nomada vicina* is described as having the "right antenna off." During an examination of the specimen (May 28, 1941) I found that the appendage was not only missing but was never present in the life of the insect.

The face of this specimen is shorter and broader than is usual in the species. The left antenna is present, with its fovea located in a normal concavity of the face between the inner orbit and the median facial carina. In consequence of the shortness of the face, this fovea is somewhat lower on the face than usual, mostly at the expense of the supraclypeus.

In the corresponding position on the right side of the face, however, the antennal fovea is completely absent. The surface here is much less concave than in the normal insect and is punctured like the rest of the face. But below and laterad of the position of the missing antenna is a deep hole, smaller than a normal antennal fovea, and apparently an upward and medial invagination of the integument of the face. So far as can be seen it is haired and punctured normally inside, and is ferruginous, the red color also forming a ring around the opening on the face. This ring of color interferes with the normal distribution of the red color of the lateral facemarks which are interrupted on this side of the face to leave a complete zone of black around the red rim of the invagination.

A New Species of and Notes on Acroceridae (Diptera).¹

CURTIS W. SABROSKY, Michigan State College.

An intensive study of the family Acroceridae was undertaken in order to try to determine some available material. The results proved to be so revolutionary in *Acrocera* and *Ogcodes* that a paper has been prepared dealing with those genera in considerable detail. The notes presented here are miscellaneous items which were not pertinent to the larger work.

Pialeoidea gloriosa new species.

Head black, the eyes and vertex rather thickly beset with long brown to brownish yellow hairs; antennae entirely black, their appearance similar to Fig. 12b in Cole (1919),² the second segment with numerous long hairs above, and the third segment elongate and clavate, but in this case the latter bears a group of five short setae at its apex.

Thorax and scutellum bright golden-yellow, only the lower halves of the pleura, the pteropleura, and a stripe ventrad of each anterior spiracle, brown, the whole thickly covered with long, erect yellow hair. First abdominal segment concolorous with the thorax, and bearing the same yellow hair; the remainder of the abdomen is shining, dark metallic blue-black, densely covered with short dark hairs; the entire venter apparently dark brown.

Legs brown, tarsi somewhat paler, the claws black and strong, twice as long as the pulvilli; the legs are densely covered with hairs, which are very long on the coxae, only moderately long on the femora, and short and appressed on the tibiae and tarsi.

Wings short for a fly of this size, barely exceeding the apex of the abdomen, with slightly browned membrane and dark brown to black veins. The venation is approximately the same as figured by Cole (1919, Fig. 14c) for *Ocnaca coerulea*, ex-

¹ Journal Article No. 642 (n. s.) from the Michigan Agricultural Experiment Station.

² Cole, 1919, The dipterous family Cyrtidae in North America, *Trans. Amer. Ent. Soc.*, 45: 1-79, 15 pls.

cept that the posterior branch (R_5) of the third vein joins with the vein immediately behind it (M_1), so that the first posterior cell is closed and petiolate. Halteres dark brown. Squamae of only moderate size, pale yellow with darker yellow margins, the upper surfaces and margins densely clothed with pale yellow hairs which are concolorous but somewhat shorter than those on the thorax.

Length, 13 mm.; length of wing, 11 mm.; length of third antennal segment, 2 mm.

Holotype, female (apparently), Brazos County, TEXAS, Oct. 20, 1940 (R. W. Strandtmann) [Texas A. & M. College Colln.]. In am indebted to Mr. H. J. Reinhard for the loan of this interesting specimen.

The genus *Pialeoidea* was erected by Westwood in 1876 for *Cyrtus magnus* Walker from Georgia. The present specimen shows the same type of antennae, with the terminal setae, as described and figured by Westwood. Of the two species cited in Cole's monograph (1919, p. 21), *P. magna* (genotype) has the disk of the thorax bronze-black, and *P. metallica* Williston has a metallic green thorax and scutellum, with brown abdomen. Nor does any described species of the related genus *Ocnaea* have a color pattern at all like that of the present form. Specimens of the genus *Pialeoidea* must be quite rare, for Cole does not mention seeing any specimens of the above species, and I have found no records in the literature.

OPSEBIUS PTERODONTINUS O. S.

Besides the costal spur, the species is readily distinguished by the dense golden-yellow body hairs, contrasted with the whitish hairs of other eastern species. The specimens which I have seen appear to be males, and it is possible, as in *Pterodontia*, that the costal spur is a sexual character and the females are known under another name. Of the two other eastern species, *O. sulphuripes* seems to be the more likely possibility as it has the same type of wing venation (anal cell open, short third posterior cell), whereas *O. gaganus* has the anal cell closed, and a long third cell. Both differ from *pterodontinus* in having whitish body hairs, but sexual dimorphism in that respect is not impossible.

The few records indicate a rather wide distribution in eastern United States. Unpublished data: Oakwood, Ill., Sept. 18, 1928 (H. H. Ross) [Ill. Nat. Hist. Survey Colln.]; Enfield, N. Y., Aug. 4, 1923, and Top of Mt. Marcy, N. Y., Sept. 1, 1942 (Henry Dietrich) [Cornell Univ. Colln.]; Ann Arbor, Mich., Aug. 1, 1927 (N. K. Bigelow) [Univ. Mich., Mus. Zool., det. by George Steyskal]. Besides these, I have examined specimens from White Cap Mt., Maine, Canobie Lake, N. H., Amherst, Mass., and Tiverton, R. I., which were included in the records of Johnson (1925).³

OPSEBIUS SULPHURIPES Loew.

Apparently distinguished from *pterodontinus* by whitish body hairs, but there is a possibility that they are opposite sexes of the same species. New records: Urbana, Ill., Aug. 17, 1920 [Ill. Nat. Hist. Survey]; College Station, Texas, Nov. 5, 1920 (H. J. Reinhard) [Texas A. & M. College Colln.]; besides which I have examined the three specimens recorded by Johnson (1925). It is thus apparently widely distributed in eastern United States, although quite rare, for Cole (1919) records seeing only two individuals in preparation for his monograph.

OPSEBIUS DILIGENS O. S.

The specimens from Giant Forest, Calif. (J. C. Bradley) [Cornell Univ.], mentioned by Cole (1919, p. 47) as a species near *paucus* but having a closed anal cell, have been examined and may be recorded as *O. diligens*. They agree in every way with California specimens of typical *diligens* kindly sent me by Mr. George E. Bohart, but both specimens are in poor condition and rather discolored, the hairs matted, and the wing veins and membrane darker than usual.

PTERODONTIA FLAVIPES Gray (= *Pterodontia flavoscutellata* Steyskal, 1941).

Hardy (1942) recently published the above synonymy, and I agree from a study of the series before me. *Flavoscutellata* represents the male sex, in which the basal two or three abdomi-

³ Johnson, 1925, List of the Diptera or two-winged flies of New England, 326 pp. (Cyrtidae, 106-108).

nal segments are normally more extensively infuscated than in the females. Cole (1919, fig. 22) illustrated the female only, but an excellent figure of the typical abdominal color pattern of the male was given by J. L. King in an extensive paper on the life history of *P. flavipes*.⁴

I find also that the sexes differ in the typical color pattern of the legs. The males have the front femora entirely deep yellow, rarely blackened narrowly at their bases, whereas in the females the front femora are more or less extensively infuscated, varying from the basal half to all but the knees. In both sexes, the mid and hind femora are black, and all tibiae and tarsi yellow. This characteristic pattern of the legs of the males is mentioned by Westwood and Cole for *P. flavipes* and by Steyskal for *P. flavoscutellata*, and I find it is also true for the northwestern species, *P. miscella*.

Some variation in color pattern should be recorded. On the dorsum of the abdomen in the males, the first segment is entirely black; the second is usually entirely black but may have two orange triangles along the hind margin, with their apices directed forward, their size varying from mere traces of color to large spots nearly one third the length of the segmental dorsum; the third segment is chiefly orange yellow with a median black stripe which varies in occupying from perhaps one seventh to one fourth the width of the segment, touching both fore and hind margins of the segment in equal breadth except in one specimen where it narrows slightly and fails to touch the hind margin; the fourth segment is entirely orange in some examples, but in others there is a narrow median stripe, linear to fusiform, as figured by King (1916, pl. 15, fig. 2).

The abdominal color pattern of the females which I have seen agrees fairly well with Cole's figure, and seems to vary less than in the males. The fourth segment is entirely yellow and the second and third are predominantly so, each of the latter having a small black spot along the fore margin of the segment, the black produced posteriorly on the median line, though never reaching the hind margin of the segment. Two females (Mich., N. Dak.) have the second segment broadly black.

⁴ Annals Ent. Soc. Amer., 9: 309-321, pl. 15, fig. 2, 1916.

It may also be noted here that the number of terminal setae on the antennae is subject to considerable variation, and that the usually stated number of three setae is not always true. Neither are the numbers on right and left antennae always the same, though breakage may in some cases have accounted for this. In the following list the first number is for the right antenna, the second for the left:—males, 3-3, 2-3, 2-3, 4-5, 6-6, 3-3, 7-7; females, 2-3, 4-3, 3-2, 3-4, 4-3, 2-3.

Variation in size:—males, 5.5-10.5 mm.; females, 5-9 mm.

New records of distribution: ♂, "Ill." [Acad. Nat. Sci. Phila.]; ♂, Algonquin, Ill., July 26, 1895 [Ill. Nat. Hist. Survey Colln.]; ♀, Brunswick, Ga., Sept., 1881 [Acad. Nat. Sci. Phila.]; ♀, Cheboygan Co., Mich., July 25, 1927 (L. K. Gloyd) [Univ. Mich., Mus. Zool.]; ♂, Cheboygan Co., Mich., July 11, 1941, found dead in spider web (C. W. Sabrosky) [Author's Colln.]; 4 ♂, 1 ♀, Cheboygan Co., Mich., July 2, 1939 (David M. Gates), Aug. 16, 1936 (E. A. Hutz), June 27, 1932 ("H. F."), July 5, 1934 (H. B. Hungerford), and July 22, 1940 (R. I. Sailer) [Snow Colln., Kans. Univ.]; ♀, Valley City, N. Dak., July 17, 1917 (P. W. Fattig) [Fattig Colln.]; ♂, Paris, Maine, June 15, 1938 (C. A. Frost) [Boston Soc. Nat. Hist.]. Besides these, I have seen specimens from Boothbay Harbor, Maine, Hampton, N. H., and Lunenburg, Mass. [Boston Soc. Nat. Hist.] which were included in the records published by Johnson (1925).

PTERODONTIA MISELLA O. S.

Pterodontia misella Osten Sacken, 1887, Western Diptera, p. 277 (Oregon). (♂).

Nothra americana Bigot, 1889, Ann. Soc. ent. France, p. 320. (Wash.). New synonym. (♂?).

Pterodontia johnsoni Cole, 1919, Trans. Amer. Ent. Soc. 45: 42 (Wash., Idaho). New synonym. (♀).

Cole's monograph does not sharply distinguish *P. misella* and *P. flavipes*, but material before me indicates that these are two distinct species. They apparently occupy quite different areas, if we may risk a statement from limited material, with *flavipes*

ranging from Georgia to North Dakota, whereas all records of *misella* are from the Pacific Northwest (Wash., Ore., Idaho, B. C.).

The males of the two species are quite similar, as Cole noted, particularly in the color pattern of the abdominal dorsum. I find also that the color of the legs in both sexes follows that noted for *flavipes*. The wing venation is similar, though in the males the costa is not always as strongly produced into a spur as in *flavipes*. The chief distinguishing features are as follows:

P. flavipes

1. Large species: average size 7.58 mm., range 5-10.5 mm.
2. Scutellum yellowish to brown, rarely brownish black, always distinctly lighter in color than the thorax.
3. Male abdomen: dorsum of fourth segment usually orange, or with only a narrow median vitta; fifth segment entirely orange.
4. Female: abdomen more predominantly orange than in the male (Cf. Cole, 1919, Fig. 22).
5. Eastern species (Ga.-N. Dak.).

P. misella

1. Smaller species: size of nine examples consistently 5-5.5 mm.
2. Scutellum coal black, occasionally slightly orange at the extreme apex, usually so dark that it does not sharply contrast with the thorax as in *flavipes*.
3. Male: dorsum of fourth segment usually with a distinct median vitta, and sometimes a slight streak on the fifth.
4. Female: abdomen entirely black, or pitch black.
5. Pacific Northwest, from available records.

Cole (1919, p. 42, 43) suggested that Bigot's species might be the same as *P. misella*, and after the study of *flavipes* vs. *misella*, I so refer it to synonymy. *P. johnsoni* proved to be the dark female of the sexually dimorphic *misella*.

Additional records of *P. misella*: 6 (5 ♂, 1 ♀), Lake Cushman, Mason Co., Wash., July 29 and Aug. 6, 1919 (F. M. Gaige) [Univ. Mich., Mus. Zool.]; 1 ♂, "Wash." and 2 (♂, ♀), Vancouver, B. C., July 11, 1929 (H. H. Ross) [Ill. Nat. Hist. Survey Colln.].

PTERODONTIA ANALIS Westw. and P. VIX Tns.

Cole placed Townsend's species from Southern California as a synonym of *P. analis* Westwood, described from Georgia. I

have seen no specimens which might be referred to either name, but from present information on the distribution of species in this family, I should question the synonymy. Species from those widely separated areas are probably distinct, although superficially they may be quite similar.

Synonymic Notes on Some Species of *Cuterebra* (Diptera; Cuterebridae).

HERBERT T. DALMAT, Division of Medical Entomology,
Cornell University.

Townsend (*Insecutor Inscitiae Menstruus 4*: 25, 1917) considered both *Cuterebra horripilum* Clark (*An essay on bots of horses and other animals*, London, 1815) and *Cuterebra abdominalis* Swenk (*N. Y. Ent. Soc. Jour.* 13: 182-183, 1905) as synonyms of *Cuterebra cuniculi* Clark (*Linn. Soc. London, Trans.* 3: 299, 1797). He also considered *Cuterebra albifrons* Swenk (*N. Y. Ent. Soc. Jour.* 13: 183-184, 1905) to be identical with *Cuterebra princeps* Austen (*Ann. and Mag. Nat. Hist.*, Ser. 6, 15: 393-395, 1895).

Mrs. Myron H. Swenk kindly made available Dr. Swenk's collection and a study was made of his types. The collections of the U. S. National Museum, American Museum of Natural History, Museum of Comparative Zoology, and Cornell University Entomological Museum were also studied. Undoubtedly Townsend was correct in considering *abdominalis* Swenk as identical with *horripilum* Clark, and *albifrons* Swenk as synonymous with *princeps* Austen. Swenk, himself, in arranging his collection, had placed his type specimens in with the specimens of the species with which they are synonymous. This decision was easily substantiated by comparing the species.

However, *horripilum* Clark and *cuniculi* Clark cannot be considered identical. Clark separated the two species mainly on the large, black shield present on the mesonotum of *cuniculi*, but absent on *horripilum*. This character was well figured by him. Bau (*Konowia* 10: 205-206, 1931) considered this black coloration on *cuniculi* to be due to the thoracic hairs being stuck

together by body fluid, thereby exposing the basic color of the thorax. Apparently Townsend concurs in this. Both in the National Museum collection and in the Cornell University collection there are single specimens of this species that show the black shield-shaped patch of hairs in perfect condition. Both the type specimen and the one in the Cornell University collection were collected in Georgia; the specimen in the National Museum was collected in Florida. There is no doubt that *horripilum* is distinctly separable from *cuniculi*.

Cuterebra scudderi Townsend (Insecutor Inscitiae Menstruus 5: 27-28, 1917) was described from a male specimen reared from a rabbit. There were also two male paratypes, reared from rabbits, from different localities. Townsend differentiated *scudderi* (males) from females of *Cuterebra buccata* Fabricius (Genera Ins., p. 305, 1776), but a comparison of the types of *scudderi* with males of *buccata*, also reared from rabbits, conclusively shows these species to be identical.

War Losses of Russian Entomology.

According to very incomplete information, the following Russian entomologists have lost their lives as the result of air-raids and shelling of the civil population of Leningrad, Moscow and other cities: A. M. Gerasimov, lepidopterist; A. M. Iljinsky, specialist in insect toxicology; S. A. Predtechensky, orthopterist, well known for his researches on the locust problem; A. N. Reichardt, coleopterist, specialist in Histeridae; V. E. Redikorzev, insect anatomist and histologist; A. A. Stackelberg, dipterist; S. P. Tarbinsky, orthopterist; "and many others" as is stated in the letter containing this tragic news. The loss of such a high percentage of specialists who were recognised leaders in their respective sphere of entomology is irreparable, the more so that even heavier losses should be feared amongst the younger generation of entomologists who have joined the armed forces. Many entomological laboratories, experimental stations, libraries, etc., have been partly or completely destroyed, but no exact data are as yet available.—B. P. Uvarov, London.

A Key to the Termites of Florida.

By A. E. EMERSON and E. M. MILLER, University of Chicago
and University of Miami.

This key to the termites of Florida has not been published except in mimeographed form for class use. The authors have used the key in practice and it seems to be satisfactory for this area. It is published because it seems likely to be of more general interest.

IMAGOS

1. Three or more parallel chitinized veins near the costal border of the wing2
 Two parallel chitinized veins near the costal border of the wing8
2. Median vein much more weakly colored than the radius ..3
 Median vein as strongly colored, or nearly so, as the radius6
3. Median vein ending near the tip of the wing4
 Median vein joining the radius about two-thirds the length of the wings from the suture7
4. Width of head including eyes 1.38–1.65 mm. Length of forewing from costal end of suture 9.40–12.22 mm. Yellow-brown *Kalotermes schwarzi* Banks
 Width of head including eyes 1.23–1.35 mm. Length of forewing from costal end of suture 8.27–9.40 mm. Yellowish*Kalotermes snyderi* Light
 Width of head including eyes 1.23–1.27 mm. Length of forewing from costal end of suture 6.75–6.96 mm. Dark brown*Kalotermes approximatus* Snyder
 Width of head including eyes .85–.92 mm. Length of forewing from costal end of suture 5.26–5.37 mm. Dark brown*Kalotermes milleri* Emerson
5. Radius with numerous branches and cross veins6
 Radius with few or no branches and cross veins; wing membranes coarsely punctate
 Calcaritermes nearcticus Snyder

6. Hairs on pronotum short, about .06 mm. or less in length; area between ocellus and eye same color as rest of head.
Kalotermes jouteli Banks
 Hairs on pronotum longer, about .13-.20 mm. long; area between ocellus and eye, light.
Neotermes castaneus (Burmeister)
 (*Neotermes angustoculus* Snyder is now believed to be synonymous with *N. castaneus* since characters formerly used for distinguishing these forms overlap in a graded series of specimens from Paradise Key, the type locality for *angustoculus*.)
7. Width of head with eyes .85-.97 mm.
Cryptotermes cavifrons Banks
 Width of head with eyes 1.05-1.15 mm.
Cryptotermes brevis (Walker)
8. Forewing-scale barely overlapping the base of the hind wing-scale; profile of top of head convex9
 Forewing-scale overlapping at least about half the length of the hind wing-scale; profile of head straight.
Prorhinotermes simplex (Hagen)
9. Color of head and body light brown to yellowish brown.
Reticulitermes hageni Banks
 Color of head and body dark brown to black10
10. Ocelli plainly less than their diameter from the eye.
Reticulitermes virginicus Banks
 Ocelli either their diameter or more than their diameter from the eye*Reticulitermes flavipes* (Kollar)

SOLDIERS

1. Pronotum approximately as wide or wider than the head ..2
 Pronotum distinctly narrower than the head9
2. Junction of front and vertex fairly flat; head not sharply truncate3
 Junction of front and vertex nearly right-angled; head sharply truncate7
3. Third antennal joint distinctly larger and darker than the second and fourth joints4

- Third antennal joint not conspicuously different from neighboring joints *Neotermes castaneus* (Burmeister)
4. Eye pigmented *Kaloterмес jouteli* Banks
 Eye unpigmented 5
5. Third joint of antennae usually longer than fourth and fifth together (may not apply to soldiers in young colonies); gula proportionately wide in small forms; labrum truncate at tip *Kaloterмес schwarzi* Banks
 Third joint of antennae about as long as fourth and fifth together; gula proportionately narrow; labrum bluntly pointed at tip 6
6. Anterior margin of pronotum deeply to mediumly emarginate; profile of head with a nearly smooth curve between the front and vertex *Kaloterмес snyderi* Light
 Anterior margin of pronotum mediumly emarginate; profile of head with obtuse angle between front and vertex; small species; head width about .97–1.06 mm.
Kaloterмес milleri Emerson
 Anterior margin of pronotum slightly emarginate; profile of head with obtuse angle between the front and vertex.
Kaloterмес approximatus Snyder
7. Front slightly oblique, relatively smooth, a deep furrow at the vertex *Calcariterмес nearcticus* Snyder
 Front conspicuously concave, more or less roughened 8
8. Top of head somewhat concave and smooth.
Cryptoterмес cavifrons Banks
 Top of head with distinct depression; rough.
Cryptoterмес brevis Walker
9. Sides of head fairly parallel 10
 Sides of head distinctly converging toward the front.
Prorhinoterмес simplex (Hagen)
10. Width of pronotum .81–1.10 mm.
Reticuliterмес flavipes (Kollar)
- Width of pronotum .67–.81 11
11. Gula narrower with more abruptly demarcated anterior portion; specimens usually larger and often with mandible tips more hooked than in next species.
Reticuliterмес virginicus Banks

Gula wider with more gradually demarcated anterior portion; specimens usually smaller and with tips of mandibles less hooked*Reticulitermes hageni* Banks

Notes on the North American Species of the *Zodion Obliquefasciatum* Group (Diptera: Conopidae).

By SIDNEY CAMRAS, Chicago, Illinois.

The present paper is the first contribution based on the study of a large number of specimens of the genera *Zodion* and *Ocemyia* from the collections listed below. The material was either borrowed by Field Museum through the courtesy of Orr Goodson, Acting Director, and W. J. Gerhard, Curator of Entomology, or loaned to the author through the kindness of the individuals listed.

C. F. Adams, American Museum of Natural History, California Academy of Sciences, S. Camras, Chicago Academy of Sciences (H. K. Gloyd), Colorado State College (M. T. James), H. Dybas, Field Museum, Illinois State Natural History Survey (H. H. Ross), Iowa Wesleyan College (H. E. Jaques), B. Krogh, Museum of Comparative Zoology, North Carolina Department of Agriculture (C. S. Brimley), Academy of Natural Sciences of Philadelphia, G. Steyskal, United States National Museum, and Utah State Agricultural College (G. F. Knowlton).

The genus *Zodion* in America north of Mexico may be conveniently divided into three groups characterized as follows:

Thorax light colored with black spots*pictulum*.
 Thorax usually dark with two relatively wide light colored stripes*Obliquefasciatum* Group.
 Thorax usually light with relatively narrow dark stripes or unmarked*Fulvifrons* Group.

Some specimens of the *Obliquefasciatum* Group have the dark thoracic pattern obliterated by white pollen so as to resemble species of the *Fulvifrons* Group very closely, and have been so identified in collections. Such individuals may be distinguished

by the absence of any trace of the pair of anterior submedian thoracic lines usually present in the Fulvifrons Group species, and by the specific abdominal patterns of the species of the Obliquefasciatum Group. The female genital plate is very short, wide, and thick, more so than in any of the species of the Fulvifrons Group examined. The striations (rows of short, closely set bristles) completely cover the posterior surface of the plate so as to meet the striations of the sixth sternite.

The great amount of variation in *Zodion obliquefasciatum* with its melanistic phase has prevented the recognition of the following new form which may be known as:

Zodion cyanescens new species.

Female: Length 10 mm. Face, cheeks, and lower occiput yellowish white, slivery along the adjacent orbits. Width of cheeks $\frac{1}{2}$ - $\frac{3}{4}$ times the eye-height. Lower two-thirds of the front orange yellow, upper one-third of front brown to black. Upper occiput brown with orange medially to entirely black, covered with yellowish gray pollen. Antennae orange, the first joint more brownish, the second joint more yellowish. Arista orange, the base black. Proportions of the antennal joints approximately 1:3:2. Proboscis black, $1\frac{3}{4}$ -2 times the head-height. Palpi black, with black hair, as long as the greatest width of the proboscis. Thorax black; reddish at humeri, base of wings, and venter of the scutellum; yellowish pollinose pleural stripe, sides of mesonotum, pair of dorsal stripes, and dorsum of the scutellum. Abdomen black, reddish at very base of 1st segment and brownish at the lateral margins of the 1st, 2nd, and 3d segments, covered with oblique light bluish pollinose markings as follows: 2nd segment confluent dorsally and narrowing to a stripe along lateral posterior edge, 3d segment widely separated dorsally, 4th segment all but two triangular spots dorsally and anterior corners, 5th segment dorsal distal portion, 6th segment most of dorsal surface. Coxae reddish, yellow pollinose anteriorly, brown to black posteriorly. Femora red, brown to black dorsally and yellow pollinose ventrally. Tibiae largely yellow pollinose. Tarsi blackish, yellowish ventrally, at base, and at sides of the segments. Pulvilli yellow;

claws yellow with black tips. Wings dark gray, veins brown to blackish, except at base. Base of wings yellowish orange; calypters yellow. First posterior cell open (usually) or closed at the margin. Halteres yellow orange.

Male: Similar to the female, but black of the abdomen more extensive, and the pollen on the distal portion of the abdomen more whitish. One abnormally small male is 7 mm. long.

Closest to *Zodion obliquifasciatum* which it replaces in the southeastern states, from which it differs by the darker color in general, and the bluish instead of white pollinose markings and black rather than rufous coloration of the abdomen.

Holotype: Female, NORTH CAROLINA: Smokemont, July 20, 1923, J. C. Crawford. *Allotype*: Male, North Carolina, Smoke-mont, July 20, 1923, T. B. Mitchell. [Both from the North Carolina Department of Agriculture; deposited in the Field Museum.] *Paratypes*: Male, New Jersey: Riverton, C. W. Johnson, [Am. Mus.]; three males, N. C.: Tarboro, July 30, 1924, T. B. Mitchell or W. B. Mabee (on *Helcium tenuifolium*), [N. C. Dept. Ag., one deposited in Kansas U. Coll.]; female, N. C.: La Grange, Aug. 27, 1921, T. B. Mitchell, [N. C. Dept. Ag.]; two males, N. C.: Willard, July 6, 1922, T. B. Mitchell (on *Senecio*), [N. C. Dept. Ag., one in author's coll.]; four males, N. C.: Raleigh, July 18-22, 1918-26, C. S. Brimley, [N. C. Dept. Ag., one in the Acad. Nat. Sci. Phila., one in Calif. Acad. Sci.]; male, N. C.: Statesville, mid July, 1919, F. Sherman, [N. C. Dept. Ag.]; female, N. C.: Newton, July 25, 1921, T. B. Mitchell, [N. C. Dept. Ag., in author's coll.]; female, N. C.: Swannanoa, July 10, 1913, C. L. Metcalf, [N. C. Dept. Ag.]; male, N. C.: Hendersonville, July 8, 1926, J. C. Crawford, [N. C. Dept. Ag.]; male, N. C.: Raleigh, July 8, 1903, P. Morse Coll., [M. C. Z.]; male, North Carolina, Morrison, [Nat. Mus.]; female, S. C.: Florence, July 19, 1935, C. F. Rainwater, [Nat. Mus.]; female, Ga.: Atlanta, Aug. 9, 1938, P. W. Fattig, [Nat. Mus.]; male, Fla.: Monticello, Aug. 16, C. Fairchild, [M. C. Z.]; female, Miss.: Utica, Aug., [Nat. Mus.]; male, Miss.: West Point, Sept. 16, 1904, F. C. Bishopp, [Nat. Mus.].

Most of the specimens correspond to the "melanistic" phase of *obliquefasciatum* described below, but three of the males are analogous to the "rufous" phase of that species by virtue of the brownish instead of the black of the proximal abdominal segments. These represent variation toward *obliquefasciatum*. Several specimens of *obliquefasciatum* from Illinois show variation toward the new species, one in particular having rather bluish pollen and very little rufous on the abdomen. Other intermediate specimens will undoubtedly be found where the ranges of the two species meet.

It was a dark specimen of *cyaneescens* from Alabama that caused Kröber (Arch. Nat., 81A, h. 4, p. 104) to question the validity of *Zodion albonotatum*.

ZODION OBLIQUEFASCIATUM (Macquart)

Myopa obliquefasciata Macquart, Dipt. Exot., Suppl. 1, 141, 1845. [Texas.]

Zodion splendens Jaennicke, Neue Exot. Dipt., 405, 1867. [Mexico.]

Zodion leucostoma Williston, Trans. Conn. Acad. VI, 380, 1885. [Western Kansas.]

This species is characterized by the rufous abdominal coloration with white pollinose markings. It is an extremely variable species, most of the individuals of which fall into one of three main types as follows:

"Melanistic" phase: Darker individuals averaging larger in size, in which the abdomen has relatively wide black markings.

"Rufous" phase: Lighter individuals averaging intermediate in size, in which the abdomen is mainly rufous with brown markings, or some blackish markings on the distal segments.

"Pollinose" phase: Very light individuals averaging smallest in size, in which the abdomen is usually rufous, and whose dark thoracic pattern is covered with gray or whitish pollen leaving two or three dark stripes. These are the individuals which resemble species of the Fulvifrons Group.

The distribution and frequency of the phases is as follows: Illinois (26 M, 9 R), Iowa (1 M, 1 R), South Dakota (1 M), Nebraska (1 M, 1 R), Kansas (1 M, 1 R, 1 M-R, 1 M-R-P),

Arkansas (1 R), Louisiana (1 R), Texas (5 M, 7 R, 1 P, 1 M-R), New Mexico (2 M, 4 R, 2 P, 1 R-P), Arizona (2 P), Colorado (1 M, 10 R, 10 P, 1 M-R, 1 M-P, 1 R-P), Utah (2 R), Nevada (4 R), California (9 R, 1 P, 1 M-R).

ZODION ALBONOTATUM Townsend.

Zodion albonotatum Townsend, Jour. N. Y. Ent. Soc. V, 175, 1897. [Brownsville, Texas.]

This species is characterized by the presence of yellowish pollen on the distal abdominal segments, and by the absence of any rufous. The base of the abdomen may have some bluish pollen. The abdomen also lacks the oblique pattern of the markings of the two previous species.

Material examined:

Arizona: Tucson (1 ♀, melanistic phase); Colorado: Jim Creek, near Boulder—6,400' (2 ♂, pollinose phase).

Notes on *Hubbellia marginifera* (Orthoptera: Tettigoniidae)

By JOHN W. H. REHN, Academy of Natural Sciences of Philadelphia

Upon receiving some additional material of the interesting and rare North American katydid, *Hubbellia marginifera* (Walker), studies were started to ascertain its relationship to other forms of the group. However, it has been impossible to complete this work at present, but it is thought advisable to publish such distributional and ecological information as has been gathered, and to note certain variation observed.

Four additional females of this species were collected two miles north of Myrtle Beach, Horry County, South Carolina, between July 22 and 26, 1940 by J. W. Cadbury III. The only other exact locality from which the species is known is "Camp Torreya," Township 2 N-R 7 W, Liberty County, Florida. A single female was taken at this locality in 1925 by T. H. Hubbell, and was described by Hebard¹ as the synonymous *praestans*. Uvarov² in 1940 pointed out the synonymy of

¹ Trans. Amer. Entom. Soc., LIII, p. 3, [1927].

² Fla. Ent., XXIII, p. 11, [1940].

Hebard's name with the much older *marginifera* of Walker, which was said to have come from Africa (Mr. Vigors' collection).

The following description of the habitat where the additional material was collected has been obtained from the collector, and it appears to represent a different set of conditions from those observed at the "Camp Torreya" site. Two miles north of Myrtle Beach, and about 2000 feet from the ocean, is an area of dry oak barrens surrounded by large open grassy areas, this formerly pine forest which had been burned, also small open tracts with scrubby oak, a few fair sized oak trees, and some long leaf pine. Topsoil was sandy with occasional black muck patches. The specimens were collected at bait, on both oaks and pines, in the thicker portions of the woods, between 10 P.M. and 2 A.M. on moonlit nights. The temperature at this time varied between 75° and 85° F. The individuals were easily captured, making no real attempt to escape.

The following table shows the size variation shown by these individuals, the type of Hebard's *praestans*, and, as far as is possible, by Walker's type.

	Length of body	Length of pronotum	Posterior width of pronotum	Length of tegmina	Greatest tegmina width	Length of ovipositor	Length of anterior femur	Length of posterior femur
July 22.....	30.6 mm.	8.0 mm.	5.2 mm.	27.0 mm.	8.0 mm.	30.3 mm.	9.5 mm.	25.5 mm.
July 23.....	31.0	8.0	5.6	27.8	7.8	31.3	9.2	25.2
July 24.....	31.8	7.8	4.9	27.0	7.6	29.0	8.9	24.8
July 26.....	29.8	8.8	5.6	28.8 ³	7.8	32.9	9.5	26.9
type of <i>praestans</i>	30.5	8.3	4.7	25.3	6.7	31.3	9.7	26.0
type of <i>marginifera</i> ...	13 lines, expansion of wings 28 lines							

With the four South Carolina specimens and the type of *praestans* before me I have noted the following significant variation; decided variation in the shape of the posterior margin of the pronotum, some variation in the width of the vertex, and slight variation in the degree of curvature of the ovipositor. In addition certain variation has been noted in coloration, but this seems clearly due to fading in certain individuals.

It is hoped that before long additional material of this species may be collected and that specimens of the unknown male sex may be found.

³ Spread specimen.

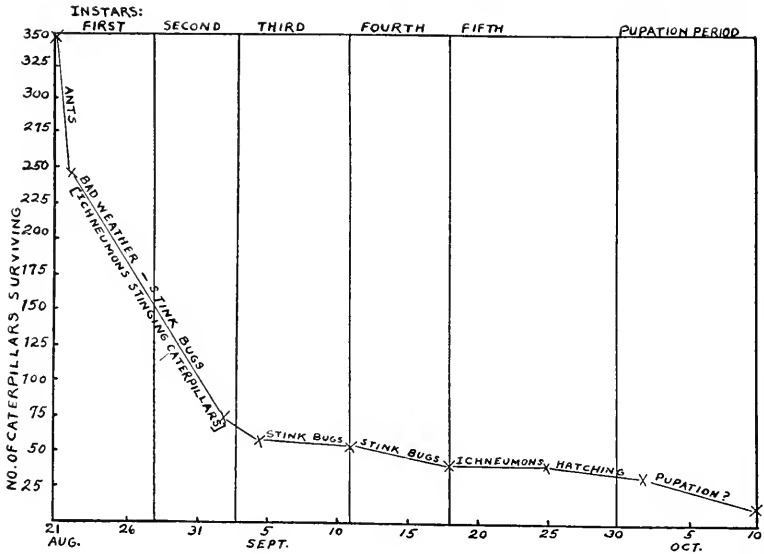
Ecologic Studies of *Ceratonia catalpae* Larvae (Lepidoptera; Sphingidae).

By C. BROOKE WORTH, Edward Martin Biological Laboratory,
Swarthmore College, Swarthmore, Pennsylvania.

Several years ago I concluded, on the basis of parasitologic investigations on the larvae of *Ceratonia catalpae*, that the adult female moths must lay more than 12.5 eggs apiece per annum in order to survive the toll exacted by a hymenopterous wasp, *Apanteles congregatus*. The number of additional eggs required to furnish species-protection against other hazards was not estimated.¹ That these hazards are formidable is indicated, however, by the fact that on August 16, 1940, at Princeton, New Jersey, I discovered an egg mass of this species containing 369 eggs. At this rate there were 356.5 eggs consigned to almost complete destruction by forces other than ichneumonid infestation. There was no way of knowing, moreover, whether this was the total complement of eggs laid by that individual moth. But despite the latter deficiency in my information, I determined at once to study the course of the 369 eggs, in hopes of finding what factors would contribute to each one's eventual successful or fatal history. The reader is referred to an appended chart which shows how adversities of weather, accidents in ecdysis, and onslaughts of ichneumon wasps and stink bugs wrought havoc among the caterpillar population, to such an extent that only a small percentage of them was able eventually to pupate.

On August 21 most of the eggs hatched. Fertility was in excess of 99%. A few caterpillars died due to their eggs being deeply buried in the egg mass; although they were fully viable, they could not escape from the morass of hatched eggshells that surrounded them. A few other caterpillars emerged in feeble condition; these were promptly carried off by a company of ants that, attending nearby aphids on the catalpa sapling, were alert to whatever usable provender might occur accidentally in their domain.

¹ *Entomological News*, May, 1939, pp. 137-141.



Thus about 350 *C. catalpae* larvae ultimately began their free existence on the undersurface of a single catalpa leaf. Each one's first feeding-act was to gnaw a single round hole, 1 mm. in diameter, at its station on the leaf. Since the caterpillars were crowded closely together, the leaf quickly became riddled with small holes.

The ants attempted to attack able-bodied caterpillars, but despite their diminutive size the latter were able to ward off these enemies by lashing vigorously from side to side. The caudal spines of the larvae were proportionately much longer and more slender and pointed than is the case of caterpillars in the final instar. Possibly the appendages look that much the more threatening at this early stage and serve thereby to render increased protection to their truly defenseless bearers.

A tiny ichneumon wasp appeared among the larvae a few hours after they had hatched. How this insect was apprised of its prey so quickly is truly an entomological conundrum. One wonders whether it had been watching the eggs as expectantly as I; whether it detected the presence of young caterpillars by some special and peculiar sense of its own; or whether

it stumbled upon the colony while making routine inspections of all the catalpa foliage in that neighborhood. In the latter case one must conclude either that coincidence operated rarely to bring the wasp to this particular station so speedily, or that such wasps are extremely numerous and widespread.

While the ichneumon patrolled the larva-bearing leaf thoroughly on the caterpillars' birthday, it did not approach any of the tiny "worms" with egg-inoculating intent.

On the next morning I found that about 100 of the caterpillars had disappeared. This, the greatest single populational catastrophe experienced by the colony, remains mysterious in its etiology. I suspect, however, that ants must have been the agents in the mass slaughter, for by this time many of those flightless insects had arrived to inspect the ranks of young caterpillars and especially to glean remaining parturient juices from the otherwise empty ancestral egg-cluster.

On this second morning an ichneumon wasp also was present, now busily parasitizing many larvae. It darted quickly into the colony, "stinging" a caterpillar in the fraction of a second, then retiring for a minute or two to a neighboring leaf. The victimized caterpillars lashed furiously upon being pierced by the wasp's ovipositor, but their demonstrations were always too late, so fleet were the ichneumon's deadly visits.

On the third day, August 23, the caterpillars dispersed over all the leaves of their catalpa branch, the majority of them selecting tender leaves near its tip. They were now massed in groups of 30 or 40, so that an ichneumon's attentions to caterpillars on any one leaf gave other groups of larvae transient immunity from attack.

The next few days were attended by unremittingly heavy rain, as a result of which the caterpillars were unable to feed properly. They spent most of the time resting quietly on the protected undersurfaces of their leaves. Quite a number of them died, either through starvation or by drowning in rain-drops. Several large leaves were stripped from the tree by strong winds. On one such leaf I counted 22 caterpillars. None of the derelict larvae succeeded in finding its way back to the tree, wherefore all such unfortunate ones died.

A few days after the first storm another arrived to cause further mortality among the colony due to falling leaves. The caterpillars were now undergoing their second molt and, though they had achieved greater size and strength, they were not able because of their resting condition to attempt the journey back to their tree. Therefore these, too, died. On September 2 only 75 of the original 350 *C. catalpac* larvae remained on the tree. A mortality of about 78.5% had visited the colony during its members' first two instars. By far the greatest single cause of death had been inclemencies of weather.

But henceforth the remaining caterpillars faced their environment with greater opportunities for survival. They were attaining a significant size and appeared fully vigorous. Their depletion, moreover, now operated to the survivors' advantage by giving insurance against defoliation of the catalpa sapling. Although the natal branch was eventually stripped, other branches provided more than adequate sustenance for the larvae throughout the remainder of their feeding period.

A constant though minor scourge of the caterpillars, from the second instar onward, was the carnivorous action of stink bugs. Two or three of these insects were usually present, systematically sucking the juices from caterpillar after caterpillar. On being partially bled to death, the weakened caterpillars let go their hold on the leaf; there they would hang from the stink bug's hypodermic proboscis until that bloated enemy dropped the deflated caterpillar to the ground. During the third and fourth instars of the *C. catalpac* colony, stink bugs were practically the only cause of continued mortality.

Tiny ichneumon wasps were seen "stinging" caterpillars as late as in the third instar. Ultimately, when ichneumon maggots burrowed outward through the caterpillars' skins, I observed that the period of their emergence occupied about two weeks. Presumably the parasitic larvae had a relatively constant time for development—about 32 days. In the case of caterpillars that were "stung" during their third instar, it seemed to me that their final (fifth) instar was prolonged in order to permit the ichneumon larva's orderly development.

These late-victimized larvae ceased feeding when their unparasitized siblings descended to the ground to pupate. Remaining plump and in good color, they clung inactively to their leaves for as long as ten days, unable to develop further, and inhibited from natural behavior by their burden of ichneumon inhabitants.

The small ichneumon wasps enjoyed a symbiotic relationship with the catalpa tree. I thought at first that this represented an accidental advantage conferred by ants upon ichneumons, but subsequent investigations proved otherwise. Ants originally attended aphids on the catalpa sapling. Later the aphids disappeared, but ants continued to frequent all parts of the catalpa, gleaning honey-like secretions from "nectaries" at the angles of veins branching from the midrib of each leaf. The nectaries consisted of hypertrophied cellular excrescences within the areas distal to each acute angle, such sites resembling tumorous growths on the leaves' nether surfaces. My original conclusion was that ants had produced these seeping organs through chronically prolonged biting, but during the next winter I "forced" several catalpa branches in a greenhouse that was inaccessible to insect-visitation, and the resulting leaves were provided with identical nectaries.

Thus the secretions upon which ichneumon wasps fed were produced without stimulation by ants—were furnished, in fact, as a natural botanical phenomenon. One may therefore postulate that the catalpa has found it profitable through natural selection to conserve such of its members as have afforded sustenance to the enemies of its specifically-adapted browsers, of which *Ceratonia catalpae* caterpillars surely rank foremost.

Ants have secondarily taken advantage of the host-tree's beneficence. Whereas catalpas are suitable for the rearing of aphids in the same manner that many plants yield, upon being pierced by insects' sharp proboscides, a nutrient sap,—other plants even presenting such manna to insects as a freely-exuded offering over the general leaf-surface,—the catalpa makes its contribution through the agency of specialized honey-organs or nectaries. This apparently has led to a diminution of ants' solicitude toward aphids on the catalpa, the intermediate ac-

tivities of these hostages being rendered less necessary by the tree's direct provision of comparable nutritive products.

The small ichneumons were less well apprised of the catalpa sap than ants, surprising though this might seem. The wasps perused a leaf with much antennal testing of each part of the leaf's surface, coming upon a nectary only as if by accident. Having fed upon extant juices at such a site, an ichneumon continued further on its exploratory way as if unaware where the next nectary was to be found. Ants, on the other hand, made routine rounds of each leaf, proceeding directly to profitable sites in regular succession. Since these insects derive even greater benefits from the catalpa than ichneumons, one is led to wonder whether another ecological settlement is not suggested here—that direct feeding by ants on specifically-provided catalpa secretions is less detrimental to catalpa trees than the indirect and traumatic feasting of ant-attended aphids.

But to proceed with the history of the caterpillars: On September 2 a larger species of ichneumon wasp arrived to threaten the colony. It was about twice as long as the common tiny black ones and was a yellowish-tan in color. It had a prominent sharp ovipositor.

Whereas small ichneumons "stung" their victims with lightning-like celerity, this one had actually to mount its caterpillar and to maintain that stance while depositing its eggs. When I arrived it was just finishing its work on one larva. It was stationed at the forepart of the "worm" facing forward, its ovipositor deeply buried in one of the caterpillar's anterior abdominal somites. The caterpillar lashed from side to side, but the wasp did not let go its footing, and when its egg-laying was completed, it lightly took wing.

It alit on a neighboring leaf and ran about quickly until it encountered a fresh victim. This caterpillar, like the last, was in the process of molting and was not at liberty to move from its silken platform. The wasp approached the caterpillar's rear end, turned around, and gave several investigative taps or thrusts with its sting. The caterpillar responded with violent thrashings from side to side.

After the caterpillar calmed down, the wasp backed into closer range and gave a sharp thrust which actually drew a small drop of green blood from the caterpillar's back. This resulted in further active demonstrations of hostility. The wasp withdrew a few millimeters and lifted its hind legs so that it was entirely out of range of the caterpillar's activities. The wasp's wings were in constant shimmering vibration, so that it was rarely possible for me to see the black markings at the midpoint of the costal edge of the fore-wings. Throughout the wasp's subsequent maneuvers, the wings were never at rest.

The strategy employed seemed to be to tire the caterpillar out. Time and again the wasp's forays were vigorously repelled. But finally the wasp mounted the posterior end of its victim, and with stiletto-like action, it vehemently plunged its ovipositor full into the caterpillar's body. Now the egg *must* be laid, and despite frantic thrashings of the caterpillar, and much to the wasp's cost, the egg *was* deposited. The wasp then withdrew for a momentary rest, but in a twinkling it was again upon the caterpillar.

Thus writhing, the caterpillar was tortured for about 15 minutes, when the wasp flew to the next leaf and selected a third victim.

This species of wasp continued its devastations during the following two days. I noticed that it had no fear of the caterpillars' caudal spines, sometimes actually straddling those appendages during the process of oviposition. Early on the morning of September 4 a wasp was observed easily "stinging" caterpillars that were chilled by a covering of night-distilled dew. On this day there were 60 remaining larvae.

The count gradually diminished thus: 51 caterpillars on September 11; 42 on September 18; and 42 on September 25. On the latter date 27 bore ichneumon cocoons on their backs. Thus only 15 remained as potentially viable members of next year's generation. This fraction represented 4.1% of the original 369 eggs laid by the moth. And it was not certain, yet, how many of the remaining few larvae harbored ichneumon parasites within their body cavities.

At least one fact was demonstrated, however. The female moth in this instance had sacrificed more than twice 12.5 offspring to the biological demands of *Apanteles*. Had the caterpillar colony not lost so many members to conditions of bad weather, the percentage of parasitization would have been far greater than this. Another fact is certain: my figures, based years ago on the extent of parasitization of caterpillars in their last instar, failed to account for the loss of caterpillars to be "expected" by *Apanteles*. In other words not only must maternal *Ceratonia* lay excessive numbers of eggs in order to assure her species' perpetuation, but fertilized *Apanteles* must also extend her activities in proportion to a mortality among *Ceratonia* larvae that necessitates an excessive rate of reproduction of the parasitic wasps as well. The parasitizing diligence of *Apanteles* must also include those cases in which many caterpillars die of starvation due to complete defoliation of their catalpa tree.

As soon as ichneumon cocoons appeared on the catalpa caterpillars' backs, chalcid wasps arrived, actively stinging the ichneumon cocoons. Wishing not to molest the caterpillars, I made no new study of the degree of chalcid-parasitization of ichneumons, but from observations of the superparasites' thoroughness, I concluded that they laid eggs in about half the ichneumon cocoons, exactly as in my former study.

On October 2 only 33 caterpillars remained, 23 of these bearing ichneumon cocoons. Five caterpillars had probably descended to the ground to pupate. Chalcids were still active among the ichneumon cocoons.

On October 9 four more normal caterpillars had disappeared for pupation and four other normal ones remained. The rest either bore cocoons of the small ichneumons or were stunted and lethargic due to internal development of the larger species of wasp. Thus only 13 caterpillars eventually pupated, representing only 3½% of the original number of eggs; and of this remainder some individuals may still have harbored large ichneumon parasites.

One wonders whether mass egg-laying of *C. catalpae* is as efficient as the random dispersal of eggs by members of the *Saturnidae* and some other groups of Lepidoptera. It would seem that *catalpae* colonies are particularly subject to onslaughts of hymenopterous parasites, whereas the chance visits of insectivorous birds must also be feared as particularly potent causes of mass mortality. Possibly the restriction of this species to a single food-plant makes it incumbent upon gravid females to lay all their eggs as soon as they encounter an appropriate leaf for doing so. Nevertheless there are other sphingids, such as the tomato moth, that are equally restricted in respect to larval fodder, but that exercise a more Saturnine lack of concentration in their egg-laying.

The eventual success of this colony, however, in bringing 13 of its members safely to the point of pupation, suggests that the colonial technique of this species may have some especial advantage that has not yet been detected. It is possible, for example, that the caterpillars are unpalatable to birds, when concentration of individuals becomes less of a menace to the species than is true of the various *Saturnidae*. At any rate it would appear that mortality, when high during one period of the colony's history, falls or fails to be as high during compensating periods of immunity to death; and thus an adequate complement of caterpillars eventually reaches winter's underground sanctuary.

I wish to thank Eleanor M. Paxson for preparing the graph that accompanies this study.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

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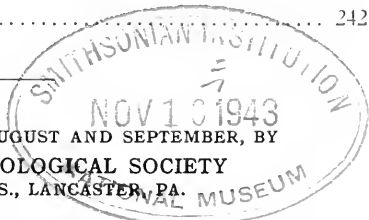
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Notes on and Redescriptions of *Megathymus yuccae* (Boisduval & LeConte) and Its Subspecies (Lepidoptera, Rhopalocera, Hesperioidea).

By H. A. FREEMAN, White Deer, Texas.

MEGATHYMUS YUCCAE (Boisduval & LeConte)

♂. Upper surface. Primaries: Deep umber brown, with the base of the wings rather heavily tinted with dark yellow. The three subapical spots are yellowish-white. There is a subquadrate, deep yellow spot in the distal end of the cell and three dots just above this of the same color. Two yellowish-white spots, one out of line, below the subapical spots, nearer the outer margin. Three, deep yellow, submarginal spots. Secondaries: Deep umber brown, with the base of the wings tinted with dark yellow. There is a deep yellow marginal border that varies from 2-3 mm. in width.

Under surface. Primaries: Light, warm brown, with the outer margins grey. The spots reappear and are lighter in coloration. Secondaries: Dark greyish-brown, with the outer margins and costal area grey. Below the costal margin there is a white crescentic spot and in a few cases a thin white dot. Expanse. 55-66 mm., average 60 mm.

♀. Similar to the male except the spots are a little darker yellow and there is a discal row of three to four deep yellow spots on the upper surface of the secondaries. Expanse. 60-78 mm., average 72 mm.

Typical *yuccae* occurs from South Carolina to the southern tip of Florida during the months of March, April and early May.

MEGATHYMUS YUCCAE COLORADENSIS Riley

♂. Upper surface. Primaries: Dark reddish-brown, with some light yellow hairs toward the base. Two light yellow spots near the costa. Three white subapical spots. Two yellowish-white spots below the subapical ones, out of line nearer the outer margin. Three yellow spots in nearly a straight line toward the outer margin of the wing. Secondaries: Dark reddish-brown, with some yellowish hairs at the base. There is a rather broad marginal border of light yellow. Fringe nearly white and not checkered with darker hairs.

Under surface. Primaries: Warm brown, with the spots reappearing and being somewhat lighter in color. Secondaries: Warm brown near the base, getting lighter grey toward the anal angle and outer margin. There is a costal band of greyish-white scales and just below this there are two somewhat crescentic shaped white spots. In the basal area there is a dark spot with a white pupil and another similar spot toward the outer margin.

Body. Dark brown above, somewhat lighter beneath. Expanse. 46-52 mm., average 50 mm.

♀. Upper surface. Primaries: Dark brown, with a few yellowish hairs at the base. The spots are similar to those found in the male only slightly larger. Secondaries: Dark brown, with a few yellowish hairs at the base. There are four yellow discal spots present and a very narrow yellow marginal border. The fringe is slightly checkered.

Under surface. Primaries: Brown, with the spots reappearing and being somewhat lighter in color. Secondaries: Warm brown, getting slightly lighter toward the outer margin caused by the presence of some scattered grey scales. There is a faintly lighter costal band of grey scales and just below this two clear white spots, one crescentic shaped and the other an irregularly shaped blotch. Toward the outer margin there is another white spot surrounded by darker scales.

Body. Dark brown above, beneath somewhat lighter. Expanse. 50-60 mm., average 53 mm.

The wing shape of *coloradensis* is considerably different from typical *yuccae*, being narrower. The spots are much lighter

yellow. There are two or three white spots below the costal margin on the under surface of the secondaries.

The subspecies *coloradensis* occurs in Colorado and Utah during April, May and June.

MEGATHYMUS YUCCAE NAVAJO Skinner

♂. Upper surface. Primaries: Black, with the usual three subapical spots, the cell spot and five marginal spots very light cream colored and in many cases white. The base of the wings are not tinted with the light color or else it is very slightly indicated. Secondaries: Black, with a rather broad grey marginal border varying in width from 2–3.5 mm.

Under surface. Primaries: Greyish-black, with the spots a little lighter than above. Secondaries: Greyish-black, with the outer margins and costal margin grey. There are two crescentic white spots below the costal margin.

Body. Black above, greyish beneath. Expanse. 43–55 mm., average 53 mm.

♀. Similar to the male except the spots are larger on the primaries and slightly yellower and there is a discal row of three or four light yellow spots on the upper surface of the secondaries.

Expanse. 55–60 mm., average 58 mm.

Navajo is the subspecies that occurs in New Mexico, Arizona and California during March, April and May. It differs from typical *yuccae* and *coloradensis* by having black instead of brown wings and by having the spots much lighter in color, being nearer white than yellow. The wing shape is similar to *coloradensis* as they are narrower than in typical *yuccae*.

MEGATHYMUS YUCCAE ALABAMAE Freeman

♂. Upper surface. Primaries: Black, with the base of the wings slightly tinted with light yellow. The usual spots are light yellow and are fairly broad. Secondaries: Black, with a very few light yellow hairs and scales at the base of the wings. There is a light yellow marginal border with some grey scales intermixed.

Under surface. Primaries: Black, with the outer margins slightly grey. The spots reappear and are somewhat lighter.

Secondaries: Greyish-black, with the outer margins and costal margin grey. There is a single crescentic white spot below the costal margin.

Body. Black above, greyish beneath. Expanse. 50-56 mm.

♀. Unknown.

Alabamac is the subspecies that occurs in Alabama and parts of Georgia during April. It differs from *coloradensis* and *navajo* by having only a single crescentic white spot on the under surface of the secondaries and by having typical *yuccae* wing shape; and from *yuccae* in having the wings black instead of brown and by having the spots light yellow instead of deep yellow. It is also somewhat smaller than typical *yuccae*.

Megathymus yuccae stallingsi new subspecies

♂. Upper surface. Primaries: Deep black, with the base of the wings tinted with bright lemon yellow scales and hairs. Three yellowish-white subapical spots, five marginal spots, two of which are out of line with the subapical ones being nearer the outer margin and are lemon yellow in color, the remaining three marginal spots are larger and bright lemon yellow in color, extending from vein M_3 to vein 2nd.A. Fringe checkered, lemon yellow and black. Secondaries: Deep black, with the base of the wings tinted with lemon yellow hairs and scales. There is a rather broad, bright lemon yellow, marginal border that varies in width from 1.5-3 mm. Fringe varies from lemon yellow to white, some show faint checkering.

Under surface. Primaries: Black, with the outer margin slightly greyish. The spots reappear and are nearly the same color as above. Secondaries: Black over the discal and basal areas, remainder being grey. There is a broad greyish-white costal margin with two crescentic white spots below it. One male had an extra white spot near the outer margin of the wing.

Body. Black above, lighter beneath. Expanse. 35-60 mm., average 55 mm.

♀. Upper surface. Primaries: Deep black, with the base of the wings tinted with deep yellow scales and hairs. The usual spots are present and are much broader than in the males and

their color is also of a deeper yellow. Secondaries: Deep black, with the base of the wings slightly tinted with deep yellow hairs and scales. There is a broad lemon yellow marginal border with some grey scales intermixed. There is a discal row of three large yellow spots and some specimens show a large fourth, phantom spot near the anal angle. Fringe is slightly checkered in some cases.

Under surface. Primaries: Deep black, with the outer margin slightly grey. The spots reappear and are about the same color as above. Secondaries: Basal and discal areas black, with the remainder of the wings greyish. There is a grey costal margin, beneath which are two white crescentic spots. There is a faint submesal black line present, and some specimens have an extra white spot near the outer margin of the wing.

Body. Black above, beneath lighter. Expanse. 41-69 mm., average 65 mm.

Described from 87 specimens, 60 ♂♂ and 27 ♀♀. 57 ♂♂ and all 27 ♀♀ were collected in the pupal stage or on the wing by Mr. Don B. and Viola Stallings, Harry and Edith Jenista and Dr. and Mrs. R. C. Turner, of Caldwell, Kansas at the following localities during March and April, 1943: Caldwell, Kansas; Medford, Salt Plains, Wakita, Waynoka, Oklahoma. The following 3 ♂♂ were collected by the author: 1 ♂ Vickery, Dallas County, Texas, April 12, 1938; 1 ♂, Palo Duro Canyon, Texas, April 25, 1942 and 1 ♂, March 21, 1943 at the same locality.

This new subspecies is named for Don B. (Dee) Stallings, Jr. upon whose third birthday the first larvae were discovered in Kansas and Oklahoma.

Holotype. ♂, IV-11-43, Caldwell, KANSAS (Don B. Stallings) and *allotype* ♀, IV-15-43, Caldwell, Kansas (Don B. Stallings) are in the collection of the author. 47 ♂♂ and 17 ♀♀ *paratypes* are in the collection of Stallings and Turner, Caldwell, Kansas and the collection of Harry Jenista, Caldwell, Kansas. One pair will be sent to the Academy of Natural Sciences of Philadelphia, one pair to the United States National Museum, and one pair to the American Museum of Natural History. The other 15 *paratypes* will remain, for the present, in the collection of the author.

Stallingsi differs from typical *yuccae* and its three described subspecies in the following particulars: The wing shape is intermediate between the two western subspecies and the two from the southeast. The wings are darker black than either *navajo* or *alabamae*. The spots are much brighter in color than either *coloradensis* or *alabamae* but not the dark orange-yellow of typical *yuccae*. As to size, *stallingsi* is much larger than *coloradensis*, being nearly as large as typical *yuccae*. There are two well defined crescentic white spots on the under surface of the secondaries thus differing from typical *yuccae* and *alabamae*. The spots composing the discal band of the female are larger than those present in any of the subspecies and in some cases surpassing those found in typical *yuccae*.

Megathymus yuccae stallingsi ♀ form **dee** new form

Upper surface. Primaries: Deep black, with some dark grey hairs and scales at the base of the wing. Two of the specimens show a few yellowish hairs intermixed with the grey ones at the base. Three yellowish-white subapical spots, a large orange-yellow spot at the distal end of the cell, five orange-yellow submarginal spots, the two below the subapical spots are out of line toward the outer margin. Fringe, black. Secondaries: Deep black. One specimen has some yellowish hairs near the base. There is a very narrow greyish-yellow marginal border and a discal band of three or four very small, orange-yellow spots. The fringe is slightly checkered.

Under surface. Primaries: Black, with the outer margins slightly grey. The spots reappear and are almost the same color as above. Secondaries: Discal and basal areas black, with the remainder of the wing grey. There is a grey costal area near the base and beneath this are two crescentic white spots.

Body. Black above, beneath greyish. Expanse. 48-64 mm., average 53 mm.

Described from 9 ♀♀. 8 of these were collected in the pupal stage or on the wing by Mr. Don B. and Viola Stallings, Harry and Edith Jenista and Dr. and Mrs. R. C. Turner of Caldwell, Kansas during March and April of 1943 at the following locali-

ties: Caldwell, Kansas; Medford and Wakita, Oklahoma. One specimen was collected by the author at Lancaster, Dallas County, Texas, IV-19-41.

This new form is named for Don B. (Dee) Stallings, Jr. of Caldwell, Kansas.

Holotype. ♀, IV-12-43, Caldwell, KANSAS (Don B. Stallings) is in the collection of the author. 3 *paratypes* are in the collection of Stallings and Turner of Caldwell, Kansas. One *paratype* will be sent to the Academy of Natural Sciences of Philadelphia, one *paratype* to the United States National Museum, and one *paratype* to the American Museum of Natural History. The remaining 2 *paratypes* are in the collection of the author.

This new form differs from the typical ♀♀ of *stallingsi* in the following particulars: Smaller in size, *dee* averages 53 mm., whereas ♀♀ of *stallingsi* average 65 mm. The ♀♀ of *stallingsi* have a number of yellow scales and hairs at the base of both pairs of wings, whereas these are absent or else very slightly indicated in *dee*. The spots on *dee* are darker yellow than those found on *stallingsi*. The ♀♀ of *stallingsi* have large yellow spots making up the discal band on the upper surface of the secondaries, whereas in *dee* these spots are much smaller, in some cases mere dots. The marginal border on the upper surface of the secondaries of *dee* is much narrower and greyer than that of the ♀♀ of *stallingsi*.

“Bred” or “Reared” and Note on the Blueberry Fruit Fly* (Diptera: Trypetidae)

By EMLÉN P. DARLINGTON, New Lisbon, New Jersey

The terms Bred and Reared seem to be used indiscriminately by entomologists. To Breed should signify that you started with controlled copulation and through rearing carried your efforts to successful conclusions. This is exemplified by A. D. Pickett and M. E. Neary, who after arduous efforts succeeded in cross-breeding apple, blueberry and hawthorn flies and ob-

* *Rhagoletis mendax* Curran, 1932.

tained viable adults capable of reproduction. Horticulturists are continually cross-breeding and obtaining new varieties without assuming the creation of a new species. Too often our concept of species is based on variations resulting from artificially created conditions rather than on fundamental differences. To Rear should signify that somewhere after copulation you obtained eggs or larvae naturally created and with food and care succeeded under artificial conditions in obtaining imagos. Obviously the terms are correlative but not synonymous. These brief remarks, making a sharp distinction between breeding and rearing, lead to the threshold of economic entomology.

Having for several years reared and observed the behavior of the blueberry fruit fly both in the insectory and in the field, notes on its peculiarities might be of interest. Unlike the apple fruit fly † it is not shy and quick in motion, but sluggish and stupid. Like others of the genus it spends much time sunning itself on the surface of a leaf. If approached cautiously it will not fly away, just circle under the leaf. Many times I have gone to a bush in the field, advanced my finger slowly and had the fly come from leaf to finger and permit itself to be carried away from the bush and exhibited to those who wished to know what hypnotic influence was being used. They will sip moisture from the foliage but I have never observed them actually feeding either in the cage or in the field, though various baits and lures have been tried. Honey alone had no attraction but the mixture that gave Dr. Pickett such good results—"5% honey with 2% to 3% yeast in equal parts of milk and water," was not tried. The flies prefer thick foliage and if this protection is accompanied by an abundance of fruit in which to oviposit they show little inclination to leave this habitat. Those interested in the flight of this little fly into economic prominence should refer to the literature cited.

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† *Rhagoletis pomonella* (Walsh, 1868).

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IN RETROSPECT

(Continued from page 166.)

In the July issue of this journal, there was given an account of the beginning of the NEWS. At this time we will give some of the milestones in its continued life.

For the year 1891, the Joint Committee, in charge of the journal, reported that volume two contained 220 pages, an average of twenty-two per month, with a plate in each number. There was no lack of papers for publication; on the contrary, it was found that the number of pages (20) authorized for each number, was quite insufficient for the amount of material offered. The edition printed was 500 copies, and the subscription list numbered 426 copies. The writer well remembers the many evenings his father spent at home, after all day at his business office, writing by hand addresses on these more than 400 envelopes for each of the ten monthly issues. Later he set the addresses in rubber type and stamped the envelopes. It was such energy and love of entomology by all those actively interested in the NEWS, that helped to carry the journal through the many trials in its life. As in fact it was freely predicted by some of the early subscribers, that the NEWS would not last six months. The report continues: "Altogether, the year has been a successful one, and Entomological News may now be considered as well established. The Editor and his advisory committee, are to be congratulated on the satisfactory manner in which the journal has been conducted during the year and, as it is right that they should be encouraged in their endeavors for success and progress, your Committee would offer for your consideration and affirmation the following suggestions: That

Entomological News be continued another year and that the edition be increased to 550 copies; that the number of pages to each number be increased to twenty-four; that the Publication Committee of the Society appropriate out of the funds of the Publication Committee to meet any deficits that may occur in the publication of the volume for 1892. It should be stated here, that although \$100 was appropriated last year to meet any deficiency on account of the present volume, none was required, [several members and friends of the NEWS made generous contributions which took care of this matter]; that the sum of \$100 be appropriated out of the funds of the Publication Committee, to pay, if necessary, for one plate in each number for 1892. Only a portion of this amount may be used, as nearly all the plates in the present volume were donated, and cost merely the paper and printing."

In 1897 the Section and the Society considered the infant had successfully completed its nursery period, having grown to 352 pages, 15 plates and a circulation of 550 copies. Therefore its management was placed entirely in the capable hands of Dr. Henry Skinner and Dr. Philip P. Calvert; and under these editors, and a helpful Advisory Committee, the NEWS continued to grow, reaching its maximum with volume nineteen (1908), containing 510 pages and 25 plates; and became one of America's outstanding entomological journals. The cost of printing so many pages, which the circulation and subscription price were unable to sustain, compelled the editors to increase the latter to two dollars, beginning with volume twenty (1909).

On October 12, 1910, E. T. Cresson received a letter from Dr. Skinner, which was read at the meeting of the Joint Committee stating: "I hereby tender my resignation as editor of Entomological News to take effect December fifteenth 1910. At that time, if I am alive, I will have served twenty-one years as editor of the journal, and the NEWS may be considered to be of age and over the nursing period. I will still have a warm interest in its welfare and will do what I can to make its future a success." This resignation was accepted, but he was appointed Editor Emeritus, with Dr. Calvert, Editor and Ezra T.

Cresson, Jr., Associate Editor. Under these editors, with the assistance of an able Advisory Committee and the continued backing of the American Entomological Society, and the support of its loyal subscribers, the journal maintained its place in American entomology.

For the next seven years the NEWS continued its subscription price of two dollars, but adverse conditions resulting from the First World War affecting costs of labor and materials, compelled the editors to drop the pagination to 30 pages per number and eliminate illustrations except those paid for by the contributors. However, papers for publication continued to come in, and because of the reduced pagination, many had to wait several months for their appearance. In the endeavor to remedy this condition, the subscription price was raised to \$2.50 in the hope that this would allow for more pages. Unhappily this anticipation was not realized, as the costs of printing and paper continued to mount. However, the editors did manage to add two more pages to each number, and expressed the "hope that all our subscribers will remain with us and help us as they have done in the past." This increase did not improve the situation, for we find in the editorial of January 1925 under the title "How to meet the rising cost of publication," these statements:

"For years, since the close of the World War, the NEWS has looked forward to a time when the cost of printing and engraving would decline, enabling it to return to something like its prewar condition, in size, illustrations and subscription price. These hopes, alas, have not been realized. On the contrary, the cost of manufacture for 1925 is greater than for 1924 and we must meet the situation as best we can. The subscription price for 1925 will not be increased, but it must be raised for 1926, or the size of the journal very greatly reduced. The latter plan would deprive you of reading matter and would meet with disfavor by authors who even now find it difficult to have their papers published with any degree of promptness. In favor of an increase of the subscription are the present relatively lower price of the NEWS, as compared with most American entomological journals, and the monthly classified list of the latest literature in our science from all parts of the world, a feature possessed by no other similar periodical. We shall be glad to hear from our subscribers as to the best way in which these problems of publication and finance can be solved.

In the March issue of the same year, the questions were asked: What shall be done with the NEWS? Do you want a smaller journal or are you willing to pay more for a larger one? The little response received to these questions was in favor of larger pagination, so the editors decided to increase the subscription price to \$3.00, hoping that this would allow the hope-for increase in the number of pages. Again this effort failed to remedy the situation, as the decrease in the number of subscribers, which always accompanied an increase in price, did not meet the additional expenses of publication. It now became evident that some means be found to meet the cost of publication other than by increasing the subscription price or reducing the pagination. This was accomplished, by changes in the procedure in editing and printing and by eliminating the different color (pink) of the cover. The savings thus secured and the gradual increase in the number of subscribers, has resulted in gradually diminishing the deficit until finally the journal again has become self-supporting.

Through two of the Country's wars the NEWS has survived. Now it faces another, a time of greater stress. Of those who nursed it, guided it, through adolescence, and assisted it in maturity, some have passed over the bar, and those who are left are approaching the shore. They need to see that capable, younger hands have control, and with these there is good prospects that the NEWS will weather the present storm.—E. T. Cresson, Jr.

Some New North American Pipunculidae (Diptera).

By WILLIAM F. RAPP, JR., Chatham, New Jersey.

Descriptions of several new species of Pipunculidae are presented herewith. I am indebted to Mr. E. T. Cresson, of the Academy of Natural Sciences of Philadelphia for allowing me to compare my specimens with material in the collection under his care. All the types will be placed in the collection of the Academy of Natural Sciences of Philadelphia.

Allomethus mysticus n. sp.

This species differs from *flavicornis* Williston in that the abdomen has black markings and the legs lack spines.

Female. Eyes not contiguous, front shining black, face silvery. Second segment of antennae brownish, third silvery with black arista. The thorax is shining black. Abdomen brownish-orange with black markings on the dorsum. Ovipositor same color as abdomen. Legs yellow; no conspicuous spines. Wings nearly hyaline. Length, 3.0 mm.; wings, 4 mm.

Holotype.—female; St. Placide, QUEBEC, Canada; August 17, 1934.

Allomethus oleous n. sp.

This species is near *willistonii* Kertész and *flavicornis* Williston, but differs in the color of the abdomen, the legs are more of a brownish-yellow, and the eyes touch each other.

Male. Front and face silvery, eyes touch each other at top of head. Second joint of antennae black. Mesonotum brown; pleurae grayish; postnotum silvery. Abdomen opaque, grayish-brown. Halteres yellowish. Femur mostly black, yellow on the lower end; tibia mostly yellow with some black; tarsus yellow, with black edges. Wings hyaline. Length 3.5 mm.; wing, 5.0 mm.

Female. The female is the same as the male. The brown ovipositor has a wide base and is sharply pointed and twice as long as the width of the base. Length 3.0 mm.; wing, 4.0 mm.

Holotype.—male; parasite in *Colladonus mendicus* (Balt) taken on Creek nettle, *Urteca gracilis* v. *holosoucea* Jepson, at Canyon of the Montara Mountain, near Montara, CALIFORNIA, October 27, 1942, (H. H. Severin). *Allotype*.—female; same data as holotype. *Paratype*.—one male; same data as the holotype.

Pipunculus nudus n. sp.

This species is closely related to *albofasciatus* Hough and it may be a geographical subspecies, but until more is known regarding the distribution it has been thought best to give it the rank of a species.

Male. Front and face silvery. Eyes almost, but not quite contiguous at top of head. Antennae black, except for third joint which is silvery. Thorax black, with a slight brownish cast on the dorsum. Halteres white. Abdomen broad, dull black, with first segment narrow and the rest of equal width. Femur black, except where it connects with tibia and here it is yellow; tibia black except upper part which is yellow; tarsi yellow. Wings hyaline. Length, 3.0 mm.; wings, 2.75 mm.

Female. Similar. Ovipositor slender, but long, yellow. Wings hyaline. Length: body 2.5 mm., wing, 2.5 mm.

Holotype.—male; La Trappe, QUEBEC, Canada; August 8, 1935; (J. Ouellet). *Allotype*.—female; La Trappe, QUEBEC, Canada; July 20, 1935; (J. Ouellet). *Paratypes*.—one male, Montreal, QUEBEC, Canada, June 17, 1934, (J. Ouellet) and one female, La Trappe, August 28, 1934, (J. Ouellet).

Pipunculus nudus tangomus n. var.

This variety conforms structurally to *nudus*. It differs from the typical variety in that the eyes are contiguous above the antennae. The abdomen is more shining than in *nudus*.

Holotype.—male; Rigaud, QUEBEC, Canada; July 21, 1941, (J. Ouellet). *Paratypes*.—three males from the following QUEBEC localities: St. Placide, August 30, 1934, La Trappe, July 11, 20, 1935, (J. Ouellet).

Collecting Beetles (Trox) with Feather Bait Traps (Coleoptera; Scarabaeidae).

By WILLIAM SPECTOR, Brooklyn, New York.

The notion of using feathers as a bait for beetles occurred to me as the result of the discovery of a large colony of *Trox scaber*, in addition to many other insects, in a rotten burlap bag of chicken feathers, heads and entrails. The bag had been flung on a vacant field near my home in Brooklyn and had lain there about three months. The burlap in contact with the ground had rotted away; the feathers now lay directly on the ground.

A superficial examination of the contents revealed a large number of chicken skulls and a considerable amount of partially digested corn grains, the latter presumably from the crops of the birds. It was a hot day in August and the bag was teeming with insect life. Very carefully everything was replaced.

The next day I returned with some collecting apparatus, of which more later. With great eagerness I then proceeded to explore the contents of the bag.

On a stout piece of brown wrapping paper which was laid on the ground I began to shake out what proved to be an entomological bonanza. There were staphylinids which scurried off as quickly as they hit the paper; histerids which lay quietly for a minute, only to start their scratchy lumbering movements over the smooth surface of the paper; tiny clambids which were black specks hardly discernible from the debris with which they fell and which could be distinguished as beetles only when they moved; trogids which dropped like pellets and obligingly lay still until the forceps had first captured their more nimble neighbors; corynetids which flew off in a flash of color; mites by the thousand; flies, sow bugs, nitidulids, Aphodiini, ground beetles—even a few small mice made their sudden appearance in a dash for safety.

A final tally revealed that I had captured 2726 beetles in this bag of chicken refuse. There were 784 specimens of *Trox* representing six different species, and along with these 1942 other beetles representing 36 species in nine different families. This is a large catch for any type of trap. It led me to use the method deliberately.

The first opportunity to bait for Trogidae with feathers came about ten months later, in June 1941. I chose as my hunting grounds the wooded region around the town of South Fallsburg, New York, a small community nestled in the Catskills, roughly about 100 miles northwest of New York City and having an elevation of 1400 feet. There were thick pine groves, open fields of hay, a small dammed-up lake from which flowed a tiny brook, and, hidden in a dense wood, the rat-and-crow infested village dump which looked very promising. Not far away was a wide shallow river. The spot chosen for the first bait-trap

was in a pine grove through which ran the tiny brook. But before going into details it would be best to mention some of the habits of Trogidae and to explain the technique use in collecting from feathers.

It is the habit of Trogidae when disturbed to lie perfectly still for several minutes, feigning death. It is interesting to see how well these torpid beetles escape detection by merely lying still, providing, of course, that the background is of the same color. The crust of dirt which covers them is so much like the color of earth that it is difficult to see them on the ground. Sometimes they look like pebbles or small pieces of dried mud, that is, until they move.

Although most beetles can be seen more readily against the background of a white cloth, it is much easier to collect the small specimens commonly found in feathers from the smooth surface of a piece of stiff, light-colored wrapping paper. Many beetles found it difficult to get a footing on the paper, and when there are several dozen of them crawling about, any means by which they can be prevented from using their maximum speed will aid in getting more of them into the killing bottle. Cloth wrinkles, hence the forceps often pick up cloth as well as beetle. Moreover, the cloth will take on the contours of the ground which it covers, sometimes allowing the specimens to remain hidden in depressions.

Captured beetles were placed directly in alcohol. By using this as the killing agent, rather than the cyanide bottle, it was possible to keep the bottle open for hours at a time instead of having to remove the cork every time a beetle was taken. If some sort of separation is attempted while collecting, a good deal of time (sometimes equal to the time spent collecting the beetles) will be saved when sorting them later. Several small vials of alcohol were used, each of which was intended for a major group of beetles. Thus, one vial was reserved for Staphylinidae, one for *Saprinus*, another for the tiny Clambidae which are generally difficult to find again when put in with other beetles, etc.

For separating the beetles from the feathers, a sieve, the kind commonly used to sift ashes from coal, was employed. A

small quantity of feathers was placed into the sieve and shaken, gently at first, over the paper (it is inconvenient to have too many insects drop out each time the collecting begins). When shaking could no longer dislodge the few beetles which remained among the feathers in the sieve, a stick was used to rub the feathers against the wire mesh. This generally accounted for the remainder. Two small garden trowels were used to handle the feathers, and later, to dig beetles out of the ground whenever present.

The first bait "trap" consisted of a corrugated paper carton which held about two cubic feet of feathers. It was placed in a small pine wood, the floor of which was covered with a dense carpet of humus and old leaves. The open box was laid on its side so that some of the feathers were forced out upon the open flaps by the pressure inside.

I did not expect too much from this initial attempt since the carton contained only feathers. Its potency was not to be compared with the Brooklyn bag in which meat scraps had supported a culture of insects. I use this term advisedly, for what in fact had taken place in the bag was that the few original beetles which had been attracted to the bag had remained, fed upon the remains of the chicken and upon each other and had multiplied in great numbers. The presence of beetle larvae in great numbers in and under the bag suggests this.

When, after ten days, I returned, the "trap" was a soggy mass of feathers and soaked paper. There had been a heavy rainfall and the carton, which had absorbed water, had fallen apart at the seams. A piece of paper was spread beside the feathers and the examination carefully begun. There were very few beetles in the bag notwithstanding the presence of a few Histerids and Aphodiids, and it looked like a failure until the bottommost layer was reached. There were the Trogids, 63 specimens of *Trox* representing four species.

Although the results were satisfactory, a comparison indicated that the Brooklyn bag had contained a greater number of species. This was probably due to the presence of the meat scraps in the first trap. It was thought that if some of the scraps were added to the feathers in a second "trap" the

staphylinids, histerids, etc., which were wanted would be attracted and that it might also help to bring trogids from greater distances. If a quantity of entrails were placed in the center of the mass of feathers then, in effect, the container would hold a large dead bird, the body being represented by the intestines and the plumage by the feathers.

A bushel apple basket was used as the container for the feathers this time. It was left uncovered and beetles could reach the feathers from the top, or from the narrow ventilating slits along the sides. The poultry dealer permitted me to help myself to as much of the chicken entrails and unwanted scraps as I needed. Four pounds of this were placed in the center of the mass of feathers.

A large flat rock, two-hundred feet away from the village dump, was chosen. It seemed an ideal locality for the beetles I wanted; the stench which permeated the air gave promise of beetles commonly associated with carrion. The dump, over which hung a pall of smoke, the result of an ineffectual attempt to destroy the huge mound of putrefaction by fire, was hidden away in a dense wood. An incessant buzzing from myriads of flies which covered patches of the ground in the clearing, could be heard from a distance of fifty feet.

A visit was made to the basket after a week. The entrails had completely disappeared; in their place was a large number of empty puparia, evidence that flesh flies had been the scavengers. No disagreeable odors emanated from the feathers as the examination was begun.

Many small silphids and staphylinids began to run from the basket as soon as it was moved. These swift runners were taken care of by placing the basket on a large piece of wrapping paper and collected as they scrambled over the smooth surface. The basket contained a greater variety of beetles than had the Brooklyn bag, but not so many specimens. There were terrestrial Hydrophilidae, Nitidulidae, Histeridae, Scaphidiidae, Cryptophagidae, Ptiliidae, Anthicidae, Carabidae, Dermestidae, Aphodiini, *Dialytes* and Trogidae. This time there were 146 specimens of *Trox*, including 22 specimens of the rare *T. aequalis*.

- The basket was replenished with more entrails and placed closer to the dump. Each visit netted a few more trogids until the middle of July after which none of the traps that I set out in various localities yielded any *Trox*.

Eighteen baskets were set up in various localities in such a manner as to take advantage of all possible haunts of the trogids. These were scattered in a twenty square-mile area, at intervals along a river, in dense woods, open fields, etc. A few baskets which contained no meat were put out also. Trogids showed a preference generally for the baskets which contained meat although both types gave satisfactory results. In some places, *Geotrupes semiopacus* and *G. splendidus* were found in numbers, generally under the baskets. A heap of chicken heads and feathers, which was placed upon a large flat rock and visited the next day, attracted thirty-five specimens of *G. semiopacus* and a specimen of *Scaphinotus viduus*, the latter under a small stone which was resting on the rock. Another dump from a town six miles away yielded a fine series of *Trox aequalis* in addition to many *T. unistriatus*. Histerids were taken in numbers in every case.

Trogidae can best be captured with feathers during June and July after which none are to be seen excepting when one stumbles upon a colony which has been established. I presume they can be baited for earlier in the southern states.

A New Membracid Genus from Peru (Homoptera).

By W. D. FUNKHOUSER, Lexington, Kentucky.

A new genus of the family Membracidae (Homoptera) from Peru is here described with its type species as follows:

Genus **Thuris** gen. nov.

This genus belongs in the subfamily *Centrotinae* Spinola and the tribe *Acuminatini* Goding and in taxonomic position stands between the genera *Lycoderes* Germar and *Stegaspis* Germar. It should be placed in a systematic key as follows:

- a. Pronotum with an elevated anterior bilobed or dilated process *Lycoderes* Germar
- aa. Pronotum without an elevated anterior process
- b. Pronotum with alternate swellings and thin translucent plates *Thuris* gen. nov.
- bb. Pronotum smooth, compressed and leaflike *Stegaspis* Germar

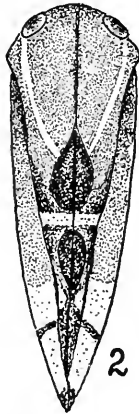
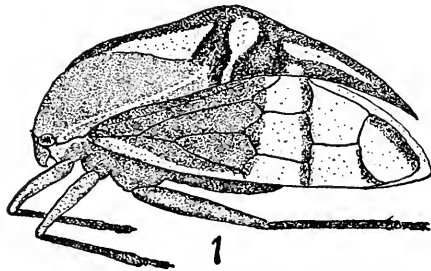


Fig. 1. *Thuris fenestratus* sp. nov. Lateral view. Fig. 2. Dorsal view.
Fig. 3. Frontal view.

Scutellum present but concealed beneath pronotum; venation of tegmina not reticulate; corium with five apical cells; tibiae slightly dilated; pronotum elevated, bilaterally compressed, with rounded swellings and thin translucent areas between and on each side of swellings; tegmina entirely free, largely opaque and marked with heavy areas of color; hind wings very small and hyaline; posterior process well developed, long and tectiform; reaching almost to apices of tegmina; femora and tarsi normal.

GENOTYPE: *Thuris fenestratus* sp. nov.

***Thuris fenestratus* sp. nov.**

Bright reddish-brown marked with dark brown and yellow; finely punctate, not pubescent; pronotum bilaterally compressed, with alternate swellings and thin transparent areas; posterior process strong, tectiform, acute, reaching almost to tips of tegmina; scutellum concealed beneath pronotum; tegmina entirely exposed, largely opaque, broadly marked with brown; under wings very short and hyaline; femora and tarsi normal, tibiae somewhat flattened.

Head reddish-brown, finely punctate, not pubescent, subovate, wider than long; base strongly arcuate and weakly sinuate; eyes dark brown; ocelli conspicuous, amber-colored, farther from each other than from the eyes and situated above a line drawn through centers of eyes; inferior margins of genae short and sinuate; clypeus wider than long, extending only slightly below inferior margins of genae, tip broadly truncate and notched and edged with bright yellow.

Pronotum expanded into a flattened dorsal plate, a lateral swelling just before middle on each side and another just behind middle, between these swellings a thin transparent window, another transparent area just in front of anterior swelling and one behind the posterior swelling extending down the center of the posterior process; metopidium sloping, broader than high, regularly convex; humeral angles weak and rounded; median carina strongly and sharply percurrent; posterior process strong, sharp, laterally flattened, central area translucent, tip

reaching almost to tips of tegmina; scutellum present but concealed under pronotum; a narrow bright yellow band extending from eye to anterior swelling of pronotum, a yellow line extending from central window to margin of pronotum, a yellow spot on each side at base of posterior process.

Tegmina entirely exposed; basal half opaque; veins difficult to distinguish because of heavy pigmentation; base narrowly coriaceous and punctate; basal half dark reddish brown; apical half hyaline with a broad transverse reddish-brown stripe across center and a brown patch on apical margin; five apical and two discoidal cells; apical limbus broad; hind wings very short, hyaline, apical cell petiolate.

Sides of thorax brown with a broad yellow band next to the head. Undersurface reddish-brown. Femora cylindrical and brown. Tibiae weakly dilated and black. Tarsi and claws black.

Length from front of head to tips of tegmina 5.1 mm.; width between humeral angles 1.8 mm.

Type.—female; San Martin, PERU.

Described from three females and five males, all collected at the type locality by Mr. Felix Woykowski in August 1936. *Holotype*, *allotype* and six *paratypes* in author's collection.

Notes on Mosquitoes of Missouri (Diptera: Culicidae).

By C. F. ADAMS and WM. M. GORDON.

The interest that has been aroused in recent years in regard to mosquitoes as vectors of various diseases justifies putting on record the results of work done by the authors in this State. The outstanding epidemic of encephalitis in the St. Louis area, and the fact that other mosquito-borne diseases, such as malaria, occur all over Missouri, lend heavily to the necessity of making known the distribution and seasonal incidence of the various species of this group.

There are several military camps of considerable size in Missouri, and these house thousands of soldiers whose health has to be guarded. On the Mississippi River, near St. Louis, is Jefferson Barracks; near the center of the State is Fort Leonard Wood; down in the southwest are Camp Crowder and Camp Clark; near the towns of Knobnoster, Columbia, Vichey, Sikeston, and Malden are aviation enterprises of various sorts; and immediately across the Missouri River in Kansas is Fort Leavenworth. All of these places are subject to mosquito infestation, and the present notes are published with the hope they will be of service to anyone engaged in mosquito control work in this part of the country.

Thirty species are listed, although one of them—*Aedes dorsalis* (Meig.)—was taken in Illinois just across the Mississippi River from Jefferson Barracks.

Some of this material has been through the hands of the late Dr. Dyar, and of Dr. Alan Stone, to both of whom we are very grateful.

ANOPHELES QUADRIMACULATUS Say. Valley Park, Sept. 10, 16; Shrewsbury, June 27, August 6, 13, 15; Jennings, August 13; Black Jack, July 23; Fenton, July 10, 14; Allenton, July 27; Florissant, Sept. 16; Jefferson Barracks, June 21; Atherton, July; Sikeston, Sept. 12; Jefferson City, June 18, 21, 25, Oct. 19; Old Monroe, Sept. 27; Wicks, July 17.

ANOPHELES PUNCTIPENNIS (Say). Fenton, Sept. 7, 10; Kirkwood, June 27, August 9; Olivette, June 25; Jennings, June 7; Shrewsbury, August 15; Valley Park, Sept. 10; Black Jack, July 23; Pine Lawn, May 30; Normandy, May 30; Lemay, July 13; Jefferson Barracks, June 20; Columbia, August 22; Sikeston, Sept. 12; Atherton, July.

PSOROPHORA CILIATA (Fabr.). Lemay, Sept. 1; Spanish Lake, July 23; Jefferson Barracks, June 23; Sikeston, Sept., Oct.; Atherton, Sept., Oct.

PSOROPHORA COLUMBIAE (D. and K.). Fenton, Sept. 5, 7; Lemay, Sept. 1, 5; Kirkwood, August 9; Bissell, August 9; Atherton, Oct. 3; Old Monroe, Sept. 27; Columbia, August 20; Boonesboro, August 22.

PSOROPHORA CYANESCENS (Coq.). Fenton, Sept. 5; Boonesboro, August 22; Malden, Sept. 1; Atherton, Oct. 1.

PSOROPHORA FEROX (Humb.). Spanish Lake, June 28, July 22, August 25, Sept. 21; Jennings, June 4; Atherton, June.

PSOROPHORA DISCOLOR (Coq.). Lemay, August 9.

PSOROPHORA HOWARDII Coq. Lemay, Sept. 1.

PSOROPHORA HORRIDA (D. and K.). Spanish Lake, June 22; Creve Coeur Lake, July 4; Gumbo, July 4; Wicks, July 17; Columbia, August 20; Acres, July 5.

PSOROPHORA DISCRUCIANS (Walk.). Atherton, August. (Retained by Dyar.)

URANOETAENIA SAPPHIRINA (O. S.). Shrewsbury, August 12, 13; Columbia, August 20; Wicks, July 21; Atherton, July.

AËDES CANADENSIS (Theob.). Ladue, June 9; Jennings, June 4.

AËDES AEGYPTI (Linn.). Jefferson City, Sept. 29, 1941, Sept. 11, 1942, Oct. 18, 1942.

AËDES TRISERIATUS (Say.). Oakville, Sept. 24; Spanish Lake, June 28, July 17, 22; Gumbo, July 4; Lemay, July 10; Jennings, June 4; Shrewsbury, June 30; Bissell, July 12; Columbia, August 20; Atherton, June.

AËDES STICTICUS (Meig.). Creve Coeur Lake, June 28; Spanish Lake, July 4; Wicks, July 17.

AËDES TRIVITTATUS (Coq.). Spanish Lake, June 28, July 21, Sept. 25; Creve Coeur Lake, July 4; Gumbo, July 4; Atherton, June 4.

AËDES DEORALIS (Meig.). Dupo, Illinois June 28. (Four or five miles east across the Mississippi River from Jefferson Barracks, Mo. Found among large numbers of *Aedes sollicitans* (Walk.).

AËDES SOLLICITANS (Walk.). Jefferson Barracks, May 2, 3; Creve Coeur Lake, July 28; Kimmswick, July 17, 21; Dupo, Illinois June 28, August 28.

AËDES NIGROMACULIS (Ludlow). Atherton, October.

AËDES VEXANS (Meig.). Spanish Lake, Sept. 21; Oakville, Sept. 24; Lemay, Sept. 1, 11; Normandy, June 13; Jennings, August 9; Gumbo, July 4; Jefferson Barracks, June 11, 18, 23,

28; Kirkwood, August 6, 9; Black Jack, July 23; Atherton, October; Old Monroe, Sept. 27; Columbia, August 20; Rockport, August 20.

CULEX APICALIS Adams. University City, June 4; Overland, June 21; Ladue, June 17, Valley Park, June 23, Sept. 18; Atherton, June.

CULEX TARSALIS Coq. Valley Park, Sept. 16, 20; Huntleigh Village, Sept. 5, 7, 10; Columbia, August 22; Atherton, June 22.

CULEX SALINARIUS Coq. Valley Park, Sept. 16; Black Jack, July 23, 27; Jennings, June 7; Bellefontaine, Sept. 10; Pine Lawn, June 7; Fenton, Sept. 7; Olivette, June 21; Overland, June 22; Carsonville, July 22.

CULEX ERRATICUS D. and K. Shrewsbury, June 30, August 6, 12, 13; Webster Groves, Sept. 24; Allenton, July 27; Bissell, July 16; Wicks, July 21.

CULEX PECCATOR D. and K. Oakville, Sept. 24; Shrewsbury, June 30, August 10, 12; Lemay, July 13; Bissell, July 16; Valley Park, Sept. 20.

CULEX QUINQUEFASCIATUS Say. Bellefontaine, Sept. 5, 10; Butler Lake, July 10; Creve Coeur Lake, June 16; Ladue, July 17; Oakville, Sept. 24; Kimmswick, August 15; Atherton, October.

CULEX RESTUANS Theob. Ladue, June 10; Carsonville, July 22; Pine Lawn, June 4; University City, June 4; Wellston, May 30; Black Jack, July 23; Butler Lake, July 10; Kimmswick, August 15; Columbia, August 22; Atherton, June.

CULEX PIPIENS Linn. Ranken, June 29; Bellefontaine, July 22, Sept. 5; Carsonville, July 22; Butler Lake, July 10; Wellston, May 30; Kirkwood, June 17; Rockhill, June 17, Sept. 20; Olivette, June 12; Jefferson Barracks, June 11, 19, 22; Kimmswick, July 17; Columbia, August 22; Atherton, June.

MEGARRIINUS SEPTENTRIONALIS D. and K. Ranken, Sept. 2 (Dr. E. P. Meiners).

THEOBALDIA INORNATA (Will.). Atherton, June.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—COE, R. L.—Charles Degeer: The correct rendering of his surname. [8] 79: 151-52. DAVIS, W. T.—Two ways of song communication among our North American cicadas. [6] 51: 185-190. FERNALD, H. T.—An insect lodging house. [6] 51: 229-231. GRINNELL & HAWES.—Bibliography on lice and man, with ref. to wartime conditions. [3] Bibl. Bull. 1, 106 pp. HOFFMAN, W. A.—1894-1943. (Obituary) by G. N. Wolcott. [12] 36: 486. KENNICOTT, R.—Kennicott in the North. By Grace L. Nute. [The Beaver, Winnipeg] pt. 274: 28-32, ill. KNOWLTON & STAINS.—Flickers eat injurious insects. [4] 75: 118. McLAINE, L. S.—The war activities of the Federal divisions of entomology and plant protection since 1939. [29] 73: 7-16. MAYR, E.—Systematics and the origin of species. N. Y. 1942. Columbia Univ. Press. xiv + 334 pp. 29 figs. METCALF, C. L.—Entomological training for the armed forces (editorial). [12] 36: 482-483. SMITH & KELLY.—The twelfth or 1942 annual insect population summary of Kansas. [103] 16: 99-116. VAN CLEAVE, H. J.—An index to the opinions rendered by the Inter. Commission on Zool. Nomen. [119] 30: 223-40. VOLCK, W. H.—1879-1943. (Obituary by E. O. Essig. [12] 36: 484-486.

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1.—Trans., Amer. Entomol. Society. 3.—United States Dept. Agriculture. 4.—Canadian Entomologist. 6.—Jour., New York Entom. Soc. 8.—Entom. Monthly Magazine. 12.—Journal Economic Entom. 14.—Arch. Inst. Biol., Sao Paulo. 20.—Annals of Applied Biol. 22.—Bulletin of Entom. Research. 26.—Bull. Mus. Comparative Zool. 29.—Ann. Rept. Entom. Soc. Ontario. 31.—Nature, London. 38.—Bull., So. Calif. Acad. Sci. 39.—Florida Entomologist. 43.—Ohio Jour. of Sciences. 60.—Smith. Miscell. Collections. 67.

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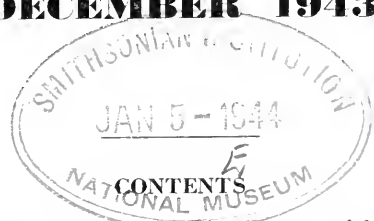
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ENTOMOLOGICAL NEWS

VOL. LIV

DECEMBER, 1943

No. 10

A New Metallic Ant from the Pine Barrens of New Jersey.

By WILLIAM LOUIS BROWN, JR., State College, Pennsylvania.

Monomorium viridum new species

Female. Length 5.3 to 5.7 mm. The distance through the compound eyes as great or greater than the distance from vertex to the apices of the clypeal teeth. The latter distance varies from about .88 to .92 mm. Antennal joints 12 in number. The frons is smooth and convex; the frontal carinae possess outer margins which are nearly or quite parallel. The clypeal teeth are more acute than in the female of *minimum*, incurved, their apices distant from each other by three times their length (two to two-and-a-half times in *minimum*); the clypeal carinae high and sharp, with the space between so concave as to be described as "scooped-out." This concavity is much more extreme than that displayed by *minimum*. Compound eyes large, coarse, and prominent. Ocelli large and very prominent, the color of medium honey.

Thorax more robust than in *minimum*, with the metanotum larger and forming a distinct "hump." The structure of the thorax in other particulars is much the same as in *minimum*, with an epinotum evenly rounded in profile.

Nodes of the petiole and postpetiole higher than those of *minimum*, the former being markedly compressed in an antero-posterior direction. The petiole bears a prominent ventral keel with a downward-directed spine or process which varies greatly in size and shape, rarely absent, but more often enlarged and acute. When present, this spine springs from the anterior third of the petiolar keel. The profile view of the petiole from behind reveals a slight concavity of the upper margin, coupled with a

greater width in the dorsal half of the node than in the ventral half. Viewed from the side, the postpetiole appears larger in relation to its petiole than does that of *minimum*. The gaster is large, robust, and oval in shape.

The large, strong wing fragments on most of the females indicate the former presence of well-developed flight apparatus.

Seen from the front, the whole head is striated strongly and regularly in a longitudinal direction, the striae finally curving and passing just outside of and over the occipital angles. The mandibles, frontal area, clypeal teeth and their immediate bases, a small space just outside each lateral ocellus, and a small space on the vertex are all smooth and shining. The triangular area enclosed by the ocelli is striated transversely, as is the space just behind the ocellar trio, the latter striae extending laterally to curve posteriorly just inside the occipital angles. Coarse, often elongate punctures are interspersed with the striae in the areas of the vertex, the occipital angles, and just inside the compound eyes.

The pronotum, scutum, mesothoracic pleuro-ventral fusion sclerite, and the major portion of the scutellum smooth and shining, with numerous small, regular punctures. When viewed laterally, the scutellum is seen to be edged with faint striations. A number of fine, very regular striations start in the region of the metathoracic fusion segments and continue horizontally along the sides of the epinotum, from thence traversing the major portion of the epinotal face and imparting to it the "ladder-like" resemblance seen when the epinotum is viewed from behind and above.

The petiole and postpetiole exhibit regional sculpture varying from disordered rugosity on the sides of the nodes to fine, even, curved striations on the posterior faces, while the anterior faces are smooth and shining. The gaster is smooth and shining and bears numerous scattered punctures on the dorsum. Each of the first three gastric segments bears a narrow band of fine, pebbled reticulation on its posterior border. In addition, several of the more posterior segments bear varying areas of fine, curving striations.

Hairs creamy white; conspicuous and abundant, especially on the head and antennae, less so on the dorsum of the gaster. The hairs are more abundant than in *minimum*, and seem to be relatively more conspicuous and slightly longer than those of the latter. Pubescence absent or scanty.

Wing fragments hyaline, covered rather densely with short, appressed hairs.

Color of the head, with the exception of the mouthparts, is a dark metallic green which is most intense on the frontal and dorsal regions. The thorax is basically of a deep ferruginous color, though very large central areas of each sclerite are impregnated with varying degrees of green. The scutum is of a very deep olivaceous green metallescence. The declivity of the epinotum, upper surfaces of the petiolar and post-petiolar nodes, femora, tibiae, and antennal clubs are tinged with a fainter green varying with the light. Tarsi, antennal scapes, and mandibles ferruginous. The entire gaster is highly polished, with distinct, dark metallic green and blue tones. This description was made in bright sunlight (direct), and was done with the aid of a 40 × binocular magnifying glass.

Holotype.—Female; Lakehurst, Ocean Co., NEW JERSEY; August 23, 1940; W. L. Brown; [Acad. Nat. Sci. Philadelphia, Pa., No. 10561].

Worker. Total length 1.8 to 2.8 mm. The head, from tips of clypeal teeth to vertex, is approximately .53 mm. in length, while the width through the eyes varies from .42 to .46 mm. Clypeal teeth more prominent than in *minimum* (Buckley), with more acute apices. The clypeal carinae, of which the teeth are a continuation, are much higher and sharper than the same structures in *minimum*, and the concavity between them is correspondingly deeper. The teeth are noticeably incurved, with no evident swelling of the bases. The posterior border of the head is slightly concave when seen from the front. Antennal joints are twelve in number; otherwise, the head is much as in *minimum*.

Thorax low and gently rounded as in *minimum*, though a few individuals possess an epinotum which is very slightly more

angular in profile than were the specimens of *minimum* studied, suggesting a transition in this respect to *carbonarium* and its subspecies *ebeninum*.

The nodes of the petiole and postpetiole are higher in relation to their antero-posterior thickness than are those of *minimum*, this conformation causing the postpetiole to be much greater in bulk relative to the petiole than is the postpetiole of *minimum* referred to its petiole. The altered height antero-posterior thickness ratio is achieved by a marked front to rear compression, presenting evidence of a relationship with *carbonarium* and *ebeninum*. The ventral keel of the petiole tends to be both narrow and straight. The gaster is larger and more bulky in profile than in the worker *minimum*, is evenly rounded and oval in profile.

The head is smooth and shining with scattered punctures, except for the few striae running upward fanwise from the mandibular insertions and a few that are oriented longitudinally on the frontal carinae. A few short longitudinal striae also sit astride the upper rounded fossa of the frontal area. The lower halves of the sides of the thorax bear faint striae which continue around the base of the epinotal declivity and are more or less horizontal to the axis of the insect. The gaster is smooth and shining.

The hairs are, on the average, longer than those found on *minimum*, whitish in color. These are scattered rather sparsely over the dorsum and sides of the body, where they are most numerous on the gaster, which latter also bears a few hairs on the venter. There is a noticeable development of gular ammochetae. Pubescence very scarce.

The color in most specimens is a deep brown overlaid on the dorsum of the body and the facial aspect of the head with a greenish metallescence. In the best lights, the green color appears to be strongest on the vertex of the head, the dorsum of the thorax, and especially so on the gaster. The mouthparts and appendages are of a lighter brown color, the greenish reflections being evident on the antennae and often on the legs. The green coloration is nowhere as definite as that of the female.

but approaches that of typical specimens of *Macromischa squamifera* in the possession of the author. The metallescence survives in the dead specimen after long immersion in alcohol and is not noticeably heightened by the addition of glycerine. A few specimens lack most or all of the metallescence in a dead and dried state. Possibly these are teneral. Alive and to the naked eye, the workers appear jet-black, as do those of *minimum*.

Ergatotype.—Worker, with same data as for female holotype.

Described from workers and (often only partially) dealate females taken August 25, 1940, and workers taken June 14, 1942, from about ten nests in yellow and white sand among the scanty, low weeds of a roadside strip within the limits of Lakehurst, Ocean County, NEW JERSEY. The nests were apparently restricted to the narrow strip, which is about 70 feet long. The craters were large, 5 to 8 inches in diameter, compared to the smaller ones I have seen of *minimum*, which are usually not half as large. On the first date mentioned above, a dry, sunny day, one to five queens were found in each nest, while on the second date, which was rainy, only workers could be found. The colonies were extremely populous.

"Associated" at varying distances were nests of *Aphaenogaster treatae*, *Leptothorax texanus* subsp. *davisi*, *Trachymyrmex septentrionalis*, and *Dormyrmex* (*Conomyrma*) *pyramicus*. The situation is now greatly changed due to the encroachment of the road and nearby residences with their cleared spaces, but closely adjacent groves of pitch pines (*Pinus rigida*) and other characteristic vegetation testify to the fact that the area once must have been the same as the typical pine barren forest completely surrounding the town. If so, *viridum* should be expected to turn up elsewhere in the barrens. That such energetic collectors as Wheeler and Davis should have missed it in their extensive collecting around the town's outskirts is probably due to the extreme superficial resemblance to *minimum* of the worker phase; the common *minimum* is found everywhere in the barrens.

This insect presents characters which ally it on the one hand with *Monomorium minutum* subsp. *minimum* and on the other with *M. carbonarium* and its race *ebeninum*. It differs from

both in its larger size, green coloration, conformation of clypeus and clypeal teeth, and in sculpture. In the form of its petiole it resembles *carbonarium* and *ebeninum*, but the thorax is much as in *minimum*, which it also resembles in having a winged female caste. The female may be distinguished at once by the naked eye because of the metallescence of the gaster, which surpasses in intensity any other green that I have yet seen in the *Formicidae*.

I wish to thank Drs. Frank McKim Swartz and Stuart W. Frost for their loans of equipment and advice and Dr. Wm. S. Creighton for permission to examine related species in his collection and also for advice.

Note Regarding Authorship of *Hexagenia limbata* (Serville) (Ephemeroptera).

F. EARLE LYMAN, Norris, Tennessee.

Most North American mayfly workers have been for some years consistently ascribing the authorship of *Hexagenia limbata* (Serville) to Guerin. Since this *Hexagenia* is the most common of our Great Lakes species, it seems that attention should be called to this fact.

Although Guerin¹ was author of the book in which the original description appeared, he definitely gave to Serville credit for writing the specific description and right to authorship. His statement to this effect is quoted as follows: "Cette espece est nouvelle. Voici la description que M. Serville en a faite." Moreover, in citing the species name for the first time immediately above the specific description, Guerin placed Serville's name in abbreviation after it, thus "*Ephemerella limbata* Serv." Most European workers have given Serville proper recognition as author of the species.

Dr. E. O. Essig, Professor of Entomology, has been appointed head of the division of Entomology and Parasitology at the University of California, Berkeley, California.

¹ Iconographie du regne animal de G. Cuvier. III. Insectes. 1829.

Some Lycaenid Aberrations (Lepidoptera: Lycaenidae).

By HARRY K. CLENCH, Cambridge, Mass.

The following aberrant Lycaenidae have been collected locally over a period of five years. Because of the interest attached to such variants by genetically-minded Lepidopterists, they were thought worthy of recording. Following the current and very wise practice, in this country, no names have been assigned these abnormal specimens.

STRYMON MELINUS HUMULI Harris

A single female taken in the Blue Hills Reservation, Milton, Massachusetts, May 9, 1943, differs remarkably from the normal of this species in the presence of a patch of fulvous scales in the center of the fore wing above, between Cu_1 and Cu_2 , with a few between M_3 and Cu_1 . I have never observed even the slightest tendency towards this type of variation in any specimen of any of the several subspecies of *melinus*, but Mr. W. Prescott Rogers, of Fall River, Massachusetts, writes me that "Specimens [of *humuli*] with the patch of orange scales on the fore wing have been frequently taken by me."

INCISALIA POLIOS Cook and Watson

An aberrant female of this species was taken on Big Blue Hill in the Blue Hills Reservation, Milton, Massachusetts, on May 5, 1942. It differs from typical *polios* in being uniformly pale yellow fulvous above, with the veins outlined in black. Below the whole aspect is paler than normal, particularly on the fore wing, where the predominant color is yellow-fulvous. The costa is edged with black. The discal line, which usually consists of a black-brown line outwardly edged with white is here merely a thin, tortuous, white thread-line.

INCISALIA NIPHON NIPHON Hübner

A male of this species, same data as preceding specimen, differs from normal males in having the fore wing above edged on the outer margin with a band of whitish scales, interrupted by

the veins, which are black through it. This band is less pronounced on the hind wing, and consists merely of a series of obscure internervural patches of whitish scales. Below, the specimen is normal.

LYCAENA EPIXANTHE EPIXANTHE Boisd. and Lec.

A male was taken near Norwood, Massachusetts, July 3, 1941, in which the violet of the upperside of the fore wing is confined to the cell, and a small area immediately costad and apicad of it. It is similarly restricted on the hind wing.

LYCAENA HYPOPILAEAS HYPOPILAEAS Boisd.

A male from Burlington, Massachusetts, August 2, 1940, has the post-discal spots of the fore wing below obsolescent, those in M_3-Cu_1 and Cu_2-2A being entirely gone, and the remainder reduced. The corresponding spots on the hind wing are absent altogether. Above, the specimen is normal, except that the post-discal spots are slightly smaller.

EVERES COMYNTAS COMYNTAS Godart

A male of this species (Boston, Massachusetts, August 7, 1939) has the orange spots on both surfaces of the hind wing colored pale cream.

A number of individuals (Blue Hills, Milton, Massachusetts; Mansfield, Massachusetts; Bolins Mills, Ohio) have been taken in which the discal and basal spots are enlarged and heavier. This apparently is the aberration named *watermani* by Nakahara. Two Blue Hills males of the spring brood (*meinersi* Field) are similarly differentiated.

LYCAENOPSIS PSEUDARGIOLUS Boisd. and Lec.

Variations of this species occur almost without limit, so that only the more striking will be given. All are the spring form *lucia* Kirby.

1. Male, Blue Hills, Milton, Massachusetts, April 18, 1941. Differs in having the outer margin of the fore wing rather broadly black from apex to Cu_1 , approaching normal female marking. The black is thickest (about 2 mm.) at the apex, and diminishes to complete obsolescence at Cu_1 .

2. 3 males, Blue Hills, April 19, 1941; 1 female, Cambridge, Massachusetts, May 9, 1943. Underside of fore wing with the discal spots tending towards complete confluence. Reaches the maximum development in the Cambridge female, in which they have united to form a large central patch similar to that found on the hind wing.

3. 4 females, Blue Hills, as follows: 2, April 19, 1941; 1, April 28, 1942; 1, May 9, 1943. Differ from normal females in having a central black patch on each wing above, particularly on the fore wing. The 1943 specimen has only a faint indication of the fore wing patch, and none whatsoever on the hind wing. A similar female is in the collection of the Museum of Comparative Zoölogy, from Long Island, New York.

Note on *Podium fulvipes* in Florida (Hymenoptera, Sphecidae).

In a paper on Florida Sphecinae published in ENTOMOLOGICAL NEWS for December, 1942, it was stated on page 280 that no species of the Tribe Podiini had as yet been reported from Florida. The capture of a female specimen of *Podium fulvipes* Cress. at Doe Lake near Moss Bluff not far from Ocala, July 30, 1943, by Mr. J. E. Gillaspay, as it was emerging from a hole about breast high in a wooden post, now adds this hitherto unrepresented Tribe to the list of Florida Sphecinae.—H. T. Fernald.

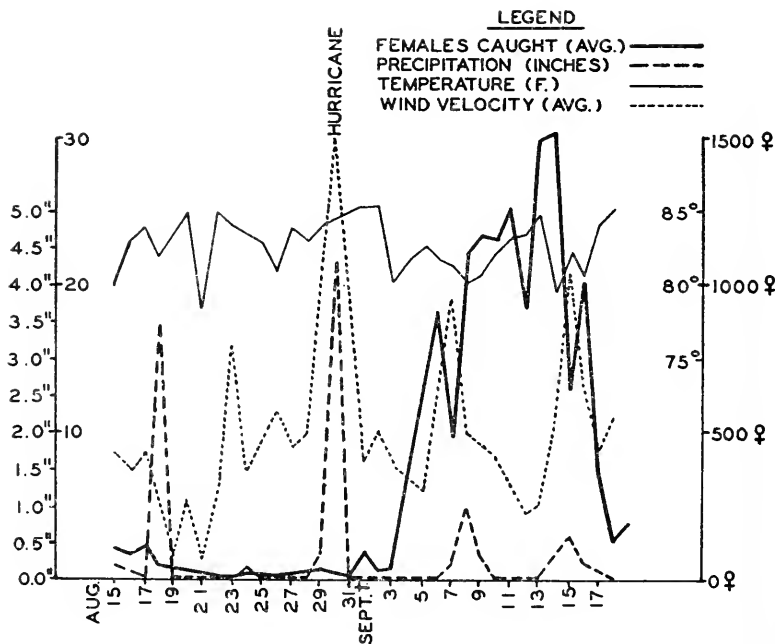
The Effect of Winds of Hurricane Velocity on Mosquito Trapping Results at Corpus Christi, Texas.

By WILLIAM M. GORDON and ROBERT Z. PAGE,
Corpus Christi, Texas.

During the months of greatest mosquito activity a peak catch may be expected in the traps five to seven days after a rain. The trapping results recorded on the graph are an average of the results of seven New Jersey type electric mosquito traps.

The number of mosquitoes represents the females taken per trap per night from 7 P.M. to 7 A.M.

It may be noted that the peak catch expected within a week after the rain of August 18th was entirely eliminated due to high winds reaching hurricane velocity. On this date gusts of wind reached a velocity of 100 m.p.h. The peak following the rain of August 30th was expected September 6th or 7th but winds of nearly 20 m.p.h. caused a decrease of about two-thirds of the expected trapping results. Due to the retarding of the peak by about one week and the mortality of the adult mosquitoes during the time lapse, the actual peak was less than it normally would have been. During this entire period the temperature was never greater than 85° F. or less than 78° F.*



* For an extensive analysis of these factors see Rudolfs, W. Observations on the relation between atmospheric conditions and the behavior of mosquitoes. *New Jersey Agric. Exp. Sta., Bull.* 388. 32 pages. 1923. —The Editors.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae). Part II.

By CHARLES P. ALEXANDER, Massachusetts State College,
Amherst, Massachusetts.

The preceding part under this title was published in 1943 (Ent. News, 54: 45-51). At this time I wish to characterize a few further species that have been discovered in extensive series of these flies from Idaho, Washington and California. Except where indicated to the contrary, the types of the novelties are preserved in my personal collection of these flies.

Limonia (Dicranomyia) linsdalei n.sp.

Most similar to *L. (D.) libertoides* (Alexander) and *L. (D.) stigmata* (Doane), differing in the slightly patterned wings and in the structure of the male hypopygium, especially the very peculiar lobe of the basistyle. The general appearance of the paratype is quite different from that of the type, but from the structure of the male hypopygium the two flies are conspecific. The species is named in honor of the collector of the holotype, Dr. Jean M. Linsdale, of the Frances Simes Hastings Natural History Reservation, Monterey, California.

General coloration gray, the praescutum with a darker brown median stripe, most evident in front; antennae black throughout; halteres short, the apex of knob darkened; wings whitish, the prearcular field even clearer white; stigma brown; a very restricted brown seaming along cord, outer end of cell *1st M*₂, *Cu* and *1st A*; vein *Sc*₁ a little longer than *R*₂; basal section of *R*₄₊₅ long, approximately two-thirds the length of *R*₅; male hypopygium with the ventromesal lobe of basistyle at extreme cephalic end of sclerite, narrow, before apex constricted into a pale bulbous tip.

Length, ♂, about 5.5-7 mm.; wing 6-8 mm.; ♀, about 6 mm.; wing 6.5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments oval; longest verticils somewhat shorter than the

segments. Head gray, the central portion of vertex extensively infuscated; anterior vertex broad, nearly three times the diameter of scape.

Pronotum dark brownish gray. Mesonotum dark gray, the praescutum more infuscated medially to produce a more or less distinct stripe, most evident in front; lateral stripes lacking; scutellum a little paler; lateral borders of mediotergite and ventral edge of pleurotergite a little darker. Pleura dark gray; dorsopleural membrane uniformly darkened. Halteres short; apex of knob darkened. Legs with coxae dark brown, heavily gray pruinose; trochanters obscure yellow; femora light brown, scarcely more darkened near the tips; tibiae and basitarsi pale brown, their tips very narrowly darkened; outer tarsal segments brownish black. Wings with a whitish ground, the prearcular field even clearer white; stigma brown; a very restricted brown pattern, including narrow seams at origin of *Rs*, along cord and outer end of cell *1st M*₂, and as seams along veins *Cu* and *2nd A*; cell *Sc* chiefly infuscated, the outer end paler; veins brown; bullate areas along cord and outer end of cell *1st M*₂ conspicuous. In the paratype, the wing pattern is much less conspicuous. Venation: *Sc*₁ ending opposite or immediately beyond the origin of *Rs*, *Sc*₂ a short distance from its tip so *Sc*₁ alone is a little longer than *R*₂; *Rs* weakly angulated and very slightly spurred near origin; *R*₂ in transverse alignment with the short free tip of *Sc*₂; basal section of *R*₄₊₅ long, from three-fifths to two-thirds *Rs*; cell *1st M*₂ about as long as vein *M*₄ beyond it; *m-cu* at fork of *M*; vein *2nd A* nearly straight until near its outer end.

Abdomen dark reddish brown, the lateral tergal borders more darkened; hypopygium darkened, the tergite and ventral dististyle paler; basal sternites pale, their caudal borders more darkened; outer segments more darkened. In female, abdomen more uniform dark brownish gray. Ovipositor with cerci elongate, straight, their tips acute. Male hypopygium with the tergite transverse but relatively long; posterior margin gently emarginate, the exact border poorly defined, delimited by a concentration of major setae on the lobes; median area of emargina-

tion with two setae; remainder of disk with delicate setulae only. Basistyle with the ventromesal lobe at extreme cephalic end of style, unusually slender, darkened at base, before apex narrowed and constricted into an oval bulbous portion with scattered setae of moderate length. Dorsal dististyle a long, gently curved, darkened rod that narrows very gradually to a long acute point. Ventral dististyle with the body small, sub-circular in outline, its area less than that of the basistyle; rostral prolongation darkened, appearing as a long, gently curved point; rostral spines two, placed close together at about one-third the length of prolongation, arising from individual tubercles; spines only a little more than one-third the length of prolongation. Gonapophyses with mesal-apical lobe elongate, nearly straight, the darkened tips a trifle outcurved.

Holotype: ♀, Frances Simes Hastings Natural History Reservation, Monterey, CALIFORNIA, April 6, 1938 (Linsdale). *Allotopotype*: a broken ♂, March 13, 1938. *Paratype*: ♂, Avalon, Catalina Island, California, March 19 (Cockerell). Type returned to Dr. Linsdale.

Rhabdomastix (Sacandaga) trichophora n.sp.

Closest to *R. (S.) flava* (Alexander), of northeastern North America, and *R. (S.) coloradensis* (Alexander), of the central and southern Rocky Mountains. It differs in the conspicuously dilated wings of the male, with the macrotrichia of the veins unusually abundant, and in the venation, as the considerably longer *Rs*.

General coloration yellow, the mesonotum pale reddish brown; head above obscure yellow, the vertex with a brown spot; halteres pale yellow throughout; legs with the femora and tibiae yellow, the tips narrowly infuscated; wings (male) broad, especially opposite cell *1st A*, pale yellow, without pattern; macrotrichia of veins beyond cord unusually numerous, including a series of about twelve on vein *R*₄, on both surfaces of vein; *Sc*₁ more than one-fourth as long as *Rs*.

Length, ♂, about 5.8 mm.; wing 6.8 mm.; antenna about 1.3 mm.

Rostrum brownish yellow; palpi brown. Antennae of moderate length; scape and base of pedicel yellow, remainder of organ black; two basal flagellar segments short-cylindrical and more or less fused, the succeeding segments becoming more elongate, especially the outer ones; verticils of outer segments long and conspicuous, exceeding the segments in length. Head broad, obscure yellow, the center of vertex narrowly but distinctly darkened; anterior vertex broad.

Pronotum light yellow, very vaguely darkened sublaterally. Mesonotal praescutum pale reddish brown, with a somewhat darker median stripe, the surface very sparsely pruinose; humeral and lateral portions light yellow; posterior sclerites of notum pale reddish brown. Pleura reddish brown, the dorso-pleural region light yellow. Halteres pale yellow. Legs with the coxae reddish yellow, the fore pair a trifle darker; trochanters yellow; femora and tibiae yellow, the tips narrowly infuscated; tarsi yellow, the outer segments infuscated. Wings (male) broad, especially opposite cell *1st A*; pale yellow, the costal border a trifle more saturated; no vestige of a stigma; veins yellow. Veins beyond cord with conspicuous macrotrichia, as follows: R_4 about twelve, on both surfaces, involving all but extreme base of vein; R_5 a long complete series the entire length of outer section, on both surfaces, and exceeding sixty in number; veins M_{1+2} , M_3 and M_4 with rows of trichia except on their restricted basal portions; a few scattered trichia on distal section of Cu_1 . Venation: Sc long, Sc_1 ending about opposite four-fifths Rs , Sc_2 far from the tip of Sc_1 , the latter more than one-fourth as long as Rs ; vein R_3 suberect; R_1 of moderate length, cell R_3 at margin subequal to cell R_4 ; Rs unusually long, about twice R_{2+3+4} ; basal section of M_3 long, much exceeding the basal section of M_{1+2} ; both sections of M_{3+4} subequal.

Abdominal tergites yellow, weakly darkened medially; a weak darker brown subterminal ring; sternites clearer yellow. Male hypopygium with the outer dististyle slightly narrower than in *coloradensis*.

Holotype: ♂, Mount Rainier, WASHINGTON, altitude 2,900 feet, July 28, 1940 (H. & M. Townes).

Cryptolabis (Cryptolabis) pachyphallus n.sp.

Entirely different from the only other northwestern Nearctic species so far described, *C. (C.) bisinuata* Doane. Readily distinguished by the structure of the male hypopygium, especially the shape of the retracted dististyle.

General coloration blackened, the postnotum and thoracic pleura variegated with yellow; legs infuscated, the femoral bases obscure yellow; wings subhyaline, restrictedly patterned with brown; male hypopygium with the dististyle retracted, its apex not reaching the posterior level of the sternite, the outer margin with a lateral lobe or flange.

Length, ♂, about 3–3.2 mm.; wing 4–4.1 mm.; ♀, about 3.3–3.6 mm.; wing 4.5–5 mm.

Rostrum and palpi black. Antennae short, dark brown to black; flagellar segments oval. Head obscure yellow, the vertex extensively darkened medially.

Pronotum darkened medially, paler on sides; pretergites yellow. Mesonotal praescutum almost uniformly blackened, sparsely pruinose, the very restricted humeral region and lateral margin more yellowish; posterior sclerites of notum blackened, with obscure yellow areas on outer posterior portion of each scutal lobe and a common spot on dorsal pleurotergite and outer lateral portion of mediotergite; in cases, the entire thorax more uniformly blackened. Pleura blackened, gray pruinose; dorsal sternopleurite narrowly obscure yellow to produce a narrow longitudinal stripe. Halteres relatively long, stem obscure yellow, the knob somewhat clearer yellow. Legs with the coxae brown, the trochanters a little paler; femora obscure yellow basally, the very broad apices gradually darkened, on the fore pair very extensive, including more than the distal half; on posterior legs more restricted; tibiae light brown, the tips narrowly darker; tarsi brownish black. Wings subhyaline, sparsely patterned with brown, including ill-defined seams on *Cu*, anterior cord and certain veins beyond cord, especially R_5 ; stigma and axillary region brown; prearcular and costal fields more whitened; veins brown, pale in the light-colored areas. Macrotrichia in distal portions of cells R_3 to M_3 , inclusive, occupying

the central portions of the cells. Venation: *Rs* strongly sinuous, oblique, to subperpendicular; *r-m* connecting with *Rs* shortly before its fork; *m-cu* nearly its own length beyond the fork of *M*.

Abdomen brownish black, the distal ends of the genitalia of both sexes restrictedly more reddish brown. Male hypopygium with the dististyle retracted, its apex not reaching the posterior level of the sternite; inner or mesal portion of basistyle heavily sclerotized, produced laterad into a strong point. Dististyle a flattened blade that gradually narrows to the acute tip, its surface with numerous scattered setae; on outer margin of style with a lateral lobe or flange. Lateral and submedian hypopygial lobes conspicuously hairy, the former rounded-oval, with unusually long setae; submedian lobes oval, with more abundant but shorter bristles. Aedeagus moderately stout.

Holotype: ♂, Riggins, IDAHO, August 10, 1938 (J. W. Zukel).
Allotopotype: ♀. *Paratopotypes*: ♂♂ ♀.

The Neon-sign Dance of the Water-boatman, *Tricocorixa verticalis* Fieb. (Hemiptera).*†

By PHIL RAU, Kirkwood, Missouri.

I was attracted to a mass of thousands of these water-boatmen in a very active dance before a neon sign of a drug store at Tiptonville, Tennessee, near Reelsfoot Lake, on the night of July 12, 1937. The bottom of the sign was about ten feet from the ground, and a "ball" of these insects—I had better say a "football" because that was the size and shape of the mass—was in constant motion, rapidly going in and out of the invisible boundaries of their little world in front of the lighted red and blue letters.

* Dr. J. F. Abbott, in Hemiptera of Connecticut (State Geol. and Nat. Hist. Survey, Bull. 34: 386, 1923) says Corixids are to be found in shallow brooks, ponds, and puddles; they are as a rule strong fliers and often migrate in great swarms from pond to pond. At such times they not infrequently come to the light.

† Identified by H. S. Barber.

The performers, in constant motion, kept together in this concentrated mass for several minutes; then they swept to a region below the sign, spreading themselves out over a greater area. When they reached a point about five feet below the lights, they continued to spread until they covered a space of about four feet wide by two feet high, dancing frantically all the while. They were now out of the glare of light, but they danced just as wildly as if they were in it. Without warning, after two or three minutes of this they again swept upward to the place they had left in front of the red and blue letters, the mass gradually tightening on its upward course into a ball. They repeated the dance again for five or six minutes and then in the same way dropped below to the less lighted area, spreading themselves as they moved.

I watched them for forty-five minutes, from 8:30 to 9:15. They repeated this same performance time and time again, without any perceptible variation, and I tried to get the meaning of it all. Was it a mating dance? If so, mating must have occurred elsewhere, for none of it took place while I watched them. What influence did the neon light have on their behavior, and what would the performance have been in the presence of ordinary light? May it be that in bobbing down to darker regions, they sought relief from the intense light? But again if this is true, why did they dance into it again and yet again? The performance on the whole may, after all, have been nothing but *kinderspiel*—insects at play and, if I may say so, enjoying life to the utmost.

Notes on Some Species of *Aphelonotus* (Hemiptera: Nabidae).

By HALBERT M. HARRIS, Ames, Iowa.

Through the kindness of Dr. A. Avinoff I have had the privilege of examining some miscellaneous *Nabidae* belonging to the Carnegie Museum. Among the specimens from South America are examples that extend our knowledge of *Aphelonotus* Uhler.

APHELONOTUS MEDIUS Harris, Bull. Brooklyn Ent. Soc., 26: 16, 18. 1931.

This species was described from a unique male specimen taken along the Madeira River, above Manaus, Brazil. The holotype is in the U. S. National Museum. It is now possible to record a nice series of specimens, both males and females, from Santarem, Brazil, H. H. Smith Collector, and from Taperina, Brazil, H. H. Smith.

A. medius agrees with the much larger, *A. major* Harris, and differs from all other known species of the genus in the much greater length of the post-ocular part of head, measured to basal constriction, as compared to the interocular width.

FEMALE: Antennae about as in male, thickly pilose; the third segment about as stout as second, slightly sinuate, faintly enlarged at middle and at apex, with a whitish sensory point, from which arises a long fine hair, on the upper surface at the median enlargement; segments four and five very fine; proportions, 16:30:27:29:30. Pronotum twice as wide at base as its median length (71:35). Front trochanters underneath toward the apex with two or three piceous teeth and intermediate coxae with one or two. Venter finely, rather thickly pilose; the apical margin of the last segment slightly, angularly convex at the median line. Length, 4.8 mm.; width, 1.4 mm.

Allotype, female, Taperina, Brazil, in collection of Carnegie Museum.

APHELONOTUS CONFUSUS Harris, Bull. Brooklyn Ent. Soc., 26: 16. 1931.

There is in the Carnegie Museum material a nice series of specimens from Santarem, Brazil, and Taperina, Brazil, that I take to be *confusus* Harris. In general they are darker than the paratype before me. Some specimens have a distinct median canal on the scutellum and thus in this respect, as in most others, agree with *A. simplus* Uhler. As noted in the original description, *confusus* is very close to *simplus*, but in all the specimens I have seen it is possible to segregate the two forms by comparison, and primarily on the basis of eye size and width

of the vertex. In *confusus* the width of the vertex is slightly less than half the width of head.

APHELONOTUS FRATERCULUS Harris, Bull. Brooklyn Ent. Soc., 26: 18. 1931.

Several specimens of this form from Bahia and Para, Brazil, are at hand. The species has previously been known from Panama and Ecuador.

Eye-Color Changes in Mayflies of the Genus *Stenonema* (Ephemeridae).¹

F. EARLE LYMAN, Tennessee Valley Authority, Norris,
Tennessee.

While pursuing ecological studies on lake-inhabiting species of mayflies, the observation was made that the eyes of individuals of certain species of *Stenonema* were of one color during the day and of a different color at dusk or after dark. To the writer's knowledge this phenomenon has not as yet been recorded for mayflies and, as will be pointed out, the fact has a definite taxonomic significance. These eye-color changes were observed only among species of *Stenonema* (Heptageniidae); the extent and degree to which this phenomenon may occur throughout the mayfly group as a whole has not been ascertained.

Each of the large compound eyes in mayflies is divided transversely into an upper portion having large facets and a lower portion consisting of smaller facets. The upper portion of the eye is usually the larger and very often the dividing line between the two is distinct. The eyes of the male are usually much larger than those of the female.

Male or female specimens of *Stenonema femoratum* (Say) collected during the day resting on vegetation had very pale, bluish-grey eyes both dorsally and ventrally. The eyes of *S. interpunctatum* (Say), under similar conditions, have pale,

¹A contribution from the Biological Station and Department of Zoology, University of Michigan.

yellowish-green eyes. However, specimens taken in the evening while swarming, possessed very dark, bluish-black eyes in both species. Individuals collected in the early part of the evening resting on vegetation just before swarming had eyes in part light-colored and in part dark, i.e., in color the eyes presented the appearance of being halfway between those individuals whose eyes were entirely pale-colored and those whose eyes were completely dark. This same condition was observed on dark, cloudy days among specimens found in shady places where the intensity of light was even further subdued.

The taxonomic import of these facts is emphasized by reference to the descriptions given for species of *Stenonema* by Traver in Needham, Traver, and Hsu.² Here, mention is often made of the fact that eye color in living specimens is generally either pale, bluish-grey or pale, yellowish-green, depending upon the species. In several species eye color is not described. In one species only (*Stenonema birdi* Traver) is there any indication that dark eyes are ever present among the members of this genus. According to Traver's statement, the eyes are "bluish black in holotype, greyish blue in some of paratypes (in alcohol)." No further statement or explanation appears. It should be noted that the color of eyes has been used extensively in the past by several mayfly workers as a distinguishing specific character in several different genera of mayflies in both dried and alcoholic material. Until a more extensive survey has been made as to the possibilities of eye-color changes in other groups of mayflies, it would seem best to use this character with caution.

Since it seemed obvious that light was the causal factor that produced the color change in the eyes and with a view to discovering the relationship of light to this phenomenon, a series of simple experiments was performed with living material.

Adult specimens of males and females of both *S. femoratum* and *S. interpunctatum* were collected during a bright day and each was placed in an individual vial. All possessed light-colored eyes. Some were placed in complete darkness, while

² The Biology of Mayflies. Ithaca, N. Y. 1935.

others were allowed to remain exposed to strong daylight. Within an hour the eyes of those specimens of both species kept in the dark had changed to a deep, bluish-black regardless of sex. When again exposed to daylight, the eyes turn pale-colored. Those specimens of both species which had remained continuously exposed to light did not show a color change during the remainder of the day. This procedure was repeated a number of times using different specimens with the same results. A differential change between the dorsal and ventral portions of the eye was not noted, both the upper and lower portions changed simultaneously.

Experiments were also performed using artificial electric light at night. Individuals with light eyes were collected during the day. The eyes of all specimens turned to the dark color at the approach of night. When these same individuals were then subjected to the stimulus of artificial light, the eyes again became pale-colored but changed to dark again when the artificial light source was removed. Repetition of similar circumstances produced the same results.

The eyes of the subimagoes of both the species under discussion are normally pale in color, either being a bluish-grey or yellowish-green, respectively. When subimago specimens were subjected to the conditions of either of the experiments described above, an eye-color change was not produced. It was further noticed that those imagoes recently emerged from the subimaginal stage did not change eye color as rapidly as those which were older. These facts seem to indicate that the ability to change the color of the eye is purely an adult adaptation and may be correlated with swarming and mating activities, which take place under conditions of very low light intensities. Small swarms of these species have been seen on dark, cloudy days.

Further experiments were conducted to determine the effects of variable light conditions upon eye-color changes under different types of preservation. When killed and preserved in alcohol, specimens retained that color of eye present at the time of killing, viz., light eyes remained light and dark eyes remained dark. The eyes of such specimens have maintained their orig-

inal color, whether dark or light when killed, even after several years of preservation. However, if the conditions of light were reversed immediately or shortly after the specimens were placed in the alcohol, the eyes were likely to change their color, unless the killing and fixing process was very rapid. The change from dark to light eyes in freshly killed individuals was first observed when specimens with dark eyes were placed in 80 percent alcohol and then allowed to stand under a bright electric light. Pinned specimens invariably turned dark upon drying. However, pale-eyed individuals did not usually become a deep black but rather a dark brown, whereas, dark-eyed individuals retained their original deep-black color when dried. A very marked shrivelling of the eyes occurred in most dried specimens which was not the case when alcohol was used as a preservative. If dark-eyed individuals were placed in the light immediately after killing with cyanide and mounting on the pin, the eyes usually turned pale again; contrariwise, light-eyed specimens usually turned dark if placed in the dark immediately upon killing.

According to the figure of the longitudinal sections of mayfly ommatidia given by Hsu in Needham, Traver, and Hsu (1935, Pl. IX), the eye of a mayfly is evidently of the type that forms an apposition image. Strangely enough the apposition eye is most characteristic of diurnal insects, although not limited to them, while most mayflies are considered as nocturnal. The eye-color changes that have been noted above are probably due to the migration of pigment contained in the iris cells and the movement of this pigment is in response to differences in light intensity.

A Correction: The millipede inadvertently described as *Fontaria kentuckiana* new species (ENTOMOLOGICAL NEWS, liii, p. 167) should have been *Cleptoria kentuckiana* new species.—Nell Bevel Causey.

A New Journal.

In January, 1942, there appeared the first issue of a new journal dealing with general biology. This, the "Revue Canadienne de Biologie," is sponsored by the University of Montreal and has a large international advisory committee. Articles are published in either French or English but with summaries in both languages. The typography and illustrations are excellent. Six numbers appear each year with a minimum total of 500 pages (vol. 1 contained nearly 800 pages). To date articles have appeared by authors in Canada, United States, France, England, Brazil, Venezuela and Chile. The articles are predominantly physiological but not entirely so. Four entomological papers have appeared so far: one on the pigment of beeswax, one on host selection by hymenopterous parasites, one on superparasitism and one on the ecology of the European spruce sawfly.—The Editors.

GENERAL CATALOGUE OF THE HEMIPTERA. Fasc. 4. Fulgoridae, part 3, Araeopidae (Delphacidae). By Z. P. Metcalf, 552 pp. Smith College, Northampton, Mass. \$5.00. This is another part of that valuable catalogue of the Hemiptera of the World; the first part, on the Membracidae, by W. D. Funkhouser, was published in 1927. Since then the following parts have appeared: Mesoveliidae by G. Horvath, 1929; Pyrrhocoridae by R. F. Hussey and E. Sherman, 1929; Tettigometridae and Cixiidae by Z. P. Metcalf, 1932 & 1936. All but one part, the Mesoveliidae, were the work of American students. This work, or any part of it, is, of course, an indispensable requisite of serious students of Hemiptera, and is reasonably priced. Its style of the bibliographical references is good, lucid and should be a sample for students to follow; although the citation of the volume, number, part and such in arabic with its accompanying colon, may not be agreeable to some. There is a little waste of space in having each reference begin on a separate line, but this is generally more apparent than real.—E. T. Cresson, Jr.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—ALLAN, P. B. M.—The travel of larvae. [9] 76: 159–64. BATEN & HUTSON.—Precautions necessary in estimating populations of small animals. [12] 36: 501–504. FLETCHER, F. C.—The arrangement of insect specimens in boxes and drawers. [118] 17: 6–7, ill. FLINT, W. P.—1883–1943.—(Obituary). [12] 36: 644–645. HEMMING, F.—The function and powers of the International Commission on Zoological Nomenclature. [Bull. Zool. Nomencl., London] 1: iv–xxvi. International Commission on Zoological Nomenclature: Financial report for the period from Oct. 6, 1936 to Dec. 31, 1942. And an appeal for a fund to continue the work. [Bull. Zool. Nomencl., London] 1: xxvii–xl. HOVANITZ, W.—Geographical variation and racial structure of *Argynnis callipe* in California. [90] 77: 400–425. JORDAN, K.—Decision to establish the Bulletin of Zoological Nomenclature. [Bull. Zool. Nomencl., London] 1: i–iii. KING, W. V.—Some entomological aspects of troop mobilization. [12] 36: 577–579. SHIELDS & HULL.—The seasonal incidence of sand flies in Florida. [12] 36: 625. Post War Entomology (Editorial). [12] 36: 642–643.

ANATOMY, PHYSIOLOGY, ETC.—DE BACII, P.—The effect of low storage temperature on reproduction in certain parasitic Hymenoptera. [55] 19: 112–19. BARRÉ, R.—Identification du colorant de la cire d'abeille. [76] 1: 485–490. BENDER, J. C.—Anatomy and histology of the female reproductive organs of *Habrobracon juglandis*. [7] 36: 537–545, ill. FLANDERS, S. E.—Partial oosorption as a possible cause of diploid males in *Microbracon hebetor*. [90] 77: 479–480. GREIFF, D.—The effect of zinc sulphate upon an inbred popu-

lation of *Drosophila melanogaster*. [90] 77: 426-441. HARRIES, F. H.—Some effects of alternating temperatures and exposure to cold on embryonic development of the beet leaf hopper. [12] 36: 505-509. HAVILAND, E. E.—Hibernation and survival of the locust leaf miner. [12] 36: 639-640. HOVEY, C. L.—Effects of temperature and humidity on certain developmental stages of the potato tuber moth. [12] 36: 627-628. LUDWIG, D.—The effect of different relative humidities, during the pupal stage, on the reproductive capacity of the cynthia moth, *Samia walkeri*. [23] 16: 381-387. McDONOGH, R. S.—The variation in adult structure of *Luffia ferchaultella* (Psychod.). [36] 93: 149-72. MOORE, W.—Some vitamin requirements of black carpet beetles. [7] 36: 483-485. PAQUET, G.—Bioclimatic study of the European Spruce sawfly in Quebec. [76] 2: 149-167. QUAYLE, H. J. The increase in resistance in insects to insecticides. [12] 36: 493-501. ROTH, L. M.—Studies on the gaseous secretion of *Tribolium confusum*. 2. The odoriferous glands. [7] 36: 397-424, ill. SMITH, ALLEN & NELSON.—Some chemotropic studies with *Autographa* spp. [12] 36: 619-621. STONE, M. W.—The effect of winter soil temperatures on emergence of adults of the sugar-beet wire worm in cages. [12] 36: 510-515. WOOLEY, T. A.—The metamorphosis of the nervous system of *Aedes dorsalis*. [7] 36: 432-447, ill. ZALESSKY, G.—Expose sommaires des fondements du changement de la terminologie pour la nervation des ailes des insectes. [Zoolog. Jour. Moscow] 22: 154-69, ill. Russian; French summary.

ARACHNIDA AND MYRIOPODA—BRYANT, E. B.—The salticid spiders of Hispaniola. [26] 92: 445-552 (*). CHAMBERLIN, J. C.—The taxonomy of the False Scorpion genus *Synsphyronus* with remarks on the sporadic loss of stability in generally constant morphological characters. [7] 36: 486-500, ill., (k. *). CHAMBERLIN & IVIE.—New gen. & sps. of No. Amer. linyphiid spiders. [Bull. Univ. Texas] 33 (10): 39 pp., ill. MCGREGOR, E. A.—A new spider mite on Citrus in southern California. [10] 45: 127-129, ill. NEVIN, F. R.—*Caeculus pettiti*, a n. sp. of mite from Virginia. [7] 36: 389-393, ill. SMITH & COLE.—Studies of parasites of the American dog tick. [12] 36: 569-572.

THE SMALLER ORDERS—BOHART, R. M.—New sp. of *Halictophagus* with a key to the genus in North America. [7] 36: 341-359, ill. KLOTS, E. B.—A dragonfly gynandromorph. [19] 38: 142, ill. STAFFORD, E. W.—Some Venezuelan Mallophaga. [46] 2: 35-58, ill., (*).

ORTHOPTERA—HAYSLIP, N. C.—Notes on biological studies of mole crickets at Plant City, Fla. [39] 26: 33–46. KNOWLTON & ROBERTS.—Orchelimum feeding notes. [19] 38: 140–141. UVAROV, B. P.—The tribe Thrinchini of the subf. Phamphaginae, and the interrelations of the acridid subfamilies. [36] 93: 1–92, ill.

HEMIPTERA—CHINA, W. E.—A n. sp. of *Microvelia* from Trinidad. [108] 12: 121–24, ill. COLTON, H. S.—Life history and economic possibilities of the American lac insect, *Tachardiella larrea*. [Plateau, Flafstaff, Ariz.] 16: 21–32, ill. DAVIS, W. T.—Local records of brood 17 of the periodical cicada. [19] 38: 121–122. DELONG, D. M.—A new genus—*Stoneana*—and three new species of Mexican leafhoppers. [7] 36: 448–450, ill. Three n. sp. of *Texananus* from the western and south-western United States. [19] 38: 124–127, ill. FERRIS, G. F.—Additions to the knowledge of the Diaspididae. [117] 8: 58–79, ill., (*). FUNKHOUSER, W. D.—Membracidae of Guatemala. [7] 36: 455–482, ill., (*). HAYWARD, K. J.—La oruga de la hoja del algodono (Alabama argillacea) en Tucuman. [Bol. Est. Agr., Tucuman] 41: 21 pp., ill. HIXON, H.—The tropical bedbug established in Fla. [39] 26: 47. ISLAS, F.—Notas sobre la variabilidad cromatica en *Triatoma picturata*. [112] 14: 243–49, ill. KNOWLTON, G. F.—*Nabis alternatus* feeding observations. [19] 38: 122. MCCONNELL, H. S.—Notes on the anatomy of the coccid genus *Aclerda* and descriptions of three n. sps. [10] 45: 106–115, ill. MCKENZIE, H. L.—The seasonal history of *Matsucoccus vexillorum*. Notes on *M. vexillorum* (Margarod). [117] 8: 42–47, ill.; 53–57, ill. Miscellaneous diaspid studies including notes on *Chrysomphalus* (Diaspid). [Bull. Dept. Agr., Calif.] 32: 148–62, ill. (*). MAZZOTTI, L.—*Triatoma phyllosoma usingeri*, a n. subsp. from Mexico. [55] 19: 81–5, ill. POOS & WHEELER.—Studies on the host plants of the leafhoppers of the gen. *Empoasca*. [3] Tech. Bul. 850: 51 pp., ill. RICHTER, L.—Catalogo de los Membracidos de Colombia. [58] 4: 405–9, ill. RUSSELL, L. M.—An apparently n. sp. of *Paurocephala* (Psyllid). [10] 45: 115–120, ill. SAMPSON, W. W.—A generic synopsis of the hemipterous subfamily Aleyrodoidea. [70] 23: 172–223. (k).

LEPIDOPTERA—COMSTOCK, W. P.—Notes on the subg. *Glutophrissa* gen. *Appias* (Pierid). [40] no. 1238. (S*). DAVIS, E. M.—*Phoebis philae* in Winter Park, Fla. [39] 26: 48. HAYWARD, K. J.—El gusano chupador de la cana de azucar, *Diatraea sacharalis*. [Rev. Indust. y Agric., Tucuman]

32: 315-25, ill. Notes on Hesperiidæ in the collection of the Mus. Nac. Brasil. [32] 14-17: 65-75, ill., 1942, (*). HEINRICH, C.—A preoccupied name in Tortricidæ. [10] 45: 126. HOVANITZ, W.—(See under General.) HOVEY, C. L.—(See under Physiology.) LICHY, R.—Documents pour servir a l'etude des Sphingidæ de Venezuela. Une forme nouv. de l'*Amplypterus tigrina* (Heterop.). [46] 2: 1-15, ill. MC-ELVARE, R. R.—Relationship of *Heliosea fasciata* and *H. pictipennis*. [19] 38: 120. MARIA, H. A.—Miscelanea entomologica. Algo sobre pieridos Colombianos. [58] 4: 349-55. SMITH, ALLEN & NELSON. (See under Physiology.) TALBOT, G.—Revisional notes on the gen. *Danaus*. [36] 93: 115-48, (S*). TORRE, S. L.—Dos nuevas esp. de mariposas diurnas para Cuba. [115] 17: 139-40, ill. WILTSHIRE, E. P.—Substitute food-plants, with a table of preference-groups. [21] 55: 79-85.

DIPTERA—ALEXANDER, C. P.—New or little-known Tipulidæ from Venezuela, I. [46] 2: 17-26. New or little-known Tipulidæ. Neotropical sps. [75] 10: 522-552. BLAGOVESHCHENSKY, BREGETOVA & MONTSHADSKY.—Activity in the mosquito attacks under natural conditions and its diurnal periodicity. [Zool. Jour., Moscow] 22: 138-53, Russian; English Sum. COE, R. L.—*Drosophila repleta*, new to Britain, with notes on the sp. and some account of its breeding habits. [8] 79: 204-207. DEONIER, C. C.—Biology of the immature stages of the Clear Lake Gnat. [7] 36: 383-388, ill. FLUKE, C. L.—A new genus and new species of Syrphidæ from Ecuador. [7] 36: 425-431, ill., (k). GALINDO & KELLEY.—*Culex thriambus*, a new mosquito record for Calif. [55] 19: 87-90, (key). JAMES, M. T.—Studies in neotropical Stratiomyidæ. VI. A new genus related to *Adoxomyia*. [7] 36: 380-382, ill. Studies in neotropical Stratiomyidæ. V. The classification of the Rhabdiocerinae. [7] 36: 365-379, ill., (k*). MACFIE, J. W. S.—A n. sp. of *Dasyhelea* from the Bahama Islands. [108] 12: 119-20, ill. ROSS, E. S.—New and additional Lower California mosquito records. [55] 19: 86. RIVENHALL, E.—Matsumura's gen. names in the Syrphidæ. [8] 79: 202-203. SABROSKY, C. W.—New genera and species of Asteiidæ, with a review of the family in the Americas. [7] 36: 501-514, ill. SHIELDS & HULL.—(See under General.) SOUZA LOPES, H.—Contribuicao ao conhecimento das larvas dos Sarcophagidæ com especial referencia ao esqueleto cafalico. [111] 38: 127-63, ill. STEYSKAL, G.—Old World Sepsidæ in N. Amer., with a key to the American genera. [55] 19: 93-95, ill.

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HYMENOPTERA—BEQUAERT, J.—Color variation and distribution of *Apoica pallida*, a nocturnal Neotropical social wasp (Vespid). [1] 69: 107-18. A n. sp. of *Polybia* from Panama. [7] 36: 394-396, ill. DONISTHORPE, H.—Myrmecological gleanings. [108] 12: 115-16, (S*) FLANDERS, S. E.—(See under Anatomy.) LLOYD, D. C.—Further experiments on the host selection by hymenopterous parasites of the moth *Pluella maculipennis*. [76] 1: 633-645. MICHENER, C. D.—Sex anomalies in the gen. *Ashmeadiella*, with notes on the homologies between male and female genital appendages. [55] 19: 96-100, ill. PAQUET, G.—(See under Physiology.) RAU, P.—The nesting habits of Mexican social and solitary wasps of the family Vespidae. [7] 36: 515-536, ill. SCHWARZ, H. F.—Bees of the gen. *Anthidium* from Peru. New *Trigona* bees from Peru. [40] nos. 1242, 1243. Some Venezuelan bees. [46] 2: 27-34. SHENEFELT, R. D.—The genus *Atanycolus* in Amer. north of Mexico (Braconid). [Res. Studies, Sta. Coll. Wash.] 11: 51-163, ill., (*). SIMMONDS, F. J.—The occurrence of superparasitism in *Nemeritis canescens* Gray. [76] 2: 15-58. SMITH, M. R.—A generic and subg. synopsis

of the male ants of the U. S. [119] 30: 273-321. WEYRAUCH, W.—La distribución de las avispas sociales en el Peru. [Biol. Mus. Nat. Hist., Javier Prado, Lima] 7: 66-95.

SPECIAL—Opinions rendered by the Inter. Comm. on Zool. Nomenclature. No. 134.—On the method to be adopted in interpreting the generic names assigned by Freyer to sps. desc. in his *Neuere Beiträge zur Schmetterlingskunde*, 1833-58. No. 135—The suppression of the so-called "*Erlangen List*" of 1801. No. 136—Opinion supplementary to Opin. 11 on the interpretation of Latreille's *Consid. Gen. sur l'ordre Nat. des Anim. composant les classes des Crust., des Arach. et des Ins. avec un tableau method. de leurs genres disposés en familles*, 1810. No. 137—On the relative precedence to be accorded to certain generic names published in 1807 by Fabricius and Hubner respectively for identical genera in the Lep. Rhopal. No. 138—On the method by which the amendment to Art. 25 of the Intern. Code adopted at the Budapest meeting of the Congress, relating to the replacement of invalid names, should be interpreted. No. 139—The names *Cephus* Latr., 1802-1803, and *Astata* Latr., 1796, in the Hymenoptera added to the official list of generic names. No. 140—On the method of forming the family names for *Merops* Linn., 1758 (Aves) and for *Merope* Newm., 1838 (Insecta). No. 141—On the principles to be observed in interpreting Art. 4 of the Code relating to the naming of families and subfamilies. No. 142—Suspension of the Rules for *Satyrus* Latr., 1810 (*Leipid.*). No. 143—On the method of forming the family name for *Tingis* Fabr., 1803 (Hem.). No. 144—On the status of the names *Crabro* Geof., 1762. *Crabro* Fabr., 1775, and *Cimbex* Oliv., 1790 (Hymen.).

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—Annals & Magazine Nat. Hist. 76.—Revue Canad. de Biol. 108.—Proc., R. Entom. Soc., London, (B). 111.—Memorias Inst. Oswaldo Cruz. 112.—Annals Inst. de Biol. Mexico. 115.—Mem. Soc. Cubana Hist. Nat., Havana. 117.—Microentomology, Stanford Univ., Cal. 118.—Ward's Nat. Sci. Bulletin. 119.—Amer. Midland Naturalist.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyraetomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

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ENTOMOLOGICAL NEWS

VOLUME LV, 1944

PHILIP P. CALVERT, EDITOR EMERITUS

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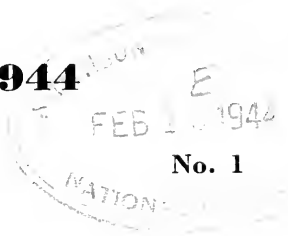
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Philip Powell Calvert—Editor Emeritus

Recently the following letter was received by the Society:

September 29, 1943

MR. JAMES A. G. REHN

President, American Entomological Society,
Chairman, Publication Committee of the same

Dear Mr. Rehn:

In accordance with my letter of May 20 last to you, and to clear matters for the approaching meeting of the editorial staff of ENTOMOLOGICAL NEWS on Tuesday next, October 5, I hereby tender my resignation as Editor of the NEWS.

Yours very truly,

(signed) PHILIP P. CALVERT

At the stated meetings of the Council and of the Society on October 28, 1943, Dr. Calvert's resignation was accepted. The Society, expressing for all of us the gratitude we feel for his many years of service, unanimously elected Dr. Calvert EDITOR EMERITUS.

For several reasons we approach with diffidence the task of choosing words to convey our tribute to the Editor Emeritus. Between what we would be justified in saying in his praise and what that modest man would read without discomfort, there is a considerable gap. Besides, we are confronted with the knowledge that the Editor Emeritus given the academic problem of writing such a tribute would do a better job.

Dr. Calvert was born in Philadelphia on January 29, 1871, and attended the University of Pennsylvania where he received a certificate in 1892 and a Ph.D. in 1895. After a year of post-

doctoral study in Germany, he returned to the University of Pennsylvania, and served on the staff of the Zoology Department until his retirement as Professor Emeritus in 1939. He became an associate in the American Entomological Society in 1888, and is now a member of numerous societies. He is also past President of both the American Entomological Society and the Entomological Society of America. All his life he has been interested in the Odonata. He was author of the Odonata section of *Biologia Centrali-Americana*, and his numerous papers on the taxonomy, biology and growth of dragonflies are well known.

Since his publications and standing in entomology speak for him as a scientist, and since the host of friends and acquaintances who wish him well speak for him as a man, we will confine ourselves to speaking of the Editor Emeritus as Editor—or Seasoner. He was a member of the advisory board when the NEWS was founded 54 years ago. A few years later he became associate editor, and, in 1911, editor. For 33 years he has been seasoning the NEWS* with his own particular flavor which in terms of the kitchen we might describe as well salted, with a judicious use of pepper. The pepper may have caused an eye to smart now and again but we think the consensus of opinion is that the flavor has been agreeable. If you find the flavor of the NEWS lasting it will be because we have succeeded in keeping his new title printed EDITOR *emeritus*.

The Publication Committee of the Society decided to continue the editorship of the NEWS in the hands of the editorial board composed of Ezra T. Cresson, Jr., E. J. F. Marx, James A. G. Rehn, A. Glenn Richards, Jr., and R. G. Schmieder. Drs. Richards and Schmieder were named co-editors. Messrs. Cresson, Marx, and Rehn will assist with part of the editorial work and handle the necessary business aspects of the journal.

* For a survey of the history of ENTOMOLOGICAL NEWS see the article by E. T. Cresson, Jr., entitled "In retrospect," ENT. NEWS, vol. 54, pp. 164-166, 219-222. 1943.

Taxonomic Notes on *Brachycercus lacustris* (Needham) (Ephemeroptera).¹

By F. EARLE LYMAN, Norris, Tennessee.

Brachycercus lacustris (Needham) was originally described (1918) as *Caenis lacustris* Needham from nymphal material only that had been collected from Oneida Lake, New York. In this description the specimen referred to as of their species and taken from Walnut Lake, Michigan, but which Needham had formerly considered as *Ephemerella* sp. in the report of the Geological Survey of Michigan, 1907, may well have been *Ephemerella temporalis* McDunnough, since individuals of this species are quite numerous in Walnut Lake during May, at which time the specimen referred to by Needham was collected. *Ephemerella temporalis* has very prominent occipital tubercles. Moreover, *B. lacustris* does not begin to emerge until about mid-summer and records have not demonstrated its presence as early as May in the nymphal stage.

Ide (1930) described *Eurycaenis pallidus* Ide from only three male imagoes taken at Daventry, Ontario, and at the same time pointed out that these mayflies might well be the adults of *Caenis lacustris*. Lestage (1931) transferred *E. pallidus* Ide to the genus *Brachycercus* but since the name, *pallidus*, had already been used for a species of this genus, Lestage proposed the new name, *Brachycercus idei* Lestage, for Ide's species.

Traver (1932) considered *Caenis lacustris* Needham as belonging in the genus *Eurycaenis* and in discussion of *E. nitidus* Traver stated that *nitidus* might be synonymous with *E. pallidus* Ide but that the nymph of *nitidus* having conspicuous lateral tubercles on the prothorax was distinct from that of *E. lacustris* (Needham). As will be shown below *E. nitidus* Traver could not, therefore, be synonymous with *E. pallidus* Ide. Traver (1935) placed *E. lacustris* (Needham) in the genus *Brachycercus*.

¹ Contribution from the Biological Station and Department of Zoology, University of Michigan.

Collections of adults from the field and also laboratory reared specimens from Douglas Lake, Michigan, according to Ide's original description, belong to the species *Brachycercus idei* Lestage. However, the nymphs from which these adults were reared clearly belong to *Brachycercus lacustris* (Needham). Consequently, the name *B. idei* Lestage falls to synonymy with *B. lacustris* (Needham) by priority, and the latter name should be used to designate the species.

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Laccophilus shermani, a New Species of Water Beetle from Arizona and Texas (Coleoptera: Dytiscidae).¹

By HUGH B. LEECH, Vernon, British Columbia.

Laccophilus shermani new species

A species allied to and resembling *L. decipiens* LeConte. It has been identified as *fuscus* Sharp, by some authors. Dedicated to Mr. John D. Sherman, Jr., whose interest in the Dytiscidae and large collection inspired and made possible most of the fine studies in the family by the late Dr. H. C. Fall.

Male: Length 6.1 mm., width 3.3 mm. *Head*, pronotum and elytra pale brownish-yellow, head infusate at base; *elytra* irrorate with brown (the tiny spots tending to form longitudinal chains), except on following areas which are not irrorate and thus stand out as maculae on each elytron: The side margin and

¹ Contribution No. 2259, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Ont.

a subhumeral, median, postmedian and preapical inward extension of it; the extreme base and a prehumeral enlargement; two faint and one larger elongate spots between subhumeral and suture; a slightly postmedian sutural spot; and two elongate spots between post-median lateral, and suture. *Epipleurae* pale yellow; prosternum and legs brownish-yellow, prosternal process and tarsi darker. *Metasternum*, metacoxal plates and abdominal sternites more rufous.

Meshes of elytral sculpture fine, nearly equal except near suture. Pro- and mesotarsal claws simple. *Metacoxal* file consisting of about 23 equidistant impressed lines; interspaces each at least three times as wide as impressed line, but convex, the lines thus appearing to be broader than they are. *Aedeagus* narrowed and thickened apically, sinuate, with a distinct subapical sinus on one side.

Female: Length 5.75 mm.; width 3.5 mm. Similar to male in color except that pale spots on elytra are smaller, and less numerous basally; under-surface paler than in male. *Metacoxal* file absent. Elytral margin from just behind middle to apical fifth extended in a thin arcuate flange which on the underside forms an epipleural area as broad as at base of epipleuron.

Holotype male and *allotype* female, collected at Bear Canyon, Santa Catalina Mountains, ARIZONA, January 2, 1938, by Edwin C. Van Dyke (Canadian National Coll.). Also 17 *paratypes* as follows: 1 ♂ and 5 ♀ topotypes; 1 ♂, Sabino Canyon, Sta. Catalina Mts., Ariz. (J. W. Tilden); 5 ♂, 4 ♀, San Xavier Mission, Pima Co., Ariz., October 2, 1932 (D. K. Duncan); 1 ♂, Phoenix, Ariz., June 17 (E. A. Schwarz). The following additional specimens have been seen: 1 ♂, Globe, Ariz., April 10, 1921 (F. A. Sherriff); 1 ♀, Pima Co., Ariz., October 21, 1924 (A. A. Nichol); 1 ♀, "Tex.;" 3 ♂, 3 ♀, 1 mi. N. of Fort Davis, Davis Mts., TEXAS, July 16, 1941 (Burdette E. White). *Paratypes* will be distributed to: The United States National Museum, the California Academy of Sciences, the British Museum, the Academy of Natural Sciences of Philadelphia and to Dr. F. N. Young.

The paratypes vary as to the number and distinctness of the white markings on the elytra. Two of the topotypical females and two from the Davis Mts., Texas, have the elytra broadly explanate posteriorly as in the allotype, two others have it faintly explanate, while in the rest the margin is as in the males.

L. shermani resembles the common *decipiens* LeConte, whose range extends from Alaska to Lower California and from Alberta to Colorado and Utah, but has a distinctly more rufous color; males may be separated as follows:

Metacoxal file consisting of 30 to 35 impressed narrow lines, the interspaces flat, and about 4 times as broad as the lines, the file appearing to be smooth. Apical fifth of aedeagus flattened, blunt, faintly notched on one side	<i>decipiens</i>
Metacoxal file of 20 to 25 narrow lines, the interspaces about 3 times as wide as the lines, but inflated, so that the lines look broader than they are, and the file rough. Apical fifth of aedeagus not flattened, but narrower and sinuate, with a sinus on one side	<i>shermani</i>

Well marked examples of *shermani* also resemble *L. maculosus* (Germar), but in the latter the elongate basal maculae arise from the base, are much larger, and margined with black; in the male the outer interspaces of the metacoxal file are progressively narrower, not of uniform width as in *shermani* and *decipiens*.

There is little chance that *shermani* is the same as *L. fuscus* Sharp. Sharp based his species on one female from Nevada, and distinguished it from *decipiens* by its smaller size (5.25×3 mm., as against 5.75×3.5 mm.), "very much narrower form," and "vertice capitis prothoracisque disco obscurioribus; coxis posterioribus fuscis." *L. shermani* averages a little larger than *decipiens*, and is if anything lighter, not darker, above and beneath. I have a small narrow female of *decipiens* from Gunnison, Colorado, which fits Sharp's description of *fuscus* perfectly.

A Note on the Habits of *Trypoxylon politum* Say (Hymenoptera: Sphecidae).

By CARL G. HARTMAN, Urbana, Illinois.

The habits of *Trypoxylon politum* have been extensively studied and described, mostly under the older name, *T. albitarse*. The observations concern mostly the comings and goings of the female as she brings in her captured spiders or returns to the nest with a pellet of mud for the partitions. Examination of the nest and an analysis of its contents have also added greatly to our information, and the behavior of the male as he "guards" the nest in the absence of the female is a matter of common knowledge.

By means of the glass-tube method (see Natural History, Dec. 1941) it was possible for the writer, assisted by Philip and Paul Hartman, to observe some of the activities of a number of *Trypoxylon* pairs as they worked within their transparent abodes.

The glass tube presented for occupancy to this largest member of the genus was about 5-6 mm. in inside diameter, large enough for the smaller male to turn around inside, too small for the female which had to turn around outside and back in when the occasion demanded for the change of orientation, as for example to lay her egg.

Epeirids of various sizes and colors are collected by this species. As they are stored they are pushed in as deeply as possible, the female using her head as a "tamper." Not infrequently the spiders will be scattered along the tube only to be pressed again into a compact mass.

Aside from standing watch, with head towards the opening, in the absence of the female, the male was in a number of instances seen to push in the spiders. Our motion pictures show one male gathering up the spiders which the female had left strewn along the whole length of the tube. From a behavioristic standpoint it is interesting to note that the male is capable of participating at least to some extent, in the activities of the "household."

When two tubes, occupied by two pairs of wasps are situated close together, the male does not confine his attention to his own mate but may meet the female from the adjoining apartment and mount in the characteristic manner of the genus and enter the tube with her.

In our experience the egg is laid on the dorsal surface of a large spider, never on a small one. In one instance the last spider brought in, being small, was rejected as the recipient of the egg. After considerable shuffling of the collected prey, a large spider was selected for the purpose. This performance constitutes one of the scenes of our motion picture, just preceding that of egg laying, and at least *looks* as though the wasp were "selecting."

The signal for egg laying is the female's change of orientation in the tube. Whereas for placing the spiders and building the partitions she works as she enters, namely, head downward looking into the tube, to lay the egg she comes out, turns around and backs in. After a minute or two of the usual and almost constant preening (cleaning the antennae with the forelegs and the abdomen with the hind legs and these in turn by rubbing them together), she is ready for oviposition. As in *Odynerus*, the expulsion of the egg is preceded and accompanied by rhythmic abdominal contractions of a much slower rhythm than the breathing movements. It is a matter of but a few minutes after the egg first appears before it is placed on the dorsal surface of the spider's abdomen. The egg is simply dropped in its place by virtue of the fact that the wasp places the abdomen on the appropriate part of the body of the spider which is to receive the egg—the same relative spot which countless ancestors have used each recurrent season for eons past.

Correction: to "Notes on Mosquitoes of Missouri," published in these ENTOMOLOGICAL NEWS, November, 1943, p. 234: *Aedes deoralis* should be *Aedes dorsalis*. [Editors.]

The Prey and Hunting Habits of the Wasp, *Trypoxylon politum* Say.

By PHIL RAU, Kirkwood, Missouri.

In my previous papers describing the behavior of this builder of pipe-organ nests, an insect probably better known by the old specific name of *albitarsis*,* no mention is made of the kind of spiders it hunts or its method of hunting them. It is indeed a rare occasion when one finds this species in a hunting mood, and although I have made but one observation on this behavior, it is sufficient, I think, to show how deliberately this business is gone about.

On the front porch of my home one sunny afternoon, a female *T. politum* flew directly into the web of a house spider in a corner. This looked at first to me like suicide for her, but the spider did not come out to grapple with her as I expected. Probably this was also as the wasp expected, for after waiting quietly for a half minute or so, she spread her legs and gave the web a half dozen shakes. This brought no result, and the wasp waited quietly for three or four minutes more and then repeated the performance. Again she shook the web—four or five times—and then rested quietly on it for a few seconds and finally, in apparent disgust, flew into another web on the opposite wall, behaved in the same way—with the same result—and finally, empty-handed, flew into the garden.

If intelligence can be attributed to any insect, I think her behavior may be called intelligent, all the more so because she "chose" her position in the web so as not to become entangled in it.

The following is the record of the species of spiders collected by another mother wasp at Lesterville, Missouri, July 24–26, 1938, and placed in three cells of her nest. There were altogether 29 spiders of which 25 belonged to one species, *Neoscona benjaminus* Walck. [det. by E. B. Bryant]. All were half-

*For the life history of this wasp see Journ. Anim. Behavior 6: 27–63, 1916, and Trans. Acad. Sci. St. Louis 25: 428–39, 1928.

grown, and both sexes were equally represented. The others were, one each of *Epeira domiciliorum* Hentz, *E. prompta* Hentz, *E. parvula* Keys and Emer., and *Eustala anastera* Walk. [all determined by E. B. Bryant].

Notes on the Habits of *Monobia quadridens* (Linn.)¹

By S. W. Frost, The Pennsylvania State College

Monobia quadridens (Linn.) is a common wasp throughout Eastern United States. This striking black species is 20 mm. long with contrasting cream-colored markings; a broad band along the distal edge of the first abdominal segment, a band across the scutellum and marks on each anterior angle of the pronotum. This, the only North American species of the genus *Monobia*, belongs to the family Vespidae and subfamily Eumeninae. *Monobia* is an American genus with several species described from Central and South America. Records indicate that *Monobia quadridens* generally nests in the abandoned burrows of wood borers, especially those of *Xylocopa*.

The following observations were made by means of six-inch glass tubes of 10 mm. bore placed in a darkened box with their outer ends exposed. This observation box, for solitary bees and wasps, will be described elsewhere. The tubes were ready for occupation on May 1. Although many solitary bees and wasps occupied these tubes early in the summer, *Monobia quadridens* did not show interest in them until June 26. On this date a female was observed inspecting them and she finally selected one for her nest. From June 27 until July 20 a succession of tubes was used apparently by the same wasp. A total of 11 cells was completed in 5 of these tubes. The wasp was not marked but the fact that a new tube was never occupied until the preceding tube was entirely provisioned and

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sealed, although seven other tubes were always available, led the writer to believe that only one female was concerned.

The procedure of constructing the cells was generally the same. A mud partition, about $\frac{3}{16}$ of an inch thick, was built across the inner end of the tube. The female suspended her egg from the ceiling of the tube before any provision was brought in. The larvae of the grape leaf folder *Desmia funeralis* were used entirely by this wasp as provision. The number placed in each cell varied from 7 to 13. After she had placed a sufficient number of larvae in a cell, she closed it with another mud partition about $\frac{3}{16}$ of an inch thick. This partition formed the inner end of the next cell. The cells varied somewhat in length but averaged one and one-eighth inches long. After the female had provisioned and sealed two or three of these cells, she left an open space and finally plugged the tube with mud leaving a vestibule at the outer end.

The female rested every night in the tube in which she was building. Her abdomen was pressed against the mud partition of the last cell and she faced the open end of the tube. She remained in the tube until at least 7 A.M. apparently waiting for warm dry weather in which to work. During cool, rainy weather she remained in the tube all day long. Pulling the tube out for examination did not disturb her.

A summary of the cells built by a female *Monobia quadridens* (L.)

Tube Number	Number of cells in each tube	Number of larvae in each cell	Cells Started	Cells Finished	Notes
1	2	8-13	June 26	June 27	Warm
2	2	8-7	June 27	June 28	Warm, clear
3	3	13-8-1 ²	June 30	July 5	Cool, rainy
4	3	7-8-8	July 10	July 14	Cool
5	1	0 ³	July 14	—	Warm, clear
6	1	9	July 15	July 19	Warm, clear
7	1	0 ³	July 20	—	Warm, clear

The habit of depositing the egg before storing food in the cell is contrary to the habits of many solitary insects. The mud

² The egg and this larva were removed by the female or a predator before the tube was sealed.

³ An egg was laid but it disappeared later.

dauber, *Sceliphron*, attaches its egg to one of the spiders in the cell and therefore brings in provision first. Solitary bees using pollen as food accumulate provision before laying their eggs. In every case *Monobia quadridens* laid its egg before bringing in the *Desmia* larvae.

The larvae of the grape leaf folder, *Desmia funeralis*, was used entirely as provision by *Monobia quadridens*. How she found so many of these larvae is amazing. A grape vine about fifteen feet from the nest was sprayed frequently during the summer and had few or none of these larvae. A search of my neighbor's unsprayed grape vine also yielded none. However, wasps have ways of finding their prey. I have watched *Chalybion californicum* (Sauss.)⁴ deliberately entangle itself in a spider's web and seize the spider when it rushed forth. This wasp is strong enough to free itself from the spider's web. The presence of grape leaf folders throughout a large part of the summer favors *Monobia*. The grape leaf folder is quite common about State College, Pennsylvania, especially upon wild grapes. There are two generations of this insect a year so that larvae are present almost continually from early June to the end of September. I must admit that the finest specimens of *Desmia funeralis* larvae in our collection of immature insects were taken from the cells of *Monobia quadridens*.

Various accounts state that *Monobia quadridens* provisions its cells with cutworms. This may be the rule but certainly the female under observation had nothing to do with these "lowly worms."

Although the *Desmia* larvae were paralyzed by the wasps when placed in their cells, they continued to defecate and in a few days the glass tubes became smeared with fecula. Mold developed on some of the *Desmia* larvae. No doubt this condition does not exist under natural conditions because the moisture of the fecula would be absorbed by the porous walls of the cells which are usually made in the abandoned burrows of wood borers.

⁴ *cyaneum* of authors.

Rau (1931) states that *Monobia quadridens* builds a double wall between each cell. This was not true in the case of the nests built in glass tubes. However, two partitions were built at the outer end of the tubes, one closing the last cell and the second at the outer end of the tube.

About July 14 the activities of this wasp became irregular. From the preceding summary it will be seen that eggs were laid by the wasp in cells numbers 5 and 7 on July 14 and July 20 but these cells were not completely provisioned. The tubes containing these were finally closed by plugs at the outer ends. Whether this marks the end of the wasp's activities for the summer or whether she had fallen prey to some bird or met another mishap, is not known. Although this wasp did not occupy the glass tubes again during 1943, adults were seen in foliage nearby as late as the middle of August indicating that they were probably constructing nests elsewhere. Other workers have observed these wasps building nests until late September.

It was questionable whether these wasps would develop in glass tubes because of the excess moisture from the fecula of the *Desmia* larvae. However, pupae were formed in several of the tubes. One of the larvae in tube No. 4 and that in tube No. 6 were permitted to develop normally. On August 10 the larva in tube No. 4 had transformed to a cream colored, naked pupa. That in tube No. 6 did not transform until August 13. The adult in tube No. 4 emerged on September 4, that in tube No. 6 did not emerge until September 8. It appears that *Monobia quadridens* hibernates as adults in this latitude.

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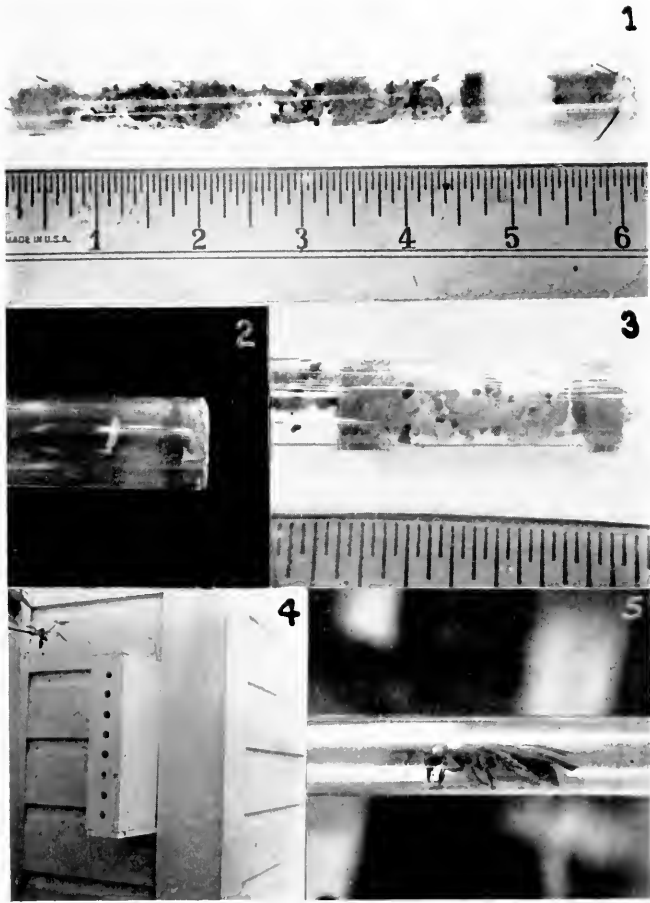
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EXPLANATION OF PLATE

1. Glass tube showing three cells of *Monobia quadridens* and vestibule at outer end.
2. Egg of *Monobia quadridens* suspended from wall of glass tube. Mud partition shows at the inner end of the tube.
3. One cell filled with the larvae of *Desmia funeralis*. Pellets voided by the *Desmia* larvae are evident.
4. Observation box used to study the habits of *Monobia quadridens*.
5. *Monobia quadridens* resting in glass tube.

PERSONAL

Dr. Axel L. Melander has retired as Professor Emeritus. For the past 17 years, Dr. Melander has been professor and head of the Biology Department of the College of the City of New York. Before coming to New York, Dr. Melander was Entomologist for the Experiment Station and head of the Zoology Department of Washington State College. He is well known among entomologists as one of the early investigators of HCN resistance in scale insects, as a specialist in Diptera, especially Empididae, as past president of the Entomological Society of America, as one of the few entomologists honored with a star in American Men of Science, and in recent years as a leader in color photography of living insects. We wish him well, and hope he does not retire out of sight.



MONOBIA QUADRIDENS—Frost

A Note on the Rove-beetle, *Staphlinus maculosis* Grav.*

By PHIL RAU, Kirkwood, Missouri.

I recently received a specimen of this rove-beetle from a resident of Grubville, Missouri, with the notation that it had bitten its way into the skin of a dog, causing a large wound. When the dog was first treated, the beetle was found in the fur near the injury and was therefore suspected of inflicting it. No doubt the beetle was found as stated, but it is quite likely that the injury was caused by some other agency. The beetle probably entered the wound for the purpose of feeding on maggots that are often found in such places.

This beetle is known to feed upon insects. Ralph Voris (Trans. Acad. Sci. St. Louis 28: 241, 1934) has observed them kill and feed upon insects, some as large as June beetles and moths. The prey, says he, is eventually reduced to a liquid, and the beetle swallows the juice. If the beetles can successfully handle large, hard-bodied insects such as moths and beetles, what a sinecure it must be for them to grapple with soft-bodied creatures such as maggots. It is, I believe, quite likely that the beetle was attracted to the store of maggots, rather than to the dog.

Sylvatic Plague: The Recovery of Fleas from the Burrowing Owl and Its Burrow in a Plague Area in Alberta

By JOHN H. BROWN, University of Alberta,
Edmonton, Alberta

Observations made in 1940, 1941 and 1942 in connection with the Alberta sylvatic plague survey showed that the Burrowing Owl, *Speotyto cunicularia*, was unusually abundant in the epizootic area at Hanna-Youngstown. As this bird lives in aban-

* Identified by A. E. Chapin.

doned ground squirrel and badger burrows and feeds on small rodents an attempt was made to study its probable relationship, as a host for rodent fleas, to the plague epizootic present amongst the Richardson ground squirrels, *Citellus richardsoni* Sabine, in that area.

It is well-known that the burrowing owl, although it usually kills its prey, will also feed on dead animals. In the epizootic area many of the ground squirrels die on the surface of the ground and are thus readily available. The burrowing owl invariably removes its victim to its burrow before it starts to feed, and it is this habit that accounts for the large number of rodent fleas in the burrow, and also for the presence of such fleas on the bird.

Jellison (1939) reported on the recovery of 109 live rodent fleas of six species from a burrowing owl nest in a plague area near Dillon, Montana. He also quotes from Rucker (1909) regarding the burrowing owl or booby owl of California as follows:

"There is reason to believe that the booby owl, which is a constant companion of the ground squirrel, occupying the same burrows with him, may play an important role in the dissemination of the epizootic. It is thought that this bird, flying from burrow to burrow, may carry infected fleas for long distances. If this be found true, the problem of the eradication of the epizootic will thereby be greatly complicated."

Wheeler, Douglas and Evans (1941) reported on the recovery of plague-infected fleas, *Echidnophaga gallinacea*, from a burrowing owl taken near a plague area in California.

Investigations

In 1940 three burrowing owl burrows were examined and a total of 47 fleas were recovered. These fleas were forwarded to Dr. R. J. Gibbons, Laboratory of Hygiene, Kamloops, B. C., for bacteriological examination. They were negative for *Pasteurella pestis*. No determination as to their species was made.

In 1941 a total of 43 burrowing owls were observed in the area, and 11 were shot and examined for ectoparasites. No

fleas were found. One burrow was examined and 37 fleas were recovered. These fleas were sent to the laboratory at Kamloops, but were not positive for plague. No determination as to flea species was made.

In 1942 a total of 32 burrowing owls were seen and 4 of these were shot. Two of these, on examination, yielded one flea each. One flea was determined as being *Oropsylla (Oropsylla) idahoensis* Baker, a species that is recorded by Eskey and Haas (1940) as being a plague vector. The other flea was tentatively determined as belonging to the species *Rectofrontia fraterna* Baker.

The following table summarizes the number of burrowing owls noted, the number shot, the fleas recovered from the shot birds, the number of burrows investigated and the number of fleas recovered from burrows for the period 1940 to 1942 inclusive.

Burrowing Owl Investigations

Year	Birds Noted	Birds Shot	Fleas Recovered	Burrows Examined	Fleas Recovered
1940	?	?	0	3	47
1941	43	11	0	0	0
1942	32	4	2	1	37
Totals	75	15	2	4	84

SUMMARY

The Burrowing Owl, *Speotyto cunicularia*, was unusually abundant in the epizootic area at Hanna-Youngstown during 1940, 1941 and 1942. A total of 84 fleas were recovered from four burrows. Two of 11 birds shot harboured one flea each. One of these fleas was determined as being *Oropsylla (Oropsylla) idahoensis* Baker, a known plague vector.

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OBITUARY

Sir Edward Bagnall Poulton died on November 21, 1943 at the age of 87 years. He was well-known throughout the world as zoologist and entomologist. Until his retirement in 1933 he was Hope professor of Zoology at the University of Oxford. Among the many honors accorded him, he was a Corresponding Member of the American Entomological Society.

NOTES AND NEWS IN ENTOMOLOGY

The first issue of the NEWS in 1890 started with the sentence: "It has for some time been apparent to Entomologists in this country that there was unoccupied room for a journal of Entomology devoted less to the dry details of descriptive and classificatory work and more to the news and gossip which is always of interest to entomological workers." This attitude has been reaffirmed in letters and editorials published in 1921 and 1925. But the labor entailed in such a project is too great for the editorial staff alone. However, the editors propose to reinstate this heading and review from time to time some of the interesting developments and happenings in Entomology throughout the world—abbreviated reviews of fields, of single papers, of trends, of events, notes, news, comments. We can prepare some of these and will start the ball rolling again, but for full advantage to all, we solicit items of general interest. Remember, such items always have received priority over technical papers, and still do.

Insects are so diversified that it has been said, more or less seriously, that the hardest thing to find in entomology is a generalization without exceptions. Our knowledge of the insect cuticle now falls right in line with this complaint. For years

the cuticle has been viewed as simply a secreted chitinous sheet with a "waterproof" covering called the epicuticle. It might be hard or soft, transparent or with the outer layers impregnated with various pigments or showing brilliant physical colors, but even so it seems of fairly uniform composition. Within the last few years quite a number of papers have appeared by various authors. The chemistry of chitin was studied by Campbell¹ and others fifteen and more years ago, and it was pointed out that sclerites were formed by the addition of hardening agents to the cuticle. More recently it has been shown that chitin actually composes less than half of the total weight of dry cuticle. Trim² has shown that several proteins apparently related to sericin (silk) are present; Fraenkel & Rudall³ showed by x-ray analyses that these proteins are polymerized with the chitin molecules to form a hard crystalline structure, as has also been shown by birefringence analyses of Browning⁴ and earlier authors,⁵ and Richards & Anderson⁵ showed with the electron microscope that this polymerization occurs in layers parallel to the surface of the body.

Anatomical diversity within the chitinous part of the cuticle is also considerable. In addition to the structures necessary to explain physical (interference) colors, there are a series of pore canals that are usually too small to be seen clearly with the light microscope and were first convincingly demonstrated by Wigglesworth⁷ and subsequently confirmed by Richards & Anderson⁵ with the electron microscope. But the electron microscope studies revealed that while the cockroach (and presumably many insects) has 1,200,000 of these tiny helical canals traversing each square millimeter of the chitinous part of the cuticle (but not the epicuticle), mosquito larvae lack them entirely. But this cannot be a matter that adults possess pore canals and larvae lack them, for Dennell⁸ now reports that *Sarcophaga* larvae have relatively gigantic pore canals. These canals in *Sarcophaga* are first hollow tubes, containing no one knows what, but as the cuticle ages in these larvae the canals become filled with a solid rod of chitin—they apparently re-

main hollow and fluid-filled in the cockroach and many other insects.

The epicuticle has generally been considered waxy, but Pryor⁹ brings forward strong evidence to indicate that in the cockroach it is a protein layer which is tanned and then made hydrophobic by the addition of a lipid ("fat"), and further that there are several kinds of epicuticles chemically speaking. Finally, Richards & Anderson⁵ point out that the epicuticle of the cockroach can be split into two different sheets but that of mosquito larvae is apparently a single sheet.

Cuticle permeability is of great importance to both the insect and the economic entomologist. Alexandrov¹⁰ showed that it is a truly semipermeable membrane in dipterous larvae, with differences in different species. Eder¹¹ by comparing various insects, pointed out that the permeability to water is correlated with the presence of pore canals, hardness and a number of other variables. Richards & Anderson⁵ present evidence indicating that the pore canals probably are not concerned in the permeability to oils. Robinson¹² has pointed out that tick and insect cuticles, unlike human skin, are more permeable to mineral oils than to vegetable oils. And quite recently in several fascinating papers Hurst¹³ has presented and Wigglesworth¹⁴ confirmed the picture of the insect cuticle being an asymmetrical membrane which is more permeable to materials moving in one direction than in the other direction.

So with some fifteen papers in the past five years the insect cuticle has changed and is changing further with each new paper from a simple paragraph to a highly complex and diversified chapter of entomology, a chapter in which few sweeping generalizations can be made today. A. G. RICHARDS, JR.

¹ Ann. Ent. Soc. Amer., 22: 401-426. 1929.

² Nature, 147: 115-116. 1941. Biochem. Journ., 35: 1088-1098. 1941. See also Lafon, Compt. Rend. Acad. Sci. (Paris), 212: 456-458. 1941.

³ Proc. Roy. Soc. London, ser. B, 129: 1-35. 1940.

⁴ Proc. Roy. Soc. London, ser. B, 131: 65-86. 1942.

⁵ See Schmidt, W. J., Die Doppelbrechung von Karyoplasma, Zytoplasma und Metaplasma. Protoplasma Monographien, vol. 11. 1937.

⁶ Journ. Morph., 71: 135-183. 1942.

- ⁷ Quart. Journ. Micr. Sci., 76: 269-318. 1933.
⁸ Nature, 152: 50. 1943.
⁹ Proc. Roy. Soc. London, ser. B, 128: 378-407. 1940. See also Bergmann, Ann. Ent. Soc. Amer., 31: 315-321. 1938, and Lafon, Compt. Rend. Acad. Sci., 212: 456-458. 1941.
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¹¹ Zool. Jahrb., allg. Zool. u. Physiol. Tiere, 60: 203-240. 1940.
¹² Parasitology, 34: 113-121. 1942.
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¹⁴ Nature, 147: 116. 1941. Bull. Ent. Res., 33: 205-218. 1942.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Allan, P. B. M.—Alder v. birch. [21] 55: 95-97. Baten & Hutson.—Precautions necessary in estimating populations of small animals. [12] 36: 501-04. Bondar, G.—Personalia. [105] 14: 313-19, port. Cockerell, T. D. A.—Nomenclature. [55] 19: 158-60. Cooper & Ris.—Handling small objects in bulk for cytological preparations. [Stain Techn.] 18: 175-76. Eliot, N.—Migration v. hibernation. [9] 76: 193-98. Epling, C.—Taxonomy and genonomy. [68] 98: 515-16. Hayward, K. J.—Primera lista de insectos Tucumanos peyudiciales. [79] Pub. Misc. 1, 110 pp. Huffaker & Back.—A study of methods of sampling mosquito populations. [12] 36: 561-68. King, W. V.—Some entomological aspects of troop mobilization. [12] 36: 577-79. Levy, H. A.—Dioxane as an aid in staining insect cuticle. [Stain Techn.] 18: 181-82. Moore, H. W.—A mechanical aspirator for sorting and counting insects in the field. [4] 75: 162. Neiva, Arthur.—Obituaries by Borgmeier, Lent, Taunay, Ribeiro, and Correa F.

[105] 14: 1-30, port. **Pereira, Hermano F. R.**—Obituary. [105] 14: 324-25. **Porter, Carlos E.**—Obituary. [105] 14: 321-24, port. **Townsend, C. H. T.**—Personalia. [105] 14: 311-13, port. Errors in economic entomology. [105] 14: 32. **Trehan, J. N.**—The role of predators in biological control of insect pests. [Current Sci., Calcutta] 12: 223-25.

ANATOMY, PHYSIOLOGY, ETC.—**Alexander & Barton.**—The excretion of ethylquinone by the flour beetle. [Biochem. Jour.] 37: 463-65. **Bodine & Tahmisian.**—The development of an enzyme (tyrosinase) in the parthenogenetic egg of the grasshopper, *Melanoplus differentialis*. [92] 85: 157-63. **Caspari, E.**—The influence of hatching order on the intensity of testis pigmentation in *Ephesia kühniella*. [42] 94: 241-60. **Cornman, I.**—Suspension of pole cell formation in *Drosophila* eggs by hydrostatic pressure. [Jour. Cell. and Comp. Physiol.] 22: 197-98. **Dethier, V. G.**—The dioptric apparatus of lateral ocelli. II. Visual capacities of the ocellus. [Jour. Cell. and Comp. Physiol.] 22: 115-26. **Harries, F. H.**—Some effects of alternating temperatures and exposure to cold on embryonic development of the beet leaf hopper. [12] 36: 505-09. **Henson, H.**—The relations between embryogenesis and metamorphosis in insects. [Proc. Leeds Phil. & Lit. Soc.] Sci. Sect. 6: 97-110, ill. **Horn, A. B.**—Proof for multiple allelism of sex-differentiating factors in *Habrobracon*. [90] 77: 539-50. **Mazzotti, G. V. y L.**—Conservacion del virus del tifo en *Triatoma bargerii*. [56] 4: 211-13. **Pepper & Hastings.**—Age variations in exoskeletal composition of the sugar beet webworm and their possible effect on membrane permeability. [12] 36: 633. **Pontecorvo, G.**—Hybrid sterility in artificially produced recombinants between *Drosophila melanogaster* and *D. simulans*. [Proc. R. Soc. Edinburg] B 61: 385-97, ill. **Power, M. E.**—The effect of reduction in numbers of ommatidia upon the brain of *Drosophila melanogaster*. [42] 94: 33-72. **Quayle, H. J.**—The increase in resistance in insects to insecticides. [12] 36: 493-500. **Ris, H.**—A quantitative study of anaphase movement in the aphid *Tamalia*. [92] 85: 164-78. **Schwanwitsche, B. N.**—Stereomorphism in cryptic coloration of Lepidoptera. [31] 152: 508, ill. **Shields & Hull.**—The seasonal incidence of sand flies in Florida. [12] 36: 625. **Stone, M. W.**—The effect of winter soil temperatures on emergence of adults of the sugar-beet wireworm in cages. [12] 36: 510-15. **Thomas, H. D.**—Preliminary studies on the physiology of

Aedes aegypti. I. The hatching of the eggs under sterile conditions. [17] 29: 324-28. **Wigglesworth, V. B.**—The fate of haemoglobin in *Rhodnius prolixus* (Hemiptera) and other blood sucking arthropods. [Proc. R. Soc. Lond.] B 131: 313-39, ill. **Williams & Chadwick.**—Technique for stroboscopic studies of insect flight. [68] 98: 522-24. **Wilson, L. P.**—Tolerance of larvae of *Drosophila* for nucleic acid components: guanine. [Growth] 7: 273-78. Id. Tolerance of larvae of *Drosophila* for nucleic acid components: uracil. Ibid. 279-86. Id. Tolerance of larvae of *Drosophila* for nucleic acid components: cytosine. Ibid. 287-90.

ARACHNIDA AND MYRIOPODA—**Barrows, W. M.**—A new prairie spider. [43] 43: 209, ill. **Chamberlin, R. V.**—Some records and descr. of American Chilopods. [95] 56: 97-108 (*). On some gen. and sps. of Amer. millipeds. On Mexican millipeds. [Bul. Univ. Utah] 34: (6), 20 pp., ill.; (7), 103 pp., ill. (*). **Cooley, R. A.**—*Ixodes dampfi* n.sp. nueva garrapata de Mexico (Acarina). [35] 4: 21-24, ill. **Cooley & Kohls.**—*Ixodes californicus*, *I. pacificus* n.sp. and *I. conepati* n.sp. [55] 19: 139-47, ill. **Crane, J.**—Spiders of the fam. Lyssomanidae and Salticidae (Magoninae) from Br. Guiana and Venezuela. [18] 28: 125-38, ill. (*). **Davis, G. E.**—Studies on the biology of the argasid tick, *Ornithodoros nicollei*. [17] 29: 393-95. **McGregor, E. A.**—A new spider mite from Argentina. [10] 45: 176-78 (ill.). **Mello-Leitao, C.**—Solifugos de Argentina. [85] 40: 1-32, ill. (*). **Schiapelli y Gerschman.**—*Aranas Argentinas*. I. [85] 40: 317-32, ill. (*). **Schubart, O.**—Os myriapodes e suas relacoes com a agricultura. Com uma bibliografia completa sobre o assunto. Diplopoda de Pirassununga I. Primeiro diplopodo Europeu encontrado no Brasil. [77] 2: 205-34; 249-54, ill. **Soares, B. M.**—Contribuicao ao estudo dos opilios da serra do mar. Opilios de boracea. [77] 2: 1-13, ill. (*S). Alguns Tomisidas e um sakticida novos do Brasil. 255-65, ill. **Vail & Augustson.**—A new ectoparasite (Acarina: Cheyletidae) from domestic rabbits. [17] 29: 419-21.

THE SMALLER ORDERS—**Clay, T.**—Bird lice from the Tinamida. [Zool. Ser. Field Mus. N. H.] 24: 375-87, ill. (*S). **Gloyd, L. K.**—*Enallagma vernalis* a n.sp. of Odonata from Michigan. [114] no. 479: 8 pp., ill. **Guimaraes, L. R.**—Sobre alguns gen. e sps. de Heptapsogas-

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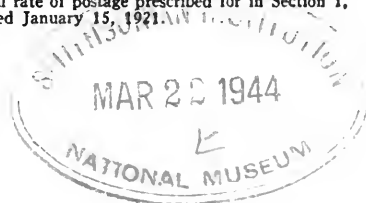
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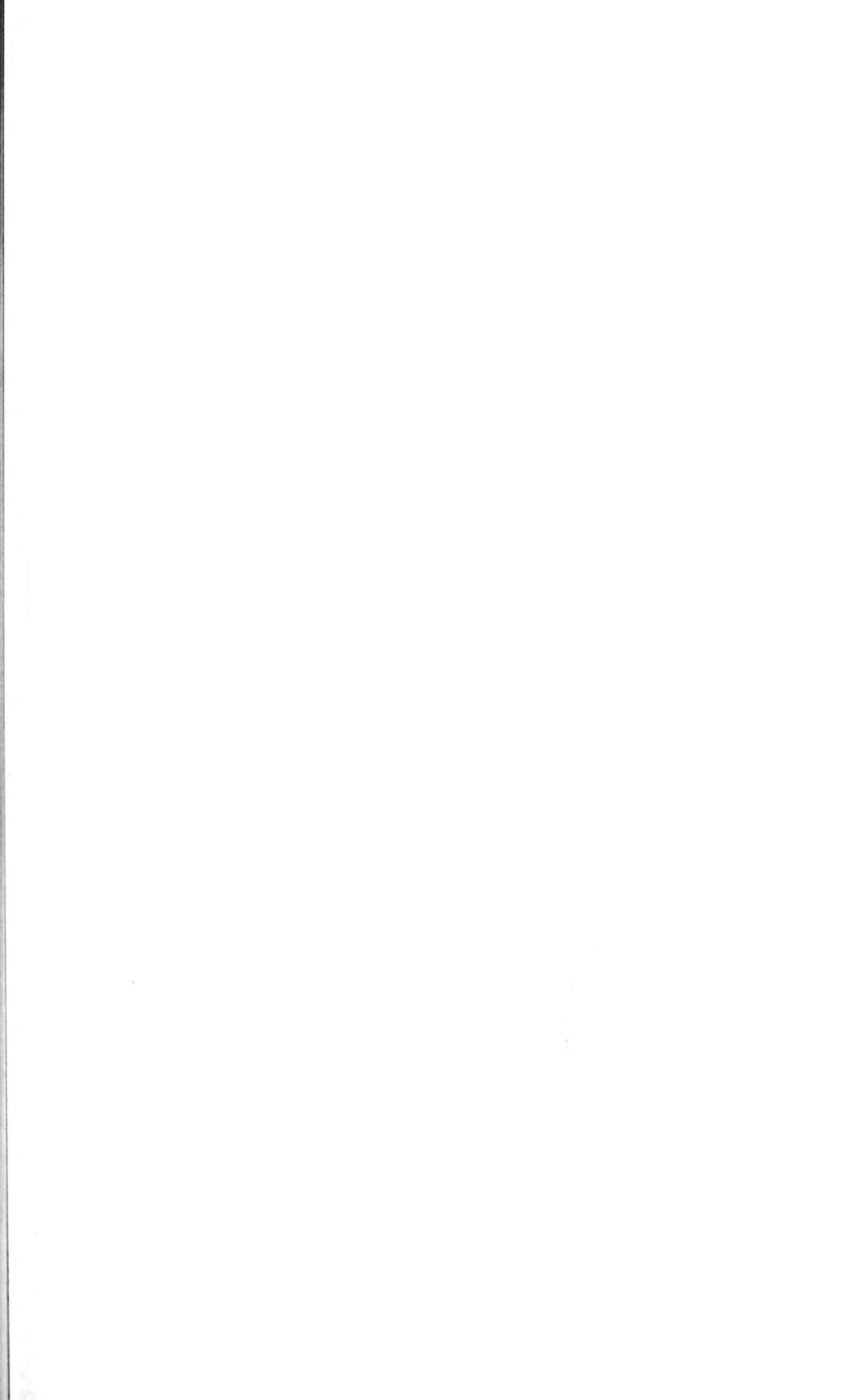
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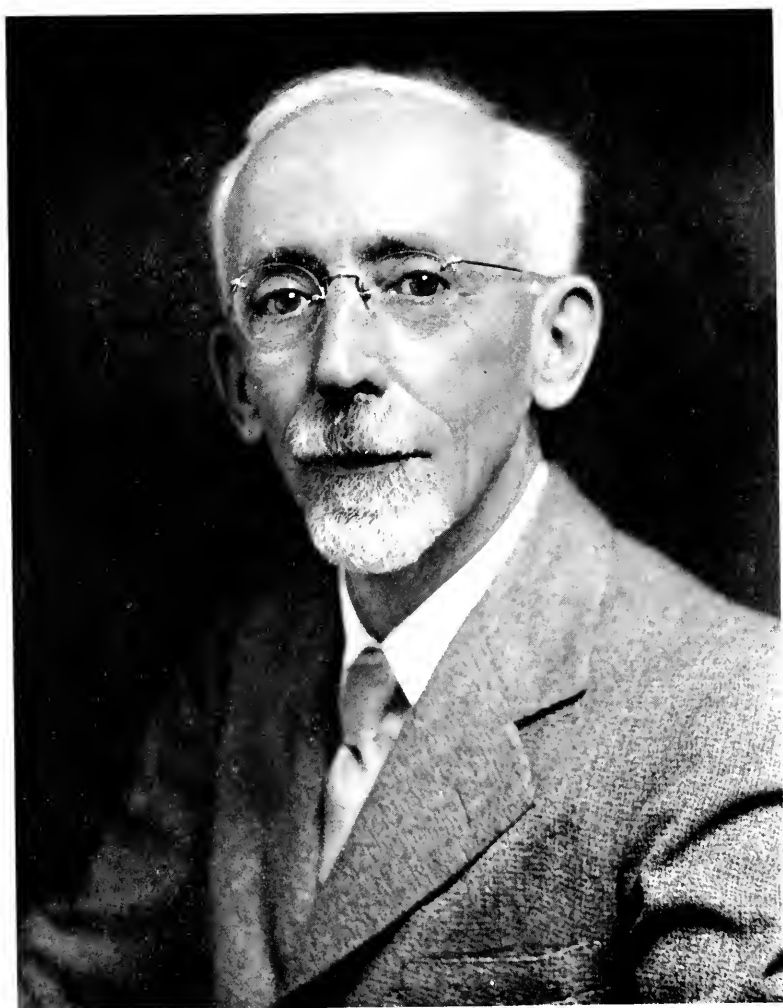
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FRANK E. LUTZ

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FRANK E. LUTZ

With the death on November 27, 1943 of Doctor Frank E. Lutz, for more than twenty years chairman and curator of the Department of Insects and Spiders in the American Museum, entomology lost one of its most creative and clear-visioned leaders, a man unusually enterprising and ingenious, with a driving faith in the value of his science, and aptitude and devotion in exploring its problems.

His administrative duties, which included not only the direction of the work of his own department but for many years also the editorial supervision of the scientific publications of the American Museum, were always discharged with ability and conscientiousness and often proved very time-consuming. Yet by concentration of effort, by extending his working day into the night, and by foregoing vacations (for no vacation could have approached in zestfulness the particular piece of research that at any given time absorbed his attention) he made more than one hundred contributions to science that gave new stimulus to those engaged in research as well as indicating to the layman how interesting insects can be.

His early papers—those that belong to the period from 1904 to 1909, when he was connected with the Station for Experimental Evolution of the Carnegie Institution—were in large part devoted to problems in genetics and biometry. He was an early champion of the fruit fly in the study of heredity and the discoverer of the first white-eyed individual, thus giving impulse to the subsequent vast researches of Professor T. H. Morgan and his associates.

Subjects that led beyond entomology to the borderland of other sciences particularly intrigued him. The book-shelves were weighed down with works on insect-flower relations, but the authors had all interpreted the colors of flowers in terms of human vision. Doctor Lutz not only demonstrated convincingly that insects see ultra-violet but he proved by photography with the aid of color filters that there are ultra-violet patterns in flowers, thus opening up a tremendous new field of research. Insect sounds interested him no less than insect sight. He pointed the way for making accurate studies of the chirps of insects by obtaining sound records of crickets and then analyzing these records through a hand lens.

In the Loomis Laboratory in Tuxedo, New York, where the equipment offers unique opportunities for experimentation, he was able to demonstrate that insects can survive sudden and extreme changes of air-pressure far transcending the limits that prove fatal to man. Yet for many of his experiments he created his own equipment. He was a born inventor although his ambitions did not take a commercial turn. Sometimes, I believe, he got as much delight from overcoming the mechanical difficulties that beset his investigations as he did from the scientific results. One of his many gadgets that startled everybody by the ingenuity and nicety of its construction was a "squirrel-wheel" so marvelously balanced and light that it would start to turn at the pressure of a tiny insect walking within.

It is difficult to single out from his diversified contributions this or that as indicative of his many-sided attainments. He was exceedingly versatile and his inquiring mind could work with calm and clarity even when—as often in his later years—he was running a fever. He wrote on the curious string figures of the Patomana Indians of British Guiana, which he had observed during his trip to Kaieteur Falls; his first contribution to the publications of the American Museum was *A Brief History of Antarctic Exploration*. He could write for the lay public as well as for the scientist. His *Field Book of Insects* became a standard work of reference in tens of thousands of

households. *A Lot of Insects* presented with equal lucidity his experiences primarily with insects of his garden and home laboratory.

What he himself published was only a small part of what he actually put in motion. Many a time he would generously hand over to another worker investigations in which he had already laid the foundations. On all occasions he tried to enrich the lives of others by making them cognizant of the wealth of interest he had found in every phase of entomology. He was never, however, an intrusive enthusiast. He won people rather by his quiet candor, his complete sincerity, and not least by his apt and at times tart and roguish humor. He was an understanding companion not only in the office but in the field as I can testify from five collecting trips shared with him. His rambles had taken him to Mexico, British Guiana, Florida, Cuba, Puerto Rico, the Rocky Mountain region, the Canal Zone, Texas, and California. To some of these areas he had gone repeatedly. He was impressed with the distinctive quality of each, but boyhood recollections of the green mountains about his birthplace at Bloomsburg, Pennsylvania, or impressions of his beloved home environment at Ramsey, New Jersey, sometimes made him challenge the attractiveness of other regions. He preferred the simple beauty of rural landscapes to the grandiose in nature. One of the hills adjoining his Station for the Study of Insects at Tuxedo, New York, he renamed affectionately "My Mountain." It was at this station that during successive summers and with the genial cooperation of his family group he devoted himself to guiding the entomological interests of a picked group of youngsters, many of whom have since brought to flower the teachings he implanted. At this station, too, he put into operation his nature-trail idea—the construction of a trail that should lead by the significant botanical and zoological exhibits that nature unsolicited had provided in a given area. He thus extended Museum exhibition to the out-of-doors. The idea was subsequently widely applied throughout the land.

In the Hall of Insect Life at the American Museum he exemplified the inexhaustible field of interest that insects offer.

Instead of presenting a mere Noah's Ark assemblage of species, two by two, male and female, such as had been the custom of the past, he selected his examples and arranged his material so as to bring out the significance of insect life, to illustrate biological principles, to stimulate thought and answer questions. He so infused the Hall of Insect Life with the vitality of his thought that it fully justified its name although much of it was static. But he went a step further in making things realistic by introducing mechanical devices and even live exhibits. He was proud of his insect zoo, which had perennial as well as seasonal exhibits, with insects demonstrating their characteristic activities for close-up observation. Here were shown the indigenous species of field and pond along with cockroaches, tarantulas, and scorpions from regions as remote as Barro Colorado Island in the Canal Zone, one of his favorite places of visit.

The passing at the age of sixty-four of so many-sided a personality leaves a great void. Happily, however, the work men do and the influence they exert during their lifetime survive to guide and inspire those who follow. HERBERT F. SCHWARZ, American Museum of Natural History.

Some Centipeds from Georgia

By RALPH V. CHAMBERLIN, University of Utah

These notes are based upon a small collection of chilopods made by my associate Wilton Ivie incidentally to his collecting of spiders in April, 1943. Most of the material was taken near Savannah. The holotypes of the two new species described are in the author's collection.

Cryptops hyalinus (Say)

Sylvania to Sardis, Apr. 20, 1 mi. west of Sylvania, Apr. 7; 1 mi. north of Sylvania, Apr. 10; and 3 mi. southeast of Savannah, Apr. 8.

Theatops posticus (Say)

One mi. north of Sylvania; 3 mi. southeast of Savannah; and southeast of Pendergrass, Apr. 23, 1943.

Theatops spinicaudus (Wood)

Lula, Apr. 24.

Scelopendra viridis Say

Southeast of Pendergrass, Apr. 23.

Sogona minima Chamberlin

Three miles southeast of Savannah, Apr. 4 and 14; southeast of Tocoa, Apr. 29.

Arenophilus bipuncticeps (Wood)

Brier Creek, Apr. 12; three miles southeast of Savannah, Apr. 4; and Millen, Apr. 6.

Pachymerium ferrugineum (C. L. Koch)

Eight miles west of Savannah, Apr. 5; north of Springfield, Apr. 6; and 1 mi. north of Sylvania, Apr. 10.

Geophilus mordax Meinert

Three miles south of Savannah, Apr. 6; Millen, Apr. 16; and Demorest, Apr. 26.

Geophilus rubens Say

Three miles southeast of Savannah, May 3; and between Sylvania and Sardis, Apr. 20.

Namphobius georgianus Chamberlin

Eight miles west of Savannah, Apr. 5; and 3 miles southeast of this city, Apr. 8; Demarest, Apr. 26; and northeast of Lula, Apr. 26.

Sozibius paurops new species

Body and appendages having the uniform light yellow color usual in species of the genus. Antennae short, composed in the holotype of 30 short and very short articles. Apparently char-

acterized among other species by the smaller eyes in which the ocelli are fewer in number and arranged in two series instead of in 3 or 4; e.g., 1 + 3, 2; single ocellus not enlarged, contiguous with series. Prosternal teeth 4 + 4 or 5 + 5; small, uniform. Posterior angles of none of dorsal plates produced. Coxal pores small circular, 3, 4, 4, 4. Spines of first and second legs below, 0, 0, 2, 1, 1; above, 0, 0, 0, 1, 1. Ventral spines of anal legs, 0, 1, 3, 2, 0; dorsal, 1, 0, 3, 1, 0; claw single. Dorsal spines of penult legs, 1, 0, 2, 1, 1; ventral, 1, 3, 3, 1; claws, 2. Claw of female gonopods strictly entire; basal spines 2 + 2.

Length, 8.5 mm.

Type Locality.—GEORGIA: Dermorest, Apr. 26, 1943; female holotype and male paratype; southeast of Pendergrass, Apr. 23, 1943, male allotype; Clarkesville to Tocoa, Apr. 28.

Agrees with *S. providens* in having the claw of the female gonopods entire but differs in the notably fewer ocelli and in the spining of the anterior legs.

Georgibius new genus

Differing from *Sonibius* and agreeing with *Enarthrobium* in not having the articles of the antennae fixed at 20, the number in the genotype being above 30. Differing from *Enarthrobium* in the anal legs of the male which are conspicuously crassate with the fourth joint longitudinally furrowed but lacking the characteristic lobe present in *Enarthrobium*. Prosternal teeth 2 + 2. Posterior angles of 9th, 11th and 13th dorsal plates produced. Tarsi of all legs distinctly biarticulate.

Genotype.—*Georgibius georgiae* new species.

Georgibius georgiae new species

Dorsum and antennae dark brown. Legs with tarsus, or some with tibia and tarsus a brighter yellow than more proximal joints. Antennae of medium length, composed of 32 articles. Eyes with ocelli in 2 series, 1 + 4, 4, single ocellus large, contiguous. Prosternal teeth 2 + 2, pale; with line of apices straight; median incision v-shaped; ectal seta on each side slender. Coxal pores round, uniseriate, 3, 4, 4, 4. Ventral spines

of first legs, 0, 0, 1, 2, 1; dorsal, 0, 0, 2, 1, 1. Ventral spines of penult legs, 0, 1, 3, 3, 2, dorsal, 0, 3, 1, 1; claws 2. Ventral spines of anal legs, 1, 1, 3, 2, 0; dorsal, 1, 0, 3, 1, 0; claw single. Only the last pair of coxae laterally armed. Fourth article of anal legs of male crassate, abruptly thicker than the fifth article, somewhat planate above with the longitudinal furrow rather deep but not reaching caudal end of article.

Length, 10 mm.

Type Locality.—GEORGIA: Brier Creek, 7 miles north of Sylvania. One male taken April 12, 1943.

Neolithobius xenopus (Bollman)

Brier Creek (7 mi. north of Sylvania), Apr. 12; 1 mi. north of Sylvania, Apr. 10; Millen, Apr. 16; 3 mi. southeast of Savannah, Apr. 14; and Lula, Apr. 26.

Both males and females are represented. The species was previously known only from a single specimen, the male holotype.

Scutigera coleoptrata (Linne)

Northwest of Elberton, Apr. 30.

Obituary

Dr. E. P. Felt died December 14, 1943, at the age of 75 years. He was stricken suddenly by a heart attack while working in his office at the Bartlett Tree Research Laboratories. Dr. Felt was widely known from his 30 years as New York State Entomologist and his many scientific papers. He was an authority on woodland and park insects, a specialist on gall-forming insects, a member of numerous entomological commissions and societies, and a past president of the American Association of Economic Entomologists.

The Rhabdiphorid *Tachycines asynamorus* Adelung in America (Orthoptera, Gryl- lacrididae, Rhabdiphorinae)

By JAMES A. G. REHN, The Academy of Natural Sciences
of Philadelphia

In 1898 S. H. Scudder briefly reported¹ the capture in greenhouses in Minnesota of a striking and spidery rhabdiphorid camel-cricket, which he considered to be an introduction of the Japanese *Diestrammena marmorata* (De Haan). Otto Lugger, who had sent the specimens to Scudder, the same year gave more details of the occurrence of the insect,² which had been captured in the conservatory of the Minnesota State University at Minneapolis. Since that time there have appeared in the literature numerous records, as *D. marmorata* and also as the related *D. unicolor*, of the occurrence of this rhabdiphorid in greenhouses or cellars, and even in wells, at a considerable number of localities distributed over the northern portion of the United States east of the Rocky Mountains, extending from Maine and New Jersey to the Dakotas and Colorado, south to Tennessee. It has also been reported from Ontario, Canada.

Morse in his classic "Orthoptera of New England" has given us³ by far the best picture of the habits and actions of the species as it occurs with us. The same year, 1920, Blatchley noted⁴ that De Haan's 1842 name *Locusta (Rhabdiphorus) marmorata*, based on Japanese material, was a primary homonym of *Locusta marmorata* Harris, 1841,⁵ and renamed the species *Diestrammena japonica*, the latter spelling apparently being a lapsus calami for *japonica*.

Unfortunately the failure by American students to correlate the determinations of this insect with conclusions then being published by European workers, was responsible until later than 1920 for the continued and erroneous reference of the

¹ Psyche, VIII, p. 180.

² Third Rep. Entom. Minn., p. 254, fig. 166.

³ Page 377, (1920).

⁴ Orth. of N. E. Amer., p. 611, (1920).

⁵ Report Ins. Mass. Inj. Veget., p. 145.

species as occurring in America to *Diestrammena*, and specifically to *D. marmorata*. In 1902 Nicolas de Adelung, the distinguished Russian orthopterist, described as a new genus and species, *Tachycines asynamorus*, a rhabdiphorid which had been found in greenhouses at St. Petersburg (the present Leningrad), Russia.⁶ He also reported that species as occurring in palm conservatories at Lubeck, Germany, and Brussels, Belgium. In 1914 Lucien Chopard, who had previously reported *Diestrammena marmorata* from greenhouses in France, corrected his previous determination and stated⁷ this material and other individuals from similar situations at localities in Hungary, Austria, Germany, France and England represented instead Adelung's *Tachycines asynamorus*. He also reported having examined material of this species taken under natural conditions ("en plein air" as he subsequently commented) in Szechuan Province, China. At the same time he suggested that the *Diestrammena* reported from the United States might instead be this genus and species. The same author in 1916 presented tables for the separation of the genera *Diestrammena* Brunner and *Tachycines* Adelung, and also for the identification of the then known species of the two genera.⁸ In 1921 he expressed the opinion that *T. asynamorus* had originated in Japan,⁹ but in 1938 he was more inclined¹⁰ toward his earlier belief that Szechuan was its probable native home.

In 1920 Karny¹¹ examined De Haan's unique female type of *Locusta* (*Rhabdiphorus*) *marmorata*,¹² in the Leyden Museum, and showed that it is a true *Diestrammena*, differing from *Tachycines* in the caudal tibial characters which Chopard in 1916¹³ gave to distinguish the two genera. We now know that both genera occur in Japan, and elsewhere in eastern Asia.

⁶ Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersb., VII, pp. 56, 59, text-figs. a & b.

⁷ Bull. Mus. Hist. Nat. Paris, 1914, no. 4, pp. 1-2.

⁸ Bull. Soc. Entom. France, 1916, pp. 154-159.

⁹ Bull. Soc. Entom. France, 1921, p. 209.

¹⁰ "La Biologie des Orthoptères" (Encycl. Entom., XX), pp. 117-118.

¹¹ Zool. Mededeel., V, p. 142.

¹² In Temminck, Verhandl. Natuur. Geschied. Nederl. Overz. Bezitt., Bijd. Kenn. Orthopt., p. 217, (1942).

¹³ Bull. Soc. Entom. France, 1916, pp. 154-156.

Of American workers Hebard was the first to point out in print¹⁴ that the "*Diestrammena marmorata*" of American authors is *Tachycines asynamorus*, although Morse in 1920 had noted¹⁵ that the species for which he used the name *D. marmorata* had "been recorded from many places in Europe by Chopard as the *Tachycines asynamorus* of Adelung." Hebard in the same paper synonymized Blatchley's *Diestrammena japonica* under *Tachycines asynamorus*, apparently on the grounds that Blatchley's description and figure (the latter taken from Luggler) refer to the latter genus and species. Karny, however, has taken issue¹⁶ with this action, and considers that Blatchley's name, which Karny emends to *japonica*, as he regarded *japonica* as meaningless and a lapsus, must replace De Haan's *marmorata*, which is preoccupied by that of Harris, as shown above. While all the material Blatchley knew is definitely *Tachycines asynamorus* and not the species named by De Haan, the former made the very exact and definite statement that "a new specific name is therefore necessary for De Haan's insect," and this name he there supplied. The majority of my taxonomic colleagues feel that, regardless of what he had before him, Blatchley's direct statement regarding what he was renaming is conclusive. This opinion makes Blatchley's *japonica*, as emended by Karny, the proper name for the Japanese *Diestrammena* called *marmorata* by De Haan, and as such it has consistently been used by Karny. That author noted in the same 1930 paper that *T. asynamorus* had been taken by Tarbinsky under natural conditions in coniferous forest in the Government of Viatka (the present Kirov), European Russia.

My present interest in *Tachycines* was occasioned by a request for determination placing in my hands a small series which had been taken in the cellar of a house in Philadelphia in September, 1943. The insects were there in sufficient abundance to warrant a call for advice in controlling them. This is the first occurrence known to me of the species in the immediate Philadelphia area, or in fact in Pennsylvania.

¹⁴ Proc. Acad. Nat. Sci. Phila., LXXVII, p. 146, (1925).

¹⁵ Orth. New Engl., p. 376.

¹⁶ Ann. Nat. Hist. Mus. Wien, XLIV, p. 173, (1930).

It is now possible to remove any question as to the identity of American material with Adelung's species. In the Hebard Collection at the Academy of Natural Sciences of Philadelphia there is a topotypic (St. Petersburg) pair of *T. asynamorus*, received from the Leningrad Zoological Museum, and determined by the Russian orthopterist Dr. E. Miram, after comparison with Adelung's type material. These authentic individuals have been compared with specimens in the Philadelphia collections from Elmhurst, Long Island, New York; Philadelphia, Penna.; Springfield, Ohio; Chicago, Ill.; Wauwatosa, Wisc.; Clarksville, Tenn.; Mt. Pleasant, Iowa; Minneapolis and St. Paul, Minn.; Fargo, North Dakota, and Brookings, South Dakota. Material from nearly all of these localities has been cited in past literature, but generally as *Diestrammena marmorata*, which, however, is not known to occur in North America. In all probability *Tachycines asynamorus* will become very generally established in suitable situations over much of the United States, but due to its environmental requirements its control, when present, should not be particularly difficult. Bue and Munro¹⁷ recently have given important notes on its habits and control in greenhouses.

In the collections at the Academy of Natural Sciences in Philadelphia we have material of several species of *Diestrammena* and of *Tachycines asynamorus* from Kyoto, Japan. This considerable series of *T. asynamorus* is inseparable from the above mentioned topotypes. Unfortunately we have no information regarding the conditions under which the species occurred at Kyoto.

Correction: In the article by F. Earle Lyman entitled "Eye-color changes in mayflies of the genus *Stenonema* (Ephemeroidea)" (*Entom. News*, LIV, p. 261, Dec. 1943), the ordinal name Ephemeroptera should have been used instead of the family name Ephemeridae. The Editors.

¹⁷ *Journ. Econ. Entom.*, XXXII, p. 468, (1939).

Rearing Notes on *Gracillaria sassafrasella* (Chamb.)

By E. P. DARLINGTON, New Lisbon, N. J.

As a fuller description of the larval history of this common under-side-miner on the leaves of sassafras might facilitate its detection, the publications of Chambers and Kearfott are herein amplified by rearing and observational records; the material being deposited at the Academy of Natural Sciences of Philadelphia.

An under side feeder on leaves of sassafras.

Larva:—When full grown will average about 8 mm. Head, light in color without distinguishing markings, I have never observed it brown as recorded by Kearfott. A notable characteristic is that the larva has but three pairs of abdominal legs; this was mentioned by Kearfott.

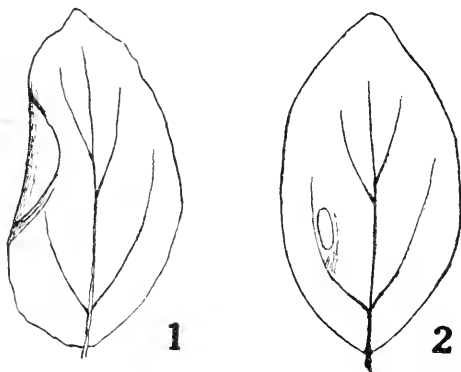


Fig. 1. Tentiform mine of the second larval stage.

Fig. 2. Split-capsule pupal case on under side of leaf.

Mine:—The linear track mine of the first stage is so inconspicuous as to escape observation, especially when it becomes nearly obliterated by the developing leaf; or when it becomes a part of the puckering tentiform mine of the second stage.

At the third stage, the larva leaves the mine near the point of its latest feeding and under-rolls the tip of a nearby young leaf; the rolling continues as the larva feeds. Occasionally it under-folds the edge of a leaf without making a roll. Seldom does it feed in the third stage on the leaf that it mined in the second stage.

In early July the larva leaves the roll, or fold, and forms a split capsule-like case on the underside of a leaf other than the one on which it was feeding; this case is firm, yellowish white, 8 mm. long and 3 mm. wide.

Thus in detail, is the larval history as outlined by Chambers. In a wire cage over a branch, attached by a muslin sleeve, the larva pupates as mentioned above, that is providing it does not pupate on the sleeve of the cage; but under natural conditions most of the larvae descend to the ground by a silken thread and pupate as recorded, in the trash. Pupation on the tree can best be detected by a slight puckering of the leaf over the pupal case.

In the Philadelphia area, larvae can be found in the rolls from the middle of June to as late as August 20th. Imagoes, from July 12th to August 20th or possibly as late as the 25th.

The moth can be easily recognized from Chambers' description but I would term the color fawn-purple, the basal color being fawn and most pronounced along the costa, especially at and near the apex of the wing. The purple varies in intensity, being quite brilliant along the dorsal margin in most specimens; in others the fawn color predominates with but small purple spots.

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Kearfott, W. D. *Bull. Am. Mus. Nat. Hist.*, xxiii, 1907, p. 167.

An Observation of a *Formica sanguinea* Raid At Battle Creek, Calhoun County, Michigan (Hymenoptera: Formicidae)

By HORACE GROSKIN, Ardmore, Pennsylvania

On August 21, 1943, at 11:30 A.M., temperature 75° F., I was in a district of residential properties, at the intersection of Oaklawn and Wood Streets, Battle Creek, Michigan, when I came upon a raid being made by the blood-red slave makers, *Formica sanguinea* subsp. *subintegra* Emery, while they were crossing a cement sidewalk in front of the corner property. The slave makers were going across the cement walk to the cut grass of the lawn, and were going in both directions; one column going to the nest being raided, while the other column was returning to their own nest, carrying in their jaws larvae, cocoons and fully adult black slaves.

The nest that was being raided was that of *Formica fusca subsericea* Say, and was located in the short grass of the lawn of the corner property, at the distance of 25 feet southeast of the cement walk. This nest was about three feet in diameter, and apparently an old nest with several entrances, the main one leading out onto a well-trodden bare ant path, about one inch wide, running through the grass for a distance of about ten feet to the bottom of a trunk of a maple tree.

The *F. sanguinea* nest was also in short grass, ten feet north of the cement walk and about 35 feet from the *F. subsericea* nest. It was less than two feet in diameter with three small entrances, and was located under a tree near a street curb. Both nests were in sandy soil with fine gravel in it below the surface.

The raid was in full progress when I first observed it on the cement walk at 11:30 A.M. I estimate there were about 400 *F. sanguinea* that crossed the cement walk, going in both directions, during a period of 30 minutes, or about 200 individuals that participated in the raid.

In a period of 20 minutes, standing on the cement walk, I was able to collect 39 *F. sanguinea* and nine adult black slaves which the *sanguinea* were carrying in their jaws, as well as a number of the larvae and cocoons also being carried. One interesting pair collected together at the same time was a *sanguinea* and a *subsericea*; the latter having apparently attacked the slave maker by grasping his leg in his jaw and holding on so tenaciously that he permitted himself to be dragged through the grass to the cement walk, where both were collected together in the same position, and are still in that position in the collection.

During the raid, I was rather surprised to see the blood-red slave makers returning to their nest with fully adult *subsericea* in their jaws. From the literature I covered, describing such raids, I gained the impression that the booty usually carried off by the *F. sanguinea* was larvae and pupae, and the adults were not molested, but in this particular raid, at least 10 to 15 percent of the booty being carried across the cement walk were adult workers. It would be interesting to know if this is a regular, routine procedure, and how the newly captured adult slaves are received by the old captives already in the nest.

Before the raid was concluded, I followed the *F. sanguinea* to their nest and watched them take their booty into the nest. A number of the black slaves were loitering about the entrances to the nest and upon the arrival of some of the slave makers with their booty, these black slaves became somewhat excited, running around the entrance to the nest, while a few followed the *sanguinea* into the nest. During this observation, I also noted a number of the black slaves going off and leaving the immediate vicinity of the nest, and I wondered whether they were old slaves going out to forage, or new slaves that may have been captured earlier in the day and were now escaping.

The raid was fully concluded at 12 o'clock noon, just 30 minutes after the time it was first observed. After 12 o'clock there was not a single *sanguinea* or a *subsericea* to be seen on the cement walk or in the grass immediately around it.

The following morning, August 22, 1943, at 10:15 A.M., I made another visit to the *sanguinea* nest and watched the ants

for 20 minutes. There was no evidence of any raid at this time. The black slaves were busy bringing loads of earth out of their galleries, and several of the *sanguinea* were standing about on the tops of the blades of grass at the entrances, as if they were standing guard.

I also visited the *subsericea* nest where everything appeared quite normal. The workers were going both ways along their path to the maple tree, and a few were wandering off through the grass.

My stay at Battle Creek, Michigan, ended the following day, so no further observation was possible.

The Monarch Butterfly, *Danaus plexippus* L., in Mexico.

By PHIL RAU, Kirkwood, Missouri.

During a visit to Mexico in February, 1939, entering the country by way of Laredo, Texas, I saw no butterflies (even though I was alert for all insect life) along the Pan American highway.

We crossed the marker "Tropic of Cancer" near Victoria, Tamaulipas, but at the high elevations no butterflies or other insects were in the air. However, as we dipped down to low elevations, several species of butterflies were observed, the most abundant as well as the most conspicuous, were the Monarch butterflies, *Danaus plexippus* L. [H. I. O'Byrne]. They were flying in the sunshine and feeding on the flowers at two localities; at Tamazunchale, S. L. P., 350 feet above sea-level, and at Igula, Guerrero, 2700 feet above sea-level.

A note by Bromley (ENTOMOLOGICAL NEWS, March, 1928, p. 96) states that in January, 1924, he saw in the Everglades, between West Palm Beach and Lake Okeechobee, great numbers of Monarch butterflies, some of which were in the air, some alighting on flowers, and some mating. He thinks that the great throngs that he observed were migrants in their winter quarters, and it is quite likely that the same may be true of those observed in Mexico.

A New *Dorcus* from Mexico (Coleop.: Lucanidæ) *

By BERNARD BENESH, North Chicago, Ill.

The following *Dorcus*, a close relative of *D. brevis* (Say), appears to be new to entomological science; it was recently discovered among the Lucanidæ material in the collection of the late Dr. Frank J. Psota, now incorporated in collections of the Field Museum of Natural History, Chicago, Illinois. This noteworthy discovery increases the meager lucanid fauna of Mexico to five species, with distribution as follows: *Pseudolucanus mazama* (Lec.), Sonora and Chihuahua; *Cantharolethrus homoderoides* Kriesche, Mexico (probably subtropical southern Mexico); *Dorcus mexicanus* n. sp., Jalapa; *Æsalus smithi* Bates, Chilpancingo; *Æ. trogoides* Albers, Oaxaca.

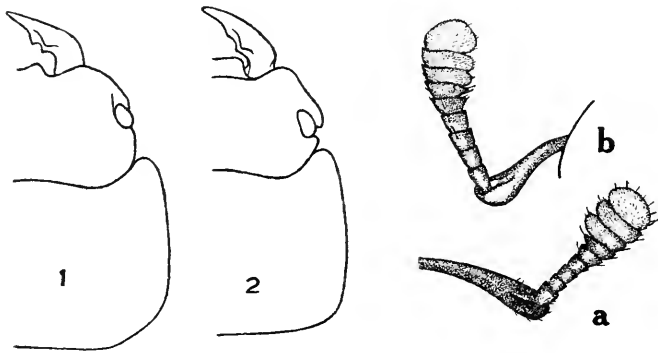
Dorcus mexicanus new species

Fig. 2♂, 2a antenna ♂, 2b antenna ♀.

♂. Head, prothorax and elytra dull black, opaque; posterior of elytra showing a faint indication of brown; suture feebly shining. Head transversal, nearly twice as broad as long, depressed (in *brevis* more convex), anterior angles oblique; eyes fairly large (bigger than in *brevis*); ocular canthus parallel opposite the eyes, dividing them for two-thirds their length; clypeus nearly straight in front, broad (broader than in *brevis*), corners obtusely rounded, base distinctly delineated by an impressed line. Mandibles regularly arcuate, acute, granulate, with some fairly large punctures, rounded on the exterior margin; at the middle of the inferior margin with two denticles and, above these, on the dorsal area an oblong, conical tooth. Antennæ short and slender, finely granulate, including the sensory area of clava, feebly shining; scape as long as funicle and clava together, black; funicle twice as long as the clava, piceous; clava three-jointed, rufous, with eighth and ninth segments produced

* The writer desires to express his deep appreciation to Mr. W. J. Gerhard and Mr. Henry Dybas, of the Field Museum, for the opportunity to study this material.

into a lobe, of which only the apices are pubescent, ultimate segment ovate in outline, with several marginal setæ. Prothorax transverso-quadrate, anterior angles produced and acutely rounded, sides gradually diverging to posterior fourth, basal angles abruptly rounded, base nearly straight; puncturation cribriform throughout. Scutellum heart shaped, broader than long, apex pointed, with several unequal punctures. Elytra one-third longer than wide, sides nearly parallel to posterior third, thence attenuated to apex, with basal half reticulate and remainder closely cribrate. Legs fairly short; intermediate and posterior tibiæ with a spine near the apical third. Beneath, mentum broadly arcuate in front, rounded on sides, with large confluent pits; palpi blood-red. Abdominal segments feebly emarginate, covered in the middle by remote punctures, which become larger and confluent towards lateral margins.



♀. In habitus resembling the male, but much broader (exceeding in width even ♀ *brevis*); clypeus narrower than in male, bilobed; cephalic tubercles well developed (represented in *brevis* by broadly spaced gibbosities), close; occipital area impunctate, shining; mandibles trigonate in cross section, porrect, acute, apex slightly bent inward, outer margin strongly carinate, inferior margin with a single median tooth, upper area with a longitudinal ridge, produced in center. Disc of pro-

notum with a median flattened area, extending from front margin to base. Clypeus and front of head reddish-brown; apex of clypeus margined with black; base of head and prothorax rufous; scutellum black; elytra reddish-brown, suture black; sculpture similar to male's, but much coarser, especially the lateral margins of pronotum and elytra; prothorax and elytra shining.

Relative size of *Dorcus mexicanus* n. sp., and *D. brevis*, used for comparison:

	<i>D. mexicanus</i> n. sp.		<i>D. brevis</i> (Say)	
	♂	♀	♂	♀
Length (incl. mandibles)	19 mm.	20 mm.	18.5 mm.	20 mm.
	width + length (in millimeters)			
head	5.6 + 3.0	5.5 + 3.0	5.75 + 3.0	5.4 + 2.5
pronotum	7.5 + 4.5	8.3 + 4.0	7.5 + 4.5	7.75 + 4.75
elytra	7.2 + 10.5	8.8 + 11.5	7.5 + 10.0	8.0 + 11.0

Holotype: ♂, Jalapa, MEXICO. *Cotype*: ♀, without data. Both in the Field Museum of Natural History, Chicago, Illinois. The female example is minus entire abdomen, precluding comparison of genitalic structure with that of *brevis*.

A New Subspecies of *Polites themistocles* (Latreille) from British Columbia, Canada (Lepidoptera, Rho- palocera, Hesperioidea)

By H. A. FREEMAN, White Deer, Texas

Polites themistocles turneri new subspecies

This new subspecies differs from typical *themistocles* (Latreille) in the depth of coloration of the fulvous areas and spots on the upper surface of the primaries. In typical *themistocles* ♂♂, the cell area, costal margin, subapical spots and the faint spots at the outer side of the stigma are decidedly yellowish-

fulvous. These same areas and spots in *turneri* are much darker, being brownish-orange. The fringes, on both pairs of wings, are somewhat darker than in the typical species. On the under surface of the primaries the ground color and spots are darker than in typical *themistocles*. The under surface of the secondaries is also darker brown. The ♀♀ of *turneri* have the spots and costal margin on the upper surface of the primaries much darker fulvous than in the typical species. *P.t. turneri* is somewhat smaller than typical *themistocles* as comparative measurements reveal that *themistocles* ♂♂ average 27 mm. and the ♀♀ 28 mm., whereas the ♂♂ of *turneri* average 23 mm. and the ♀♀ 26 mm.

Described from 12 specimens: 3 ♂♂ and 2 ♀♀, VI-28-38, Heffley Ck., BRITISH COLUMBIA. 5 ♂♂ and 1 ♀, Jesmond, B. C., and 1 ♀, Clinton, B. C., by J. K. Jacob, during June and July, 1937-38.

The writer takes great pleasure in naming this new subspecies for Dr. J. R. Turner of Caldwell, Kansas, who is now in our armed forces.

Holotype, ♂, Jesmond, BRITISH COLUMBIA, VII-9-37 and allotype ♀, Clinton, B. C., VI-17-38 (coll. J. K. Jacob) are in the collection of the author. Ten paratypes are in the following collections: 2 ♂♂, 1 ♀, Stallings and Turner; 3 ♂♂, 1 ♀, Canadian National Museum; 1 ♂, Academy of Natural Sciences, and 1 ♂, 1 ♀, in the collection of the author.

P. themistocles occurs over nearly all the eastern United States and Canada; *turneri* is the subspecies that occurs in British Columbia and possibly other localities in western Canada and northwestern United States. *P.t. turneri* can be recognized by its darker coloration and slightly smaller size. On the upper surface *turneri* resembles *Polites mardon* Edwards but can be readily separated by the under surface of the secondaries, as *turneri* does not have the poorly defined bands of slightly darker color found in *mardon*.

Another Use for the Cockroach, *Blatta orientalis*.

By PHIL RAU, Kirkwood, Missouri.

One finds in entomological literature reference to many uses of the common cockroach or water-beetle, *Blatta orientalis*.

Frank Cowan in "Curious Facts in the History of Insects" (1865) gives several instances of cockroaches being given as food to pet animals, and he also gives details of the medicinal use of cockroaches for ulcers, cancers, earache, and also for killing worms in children. Miall and Denny in their book "The Structure and Life History of The Cockroach" (1886) say that in Russia, the Oriental cockroach constitutes a popular remedy for dropsy and also that cockroach tea and cockroach pills are known in the medicinal practices of Philadelphia, and that salted cockroaches are said to have an agreeable flavor, which is apparent in certain sauces.

There are no records, in so far as I know, of the Oriental cockroach being used as bait by fishermen. However, while visiting Reelfoot Lake in Tennessee, in July, 1937, I was surprised to find that the keepers of boathouses all along the lake-front keep on hand large stocks of these cockroaches. These they sell at a cent apiece to the fishermen who go after the carp-like fish known locally as "bream." Several of the men told me that these cockroaches are unexcelled for bream fishing; in fact "no other bait is as good."*

The dealers keep the live cockroaches in large wooden rain-barrels which are covered with heavy, wooden lids. They procure their stock by setting traps in the commission houses in the nearest large city, Cairo, Illinois.

The popular season for bream fishing is from April to August, although there is no law against catching them at other times. Incidentally, and I smiled to myself when I remembered it, these are the very months when the cockroaches attain their maximum growth. They die off a little later, leaving their egg-

* According to Jordan & Evermann (Amer. Food & Games Fishes, p. 349) the largest species of the sun-fish family, the Bluegill, *Lepomis pallidus*, is also known as the Blue Bream.

cases, or very small nymphs. After August there evidently is no bream fishing for want of big cockroaches; the popular season for bream fishing therefore is not when the fish are at their best, but when the cockroaches have reached their maximum size.

I was also told that, in a pinch, when cockroaches cannot be obtained, the fishermen use the larvae of the dirt-dauber (*Sceliphron*) and also large lepidopterous larvae found in stems of the giant ragweed.

Note on Unusual Nests of *Trypoxylon politum* Say

By MARTIN H. MUMA AND WALTER F. JEFFERS,
College Park, Maryland

The pipe-organ builder, *T. politum* Say, is one of the more interesting of our native mud-dauber wasps. Its finely striated tubular nests, often seen on the walls of deserted or little used sheds and barns are commonly five inches in length. They occur in groups which often are composed of several layers. Occasionally the nests are found in odd situations and are of unusual construction. Phil Rau in 1928 stated that this species in one instance had utilized a corner of woodwork, building a nest twenty inches long.¹

While studying the food habits of several mud-dauber wasps the authors discovered similar nests on abandoned window frames. In this case several long tubes had been built in the guide-groove of the frames leaving only the front surfaces of the tubes exposed. Three of the nests were measured; one was ten inches long, one twenty inches and the longest twenty-five inches. It is interesting to note that all of the unusual nests, the one observed by Mr. Rau and those described here, were multiples of the five inch tube commonly built. This seems to indicate that the tendency to construct nests of uniform length is inherent even though the tubes are placed end to end rather than side by side.

¹Rau, Phil, 1928, Field Studies on the Behavior of the Non-social Wasps, Trans. Acad. Sci. St. Louis, 25 (9); 325-489.

Notes and News in Entomology

Under this heading we present from time to time short reviews, notes, news and comments on entomology throughout the world. Contributions from readers are solicited and will be acknowledged when used.

Hovanitz,¹ the student of butterfly population analysis, has presented another interesting analysis for the case of the genetic and ecological relationships of the yellow and orange races of *Colias chrysotheme* in California. The two races differ in color, number of broods, diapause, preferred food-plants (alfalfa versus red clover) and somewhat different ecological niche. Genetical analyses show that hybridization occurs readily and that some genes are and some genes are not readily transferred from one race to the other. In nature, hybrid intermediates reach 10 per cent of the population in certain localities. This is one of the many cases where the question of species versus race is difficult to decide; Hovanitz lists them tentatively as races because it is possible to interchange a certain number of genes from one to the other. In nature the two tend to remain distinct, and the author lists a number of possible ecological and genetical reasons for this.

A more comprehensive analysis of the genetical variations and hybrids in *Colias eurytheme*, *eriphyle*, and *philodice* has recently been presented by Gerould.² This large paper covers breeding experiments from 1911 to 1942, the whole history of the migration of *eurytheme* to the eastern and northeastern states and the resultant effects in terms of natural hybrid populations. Of particular interest are the two beautiful color plates (35 figs.) showing the hybrids obtained by crossing *C. philodice* x *eurytheme* and by backcrossing such a known hybrid to parental stocks. These two papers will be of interest to everyone who tries the extremely difficult job of sorting mixed unknown lots of our Sulphur Butterflies.

Keegan³ has described and given photomicrographs of the

¹ Biol. Bull., 85: 44-51. 1943.

² Proc. Amer. Phil. Soc., 86: 405-438. 1943.

³ Trans. Amer. Micr. Soc., 62: 194-199. 1943. See also Penn. Jour. Parasit., 28: 277-283. 1942.

embryos of *Kiricephalus coarctatus* from the Indigo snake. This is a pentastomid worm; a peculiar and little-studied group of uncommon parasites in which the adult has the general appearance of an earthworm and lives in the lungs and coelom of snakes, but the embryos look like little mites with four peg-legs. For want of a better place they are nowadays put next to the Acarina. The embryos resist cold well but succumb rapidly to mammalian body temperatures and to drying. This suggests a cold-blooded aquatic animal as the still unknown intermediate host.

Alexander⁴ (1943) continues the physiological studies of the flashes of fire-flies—a subject that has received intensive study by a number of physiologists in recent years.⁵ Apparently the chemical precursor, “luciferin,” is produced steadily, and the mechanism (flash) is set-off by the sudden entrance of oxygen. This implies that the control of flashing is in the tracheal end-cell system. In a sense this clarifies the question of how the beetle may control the flash but we are still uncertain as to how any insect can more or less voluntarily control the tracheal end-cell system.⁶

Of more general interest is Squire's recent indictment of the light-trap method of studying phototropism in insects.⁷ Squire analyzes particularly the question of fatigue or rapid loss of phototropic potential on exposure to light. Since this fatigue may quickly produce a drop in response of more than 90 per cent (the moth, *Platyedra gossypiella*) it can be a bad source of error in studies of phototropism if not carefully controlled. He severely criticizes all analyses of light-trap data that do more than compare the relative efficiency of various types of traps. As he says, “What the experimenter with light traps really studies is light traps by means of phototropism and not photo-

⁴ Journ. Cell. & Comp. Physiol., 22: 51-71. 1943.

⁵ See also Harvey, “Living Light,” Princeton Univ. Press. 1940.

⁶ See Wigglesworth, “Principles of Insect Physiology.” Dutton & Co. 1939, and especially Bult, T., “Over de Beweging der vlocistof in de Tracheolen der Insecten,” Dissertation: Von Gorcum & Co., Assen, 143 pp. 1939.

⁷ Bull. Ent. Res., 34: 113-116. 1943.

tropism by means of light traps. The latter can be investigated only by direct observation of the reaction of the whole of a known body of living material, and not by counting the trapped portion of an unknown aggregate. The light trap tells us very little about the reactions of the trapped individuals and nothing about those that were not trapped. It is equally plain that the question of fatigue must be taken into account in any method of investigating phototropism. The light-trap method fails to do so and therefore stands indicted as unscientific and the extensive literature which it engendered as worthless." Strong words those, but we can well profit by such severely critical analyses in entomology. A. G. RICHARDS, JR.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Fenton, F. A.—The insect pest record for Oklahoma. [Proc. Okla. Acad. Sci.] 21: 25–28. Frost, S. W.—An observation box for solitary bees and wasps. [12] 36: 803–804, ill. Hamlin, John Calhoun, 1896–1943.—Obituary by W. R. Walton. [12] 36: 812, photo. Knowlton & Wood.—Seasonal insect food of the western chipping sparrow. [119] 30: 783–85. Little, E. L.—Common insects on Pinyon. [6] 41: 239–52. Mosely, M. E.—The preparation of insects for the microscope with special reference to Trichoptera. [9] 76: 227–34, cont. Reid, W. M.—A

simple technique for the transfer of small objects. [Trans. Amer. Micro. Soc.] 61: 423, ill. **Sanders, George Ethelbert**, 1884-1943.—Obituary by J. J. Davis. [12] 36: 811-12, photo. **Valentine, J. M.**—Insect taxonomy and principle of speciation. [91] 33: 353-58. **Weiss, H. B.**—The Journal of the New York Entomological Society, 1893-1943. [6] 41: 285-94.

ANATOMY, PHYSIOLOGY, MEDICAL—**Flanders, S. E.**—The rôle of mating in the reproduction of parasitic hymenoptera. [12] 36: 802-803. **Haydak, M. H.**—Nutrition of the wax moth larvae, vitamin requirement. I. Requirement for vitamin B1. [Proc. Minn. Acad. Sci.] 9: 27-29, 19-41. **Pilano, F.**—Notas sobre entomologia medica Venezolana. I. Flebetomos transmisores de Leishmaniasis tegumentaria en el Valle del Yaracuy. [46] 2: 99-102. **Whiting, P. W.**—Intersexual females and intersexuality in Habrobracon. [92] 85: 238-43, ill. **Yust, Nelson & Busbey.**—Comparative susceptibility of two strains of California red scale to HCN, with special reference to the inheritance of resistance. [12] 36: 744-49.

ARACHNIDA AND MYRIOPODA—**Bailey & Keifer.**—The tomato russet mite, *Phyllocoptes destructor* Keifer: Its present status. [12] 36: 706-12, ill. **Chickering, A. M.**—Twenty-one n.sps. of *Dipoena* from Panama (Theridae). [Trans. Amer. Micro. Soc.] 61: 329-78, ill. **Hungerford, H. B.**—The tropical rat mite in Kansas. [103] 16: 154. **Kaston, B. J.**—Supplementary notes on fam. names in the order Araneae. [119] 30: 765-68. **Marshall, R.**—Hydracarina from California. II. [Trans. Amer. Micro. Soc.] 61: 404-15, ill. (*). **Neivell, I. M.**—A new sironid from No. America (Opiliones). [Trans. Amer. Micro. Soc.] 61: 416-22, ill.

SMALLER ORDERS AND ORTHOPTERA—**Banks, N.**—Neuroptera of Northern S. America. [46] 2: 59-78, ill. (*). **Dexter, R. W.**—*Anurida maritima*: An important sea-shore scavenger. [12] 36: 797. **Hughes-Schrader, S.**—Polarization, kinetochore movements, and bivalent structure in male mantids. [92] 85: 265-300. **Montgomery, E.**—Records of Ohio dragonflies. [43] 43: 267-70. **Mosely, M. E.**—(See under General.) **Traver, J. R.**—New Venezuelan mayflies. [46] 2: 79-98, ill.

HEMIPTERA—**DeLong, D. M.**—A n. gen (*Ascius*) & 2 n. sps. of leafhoppers closely related to *Flexamia*. [43] 43: 250-51, ill. **Harris, H. M.**—Additions to the S. Dakota list of Hemiptera. [103] 16: 150-53. **Funkhouser, W. D.**—Synonymy of the Membracidae of Formosa. [6] 41: 265-75. **Jones, M. G.**—A brown aphid, *Aphis (Dorsalis) cognatella*, sp. n., found on spindle tree. [22] 34: 213-24, ill. **Nelson, H. D.**—The position of *rostralis* of the California red scale feeding on lemons. [12] 36: 750-51. **Smith & Knowlton.**—The aphid gen. *Drepanaphis*. [80] 59: 171-76, ill. (*k).

LEPIDOPTERA—**Field, W. D.**—Racial variation in *Strymon columella* (Lycean). [103] 16: 153. **Forbes, W. T. M.**—Revisional notes on the *Danainae* (Supplement). [6] 41: 295-304, ill. (*). **Hinton, H. E.**—The larvae of Lepidoptera associated with stored products. [22] 34: 163-212, ill. (k). **Lichy, R.**—Documents pour servir a l'etude des Sphingidae de Venexuela. Une aberration de *Protanbulyx strigilis*. [46] 2: 103-6. (*). **Remington, C. L.**—The *Rhopalocera* of Principia College. [Trans. Ill. Sta. Acad. Sci.] 36: 179-80. **Stallings & Turner.**—A new U. S. record [for *Hypota redtenbacheri*] [103] 16: 154.

DIPTERA—**Alexander, C. P.**—Records & descr. of N. Amer. craneflies. IV. Tipuloidea of the Yellowstone Nat. Park. [119] 30: 718-64. (*). **Coe, R. L.**—Swarming of *Sepsis cynipsea*. [8] 79: 251. **Frost, S. W.**—Three new species of Diptera related to *Agromyza pusilla*. [6] 41: 253-63, ill. (k). **Hodgen, B. B.**—*Aedes aegypti*, the yellow fever mosquito in Oklahoma. [103] 16: 154. **Lindquist & Deonier.**—Seasonal abundance & distribution of larvae of the Clear Lake gnat. [103] 16: 143-49, ill. **Mailen, T. H.**—Seasonal occurrence and the effect of host attractiveness on the abundance of stable flies and horn flies on cattle. [Proc. Okla. Acad. Sci.] 21: 19-22. **Portman, R. W.**—New mosquito records for Colorado. [103] 16: 155. **Roth, L. M.**—A key to the *Culex* of the southeastern U. S., by male genitalia. [103] 16: 117-33, ill. **Snow, W. E.**—Laboratory feeding of Culicidae. [Trans. Ill. Sta. Acad. Sci.] 36: 181-82.

COLEOPTERA—**Blackman, M. W.**—New sps. of Amer. Scolytoid beetles, mostly Neotropical. [50] 94: 371-99, ill. **Chamberlin & Callenbach.**—Oviposition of June beetles and

the survival of their offspring in grasses and legumes. [12] 36: 681-88. **Chamberlin, Fluke & Callenbach.**—Species, distribution, flight and host preferences of June beetles in Wisconsin. [12] 36: 674-80. **Glen, King & Arnason.**—The identification of wireworms of economic importance in Canada. [52] 21: 358-87, ill. (*k). **Hovey, C. L.**—Studies on *Chion cinctus* in Oklahoma (Ceramb.). [Proc. Okla. Acad. Sci.] 21: 23-24. **Kulash, W. M.**—The ecology and control of wireworms in the Connecticut River valley. [12] 36: 689-93. **Linsley, E. G.**—The date-stone beetle in California and Lower California. [12] 36: 804-805, ill. **Reinhard, H. J.**—Hibernation of the boll weevil. [Bull. Texas Agr. Exp. Sta.] 638: 23 pp., ill. **Sanderson, M. W.**—A n. subf. of Staphylinidae, the Pulicomorphinae. [103] 16: 134-42, ill.

HYMENOPTERA—**Bequaert, J.**—Color variation in the American social wasp *Polistes canadensis*, with descr. of two n. forms (Vespid). [46] 2: 107-24 (*S). **Burks, B. D.**—The No. Amer. parasitic wasps of the gen. *Tetrastichus*: a contribution to biological control of insect pests. [50] 93: 505-608, ill. (*). **Flanders, S. E.**—(See under Physiology.) **Frost, S. W.**—(See under General.) **Gahan, A. B.**—Revision of two gen. of chalcidflies belonging to the fam. Eupelmidae from N. & S. Amer. [50] 94: 339-69. **Hincks, W. D.**—Further nomenclature notes on Braconidae and Aphidiidae. [9] 76: 221-24. **Lloyd, R. W.**—Wasps robbing bee-hive. [8] 79: 258.

LIST OF JOURNALS CITED

6.—*Jour. New York Entom. Soc.* 8.—*Entom. Monthly Mag.* 9.—*The Entomologist, London.* 12.—*Journal Economic Ent.* 22.—*Bull. Entom. Research.* 43.—*Ohio Jour. Sciences.* 46.—*Bol. Entom. Venezolana.* 50.—*Proc. U. S. Nat. Museum.* 52.—*Canada Jour. Research.* 80.—*Jour. Elisha Mitchell Sci. Soc.* 91.—*Jour. Washington Acad. Sci.* 92.—*Biological Bulletin.* 103.—*Jour. Kansas Entom. Soc.* 119.—*Amer. Midland Nat.*

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyroctomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

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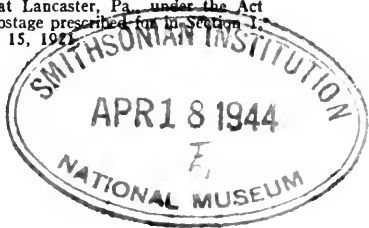
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No. 3

Arthropod Collecting in the Burrows of a Texas Pocket-Gopher

By EDWARD S. ROSS, California Academy of Sciences

The writer's methods of collecting insects and other arthropods in pocket-gopher (*Geomys*) burrows and nests are here presented in the hope that they may be applied elsewhere by other workers. These investigations were prompted by the remarkable findings of Hubbell and Goff (1940) in Florida in burrows of *Geomys f. floridanus*, and the writer's desire to know more about the geographical distribution of some of the inquilines which they encountered. This work was conducted in the Carrizo Sands, seven and one-half miles southeast of Somerset, Texas (near San Antonio). The burrows at this locality were made by *Geomys breviceps attwateri* Merriam. Great assistance, for which the writer is very grateful, was given by Mr. A. J. Kirn, a local naturalist, and Dr. H. R. Roberts of the Academy of Natural Sciences of Philadelphia.

Two methods of collecting were employed—the molasses bait trap method and direct excavation. Of the two, the trap method yields the largest numbers of specimens with the least effort but direct excavation, which results in the discovery of the nest and a refuse chamber, is the most satisfactory method, as it provides data on the nature of the burrow system; complete populations of inquilines; and an opportunity to observe the ecological niche and role of each inhabitant.

The bait trap method used was the same as that described by Hubbell and Goff (1940) and consisted of first trapping the gopher with a spring trap and then inserting a half-pint jar, half filled with a molasses and water mixture (50-50), into the floor of a runway burrow. The excavation was then cov-

ered with a square of tin or cardboard which was banked with sand around the edges to exclude light and free living insects. Every day the insects trapped in the jar were removed, washed in water several times, and preserved in 70 per cent alcohol. Collections thus obtained were particularly rich in inhabitants of the subsurface runway system such as *Ceuthophilus* (camel crickets), *Rhadine* (Carabidae) and *Pseudoleria* (Diptera).

Direct excavation is very laborious and, as the subsurface runway system of one gopher burrow may extend several hundred feet, a great deal of luck is involved in contacting a tunnel which leads down to the nest. The element of chance can be somewhat lessened if the collector first surveys the arrangement of the mounds, or throw-out piles of sand, which indicate the course of the runways. The main objectives of such a survey should be: (1) to learn the extent of activity of one gopher and (2) to find the "central" point from which the subsurface runways seem to radiate. The nest should lie beneath such a "central" point.¹ It might also be suggested that the burrow chosen for excavation be one selected from the edge of the range of gopher activity, or one that is as isolated as possible. This will eliminate or reduce the difficulty of surveying the overlapping burrow systems of several gophers. A contact is made with one of the subsurface runways near the apparent "central" point and the burrow is followed. After much disappointment the collector may contact a runway that heads downward with an increased gradient. This may continue deeper and deeper for as much as twenty-five feet distance and three feet vertically. Suddenly the burrow may spiral for a short distance straight down.² At this time the excavation should be broadened so that the tunnel may be carefully excavated from the side so as to prevent a collapse of the nest chamber. At this stage some of the writer's excavations were about six feet square and four

¹ It will be noted in Hubbell and Goff's diagram (1940, fig. 1) of one of the two burrows they excavated, that the deepest point and fecal chamber, with a nearby spiral turn, is located near the intersection point of the three main runways.

² In the five nests excavated such a vertical spiral was encountered near or above every nest.

feet deep. After the spiral, the tunnel may continue for some distance downward (or at times upward) to the nest.

The nest chamber of the Texas gopher was usually about nine inches in diameter and filled with dry grass, roots, peanuts, and debris, such as old bones, apparently collected by the gopher. The nest material and the walls of the chamber literally teemed with arthropod life. It is best to immediately place the entire nest in a large, stout, paper bag which is then tightly twisted at the top. Then carefully excavate all the damp sand immediately surrounding the chamber (especially the floor) into another paper bag. This material may be carefully picked over for specimens upon return to the laboratory or placed in a Berlese funnel.

It will be noted that many steep burrows descend from several directions to the nest. Each of these should be followed for a short distance for stray inquilines and especially in a search for the gopher's "garbage pit" or fecal chamber, which is usually at a lower level than the nest chamber. It is in this "pit" filled with gopher feces, decomposing roots, etc., that the richest collecting is often encountered. It is here that the larvae and adults of the coprophagous Scarabaeidae, and other scavengers are found, together with larvae of their predators, such as the Histeridae. All this material should also be placed in a paper bag for careful examination in the laboratory and for rearing.

The writer's excavations were made in the winter of 1942-43 and it may be pointed out that it would be very difficult to excavate in this region at most other times of the year as the sand would be too dry and the heat too intense. In all, five nests (no two of which had the same kinds of populations and ratio of individuals) were uncovered and a large collection of arthropods was obtained, which it is hoped will be reported upon later in greater detail by specialists. Some of the species obtained have proved to be, and others yet may prove to be, new or "lost" species, the true habitats of which had not yet been discovered.

The writer urges entomologists to excavate animal burrows of all types in their particular area. The tedious labors are well rewarded by exciting and rare discoveries.

The following is a preliminary list of some of the arthropods collected:

Predominant Inhabitants of Nest Chamber

Acarina: *Macrocheles* sp. (Parasitidae), (very numerous), (dt. H. E. Ewing).

Araneida: Few pale Lycosidae.

Pseudoscorpionida: In two nests only (26 and 11 specimens).

Collembola: Numerous, especially Entomobryidae.

Orthoptera:

Ceuthophilus sp. (Gryllacrididae).

Coleoptera:

Rhadine myrmecoides Horn (Carabidae), (dt. E. C. Van Dyke).

Ptomaphagus sp. (Silphidae), (dt. E. S. Ross).

Atheta. Four species (Staphylinidae), (dt. E. S. Ross).

Onthophilus n. sp. (Histeridae), (dt. E. S. Ross).

Geomysaprinus goffi Ross (Histeridae), (dt. E. S. Ross).

Spilodiscus gloveri (Horn) (Histeridae), (dt. E. S. Ross).

Aphodius. Seven new species? (Scarabaeidae), (dt. O. L. Cartwright).

Asidopsis sp. Larvae (Tenebrionidae), (dt. R. A. St. George).

Hemiptera:

Blissus leucopterus Say³ (Lygaeidae), (dt. R. I. Sailer).

Exptochiomera oblonga (Stål) (Lygeidae), (dt. R. I. Sailer).

Lepidoptera:

Amydra sp. Larvae feeding on nest (Tineidae), (dt. H. Capps).

Diptera:

Pseudoleria pectinata (Lw.) (Helomyzidae), (dt. M. T. James).

Maggots.

Predominant Inhabitants of Refuse Chamber

Acarina: see above.

Collembola: see above.

Coleoptera:

Ptomaphagus sp.

Atheta. Four species. Numerous larvae and adults.

Onthophilus n. sp. Fewer than in nest chamber.

Spilodiscus gloveri (Horn). Adults.

Larvae of Histeridae.

Aphodius. Numerous larvae, fewer adults.

³ The presence of hibernating chinch bugs in the nests may have an economic significance. Rodent nests, because of their depth and the body warmth of the rodent, may contribute to the winter survival of such economic insects in their northern or marginal limits of range.

Tenebrionidae. One large larva.⁴
Diptera: Numerous maggots (*Pseudoleria?*).

Predominant Inhabitants of the subsurface runways

Ceuthophilus sp. and *Rhadine myrmecoides* Horn predominate; the latter, perhaps, prey on at least the early stages of the *Ceuthophilus* which in turn appear to feed upon the decomposing tubers and roots stored by the gopher in caches along the runway.

Pseudoleria pectinata Lw. is also abundant with scattered *Plomphagus*, *Atheta*, *Aphodius* and *Geomysaprinus* which must wander up from the nest area.

REFERENCE

- HUBBELL, T. H., AND C. C. GOFF. 1940. Florida pocket-gopher burrows and their arthropod inhabitants. *Proc. Florida Acad. Sci.*, iv (1939), pp. 127-166, 2 figs.

THE CHICAGO NATURAL HISTORY MUSEUM

The former Field Museum of Natural History has been recently granted an amended charter by the Secretary of State of Illinois, and is henceforth to be known as the Chicago Natural History Museum. As is well known, several important insect collections are housed in this museum, notably the collection of Lepidoptera of Hermann Strecker. Future references to these collections should use the new name of the institution.

According to an article in the January 14th issue of *Science*, the museum is continuing nearly normal activities during the war despite the absence of thirty-nine employees and trustees engaged in war services. Attendance the past year has been nearly normal; more than a million visitors were received. In entomology, Dr. Alfred E. Emerson, Dr. Charles H. Seevers and Mr. Alex K. Wyatt have recently been appointed research associates.

⁴ The discovery of large Tenebrionidae larvae (Eleodini ?) as well as adults, in these, and other animal burrows the writer has excavated in arid regions, suggests that burrows, particularly of the open type made by spermophiles, may be the normal breeding places or refuges of such insects. The cool, moist depths of the tunnels offer the adults a means of escaping the rigors of the desert during the day and access to favorable places for oviposition.

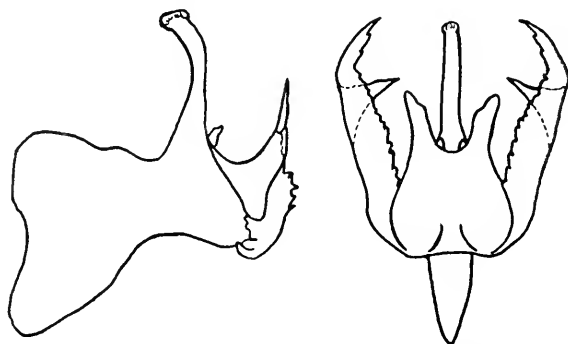
A Californian *Acinopterus* (Homoptera: Cicadellidae)

By DOROTHY J. KNULL, Ohio State University,
Columbus, Ohio

Acinopterus morongoensis new species

Large, brown with light veins fuscous-margined, head and pronotum tinged with green; in form of inner male genitalia resembling *A. rostratus* Beamer and Lawson.¹ Vertex slightly narrower than pronotum, distinctly longer at middle than next eyes; elytra acute at apices.

Color. Buff above, green tinged on head, pronotum, scutellum and below, eyes reddish brown, pronotum darker posteriorly, lateral angles of scutellum slightly darkened, elytra with light veins distinctly and consistently brown-margined, cells of corium especially near cross-veins infuscate, also inner apices. In most specimens a distinct whitish bloom in posterior two-thirds of claval area; apex of last ventral segment of female embrowned medially, ovipositor reddish brown.



Ventral and lateral view of aedeagus of *A. morongoensis*.

Genitalia. Last ventral segment of female strongly produced, gradually narrowed on posterior two-thirds to width of

¹ Ann. Ent. Soc. Am., xxxi: 481, 1938. The Genus *Acinopterus*.

ovipositor where it is shallowly indented at apex, more than four times length of preceding abdominal segment. Male, aedeagus complex: in ventral view with outer pair of processes heavy, broadened on outer half, forming two large sharp points, serrate on inner edge, inner pair about half length of aedeagus, parallel to it and separated from it by about its width, notched near apex and projecting slightly laterad from notch; a minute tooth either side of aedeagus at base; shaft as long as outer processes, straight-sided, somewhat enlarged at apex; in lateral view outer processes apically produced in two sharp, widely separated points, aedeagus shaft bent dorsad on outer third, small basal tooth more prominent in this view.

Length: male $5\frac{3}{4}$ -6 mm.; female 6-6 $\frac{1}{2}$ mm.

Male holotype, allotype, one male and three female paratypes from Morongo Valley, CALIFORNIA, vi-19-42, D. J. and J. N. Knull Collectors, are deposited in the Collection of The Ohio State University.

AS OTHERS SEE US

Professor G. E. Hutchinson, of Yale University, regularly contributes a section on interesting current scientific papers to the journal published by Sigma Xi. In the January 1944 issue of the *American Scientist* (vol. 32, p. 78) he lauds the work of amateur astronomers and contrasts it with the work of amateur entomologists. We quote without comment:

"Both the study of butterflies and that of birds, with which we close these notes, have likewise benefited greatly by the labors of non-professional investigators. It is, however, probable that if amateur students of insect variation would take as much trouble to familiarize themselves with the elements of modern genetics and evolutionary theory, as the amateur astronomer devotes to the elementary methods of computations required in his science, the results would be even more significant than they are at present. A butterfly may have the answers to most of the problems of biology symbolically painted on its wings, but it is necessary to set these problems correctly before attempting to coax an answer from *Colias* or *Papilio*."

Two New Centipeds

By RALPH V. CHAMBERLIN, Salt Lake City, Utah

Of the two new centipeds here named and described the first was taken at quarantine in Honolulu from packing about a plant of *Epidendrum* sp. imported from Australia. The second was included with a "few odds and ends picked up in various strolls about the area" somewhere in New Guinea by James E. Hadley stationed there with a unit of the U. S. armed forces. The types for the present are retained in the author's collection.

Nipponobius australis new species

Antennae short; composed of 18 articles. Eyes consisting of four ocelli; thus, 1 + 2, 1. Of these ocelli the single ocellus and the bottom one of the group are smallest, the first of the top series largest. Prosternal teeth 2 + 2, small and pale. Coxal pores small, circular. None of posterior coxae armed. Ventral spines of penult legs, 0, 1, 2, 1, 0; dorsal, 0, 0, 2, 0, 0; claws 2. Anal legs missing from type. Gonopods of ♀ with claw tripartite, basal spines 2 + 2.

Length, 4.75 mm.

Holotype: A female taken at HONOLULU, Apr. 22, 1943 in packing about *Epidendrum* sp. from AUSTRALIA.

This species differs from the three previously known in having the articles of the antennae 18 instead of 20. From *migrans* and *sinensis* it differs also in the fewer ocelli and the spining of the penult legs. From *N. annectus* it differs in the tripartite claw of the female gonopods, as well as in the spining of the legs. *N. australis* is the smallest of the four species now referred to the genus.

Genus *Gomphor*, new genus

A genus of Scutigeridae in which the antennae have most articles much broader than long. Legs from fifth pair on with

spines at end of the first tarsal division. On the second tarsus of anterior legs pegs of uniform size present in a continuous series, peg-bearing articles not alternating with pegless ones as in *Scutigera*. Tergites bearing short spines over margins and surface, each of which has at its base normally a sense hair much as in *Theruonema*; very fine, short hair points in spaces between spines.

Genotype.—*Gomphor hadleyi*, new species

Apparently nearly related to *Scutigera* from which it is most readily separated by the difference in arrangement of the tarsal pegs.

Gomphor hadleyi new species

Sides of dorsum dark olive brown with a continuous median dorsal stripe bluish white. The median stripe expands on the head to cover most of the width and caudally expands to embrace all, or all but 7 narrow lateral borders, of the eighth tergite and the following segments. Legs marked with bluish while annult between which the color is dark, more or less olive.

Articles of antennae very short in comparison with length. Articles of antenna I 44; of antenna II, about 52.

First division of tarsus of leg II with 9 articles, the second division with 22, of which the first 5 and the last one are longer, the intervening short ones bearing uniform tarsal pegs; no spines at end of first tarsus. First division of tarsus III with 8 articles, the second with 22; no spines at end of first division, the second with pegs as in leg II. First division of tarsus of leg IV with 9 articles, the second with 19; no terminal spine. First tarsal division of leg V composed of 6 articles, the second of 19; first tarsus with a spine at end. First tarsal division of leg VI composed of 5 articles of which the first has become proportionately very long. The second of 18; first tarsus with terminal spines of which one is much reduced. First tarsus of leg VII consisting of 5 articles, the second of 18; first tarsus ending in two spines. First tarsus of leg VIII consisting of 6 articles, the second of 19; first tarsus with 2 terminal spines.

First tarsus of leg IX of 5 articles, the second of 20; first tarsus ending in 2 spines.

Syntelopodite of female gonopods nearly parallel-sided, the width across its caudal end but slightly exceeding that across cephalic; space enclosed by terminal pieces very narrowly elliptic.

Length, about 9 mm.

Holotype: One female picked up "somewhere in NEW GUINEA" in Sept. 1943, by James E. Hadley.

Esplanate versus Explanate

In my recent paper¹ a substitution by the editors of a letter puts an entirely different meaning on the characters described; the used word esplanate, was altered to explanate, an "Ersatz" wholly unsuitable. The following, I hope, will illustrate the point in question:

ESPLANATE.—The late Col. Casey used several military terms in his entomological works, one of these being esplanate, derived from esplanade, which is defined in military parlance as "any clear, level space especially suited for military displays or maneuvering of troops." I am using the word in the same sense as Col. Casey.

EXPLANATE.—According to Webster, explanate is "spreading out or extending outwardly in a flat form," i.e., projecting outward, as used by Smith,² who defines it "spread out and flattened; applied to a margin."*

It is needless to say that the substitute does not fit the conditions, as in one instance dorsal aspect (p. 43, line 30) is described, the other being abdominal segments (p. 47, line 14); there is no allusion nor reference to a margin.

BERNARD BENESH, North Chicago, Illinois

¹ Psyche, 50: 37-49, 1943.

² Smith, John B., Explanation of Terms used in Entomology, p. 48, 1906.

* The italics are mine.

Notes on Seasonal Variation in Lepidoptera

By ROBERT WHITTAKER and DON B. STALLINGS,
Eureka and Caldwell, Kansas

GENUS EUREMA (Hübner)

The genus *Eurema* has been one of the more confused in the Americas. The key to the difficulty is the failure to recognize that most (if not all) species of this genus show distinct seasonal variation. Thus many forms, particularly seasonal ones, have been named as races or even as species. A simple example is to be found in *Eurema proterpia* (Fabr.) and *Eurema gundlachia* (Poey). Bates suggested that *gundlachia* might be a form of *proterpia*. In this he is correct as it is the winter form of *proterpia*. This is no isolated example. Comparison of many so-called species and races with winter forms that we have studied in material from North America shows that the same problem runs through the entire genus.

Most of the confusion apparently has arisen when a collector who may have taken a series of the extreme summer form in one location, a series of the extreme winter form in a second location and a series of intermediates in a third location has regarded them as three races, or even as three distinct species and named them as such. The Mexican material in the Stallings-Turner Collection clearly indicates that no student is justified in naming a species or race without collecting a full series of specimens throughout the year showing the seasonal variation in all of the localities involved. Seasonal variation is almost universal in Mexican material and unless extreme care is taken seasonal forms will be described as species and races.

In this paper we shall deal with the northern species of *Eurema*, being a part of those that are recorded as occurring in the United States. Careful study of the more southern material will undoubtedly reveal further seasonal forms named as species and races.

The seasonal variation in *Eurema* shows two tendencies. In one group of species the lower secondaries tend to be suffused with reddish in the winter form. This group might well be referred to as the Rosa Group and includes such species as *daira*, *nicippe*, *boisduvaliana*, *mexicana* and *proterpia*. In the other group the lower secondaries tend to have increased maculation in the winter form. This group might well be referred to as the Maculata Group and includes such species as *lisa*, *nise* and *dina*. It may also be noted that in those species that have tails the winter form has the tails longer and more pointed. This last character is not limited to the genus *Eurema* by any means as a good many species that show seasonal variation show a change in wing shape, particularly in tails and apices. The genus *Anaea* (Hübner) is a very good example.

The winter form of *Eurema mexicana* (Boisduval) will be taken as typical of the Rosa Group. For convenience in studying this, we have arbitrarily classified this species into five phases from the extreme summer form to the extreme winter form. These phases do not necessarily represent different broods. These phases are as follows:

1. Male. Black margin on upper secondaries extends down to tail. Lower secondaries solidly yellow with very light or no maculation. Submesial bar of lower secondaries faintly traced. Tails short and blunt.
Female. Similar to phase two male. Black margin on upper secondaries ends in vicinity of vein M_2 .
2. Male. Black margin on upper secondaries not as broad as in phase one and does not quite reach the tail. Submesial bar on lower secondaries apparent and brown in color. Inner marginal spot distinct with some maculation present on lower secondaries. Tails short but not so blunt.
Female. Similar to phase three male. Black margin as above noted.

3. Male. Black margin on upper secondaries ends in vicinity of vein M_2 . Red coloring apparent at apex of lower primaries. Transverse striations on lower secondaries appear, but are not predominant. Tails short but pointed.
- Female. Similar to phase four male. Black margin of secondaries, above, limited to upper veins being marked in black.
4. Male. Black margin on upper secondaries as in phase three. Transverse striations on lower secondaries predominant, but not sufficiently so as to give the wings an over-all pinkish appearance. Tails are long and pointed.
- Female. Similar to phase five male. Black margin of secondaries limited to upper veins being marked in black.
5. Male. Black margin on upper secondaries as in phase three. Transverse striations on lower secondaries predominant, and giving lower secondaries an over-all pinkish appearance or completely covering the yellow ground color. Tails long and pointed. Apex of forewing more square than in phase one.
- Female. Similar to male. Black margin on upper secondaries sometimes entirely lacking. Pinkish striations in turn suffused with a chalky coloring.

These arbitrary phases may be applied to other genera as well. For example it becomes apparent at once that *Zerene caesonia* f. *rosa* (McNeill) and *rosea* (Rober) are merely two phases of the winter form.

The Maculata Group may be divided in a similar fashion. The extreme summer form is nearly immaculate while the extreme winter form has the lower secondaries heavily suffused with brownish specks and with increased maculation.

Dr. A. B. Klots in his revision of the genus in 1929 points the way to the solution of one of the most vexing problems in

this genus. He points out that *daira*, *jucunda* and *palmyra* (and *nigrocincta*, not herein considered) may be but a single species. In the northern range of this species, *jucunda* and *daira* have long been accepted as separate species, although the lack of genitalic variation and the analogy to the seasonal forms above described by phases leaves little doubt but that *daira* and *jucunda* are only the winter and summer forms of the same species. *Palmyra* has in turn been divided into two races, *palmyra* representing the race in the islands of the West Indies and *lydia* representing the mainland race. In the Stallings-Turner Collection a series of *jucunda* and *lydia* collected in Mexico from Laredo to Vera Cruz shows that these two intergrade into each other. Thus the replacement of the yellow of the upper secondaries with white as in *palmyra* and *lydia* is at most a racial tendency corresponding with the more southern latitudes. A study of a small series of the form *sidonia* indicates that it is an altitude form. *E. eugenia* often considered as a race of *daira* is in reality the winter form of *lydia*. The race of *Eurema proterpia watsonia* (Klots) described from Ecuador has the same characters as phase one of *Eurema proterpia* (Fabr.) caught at Victoria, Mexico.

It is not unusual to find a few specimens of the winter form flying in the spring and especially is this true when the previous fall has been short and cold.

At times a winter form will be caught flying with the summer form or vice versa, due no doubt to the peculiar place where this particular individual pupated. Normally the summer form is replaced by the winter form in a matter of a few days. One day the normal summer form is in full flight, then there will be a weather change, during which time little material is in flight, and two or three days later the winter form is in full flight with few or no summer forms flying. We have a series of *jucunda* caught at Savannah, Ga., up to and including Sept. 14, 1937, and a series of *daira* caught from Sept. 16 on.

Phase three of most of these species is rare and difficult to secure.

Small series of both *Eurema dina westwoodi* and *nise perimede* in the Stallings-Turner Collection indicate that they are subject to similar seasonal variation; the series available, however, is too small to describe the unnamed forms.

Field described a female form of *Eurema nicippe* under the name of *callae*. We have not been able to examine the type but from the description are of the opinion that this is a phase five, or extreme winter form and hence a synonym of *nicippe*. We suggest that form *clappi* (Maynard) of *Eurema lisa* is likewise a phase five, or extreme winter form and hence a synonym of *lisa*.

(To be continued)

PERSONAL

Dr. Guy F. MacLeod, professor of entomology at the University of California, has been appointed chief of the chemicals and fertilizer branch of the Chemical Division of the War Food Administration.

A Summary of the Mormon Cricket (*Anabrus simplex*) (Tettigoniidae: Orthoptera)

By IRA LA RIVERS, Bremerton, Washington

A considerable fund of information concerning the biologics and economics of the Mormon cricket (*Anabrus simplex* Halderman) has accumulated in recent years in widely-scattered journals throughout the country, and I have thought it expedient to review the essential features of the more important of these papers for the sake of unification and clarity, as well as to add certain hitherto unpublished aspects of the problem.

The 1848 "cricket war" in the Great Salt Lake valley was the first record of this species' destructive capabilities, and it has periodically appeared in many surrounding states since then. The total distribution of the species embraces nearly all the western United States, viz., Washington, Oregon, California, Idaho, Nevada, Montana, Wyoming, Utah, Colorado, New

Mexico, North and South Dakota, Nebraska, Kansas, Minnesota and adjacent Canada. It is not, fortunately, of economic importance over the entire area of its occurrence, but in 1939, ten states had found it of sufficient importance to attempt control measures, with the aid of the Federal Government.

While there have been many infestations of local importance, the major outbreaks have occurred in Utah (Great Salt Lake valley, 1848-1850; Duchesne and Uinta Counties, 1923-1926), Idaho (various districts in southern Idaho, 1872, 1883, 1894, 1904, and 1932-1940), Nevada (Tuscarora, Elko County, 1878; Pine Valley, Eureka County, 1882; Diamond Valley, Eureka County, 1886; Cortez area, Lander County, 1900-1904; Elko, Humboldt, Eureka, Lander, and Pershing Counties, 1932-1940), Colorado (northwestern section, 1879, 1882, 1895, 1900, 1902, 1905, 1924-1928, and 1928-1931), Wyoming (Hot Springs County, 1923-1925; various districts in the state, except the southwest sector, 1932-1938), Montana (Carbon County, 1923; Lake and Sanders Counties, 1924-1928; south-eastern section, 1932-1940), North Dakota (southern portion, 1932-1940), South Dakota (central portion, 1932-1940). Co-operative Federal, State, and County efforts must be exercised in any satisfactory system of control. At the present time, the species is pandemic over a wider area than at any other time in its recorded history.

Present-day control methods are reasonably satisfactory when the infested country is such that modern, efficient machinery can be used, as power dusters and airplanes. Rough, rocky terrain requires the use of slower, less comprehensive hand dusters with a consequent loss of killing power. Districts with well-ditched sections advantageously situated for the use of oiling further increase the efficiency of known control methods. Level or rolling country in which crickets are moving as bands is suited to the erection of tin barriers to reflect the marching insects into traps of various types where they may be dusted, burned, or merely left in the hot sun, which quickly kills them.

The first efficacious dusting mixtures were developed by Shotwell and Cowan for use in Montana field work (1926) and

consisted of one part sodium arsenite to four parts hydrated lime, and one part calcium arsenite to three parts lime, with a recommended application of five-to-seven pounds per acre for the former and eight pounds for the latter, depending upon cricket concentration. The latter compound has been largely discarded in favor of the more toxic sodium arsenite, and cheaper diatomaceous earth has been substituted for lime, which is irritating to human skin. It is a relatively simple matter to mix the ingredients, which are then delivered with power and hand dusters; assuming the topography of the country to be suitable for power duster use, hand dusters are still valuable supplements especially for spraying early morning concentrations of crickets where they have spent the night clustered under, and in, sagebrush (*Artemisia tridentata*), etc., and along rough coulee and cañon bottoms.

Successful oil barriers require irrigating ditches, canals, or streams upon which the oil can be spread, and are an excellent control method under these conditions. A thin, low-grade distillate has been found most satisfactory, since it flows freely, spreads rapidly and smoothly, and forms a uniform, thin film. Just enough need be used to form the thinnest film on the water's surface, and when used correctly, neither disqualifies the water for human consumption nor for irrigation purposes. Oil can be retained in the main ditch by baffle boards or underwater delivery boards, which prevent it from entering secondary ditches; when present in moderate excess, however, it does no harm to plants or livestock, merely acting as a laxative to the latter. It kills crickets by enclosing them in an oil film through which they cannot breathe.

Metal barriers most successfully used are ten- and twelve-inch strips of 28-gauge galvanized sheet iron in 50- or 100-foot rolls. These are erected across the crickets' line-of-march, care being taken to clear the ground before the barrier so the brush does not overlap, and to keep the supporting pegs well below the level of the barrier so these cannot serve as ladders for the animals to climb over. Traps of various types must be utilized with metal barriers, and may be pits in the ground, or traps formed

by making large corrals of the galvanized sheeting out of which crickets cannot climb.

Baiting has proven as unsatisfactory with crickets as it has been successful with grasshoppers.

Those first interested in the biologics of the Mormon cricket were undoubtedly the American Indian (Amerind) tribes who used the insect for food. From reports of early pioneers, these included principally those tribes of Shoshoni origin and probably all Ute tribes of southern and eastern Utah and adjacent parts of Colorado, as well as the Bannocks of southern Idaho. The Northern Piutes bordering the Shoshonis on the west and occupying western Nevada, southeastern Oregon and portions of southwestern Idaho likewise feasted on insects on occasion, but the Southern Piutes were too far south to have come in contact regularly with epidemic cricket bands. Crows, Flatheads, and Nez Perce, although occupying areas of large cricket populations, evidently did not exist in the extreme poverty which usually characterized Amerinds of the Great Basin area generally, so probably did not require such items as insects in their diets. Early Mormon accounts of the use of the cricket as food by local natives (probably Weber Utes) tell of the Amerinds seining the insects from streams with baskets especially constructed for such work, sun-drying and roasting them for future consumption (Hendson 1931). In a region where many of the tribal groups were forced to subsist on lizards, roots, pinenuts, etc., the appearance of thousands or millions of large crickets must have been regarded by them with satisfaction, although most readers of this would face the prospect of such a meal with extreme repugnance.

The Mormons of 1848 were the first whites with reason to be interested in the large black crickets, and made many impromptu observations on the species' life history. In 1850, Captain Howard Stansbury led a United States Government expedition to explore the valley of the Great Salt Lake and to collect such biologic items, at the request of S. F. Baird, Smithsonian Institute secretary, as the party could while conducting their survey. Among the specimens returned to Washington was one largely

legless, adult tettigoniid which Prof. Haldeman described as *Anabrus simplex* because of its unprepossessing appearance. Haldeman said of it in the report of the expedition published in 1853: "A single specimen was brought from the Valley of the Great Salt Lake. . . . This seems to be one of the species eaten by the aborigines of the Valley. . . ." No mention was made of the species as a destructive agent, and it is clear that neither Haldeman nor Baird suspected this wingless cricket to be the "plague" insect of 1848, for in describing a new oedipodine from the same region (*Oedipoda corallipes*), Haldeman said: "This fine large grasshopper is probably the species which has been destructive to vegetation in the Valley of the Great Salt Lake" and Baird clearly indicated beyond doubt that he shared the misconception by the introductory statement that "The principal entomological result" (of the expedition) "is the precise determination of the destructive grasshopper, which, but for the interposition of a species of tern, at one period was near turning the 'Garden of the mountains' into a desert." It is not printed, to the author's knowledge, when the true status of *Anabrus simplex* became established. It is certain the error was corrected soon afterward.

In 1931 Henderson, assuming the inviolability of the common name, in discussing the original error stated "For Baird to be correct about having the right species in mind it must be clear that he should have said 'cricket' instead of 'grasshopper.'" On this basis alone, it would not be entirely safe to evaluate such a statement by an elder naturalist since entomologists in general have not, in the printed word, made quite the distinction between crickets and grasshoppers as Henderson has the logic to make; in fact, the majority of publications including the tettigoniids usually call them crickets and apologize immediately in parentheses or a footnote that they are, after all, "long-horned grasshoppers instead," to differentiate them from the Locustidae, or short-horned grasshoppers. As may easily be verified by a study of the groups involved, the Tettigoniidae are more closely allied to true crickets than to grasshoppers, and it is begging

the question to call them "long-horned grasshoppers." In this case, the use of the common name shows better judgment.

Gradually more information accumulated, but organized official action was not taken in the matter of control until the turn of the 20th century; in 1902 the University of Nevada Agricultural Experiment Station undertook preliminary field work in northeastern Nevada in an effort to control an outbreak in Starr Valley, but little constructive information accrued from this work (Doten 1904). Similar work was carried on, about the same time, by the Idaho (Aldrich 1904) and Colorado (Gillette and Johnson 1905) Experiment Stations. Desultory official recognition persisted until the early 1920's, when Colorado state entomologists began contributory work on life history and control, publishing three bulletins on the results of their research between 1920 and 1930. Progress followed rapidly, culminating in Cowan's admirable investigations in Montana in 1926 and 1927 (Cowan 1929) in which, for the first time, the essentials of the animal's life history and satisfactory control measures were worked out and successfully applied in the field. During the 1930's, several state and Federal bulletins were published on the economics of the cricket, each contributing a little more to the growing fund of knowledge.

Interest was turning to the less immediately applicable economic aspects of the problem, such as the possibilities presented by biological control. Isolated observations on certain elements of this complex had been made and published from time-to-time in economic bulletins. Cowan's bulletin (1929) was the first to bring together any significant amount of this type of information in detail, and gave the first preliminary account of the most important of the crickets' parasites and predators. He gave a preliminary list of the birds which fed on the cricket, listing 19 forms representing ten families. This was a summation of what had accumulated up to that time. In 1939, the number of birds known to feed on the animal was raised to 37, distributed among eighteen families (La Rivers 1941). In addition, Cowan mentioned some common mammals in passing, and a section was devoted to the principal parasites. At that

time it was known that the crickets' eggs were attacked by a tiny scelionid wasp *Sparaisson pilosum* Ashmead, which had been seen to so reduce the yield of several western Montana cricket eggbeds that no control was necessary the following season. Then, as now, this wasp was considered potentially the most important of the crickets' parasites, but to date (1943) no further detailed knowledge of the possibilities presented by this phase of the problem has accrued.

A more conspicuous parasite of the cricket is the much larger black cricket wasp, *Chlorion laeviventris* (Cresson), which has a less noticeable effect in reducing the crickets' numbers, but which, nevertheless, is a factor. The details of this species' parasitization were only generally outlined by Cowan, since uncorrelated field observations formed the only basis for the known facts.

(To be continued)

Mounting Mosquito Larvae

In the issue of *Science* for March 10, 1944, Captain W. W. Middlekauff described a method of preparing slides of mosquito larvae by dehydrating in ethyl alcohol, clearing in creosote and then mounting in Canada Balsam. The method is not entirely new but is excellent for rapidity, ease and permanence.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Felt, Ephraim Porter, 1868–1943.—(Obituary) [68] 99: 52–53. Fox, W. B.—Some insects infesting the “selenium indicator” vetches in Saskatchewan. [4] 75: 206–07. Fraenkel & Blewett.—The natural foods and the food requirements of several sps. of stored products insects. [36] 93: 457–90. Mosley, M. E.—The preparation of insects for the microscope, with special reference to Trichoptera. [9] 76: 241–51. von Muttkowski, Richard Anthony, 1887–1943.—(Obituary) [Trans. Amer. Micr. Soc.] 62: 425. Packard, C. M.—Insect enemies of our cereal crops. [Smiths. Rept.] 1942: 323–38, ill. Poulton, Edward.—Obituary by G. D. Hale-Carpenter. [31] 153: 15–17. Tait &c.—The sale of the Tait, Whitehouse and other collections. [9] 76: 254–56. Cortés, R.—A glance at Chilean entomology. [10] 45: 226–32. Anon.—The importance of entomology in war times. [118] 17: 46–48. Ball, Elmer Darwin, 1870–1943.—(Obituary by Osborn. Graf & Poos.) [10] 46: 20–22, photo. Blackman, Maulsby Willett, 1876–1943.—(Obituary, with bibliography by Craighead, Stage & Buchanan.) [10] 46: 14–21, photo. Bondar, G.—Insectos nocivos e molestias do coqueiro (cocos nucifera) no Brasil. [Bol. Inst. Cent. Formen. Econ. Bahia] no. 8: 160 pp., ill.

ANATOMY, PHYSIOLOGY, MEDICAL.—Butt, F. H.—Comparative study of mouthparts of representative Hemiptera-Homoptera. [Cornell Univ., Agr. Exp. Sta.] Memoir 254: 1–28, ill. Butler, Jeffree & Kalmus.—The behavior of a population of honeybees on an artificial and on a natural crop. [33] 20: 65–73. Eastham & McCully.—The oviposition responses of *Calandra granaria*. [33] 20: 35–42. Fraenkel & Blewett.—The basic food requirements of several insects. [33] 20: 28–34. Ho, Shen, Tang & Yü.—Physiology of the silkworm. II. Mechanism of silk formation as revealed by x-ray analysis of the contents of the silk gland in *Bombyx mori*. [23] 17: 78–82. Hsueh & Tang.—Physiology of the silkworm. I. Growth and respiration of *Bombyx mori* during its entire life cycle. [23] 17: 71–77. Hughes, T. E.—The respiration of *Tyroglyphus farinae*. [33] 20: 1–5. Hungate, R. E.—Quantitative analyses on the cellulose fermentation by termite protozoa. [7] 36: 730–739, ill. Lees, A. D.—On the behavior of wireworms of the gen. *Agriotes*. I. Reactions to humidity. [33] 20: 43–53. II. Reactions to moisture. *Ib.* 54–60. Shull,

A. F.—Inheritance in lady beetles. I. The spotless and spotted elytra of *Hippodamia sinuata*. [Jour. Heredity] 34: 329–37, ill. **Walker, E. M.**—On the anatomy of *Grylloblatta campodeiformis* Walker. 4. Exoskeleton and musculature of the abdomen. [7] 36: 681–706, ill. **Watson, M.**—The geographical aspects of malaria. [Smiths. Rept.] 1942: 339–50.

ARACHNIDA AND MYRIOPODA—**Chickering, A. M.**—Twenty-one n.sps. of *Dipoena* (Theridiid) from Panama. [Trans. Amer. Micr. Soc.] 62: 329–81, ill. **Goodnight, C. J. & M. L.**—More Phalangida from Mexico. [40] no. 1249, 13 pp., ill. (*). **Marshall, R.**—Hydracarina from California. Part II. [Trans. Amer. Micr. Soc.] 62: 404–15, ill. (*). **de Mello-Leitao, C.**—Araneologica varia Brasiliana. [15] 15: 255–65. **Newell, I. M.**—A new sironid from N. America (Opiliones). [Trans. Amer. Micr. Soc.] 62: 416–22, ill. **Stahnke, H. L.**—Scorpions of the U. S. [Turttox News, Chicago] 22: 20–22, ill.

SMALLER ORDERS AND ORTHOPTERA—**Cable, R. M.**—The indian rat flea, *Xeropsylla cheopis*, in Indiana. [Proc. Indiana Acad. Sci.] 52: 201–202. **Callan, E. McC.**—Natural enemies of the cacao thrips. [22] 34: 313–21. **da Costa Lima, A.**—Insectos do Brasil. IV. Panorpatos, Suctorios, Neuropteros, Trichopteros. 141 pp., ill. **Crawford, J. C.**—A new gen. and sp. of Hoplothripini (Thysanoptera). [10] 45: 221–25, ill. **Fraser, F. C.**—Notes on the gen. *Agriogomphus* and *Ischnogomphus* with the descr. of the male of *Agricogomphus sylvicola*. [108] 12: 161–66, ill. **Frison, T. H.**—Three n.sps. of *Capnia* from Colorado (Plecopt). [1] 69: 151–57, ill. **Joyca & Eddy.**—A list of fleas (Siphonaptera) collected at Tama, Iowa. [81] 18: 209–15. **Kevan, D. K. McE.**—An account of *Schistocerca flavofasciata* in Trinidad. [22] 34: 291–310, ill. **Milne, D. J.**—The distribution and life histories of the caddice flies of Waskesiu Lake, Saskatchewan. [4] 75: 191–98. **Morison, G. D.**—Notes on Thysanoptera found on flax (*Linum usitatissimum*) in the British Isles. [20] 30: 251–59. **Mosely, M. E.**—(See under General.) **Volkonsky, M. L.**—Rearing locusts in captivity. [22] 34: 253–56.

HEMIPTERA—**Butt, F. H.**—Comparative study on mouthparts of representative Hemiptera-Homoptera. [Mem. Cornell Univ.] 254: 20 pp., ill. **Davidson & DeLong.** Studies of the genus *Empoasca*. Part II. Six n.sp. from

Mexico. [7] 36: 636-640, ill. **DeLong, D. M.**—A n.gen *Artucephalus*, and a n.sp. of Mexican leafhopper. [7] 36: 654-655, ill. **Ferris, G. F.**—The gen. *Targionia* and some of its allies (Coccid: Diaspid). [117] 8: 82-111, ill. **Harris, H. M.**—A new *Harmostes*, with a provisional key and a check list to the sps. (Corizidae). [81] 18: 191-98, ill. **Harris, & Shull.**—A preliminary list of Hemiptera of Idaho. [81] 18: 199-208. **Knight, H. H.**—New sps. of *Polymerus* from the U. S. (Mirid.). [4] 75: 179-82. **Russell, L. M.**—A taxonomic study of the genus *Aleuroglandulus* bondar (Aleyrodid). [10] 46: 1-9, ill. (k*). **Usinger, R. L.**—A revised classification of the Reduvioidea with a new subfamily from South America. [7] 36: 602-618, ill (*k).

LEPIDOPTERA—**Atwood, C. E.**—The third tent caterpillar in eastern Canada (*Lasiocampid*). [4] 75: 203-05, ill. **Bird, J. F.**—Apparent sex disparity in Lepid. [9] 76: 260-61. **Brown & MacKay.**—The jack pine budworm and the spruce budworm, *Cacoecia fumiferana* (*Tortricid*). [4] 75: 207-11, ill. **Clench, H. K.**—Two n. subsps. of *Incisalia* (*Lycaenid*). [4] 75: 182-85. **Forbes, W. T. M.**—The genus *Thyridia*. [7] 36: 707-716, ill. (*kS). **Freeman, H. A.**—*Leodea tyrtaeus*, new to the U. S. (*Hesperid*). [Field & Laboratory, Lancaster, Tex.] 9: 45. **McDunnough, J.**—Notes and descrip. of N. American *Geometridae*. [4] 75: 211-18 (*). **McGuffin, W. C.**—New descri. of larvae of forest insects, VII, *Pero*, *Nepytia*, *Caripeta* (*Geometrid*). [4] 75: 186-90, ill. **Michelbacher & Smith.**—Some natural factors limiting the abundance of the alfalfa butterfly. [*Hilgardia*, Calif.] 15: 369-97, ill. **Russell, S. G. C.**—Mice eating butterflies. [21] 55: 122-23. **Shepard, H. H.**—The types of Hesperioid genera. Further additions and corrections to the Lindsey list, 1925. [7] 36: 754-760. **Wishart, G.**—Note on the establishment in Canada of imported parasites of the peamoth. *Laspeyresia nigricana*. [4] 75: 237-38.

DIPTERA—**Alexander, C. P.**—New or little known *Tipulidae*. LXVIII. Neotropical sps. [75] (11), 10: 738-65. **Brooks, A. R.**—A review of the N. Amer. sps. of *Gonia* sens. lat. (*Tachinid*). [4] 75: 219-36, ill. (k*). **Burdick, W. N.**—Notes on *Heteropogon vespoidea* and other *Asilidae*. [4] 75: 199-202 (*). **Fairchild, G.**—Life story of the mosquito. [*Nat. Geogr. Mag.*] 85: 180-96, col. ill. **Hall, J. A.**—Notes on the dogwood fruit fly; a race of

Rhagoletis pomonella. [4] 75: 202. **Hull, F. M.**—Three n.sps. of syrphid flies in the British Museum of Nat. Hist. [10] 46: 10–12 (S). **Johannsen, O. A.**—Two n.sps. of American *Ceratopogonidae*. [7] 36: 761–762. A generic synopsis of the *Ceratopogonidae* of the Americas, a bibliography and a list of the North American species. [7] 36: 763–791, ill. (k). **Jones, J. W.**—Observations and suggestions concerning some factors related to malaria mosquito surveys. [Jour. Tenn. Acad. Sci.] 18: 298–304. **Judd, W. W.**—Dipterous larvae parasitic on nestlings of the song sparrow. [Canada. Field. Nat.] 57: 146. **Rau, P.**—Some robber flies and their prey. [4] 75: 205. **Stage, H. H.**—Saboteur mosquitoes. [Nat. Geogr. Mag.] 85: 165–70, ill. **Watson, M.**—(See under Anatomy.)

COLEOPTERA—**Balfour-Browne, J.**—A n. generic name in the *Dytiscidae*. [108] 21: 172. **Beerbower, F. V.**—Life history of *Scirtes orbiculatus* Fabius. [7] 36: 672–680, ill. **Blake, D. H.**—The generic position of *Hypolampsis pilosa* and some related n.sps. (*Halictid*). [10] 45: 207–21, ill. (k). **Eastham & McCully.**—(See under Anatomy &c.) **Henderson, F. Y.**—The depletion of starch from the sapwood of the ash (*Fraxinus excelsior*) and its relation to attack by powder-post beetles (*Lyctus* spp.). [20] 30: 201–208. **Jordan, K.**—A case of progressive evolution in *Coleoptera* which, if uncontrolled, would lead to extinction. [107] 18: 99–105, ill. **La Rivers, I.**—A list of the *Eleodes* of Nevada, with the descr. of a n. subsp. (*Tenebrionid*). [13] 35: 53–61, ill. **Lees, A. D.**—(See under Anatomy &c.) **Linsley & MacSwain.**—Observations on the life history of *Trichodes ornatus*, a larval predator in the nests of bees and wasps. [7] 36: 589–601, ill. **Wenzel, R. L.**—On the classification of the *histerid* beetles. [Field Mus. N. H., Zool. Ser.] 28: 51–151, ill. (*).

HYMENOPTERA—**Bequaert, J. C.**—On the so-called *Mischocyttarus ater*, *polybia*, *atra* and their relatives. [7] 36: 717–729, ill. (*Sk). **Butler, Jeffree & Kalmus.**—(See under Anatomy &c.) **da Costa Lima, A.**—Segunda contribuicao ao conhecimento da biologia do *Telenomus polymorphus* n.sp. (*Scelion*). [15] 15: 211–27, ill. **Donisthorpe, H.**—A list of the type sps. of the gen. and subgen. of the *Formicidae*. [75] (11), 10: 721–37. **Doubleday, B. S.**—A brief introduction to the study of chalcids. [60] 1942–43, (2): 56–66. (Key to fam.) **Ford, R. L. E.**—On collecting and rearing parasitic Hym. with special

reference to the gen. *Apanteles* (Braconid). [107] 18: 89-94. **Headley, A. E.**—Population studies of two sps. of ants, *Leptothorax longispinosus* and *curvispinosus*. [7] 36: 743-53. **Mitchell, T. B.**—On the classification of neotropical Megachile. [7] 36: 656-71, ill. (*k). **Morris, R. L.**—An annotated list of the ants of Indiana. [Proc. Indiana Acad. Sci.] 52: 203-24. **Osburn, R. C.**—Two unusual *Vespula* nests. [7] 36: 740-42. **Parker, H. L.**—Gross anatomy of the larval of the wasp *Polistes gallicus*. [7] 36: 619-24, ill. **Rau, P.**—Notes on the nesting habits of certain social and solitary bees of Mexico. [7] 36: 641-46, ill. The nesting habits of certain sphecid wasps of Mexico, with notes on their parasites. [7] 36: 647-53, ill. **Schell, S. C.**—The biology of *Hadronotus ajax* Girault, a parasite in the eggs of the squash bug. [7] 36: 625-35, ill.

SPECIAL—Opinions and declarations rendered by the International Commission on Zoological Nomenclature: Declaration 1, Code of ethics to be observed in the renaming of homonyms; 2, On the importance of avoiding the issue of author's reprints or separata in advance of the publication of the work or journal in which the paper in question is to be published; 3, On the importance of giving a clear indication of the date of issue of every zoological publication; 4, On the need for avoiding intemperate language in discussions on zoological nomenclature; 5, On the grant to the International Commission . . . of plenary powers to suspend the rules in certain cases. Opinion 145. On the status of names first published in works rejected for nomenclatorial purposes and subsequently published in other works; 146, Suspension of the rules for *Colias* Fab. (1807); 147, On the principles to be observed in interpreting Art. 34 of the Code in relation to the rejection, as homonyms, of generic and subgeneric names of the same origin and meaning as names previously published; 148, On the principles to be observed in interpreting Art. 25 & 34 of the Code in relation to the availability of generic names proposed as emendations of, or as substitutes for, earlier generic names of the same origin and meaning.

Bulletin of Zoological Nomenclature, Vol. 1 part 3, pp. 1-86.

LIST OF JOURNALS CITED

- 1.—Trans. Amer. Entom. Soc.
- 4.—Canadian Entomol.
- 7.—Ann. Entom. Soc. America.
- 9.—The Entomologist,

London. 10.—Proc. Entom. Soc. Washington. 13.—Jour. Entom. & Zool. 14.—Arch. Inst. Biol., S. Paulo. 15.—Anais Acad. Brasil, Cien., Rio. 20.—Annals of Appl. Biology. 21.—Entom. Record & Jour. Variation. 22.—Bull. Entom. Research. 23.—Physiological Zool. 31.—Nature, London. 33.—Jour. Exper. Biology. 36.—Trans. R. Entom. Soc. London. 40.—Amer. Museum Novitates. 60.—Smithsonian Miss. Coll. 75.—Annals & Mag. Nat. Hist. 81.—Iowa Sta. Coll. Jour. Science. 107.—Proc. R. Entom. Soc. London. 108.—Proc. R. Entom. Soc. London (B). 117.—Microentom., Stanford Univ. 118.—Ward's Nat. Sci. Bull.

AN OUTLINE OF GENERAL PHYSIOLOGY (SECOND EDITION).
By L. V. HEILBRUNN. 748 pages, 135 figs. W. B. Saunders Co., Philadelphia & London. Dec. 1943. Price \$6.00. This is a completely revised edition of a standard reference text. It contains approximately 150 pages more than the first edition and a good many additional references to insects. There are approximately 4000 references, and a large index which seems to really cover the material presented in the text (the index lists approximately 75 page references to insect data). As in the first edition, the text treats first of protoplasmic morphology, followed by the chemical and physical properties of general cells, then the general phenomena of growth, nutrition, respiration, movement, bioluminescence, effects of environmental conditions, acclimatization, irritability and tropisms, and ends with chapters on aging and cell division. All of these subjects are treated from the standpoint of general physiological phenomena, and, by and large, processes limited to one or a few phyla are omitted.

Until recently no general survey was available in insect physiology. Wigglesworth's text (1939) has admirably filled this gap. But Wigglesworth's text is limited to the insects and does not even cover the other groups of arthropods. And, fur-

ther, Wigglesworth does not discuss the techniques employed in physiological studies or the methods of their evaluation. In Dr. Heilbrunn's text, both graduate students and research entomologists may find treatments of the techniques of physiological study, their application and limitations, a resumé of phenomena general to all animals (and plants), and mention of general insect phenomena in their proper relation to the same phenomena in other animal groups. For a proper understanding of insect physiology, a background of general physiology is required. Dr. Heilbrunn's text supplies this.—A. G. R., Jr.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. MacKenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyractomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

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- 1108.—Ross & Roberts—Mosquito Atlas. I. The Nearctic Anopheles, important malarial vectors of the Americas, and *Aedes aegypti* and *Culex quinquefasciata*. 44 pp., ill., 194360
- 1113.—Mosquito Atlas. II. Eighteen Old World anophelines important to malaria. 44 pp., ill., 194360
- 1112.—Russell, Rozeboom & Stone—Keys to the anopheline mosquitoes of the World, with notes on their identification, distribution, biology, and relation to malaria. 152 pp., figs., 1943 2.00

HYMENOPTERA

- 1109.—Bequaert (J.)—Color variation and distribution of *Apoica pallida*, a nocturnal Neotropical social wasp (Vespididae). (69: 107–118, 1943)25
- 1107.—Linsley (E. G.)—Revisions of the gen. *Townsendiella*, *Triopasites* and *Paranomada* (Nomadidae). (69: 93–106, ill., 1943)30
- 1110.—A revision of the gen. *Neopasites* (Nomadidae). (69: 119–140, fig., 1943)45
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- 1114.—Frison (T. H.)—Three n.sps. of *Capnia* from Colorado (Plecoptera: Capniidae). (69: 151–157, figs., 1944) .. .20

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- 1116.—Needham (J. G.)—Further studies on Neotropical gomphine dragonflies. (69: 171–224, 3 pls., 1944) 1.00

ORTHOPTERA

- 1115.—Rehn (J. A. G.)—Critical notes on and descr. of American steiroidont katydids (Tettigoniidae). I. A review of the gen. *Steiroidont* of authors (*Phyllolophus* n.name). (69: 159–169, 3 pls., 1944)35

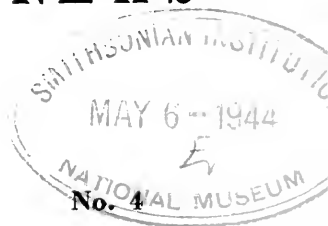
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ENTOMOLOGICAL NEWS

APRIL 1944

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No. 4

A Second Species of Elasmocorinae (Hemiptera, Reduviidae)

By H. M. HARRIS AND C. J. DRAKE, Ames, Iowa

In the December number of the Annals of the Entomological Society of America (Vol. 36, 1943), Usinger described *Elasmocoris setigerus*, new genus and species, for which he proposed the new subfamily, Elasmocorinae. We present below the characterization of a second species of this unique group of insects.

Elasmocoris comptus, new species

Size and form of *Elasmocoris setigerus* Usinger, but recognizable at a glance by the different color markings and the proportional lengths of the antennal segments.

Dark brown, the antennae, rostrum and tarsi paler, the apices of the femora, the trochanters and the basal lobe of the pronotum yellowish testaceous, alternating bands on the connexivum and a broad stripe down each side of the venter whitish testaceous. Hemelytra brown, the membrane smoky, with veins darker.

Head with impressed lines and setigerous tubercles as in *E. setigerus*, slightly broader across eyes than long, the interocular space almost four times the width of an eye, the median process distinctly broader than the antenniferous tubercle. Antennae only slightly longer than head, pronotum and scutellum conjoined (115:106), armed with spines and bristles as in *E. setigerus*, the proportions of segments one to four as 13:45:27:28.

Pronotum, except for color, about as in *setigerus*, the width across humeri (76) more than one-third greater than median length (53). Scutellum and hemelytra as in *setigerus*, the latter, however, unicolorous brown. Connexivum conspicuously alternated with yellowish white. Undersurface flattened and spinous as in *setigerus*, the venter with a fine, sinuous carina down each side just lateral to the midline, the portion between the carinae flat and slightly impressed. Apex of fifth segment of female venter more broadly and not so deeply emarginate as in *setigerus* Usinger. Legs stout, armed as in *setigerus*, the femora, except for extreme ends, unicolorous brown.

Length: 5.2-5.7 mm. Width: pronotum, 1.5-1.6 mm.; abdomen, 1.7-2.2 mm.

Holotype: male, *allotype*, female and one female *paratype*, Nova Teutonia, BRAZIL, July 10, 1936, Fritz Plauman (in collections of authors).

This unique form is much like the related *E. setigerus* Usinger from Paraguay, but is readily recognized by the pale posterior lobe of the pronotum, the unicolorous hemelytra and femora, the bicolored venter and the structural characters of the head, antennae and venter. It had tentatively been identified as "*Elasmodema* sp. near *erichsoni* Stal" but is unquestionably congeneric with *Elasmocoris* Usinger.

Navy Entomologist Killed in New Guinea

Lt. William M. Gordon of the Navy Medical Corps was killed in action somewhere in New Guinea, February, 1944. Lt. Gordon graduated from the University of Missouri, took a masters degree in entomology at Cornell University, and then was entomologist for the St. Louis County Health Department prior to enlisting in the Navy. He served as entomologist at the Naval Station in Corpus Christi for about two years before being transferred overseas recently. He was co-author of two papers on mosquitoes published in the November and December, 1943, issues of Entomological News.

Notes on Seasonal Variation in Lepidoptera

By ROBERT WHITTAKER and DON B. STALLINGS,
Eureka and Caldwell, Kansas

(Continued from page 71)

Typical *Eurema mexicana* (Boisduval) is the summer form. The winter form as indicated is easily distinguished from typical *mexicana*, particularly by an examination of the lower secondaries which are greatly suffused with reddish. This form, which has not been named, is described herewith:

Eurema mexicana f. *hiem. rosa* new form

Male. Expanse 39 mm. Upper surfaces: Primaries with irregular marginal black band, remainder of wing whitish, faintly yellowish at base. Secondaries: Black marginal band does not extend below M_2 , remainder of wing yellowish in upper portion and whitish in lower portion. Tails long and pointed. Lower surfaces: Primaries suffused with reddish striations at apex. Base of wing yellowish, remainder of wing whitish. Secondaries completely suffused with reddish striations.

Female. Expanse 43 mm. Upper surfaces: Primaries with irregular marginal black band, remainder of wing pale yellowish. Secondaries, upper veins edged in black in marginal area, remainder of wing pale yellowish. Fringes reddish. Tails long and pointed. Under surfaces: Primaries, costal margin and apex suffused with reddish striations, base of wings yellow, remainder pale yellowish. Secondaries completely suffused with reddish striations, in turn washed with chalk.

Holotype: Caldwell, KANSAS, Nov. 1, 1943. Allotype: Caldwell, Kansas, Oct. 24, 1941.

Described from 56 males and 42 females. Paratypes collected at Caldwell, KANSAS during Oct. and Nov. of 1940, 1941 and 1943 by Stallings, Turner, Jenista and Toland; Victoria, MEXICO during Jan. and Febr. of 1942 by Stallings and Turner; Eureka and Topeka, KANSAS during Oct. and Nov. of

1939, 1940 and 1941 by Whittaker, and Cochise Co., ARIZONA, June, 1940, by Stallings and Turner.

Typical *Eurema lisa* (B. & L.) is the winter form. The summer form is distinguished from *lisa* particularly by the absence of maculation on the lower secondaries. This form is here described:

Eurema lisa f. aest. **immaculata** new form

Male. Expanse 31 mm. Upper surfaces: Both wings with irregular marginal black band. Remainder of wings bright yellow. Lower surfaces: Yellow. Faint pink apical patch on secondaries. Secondaries show a few small, faint patches of brown maculation.

Female. Expanse 34 mm. Upper surfaces: Apical third of primaries black, remainder of wing pale yellow. Secondaries with black apical patch, veins below patch edged with black, remainder of wing pale yellow. Under surfaces: Similar to male with maculation a bit more distinct.

Holotype: Caldwell, KANSAS, Sept. 2, 1943. Allotype: Caldwell, Kansas, Aug. 15, 1943.

Described from 60 males and 33 females. Paratypes collected at Caldwell, KANSAS during Aug. and Sept. of 1941 and 1943 by Stallings and Turner; Faulkner Co., ARKANSAS, June and July of 1943 by H. A. Freeman; Novelty, MISSOURI, Aug., 1943 by Stallings and Turner; Quitman, ARKANSAS, July, 1941, and Uvalde Co., TEXAS, May, 1941 by Stallings and Turner.

Eurema nicippe (Cramer) is represented by the winter form. The summer form is distinguished from typical *nicippe* by the absence of the reddish suffusion on the lower secondaries and is described as follows:

Eurema nicippe f. aest. **pallens** new form

Male. Expanse 40 mm. Upper surfaces: Primaries, irregular black border on outer margin and costal margin, remainder of wing bright orange. Secondaries, irregular black border on outer margin, remainder of wing bright orange. Under surfaces: Primaries yellow. Secondaries yellow and nearly immaculate.

Female. Expanse 48 mm. Upper surfaces similar to male but black marginal border on wings not solid in color on lower portion of each wing. Orange not as bright as in male. Under surfaces: Primaries similar to male. Secondaries, ground color yellow, mesial and discal area with heavy brownish striations, the ground color showing through being more chalky than yellow.

Holotype: Caldwell, KANSAS, Aug. 22, 1943. Allotype: Caldwell, Kansas, Aug. 12, 1943.

Described from 148 males and 89 females. Paratypes collected at Caldwell, KANSAS during June, July, Aug., Sept. and Oct. of 1938, 1941, 1942 and 1943 by Stallings, Turner and Jenista; Eureka, KANSAS during Aug., Sept. and Oct. of 1937 and 1941 by Whittaker; Lancaster, TEXAS, June, 1941 by H. A. Freeman; Augusta, GEORGIA, Aug., Oct. of 1940, 1941 and 1942 by H. W. Eustis; Harrison, ARKANSAS, July, 1940, Marathon, TEXAS, April, 1942, Osage, ARKANSAS, July, 1939, 1937, Victoria, MEXICO, June, 1941, Laredo, MEXICO, May, 1941, Zavala County, TEXAS, May, 1941, Uvalde County, TEXAS, May, 1941, Tamazunchale, MEXICO, June, 1941, Cache, OKLAHOMA, June, 1942, all collected by Stallings and Turner; St. Petersburg, FLORIDA, Oct., 1939, T. T. Conway and Dragoon, ARIZONA, July, 1940, and Rogers, ARKANSAS, Sept., 1941.

Applying the foregoing to the species discussed it would appear that the following revision is advisable:

- 1A. *Eurema दौरα* (Godart)
 syn. *cepio* (Godman & Salvin)
 delia (Cramer)
 demoditas (Hübner)
- 1Aa. f. aest. *jucunda* (B. & L.)
 ab. *fusca* (Harr.)
- 1Ab. f. *delioides* (Haskin)
- 1B. *Eurema palmyra* (Poey)
 syn. *cubana* (H. Schaffer)
 albina (Poey)
- 1C. *Eurema lydia* (Felder)
 syn. *lemnia* (Felder)

- 1Ca. f. hiem. *eugenia* (Wallen.)
 syn. *solanã* (Reak.)
 rhodia (Felder)
 persistens (B. & D.)
- 1Cb. f. alt. *sidonia* (Felder)
- 1Cc. f. ♀ *pallidula* (Klots)
- 2A. *Eurema nicippe* (Cramer)
 syn. *callae* (Field)
 ab. *dammersi* (Gund.)
- 2Aa. f. aest. *pallens* (W. & S.)
- 2Ab. f. ♀ *flava* (Strecker)
- 3A. *Eurema boisduvaliana* (Felder)
 syn. *gratiosa* (Reakirt)
- 3Aa. f. aest. *ingrata* (R. Felder)
- 4A. *Eurema mexicana* (Boisduval)
 syn. *damaris* (Felder)
 depuiseti (Boisduval)
 henrici (Maria)
 ab. *biedermanni* (Ehrmann)
 recta (Klots)
- 4Aa. f. hiem. *rosa* (W. & S.)
- 5A. *Eurema proterpia* (Fabr.)
- 5Aa. f. hiem. *gundlachia* (Poey)
 syn. *longicauda* (Bates)
- 5Ab. f. ♀ *alba* (Maria)
- 6A. *Eurema lisa* (B. & L.)
 syn. *stygmula* (Boisduval)
 thymetus auct. (nec Febricius)
 similar auct. (nec Donovan, nec Godart)
 clappi (Maynard)
 centralis (H. Schaffer)
- 6Aa. f. aest. *immaculata* (W. & S.)
- 6Ab. f. ♀ *alba* (Strecker)

Genus *PRECIS* (Hübner)

The species *Precis coenia* (Hübner) exhibits the same seasonal characters that have been discussed under the genus *Eurema*. *P. coenia* itself is represented by the summer form. The winter form which differs from *coenia* in having the lower secondaries suffused with red, is described as follows:

Precis coenia f. hiem. **rosa** new form

Male. Expanse 49 mm. Upper surfaces similar to *coenia*. Under surfaces: Apex of primaries and all of secondaries completely suffused with deep reddish. Markings on secondaries so heavily covered over with this reddish suffusion as to be but faintly visible, if at all.

Female. Expanse 52 mm. Similar to male.

Holotype: Caldwell, KANSAS, Oct. 24, 1943. Allotype: Alton, Ill., Oct. 19, 1941.

Described from 80 males and 66 females. Paratypes collected at Caldwell, KANSAS during Oct., 1940, 1941 and 1943 by Stallings and Turner; Topeka, KANSAS, Oct. and Nov., 1940 and 1941 by Whittaker; Alton, ILLINOIS, Sept. and Oct., 1941 by A. G. Lauck; Augusta, GEORGIA, Oct., 1942 by H. W. Eustis; Quincy, ILLINOIS, Sept. and Oct., 1940 by E. N. Tryon; Eureka, KANSAS, Oct., 1941 by Whittaker; Chewacla Park, ALABAMA, Nov., 1942 by Stallings and Turner.

Genus *NATHALIS* (Boisduval)

The species *Nathalis iole* (Boisduval) also shows seasonal variation, however it differs from the previous species discussed in that the suffusion of the apex of the primaries and of all of the secondaries is greenish. This species can be divided into five phases as to seasonal variation as was done with the euremas. Phase one would be the first stage or summer form, which has the under surfaces of the secondaries immaculate. Phase five, or winter form, has these surfaces heavily suffused with green. Field described the male of phase one under the name of form *immaculata* and the female under the name of form *pallida*; in as much as *pallida* has page priority over *immaculata*, *immaculata* probably should be treated as a synonym of *pallida*. *N. iole* itself is represented by phase three specimens, in which there are two transverse greenish clouds on the under surfaces of the hind wings. The female form *lutcolus* (Reakirt) has a large amount of orange on the secondaries, upper surfaces, whereas the typical females have yellow. The winter form of this species is described as follows:

Nathalis iole f. hiem. **viridis** new form

Male. Expanse 25 mm. Upper surfaces: Fore-wing, ground color yellow. Apex fourth of wing black with the marginal black bar at base very faint, in some cases obsolete. Secondaries, ground color yellow. Black bar along costal margin, with red dot in bar. Under surfaces: Apex of primaries and all of secondaries heavily suffused with green, except for white dot in center of wing and white bar in margin.

Female. Expanse 31 mm. Similar to male with black markings heavier.

Holotype: Caldwell, KANSAS, Oct. 17, 1943. Allotype: Caldwell, Kansas, Oct. 17, 1943.

Described from 265 males and 199 females. Paratypes collected at Eureka, KANSAS during Nov., 1937 and at Topeka, KANSAS during Sept., Oct. and Nov., 1938 and 1940 by Whitaker; Palo Duro Canyon, TEXAS during May, 1943 and Caldwell, KANSAS during Oct. and Nov., 1943 by Stallings, Turner, Jenista and Toland.

In conclusion it might be well to point out that some of these winter forms such as *Eurema mexicana* f. *rosa* and *Nathalis iole* f. *viridis* may have subspecific value in their more northern range, as such situations do occur in other species.

Holotypes and allotypes of all forms described in this paper are to be deposited in the U. S. National Museum, and paratypes in various museums and private collections. We wish to thank Mr. William D. Field of the U. S. National Museum for his assistance with the literature.

Delays in Publication

Should your copy of Entomological News or your reprints be late in coming, please be patient. The delay may be due to the present manpower shortage in the editorial as well as in the printing staff. Should your copy or your reprints be more than two months late, please let us know.

On Some Cuban Psyllidae (Homoptera)

By LEONARD D. TUTHILL, Iowa State College, Ames, Iowa

A small collection of psyllids recently received from Sr. S. C. Bruner of the Agronomic Experiment Station, Santiago de Las Vegas, Cuba, consists of four species, two of which have not been described. The other two species have been known but not previously recorded from Cuba.

Coelocara * *ernstii* Schwarz

Originally described from Venezuela this species came to me correctly determined. The data at hand indicate that it breeds on *Cedrela mexicana*.

Ceropsylla sideroxyli Riley

Recorded heretofore from Florida, Mexico and Puerto Rico the specimens at hand bear data indicating it forms galls on "jocuma."

Katacephala tenuipennis new species †

Figs. 3, 4, 5

Length to tip of folded wings 2.5 to 2.75 mm.

Color: General color brownish yellow. (Light green when alive.) Forewings brown along anal margin from base through apex.

Structure: Body with short pubescence. Head narrower than thorax, very strongly deflexed, somewhat retrorse. Vertex roundly swollen, nearly straight on caudal margin, narrowed anteriorly to prominent frons. Genal processes large, swollen, .6 as long as vertex, smoothly joined to vertex, contiguous except basally. Antennae 1.33 times as long as width of head. Thorax very strongly arched. Pronotum nearly vertical, long, smooth. Forewings 2.5 times as long as wide.

* New name for *Freysuila* Schwarz (*nec Freysuila* Aleman 1891). The name *Coelocara* is formed from the Greek adjective *kollos*—concave and *kara*, G.f. noun—head.

† From *tenuis* -e, L. adj.—slender + *pennis*, L. noun—wing.

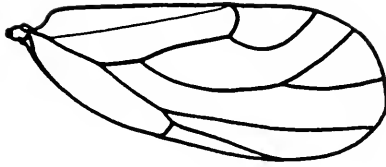
broad basally, tapering to slender rounded tips; veins setate, basal vein, $R + M + Cu$ very short, R and $M + Cu$ very short also, marginal cells elongate, cubital much larger than medial, pterostigma prominent. Legs short and stout.

Genitalia: Male genitalia small. Proctiger straight, roundly produced caudad. Forceps as long as proctiger; in lateral view broad basally, tapered to blunt apices, bent cephalad, then caudad; in caudal view slender, sharply incurved apically to blunt, black tips. Female genital segment about as long as rest of abdomen; dorsal valve elongate, slightly downcurved to blunt apex; ventral valve acute, upcurved, slightly shorter than dorsal; both valves with numerous short retrorse setae toward apex.

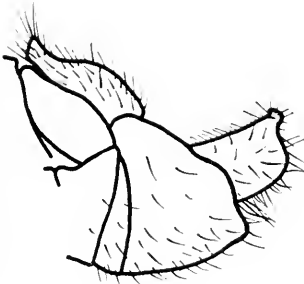
Described from a series of four males and seven females from Wajay and Santiago de las Vegas, Habana, CUBA, A. R. Otero collector. They were found breeding on shoots of "guairaje" (*Eugenia axillaris* (Sw.) Willd.) in February and May and are accompanied by nymphs of several instars. Bruner writes, "The nymphs were present in abundance, largely covered with a white, transparent mucilaginous substance, and the leaves were curled in a manner similar to an aphid attack on some plants." Five females in the United States National Museum are identical with the exception of the presence of two brown spots and an incomplete median line on the prescutum and six brown lines on the scutum. The latter specimens were taken on Key West by E. A. Schwarz in March.

Holotype, male, *allotype*, female, in author's collection. Paratypes in the United States National Museum and author's collection.

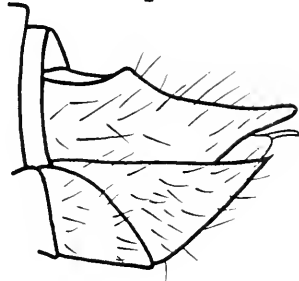
This species resembles *K. arcuata* Crawford but may readily be distinguished by its smaller size and lighter color. Miss Louise M. Russell of the National Museum has kindly compared the allotype with the type of *arcuata* and has noted various other differences chief of which are the following: In *arcuata* the wing is more angular at the apex; the vertex is nearly flat; the genae are about as long as the vertex and strongly reflexed against the anterior coxae.



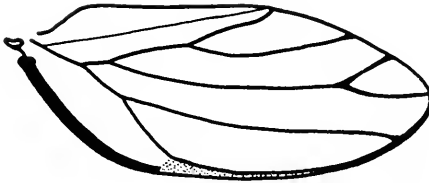
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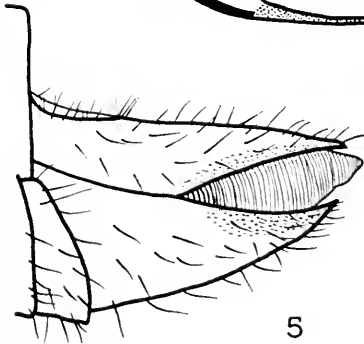
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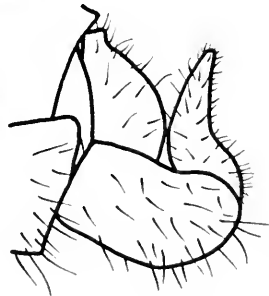
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6

Heteropsylla distincta new species *

Figs. 1, 2, 3

Length to tip of folded wings 2.25 mm.

Color: Uniformly yellowish green. Tip of antennae dark, eyes red, wings hyaline.

Structure: Head large. Vertex narrowed anteriorly, distinctly separated from genae. Genae somewhat produced as small but definite processes. Frons not completely covered by genae. Antennae 1.75 times as long as width of head. Thorax well arched. Forewings about 2.5 times as long as wide; pterostigma large, Rs straight, marginal cells large, medial elongate. Hind tibiae with large basal spur.

Genitalia: Male genitalia large. Proctiger strongly narrowed apically, roundly produced caudad in middle. Forceps about .66 as long as proctiger; in lateral view very broad, nearly parallel sided, anterior margin straight to apex, caudal margin sharply excavate forming a slender, blunt, black tipped apical portion; in caudal view stout, bowed, apices truncate, black, touching. Aedeagus with large, complex apical portion. Female genital segment shorter than rest of abdomen; dorsal valve slender apically, slightly upturned to blunt apex; ventral valve shorter than dorsal, acute.

Holotype, male, *allotype*, female, Viñales, CUBA, April 15, 1930, S. C. Bruner collector. Taken on the foliage of "moruro rojo." *Pithecolobium arboreum* (L.) Urban. One male and five female paratypes same data. Holotype, allotype and paratypes in author's collection.

This species differs markedly from the previously known species of *Heteropsylla* in the male genitalia. The inner elongate process present on the forceps of most of the others is completely lacking here.

1. *Heteropsylla distincta*—forewing
2. *Heteropsylla distincta*—male genitalia
3. *Heteropsylla distincta*—female genitalia
4. *Katacephala tenuipennis*—forewing
5. *Katacephala tenuipennis*—female genitalia
6. *Katacephala tenuipennis*—male genitalia

* *distinctus* -a -um, L. adj.—separated, distinct.

A Summary of the Mormon Cricket (*Anabrus simplex*) (Tettigoniidae: Orthoptera)

By IRA LA RIVERS, Bremerton, Washington

(Continued from page 77)

During 1939 Mormon cricket fieldwork in northern Nevada, the relationship between the wasp and cricket was worked out in detail (La Rivers MS.). An area a mile long by one-half mile wide was invaded by a band of crickets and their attendant wasps while control work was being pressed against other bands in the same region. This area, lying on a ridge, was unmolested, and observations made during the period that wasp and cricket activity was at a maximum. Sampling stations were established and data obtained on observable phases of the complex. It was estimated that a round total in excess of 500,000 crickets were killed by the approximate 30,000 wasps present, whose procedure was to dig a burrow in the loose soil, capture generally two crickets, paralyze them by stinging the ventral thoracic ganglia, and drag them into the burrow, deposit an egg on each victim, then close the burrow and repeat the performance elsewhere. However, the decidedly beneficial work of the wasp was seriously affected by activities of three parasites of the wasp, and five active predators. The parasites, two sarcophagid flies, *Eumacronychia clita* Townsend and *Euaraba tergata* (Coquillett) and the large bembicid wasp *Stizoides uncinatus* (Say) invaded the burrows of *Chlorion laeviventris* and utilized the paralyzed crickets as food for their own larvae and eggs. The sarcophagids, too small to dig, took advantage of the wasp's absence from the burrow to larviposit up to 20 larvae on each cricket, while the bembicid dug up completed burrows, being but slightly smaller than the cricket wasp, chewed the latter's eggs, and deposited her own. It was estimated that an approximate 45,000 wasps, or nearly 10 percent of the theoretical hatch of *laeviventris*, were destroyed by these three parasites alone. The five predators, preying as they did upon the adult wasps and not upon the theoretical hatch, took less toll, but this was sufficient to indicate a 12 percent kill in the

most heavily concentrated sector, which did not, however, apply to the areas of lesser concentration. Chief of these predators were the Short-tailed Grasshopper mouse (*Onychomys leucogaster brevicaudus* Merriam) and the Sierra shrew (*Sorex vagrans amoenus* Merriam). Three species of birds, the Sage thrasher (*Oreoscoptes montanus* (Townsend)), the Brewer blackbird (*Euphagus cyanocephalus* (Wagler)), and the Sparrow falcon (*Falco sparverius* Linné) played minor roles.

It had been stated that Mormon crickets, being cannibalistic, suffered from no prominent diseases, but C. V. Riley recorded hairworms as killing crickets in Idaho as early as 1880. Wakeland and Shull (1936) reported the species of hairworm involved as *Gordius villoti* Rosa, and recorded individual parasites up to 48 inches long. Those infested crickets which were not killed were rendered infertile, but the parasite was adjudged a possible control factor only in the more humid sections of the crickets' range, which, unfortunately, represent but a small portion of the animals' total economic distribution.

In northern Nevada, a given sample showed approximately one-third of the crickets to be infected with the large flesh fly *Sarcophaga tuberosa* Pand. (La Rivers MS.). There is some evidence to indicate that crickets so infected were rendered infertile. However, this flesh fly was extensively preyed upon, in certain localities, by the small bembicid wasp *Stictiella pulla* (Handlirsch), thereby limiting its usefulness (La Rivers 1942).

Practically the entire extent of the Mormon crickets' distribution is in the sagebrush country typical of semi-arid intermontane portions of the western United States, with some overflow into adjacent lowlands, as the western edge of the Great Plains and the Sacramento Valley. Over much of this area, extremes of temperature prevail, with winters cold and snow-bearing, and summers warm-to-very-hot in the valleys. The crickets hatch out between March and June, depending upon elevation and temperature, and so must tolerate wide ranges in temperature. Once hatched, they are hardy and resistant to temperature changes, and have been known to survive cold, snowy springs following warm, open winters if they can find

food during the inclement spell. Cowan (1929) determined the active ground temperature range of the species to be approximately 40° F. to 100° F. (4.4° C. to 37.7° C.). In northern Nevada, crickets were found actively migrating at ground temperatures between 111.2° F. (44° C.) and 120° F. (49° C.); others were seen crossing an open flat into the face of a bitter wind varying from 6° C. to 9° C. (42.8° F. to 48.2° F.) two inches above the ground (La Rivers 1941).

The exact extent and nature of damage caused by the Mormon cricket is difficult to determine, but recent studies have thrown much light on the matter. Early reports credited the insects with eating practically all types of succulent vegetation, and they have been known to strip clothes lines and wall paper, but detailed information was lacking. Their omnivorousness has always been acknowledged. "We know of no agricultural plant that is immune from attack" (Corkins 1923). In 1938 and 1939, Swain (1940) made range damage surveys in epidemic areas throughout several Western states, and recorded a list of 403 plants utilized by the cricket for food. Cultivated plants were preferred to adjacent range vegetation, and the reproductive portions of plants were noted to be more often eaten than the vegetative parts. More range loss was recorded in sagebrush associates than in tall grass-mixed prairie associations, and regions of conifers and deciduous trees were often greatly damaged by crickets attracted to the shade.

"Calculation of Mormon cricket damage to tenth-acre plots showed losses in seasonal forage production for cattle and horses ranging from less than one to 100 percent. Losses of total dry weight of herbage reached 50 percent in two instances. One plot lost 56 percent of total dry weight of herbage, which is comparable to a loss of 483 pounds per acre.

"In a few limited areas almost complete destruction of seasonal forage production occurred during two successive years and, presumably, will occur again" (Swain 1940).

It is well known that cannibalism increases among Mormon crickets during the latter part of the season, when forage is scarcer and many crickets are weakened and near natural death.

On occasion, they can become predominantly carnivorous. Cyrus Thomas, an early Federal entomologist, wrote in 1872: "But the strangest part of its history is that it will go in pursuit of and catch and eat the Cicada. This latter insect also made its appearance in this valley [Cache Valley, Utah] the past season in immense numbers, covering the grass and sage and other bushes, especially those which formed a fringe along the little stream. Up these the *Anabrus* would cautiously climb, reach out with its foreleg, and plant its claw in its victim's wing; once the fatal claw secured a hold, the Cicada was doomed, for without ceremony it was at once sacrificed to the voracious appetite of its captor. No uniformity appeared to be preserved in this process; sometimes they would commence with the thorax, at others with the head, not even taking the trouble to remove the legs or wings."

In northern Nevada, the author found crickets feeding on any animal matter available, such as cricket wasps (*Chlorion laeviventris*) abandoned by mammals, and even cast-aside bodies of the mammals themselves which had been trapped in rodent traps (*Sorex vagrans amoenus*, *Onychomys leucogaster brevicaudus*, *Peromyscus maniculatus sonoriensis*). In one instance (and there must have been others) eight miles south-southeast of Mountain City, Nevada, a nest of half-grown Brewer sparrows (*Spizella breweri* Cassin) was devoured by a swarm of crickets. It was early July, and the nest had been first noted several days before, at which time no crickets were about. The day before the incident, a large migrating band of crickets had invaded the sagebrush ridge on which the nest was located. While following a wandering cricket wasp (*Chlorion laeviventris*) returning to her burrow with a paralyzed cricket, I passed by the nest and noticed a mass of struggling crickets on the ground beneath the bush. They hopped for cover and I found two of the nestlings dead with large patches of skin and viscera removed. Another nestling lay on the other side of the bush, but the fourth was never found. By the following morning, little but bones and bills remained of the unfortunate birds (1939).

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PERSONAL

Professor Roger C. Smith, head of the Department of Entomology of Kansas State College, has been granted leave of absence to join the increasing number of entomologists assisting the government with war problems. He has become professional allocations specialist of the War Manpower Commission for agricultural and biological sciences, and is now located in Washington, D. C.

Notes on the Streckeri Group of the Genus *Megathymus* (Lepidoptera, Rhopalocera)

By H. A. FREEMAN, White Deer, Texas

Much confusion has centered around the *streckeri* group of the genus *Megathymus* for a number of years. The writer* is attempting to bring some light upon part of that complex, namely the status of *streckeri* (Skinner), *texana* Barnes & McDunnough, *albocincta* Holland and *leussleri* Holland. Concerning the other two members of this group, *cofaqui* (Strecker) and *ursus* Poling, little will be said at the present. *M. cofaqui* is apparently a valid species occurring in Georgia and Florida. As there are only three known specimens of *ursus* a definite knowledge of that supposed species is impossible at the present.

Megathymus streckeri (Skinner)

The ♂♂ of this species are characterized by their grayish-black coloration, by light yellow spots on the upper surface of the primaries, by the absence of or else poorly developed three large submarginal spots on the under surface of the primaries, and by the well-developed white spots and numerous dark blotches on the under surface of the secondaries. The ♀♀ are characterized by their grayish-black coloration, by lemon-yellow spots on the upper surface of the primaries, by no submarginal spots on the upper surface of the secondaries, except rarely a single spot, and by the well-developed white spots and dark blotches on the under surface of the secondaries.

The genitalia of this species resemble those of *cofaqui* (Strecker) except the valvae are shorter and broader in comparison.

M. streckeri occurs in Colorado, northern New Mexico, parts of Arizona, possibly southeastern Utah and the northwestern tip of the panhandle of Texas, during May, June and July.

* The writer is indebted to D. B. Stallings and J. R. Turner, Caldwell, Kansas, for valuable information on this group and for the loan of many fine specimens.

Megathymus texana Barnes and McDunnoughSyn. *leussleri* Holland

The ♂♂ of *texana* differ from *streckeri* by their black coloration, by bright lemon-yellow spots on the upper surface of the primaries, by the reappearance of all the spots on the under surface of the primaries, these spots having the same coloration as above, and by the smaller number of white spots and the absence of dark blotches on the under surface of the secondaries. The ♀♀ differ by their fuscous coloration, by large orange-yellow spots on the primaries, by a well-defined submarginal band of orange-yellow spots and orange-yellow border on the secondaries, and by the smaller number of creamy-white spots and the absence of dark blotches on the under surface of the secondaries.

For some time *leussleri* Holland was considered to be a separate species but after the writer located restricted habitats where *texana* was abundant and after making a careful study of the genitalia of Texas examples and specimens from Valentine, Nebraska, the two were found to be the same. It is impossible to separate them by superficial or genitalic characters.

In all previous publications *texana* has been considered as a smaller and darker subspecies of *streckeri*. This is only partly true as it is certainly darker but as a general rule it is larger. Possibly the reason for this lies in the fact that Barnes and McDunnough did not describe the typical ♀ of *texana* in their original description. Their discussion of the two ♀♀ agrees better with a smaller and darker form that is by no means common. Holland's description of the ♀ of *leussleri* applies to the typical form of *texana*.

The genitalia of *texana* differ from those of *streckeri* by the more elongated valvae, structural differences in the teeth that are so prominent at the posterior extremity of the valve and differences in the uncus.

M. texana occurs over a wide area extending from the Mesa del Norte, Mexico to Rapid City, South Dakota. It appears to be more common in the vicinity of White Deer, Texas than anywhere else. In its southern range this species flies from April to June and in its northern range during June and July.

Megathymus texana form *albocincta* Holland

The ♂♂ of the form *albocincta* differ from typical *texana* by their smaller size, *albocincta* averages 46 mm. whereas *texana* averages 68 mm., by the absence of yellow scales and hairs at the base of the wings on the upper surface, by the spots on the primaries being lighter in color and by the fewer white spots on the under surface of the secondaries. The ♀♀ of this form differ in being smaller, averaging 45 mm., by having the ground color usually black instead of brown, by having fewer orange-yellow hairs and scales at the base of the wings and by having the spots on the under surface of the secondaries usually clear white instead of creamy.

When Dr. Holland described *albocincta* he apparently used a normal ♂ specimen of *texana* as his ♀ type, judging from his original description, because he failed to mention spots on the upper surface of the secondaries and other ♀ characteristics. His ♂ type certainly belongs to this smaller and darker form of *texana*.

Genitalic studies were made of a number of specimens from Texas and Nebraska and it was found that this form has genitalia identical with those of typical *texana*.

Form *albocincta* occurs wherever you find typical *texana*; however the writer has found it more abundantly on the north-eastern rim of the Palo Duro Canyon, below Claude, Texas, during early May, than anywhere else.

NOTES AND NEWS IN ENTOMOLOGY

Under this heading we present from time to time short reviews, notes, news and comments on entomology throughout the world. Contributions from readers are solicited and will be acknowledged when used.

Sewage filter beds afford an unusually constant wet environment characterized by high nitrogen content, low oxygen tension and a smaller temperature range than the surrounding country (temperature elevated in winter by vital activity of the included organisms, lowered in summer by evaporation and effect of depth). In this specialized environment there is a special fauna, small in number of species but commonly enormous in

numbers of individuals. The flora is also restricted, and is characterized, of course, by the stupendous numbers of putrefactive bacteria. The bacteria are so abundant that sewage beds are sometimes referred to as "bacteria beds."

The constancy of the fauna and flora has permitted Lloyd, Graham and Reynoldson¹ to make a detailed study of animal competition on several sets of sewage beds in England. The bed growth consists of putrefactive bacteria, fungi and protozoa with a relatively thin coat of algae at the surface. Oligochaete worms, snails, insects, mites and spiders are found, but the fauna is a balanced one dominated by an oligochaete and several species of dipterous larvae, namely *Psychoda* (Psychodidae), *Metriocnemus* and *Spaniotoma* (Chironomidae).

The seasonal abundance of *Psychoda* species departs from what it would be if determined by only climatic influences. They prefer the topmost foot of the medium, but when chironomids and oligochaetes are abundant they are found most abundantly at greater depths. The chironomids, especially *Metriocnemus*, are distinctly predatory especially when overcrowding depletes their normal food.

The more recent papers by Lloyd (1943) add to the ecological picture. The numbers of *Metriocnemus* are controlled principally by the June weather. If June is cold and wet a large brood of larvae becomes established on the beds. The eggs of other species ovipositing a month later are largely destroyed by the activities of these larvae. When *Spaniotoma* is thus reduced, this potential predator is uncommon in the depths of the beds, and by this *Psychoda* species benefit. So the weather-controlled fluctuations of *Metriocnemus* cause competition factors to affect both *Spaniotoma* and *Psychoda*. The competition goes further than just including these flies. A warm winter will cause the oligochaete worms to accelerate their cycle and so adversely affect *Metriocnemus*. In all cases the influences are thought to be exerted mainly at the time of establishment of broods rather than later in the cycle.

¹ L. L. Lloyd, J. F. Graham and T. B. Reynoldson. Ann. Appl. Biol., 27: 122-150. 1940.

L. L. Lloyd. Trans. Roy. Soc. trop. Med. Hyg., 35: 93-104. 1941.

L. L. Lloyd. Ann. Appl. Biol., 30: 47-60, 358-364. 1943.

Competition is not absent in beds where *Psychoda alternata* is almost free from other insect competitors (due to tolerating stronger sewage containing chemical wastes). Under these conditions, Lloyd (1943) shows that *Psychoda* tends to give rise to alternating large and small generations. These develop concurrently but emerge alternately. The larger generation dwarfs and depletes the smaller generation by competition since older larvae are more successful at getting food. As one might expect, there is a correlated but reverse periodicity in the solid discharges (food) from the filter beds. In *Spaniotoma*, Lloyd (1941) was able to show that the establishment of such alternating large and small broods was initiated by irregular temperatures of fall and spring tending to split broods. Warm spells tend to fuse adjacent peaks of development; cold spells tend to split and separate the peaks. The fusion is most noticeable in the spring, splitting in the fall. Lloyd thinks that this explanation, with the additional factor of competition, will account for the alternating broods of *Psychoda alternata*. In fact, Lloyd goes further and suggests that any uniformly distributed population of an insect with rapid cycles and no diapause would naturally tend to assume this form of seasonal rhythm. A. G. RICHARDS, JR.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Allan, P. B. M.—Substitute foodplants. [21] 56: 5-7. **Beeson, C. F. C.**—Influence of insects on the regeneration, composition and destruction of forests. [109] 8: 48-51. **Campbell & Moulton** (Editors).—Laboratory procedures in studies of the chemical control of insects. Publication of the Amer. Assoc. Adv. Sci. No. 20. Science Press, Lancaster, Pa. 206 pages, 1943. Review in [84] 25: 122. **Craig, W.**—(See under physiology.) **Diver, C.**—Insects limited by general conditions imposed by plant communities. [109] 8: 44-48. **Felt, Ephraim Porter, 1868-1943.**—Obituary by Muesebeck & Collins. [10] 46: 27-29, photo. (Obituary) by A. F. Burgess. [12] 36: 950-52 (photo). **Flanders, S. E.**—Indirect hyperparasitism and observations on three sps. of indirect hyperparasites. [12] 36: 921-26. **Forbes, W. T. M.**—Substitute food-plants. [21] 56: 8. **Gibson, A.**—International entomology. [12] 36: 944-45. **Grinnell, Fordyce, Jr.**—Obituary. [38] 42: 136-37. **Hovanitz, W.**—The ecological significance of the color phases of *Colias chrysotheme* in N. America. [84] 25: 45-60. **Keifer, H. H.**—Applied entomological taxonomy. [55] 20: 1-6. **Lloyd, Ll.**—Materials for a study in animal competition. Part III. The seasonal rhythm of *Psychoda alternata* and an effect of intraspecific competition. [20] 30: 358-63. **McLaine, Leonard Septimus, 1887-1943.**—(Obituary) by H. T. Fernald. [12] 36: 946-47 (photo). **Middlekauff, W. W.**—A rapid method for making permanent mounts of mosquito larvae. [68] 99 (2567): 206. **Newell, Wilmon, 1878-1943.**—(Obituary) by J. T. Creighton. [12] 36: 947-49 (photo). **Parker, G. H.**—Coloration of animals with special reference to change of color. [Proc. R. Inst. Canad. Inst.] (IIIA), 8: 39-41. **Pickett, A. D.**—Blueberry insects and their control. [Canada Dept. Agr., Farm. Bull.] 120: 24-28. **Poulton, Edward Bagnall.**—Obituary, by G. D. Hale Carpenter. [8] 80: 24. **Salisbury, E. J.**—Interrelations of plants and insects; the place of both in the Eco-system. [109] 8: 39-42. **Symposium** on the organization, direction and support of research. [Proc. Amer. Phil. Soc.] 87: 291-364. **Torre-Bueno, J. R.**—Part versus portion. [19] 38: 177. **Van Cleave, H. J.**—Continuation of the program of the International Commission on Zoological Nomenclature. [68] 99 (2567): 200.

ANATOMY, PHYSIOLOGY, MEDICAL—Collins & Machado.—Reactions of the codling moth to artificial light

and the use of light traps in its control. [12] 36: 885-93.

Craig, W.—The twilight ceremonies of horseflies and birds. [68] 99: 125-126. **Fernando, W.**—Anatomy and histology of the alimentary canal of *Tridactylus variegatus* (Orthop.: Gryllid). [*Spolia Zeylanica*] 23: 71-78, ill. **Hastings & Pepper.**—Studies on body fluids of seven orthopterans, their pH, buffering capacity, and effect on solubility of fractionated insecticides. [12] 36: 857-64. **Hill, D. L.**—Certain relationships between carbohydrate and respiratory metabolism during embryonic development (Orthoptera). [129] 87: 21. **Jahn & Wulff.**—Spectral sensitivity of the compound eye of *Dytiscus*. [129] 87: 24. **Lichen, M. M.**—Relative growth in the garden centipede. [Growth] 7: 323-29. **Milne & Milne.**—Selection of colored lights by night-flying insects. [129] 87: 29. **Noland, J. L.**—A new method for lethal temperature determinations; studies on *Periplaneta americana*. [129] 87: 32. **Oliver, C. P.**—A case of change in dominance of a dominant mutant in *Drosophila melanogaster*. [129] 87: 33. **Park, T.**—Interspecies-competition within populations of the genus *Tribolium*. [129] 87: 34. **Park & Davis.**—Further analysis of fecundity in the flour beetles *Tribolium confusum* and *T. castaneum*. [129] 87: 35. **Park, Davis & Horowitz.**—“Ebony”: a new mutation in the flour beetle, *Tribolium confusum*. [129] 87: 35. **Pennak & McColl.**—An experimental study of oxygen absorption in some damselfly naiads. [Jour. Cell. & Comp. Physiol.] 23: 1-10. **Reese, A. M.**—The anatomy of the poison glands in the black widow spider, *Latrodectus mactans*. [129] 87: 40. **Scharer, B.**—The influence of the corpora allata on egg development in an orthopteran (*Leucophaea maderae*). [129] 87: 43. **Villee, C. A.**—Phenogenetic studies of the mutant bithorax-34E of *Drosophila melanogaster*. [129] 87: 47. **Wulff & Jahn.**—Correlation of E. M. F. and photochemical changes in the dark-adapted insect eye. [129] 87: 51.

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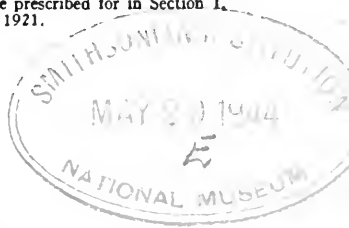
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No. 5

Effect of Temperature on the Emergence of Mayfly Imagoes from the Subimago Stage¹

By F. EARLE LYMAN, Norris, Tennessee

While rearing a series of adult specimens of certain mayfly species from mature nymphs to the adult stage under circumstances closely simulating natural conditions, the normal length of the subimago stage was determined as approximately 24 hours for both sexes of each of the species considered. However, as the rearing was carried on out of doors, it was further observed that this 24-hour interval was materially lengthened by a period of cool weather. Clemens (1915) recorded that the length of the subimago period for laboratory-reared specimens of *Stenonema tripunctatum* (Banks) is generally one day, but in the early part of the season, it may last 3-4 days. He also stated "no doubt this time would have been shortened had the subimagoes been out of doors." He did not give his reason for believing this, but in an earlier paper (1913) he mentioned that temperature and humidity seemed to be factors in determining the duration of the subimago stage. While humidity seems to be a significant factor that may determine in general the success or failure of the subimaginal molting process, it may be pointed out that concrete experimental evidence is lacking as to its exact role in the transformation of subimago to imago. The purpose of this writing is to direct attention toward the effect of temperature on the length of the subimago period; it is not an attempt to settle the question of the effect of humidity

¹ Contribution from the Biological Station and Department of Zoology, University of Michigan.

differences on the life of the subimago. Preliminary experimental evidence is given below to support the contention that temperature is definitely a controlling factor which determines the length of the subimago stage and that humidity is probably a minor factor.

To study the influence of temperature upon the length of the subimago period, several subimagoes of both sexes of *S. femoratum* (Say) were placed in a glass jar with an inner screen-wire lining and perforated top. This jar was then placed in a refrigerator regulated at an average temperature of 7.2° C. Soon after being placed in the cold, the subimagoes became inactive and ceased practically all movement during the entire time at this temperature, although they retained their normal vertical position on the wire screen. None of the specimens had emerged after 130 hours, at which time they were removed from the cold. All individuals were apparently in good condition, for they emerged successfully within 12 hours under the prevailing air-temperature conditions of mid-summer (25.0° C.-30.0° C.).

A number of other specimens were collected as they emerged from their nymphal skins during the evening and were immediately placed in the glass jar described above. The jar was then submerged, except for the perforated cover, into an aquarium provided with a steady flow of cold water. The air temperature within the jar remained at 16.7° C. throughout the duration of the experiment. The length of the subimago period under these conditions lasted for about 48 hours while other specimens collected as subimagoes at the same time and maintained as controls during the same period under the higher prevailing air temperatures and under similar conditions of humidity emerged in about 24 hours.

Individuals of *S. interpunctatum* (Say), *Ephemercella bicolor* Clemens, and *E. temporalis* McDunnough which normally also have a subimaginal period of 24 hours were subjected to experimental conditions as described above with similar results.

While temperatures were varied and humidity remained more or less constant during the experiments, it seems evident that temperature is an important factor determining the length of

the subimago period. Since the life-span of the adult mayfly is relatively short and swarming for most species can best be carried out during periods of warm, fair weather, it is a distinct advantage to the mayfly to have its aerial existence prolonged so as to tide it over times of cold, inclement weather. It has been noted that unusually large swarms of *Hexagenia* follow an interval of cool, windy, and rainy weather.

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Onthophilus kirni New Species, and Two Other Noteworthy Histeridae from Burrows of a Texas Pocket- Gopher

By EDWARD S. ROSS, California Academy of Sciences

The following Histeridae were collected in burrows of *Geomys breviceps atwateri* in Central Texas in the manner outlined in the foregoing paper.

ABRAEINAE

Onthophilus kirni new species

Holotype male.—Elongate oval, robust, convex, black, shining.

Head punctate throughout, punctures dense and confluent, especially in clypeal region, interspaces rugose; surface without striae, carinae, or ridges.

Pronotum not continuous in outline with elytra; sides very broadly, obtusely angulate, somewhat rounded; lateral bead prominent with a deep inner groove along entire length of side, deepest at anterior angle and extended for a short distance mesad along anterior margin which is very shallowly emargi-

nated, nearly straight; surface evenly, weakly convex; punctate throughout, the punctures irregular in shape and size—smallest on disk, largest and densest laterally, interspaces shiny; disk without longitudinal ridges or carinae; with a very prominent, deep groove at lateral fourth, nearest sides at base, and extending to apical third, arcuate, outer margin of groove most abrupt, shining.

Elytra narrow behind, with two prominent, deep fossae at basal margin just within mesal half; surface continuous with that of pronotum, not inflated, with rather uniform, longitudinal carinae—seven larger, broader, shiny carinae with three or four lesser ones between; the grooves scarcely crenulate or fossate except distad; subhumeral stria very deep, broad, sinuous, deeply fossate; area between this stria and margin with large, shallow, disk-like punctation in apical half. Propygidium quadrate, one-third broader than long; with a rounded, longitudinal, medial elevation; punctation coarse, irregular, especially across base and on sides, very fine at vertex of elevation. Pygidium elongate, little less than twice as long as wide; surface without ridges, rather smooth except for two shallow, sub-lateral impressions near basal margin; coarsely, irregularly punctate, interspaces shining.

Prosternum broad, flat, obtusely emarginated at base; punctation fine, sparse, with larger punctures interspersed with finer ones. "Mesosternum" with punctures deep, sparse. "Metasternum" rather impressed along median longitudinal suture; punctures evenly spaced, deep with micropunctures in interspaces. Pterothoracic pleurites with broad, disc-like, shallow, nearly contiguous punctures.

Protibiae slender with eight spicules, each on an elevated base.

Length (anterior pronotal margin to apex of elytra), 3.0 mm.

Allotype female.—Very similar to male but somewhat broader with the head and pronotum more sparsely punctate, the "metasternum" not depressed, and the protibial denticules larger, more numerous and extended nearly to base.

Length, 3.1 mm.

Holotype and allotype.—Collected in a bait trap in a *Geomys* burrow, seven and one-half miles S. E. Somerset, TEXAS (near San Antonio); February 18, 1943 (A. J. Kirn); [California Academy of Sciences].

Paratypes.—Numerous males and females collected at the above locality in bait traps and by excavating *Geomys* burrows by A. J. Kirn and the writer.

These specimens will be distributed among the major insect collections in this country.

Kirni is separated at once from all other North American *Onthophilus* by its prominent, basal, elytral fossae and small, deep punctuation of the "sternal" plates. All other species of the genus have very broad, disc-like, shallow punctures on these plates. It, and its allies, *lecontei* Horn* and *soltaii* Casey† form a natural group of species characterized by the simplicity of the elytral carinae and the development of the sublateral pronotal grooves. *Lecontei* and *soltaii* are very similar to one another if not conspecific. I have seen specimens of the former from California which have pronotal grooves very similar to those of the holotype of *soltaii*, although the reduction of these grooves is characteristic of most California specimens. A series of specimens from Colorado may reveal that this variation may also occur in *soltaii*.

Kirni was encountered in large numbers in the nest chamber of *Geomys breviceps attwateri*. As many as nineteen specimens were found in one nest and 115 specimens were collected in all, counting those obtained in bait traps. This appears to be the normal habitat of the *kirni* and, in view of their rarity, animal burrows may likewise be the true habitat of *soltaii* and *lecontei*. Indeed, a small series of the latter species was collected in *Thomomys* burrows at Atascadero, California, February 8, 1940, by J. W. Tilden. Only a few specimens of this species had previously been captured in all the years it has been known.

* Trans. Amer. Ent. Soc., III, p. 138, 1870; type locality, Ft. Tejon, Calif.

† Ann. New York Acad. Sci., VII, p. 557, 1893; type locality, Denver, Colo.

SAPRININAE

Geomysaprinus goffi Ross

Geomysaprinus goffi Ross, 1940, Ann. Ent. Soc. Amer., XXXIII, p. 3, fig. 1, 1940. [Type locality: Leesburg, Fla.; in a *Geomys* burrow.]

Forty specimens of this species were collected near Somerset, Texas in bait traps and nest chambers of the *Geomys* during December, January and February. Except for their consistently smaller size, they appear to be very similar to the Florida specimens. The species may be expected to occur throughout the range of *Geomys* in the United States.

It should be noted here that *Saprinus rugosifrons* Fall* is actually a *Geomysaprinus* and is closely related to *goffi* but separable by the much stronger punctuation of pronotum and elytra. Since the type was collected apparently far north of the range of *Geomys*, *Geomysaprinus* may be encountered in burrows made by other animals.

HISTERINAE

Spilodiscus gloveri (Horn)

Hister gloveri Horn, Trans. Amer. Ent. Soc., III, p. 135, 1870. [Type locality: Ft. Cobb, Indian Territory (Oklahoma).]

Until Mr. Kirn and the writer collected eleven specimens of this species in *Geomys* burrows near Somerset, Texas, it apparently had not been collected since it was described from a unique specimen seventy-three years ago. *Spilodiscus floridanus* Ross (1940, p. 7) from Florida *Geomys* burrows is very similar to *gloveri* and probably will prove to be only a subspecies of it. *Floridanus* appears to differ in that the third dorsal elytral stria is consistently abbreviated apically. In the eleven specimens of *gloveri* this stria is always complete to the elytral apex.

REFERENCE

Ross, E. S. 1940, New Histeridae (Coleoptera) from the burrows of the Florida pocket gopher. Ann. Ent. Soc. Amer., XXXIII, pp. 1-9, 5 figs.

* Can. Ent., LI, p. 213, 1919; type locality, Aweme, Manitoba.

Butterflies of the Organ Pipe Cactus National Monument, Arizona

By JOHN S. GARTH

In April, 1942, four staff members of the Allan Hancock Foundation of the University of Southern California made a preliminary biological survey of a portion of the Organ Pipe Cactus National Monument, which borders on the Mexican state of Sonora midway between Yuma and Nogales, Arizona. The party was joined at Ajo by Dr. Ernest R. Tinkham of the Arizona Game and Fish Commission, who with the writer explored Alamo Canyon and the spur of the Ajo Mountains which forms its southern rim. The following species of diurnal Lepidoptera were taken or observed on April 19 and 20. Because of the extreme ruggedness of terrain, density of plant cover, and lack of trails, not all species seen could be netted. Observations on which both collectors concurred are included because of the paucity of records from this part of Arizona. The nomenclature is according to the McDunnough check-list of 1938. Plants were determined by Dr. Norman C. Cooper, party botanist, from specimens collected by Dr. Tinkham at the same time.

Papilio philenor L.

A single ♀ specimen was taken on the south side of Alamo Canyon.

Papilio daunus Bdv.

Several individuals believed to be of this species were seen flying up the steep canyons which are tributary to Alamo Canyon. Because of the heavy growth of California Rosewood (*Vaquilina californica*), barberry (*Berberis trifoliata*), and associated shrubs, these vigorous fliers kept well out of net's reach.

Zerene caesonia Stoll.

A single specimen was observed in rapid flight just below the "waterfall" (dry at the time of our visit). Since the species ranges westward into Riverside County, California, it is to be expected to occur throughout southern Arizona.

Eurema nicippe Cram.

One ♀ specimen was netted of many seen fluttering over a large residual pool at the base of the dry waterfall mentioned above. The green moss which covered the water was a favorite resting place for the insects but afforded poor footing indeed for the collector!

Eurema mexicana Bdv.

Specimens of this species were observed flying with *nicippe*, but none were taken.

Nathalis iole Bdv.

One ♂ specimen of this ubiquitous species was taken at a low elevation.

Danaus berenice Cram., race *strigosa* Bates

A single example was observed in Alamo Canyon, flying over a species of climbing milkweed (*Funastrum heterophyllum*) on which it undoubtedly feeds in this vicinity.

Euphydryas hermosa Wgt.

Two specimens, ♂ and ♀, were taken on successive days on the south side of Alamo Canyon just below the top of the ridge dividing it from the watershed to the south. Both were in perfect condition, indicating the height of the season, but no more specimens were encountered, although Dr. Tinkham reported a second male flying with the specimen captured by him. They were taken over a small bush composite, *Senecio*, the blossoms of which have been frequently noted as attractive to members of the genus. Dr. Tinkham also remarked upon their active flight.

Mr. W. N. Burdick (Bull. S. Cal. Acad. Sci., 38: 36-38, 1939) mentions this insect as occurring sparingly in the Santa Catalina Mountains northeast of Tucson, whereas *E. klotsi* Dos Passos is said to occur to the north and east in Oak Creek Canyon, Coconino County, and on the south slope of Pinal Pass south of Globe.

The Ajo Mountain specimens have been compared with paratypes of *E. klotsi* in the collection of the Los Angeles Museum and with specimens in the writer's collection which are undoubtedly *klotsi* also, since they were taken at the type locality, Roosevelt Dam, although prior to the separation of *klotsi* from *hermosa*. There is a small but constant difference in the lunules of the under side of the secondaries. Even in the absence of comparative material from the Santa Catalina Mountains, it would seem that "Southern Arizona," the type locality mentioned by Wright for *hermosa*, would apply equally well to a *Euphydryas* from the Ajo Mountains, irrespective of whether or not these be identical. Consequently, the *Euphydryas* of the Ajo Mountains is referred to *hermosa* Wright, leaving *klotsi* to the more northern and eastern parts of Arizona.

Melitaea fulvia Edw.

A total of 7 ♂ and 5 ♀ specimens were taken of a *Melitaea* believed to be of the *leanira* group. Later comparison showed them to have Eastern rather than Western affinities, *M. fulvia* extending through eastern Arizona and New Mexico into Texas, whereas members of the *laenira* group, *M. wrighti* and *cerrita* of Southern California, apparently do not cross the Colorado River.

The butterflies were flying over buckwheat (*Eriogonum gasciculatum*), the pink blossoms of which were the only lure capable of arresting their rapid and erratic flight. Only two pairs of the specimens were in perfect condition, indicating that an earlier date, perhaps April 10-15, would find them at their best. One specimen was taken in the canyon bottom. The rest were found on the open mountainside at elevations of 3,000 feet or better and preferably on those shoulders having a south-western exposure.

The larval food plant of these *Melitaeas* is undoubtedly the paint brush (*Castilleja*), of which an abundance was to be found among the buckwheat and verbena.

Anthanassa texana Edw.

A single example was observed by both Dr. Tinkham and the writer to alight in the canyon bottom. It however eluded capture.

Chlosyne californica Wgt.

A total of 6 ♂ and 2 ♀ were taken out of many more seen. All were flying over *Encelia farinosa*, which occurs on the hot, dry mountainside in company with the pale, yellow-flowered legume, *Corsetia microphylla*. But for the *Corsetia*, the association is much the same as that in which *Chlosyne californica* occurs in Chino or Whitewater Canyon, Riverside County, California.

The Ajo Mountain specimens are uniformly much darker than California specimens, and are larger than those taken near Palm Springs. Also, their relation to the *lacinia* complex is more apparent, although by this it is not meant to imply that they represent hybrid forms. By means of them, however, the existence of an isolated and distinct representative of the genus in Southern California is more readily understandable.

Asterocampa celtis Bdv. & Lec., race *antonia* Edw.

The Ajo Mountains falling within the range of the hackberry, it was to be expected that some member of the genus *Asterocampa* Rob., or *Chlorippe* Bdv., as it has formerly been known, would be encountered. Comparison of 4 ♂ specimens taken in Alamo Canyon with specimens in the collection of the Los Angeles Museum shows that they should be referred to the race *antonia* as above.

The butterflies fly rapidly up and down the canyon bottom, alighting only upon the rocks or on the pebbly sand, where they may be netted after much patient stalking. Three or four times as many were seen as could be taken, although later in the sea-

son they may not be so wild. The female is considerably larger than the male and much lighter in color. No females were taken, nor, so far as is known, were any seen.

Libythea bachmanii Kirt.

A single specimen was observed to alight in the moist sand of the canyon bottom.

Atlides halesus Hbn.

One larva was secured from mistletoe (*Phorodendron californica*) growing on desert ironwood at the mouth of Alamo Canyon. The specimen pupated a few days later on April 27 and emerged, a male, on May 11.

Leptotes marina Reak.

At least eight specimens were taken, including females. They were flying low over the few remaining water holes in Alamo Canyon and could be netted two and three at a time.

Philotes rita B. & McD.

One ♂ and 3 ♀ specimens of this tiny blue butterfly were taken over the wild buckwheat (*Eriogonum fasciculatum*) which is a dominant plant of the dry southern slopes of the Ajo Mountains. The locality is the same as that in which *Melitaea fulvia* flies, and the *Eriogonum* and *Castilleja*, together with the bright blue *Verbena gooddingii*, combine to make the mountainside attractive to insect visitors.

Lycaenopsis pseudargiolus Bdv. & Lec., race *cinerea* Edw., gen. aest. *arizonensis* Edw.

A single ♂ specimen of this early spring flier was taken in a canyon tributary to Alamo Canyon on the south side. As with *L. echo* Edw. in the mountains of Southern California, so in Southern Arizona *L. arizonensis* is one of the first butterflies to appear on the wing and its spring flight may be nearly over before other species make their appearance.

Pyrgus communis Grt., race *albescens* Ploetz

To avoid confusion, it should be mentioned that this is the same insect previously known to the writer, and to most lepidopterists, as *Urbanus tessellata occidentalis* Skin. Indeed, it is so designated in so recent a work as Comstock, "Butterflies of California."

A single ♂ specimen of this common and widely-distributed skipper was taken in Alamo Canyon.

Antigonus pulverulenta Feld.

Considered something of a rarity in California, this powdery skipper becomes common in Lower California and in Sonora, Mexico. It is therefore quite understandable that it should be found in territory which more or less links these localities.

A single specimen was netted in Alamo Canyon.

Pholisora ccos Edw.

A single ♂ of this small black skipper was taken in Alamo Canyon. At the time the writer was under the impression that it was *P. alpheus*, which occurs in the Colorado River bottom. However, close examination with a hand lens at the suggestion of Dr. John A. Comstock revealed that the head of the insect was covered with yellow hairs, an unmistakable characteristic of *ccos*. Specimens labeled *Bolla ccos* from the Baboquivari Mountains in the collection of the Los Angeles Museum compare nicely with the Ajo Mountain specimen. We have therefore a considerable westward extension of range for the diminutive insect.

Copacodes aurantiaca Hew.

A total of six specimens of this golden skipper were obtained, mostly in the canyon bottom. *C. aurantiaca* was as numerous in the Ajo Mountains at this season as were all other hesperids combined. This is one species which apparently is quite constant in its markings, Ajo Mountain specimens showing no difference from those of the desert regions of Southern California, particularly those taken in the vicinity of Palm Springs, Riverside County.

Undescribed Species of Crane-flies from the Eastern United States and Canada (Dipt.: Tipulidae). Part VIII

By CHARLES P. ALEXANDER, Massachusetts State College,
Amherst, Massachusetts

The preceding part under this general title was published in ENTOMOLOGICAL NEWS, vol. 52: 192-196; 1941. At this time I am describing two interesting species collected by Mr. P. W. Fattig in Georgia. These specimens were included in materials sent for identification to the United States National Museum and the types of the novelties are preserved in that institution. I am much indebted to Mr. Fattig and to Dr. Alan Stone for the privilege of examining these flies.

Tipula (Lunatipula) fattigiana new species

Belongs to the *bicornis (fascipennis)* group; male hypopygium with the tergite relatively tumid, at apex produced into two subpendulous, slightly flattened, dark-colored lobes; apex of the region of the basistyle roughened and toothed; dististyle with both the rostral portion and the outer basal lobe unusually slender and spiniform; eighth sternite sheathing, narrowed outwardly, at apex with three brushes of setae, the lateral pair longer and interspersed with a few stronger bristles.

♂. Length about 19 mm.; wing 19 mm.

Frontal prolongation of head brownish yellow; nasus lacking; palpi with basal segment yellow, the outer segments broken. Antennae broken. Head light brown, yellowish gray pruinose.

Pronotum brown. Mesonotum chiefly light testaceous brown, covered with a yellow pollen, the usual praescutal stripes apparently lacking or very poorly indicated (the thorax of the unique type is badly damaged by pinning). Pleura yellow, sparsely pruinose. Halteres brown, the base of stem narrowly yellow. Legs with the coxae yellow, sparsely pruinose; trochanters yellow; remainder of legs obscure yellow, the outer tarsal segments dark brown; claws (male) toothed. Wings relatively broad, strongly tinged with brown, the prearcular and

costal fields somewhat more yellow; stigma darker brown; obliterative area before cord very conspicuous, extending from before stigma through cell *1st M*₂, narrowed over the anterior cord, involving vein *M*₃ but scarcely entering cell *M*₃; no post-stigmal brightening; veins brownish yellow, paler in the obliterative portions. Venation: *Rs* nearly twice *m-cu*; cell *1st M*₂ small, pentagonal; basal section of *M*₃ and *m* almost in a straight line and virtually parallel with the basal section of *M*₁₊₂; cell *M*₁ a little more than twice its petiole; *m-cu* near extreme base of vein *M*₄.

Abdominal tergites brownish yellow, with a conspicuous median, dark brown stripe, very narrow on the more basal segments, broadened behind, vaguely interrupted by pale posterior borders to the segments; lateral tergal borders entirely pale; sternites obscure reddish yellow; hypopygium chiefly dark brown, the eighth sternite more brownish yellow. Male hypopygium large; ninth tergite widely separated from the sternite-basistyle by pale membrane; basistyle chiefly indicated by its ventral suture only. Ninth tergite relatively tumid, at central apex produced into two subpendulous, slightly flattened, darkened lobes that are provided with conspicuous white setae; viewed from above, these lobes are seen to lie close together, being separated only by a linear notch; tergite viewed from the side with its ventro-caudal portion produced into two more compressed-flattened black lobes that are subcircular in outline. Apical margin of basistyle roughened and toothed, the most conspicuous point being a dorsal flattened blade that terminates in an acute tooth. Dististyle with both the rostral portion and the outer basal lobe unusually slender, the latter spinous; style clothed with conspicuous erect white setae. Appendage of ninth sternite appearing as a conical spine, its tip acute, the dorsal margin fringed with long yellow setae; on the mesal aspect, these setae very long, directed mesad, their apices conspicuously crinkly. Eighth sternite sheathing, narrowed outwardly, at apex bearing three groups of setae, two lateral and one median, the former longer, the setae interspersed with a few still longer and stouter bristles; median brush shorter.

Habitat.—GEORGIA. *Holotype*: ♂, Atlanta, June 1, 1941 (P. W. Fattig); Collector's No. 6.

I am greatly pleased to dedicate this conspicuous fly to Mr. Fattig whose detailed collecting and published studies have added materially to our knowledge of the insect fauna of our southeastern states. The fly is most similar to *Tipula* (*Lunatipula*) *megaura* Doane, 1901, differing from this and all other members of the group by the structure of the male hypopygium, notably of the tergite, basistyle, and dististyle.

***Limnophila* (*Eutonia*) *phorophragma* new species**

Allied to *alleni*; mesonotal praescutum with the disk deep cinnamon brown, with darker brown stripes; wings with a strong supernumerary crossvein in cell R_5 , connecting posteriorly with vein M_1 ; abdomen (female) elongate, the intermediate segments longer than broad.

♀. Length about 29–36 mm.; wing 18.5–23 mm.; abdomen alone, about 22–28 mm.

Rostrum dark brown; palpi brownish black. Antennae with scape and pedicel brownish black, the flagellum abruptly obscure yellow, the outer two or three segments infuscated; basal flagellar segments subglobular to short-oval, the outer ones passing into elongate, with long conspicuous verticils. Head brown, variegated with pruinose patches, strongly narrowed behind.

Pronotum grayish, more fulvous dorsally, the mid-area deepening to brown. Mesonotal praescutum with the disk deep cinnamon brown, including the interspaces, the area variegated by darker lines, most distinct as intermediate stripes in front and as a median darkening at suture, the lateral borders of the discal area again deepening to brown; humeral and lateral praescutal borders gray, internally passing into orange adjoining the discal area; pseudosutural foveae castaneous; scutum cinnamon brown, each lobe on central and lateral portions variegated with darker brown, the latter a backward continuation of the lateral discal borders of praescutum; scutellum fulvous brown, the broad posterior border and a delicate median vitta darker brown; mediotergite in center fulvous, more infuscated and

slightly pruinose around the borders, in cases more uniformly brown; pleurotergite brown. Pleura whitish gray pruinose over a light brown to fulvous brown background, where the pruinosity is rubbed exposing much of the ground; darker brown areas on dorsopleural membrane and below and before the wing-root. Halteres obscure yellow, the knob not darkened. Legs with the coxae light gray pruinose, weakly infuscated on outer faces; trochanters obscure yellow; femora obscure yellow, the tips broadly blackened, the amount subequal on all legs; fore legs with a further dark medial ring, broader but slightly less intense than the apex; tibiae yellow, tips narrowly blackened; tarsi obscure yellow, the outer segments brownish black. Wings chiefly fulvous, variegated with paler fulvous and brown areas; the dark pattern appears as large areas in bases of cells *R* and *M*, virtually confluent with a quadrate mark at origin of *R*_s; anterior cord and fork of *R*₂₊₃₊₄; cell *C* uniformly darkened; more restricted brown clouds along posterior cord, outer end of cell 1st *M*₂, the supernumerary crossvein in cell *R*₅, at near midlength of cells *Cu* and 1st *A*; centers of the more posterior cells and the axillary border even less distinctly clouded; stigma oval, pale yellow; veins yellow, darker in the clouded areas. Venation: A supernumerary crossvein in cell *R*₅, connecting vein *R*₅ at just beyond midlength with *M*₁, about its own length beyond the fork.

Abdomen elongate, as shown by the measurements, segments two to seven, inclusive, being longer than broad; tergites orange, with a nearly continuous brown median vitta beginning on the third tergite, extending through the seventh; very narrow lateral tergal darkenings; outer tergites more darkened and slightly pruinose; sternites light yellow, with three narrow longitudinal brown stripes, the median one interrupted at posterior border of the segments, the lateral pair more continuous; outer sternites slightly more pruinose. Ovipositor with cerci dark brown basally, paling to horn yellow outwardly.

Habitat.—GEORGIA. *Holotype*: ♀, Lakemont, Rabun Co., June 5, 1940, at light (P. W. Fattig). *Paratopotype*: ♀; in Alexander Collection. An additional female from the moun-

tains of western NORTH CAROLINA, collected by H. K. Morrison (Cornell University Collection); see Alexander, Amer. Midl. Nat., 26: 304-305; 1941, as *alleni* Johnson.

This species has been known to me from the fragmentary specimen from western North Carolina, mentioned above. The receipt of this further material indicates a distinct species which, while allied to *Limnophila* (*Eutonia*) *alleni* Johnson, 1909, is distinguished by the elongate abdomen, the supernumerary crossvein in cell R_5 , and the coloration of the mesonotum. In *alleni*, the ground color of the praescutum is gray, strongly delimiting four dark brown stripes; there is no supernumerary crossvein in any cell of the wing, and abdominal segments three to six are wider than long, in conformance to the much shorter abdomen. The distribution of *alleni* as given by the author in the "Diptera of Connecticut," p. 390; 1943, is correct,—New Hampshire, Vermont, New York and Ohio. All records from the southeastern United States will presumably be found to refer to the present fly.

New Aphodius from Texas Gopher Burrows *

By O. L. CARTWRIGHT, South Carolina Agricultural
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Descriptions of six undescribed species of *Aphodius* together with brief notes on these and one previously known species are presented in the following. All specimens were collected by E. S. Ross and A. J. Kirn from the burrows of the pocket gopher, *Geomys breviceps atwateri* Merriam, 7½ miles south of Somerset, Texas (twenty miles south of San Antonio). Descriptions and data concerning other material collected in the burrows are presented by Mr. Ross in other papers † in this journal.

I am indebted to Mr. E. T. Cresson, Jr. of the Philadelphia Academy of Science, Mr. Nathan Banks of the Museum of

* Technical Contribution No. 117 from the South Carolina Agricultural Experiment Station, Clemson, South Carolina.

† Ent. News, 55: 57-61, 115-118. 1944.

Comparative Zoology at Harvard, and Mr. W. J. Brown of the Canadian National Museum for opinions and comparison of specimens with types in their respective collections. To Mr. E. S. Ross I am especially indebted and grateful for the privilege of examining the material and for his permission to describe the new species. To these gentlemen I wish to express my thanks.

Holotypes and allotypes of the new species will be deposited in the collection of the California Academy of Science in San Francisco, California. Paratypes will be placed in the collections of the California Academy, the Philadelphia Academy, Mr. Ross, and the writer.

***Aphodius rossi* new species**

Holotype male.—Length 8 mm., width 3.75 mm. Moderately elongate, shining, reddish brown; antennae and underside a little paler. Head moderately convex, without trace of tubercles, smooth, minutely punctulate, especially on genae and occiput under medium magnification; clypeus broadly shallowly emarginate, broadly rounded each side, the edge narrowly reflexed, genae fimbriate, moderately prominent; eyes small and inconspicuous from above. Pronotum slightly less than two-thirds as long as wide, sides arcuate, narrowly margined, feebly explanate, angles rounded and obtuse, a broad shallow depression in posterior angles, base strongly lobed medially and without marginal line, surface with extremely minute scattered punctation, practically imperceptible over middle, and with moderately coarse and close punctures at sides and posterior angles. Elytra twice as long as pronotum, seven-ninths as wide as long, slightly narrower than thorax at base, sides feebly arcuate, disc finely, not deeply, striate, the striae closely punctate, intervals flat, smooth, impunctate. Mesosternum feebly carinate between coxae, surface closely shallowly coarsely punctate and alutaceous except for a small smooth area on each side near middle. Metasternum smooth at middle, alutaceous with moderate setigerous shallow punctures at sides, median line weakly impressed. Abdomen alutaceous, and with scattered

fine punctures bearing very fine hair. Anterior tibiae smooth in front, tridentate with moderately long subacute teeth, weakly crenulate above the teeth, the first tarsal joint shorter than the second, the spur heavy, subacute, decurved, nearly five times as long as wide, its greatest width about at middle. Middle femur finely pubescent along inner two-thirds of posterior margin, two or three coarse setigerous punctures at knee, otherwise smooth. Posterior femurs including trochanters with similar but less extensive fine hair. Normally shaped short spur of middle tibiae one-half length of the longer. Posterior tibiae fimbriate with unequal spinules, the first joint of the tarsus as long as next three together.

Allotype female.—Length 8.2 mm., width 4 mm. Similar to male except that the spurs of the anterior tibiae are not as heavy and their acute tips are bent rather sharply inward, the short spurs of the middle tibia are somewhat greater than half the length of the long spurs, and the middle and hind femurs lack the fine pubescence along the posterior edge.

Holotype, 22 November 1942, allotype 27 November 1942, Somerset, TEXAS (Ross and Kirn). One hundred thirty-two paratypes, 22 November 1942 to 10 January 1943, same locality and collectors, from nest chamber, refuse chamber and bait traps in burrows of *Geomys breviceps atwateri* Merriam. Paratypes vary from 6.75 to 8.2 mm. in length, 3.2 to 4 mm. in width.

Aphodius rossi is very similar to *Aphodius haldemani* Horn, but the thorax is not as strongly explanate, the coarse punctures of the pronotum are not as large, the femurs are not as densely hairy along the posterior margin in the male, and the male spurs of the anterior and middle tibiae are distinctly different. The anterior spur in *haldemani* is elongate triangular, broadest and truncate at the tip; the short spur of the middle tibia is less than half the length of the long spur, feebly curved, apex dilated, almost squarely truncate and with the inner angle produced inward.

***Aphodius kirni* new species**

Holotype male.—Length 6.9 mm., width 3.3 mm. Moder-

ately elongate, shining, dark reddish-brown, under parts somewhat paler. Antennae rufotestaceous. Head moderately convex, obsoletely tuberculate each side, minutely punctate; clypeus broadly feebly emarginate, distinctly angulate each side, sides arcuate, edge narrowly reflexed, fimbriate; genae not prominent, very obtuse, evenly rather weakly arcuate from anterior edge of eye to clypeus. Pronotum one-third wider than long, sides feebly arcuate, fimbriate, not explanate, and converging to rather sharply rounded anterior angles, posterior angles obtusely rounded, the marginal line strong and extending inward about equally around anterior and posterior angles, base sinuate and without marginal line; surface rather closely minutely punctate throughout, scattered medium punctures each side about equally divided between the anterior and posterior angles. Elytra a little narrower than pronotum at base, about one-fourth longer than wide, twice as long as thorax, sides feebly arcuate, disc moderately deeply striate, the striae finely crenately punctate, third and fourth striae united at base, intervals feebly convex, impunctate. Mesosternum not carinate between coxae, surface alutaceous, with moderate punctures scattered medially, dense at edges. Metasternum smooth with extremely minute punctures at middle, moderate setigerous punctures anteriorly at the sides, median line weakly impressed except posterior sixth which is carinate; a series of moderately coarse setigerous punctures each side converge in form of a wide V at posterior coxae. Abdomen alutaceous, finely to moderately punctured, the punctures bearing fine to medium hair. Anterior tibiae smooth in front, tridentate, smooth above the teeth, the spur only slightly decurved, subequal to first two tarsal joints combined, flattened, somewhat lanceolate, less than a third as wide as long, the tip sharply rounded. Middle and posterior femurs smooth with a row of coarse setigerous punctures at knee. Short spur of middle tibiae not quite half as long as long spur, bluntly rounded apically and produced inwardly in a small sharp tooth. Posterior tibiae fringed with unequal spinules, the long spur, first joint of tarsi and next three joints combined all equal in length.

Allotype female.—Length 7.5 mm., width 3.75 mm. Similar

to male except that the spur of the anterior tibia is narrower, and the normally shaped short spur of middle tibia is slightly more than half the length of the long spur.

Holotype, Somerset, TEXAS, 12 December 1942 in bait trap (A. J. Kirn). Allotype, same locality, 6 January 1943 in refuse chamber (Ross and Kirn). Fifteen paratypes, 22 November to 10 January 1943, same locality and collectors, from nest chamber, refuse chamber and bait traps set in burrows; and two from light trap by an unknown collector 22 June 1937, Morris County, Texas. They vary from 6 mm. to 7.8 mm. in length, in width from 2.7 mm. to 3.75 mm. Viewed from certain angles some specimens appear to have an extremely fine basal line on pronotum at middle. The moderate punctures of the pronotum vary considerably in numbers but are usually not very numerous.

Aphodius kirni is closely allied to *Aphodius goffi* Cartwright but differs in the larger moderate punctures of the pronotum, in the lack of complete basal marginal line on the thorax, and in the hooked or toothed spur of the middle tibiae of the male. In *fucosus* Schmidt, also closely similar, the coarse punctures of the pronotum are still larger and more widely distributed, the genae are more prominent, and the elytral intervals show scattered fine punctures.

***Aphodius acuminatus* new species**

Holotype male.—Length 5.6 mm., width 3 mm. Moderately elongate, shining, dark reddish brown with edge of clypeus, lateral margins of pronotum and elytra, sutural intervals of elytra, femurs, and abdomen paler. Antennae testaceous. Head only slightly convex, not tuberculate, vertex and occiput closely, finely punctate, the punctures becoming slightly less dense, finer, and finally obsolete over anterior third of clypeus. Clypeus widely moderately emarginate, rounded each side and arcuate to prominent nearly right-angled genae, the genae sloping away from the general plane of the clypeus at nearly forty-five degrees. Pronotum rectangular, seven-tenths as long as wide, sides with moderate beading, weakly arcuate, strongly ex-

planate with a deep depression in posterior angles, anterior angles widely obtusely rounded, posterior angles truncate and without marginal line, base strongly widely lobed medially, the lobe with fine marginal line; surface with mixed coarse, fine, and minute punctures, the evenly distributed fine punctures moderately close with interspersed very minute punctuation, the coarse punctures absent antero-medially, becoming quite dense laterally, especially toward posterior angles, changing gradually from very shallow laterally and in anterior angles to moderately deep basally near the posterior angles, and uniting above the laterally smooth deep depression to form longitudinal rugae posteriorly to extreme edge of posterior angles. Elytra about one-third longer than wide, more than twice as long as pronotum, humeri very obtuse, sides strongly arcuate and jointly extended to a sharply rounded apex, striae shallow and not deeply punctate, intervals weakly convex, finely alutaceous, and with moderately close minute punctures. Mesosternum weakly convex between coxae, alutaceous medially, closely shallowly coarsely punctate laterally. Mestasternum finely alutaceous, fine to moderate punctures medially, alutaceous sculpture more pronounced laterally with scattered setigerous punctures, fine dark longitudinal median line showing through lighter surface color. Abdomen with indistinct fine punctures, strongly alutaceous throughout. Anterior tibiae smooth in front, tridentate, the teeth subacute, not serrate above the teeth; spur nearly as long as apical tooth, decurved basally, external edge arcuate outwardly, inner edge obtusely subangulate, apex acute; first tarsal joint shorter than second. Middle and posterior femurs with three or four coarse well-separated setigerous punctures at knee, and a group of moderate hairy punctures on posterior edge near the trochanter, otherwise minutely punctate and very finely alutaceous throughout. Short spur of middle tibiae arcuate, less than half the length of long spur, bluntly rounded apically and produced inwardly in a small sharp tooth, long spur slender and slightly longer than first tarsal joint. Posterior tibiae fimbriate with unequal spinules, first tarsal joint shorter than next three combined.

Allotype female.—Length 6 mm., width 3 mm. Similar to male except that anterior tibial spur is slender, apically acute and noticeably decurved at tip, the spurs of the middle tibiae are slender and normal, the shorter being more than half the length of the longer, and the middle and posterior femurs lack the hairy punctures near the trochanter.

(*To be continued*)

Notes and News in Entomology

Under this heading we present from time to time short reviews, notes, news and comments on entomology throughout the world. Contributions from readers are solicited and will be acknowledge when used.

Parasite production by the New Jersey Department of Agriculture: From 1939 to 1942 the parasite laboratory of the Bureau of Plant Industry of the New Jersey Department of Agriculture cultured millions of *Neoapectana glaseri*, the nematode parasite of the Japanese beetle grub, and introduced 563 colonies of this nematode over sections of New Jersey that had an appreciable beetle population. These colonies were introduced at 3½ mile intervals. As this colonization should be adequate if the nematode is adapted to become a factor in the natural control of the Japanese beetle, emphasis has now been shifted to the production of other insect parasites.

At present the fungus *Beauveria bassiana* is being investigated as an adult Japanese beetle pathogen; *Microplectron fuscipennis* is being reared and introduced in the field as a parasite of the European pine sawfly; and work has begun on the production of large numbers of *Macrocentrus ancylivorus*, the most important insect parasite of the Oriental fruit moth, which is so troublesome to peach growers. H. B. WEISS.

Gnorimoschema operculella (Zell.) in New Jersey (Lep.): During the summer of 1943 an outbreak of this insect, known as the potato tuber moth, occurred over the southern half of New Jersey and was particularly severe in Cumberland and Salem counties. In years past minor indications of the presence of

this insect had been noted in a few potato fields, but it was assumed that it would never be a pest in New Jersey because our usual climatic conditions and disposition of the potato crop did not favor its development. This assumption was wrong. This insect, which is a pest in warm, dry regions, developed in alarming numbers last summer when temperatures were high and precipitation was low or absent. It is believed that the establishment of this insect in New Jersey was hastened by the operations of Federal governmental agencies which purchased and stored southern potatoes in New Jersey and then dumped them as unfit for food. Some of these potatoes were found to be severely infested by tuber moths.

Although not welcomed by potato growers, the larvae of the potato tuber moth were found by the Citrus Experiment Station of Riverside, California, to be ideal insectary hosts for the mass production of *Macrocentrus ancylivorus*, the parasite of the Oriental fruit moth, and advantage is being taken of this in the production of these parasites in New Jersey. H. B. WEISS.

A classification of entomologists in 1764: In his book *Entomologia sistens insectorum tabulas systematicas*, Hafniae, 1764, Martin Thomas Brunnich, the Danish naturalist and professor at Copenhagen, supplied a classification of entomologists, which is herewith reproduced as a matter of interest. Although in 1764 there may have been some basis for the distinctions then made, these do not hold at the present time, and Brunnich's classification needs to be completely revised and modernized. However, his grouping, which follows, shows the varied interests of a comparatively small group of early entomologists and naturalists.

I. Entomologists.

A. Collectors.

1. Ancients or Fathers (Patres), such as Aristotle, Pliny, Dioscorides.
2. Commentators, the same names as above.
3. Ichnographers, or figurists, such as Goedart, Hoefnagel, Merian, Vallisnieri, Albin, Frisch.

4. Metamorphosists, such as Swammerdam.
5. Describers, such as Ray and Linnæus.
6. Monographists, such as Lister, Schoeffer, Clerk.
7. Curiosi, such as Catesby, Strom, Pontoppidan.
8. Museographists, such as Linnæus and Poda.
9. Topographers, such as Albin and Frisch.
10. Voyagers, such as Marcgrave, Rumphius, Sloane, Has-
selquist, and Osbeck.

B. Methodists.

1. Philosophers, such as Swammerdam, Réaumur, De-
Greer, and Linnæus.
2. Systematists, the same names as above.
3. Nomenclators.

II. Entomophilists.

1. Anatomists, such as Malpighi, Swammerdam, Leuwen-
hoeck, Lyonnet, etc.
2. Physicians, such as Dioscorides, Galen, Aldrovandus,
Mathiolus, Glauber, Dale, etc.
3. Miscellanei, such as Bochart, Lesser, Derham, etc.

H. B. WEISS.

The Survival of the Fittest "ism": Seventy-six years ago, March 19, 1868, on the publication of Darwin's "The Variations of Animals and Plants Under Domestication," the following paragraph appeared in "The Nation":

"For critical examination in detail, Mr. Darwin's new book must be referred to the scientific journals and to cultivators and breeders. But whatever audience he may address, a wide circle of general readers is sure to attend the founder of a new *ism*, and the word Darwinism has become as familiar as Galvanism or Mormonism."

Apparently in that day long ago, the three *isms* were equally famous, but with the passing of the years, the sole survivor, at least in common English usage, is Darwinism. Evidently the "survival of the fittest" works as well for *isms* as for organism, and despite its ups and downs, Darwinism sings today as loudly and lustily as ever. PHIL RAU.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Ball, Elmer Darwin, obituary, [39] 26: 60–61. Bronson, W. S.—The grasshopper book. Harcourt, Brace & Co. N. Y. \$1.75; 1943. **Declarations.**—On the need for new names to be clearly indicated as such on their first publication and on the need for avoiding the publication of names as new on more than one occasion (Decl. 6). On the need for quoting bibliographical or other references for all names cited in zoological works (Decl. 7). On the need for giving in the case of zoological journals a clear indication of the date of publication of each number or part (Decl. 8). [87] 1: 41–64. **Dice, L. R.**—The biotic provinces of N. Amer. Univ. Mich. Press. \$1.75; 1943. **Eliot, N.**—Larval anthropomorphism. [9] 77: 22–27. **Hinton & Corbet.**—Common insect pests of stored food products. A guide to their identification. British Mus. (Nat. Hist.) Economic Ser. No. 15. 1943, price 1 s. **Lutz, F. E.**, obituary and bibliography. [6] 52: 63–73, ill. **McDunnough, J.**—Genotype tangles. [4] 76: 20. **McLaine, Leonard Septimus.**—Obituary by Keenan & Twinn. [4] 76: 1–4, photo and bibliography. **Metcalf & Patton.**—Fluorescence microscopy applied to entomology and allied fields. [Stain Technology] 19: 11–28, ill. **Michelbacher & Smith.**—Some natural factors limiting the abundance of the alfalfa butterfly. [Hilgardia] 15: 369–97. **Newell, Wilmon**, obituary. [39] 26: 53–4, ill. **Prout, Louis Beethoven**, obituary. [21] 56: 28. **Scuza-Araujo, H. C.**—Infecção espontânea e experimental de hematofagos (Ixodídeos, Triatómídeos, Culicídeos, Hirudíneos, Pediculídeos e Címídeos) em leprosos. [111] 38: 447–84, ill. **Sheldon, Wil-**

liam George, obituary. [9] 77: 17-19, ill. **Smith, R. W.**—Observations on some parasites of some Canadian grasshoppers. [4] 76: 28-33. **Stern, Schaeffer & Spencer.**—The genetic basis of differences between two sps. of *Drosophila*. [90] 78: 183-87. **Travassos e Freitas.**—Relatorio de setima excursao scientifica do Inst. Oswaldo Cruz, realizada a zona da Estrada de Ferro Noroeste do Brasil. . . . [111] 38: 385-412.

ANATOMY, PHYSIOLOGY, MEDICAL.—**Alexander, Kitchener & Briscoe.**—The effect of waxes and inorganic powders on the transpiration of water through celluloid membranes. [Trans. Faraday Soc.] 40: 10-19. **Dreyfuss & Breuer.**—Chromosomes and sex determination in the parasitic hymenopteron *Telenomus fariae*. [Genetics] 29: 75-80. **Hovanitz, W.**—Genetic data on the two races of *Colias chrysotheme* in N. Amer. and on a white form occurring in each. [Genetics] 29: 1-30. The distribution of gene frequencies in wild populations of *Colias*. [Genetics] 29: 31-60. **Weiss, McCoy and Boyd.**—Group motor responses of adult and larval forms of insects to different wave-lengths of light. [6] 52: 27-43, ill.

ARACHNIDA AND MYRIOPODA—**Hathaway, C. R.**—Associacao entre Mallophaga e Hippoboscidae. [111] 38: 413-17, ill. **Nesbitt, H. H.**—Three new mites of the subfam. Rhizoglyphinae. [4] 76: 21-27, ill. **Wilder, V. P.**—"Children of the earth." Solpugids are strange spider-like creatures called children of the earth. [Nature Mag., Washington] 37: 207-209, ill.

THE SMALLER ORDERS.—**Crutchfield & Hixson.**—Food habits of several sps. of poultry lice with spec. ref. to blood consumption. [39] 26: 63-6. **Needham, J. G.**—Further studies on Neotropical Gomphine dragonflies. [1] 69: 171-224, ill. (*).

ORTHOPTERA—**Bronson, W. S.**—(See under general.) **Opinions.**—Twenty-one names in the Orthoptera added to the official list of generic names in zoology (no. 149). [87] 2: 145-60. **Smith, R. W.**—(See under general.)

HEMIPTERA—**Drake & Hanis.**—So. Amer. Aradidae in the Carnegie Mus. [An. Carnegie Mus.] 30: 39-43 (*). **Hathaway, C. R.**—Consideracoes sobre *Cephus siccifolius* (Cercop). [111] 38: 443-46, ill. **Lent, H.**—Triatomideos da Guinana Holandesa, redescricao de *Panstrongylus lignarius*. Novo transmissor da doenca de Chagas na cidade do R. d. Janeiro, estudo dos gen. *Belminus*, *Bolbodera* e

des. de *Parabelminus carioca* n.g., n.sp. (Triatom). [111] 38: 485-96, ill; 497-516, ill. (S). **Marshall & Pickett**.—The present status of the apple mealybug, *Phenacoccus aceris* in Bri. Col. & Nova Scotia. [4] 76: 19. **Moore, G. A.**—A list of hemiptera taken at Hudson Heights, Quebec. [4] 76: 40-44.

LEPIDOPTERA—**Brown, F. M.**—Notes on mexican butterflies, II, Pieridae. [6] 52: 99-119. **Clench, H. K.**—Two n. subsps. of *Everes comyntas*. [6] 52: 59-61. **Forbes, W. T. M.**—Lepidoptera from W. Peru and Ecuador. [6] 52: 75-83 (k*). **Hovanitz, W.**—(See under physiology.) **Michelbacher & Smith.**—(See under general.) **Opinions.**—On the dates of publication of the several portions of Hübner's *Verzeichniss bekannter Schmetterlinge*, 1816-1826 (no. 150). [87] 2: 161-68. **Sperry, J. L.**—A revision of the genus *Chlorosea* Pack., with descr. of n. sps. (Geometrid). [4] 76: 33-39, ill. **Tinkham, E. R.**—Faunistic notes on the diurnal Lepidoptera of the big bend region of Trans-Pecos, Texas, with the description of a new *Melitaea*. [4] 76: 11-18, ill. **Watson, J. R.**—*Melipotis acanthoides* in Fla. [39] 26: 71.

DIPTERA—**Alexander, C. P.**—Records and descr. of neotropical crane-flies. [6] 52: 45-57. **Bequaert, J.**—The dipterous fam. *Mydaiidae* in Canada. [4] 76: 44. **Brown, W. J.**—Some new and poorly known sps. of *Coleop.*, II. [4] 76: 4-10. **Hathaway, C. R.**—(See under Smaller Orders.) **Hull, F. M.**—Some flies of the fam. *Syrphilae* in the Br. Museum. [75] (11) 11: 21-61 (2 sp. S). **Miller, D. D.**—*Drosophila melanura*, a new species of the *melanica* group. [6] 52: 85-97, ill. **Oliveira Castro, G. M.**—*Ecologia de Anopheles gambiae*. [111] 38: 517-34.

COLEOPTERA—**Arnett, R. H., Jr.**—A revision of the nearctic *Silphini* and *Nicrophorini* based upon the female genitalia. [6] 52: 1-25, ill. **Seevers, C. H.**—A new subf. of beetles parasitic on mammals (*Staph.*: *Amblyopinae*). [*Zool. Ser., Field Mus. N. H.*] 28: 155-72, ill. **Watson, J. R.**—Atropical book worm in Florida. (*Neogastrallus librinocens*) (*Anobid*). [39] 26: 61-3.

HYMENOPTERA—**Hincks, W. D.**—Note on the nomenclature of some microgasterine *Braconidae*, with ref. to the works of Haliday and Nees von Esenbeck, pub. in 1834. [21] 56: 19-20. **Michelbacher & Smith.**—(for l.h. and host relations of *Apanteles flaviconchae* see under general.) **Webb, A.**—Beekeeping for profit and pleasure. Macmillan Co., N. Y. \$2.00; 1943.

LIST OF JOURNALS CITED

1.—Trans. Amer. Entom. Soc. 4.—Canadian Entomol.
6.—Jour. N. Y. Ent. Soc. 9.—The Entomologist, London.
19.—Bull. Brook. Entom. Soc. 21.—Entom. Record &
Jour. Variation. 39.—Florida Entomologist. 75.—Annals
& Mag. Nat. Hist. 87.—Opinions and Declarations, Nat.
Comm. Zool. Nomen. 90.—American Nat. 111.—Mem.
Inst. Oswaldo Cruz.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyractomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

RECENT LITERATURE

FOR SALE BY

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DIPTERA

- 1108.—Ross & Roberts—Mosquito Atlas. I. The Nearctic Anopheles, important malarial vectors of the Americas, and *Aedes aegypti* and *Culex quinquefasciata*. 44 pp., ill., 194360
- 1113.—Mosquito Atlas. II. Eighteen Old World anophelines important to malaria. 44 pp., ill., 194360
- 1112.—Russell, Rozeboom & Stone—Keys to the anopheline mosquitoes of the World, with notes on their identification, distribution, biology, and relation to malaria. 152 pp., figs., 1943 2.00

HYMENOPTERA

- 1109.—Bequaert (J.)—Color variation and distribution of *Apoica pallida*, a nocturnal Neotropical social wasp (Vespididae). (69: 107–118, 1943)25
- 1107.—Linsley (E. G.)—Revisions of the gen. *Townsendiella*, *Triopasites* and *Paranomada* (Nomadidae). (69: 93–106, ill., 1943)30
- 1110.—A revision of the gen. *Neopasites* (Nomadidae). (69: 119–140, fig., 1943)45
- 1111.—A revision of the gen. *Gnathopasites* (Nomadidae). (69: 141–149, fig., 1943)20
- 1106.—Ross (H. H.)—North Amer. sawflies of the gen. *Hoplomacampa* (Tenthredinidae). (69: 61–92, 4 pls., 1943) .. .80

NEUROPTERA

- 1114.—Frison (T. H.)—Three n.sps. of *Capnia* from Colorado (Plecoptera: Capnidae). (69: 151–157, figs., 1944) .. .20

ODONATA

- 1116.—Needham (J. G.)—Further studies on Neotropical gomphine dragonflies. (69: 171–224, 3 pls., 1944) 1.00

ORTHOPTERA

- 1115.—Rehn (J. A. G.)—Critical notes on and descr. of American steirodont katydids (Tettigoniidae). I. A review of the gen. *Steirodont* of authors (*Phyllolophus* n.name). (69: 159–169, 3 pls., 1944)35

Insects

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The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages may be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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ENTOMOLOGICAL NEWS

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No. 6

A Bibliography of Keys to Immature Mosquitoes (Diptera: Culicidae)

By WM. P. HAYES¹

The classification of mosquito eggs, larvae and pupae has assumed an increased degree of importance because of the intensive malarial control program being carried out in the war effort. Since many public health workers, entomologists and sanitary men in the army and navy are concerned with identification of mosquitoes, it is thought that a bibliography treating of those articles which have keys to the immature stages of the Culicidae would be of considerable help as a guide to this type of literature. The writer published a bibliography (*Ent. News*, 49: 246-251; 50: 5-10 and 50: 76-82, 1938 and 1939) listing the taxonomic keys to the immature stages of flies of the order Diptera. In this paper were a number of citations to works on Culicidae. Since the publication of this work, a number of new works have been published and attention has been called to some older works that were then omitted. Thanks are due to Professor P. S. Welsh and Dr. T. H. G. Aitken for calling the writer's attention to a number of works overlooked in the first publication. The number of citations to culicid papers, herein, is more than doubled over those in the first paper.

BARRAUD, P. T. 1934. Fauna of British India including Ceylon and Burma. Vol. 5. Family Culicidae, tribes Megarhini and Culicini. London, 463 pp. 8 pls. (Various keys to larvae and pupae.)

¹ Contribution No. 240 from the Department of Entomology, University of Illinois, Urbana, Illinois.

- BATES, M. 1941. Field studies on the anopheline mosquitoes of Albania. Proc. Ent. Soc. Wash., 43: 37-58. (Keys to eggs, pp. 40-41; key to fourth stage larvae, pp. 41-42).
- BELLAMY, R. E. 1942. Observations on the macroscopic species—identification of larval *Anopheles* in Georgia. Parasitology, 28 (4): 299-310. (Table of characters for three species of *Anopheles*, pp. 307-308).
- BLACKLOCK, D. B. and A. M. EVANS. 1926. Breeding places of anopheline mosquitoes in and around Freetown, Sierra Leone. Ann. Trop. Med. and Parasit., 20: 59-83. (Key to 4th stage larvae, p. 69).
- BONNE-WEPSTER, J. and S. L. BRUG. 1939. Larven van Netherlandisch Indische Culicinen. Geneesk. Tijdschr., Batavia, 79: 1218-1279. (Paper not seen).
- BRADLEY, G. H. 1932. On the identification of *Anopheles* mosquito larvae in Florida. Proc. Ent. Soc. Wash., 34: 41-43. (Larval key to species, pp. 41-42).
- Id.* 1936. On the identification of mosquito larvae of the genus *Anopheles* occurring in the U. S. (Diptera: Culicidae). Southern Med. Journ., 29: 859-861.
- BRAGA, J. M. 1931. Culicideos de Portugal. Aránjo and Sobrinko, Porto. (Keys to larvae of *Culex*, pp. 31-32; *Aedes*, pp. 52-53, and *Anopheles*, pp. 73-74).
- BUXTON, P. A. and G. H. E. HOPKINS. 1925. The early stages of Samoan mosquitoes. Bull. Ent. Res., 15: 295-301. (Key to larvae and pupae, p. 301).
- CARPENTER, S. J. 1939. The mosquitoes of Arkansas. Mimeog. Publication of the Arkansas State Board of Health. Little Rock, Ark., 89 pp. 31 figs. (Revised 1941). (Various keys).
- CHABELARD, R. 1941. La diagnose différentielle des larves de *Anopheles multicolor* et de *A. hispaniola*. Bull. Soc. Hist. Nat. Afr. No., Algiers, 32: 242-244 (paper not seen).
- CHRISTOPHERS, S. R. 1933. Culicidae, tribe Anophelini. In: Fauna of British India. Diptera, Vol. 4. (Key to larvae, pp. 84-90; eggs, 90-94).
- COOLING, L. E. 1924. Larval stages and biology of the com-

- moner Australian mosquitoes. Comm. Aust. Dept. Health Service, Melbourne, Publ. No. 8, pp. 1-40. (Paper not seen).
- DEMEILLON, B. 1931. Illustrated keys to the full-grown larvae and adults of South African anopheline mosquitoes. Publ. So. Africa Inst. Med. Res., No. 28, Vol. 4, pp. 273-375.
- Id.* 1931. Notes on the larvae of some South African anophelines. Bull. Ent. Res., 22: 237-243. (Larval key to species, p. 241).
- Id.* 1941. Guia para identificação dos anofelines da Colônia de Moçambique, etc. *In*: Estudos entomológicos da Colônia de Moçambique. 315 pp. Lorenz. Marques, Estac. antimalár. (Key to last instar larvae. Paper not seen. Abstract in Rev. Appl. Ent., Ser. B, 30: 184).
- DYAR, H. G. 1901. Notes on mosquitoes on Long Island, New York. Proc. Ent. Soc. Wash., 5: 45-53. (Larval key to species on p. 51).
- Id.* 1902. Notes on the mosquitoes in New Hampshire. Proc. Ent. Soc. Wash., 5: 140-148. (Larval key to species, pp. 145-146).
- Id.* 1905. A synoptic table of North American mosquito larvae. Journ. N. Y. Ent. Soc., Vol. 13: 22-26.
- Id.* 1906. Larvae of Culicidae classified as independent organisms. Journ. N. Y. Ent. Soc., 14: 169-230. (Many keys throughout the work).
- Id.* 1906. Key to the known larvae of the mosquitoes of the United States. U. S. Dept. Agr. Bur. Ent., Circ. 72: 1-6.
- Id.* 1928. The mosquitoes of the Americas. Carnegie Inst. Wash., Pub. 387. 616 pp. 123 pls. (Various keys to larvae, no pupal keys).
- EDWARDS, F. W. 1912. Revised keys to the known larvae of African Culicinae. Bull. Ent. Res., 3: 373-385. (Key to genera and species, p. 373).
- Id.* 1912. A revision of the mosquitoes of the palaearctic region. Bull. Ent. Res., 12: 263-351. (Several keys to larvae of various genera).
- Id.* 1932. Culicidae. Gen. Ins., Fasc. 194, pp. 1-258. (Various larval keys to genera of the world).

- Id.* 1941. Mosquitoes of the Ethiopian region. III. Culicine adults and pupae. London, British Museum, 499 pp. (Key to genera of pupae, p. 358).
- EVANS, A. M. 1938. The mosquitoes of the Ethiopian region. II. Anophelini, adults and early stages. London. British Museum, 404 pp. (Key to species of larvae, p. 51).
- FELT, E. P. 1904. Mosquitoes or Culicidae of New York State. N. Y. State Mus., Bull. 79, Ent. 22, pp. 241-400. (Larval key, p. 279).
- Id.* 1905. Studies in Culicidae. N. Y. State Mus. Bull. 97 (Entom. 22). Twentieth Report N. Y. State Entomologist, pp. 442-497. (Larval key to genera and species, pp. 445-449).
- FENG, L. C. 1931. The larvae and pupae of the North China species of *Anopheles*, their structure and breeding habits. Nat. Med. Journ. China, 17: 493-512.
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(To be continued)

New *Aphodius* from Texas Gopher Burrows

By O. L. CARTWRIGHT, South Carolina Agricultural
Experiment Station, Clemson, South Carolina

(Continued from page 135)

Holotype, 27 November 1942, and allotype, 22 November 1942, Somerset, TEXAS, in bait traps set in gopher burrows (A. J. Kirn). Four paratypes, 17 November 1942 to January 1943, otherwise same data, vary from 5.6 to 6 mm. in length, and 2.7 to 3 mm. in width. In two cases the coarse punctures cover almost all of the pronotum, being only somewhat less numerous antero-medially.

Aphodius acuminatus belongs in the subgenus *Platyderides* but is not closely allied to any of the known species in this group. It is distinguished at once by the strongly arcuate and apically pointed elytra. The species is unusual also in having basal marginal line except at the sides and hind angles, and in having a heavily punctate pronotum combined with minute punctuation on elytral intervals.

Aphodius sepultus new species

Holotype male.—Length 3.0 mm., width 1.3 mm. Moderately elongate, feebly shining, pubescent, dark brown, with lateral margins of pronotum, clypeus, and legs paler. Head slightly convex, closely moderately granulate throughout, alutaceous between the granules. Clypeus widely feebly emarginate, broadly rounded and slightly reflexed each side, genae moderately prominent. Pronotum convex, nearly three-fourths as long as wide, sides feebly arcuate, a little narrower in front, hind angles well defined, base feebly sinuate, finely margined, disc closely, shallowly, coarsely, setigerously punctate, the setae decurved. Elytra five-sevenths as wide as long, narrower at base than thorax, slightly wider posteriorly, striae geminate, moderately deep, feebly crenate, finely not closely punctate; intervals slightly convex, alutaceous, each with a double row of

close, shallow, coarse, setigerous punctures, the decurved setae arising immediately behind small granules which cause the surface to appear submuricate. Mesosternum finely alutaceous, not carinate between the coxae. Metasternum strongly alutaceous and opaque except for a small flattened to depressed shining medial area having scattered shallow punctures and much finer alutaceous sculpture. Abdominal segments finely alutaceous and with scattered very shallow setigerous punctures. Tridentate anterior tibiae serrulate above the teeth, the first tarsal joint shorter than the second, the spur stout and slightly decurved. Short spur of middle tibiae less than half the length of the long spur, its tip obliquely truncate and with a small fine tooth on inner side. Middle and hind femurs with scattered fine setigerous punctures. Posterior tibiae fimbriate with unequal spinules, first tarsal joint longer than the next two combined.

Allotype female.—Length 3.25 mm., width 1.25 mm. Similar to male except that the short spur of the middle tibia is normal and is more than half the length of the long spur.

Holotype and allotype, Somerset, TEXAS, 3 January 1943, four feet below surface, in nest chamber of the gopher, *Geomys brevipes atwateri* Merriam (Ross and Kirn). Two hundred eighty-two paratypes from same locality, taken between 18 November 1942 and 6 January 1943, at bait traps, in refuse and dung chambers, and in nest chamber by same collectors. Paratypes vary in length from 2.6 to 3.6 mm. and in width from 1.2 to 1.5 mm.

Aphodius sepultus may be placed in Horn's group H following *stupidus* Horn. It differs from all others in the group by having very noticeable recurved hair on the thorax as well as on the elytra, and by the unusual twinning or doubling of the elytral striae.

Aphodius captivus new species

Holotype male.—Length 5.25 mm., width 2.55 mm. Moderately elongate, shining, head and thorax piceous with pale outer

margins, elytra and legs rufotestaceous. Head finely, quite closely punctate throughout, without tubercles; clypeus broadly not deeply emarginate, rounded each side; genae fimbriate, angulate, only moderately prominent. Pronotum two-thirds as long as wide, sides rounded, converging anteriorly from posterior third, broadly explanate, depressed in posterior angles, angles obtusely rounded, base strongly sinuate each side and without marginal line; punctuation fine and moderately close medially, intermixed with coarse punctures laterally, the coarse punctures becoming very close and dense above the depression in posterior angles. Elytra twice as long and narrower at base than pronotum, sides evenly arcuate, finely not deeply striate, striae crenately punctate; intervals wide, nearly flat, with moderately close fine scattered punctures. Mesosternum not carinate, surface alutaceous medially, coarsely shallowly punctate laterally. Metasternum with median flattened area shining, finely closely punctate, laterally alutaceous with shallow setigerous punctures. Abdominal segments alutaceous and with numerous scattered punctures bearing very fine hair. Anterior tibiae smooth in front, tridentate, crenulate above the teeth; spur heavy, acute, decurved; first tarsal joint shorter than the second. Middle and posterior femurs with scattered very fine punctures and a row of moderately spaced punctures from knee to trochanter. Short spur of middle tibiae less than half the length of long spur, blunt, and bearing a small denticle on under side at tip. Posterior tibiae fringed with unequal spinules, the first tarsal joint as long as the next three together.

Allotype female.—Length 5.7 mm., width 2.85 mm. Very similar to male except that the anterior tibial spur is not quite as heavy and the shorter spur of the middle tibiae is more than half as long as the long spur, which in turn is subequal in length to the first tarsal joint.

Holotype and allotype, Somerset, TEXAS, 22 November 1942, under nest two feet below surface (E. S. Ross). Twenty paratypes vary in length from 4.8 to 6 mm., and from 2.4 to 3 mm. in width. A few specimens show a very slight angulation in the lateral edge of the pronotum at the posterior third. The

specimens were collected between November 22 and 30, 1942, under a nest two feet below the surface and in bait traps set in the burrows.

Aphodius captivus very closely resembles *umbricollis* Fall in size and color but differs in several ways. Viewed from the side, the elytra of *captivus* are less evenly convex than in *umbricollis* which does not curve downward so suddenly at the apex. *A. umbricollis* does not have the patch of densely placed coarse punctures at the posterior angles of the pronotum. The punctures of the intervals of the elytra are much finer in *umbricollis*, the spurs of the middle tibiae are longer and more slender, the long spur being longer than the first tarsal joint. Mr. Banks states that in the type of *umbricollis*, a female, the middle tibiae have fairly long erect or nearly erect hairs on the inner and outer sides in addition to the usual bristles; these are not seen in *captivus*.

Aphodius atwateri new species

Holotype male.—Length 5.5 mm., width 2.7 mm. Oblong, moderately convex and elongate, shining, rufotestaceous, with the head, pronotum, and tibiae slightly darker than the elytra. Head finely closely punctate throughout, without tubercles. Clypeus broadly not deeply emarginate, rounded each side; genae fimbriate, angulate, moderately prominent. Pronotum two-thirds as long as wide; sides feebly arcuate, converging anteriorly from posterior third, finely margined, weakly explanate, depressed in posterior angles, all angles obtuse, broadly rounded; base arcuate, sinuate each side and without marginal line; punctuation fine and moderately close medially, intermixed with coarse punctures at sides and base, dense and confluent in posterior angles to well separated in anterior angles and scattered across the base. Elytra two and one-third times as long as pronotum, base narrower than pronotum; sides feebly arcuate, humeri obtuse; striae moderately deep, finely closely, crenately punctate; intervals feebly convex, with moderately close fine punctures more or less scattered in two irregular rows. Meso-

sternum not carinate, alutaceous medially. Metasternum minutely alutaceous, moderately fine and close punctures at middle, close shallow setigerous punctures at sides. Abdominal segments alutaceous, finely, setigerously punctate. Anterior tibiae smooth in front, strongly tridentate, serrate above the teeth, spur moderately heavy, acute, decurved, first tarsal joint shorter than the second. Middle and posterior femurs with scattered fine punctures, three coarse setigerous punctures at knee, and scattered more finely setigerous punctures along posterior edge. Short spur of middle tibiae less than half the length of the long spur, a small denticle on under side at tip. Posterior tibiae fringed with unequal spinules, the first tarsal joint as long as next three together.

Allotype female.—Length 5.8 mm., width 2.7 mm. Very similar to male except that the anterior spur is more slender and acute, and the short spur of the middle tibiae is more than half the length of the long spur.

Holotype male taken in sand under nest two feet below the surface, Somerset, TEXAS, 22 November 1942 (E. S. Ross). Allotype collected in bait trap, 17 November 1942 (A. J. Kirn). Twelve paratypes vary in length from 4.9 mm. to 6.3 mm., and in width from 2.4 to 3.0 mm. The fine punctures of the head and thorax become so fine in some individuals as to be practically imperceptible over the middle of the pronotum and the anterior of the clypeus. The specimens were taken in bait traps and in nest chambers from two to five feet below the surface.

Aphodius atwateri should be placed in the subgenus *Platyderides* where it will key to *Aphodius oklahomensis* Brown which it resembles closely. It differs by being lighter in color, smaller in size, and in having less widely explanate pronotal side margins.

Aphodius peculiarus Schmidt

Eleven specimens of *Aphodius peculiarus* Schmidt (*longitarsus* Fall) were taken between 18 November 1942 and 6 December 1942 in bait traps set in the burrows of the gopher.

Some New Mexican Species of *Omanana* (Homoptera: Cicadellidae)

By DWIGHT M. DELONG, Department of Zoology and
Entomology, Ohio State University

The Genus *Omanana* was described in 1941¹ to include several undescribed Mexican species and *Athysanus litigiosus* Ball which was designated as the genotype. At that time six new species, namely *damfi*, *similaris*, *striata*, *pallidens*, *angustata* and *nigrifrons*, were described by the author. The long tapered apices of the male plates and the long paired ventral processes of the aedeagus distinguish the species of this genus rather easily from the species of allied North American genera. This fact has caused the author to place *Menosoma tortolita* Ball in this genus, the characters of which as illustrated at this time will demonstrate its generic position. Also, additional collecting in Mexico in 1941 has brought to light six new species which are described in the following pages. The species of the genus feed upon herbaceous vegetation in grassy areas and occur in abundance at altitudes below 5000 feet.

Athysanus acuminatus Baker which was placed in *Menosoma* by Ball is definitely not a member of that genus and is more closely related to *Omanana*. It is the author's opinion, however, that it represents a separate generic type.

Omanana duodens new species

Resembling *litigiosa* in general appearance but with vertex more produced and distinct male genitalia. Length 5.5 mm.

Vertex broadly roundedly produced about two and one-half times as wide between eyes as median length.

Color: Vertex with a narrow pale line on margin connecting ocelli. Beneath this line is a heavy black band separated from black face by a narrow white band. Just above the marginal pale line are an anterior broad black and a posterior narrow black

¹ DeLong, D. M. A new genus (*Omanana*) and six new species of leafhoppers (Homoptera-Cicadellidae) from Mexico. *Lloydia*, 4: 293-299, 1941.

band separated by a narrow white band. The posterior half of vertex is brownish with indication of a darker brownish transverse band near base. Pronotum pale brown, mottled with dark brown. Scutellum pale brown with a white mark in each basal angle and a white oblique dash either side of middle on basal margin. Elytra white subhyaline with scattered ramose pigment marks. A brown spot on discal cell, and dark brown spots on apical margin.

Genitalia: Male plates triangular with long tapered, pointed apices. Styles constricted near middle and deeply notched just before apex forming a long slender apical process. Aedeagus with a ventral and dorsal portion. The ventral portion is composed of a pair of ventral processes from each of which arise an inner spine and a dorsal spine, neither of which is as long as the main process. The dorsal process is broadly U-shaped in lateral view.

Holotype male collected at Tuxpan, Michoacan, MEXICO, October 5, 1941, by Caldwell, Good, Plummer and the author.

Omanana bifurcata new species

Resembling *litigiosa* in general appearance but with distinct male genitalia. Length 6 mm.

Vertex strongly rounded in front, more than twice as wide between eyes at base as median length.

Color: A narrow pale band between ocelli on margin of vertex, a broad black band beneath, separated from the uniformly black face by a narrow pale band. Vertex pale with two heavy black bands separated by a pale band on anterior portion. Pronotum pale brown mottled with darker brown on posterior portion. A transverse dark band on anterior portion parallel to anterior margin. Scutellum with the four white oblique dashes along the anterior margin. Elytra pale with dark brown veins and brown spots on discal, costal and apical veins.

Genitalia: Male plates triangular, produced and with long slender apices. Aedeagus with a ventral portion divided into two parts each of which bears a bifurcate process on the dorsal side at about the middle, with a minute spur on inner margin of

each at the base. A dorsal portion arises near the base and is broadly V-shaped. Style deeply notched on outer margin at about one-fourth the distance from apex so as to form a pointed apical finger-like process.

Holotype male and male paratypes collected at Iguala, Guerrero, MEXICO, October 25, 1941, by E. E. Good and the author.

Omanana divergens new species

In form and general appearance resembling *nigrifrons* but with distinct male genitalia. Length 6.5–7.5 mm.

Vertex broadly rounded, appearing almost parallel margined, two and one-half times as broad between eyes at base as median length.

Color: A broad pale transverse band between ocelli on margin. A broad, black band just beneath marginal pale band separated from black face by a narrow pale band. The upper portion of face has several pairs of pale arcs. Vertex pale with a marginal narrow dark band and another just posterior to it separated by a broader, pale band. Posterior portion of vertex pale brown. Pronotum dark brown, pale on anterior margin. Scutellum brown with a white line in each basal angle and a white oblique dash on either side of middle at base extending to middle of scutellum. Elytra pale brown, veins dark brown marked with darker brown areas and areolar spots.

Genitalia: Female last ventral segment with lateral angles rounded to slightly produced, broadly rounded posterior margin. Male plates elongate, triangular, apical portion concave on outer margin, apices blunt. Style long, rather narrow, slightly roundedly notched on outer margin just before apex. Ventral portion of aedeagus composed of two long processes which are thickened at middle in lateral view and tapered to pointed apices. The dorsal portion composed of a broad U-shaped structure in lateral view.

Holotype male collected at Tepetzlan, Mor., MEXICO, September 11, 1941, by Good, Plummer, Caldwell and the author. Allotype female and paratype female collected at Taxco, Gro., October 26, 1941, by Good and the author.

Omanana mediana new species

Resembling *nigrifrons* in general form and appearance but with distinct male genitalia. Length, male, 5 mm.

Vertex broadly rounded, more than twice as wide between eyes at base as median length.

Color: Vertex with a pale band between ocelli on margin. Beneath this is a broad black band separated from the black face by a narrow pale band. The vertex is orange to dull red with a narrow black band just above the pale marginal band which is distinctly separated from another very narrow transverse black band. Pronotum brown, anterior portion tinged with orange. Scutellum orange with a pair of proximal round black dots on anterior portion of disc. Elytra pale with brown veins and brownish pigment lines.

Genitalia: Male plates triangular with long tapered apices. Style broad at base gradually narrowed to near apex where it is abruptly narrowed to form a long narrow finger-like process on inner margin. The ventral portion of the aedeagus has a pair of long ventral processes, from the dorsal surface of each at about the middle arises a short spine. Dorsal portion broadly U-shaped in lateral view, the posterior portion composed of three processes.

Holotype male collected at El Mante, Tamps., MEXICO, October 26, 1930, by Dr. Dampf (M.F. 1775).

Omanana arcata new species

Resembling *mediana* in general appearance but with fewer markings on the vertex and with distinct genitalia. Length 4.5 to 5 mm.

Vertex bluntly but distinctly produced, less than twice as wide between eyes at base as median length.

Color: Face tawny with traces of dark arcs just beneath margin of vertex. Vertex orange to tawny without dark markings. Pronotum, scutellum and elytra rather uniform, tawny, veins pale, a dark band on apical margin of elytra.

Genitalia: Female last ventral segment with lateral angles rounded to posterior margin which is gradually produced to a

bluntly pointed, conspicuous median tooth. Male plates triangular with long tapered apices. Style rather deeply notched on outer margin just before apex so as to form a slender finger-like apex. The paired ventral processes of the aedeagus are long and slender, proximal, waved and each bears a small dorsal spur just beyond middle. The dorsal portion is broadly V-shaped, the anterior process being erect and the posterior process curving dorso-caudally.

In genitalic structure this species is closest to *nigrifrons* and may prove to be a variety form of that species.

Holotype male collected at El Mante, Tamps., MEXICO, October 2, 1930, by Dr. Dampf (M.F. 1775). Allotype female and female paratypes collected at Huetamo, Mich., August 22, 1933 by Dr. Dampf (M.F. 3101).

Omanana tortolita (Ball)

Menosoma tortolita Ball. Fla. Ent., 15: 6, 1931.

A pale brownish species with dark bands on vertex. Length 6.5-7 mm.

Vertex broadly roundedly produced, about twice as wide between eyes at base as median length.

Color: The marginal pale band, black face with pale arcs above and the transverse lines on the vertex are similar to the other species of the genus. The two brown lines on vertex are sometimes broken or widened either side of middle. Pronotum mottled with brown. Scutellum with white oblique dashes in the basal angles and one either side of middle on basal margin. Elytra pale brown with dark brown veins and some dark brown spots in apical and anteapical cells.

Genitalia: Female last ventral segment with lateral angles rounded to posterior margin which is triangular with a bluntly pointed apex. Male plates elongate, triangular, with blunt apices. Style rather broad at base tapered to near apex where it is abruptly narrowed to form a long slender apical process on inner margin. The paired ventral processes of aedeagus are rather complicated and are each composed of three processes. There is a flattened ventral process at about the middle, a long

slender process arising ventrally and extending caudally and a shorter slender caudally directed process arising dorsally. Dorsal portion short U-shaped; the posterior part is more slender with a pair of minute processes at apex.

Mexican specimens of the species are at hand collected at Iguala, Gro., October 25, 1941.

Omanana torquea new species

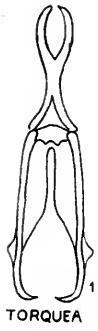
In general appearance resembling *tortolita* but with distinct genitalia. Length 6 mm.

Vertex broadly rounded, less than twice as wide between eyes at base as median length.

Color: Similar to *tortillata*. The marginal pale band on vertex is rather broad, with a broad black band just beneath it which is separated from the black face by a narrow pale band. Upper portion of face with pale arcs. Vertex pale anteriorly with a narrow waved marginal dark band and a posterior dark line jointed with the waved line at the eyes. Posterior portion of vertex darker. Pronotum mottled. Scutellum pale brown with white and dark brown markings in basal angles and along basal margin. Elytra pale, subhyaline, veins brown with brown spots on claval, discal, costal and apical cells.

Genitalia: Female last ventral segment with lateral angles rounded to posterior margin which slopes to a central rather broad blunt produced apical tooth. Male plates elongate, triangular, with slender produced pointed apices. Style broad at base, narrowed to near apex where it is excavated on outer margin to form a slender produced apex on inner margin. The paired ventral processes of aedeagus in lateral view are rather broad at base, produced ventrally near middle, then tapered to narrow blunt apices. These are also curled or twisted at about the middle. The dorsal process is short and U-shaped in lateral view with a pair of small processes on posterior portion.

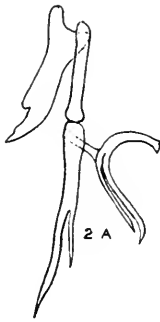
Holotype male and male paratypes collected at Iguala, Gro., MEXICO, September 11, 1939, and October 25, 1941; allotype female and male paratype collected at Mexcala, Gro., October 22, 1941, by E. E. Good, C. C. Plummer, and the author.



1
TORQUEA



1 A



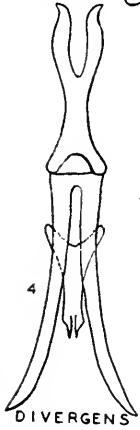
2 A



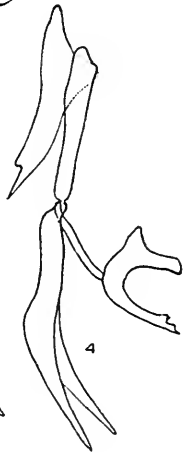
3 A



3
BIFURCATA



4
DIVERGENS



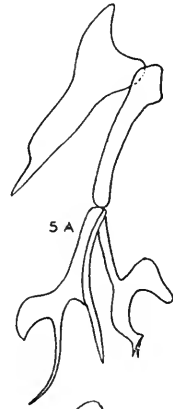
4



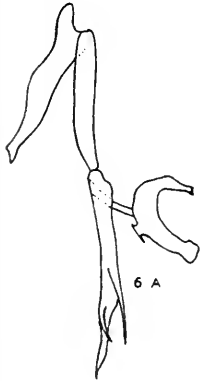
2
MEDIANA



5
TORTOLITA



5 A



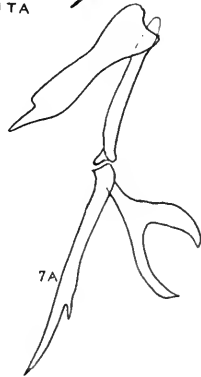
6 A



6
DUODENS



7
ARCATA



7 A

- Fig. 1. Ventral view of aedeagus of *O. torquea*;
1a. Lateral view of aedeagus and style;
Fig. 2. Ventral view of aedeagus of *O. mediana*;
2a. Lateral view of aedeagus and style;
Fig. 3. Ventral view of aedeagus of *O. bifurcata*;
3a. Lateral view of aedeagus and style;
Fig. 4. Ventral view of aedeagus of *O. divergens*;
4a. Lateral view of aedeagus and style;
Fig. 5. Ventral view of aedeagus of *O. tortillata*;
5a. Lateral view of aedeagus and style;
Fig. 6. Ventral view of aedeagus of *O. duodens*;
6a. Lateral view of aedeagus and style;
Fig. 7. Ventral view of aedeagus of *O. arcata*;
7a. Lateral view of aedeagus and style.

OBITUARY

Mr. August Busck died on March 7th at the age of 73 years. Mr. Busck was born in Denmark, and graduated from the Royal University of Copenhagen in 1893. He came to this country shortly thereafter and was associated with the Bureau of Entomology from 1896 until his retirement three years ago. He had charge of the Microlepidoptera at the U. S. National Museum for many years and was justly famous for his many papers on these moths.

On the Significance of Localized Coloration in the Creosote Bush Locust (*Boottettix*) (Orthoptera; Acrididae; Acridinae)

By JAMES A. G. REHN, Academy of Natural Sciences
of Philadelphia

The acrolophitine truxalid locust genus *Boottettix* is in many respects one of the most interesting of these insects found in the southwestern United States. It is most unusual in possessing mother-of-pearl markings on the pronotum, pleura and limbs, something rarely encountered in the Orthoptera.

Both of the known species of the genus are completely restricted in their habitat to the creosote bush, or so-called "greasewood" of the Southwest (*Larrea tridentata* or *Covillea tridentata* of many authors), with their combined distribution about equal to that of the host plant within the borders of the United States. This may be summarized roughly as extending from the vicinity of Laredo, Texas, west to the San Geronio Pass in southern California, north to the Tonto Escarpment in Arizona and the lower Virgin River Valley in Utah.¹

The creosote bush is one of the most conspicuous floral elements of great areas of the Lower Sonoran Life Zone, and under a broad diversity of conditions it is by all odds the dominant shrub over thousands of square miles of territory.² Its evergreen resinous foliage is of a dark olive-green shade, often supplying the general tone of a whole landscape as seen from some little distance, and its detached silvery white wooly seed capsules are an important element in the wind-drifted flotsam and jetsam of the desert floor.³ In Spring the small yellow

¹ The distribution of the host plant in parts of California, Nevada, Utah and Arizona is graphically shown in Map 4 in the report on the Death Valley Expedition (North American Fauna no. 7), published in 1893. Its Texan distribution was mapped by Vernon Bailey in his "Biological Survey of Texas" (North American Fauna no. 25), page 25, figure 2, published in 1905. In Arizona its range is essentially that mapped as "Creosote bush—salt bush" by A. A. Nichol in "The Natural Vegetation of Arizona" (Technical Bulletin no. 68, College of Agriculture, University of Arizona), published in 1937.

² An excellent illustration of *Larrea* in its natural habitat is given by Vernon Bailey in his "Life Zones and Crop Zones of New Mexico" (North American Fauna no. 35), plate II, figure 2, published in 1913. Spaulding (Botanical Gazette, XXXVIII, p. 124 (1904)), says of this shrub: "It occupies extended areas where its removal would leave a bare waste, but at the same time shares, on mesa and foothills, a great variety of soils and exposure with other species that exhibit far less capacity of accommodation than itself."

³ Protective resemblance is exceptionally illustrated in the similarity of the wingless females of certain mutillid wasps, of the genus *Dasy-mutilla*, found in creosote bush areas, to these capsules. It is sometimes difficult to be certain quickly whether one sees a wind-wafted seed pod or a mutillid wasp moving erratically over the adobe or stony ground surface.

flowers of the creosote bush are a conspicuous, if minor, feature of its native desert landscape.

A number of other species of Orthoptera find *Larrea* a congenial home, but *Bootettix* is, as far as known, one of the few which are strictly limited to that one shrub. The species of *Bootettix* inhabiting roughly the area which Mearns has called the "Eastern Desert Tract"⁴ is *B. argentatus* Bruner, while that of the "Western Desert Tract" of Mearns is *B. punctatus* (Scudder). The differences between *argentatus* of the Chihuahua or Eastern Desert area, and *punctatus* of the Colorado-Yuman or Western Desert section, were first pointed out in detail by Rehn and Hebard in 1909.⁵ These authors in three separate studies published in 1908 and 1909 first called attention to the invariable association of species of the genus with the creosote bush. Experience of one or both of these observers since that time, at many additional localities where the species occur, has definitely supported their previous remarks regarding this constant association of *Bootettix* with *Larrea*. The number of localities where their observations have been made now totals between one hundred and one hundred and fifty, and in areal extent these localities cover virtually the entire range of the genus in the United States. In northern Mexico the more eastern *B. argentatus* is known to extend over the Mexican tableland at least as far to the southward as northern San Luis Potosi and eastern Durango, while the western *B. punctatus* most certainly occurs over a very considerable section of northern Sonora where *Larrea* is a dominant feature of the vegetation, as in adjacent southern Arizona.

Males of both species of *Bootettix* stridulate quite distinctly, and thus announce their presence when not alarmed. Both sexes are excellent jumpers, and are usually captured by beating the foliage, as ocular recognition of their form is not easy, due to their usually rich olive-green base color blending so completely with that of the foliage of the creosote bush. The

⁴ "Mammals of the Mexican Boundary" (Bull. U. S. Nat. Mus., no. 56, pt. 1, pl. II (1907)).

⁵ Proc. Acad. Nat. Sci. Phila., 1909, p. 423.

mother-of-pearl markings produce an obliterative or disruptive effect, by camouflaging the general outline, and in certain lights these patches simulate the silvery sheen of the seed capsules.

On October 2, 1910, when in the field at Sentinel, Maricopa County, Arizona, with my long-time colleague Mr. Morgan Hebard, we had an experience with *Boottettix punctatus* which seems worthy of record. The entire vicinity of Sentinel is a sandy desert plain over which are scattered many thousands of varying sized fragments of old weathered lava. The whole environment when we visited it was, and doubtless usually is, one of excessive aridity. The creosote bush, the chief feature of the very scanty plant cover, was exceptionally stunted, very dry and its abnormally sparse foliage was brown green in color, being in fact the most pathetic examples of this exceptionally sturdy shrub which I have ever seen. At the small railroad station of Sentinel, on the Southern Pacific Railroad, are several deep wells which are pumped to supply locomotives with necessary water for the run over this portion of the extremely arid Gila Desert.

In 1910 the water from these wells was stored in several large timber water tanks along the right-of-way, and of the character usual for this purpose. Overflow from these tanks, drips or leaks, had at various times permitted a trickle of water to run off a hundred yards or so, until the thirsty desert had absorbed it all. Within this very limited area—a belt but a few yards wide and not over a hundred long—the creosote bush was very much more luxuriant than in the encircling lava plain, and in addition its foliage was of the rich olive-green coloration usual in the species. In size these bushes were virtually small trees, when contrasted with the low shrubs of the same species in the burned-up surroundings.

In a study of the relation of the creosote bush to water supply published forty years ago by Spaulding,⁶ there is presented some most interesting evidence which shows that while the creosote

⁶ "Biological Relations of Certain Desert Shrubs. I. The Creosote Bush (*Covillea tridentata*) in its Relation to Water Supply." *Botanical Gazette*, XXXVIII, pp. 122-138 (1904).

bush is exceedingly adaptable, and can exist in a great variety of desert conditions, it responds markedly to favorable water conditions, that its leaves "become deep green and undergo a marked increase in size, while the whole plant presents the appearance of robust health and remarkable vigor, very different from the pinched specimens with narrow, pale leaves, branches more or less defoliated, and other marks of a struggle that, however successful, is manifestly one of great severity." The far greater development of the fine roots in individuals of this plant in better watered environments is also most graphically set forth by Spaulding.

The word picture given above presents exactly what was found by us at Sentinel. Spaulding sums up his general conclusions regarding the plant as follows: "the creosote bush, living over much of the territory where it is now found from the period of maximum precipitation ⁷ to the present time, has acquired habits that enable it to withstand excessive drouth, but has never lost its capacity to absorb and use large quantities of water, and attain its best development under such conditions."

The crux of the observation which I wish to present, and which is attested by material then collected and now in the Philadelphia collections, is that the *Boottettix punctatus* found in the stunted, burned-up *Larrea* on the lava plain at Sentinel were much more definitely brownish green than any encountered by us previously or since, while those from the *Larrea* which had benefited by the water seepage and had retained the plant's normal coloration, were correspondingly colored, and were as the norm of the species at the very great majority of the localities at which it has been collected.

Everything points to but a single annual brood of *Boottettix*. I have been advised (in litt.) by the Superintendent of the Southern Pacific Company at Tucson, Arizona, that the first well at Sentinel was drilled in 1897 and the second in 1904. Prior to the former date there was absolutely no surface water

⁷ This comment refers to conditions in a period preceding the present.

at Sentinel or for nearly a dozen miles to the north, where occasionally the usually dry bed of the lower Gila River carries some flood water. The normal precipitation in the Sentinel area is exceedingly low, with occasional years virtually rainless.

It would thus seem that the rich coloration of the *Bootettix* from the well-watered creosote bush at Sentinel is correlated with the relatively optimum condition of the host plants. Its explanation may thus be a physiological one, due to the character of the food supplied by the *Larrea* in which they lived. If we are to assume that selection alone was responsible we must be willing to grant that the process could be made sufficiently complete within thirteen years at the most (i.e. the time period between 1897 and 1910) to give the observed and evidenced results, or in other words that in not more than the same number of consecutive broods all brownish individuals, such as occurred virtually without exception in the surrounding areas, were completely eliminated from the restricted area by selective processes.⁸

The field work in which these observations were made was done well over thirty years ago, but they are supported by field notes made at the time, and do not depend solely on the collected material or one's recollections. Since that time *Bootettix* has been collected by me at many localities in Texas, New Mexico, Arizona, Utah, Nevada and California, but in no case has the same striking difference at a single locality been observed, although at a few localities in extremely arid districts the green base color has been found much suppressed and a brownish tone more dominant, but usually combined with a blackish tendency to the darker pencillings. At no other single locality, however, have I found either plant or locust conditions fully comparable to those at Sentinel.

⁸ The summary of information on the reduced variability of small populations and its relation to accidental gene loss, recently presented by Mayr ("Systematics and the Origin of Species," pp. 234-237) has been read, but I feel the *Bootettix* case is not comparable to the illustrations there presented. We are not dealing with a peripheral case or a new population, but a condition developed in a very short time in the midst of the distribution of the species.

The ground dwelling locusts furnish many illustrations of similarity of their coloration to that of their environment, and in most of these a food plant cannot be brought into the picture, as the insects' normal repose is on a bare sandy, stony or even rocky surface, which areally may differ greatly, with little, if any, plant cover, yet most remarkable cases of obliterative coloration will be found in these locusts. Are these due solely to selection, even when the color of their environment, and of themselves, is the charcoal black of a "burn" but a few years old? With most species having but a single annual brood it is difficult to believe that selection alone is responsible for what we frequently find, yet by the very nature of these ground-dwelling locusts we cannot look for an explanation in their food supply, as we can with a thamnophilous form such as *Boottettix*. Pattern usually less than tone furnishes the protection which those species receive from their normal habitat background. Pattern is very probably genetic—we know it is in a number of locust genera—and thus selection could work satisfactorily over a considerable period of time. It sometimes happens, however, that the habitat background pattern is by no means old, and occasionally has been created very recently by man or a cataclysm or fluctuation of nature, such as a landslide or the exposure of generally covered river or lake beds.

In a field experience of over forty years there have been accumulated numerous illustrations of the type set forth in the preceding paragraph, in nearly all cases supported by collected material, and generally by field notes. These cases were encountered as incidental to broad Orthoptera faunistic field studies, and without the motivation of any special theory for which evidence was being accumulated. The great difficulty in interpreting certain natural phenomena of this type is that far too many students are seeking for a single explanation for a broad range of observed results. Similarly I feel we often are depending too much on the breeding cage in a laboratory and too little on nature's own outdoor laboratory, the sum total of conditions in which are exceedingly difficult, if not impossible, to reproduce indoors.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyroctomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

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- 1113.—Mosquito Atlas. II. Eighteen Old World anophelines important to malaria. 44 pp., ill., 194360
- 1112.—**Russell, Rozeboom & Stone**—Keys to the anopheline mosquitoes of the World, with notes on their identification, distribution, biology, and relation to malaria. 152 pp., figs., 1943 2.00

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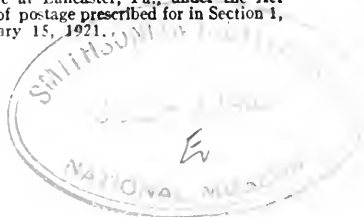
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Co-operative Measures for Locust Control

By A. D. IMMS, F.R.S.

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Depredations by locusts have, in all probability, been a menace to the food supply of man ever since he adopted some form of agriculture. References to these insects are to be found in the writings of Pliny, in Chinese, Egyptian and Greek texts, and there are also the familiar Biblical allusions. The earliest discovered record of locusts is said to be a representation of one of these insects on the wall of an Egyptian tomb of about the date 2400 B.C.

Two main phenomena have, almost from time immemorial, obstructed the devising of sound methods for the control of locusts. One is the prevalence of outbreaks at more or less irregular and usually unpredictable intervals. The other is the frequent occurrence of outbreaks in one country, and their spread causing depredations in other and often far distant lands.

Lack of fundamental knowledge of the origins and causes of the outbreaks has been the reason for the repeated frustration of human efforts to cope with them.

It was not until 1921 that some light began to be shed on these problems. In that year B. P. Uvarov, of the (then) Imperial Bureau of Entomology in London, advanced what has now become well known as the phase-theory of locusts. Its starting point is that a locust can exist in three biological phases: a solitary one (*phasis solitaria*), a transitional one

(phasis transiens), and a gregarious or migratory phase (phasis gregaria).

The periodicity of locust outbreaks is connected with the transformation of these insects from the harmless solitary phase into the destructive migratory one. Subsequent experimental observations made by J. C. Faure in South Africa in 1929-31 and in Minnesota, U. S. A., in 1933, and by others elsewhere, have now so fully corroborated the main contentions of Uvarov's phase-theory that it is accepted to-day as an established biological phenomenon.

By varying the conditions, locusts can be reared experimentally from the eggs to develop into whichever of the phases is desired. If a large batch of the hoppers be reared under crowded conditions in a single cage, they then become extremely active and develop into a close approximation to the gregarious phase. Under less crowded conditions they develop into the transitional phase, while individuals reared in separate containers grow into the solitary phase.

The great activity and consequent high metabolism of the gregarious individuals lead to differences separating them from those in the relatively inactive solitary phase.

It is now known that the transformation from the solitary into the gregarious, or migratory, phase occurs in nature in certain localized areas known as *outbreak areas*, which have special conditions of climate and vegetation for each locust species. It is here that the great swarms develop. Thus, swarms of the African Migratory Locust (*Locusta migratoria migratorioides*) identified as having originated in a restricted area of the Middle Niger in the French Sudan in 1928, have been shown to be the cause of an invasion involving a great part of Africa. Some of the outbreak areas of the Desert Locust (*Schistocerca gregaria*) have been discovered among the barren scrub lands bordering the Red Sea. Swarms of the Moroccan Locust (*Dociostaurus maroccanus*) have been shown to develop on stony hillsides clothed with scanty vegetation.

Knowledge of South American Locusts is incomplete. The most important species is *Schistocerca paranensis*, not known

for certain in its solitary phase. It is possible that the North American *S. americana* is, in fact, not a separate species, but the hitherto unrecognized solitary phase of *S. paranensis* has apparently yet to be discovered.

In North America, the once dreaded Rocky Mountain Locust (*Melanoplus spretus*) is no longer evident. Various causes have been examined to account for its disappearance. The experiments of Faure, made in 1933, point to its being the now extinct gregarious phase of the very abundant *M. mexicanus* (*atlantis*), but further experiments and observations are needed.

The widespread migrations of locusts make it futile for each country affected to attempt its own isolated control measures. At the most, such measures are only temporary palliatives. Much of the failure to repress these plagues is now recognized to be the result of "isolationist policy."

A severe outbreak of the Desert Locust was the moving factor in the British Government taking steps towards solving the problem by setting up a special research organization. This British venture led to the holding of an International Locust Conference in Rome in 1930, which requested the British organization to serve as the international centre for co-ordinating locust research and the collecting of information. Other conferences followed, the fifth being held in Brussels in 1938.

World War II then intervened, and these meetings are now in abeyance, but locust investigations are being continued. Headquarters and initiatory organization is the Anti-locust Research Centre in London, which operates under the direction of Sir Guy Marshall, with Dr. B. P. Uvarov as technical head. The arranging of campaigns against locusts, and the establishment of efficient locust information services, are largely in the hands of the British Colonial Office, which works through a special committee for the purpose.

The whole organization is too complex to be detailed in a brief article, but it may be said that it requires close co-operation between many Governments and departments in order to ensure harmony and progress.

At the present time, despite the war, extensive work is going on in regard to the Desert Locust. The swarms of this insect, if unchecked, would be deleterious to the Allied war effort, owing to the destruction of food and fodder crops. These would need to be made good by imports, with consequent extra demand upon shipping.

The Middle East, India and East Africa, are menaced by the probability of outbreaks of the Desert Locust during the next two years or longer. Co-operative action by Belgian, British, Egyptian, French, Indian and South African entomologists and other workers has led to the collection of a great deal of invaluable field data. Under great difficulties, the outbreak centres of this locust are being located and kept under observation—often in very remote and inhospitable lands.

Aircraft have proved an invaluable aid in this work, enabling watch to be kept where outbreak centres have been located and any tendency to migration noted. At the same time, lands likely to be affected are warned to be ready to adopt necessary measures. The ultimate aim of all this work is that the developing swarms may be destroyed in their outbreak centres or, better still, the ecological conditions therein altered by cultivation or other measures so that they are no longer suitable for generating these swarms.

In the meantime, forewarning of the arrivals of expected migrant swarms is enabling a number of menaced lands to prepare their control procedure well in advance so that, when the locusts do arrive, poison baits and other measures are available.

Twelve years of co-operative research, carried out under the direction of the Anti-locust Research Centre, have revealed much data on the migrations of the Desert Locust. Swarms usually arrive during the summer monsoon rains in India and, in autumn, they migrate to Persia and Arabia. The latter country also becomes invaded by other swarms of the same locust which have originated in Africa. From Persia and Arabia, swarms reach the margins of Soviet Asia, Iraq, Transjordan, Palestine, Syria and Egypt. Later in the season there is further dispersal to East Africa and back to India for breeding during the next monsoon rains.

Once the complexity and range of such migrations become known, co-operation of the various countries concerned becomes essential. A further indication of the progress made through co-operative research is the fact that in the present outbreak of the Desert Locust, no country has been invaded which had not previously received due warning from the Anti-locust Research Centre.

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Notes on *Hadronotus parkeri* Fouts (Hymenoptera: Scelionidae)

By E. E. KENAGA, Biochemical Research Laboratory,
The Dow Chemical Company, Midland, Michigan

Hadronotus parkeri was first described as a heteropterous egg parasite by R. M. Fouts in 1920.¹ No specific identification of the parasitized eggs was made at that time.

While rearing a culture of the small milkweed bug, *Lygaeus kalmii* Stål, in our laboratory in August, 1942, a number of parasitized eggs were noted and placed in a closed petri dish for observation. The parasites hatching from these eggs were identified as *Hadronotus parkeri* Fouts through C. F. I. Muesebeck, in charge of the Division of Insect Identification, U. S. D. A., Bureau of Entomology and Plant Quarantine, Washington, D. C.

After *H. parkeri* hatched from the eggs of *L. kalmii*, the adults were placed with eggs of the large milkweed bug, *Oncopeltus fasciatus* Dall. These also hatched and were transferred back to *L. kalmii* for a generation and then to the Mexican bean beetle, *Epilachna varivestis* Muls. No Mexican bean

¹ Fouts, R. M. (1920) Some new parasites, with remarks on the genus *Platygaster* (Hymenoptera). Proc. Ent. Soc. Wash., 22 (4): 61-72.

beetle eggs were parasitized. All of the eggs of *L. kalmii* and *O. fasciatus* in these experiments were parasitized, indicating a possible reason for the scarcity of milkweed bugs in this area in 1942.

The life cycle of *H. parkeri* takes a period of 14-16 days in the eggs of milkweed bugs at temperatures ranging from 65°-90° F.

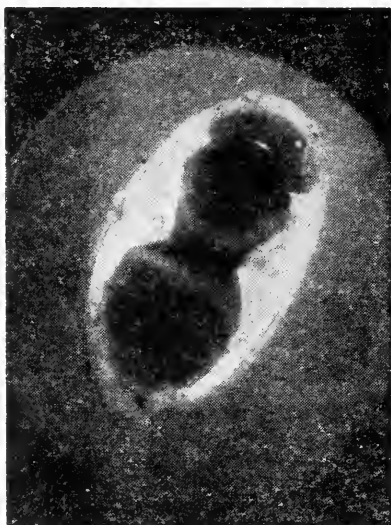


FIG. 1.

An interesting photograph taken of a parasitized egg of *L. kalmii* shows *H. parkeri* about one day before emergence as an adult. Details of the abdomen, ocelli and parts of the legs, antennae, etc., may be seen through the semi-transparent shell of the parasitized egg. See fig. 1.

Notes on *Oecleus* Stal (Homoptera: Ciciidae)

By JOHN S. CALDWELL, Circleville, Ohio

The species listed by Fowler¹ are roughly divided into two groups; those with three carinae on the mesonotum and those

¹ Biologia Centrali-Americana Homoptera, 1: 88-92, 1904.

with five. In practically all cases the intermediate carinae are very weak, the appearance of five prominent carinae being due to color contrast rather than base relief. As stated by other workers *tenellus* Fowler belong in the genus *Oecleidius*. All types are in the author's collection unless stated to the contrary in the script.

Oecleus seminigra Stal

This is one of the few species easily differentiated by color and marking. The dark brown body and basal half of the elytra are distinct. The medio-ventral process of the male pygofer is elongate-ovate and as long as the styles. One male, Veracruz, Mexico (Dampf).

Oecleus pellucens Fowler (figs. 1 & 1a)

Variable in size and marking but with constant male genitalia. Length over all 4-7 mm. Costal nerve broadened at base. The fuscous band referred to by Fowler may be either entirely absent or present in varying degrees of intensity and width. Sometimes this band is enlarged to include the entire apex of the elytra and in some examples the claval area is dark fuscous. It is probable that *centronus* Ball & Klgb.² belongs to this species. Specimens present from Chiapas, Guerrero, Jalisco, Michoacan, Oaxaca, Puebla, Quintana Roo, San Luis Potosi, Veracruz, and the Federal District in Mexico, and from El Salvador and Guatemala.

Oecleus dubius new species (figs. 2 & 2a)

Length 6-7 mm. Orange over all with black frons; mesonotum sometimes with central tablets darkened. Veins of elytra evenly and strongly punctate with black.

Vertex narrow, slightly produced more than in *pellucens*. Frons narrowed between the eyes; median carina prominent. Profile angular. Base of costa broadened; punctations on this surface few and not prominent.

Medio-ventral process of male pygofer more elongate than in *pellucens*; aedeagus with different spur arrangement and number.

Male *holotype*, female *allotype*, and *paratypes* from Gualan,

² Annals Ent. Soc. Amer., 27: 193-213, 1935.

GUATEMALA, January and February, 1905, are in the H. Osborn collection at Columbus, Ohio. This species is very close to *pellucens* Fowler and may prove to be only a variety.

Oecleus decens Stal (figs. 13 & 13a)

For all practical purposes this species is today an unknown element in our fauna. It is my belief that *decens* Fowler is not *snowi* Ball as found in Arizona although the two species are similar. I am not sure that I have interpreted the description of the male genitalia as given by Fowler; however the chrotic characters compare well with the figure in the Biologia (Pl. 10, fig. 6). Specimens from Jalisco and Morelos in Mexico (Dampf).

Oecleus apicatus new species

Length 5.5 mm. Frons dark with light median carina; clypeus testaceous. Pronotum whitish with smoky spots; mesonotum smoky with yellowish carinae. Elytra evenly browned with exception of a clear apical area. Punctations on veins scattered, black. Profile somewhat rounding. Vertex produced its apical width before the eyes; widened in apical fourth. Base of costa broadened; thickening of costa at stigmal spot long, narrow.

Female holotype from Tamazunchale, San Luis Potosi, MEXICO, 8-29-39 (DeLong).

Oecleus parallelus new species (figs. 3 & 3a)

Length 6.2 mm. Black with light carinae on face and pronotum. Mesonotum with orange carinae and large orange dash in either lateral compartment. Elytra somewhat yellowish, especially in claval area.

Vertex narrow, produced; lateral margins parallel for full length. Frons narrowed between the eyes. Profile right-angled. Elytra broad; base of costa broadened. Punctations on veins not prominent. Medio-ventral process of male pygo-fers broadly quadrate basad, greatly produced apically.

Male holotype from Tehuacan, Puebla, MEXICO, 10-17-41 (DeLong, Good, Caldwell, and Plummer).

(To be continued)

A New *Scelolyperus* and a Key to the American Species North of Mexico (Coleoptera: Chrysomelidae)

By BURDETTE E. WHITE, Merced, California

The genus *Scelolyperus* Crotch appears to have received very little attention since Dr. Horn presented his description of *cyanellus* in 1895. The new species presented herein thus bridges a gap of 50 years of systematic inactivity for this genus; and, although Horn's excellent key and review of the genus leave little to be desired, a brief modification of the half-century-old tables to include his *cyanellus* and the new form seems worthwhile.

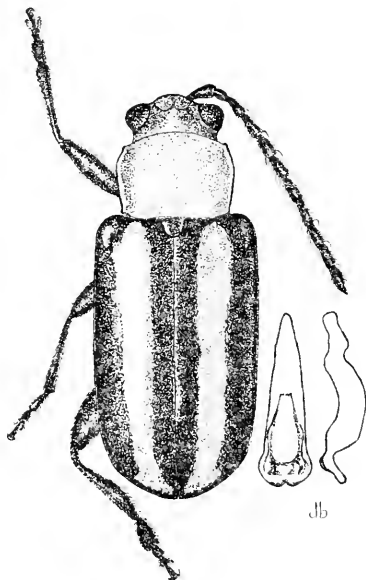
Key to the Species of *Scelolyperus* (Modified from Horn)

1. Elytra unicolorous2
 Elytra vittate (each elytron with a broad, median, flavous
 vitta and the margins piceous)*blakcae*, n. sp.
2. Pronotum entirely yellow3
 Pronotum either maculate or blue, varying to black6
3. Head and femora yellow*flaviceps* Horn
 Head metallic green4
4. Posterior tibiae of male straight and not toothed; elytra
 finely, sparsely punctate, smoother at apex
 *flavicollis* Lec.
 Posterior tibiae of male arcuate5
5. Elytra coarsely, sparsely punctate; posterior tibiae of male
 stout and toothed at base*tejonicus* Crotch
 Elytra sparsely punctate and alutaceous; posterior tibiae of
 male strongly curved, not toothed*loripes* Horn
6. Pronotum yellowish, with a median and lateral spot piceous
 *maculicollis* Lec.
 Pronotum uniformly blue, greenish, or black7
7. Elytra evidently punctate8
 Elytra alutaceous, not punctate11
8. Pronotum polished, impunctate, black9
 Pronotum sparsely punctate, green, blue, or bronze10

9. Size relatively small, 3-4 mm. *cyanellus* Horn
 Size relatively large, 6-7 mm. *maculicollis* (variety)
10. Posterior tibiae of male straight; antennae and legs black
graptoderoides Crotch
 Posterior tibiae of male curved; antennae at base, anterior
 femora, and tibiae in great part yellow . . . *schwarzi* Horn
11. Antennae filiform, last segment scarcely longer than the
 preceding *longulus* Lec.
 Antennae broader externally, the outer segments flattened
 and slightly concave beneath in male, last segment notably
 longer than the preceding *decipiens* Horn

Scelolyperus blakeae new species

Upper surface strongly shining, pronotum flavous to fulvous, elytra piceous and each with a broad, median flavous vitta.



Head polished, not punctate, pale, darker above each eye and on the epicranium, frontal tubercles prominent, interocular space nearly twice the vertical width of the eye; clypeus and labrum

with a few moderately long, pale setae; antennae reaching past middle of elytra, fuscous, basal segments less dark. Pronotum only slightly convex, two-thirds as long as wide, widest at apical third, surface polished, very finely, sparsely punctate, color flavous to rufous. Scutellum dark. Elytra a little more than one and one-third times as wide as pronotum, humeri prominent; surface polished, very finely punctate (apparently impunctate); color piceous with a broad, median, flavous vitta extending from base to apex; the piceous areas with a greenish reflection in strong light; the flavous areas with a micro-granular appearance due to a fine but strong subcuticular, alutaceous structure; a few fine setae along the lateral and apical margins. Body beneath polished, pale, darker on episternal sclerites, sparsely covered with pale pubescence, more densely so at sides; legs fuscous, lighter at base; tibiae of male slightly arcuate and without spurs, female with tibial spurs; basal segment of hind tarsus of male greatly delated, concave beneath, almost as long as the other tarsal segments together. Length, 3-4.5 mm.

Holotype, male, collected by author from a very thorny species of Rhamnaceae (*Condalia spathulata* A. Gray, determined by S. F. Blake, U. S. D. A.) at Big Bend State Park, Chisos Mts., Brewster County, TEXAS, July 12 to 16, 1941; and *allotype*, female, with same data, are deposited in the author's collection. Male plesiotype and 78 paratypes (39 of each sex) with same data are deposited as follows: Two pairs in the U. S. National Museum through Mrs. Doris H. Blake, one pair each in the collections of Dr. W. J. Brown, Prof. J. N. Knull, Mr. C. A. Frost, Mr. C. D. Orchard, Mr. Borys Malkin, Capt. John J. duBois, The Academy of Sciences at San Francisco, The American Museum of Natural History through Dr. Mont Cazier, The British Museum, and Lt. William Barr. The remaining specimens are in the author's collection.

In addition to the above designated paratypes, several topotypical specimens are in the collections of Captain duBois and Lt. Barr, who were present at the time of the original collection. Since these men are now in the armed services, their materials are not available for study and, unfortunately, cannot be included in the type series.

It is quite unnecessary to compare *blakcae* with any of our other *Scelolyperus* for its vittate elytra will immediately separate it from all others. However, it might easily be confused with the vittate *Luperodes* with which it bears strong superficial resemblances. From the latter, it will be readily separated by its greatly dilated basal tarsal segment on the posterior leg of the male (see figure).

The sexes are dimorphic as usual in *Scelolyperus*. But, in addition to the usual differences between the sexes, such as the elytra more explanate in the female, tibiae slightly arcuate in the male, antennae more elongate and filiform in male, and the different apical structure of the last ventral abdominal segment, there is apparently a color relationship. The females have a distinctly wider flavous vitta than the males. As a result of this feature, the females present quite a different facies to that of the male; and, in the extreme, they may have the dark margins almost absent. The male typically possesses flavous vittae equal in width to the piceous margins.

At the time of discovery there were actually millions of the beetles available. A single blow on the host plant would completely cover the beating sheet and fill the air about the plant. From this it might seem unfortunate that such a limited number of specimens was obtained; however, unless this species proves the exception to the general experiences the writer has known with this type of beetle, it will be abundantly available for future collectors at its type locality.

The new species is named after Mrs. Doris H. Blake in recognition of her excellent work on the Chrysomelidae and her assistance with this particular problem. Mrs. Blake also prepared the accompanying drawing. In addition to Mrs. Blake's able assistance the writer received valuable aid from the other half of the Blake family—Mr. S. F. Blake, and from Dr. E. Gorton Linsley whose esteemed advice in this little problem as well as on many past occasions has been truly appreciated.

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Annotations and Keys for the Dermaptera of Missouri

By RICHARD C. FROESCHNER, St. Louis, Missouri

In Missouri the Dermaptera, like most other orders, has been neglected taxonomically. As yet, our card catalogue of Missouri insects contains no literature records of earwigs. A survey of the distribution of the members of this order indicates that three species should occur here. Our cabinet records include all of them.

KEYS TO MISSOURI FAMILIES, GENERA AND SPECIES OF DERMAPTERA

- 1. Tarsal segment II cylindrical.....Labiidae
- Tarsal segment II bilobed.....Forficulidae

Labiidae

- 1. Head with postocular space shorter than length of an eye; antennal segment VI much shorter than I; length more than 8 mm.....I. *Vostox*
- Head with postocular space as long as or longer than the length of an eye; antennal segment VI but slightly shorter than I; length less than 7 mm.....II. *Labia*

I. *Vostox* Burr

- 1. Head, pronotum and tegmina almost black, shining; exposed portion of wings yellow, with inner and apical margins black; abdomen, forceps and under surface chestnut-brown; forceps stout, incurved at apex; length of body 8.5-9.5 mm.....1. *brunnipennis* (Serv.)

II. *Labia* Leach

- 1. Tegmina twice as long as pronotum, the latter subquadrate, narrower than head; legs uniformly yellow-brown; length of body 3-4 mm.....2. *minor* (Linn.)

Forficulidae

1. Antennae 12-segmented, with segment IV twice as long as broad and subequal to III.....III. *Doru*

III. *Doru* Burr

1. Chestnut-brown with palpi, legs, edges of pronotum and outer two-thirds of tegmina yellow. Pronotum longer than broad, narrower than head and about half the length of tegmina; length of body 8-11 mm. 3. *aculeatum* (Scud.)

ANNOTATED LIST OF SPECIES

1. *Vostox brunneipennis* (Serv.). [Fig. 1.] Usually considered rare, this species is apparently common when found. The two times we have collected it in Missouri



FIG. 1.

we found it in great numbers under loose bark. Adults and nymphs were taken from a tree in a moist ravine near Lampe (Stone Co.) on September 25. At Qulin (Butler Co.), on February 22, adults were taken from a log that was partially submerged in a swamp.

2. *Labia minor* (Linn.). This species, which was originally introduced from Europe, seems to be the commonest member of the order in the state. It is to be found under boards, rocks and logs on the ground and at night is frequently taken at lights. Although our records extend from April

4 to October 3, adults will probably be found to occur the year around. Boone, Butler, Cape Girardeau (C. W. Wingo), Dunklin, Iron, Jefferson (E. P. Meiners), and St. Louis counties.

3. *Doru aculeatum* (Scudd.). A single specimen was found on a porch in St. Louis on March 4. One other from St. Louis is in the collection of Dr. E. P. Meiners. He took it on April 11 from a head of cabbage which was purchased at a local market. It will probably be found throughout most of the state as it has been recorded as occurring north to Michigan and west to Nebraska.

A Bibliography of Keys to Immature Mosquitoes (Diptera: Culicidae)

By W. M. P. HAYES

(Continued from page 145)

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Notes and News in Entomology

Under this heading we present from time to time short reviews, notes, news, and comments on entomology throughout the world. Contributions from readers are solicited and will be acknowledged when used.

Since the relatively recent electron microscope study of the architecture of iridescent butterfly scales was published in a non-biological journal¹ I am taking the liberty of abstracting a part of that paper here. It has long been recognized that insects possess both pigment colors and structural colors, and, further, that the brilliant iridescent colors are due to minute structural elements similar to the lines of a grating or the lamellae of a soap bubble which produce colors by interference effects. By detailed inspection of the light scattering, Süffert² and Mason³ were able to infer what types of structures must be present to give rise to the effects observed, although these details were too small to be seen with the light microscope. With the greater resolving power of the electron microscope it is possible to observe these structures directly, and a fairly detailed analysis has been presented for one case—the wing scales of the brilliant blue butterfly, *Morpho cypris*.⁴

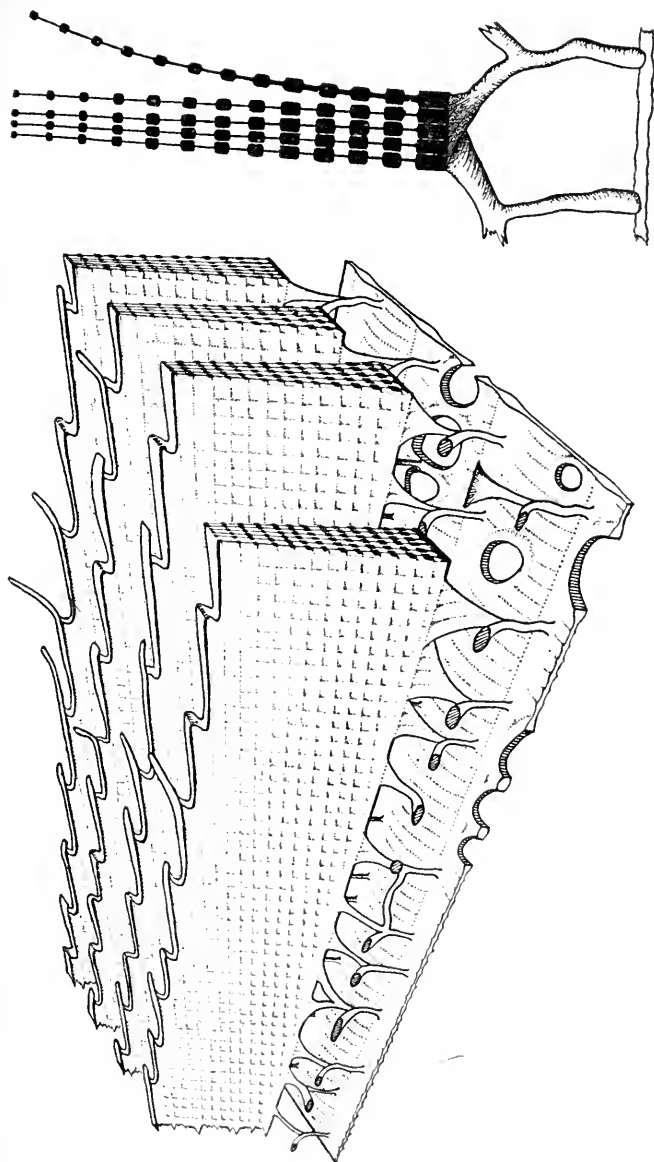
The accompanying figure shows a schematic and somewhat idealized fragment of such a scale as reconstructed from numerous stereoscopic electron micrographs. On the left is a

¹ T. F. Anderson and A. G. Richards, Jr. An electron microscope study of some structural colors of insects. *Jour. Applied Physics*, 13: 748-758. Dec. 1942. See this for halftone figures and detailed technical analysis.

² *Zts. Morph. u. Ökol. Tiere*, 1: 171-308. 7 pls. 1924.

³ *Jour. Physical Chem.*, 27: 201-248, 401-447, 1923; 30: 383-395, 1926; 31: 321-354, 1856-1872, 1927; *Entomological News*, 40: 52-56, 1929.

⁴ The indirect optical studies of Süffert and Mason show that this "Morpho-type" of physical coloration does not hold for the physical colors of all types of butterfly scales. The same general structural elements are to be found in the wing scales of mosquitoes. A poor reproduction of part of a mosquito scale has been published but it was at the time unfortunately misidentified as a piece of egg shell (Anderson and Richards, *Scientific Monthly*, 40: 187-192, fig. 6. 1942).



A schematic and idealized reconstruction of a small portion of an iridescent scale. On the right is a drawing of a cross section of one rib with its vanes and supports; one vane is drawn through a vertical mullion.
 (From Anderson and Richards, in Jour. Applied Physics)

three-dimensional rendering showing the ribbed and perforated lower membrane from which rows of minute pillars rise and branch to support the bases of groups of fenestrated leaves which make up a single vane or ridge of a scale. Each of these fenestrated leaves is really an exceedingly thin sheet crossed by vertical and nearly horizontal thickenings or mullions. It is from these nearly horizontal thickenings, about $0.2\ \mu$ apart ($= 0.0002$ mm. or $0.000,008$ inch), that the blue light is reflected and reinforced. An analogy has been drawn between this structure and a hypothetical transparent skyscraper. Light falling on the roof would be partly reflected, partly allowed to pass through. The same would happen at every floor. But only those rays with wave-lengths twice the height of a single floor would be reflected in phase so as to reinforce the rays from other floors. The reflection from any one floor would be relatively weak, but the sum of the reinforced reflections from 12-14 floors would be quite brilliant. The blue color of these scales is due to the spacings being half the wave-length of blue light; if the spacing were slightly greater the scales would appear green, if slightly less they would appear violet.

Examination of non-iridescent scales from the same wing showed that the non-iridescent scales have the same structure, *but* they have fewer reflecting mullions and these mullions are *too close together* to reflect and reinforce visible light. Also, among the iridescent scales, there are no structural differences between pigmented and non-pigmented scales—the pigment when present is below the vanes and merely makes a background for the overlying iridescent color.

The various optical effects shown by these scales can be explained on the basis of the structure shown in the figure but space will not permit enumerating them all (see papers cited).

Numerous miscellaneous observations were made. It may be coincidence but it seems remarkable that so many of the parts of the scale are traversed by thickenings approximately $0.2\ \mu$ apart—the vertical and horizontal mullions of the vanes, thickenings in the supporting rods and in the lower membrane. If this is not coincidence it would seem likely to represent a fundamental

periodicity of the chemical of which the scale is made. Another possibly molecular pattern comes from pictures showing a cloth-like fiber pattern in the vanes, the fiber being only 0.006μ wide and 0.02μ apart ($0.000,000,24$ and $0.000,000,8$ inch respectively). If this represents anatomy, and there is no reason not to call it such, then it is indeed the smallest anatomy ever seen.

Correlated with the above remarks is the discovery that these butterfly scales, contrary to general assumption, are not chitinous. Chemical tests showed only protein, and while these tests are incomplete it seems likely that the architectural pattern may be a purely protein framework. A. G. RICHARDS, JR.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Anduze, P. J.—Estudios de entomologia medica en el Estado Merida (Venezuela). [46] 2: 149-60, ill. Brandhorst, C. T.—Study of the relationship existing between certain insects and some native West Kansas forbes and weedy plants. [65] 46: 164-75, ill. Milne, A.—The ecology of the sheep tick *Ixodes ricinus*. Distribution of the tick in relation to geology, soils and vegetation in north England. [116] 35: 186-96, ill. Vogelsang & Gonzalez.—Contribucion al estudio de la parasitologia ani-

mal en Venezuela. Gastrofilos de los equinos de Venezuela. [46] 2: 145-48. **Walker, H., Jr.**—Life histories and control tests on 3 insect pests of skins stored in the tannery. [103] 17: 7-14.

ANATOMY, PHYSIOLOGY, MEDICAL—**Bartley & Mellanby.**—The parasitology of human scabies (women and children). [116] 35: 207-09, ill. **Brecher & Wigglesworth.**—The transmission of *Actinomyces rhodnii* in *Rhodnius prolixus* and its influence on the growth of the host. [116] 35: 220-24. **Ephrussi & Herold.**—Studies of eye pigmentation of *Drosophila*. I. Methods of extraction and quantitative estimation of pigment components. [Genetics] 29: 148-175. **Denisova, S. M.**—Excretion of dyes from the body of *Anopheles maculipennis* by the excretory and phagocytic organs. [Zool. Jour., Moscow] 32: 259-62. (Russian, English Sum.) **Fyg, W.**—(See under Hymenoptera.) **Halberstaedter, Goldhaber & Hecht.**—The effect of x-rays on the development of insects. I. Irradiation in the larval stage. [Growth] 7: 413-26. **Harpster, H. A.**—The gaseous plastron as a respiratory mechanism in *Stenelmis quadrimaculata* (Dryopid). [Trans. Amer. Micr. Soc.] 63: 1-26. **Huffaker, C. B.**—The temperature relations of the immature stages of the malarial mosquito, *Anopheles quadrimaculatus*, with a comparison of the developmental power of constant and variable temperatures in insect metabolism. [7] 37: 1-27, ill. **Mellanby, K.**—The development of symptoms, parasitic infection and immunity in human scabies. [116] 35: 197-206, ill. **Walkden, H. H.**—(See under Coleoptera.)

ARACHNIDA AND MYRIOPODA—**Bartley & Mellanby.**—(See under Anatomy.) **Chamberlin, R. V.**—Chilopods in the collection of the Field Mus. Nat. Hist. [Field Mus. N. H.] Zool. Ser., 28: 175-216, ill. (*). **Keifer, H. H.**—Eriophyid studies XIV. [11] 33: 18-38, ill. (*). **Milne, A.**—(See under general.) **Pearse, A. S.**—Chelonethida from the Duke Forest. [129] 87: 36. **Radford, C. D.**—New parasitic mites from rodents. [116] 35: 161-66, ill.

THE SMALLER ORDERS—**Banks, N.**—Neuroptera of Northern S. Amer. [46] 2: 161-73 (*). **Gloyd, L. K.**—New sp. of *Stypurus* from Mexico. N. sp. of *Archilestes* from Mexico (Odonata). [114] 482 and 483: 4 and 4 pp., ill. **Mellanby, K.**—(See under Anatomy.) **Ross, E. S.**—Methodos de recoleccion, crianza y estudio de los Embiop-

teros. [105] 14: 441-46. **Tuthill, L. D.**—Descr. of some new N. Am. Psyllidae with notes on others. [103] 17: 1-6, ill. **Wygodzinsky, P.**—Note of the origin and classification of Apterygota. [105] 14: 516-21.

ORTHOPTERA—**Giral, J., F. & M. L.**—Sobre aceites de insectos. II. *Melanoplus* sp. [121] 4: 155-56. **Isely, F. B.**—Correlation between mandibular morphology and food specificity in grasshoppers. [7] 37: 47-67, ill. **Todd, A. C.**—On the development and hatching of eggs of *Hammer-schmidtella diesingi* and *Leidynema appendiculatum*, nematodes of roaches. [Trans. Amer. Micr. Soc.] 63: 54-67.

HEMIPTERA—**Beamer, R. H.**—N. sp. of *Acinopterus* from California. [103] 17: 21-22, ill. **Brecher & Wigglesworth.**—(See under physiology.) **Carvalho & Drake.**—Neotropical Miridae: Concerning the Pennington Collection. [105] 14: 522-24 (*). **DeLong, D. M.**—A n. sps. of *Plummerella* from Mexico. [7] 37: 68-69, ill. **Drake & Hambleton.**—Concerning Neotropical Tingitidae. [91] 34: 120-29 (*S). **Knoll, D. J.**—Nomenclatorial notes on Cicadellidae. [7] 37: 123. **McKenzie, H. L.**—Miscellaneous Diaspid scale studies (Coccoid). [11] 33: 53-59, ill. (*). **Wygodzinsky, P.**—Notas sobre as esp. brasileiras do gen. *Aradus*. [105] 14: 502-10, ill. (*).

LEPIDOPTERA—**Decker, G. C.**—Annotated list of the Crambid moths known to occur in Iowa (Pyrals). [Proc. Iowa Acad. Sci.] 50: 337-39. **Miller, D. O.**—Observations on soil webworms (*Crambus* sp.) in Kansas. [65] 43: 267-82, ill. **Stallings & Turner.**—Notes on Lepidoptera. [103] 17: 29-31.

DIPTERA—**Alexander, C. P.**—New or little known Tipulidae from Venezuela. II. [46] 2: 125-44, ill. Records and descr. of Tipulidae from tropical Amer. IV. [105] 14: 485-502 (*). **Boesel & Snyder.**—Observations on the early stages and life history of the grass punky, *Atrichopogon levis*. [7] 37: 37, ill. (K). **Carrera, M.**—Algumas notas sobre *Scenopinus*. [105] 14: 524-25. **Hardy, D. E.**—Rev. of N. Amer. Omphralidae (*Scenopiniidae*). [103] 17: 31-40 (cont.) (K*). **Huffaker, C. B.**—(See under Anatomy.) **Hull, F. M.**—Some Neotropical Syrphids. [105] 14: 510-15 (*). **Jones, D. T.**—Rare variant of *Pollenia rudis*, the Iowa winter house fly. [Proc.

Iowa Acad. Sci.] 50: 345-46, ill. **Lane, J.**—Geographic distribution of *Sabethini* (Culic). [105] 14: 409-29, ill. **Lane e Vulcano.**—A armadura bucal dos Simuliídeos e seu valor taxonómico (Simuli). [105] 14: 430-40, ill. **Lane e Whitman.**—Nov. esp. de *Culex* do Brasil. [105] 14: 389-408. **Roth, L. M.**—Key to the *Anopheles* of the South-eastern U. S., by male genitalia. [119] 31: 96-110, ill. **Roth & Young.**—*Culex atratus* in Florida. [7] 37: 84-88, ill. (K).

COLEOPTERA—**Blackwelder, R. E.**—Checklist of the coleopterous insects of Mexico, Cen. Amer., W. Indies and S. Amer., I. [Bull. U. S. Nat. Mus.] 185: 188 pp. **Bondar, G.**—Notas entomológicas da Baía. XIII. Rev. e fusao dos gen. *Celetes*, *Everges*, *Hoplorhinus*, *Erirrhinoides*, *Phytotribus*, *Centemerus*, *Ancylorrhynus* (*Erirrhininae*); *Barinae* em palmeiras &c.; *Novo Himatidium* &c. [105] 14: 337-88, ill. (*). **Cartwright, O. L.**—New *Scarabaeidae* from United States. [7] 37: 28-36, ill. **Fattig, P. W.**—*Phyllophaga* or may beetles of Georgia (*Scarabae*). [Emory Univ. Mus. Bull.] 2: 31 pp. **Harpster, H. A.**—(See under physiology.) **Knull, J. N.**—Notes on *Agrilus* with descr. of two n. sps. [7] 37: 75-83, ill. **Marshall, G. A. K.**—On the gen. of the tribe *Cyphicerini* (*Curcul*). [75] 11: 73-98 (k). **Owen & Jaques.**—Preliminary list of the *Elaeteridae* of Iowa. [Proc. Iowa Acad. Sci.] 50: 341-44. **Sanderson, M. W.**—Distribution and hosts of *Arkansas Phyllophaga* (*Scarab*). [103] 17: 14-21. **Walkden, H. H.**—Seasonal variation in resistance to high temperature of the cadelle and the confused flour beetle. [65] 43: 283-88, ill.

HYMENOPTERA—**Bugbee, R. E.**—Two n. sps. of the *Laxitas* complex from Mexico (*Eurytom*). [103] 17: 23-29, ill. **DeBach, P.**—Environmental contamination by an insect parasite and the effect of host selection. [7] 37: 70-74. **Fyg, W.**—Experimentelle Untersuchungen ueber den Eilegeakt der Bienenkoenigin. [Mitt. Schweizer. Ent. Gesells.] 18: 493-521, ill. **Michener, C. D.**—Comparative external morphology, phylogeny and a classification of the bees. [62] 82: 157-326, ill. **Moure, J.**—Notas sobre abelhas da colecao Zikan (*Apoidea*). [105] 14: 447-84 (S*). **Weber, N. A.**—The neotropical coccid-tending ants of the genus *Acropyga*. [7] 37: 89-122, ill. (k*).

SPECIAL—*Mosquito News*, vol. 4, no. 1. Pub. by the Eastern Assoc. Mosquito Control Workers.

LIST OF JOURNALS CITED

7.—Ann. Entom. Soc. America. 11.—Bull. Dept. Agric., Calif. 46.—Bol. Entom. Venezolana. 62.—Bull. Amer. Mus. Nat. Hist. 65.—Trans. Kansas Acad. Sci. 75.—Annals and Mag. Nat. Hist. 91.—Jour. Washington Acad. Sci. 103.—Jour. Kansas Entom. Soc. 105.—Rev. Entomol. R. d. Janeiro. 114.—Occ. Pap. Mus. Zool. Univ. Mich. 116.—Parasitology, London. 119.—Amer. Midland Nat. 121.—Ciencia, Mexico. 129.—Anatomical Record.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dieke, 1101 Argonne Drive, Baltimore, Md.

Coleoptera—Will exchange mounted and labeled specimens from North America. All groups except Rhynchophora. G. P. Mackenzie, 1284 Sherwood Road, San Marino, Calif.

Lepidoptera—Should like to hear from collectors interested in species from central Alberta and Saskatchewan. Would collect other Orders. Paul F. Bruggemann, R. R. 1, Furness, Sask., Canada.

Lampyridae of U. S. and Canada wanted from the South and West, especially *Photinus* and *Pyraclomena* for revisional study. Buy or exchange. J. W. Green, R. D. 2, Easton, Pa.

Lepidoptera—Would like to exchange Californian butterflies, noctuids, geometrids, etc. for eastern specimens. Glenn E. Pollard, 500 Clark Drive, San Mateo, Calif.

A CATALOGUE AND RECLASSIFICATION OF THE NEARCTIC ICHNEUMONIDAE

(HYMENOPTERA)

By HENRY K. TOWNES, JR.

(Memoirs of the American Entomological Society, Number 11)

The parasitic habits of this group of insects render them of great economic importance and biological interest, but because of the handicaps of an extremely scattered literature and confused taxonomy, a vast amount of preparation is required of the prospective worker, if his results are to be of lasting value.

This catalogue is a coherent guide to the published information and thereby opens the field to more and a better class of research. It gives a more natural systematic arrangement than has previously been available, a bibliography, and a list of the host and parasites of the described ichneumon-flies which occur in America north of Mexico, complete through the year 1940.

The catalogue will be published in two parts (to facilitate publication in the present paper situation), the first covering the subfamilies Ichneumoninae, Tryphoninae, Cryptinae, Phaeogeninae and Lissonotinae, and will comprise 477 pages. The second part will contain the remaining subfamilies, an alphabetic list of unplaced genera and species, and of nomina nuda, a systematic list of hosts and parasites, an index to hosts and parasites, and an index to the genera and species in the entire work, and will cover about 450 pages.

The price of the entire work, parts I and II (in paper cover), is \$15.00, post paid, if remittance accompanies order. An alternative price is \$10.00 on delivery of part I and \$8.00 on receipt of part II.

Part I will be ready for delivery in August, 1944 (unforeseen delays excepted). Part II is in press and should be ready for delivery the latter part of the present year (1944).

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ENTOMOLOGICAL NEWS

OCTOBER 1944

Vol. LV

ENTOMOLOGICAL NEWS

No. 8

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A Note on *Lecontella cancellata* Lec. (Coleoptera: Cleridae) in Cells of the Mud-Daubing Wasp

By PHIL RAU, Kirkwood, Missouri

Members of the beetle family Cleridae are generally regarded as predators, although Dr. C. P. Clausen, in his recently published book "Entomophagous Insects," says that several species of these beetles that develop upon the larvae of bees "are somewhat on the border line between parasitism and predatism."

In Crawford County, Missouri, I have found a beetle of this family, *Lecontella cancellata* Lec.,¹ which is evidently one such borderland species, with the weight of evidence much in favor of parasitism rather than predatism.

In addition to finding two dead beetles in old cells of the mud-wasp, *Sceliphron caementarium*, in 1942, I also found in a sealed cell a quiescent larva that pupated on May 9 and eight days later transformed into an adult. This beetle larva, as already stated, was found in a sealed cell, which indicates that egg or young had gained access to the nest while it was being provisioned by the wasp; this, I think, places the beetle in the position of a parasite or parasitoid rather than a predator.

In an important paper by Linsley and MacSwain,² I find that several other members of the family Cleridae are predaceous on a good many species of Aculeate Hymenoptera, but this is the first record, so far as I know, of a clerid beetle developing upon the wasp, *Sceliphron caementarium*.

¹ Kindly determined by Mr. A. E. Chapin.

² Observations on the life history of *Trichodes ornatus*, a larval predator of bees and wasps. Ann. Ent. Soc. Amer., 3: 589-601. 1943.

Notes on *Oecleus* Stal (Homoptera: Ciciidae)

By JOHN S. CALDWELL, Circleville, Ohio

(Continued from page 176)

Oecleus apterapunctatus new species (figs. 4 & 4a)

Length 6.5 mm. Yellow with extremities of frons dark. Fore-femora dark for basal two-thirds. Eyes black. Mesonotum black between intermediate and median carinae.

Vertex produced, broadened before the eyes, closed caudad. Frons with very prominent lateral carinae. Profile right-angled. Base of costa broadened. Punctations not visible on veins. Medio-ventral process of male pygofers elongate-bulbose apically.

Male holotype from Tehuantepec, Oaxaca, MEXICO, 10-13-41 (DeLong, Good, Caldwell, and Plummer).

Oecleus concinnus Fowler (figs. 5 & 5a)

This is not *lineatus* Ball as stated by that writer but is a distinct species easily identified by the bright carinae of the thorax, yellowish elytra, and broadened costal base. The medio-ventral process of the male pygofers is also very elongate and slender. Specimens from Morelos (DeLong and Plummer) and Jalisco (Dampf) in Mexico.

Oecleus minimus Fowler (figs. 6 & 6a)

This species is between 4-6 mm. and for the length is much more slender than *pellucens* which it resembles. The punctations on the veins are much more pronounced and slightly denser. The costal vein is not broadened at the base. As a rule the general color of the thorax is darker than the darkest variations of *pellucens*. Specimens from Chiapas, Guerrero, Oaxaca, San Luis Potosi, and Veracruz in Mexico.

Oecleus infuscatus new species (figs. 7 & 7a)

Length 6-6.8 mm. General color black. Wings fuscous. Carinae of face yellow. Pronotum with light carinae and a

yellow dash on either side far laterad. Mesonotum with intermediate carinae and two dashes in lateral compartments dark orange.

Face rounded in profile. Vertex scarcely produced before the eyes, very broad, open caudad. Costa not broadened at base. Anal segment of male long, straight. Lateral margins of pygofers produced somewhat basad; medio-ventral process, broad, subtriangular.

Male holotype and female allotype from Acapulco, Guerrero, MEXICO, 9-10-39 (DeLong and Plummer).

Oecleus delongi new species (figs. 8 & 8a)

Length 5-6.8 mm. Face dark; lateral carinae light; median carinae orange. Mesonotum black with orange carinae and two dashes in either lateral compartment, one dash cephalad near the lateral carinae and the other caudad near the outer angles. Elytra hyaline, whitish, with veins becoming darker apically; two dark dashes present along sutural margin before apex of clavus.

Profile rounding. Vertex produced before the eyes, broad, not closed caudad. Base of costa not broadened. Medio-ventral process of male pygofers quadrate basad, produced apically.

Male holotype, female allotype, and paratypes from Tamazunchale, San Luis Potosi, MEXICO, 8-29-39 (F. M. & D. M. DeLong).

The writer takes great pleasure in naming this distinct species in honor of the collectors, Dr. and Mrs. D. M. DeLong.

Oecleus constrictus new species (figs. 9 & 9a)

Length 4.5-5 mm. Uniformly light to dark yellow with the exception of dark eyes, tarsi, and dark brown bordering the lateral carinae of the mesonotum. Punctations on veins black, small but very distinct. Vertex very narrow, produced. Profile angular. Frons much narrowed between the eyes. Base of costa not broadened. Anal segment of male elongate. Medio-ventral process of pygofers elongate, subtriangular.

Male holotype, three paratypes, and female allotype from Huetamo, Michoacan, MEXICO, 8-22-33 (Dampf).

Oecleus cephalicus new species (figs. 10 & 10a)

Length 4.5-6 mm. Orange species with black eyes, tarsi, and the spaces between the carinae of the mesonotum. Female with two black dashes in the lateral compartments, one cephalad and the other caudad; male with only one dash. Punctations on veins very prominent, black; cross veins and apical terminations of all veins broadly fuscous.

Vertex greatly produced, apex broad, flat. Frons very elongate, scarcely narrowed between the eyes. Profile acute; apex of head projecting dorsad. Elytra short, broad, small in proportion to rest of body. Base of costa not broadened. Medio-ventral process of male pygofer very small, acute.

Male holotype and female allotype of this unique species from San Miguel. EL SALVADOR, 3-19-42 (Plummer).

Oecleus spatulatus new species (figs. 11 & 11a)

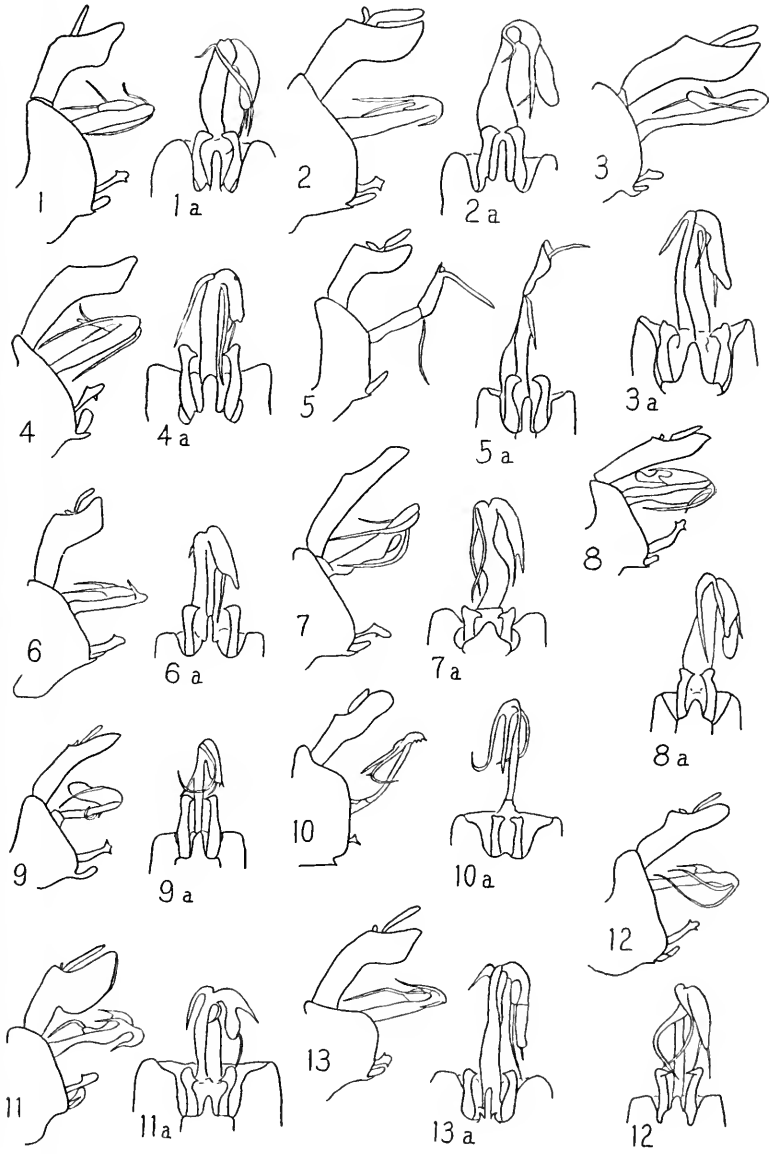
Length 4.5-5 mm. Vertex and face dark with orange carinae. Eyes and pronotum gray. Mesonotum black with orange carinae and a large orange spot in either lateral compartment. Elytra whitish, hyaline, with yellow veins; punctations black.

Vertex produced, much widened before the eyes; tapered closed caudad. Frons very narrow. Profile right-angled. Base of costa not broadened. Anal segment of male greatly enlarged apically. Medio-ventral process quadrate basad, produced apically.

Male holotype, female allotype, and paratypes from Los Amatos, GUATEMALA, 1-17-05, paratypes same locality 2-25-05, and from Point Barrows, 3-3-05, are in the H. Osborn collection at Columbus, Ohio, paratypes in writer's collection.

Oecleus quinquilineatus new species (figs. 12 & 12a)

Length 5-5.5 mm. Coloration and marking very similar to *quadrilineatus* Van Duzee from Arizona. In addition to the four intercarinate dashes, the median carina is very narrowly



orange. Median carina of frons very short, orange, whereas in that species the carina is long and yellow.

Vertex very short, evenly tapered to closed base. Profile rounded. Base of costa not broadened. Aedeagus of male with four spine-like processes.

Male holotype from Xaltianguis, Guerrero, MEXICO, 10-23-41 (DeLong, Good, Caldwell, and Plummer), male paratype from Cuernavaca, Morelos, 10-14-31 (Plummer), and female allotype from Tierra Blanca, Veracruz, 9-17-24 (Dampf).

Oecleus campestris Ball

One male specimen from Jalisco in Mexico, 8-24-37 (Dampf).

- Fig. 1. *O. pellucens* Fowler. Lateral view of abdominal apex of male.
1a. Ventral view of abdominal apex of male in fig. 1.
- Fig. 2. *O. dubius* n. sp. Same view as in 1.
2a. Same view as in 1a.
- Fig. 3. *O. parallelus* n. sp. Same view as in 1.
3a. Same view as in 1a.
- Fig. 4. *O. apterapunctatus* n. sp. Same view as in 1.
4a. Same view as in 1a.
- Fig. 5. *O. concinnus* Fowler. Same view as in 1.
5a. Same view as in 1a.
- Fig. 6. *O. minimus* Fowler. Same view as in 1.
6a. Same view as in 1a.
- Fig. 7. *O. infuscatus* n. sp. Same view as in 1.
7a. Same view as in 1a.
- Fig. 8. *O. delongi* n. sp. Same view as in 1.
8a. Same view as in 1a.
- Fig. 9. *O. constrictus* n. sp. Same view as in 1.
9a. Same view as in 1a.
- Fig. 10. *O. cephalicus* n. sp. Same view as in 1.
10a. Same view as in 1a.
- Fig. 11. *O. spatulatus* n. sp. Same view as in 1.
11a. Same view as in 1a.
- Fig. 12. *O. quinquilincatus* n. sp. Same view as in 1.
12a. Same view as in 1a.
- Fig. 13. *O. decens* Stal (after Fowler). Same view as in 1.
13a. Same view as in 1a.

Some Syrphid Fly Genera (Diptera)

By F. M. HULL, University of Mississippi

During the past several years a few peculiar Syrphid flies have been studied which do not appear to belong in existing genera. Several of these are based upon undescribed species and in other cases represent reassignments of existing species. The first of these several flies are treated in this paper.

Syrittosyrphus new genus

Eyes bare, holopticism well developed in the male. Vertex and front a little swollen. Antennae short, the third joint oval, about twice as long as wide and with dorsal arista. Face well developed, barely concave, the epistoma but little produced. Thorax long pilose particularly upon the sides and posteriorly and upon the scutellum. Scutellum quite wide, with a deep, crimped margin and long pile and particularly abundant ventral fringe. Abdomen elongate-oval, the pile setaceous and flat-appressed except near the sides of the base. The legs have a quite long trochanteral spine (male). Hind femora stout, the thickening distributed throughout and without apical spines. Wings villose except about the basal cells. Marginal cell widely open, the second longitudinal vein recurrent. Small cross vein joining the fourth longitudinal vein near the outer end of the discal cell. Third vein with a deep, somewhat oblique loop.

Genotype: *S. opacea* new species. (Cape Province.)

This genus is related to *Korinchia* but is distinguished by the widely opened marginal cell.

Syrittosyrphus opacea new species

Male. Length 15 mm.; wing 10.5 mm. Head: hemispherical, barely wider than thorax. Eyes touching for a short distance. Occiput shining brownish-black, the ocelli large. Front very convex viewed from in front; also convex in profile and shining, dark reddish-brown in color. Face chiefly dark brown with a V-shaped mark running from the anterior oral margin

diagonally upwards through the middle of the face to a point on the eye margin below the antennae. This leaves above it a broad band of pale, feebly shining yellow that encircles the face below the antennae; below the V-shaped black facial stripe that separates the cheek from the face, there is a similarly colored brownish-yellow band. Antennae dark brown, the first and second joints short, subequal; the third joint about twice as long as its basal width, its apical width somewhat less than that of the base and its apex broadly rounded, its inner surface with a deep pit; arista thick, pale yellow, almost white upon the apical half and its length considerably greater than that of the antennae. Eyes bare, the facets scarcely thickened above. Thorax: broad, rather flattened, obscurely shining black with dark brown to brownish-grey pollen and a mixture of suberect, moderately long black and pale hairs. The pile upon the humeri is more extensively yellow, wholly yellow on the sides of the mesonotum just posterior to the humeri, and long and yellow upon the meso-, sterno-, and pteropleurae. Scutellum broad, over twice as wide as long, light brownish-yellow, paler apically and with strongly impressed and emarginate rim; there is long, thick, brownish-yellow pile above and below. Abdomen: about twice as long as wide, widest at the end of the second segment, the first segment barely less wide, and the end of the fourth segment about three-fifths as wide as the second segment. Whole abdomen obscurely brown and brownish-yellow. Second segment light brown, brownish pubescent, transversely darker brown along its base, its pile everywhere pale. The second segment is more widely brownish along the entire posterior margin and this brown area is connected to the anterior brown color and is also continuous with the narrow brown lateral margins. Near the base on either side is a large brownish-yellow spot of rectangular shape. Third segment obscurely brownish-yellow along the entire basal marginal third and also obscurely yellowish pollinose; the yellow pollen tends to form a median vitta. Elsewhere the segment is dark brown. Fourth segment wholly dark brown with a narrow, basal, medial and similar, subapical transverse band of faint, pale pollen. The pile of the dark brown areas

is chiefly appressed, black and setaceous. Lateral margins of the segments with long, pale pile, and especially on the anterior corners of the second segment. Hypopygium large, shining brownish-black. Legs: all the femora dark brown in color, the first and second femora seen from the front are pale pubescent, pale pilose with darker and somewhat blackish areas upon the apical half. Hind femora strongly thickened, the increase in width being spread out over more or less the whole length; there is stiff, bristly black pile ventrally. Hind coxae with a large, heavy, sharp black spine. All of the tibiae are dark upon the apical two-thirds, yellowish white basally. All of the tarsi reddish-brown. Wings: smoky brown on the apical fourth, narrowly brownish in the middle below the stigma with a strong stigmal cross vein. The veins are dark brown, the third longitudinal vein deeply-looped into the first posterior cell and the marginal cell is widely open.

Holotype: a male. Cape Province. Somerset East, Nov. 1930, R. E. Turner. The type is in the British Museum.

Catacores new genus

Eyes large and bare; holopticism well developed in the male. Front a little swollen. Antennae short, the third joint oval, the arista dorsal. Face tuberculate, concave above. Epistoma not greatly produced. Thorax short pilose, unmarked. Scutellum about twice as wide at base as long; the margin of the scutellum with a well marked preapical crease. Abdomen short and broad at base, with four segments visible from above. Wings hyaline, the marginal cell well open, the third longitudinal vein with a deep kink dipping into the first posterior cell. Small cross vein at the middle of the discal cell. Legs simple, the hind femora a little thickened.

Genotype: *Axona cyanea* Brunetti. (India.)

This genus is related to *Helophilus* and perhaps *Mesembrius*. The eyes are markedly holoptic. I have studied a specimen of *cyanea* Brunetti kindly loaned me by the Vienna Museum and have compared it with *Axona chalcopyga* Wiedemann, specimens of which are before me, and do not consider the two congeneric.

A Note on the Dates of Loew's *Diptera Americae Septentrionalis Indigena*

By EZRA T. CRESSON, JR., Academy of Natural Sciences
of Philadelphia

During his residence in the United States, in part as Secretary of the Russian Legation at Washington (1856-1877), Charles Robert, Baron Osten Sacken, in collaboration with the eminent European Dipterist Dr. Hermann Loew, undertook to work up the Diptera of North America, north of the Isthmus of Panama, with the title of "Monograph of the Diptera of North America," of which four volumes only were published; the material for which was to be secured by Osten Sacken through various channels.

Unfortunately, Loew, who was also studying other material and publishing his results, became impatient of the delays in the issuances of the Monographs, although some of these delays were of Loew's own making.* The descriptions of the numerous species which he found in the mass of material Osten Sacken sent him, required publication and could not be held for inclusion in slowly appearing monographs. Furthermore, Loew was much averse to monographic study on a large scale, requiring long patient study; he preferred to produce "a large number of short, disconnected articles, such as descriptions of new species, critical summaries of small groups, local lists of species, etc. This manner of work may have been easier and more handy for him in his circumstances, and among the multitude of various occupations which his insatiable energy required." To get his new species timely described he resorted to a series of Centuries under title "*Diptera Americae Septentrionalis Indigena*" of which ten were published each containing descriptions of one hundred species. These appeared in the comparatively new journal, "*Berliner Entomologische Zeitschrift*," for 1861 to 1872. They were also collected and published, retaining original pagination, as "*Diptera Americae Septentrionalis Indigena*."

* See Osten Sacken's Record of my Life Work in Entomology, 1903.

Descriptis H. Loew. Berloni. Typis A. W. Schadii," in two parts; the first part, bearing title date, 1861, contained Centuries I to V and index; the second part, dated 1865-1872, contained Centuries VI to X and index to the two parts. As Century V first appeared in 1864, naturally the first part of the reprint could not have been published prior to that date.

These Centuries should be cited as, for example: *Parydra abbreviatata* Loew, Berl. Ent. Zeit., V, p. 357, 1861. (Cent. I, no. 97.) As the Dipt. Amer. Sept. Indig. is merely a reprint in facsimile, it is unnecessary to quote it, but as it is generally the work possessed, or consulted, by many students, it should be well for the owner to renumber the pages in agreement with the original in the Berliner Entomologische Zeitschrift.

The following shows the corresponding pages in the two works:

Berl. Ent. Zeit.	Centuria	Dipt. Amer. Sept. Indig.
V, pp. 307-359, 1861	I	I, pp. 1- 53, 1864
VI, 185-232, 1862	II	55-102
VII, 1- 55, 1863	III	103-157
VII, 275-340, 1863	IV	159-210
VIII, 49- 99, 1864	V	211-261
		Index 262-266
IX, pp. 127-186, 1865	VI	II, pp. 1- 60, 1872
X, 1- 54, 1866	VII	61-114
XIII, 1- 52, 1869	VIII	115-166
XIII, 129-186, 1869	IX	167-224
XVI, 49-115, 1872	X	225-291
		Index 292-300

Notes on Emergence, Swarming, and Mating of *Hexagenia* (Ephemeroptera) ¹

By F. EARLE LYMAN, Norris, Tennessee

The western end of Lake Erie produces yearly prodigious numbers of *Hexagenia* mayflies belonging to three species: *H. limbata* (Serville), *H. rigida* McDunnough, and *H. affliata* Mc-

¹The writer expresses appreciation to Dr. Thomas H. Langlois, Director of The Ohio State University, Franz Theodore Stone Laboratory for use of the laboratory facilities during the summer of 1940 and to Dr. David C. Chandler for helpful suggestions.

Dunnough. These are named in the order of relative abundance and of seasonal emergence. The specimens recorded by Wiebe (1926) as *H. bilineata* (Say) from this region were evidently one or more of the above species, since *bilineata* appears to be limited in distribution to the Mississippi River drainage. It should be pointed out that some mayfly taxonomists (McDunnough 1927; Spieth 1940) have subdivided *H. limbata*, by far the most common species in the Great Lakes Region, into two subspecies: *H. limbata occulta* (Walker) and *H. limbata viridescens* (Walker). Both of these subspecies occur in the Put-in-Bay area.

Several specimens of an albino form of *H. rigida* were collected in July 1940. The identification of these unusual specimens in the absence of color markings is based upon the form of genitalia which is distinct for this species. A single albino specimen of this species had been collected previously by Mr. Dale W. Jenkins on July 1, 1938. Further collecting and study may show that this is a subspecies of *rigida*.

The emergence of *Hexagenia* begins toward the end of June and continues to September; the peak of emergence is reached during July and is due primarily to individuals of *H. limbata*. However, soon after the beginning of the *limbata* emergence, *H. rigida* makes its appearance and is followed about the middle of July by *H. affiliata*; hence, all three species are present at the same time. Except at the very peak of abundance when specimens are found about equally distributed almost everywhere, it was noted that local concentrations of *Hexagenia* individuals were dependent to a large degree upon wind direction. Emerging subimagos tend to be carried and to fly with the wind; therefore, during a period of on-shore breeze individuals accumulated on one side of an island while relatively few specimens could be found on the opposite shores.

In a personal communication from Dr. Langlois the writer has learned that the emergences of *Hexagenia* were not as large in the summers of 1941 and 1942 as they were in 1940 and 1943. This observation seems to indicate a cyclic trend in the population numbers of *Hexagenia* which has also been noted by the author for other localities (unpublished data).

Typical examples of swarming were observed from South Bass Island during the forepart of July 1940. Swarming activity was begun about 8:00 p.m. (E.S.T.) by a few male individuals taking to the air from the trees and shrubs that had furnished them with resting places and concealment during the subimaginal period and during the daytime. Most individuals flew low to the ground at the start but as the numbers increased the swarm moved gradually higher. Dense swarms were observed over the islands of South Bass, Rattlesnake, Middle Bass, and Gibraltar. These swarms were so thick as to appear like clouds of smoke weaving up and down over the tree-tops of the respective islands. Swarming took place well over the land and individuals were most concentrated over the trees fringing the shores. Very few individuals were seen flying over the water as compared to the numbers over the land. The location of swarms over land and the trees in particular is apparently correlated with the fact that the females, which are relatively cumbersome in flight owing to the weight of the egg packets, do not usually take part in the actual swarming activity which is carried on primarily by the males, are most numerous in the trees along the shore, and enter the swarming males only to mate. At various times especially huge flights resulted from the accumulation of individuals over several days owing to the cool, rainy, and windy weather of the days immediately preceding the flights. Such weather inhibits swarming activity. By 8:30 p.m. many mating pairs were seen. The swarming continued until darkness obscured further observations.

In the course of nightly observations it was a common occurrence to see males of one species *in copula* with females of another species. Also imago males often attempted copulation with female subimagoes. At times two or three males were seen clinging to a single female. Occasionally two males were seen flying together as though attempting to mate, the fore legs of one individual grasping securely the mesothorax of the other as in the manner described below for male and female. The greater length of the fore legs of mayfly males in general is well-known. The advantages of this sexually dimorphic character

are apparent when the details of the way in which the male grasps the female are observed. The relatively sluggish flight and large size of *Hexagenia* individuals are especially propitious to the capture of copulating pairs and for observing the intricacies of the method used by the male for maintaining his attachment to the female while the pair is in flight. The male approaches the female from below and the already upwardly extended fore legs are securely anchored to the mesothorax of the female. The tarsi of the male are crossed over one another across the mesonotum of the female, are passed around the anterior edge of the fore wing base, and the respective tarsal claws are hooked into the pleural wing recess which is located ventrally on each wing near the base. The capture of numerous pairs demonstrated these facts repeatedly; however, observations had to be made rapidly for the pairs became separated easily when disturbed. Actual copulation was accomplished when the abdomen of the male was curved upward and the abdomen of the female was encircled by the forceps usually about the ninth segment. The observations made by Cooke (1940) upon *Stenonema vicarium* (Walker) wherein it is stated that the male placed the fore legs over the prothorax and the head of the female are worthy of note. During the writer's experience in observing *Hexagenia* pairs the fore legs of the male often became unseated from their normal attachments on the mesothorax and then appeared to be attached to the prothorax.

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Recent Work by the International Commission on Zoological Nomenclature

By FRANCIS HEMMING, Secretary to the International
Commission on Zoological Nomenclature

The International Commission on Zoological Nomenclature is now engaged in the publication of decisions taken before the outbreak of war in 1939. These decisions have been embodied in *Opinions* 134–183 and *Declarations* 10–12. Of these, *Opinions* 134–155 and the 3 *Declarations* have already been published or are in the press. The remainder are ready for printing and will be published as soon as funds are available.

These *Opinions* are of particular interest to entomologists, since in addition to 9 *Opinions* relating to the interpretation of various aspects of the International Code, no less than 38 of these *Opinions* are directly concerned with entomological subjects.

The *Opinions* relating to the interpretation of the Code are: *Opinion* 138 (meaning of phrase "definite bibliographic reference" in Article 25); *Opinion* 141 (naming of families); *Opinion* 143 (status of names first published in invalid works); *Opinion* 147 (generic names of same origin and meaning as older generic names); *Opinion* 148 (status relating to names published as emendations of, or substitutes for, older names); *Opinion* 164 (position as regards types when two or more genera are united); *Opinion* 168 (supplementing *Opinion* 65 regarding genera based upon erroneously determined species); *Opinion* 172 (status of type—designations of genera in abstracts, etc.); and *Opinion* 183 (interpretation of Article 8 relating to form in which generic names should be published).

Of the *Opinions* specially concerned with entomological subjects, 6 deal with the status of particular works or with the dates of such works: *Opinion* 136 (Latreille, 1810) affects all Orders of insects; *Opinion* 135 ("Erlangen List," 1801) is of special interest to hymenopterists; *Opinions* 134 (Freyer, *Neue Beiträge*), 138 (Hübner, *Samml. exet. Schmiett* 1807 and Fabricius,

Mag. Insektenk. (Illiger) 1807) and 150 (Hübner, *Verz. bek. Schmett*) are concerned with Lepidoptera and *Opinion* 152 (Meigen, 1800) with Diptera. *Opinions* 140 and 143 deal with certain family names in insects.

The remaining 30 *Opinions* deal with particular generic names in various Orders of insects. These *Opinions* either fix the types of these genera or add the names to the *Official List of Generic Names in Zoology*, or do both. Three of these *Opinions* are concerned with Orthoptera; 13 with Hymenoptera and 14 with Lepidoptera.

Each *Opinion* is published separately but *Opinions* are consecutively pagged to facilitate the publication of an index on the completion of the volume concerned.

The International Commission are most anxious to secure that *Opinions* are published as rapidly as possible but they are greatly hampered by lack of funds. The Commission therefore appeal to scientific institutions and individual scientific workers for donations to a special fund to be used for the issue of publications. Full particulars of this Appeal are given in Part 2 of the Commission's Official Organ, the *Bulletin of Zoological Nomenclature* published in 1943.

Contributions, however small, will be warmly welcomed and will be acknowledged in the *Bulletin*. Bankers' drafts, cheques, and money orders should be made payable to the 'International Commission on Zoological Nomenclature' and sent to the Commission at their Publications Office, 41 Queen's Gate, London, S.W.7. All orders for the Commission's publications should be sent to the same address. Inquiries relating to the work of the Commission should be addressed to me at 83 Fellows Road (Garden Flat), London, N.W.3.

Notes and News in Entomology

In the February issue of the NEWS under Notes and News in Entomology we quoted a denouncement of light-trap studies of phototropism by Squire.* This aroused some comment. The editors do not pretend to be authorities in this complex field. Accordingly we asked for the following evaluations—one from an entomologist who is familiar with biophysical problems and techniques and who has studied phototropism by the use of light traps, the other from an entomologist who has studied phototropism under carefully controlled laboratory conditions.

The editors would be glad to have other similar queries raised on subjects of general interest for brief evaluation or comments by other workers. THE EDITORS.

Squire's indictment of the traplight approach to studies of insect phototropism is probably quite sound as applied to conclusions derived from catches by traps which have not been carefully operated to preclude errors. Study of light-traps by prototropic response is a preliminary requirement if later experimental data from those traps are to receive consideration. Such a study was made in the summers of 1938 and 1940 in connection with experiments on the selection of colored lights by night flying insects at the Mountain Lake Biological Station in Virginia. In this study, two or more identical light-traps were exposed side by side, facing in the same direction, and analysis was made of the insects collected. In part the results were these: (1) Insects (except some Coleoptera and arctiid moths) fly to an attracting light with considerable accuracy (as shown by the size and nature of the haul in adjacent unlit traps), (2) Selection of traplights of equal color and brilliance, equally exposed, is random unless affected by external factors (such as crosswind) in which case the disproportion in catch is regularly in one direction for all species, (3) Approximately 90% of the total *specimens* collected by traplight methods are of species which arrive in sufficient numbers for valid statistical study, and (4) Over 90% of the *species* coming to light-traps do so in

* Ent. News, 55: 52-53, 1944.

numbers too small for reliable statistical analysis. Thus when precautions are taken to find and evaluate errors common in light-trap studies, the technique can yield valuable information on the photopositive response of species which arrive in large numbers. It is interesting to note that of the abundant species in 1938, only a third were in that category again in 1940, and that the colder, drier season (1938) produced fewer species but more specimens than the warmer, wetter one (1940). The full report on these investigations will appear soon in the *Annals of the Entomological Society of America*. L. J. MILNE.

Relative to the quotation from Squire concerning studies of phototropism by means of light-traps, as reported in the February, 1944, *NEWS*, p. 52, I am inclined to agree with the conclusion that phototropism cannot be adequately studied by the light-trap method: First, because the aggregate of insects is not known, and second, because the relative radiant intensity, of the source lamp, for different points in the spectrum, is also seldom known. It is also true that not all insects are equally photosensitive at the same time. Variations exist in the sensitivity of their visual receptors. These may be connected with different physiological states; they may be due to a depletion of the primary photosensitive substance in the visual sense cells due to previous exposure to light; they may be due to the angle of incidence; or to the influence of the central nervous system, etc., etc., etc. The study of phototropism in insects needs a more refined piece of apparatus than a light-trap.

On the other hand, light-traps have their uses in connection with the sampling of mosquito populations, the collection of information on geographical distribution, seasonal distribution, influence of temperature, etc., on flight, etc. In work of this sort, entomologists are not studying phototropism as such, but are taking advantage of the positive phototropism of certain members of an aggregate in order to collect other types of information. When Squire characterized the light-trap method as worthless, I believe he meant it in connection with a study of phototropism and not in connection with the uses of light-traps as enumerated above. HARRY B. WEISS.

Obituary Notices

The Secretary of the Royal Entomological Society of London announced the death of **Dr. and Mrs. W. Junk** in December, 1942 in the Hague. Dr. Junk was well-known as a scientific publisher and as editor of the *Coleopterorum Catalogus*. Delayed news of his death has only recently been received through the Netherlands Red Cross. Proc. Roy. Ent. Soc. London, C, 9 (5): 19. June 7, 1944.

Dr. Dayton Stoner, state zoologist of the New York State Museum, died in Albany, May 8, 1944. In earlier years he had published on Pentatomoidea, especially of Iowa. He was born at North Liberty, Iowa, November 26, 1883, and took the degrees of A.B., M.S. and Ph.D. at the University of Iowa where, as a member of the faculty, he remained until 1928. An obituary notice by W. L. McAttee appeared in *Science* for July 28, 1944.

Dr. Charles E. Sanborn, formerly professor of entomology and head of the department of entomology at the Oklahoma Agricultural and Mechanical College, died on July 5, 1944. He was particularly interested in medical entomology, especially anaplasmosis in cattle and its transmission by horse flies—a vector relationship which he helped establish. An obituary notice by G. W. Stiles appeared in *Science* for August 18, 1944.

Mr. Charles S. Beckwith, a resident member of the American Entomological Society, died of heart attack at his home in New Jersey on May 18, 1944. He was a graduate of Rutgers University, and was interested in economic entomology in relation to bog ecology. He was entomologist in charge of the New Jersey Cranberry and Blueberry Agricultural Experiment Station at Pemberton, New Jersey, and most of his entomological work was associated with these two crops. He had held numerous positions, viz. secretary-treasurer of the Eastern Branch of Economic Entomologists, secretary of the American Cranberry Growers Association, secretary of the New Jersey Blueberry Cooperative Association, chairman of the Pemberton Board of Health (he was interested in promoting mosquito control work) and even mayor of Pemberton for two terms.

Honorary Members, New York Entomological Society

At the meeting of the New York Entomological Society, April 18, 1944, eight more persons were elected to Honorary Membership in that society. With one previously elected (Dr. Howard) there are now nine such members. Those so honored are:

Nathan Banks
T. D. A. Cockerell
Wm. T. Davis
L. O. Howard
J. McDunnough
A. L. Melander
James G. Needham
Herbert Osborn
R. E. Snodgrass

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—**Cerqueira, N. L.**—Um novo meio para montagem de pequenos insectos em laminas. [111] 39: 37–41. **Cronin, J. W.**—Handbook of card distribution [of Library of Congress] 7th edit. Washington, Libr. of Congr. Mar. 15, 1944. **Doetschman, W. H.**—Some suggestions in microtechnique particularly useful in microentomology and parasitology. [89] 63: 174–78. **Fletcher, F. C.**—Entomologists' five-foot bookshelf. [118] 17: 83–86. **Hovanitz, W.**—Genetic study of wild populations and evolution. ["Caldasia" Bol. Inst. Cie. Nat. Univ. Nac. Colombia] 10: 459–64. **Hubbs, C. L.**—Concepts of homology and analogy [90] 78 (777): 289–307. **Knowlton & Maddock.**—Insect food of the western meadowlark. [120] 4: 101–102. **Lutz, Frank Eugene**—Obituary. [4] 76: 69. **Malcolm, M. C.**—Mice eating moths. [21] 56: 59. **Moojen, J.**—Ecogenizacao e domesticidade. [32] 14–17: 83–128, ill. **Rolfs, Peter Henry.**—Obituary notice. [39] 27: 1–4, ill. **Schubart, O.**—Fauna do Est. de Pernambuco e dos Est. Limitrofes. Secunda list. [32] 14–17: 21–64, ill. **Stafford, A. E.**—Prices of insects. [9] 77: 78. **Strickland, A. H.**—The arthropod fauna of some tropical soils with notes on the techniques applicable to entomological soil surveys. [Tropical Agriculture, Trinidad] 21 (6): 107–114. **Twinn, C. R.**—A note on DDT, the new synthetic insecticide. [4] 76: 87–88. **Yothers & Carlson**—A graphic method of indicating the incidence of an insect population. [12] 37: 300–01. **Zalessky, G.**—Brief statement of reason for some changes in the terminology of insect wing venation. [107] 19: 37–47, ill.

ANATOMY, PHYSIOLOGY, MEDICAL—**Andrewartha, H. G.**—Air temperature records as a guide to the date of hatching of nymphs of *Austroicetes cruciata*. [22] 35: 31–41. **Baker, E. W.**—Studies on the response of fruit-flies to temperature. [12] 37: 280–83. **Bodenstein, D.**—The induction of larval moults in *Drosophila*. [92] 86: 113–124. **Brauer, A.**—Modification of development in bruchid embryos by treatment with amino acids [Trans. Kent. Acad. Sci.] 10: 24–28, ill. **Christophers, R.**—Structure of the *Culex* egg and egg-raft in relation to function (Abst.). [109] 9: 13–14. **Cook, E. F.**—Morphology and musculature of the labrum and clypeus of insects. [117] 9: 1–35, ill. **Comeau, N. M.**—Le parthenogenese chez les Ophionidae [abstract]. [96] 10: 103. **Crampton, G. C.**—A comparative morphological study of the terminalia of

male calypterate cyclorrhaphous Diptera and their acalypterate relatives. [19] 39: 1-31, ill. **Dobzhansky, T.**—Distribution of heterochromatin in the chromosomes of *Drosophila pallidipennis*. [90] 78: 193-213. *Drosophila mutans* [Review]. [68] 100 (2586): 52. **Feldman-Muhsam, B.**—Studies on the ecology of the Levant house fly (*M. domestica vicina*). [22] 35: 53-67. **Frost, Dills & Nicholas**—The effects of infrared radiation on certain insects. [12] 37: 290. **Goldhaber & Feldman-Muhsam.**—Immediate effects of x-rays on the movements of larvae and pupae of mosquitoes. [31] 153: 528. **Hardy, G. H.**—Copulation and the terminal segments of diptera. [107] 19: 52-65, ill. **Harvey, E. N.**—The nature of the red and green luminescence of the S. Amer. "railroad worm," *Phryxothrix*. [Jour. Cell. & Comp. Physiol.] 23: 31-38, ill. **Kalmus, H.**—Action of inert dust on insects. [31] 153: 714-15. **Kevan, D. K. McE.**—The bionomics of the neotropical cornstalk borer, *Diatraea lineolata* (Pyrál) in Trinidad, B.W.I. [22] 35: 23-30. **Laidlaw, H. H. Jr.**—Artificial insemination of the queen bee (*Apis mellifera*): Morphological basis and results. [57] 74: 429-66, ill. **Lathrop & Dirks**—Timing the seasonal cycle of insects. [12] 37: 199-204. **Light, S. F.**—Parthenogenesis in termites of the gen. *Zootermopsis*. [Univ. Cal. Pub. Zool.] 43: 405-12. Experimental studies on ectohormonal control of the development of supplementary reproductives in the termite gen. *Zootermopsis* (formally *Termopsis*). [Univ. Calif. Pub. Zool.] 43: 413-54, ill. **Mayr, E.**—Chromosomes and Phylogeny [Review of work on *Drosophila*]. [68] 100 (2584): 11-12. **Middlekauff, W. W.**—Gynandromorphism in recently collected mosquitoes. [12] 37: 297, ill. **Nash, T. A. M.**—A low density of tsetse flies associated with a high incidence of sleeping sickness. [22] 35: 51. **Ochse, W.**—Experimentelle und histologische beitrage zur innern metamorphose von *Sialis lutaria*. [Rev. Suisse Zool.] 51: 1-82, ill. **Reese, A. M.**—The anatomy of the venom glands in the black widow spider, *Latrodectus mactans*. [89] 63: 170-74, ill. **Salt & Hollick**—(See under Coleoptera.) **Wedmore, E. B.**—Factors in the production of honey. [31] 153: 578-79. **Wigglesworth, V. B.**—Action of inert dust on insects. [31] 153: 493-94. **Williams & Reid**—Physiological effects of genes: The flight of *Drosophila* considered in relation to gene mutations. [90] 78: 214-23.

ARACHNIDA AND MYRIOPODA—**Baker, E. W.**—Nuevos Tydeidae Mexicanos (Acarina). [35] 4: 181-90, ill. *Pronecupulatus*, a n.gen. of Tydeidae from Mexico (Acadina). [103] 17: 72-3, ill. **Boardman, E. T.**—Methods for collecting ticks for study and delineation. [17] 30: 57-59. **Chamberlin, R. V.**—Some records and descr. of American diplopods. [95] 56: 143-152. **Cooley & Kohls**—The gen. *Amblyomma* in the U. S. [17]30: 77-111, ill. Argasidae of No. Amer., Cent. Amer. and Cuba. [Monogr. Amer. Mid. Nat.] 1. 152 pp., ill. **Eddy & Joyce.**—Seasonal history and hosts of the American dog tick, *Dermacentor variabilis*, in Iowa. [81] 18: 313-324. **Fraenkel & Bluett**—The vitamin B-complex requirements of several insects. [Biochem. Jour.] 37: 686-92. The sterol requirements of several insects. *Ibid.* 692-94. **Islas, F.**—Observaciones sobre el tlalzahuate en izucar de Matamoros y Acatlan, Puebla (Acarina Trombid). [112] 14: 439-50, ill. **Lacerda de Araujo Feio, J.**—Sobre o apresamento e succao em algumas esp. de *Pachyolpium* e *lustrichernes* (*Pseudoscorp.*). [32] Zool. (3): 113-20, ill., 1942. **de Melo-Leitao, C.**—Catalogo das aranhas do Rio Grande do Sul. [Arq. Mus. Nac., R. d. Janeiro] 37: 149-245, ill. (*). Oito novos opiloes do Espirito Santo. [32] 14-17: 1-20, ill. (S*). **Muma, M. H.**—Report on Maryland spiders. [40] 1257 (*). **Murillo, L. M.**—Los insectos y el Clima en Colombia. ["Caldasia" Bol. Inst. Cie. Nat. Univ. Nac. Colombia] 10: 465-71. **Pierce, W. D.**—(See under Coleoptera.) **Reese, A. M.**—(See under anatomy, &c.) **Solomon, M. E.**—Behavior of tyroglyphid mite populations in stored grain and flour. [20] 31: 81. **Verhoeff, K. W.**—Ueber einige diplopoden aus Minas Gerais (Brasil). [Arq. Mus. Nac., R. d. Janeiro] 37: 249-288, ill. (*).

THE SMALLER ORDERS—**Atwood, E. P.**—Lion and lacewing lore. [Nature Mag., Washington] 37: 317-18, ill. **Bonet, F.**—Sobre la clasificacion de los Oncopoduridae (*Collembola*), con descr. de esp. n. [An. Esc. Nac. Cie. Biol. Mexico] 3: 127-53, ill. (S). **Collenette, C. L.**—Odonata avoiding limestone country. [9] 77: 61. **Dendy, J. S.**—Notes on Trichoptera, Elmidae and Plecoptera from pre-impoundment bottom fauna studies of Cherokee and Watts Bar areas (Tenn.). [49] 19: 175-76. **Dias dos Santos, N.**—Libellulidae coligidos em ilha seca (Est. d. S. Paulo) salobra e bodoquena (Est. d. Mato Grosso) pela comissao cientifica do Inas. Oswaldo Cruz. [32] Zool. (16):

10 pp. **Fraser, F. C.**—Diurnal and nocturnal resting habits of *Bradinopyga geminata* (Odonata). [8] 80: 76-7, ill. Significance of vestigial oblique veins in the evolution of intercalated veins in the odonate wing, with the descr. of a n.gen. [108] 13: 58-67, ill. **Leitao de Carvalho, A.**—Sobre "Peripatus heloisae" do Brasil Central. [32] Zool. (2): 1-112, ill., 1942. **Robert, F. A.**—Aperçu des odonates abitibiennes [abstract]. [96] 10: 101. **Zavaleta, D.**—Una n. esp. de *Trochiloectes* (Mallophaga). [112] 14: 613-18, ill. (S).

ORTHOPTERA—**Andrewartha, H. G.**—(See under anatomy, &c.) **Chagnon, G.**—Contribution a l'étude des orthopteres et des dermapteres du Quebec. [76] 71: 127-48, ill. **Fox, W. B.**—An unusual egg laying site for the two-striped grasshopper [4] 76: 111, ill. **Giral, Giral & Giral**—Sobre Aceites de insectos. III. Nuevos datos sobre *Taeniopoda auricornis*. [121] 4: 215-16. **Liebermann, J.**—Hacia la solucion de un gran problema Argentino: La langosta. Interpretacion de la periodicidad de la migraciones acridicas. [106] 137: 122-30. **Pierce, W. D.**—(See under Coleoptera). **Tinkham, E. R.**—Biological, taxonomic and faunistic studies on the shield-back katydids of the No. Amer. deserts. [119] 31: 257-328, ill. (*).

HEMIPTERA—**Black, L. M.**—Some viruses transmitted by Agallian leafhoppers. [Proc. Amer. Phil. Soc.] 88 (2): 132-144, ill. **Butt, F. H.**—Comparative study of mouthparts of representative Hemiptera-Homoptera. [Mem., Cornell Univ.] 254: 20 pp., ill. **DeLong, D. W.**—The Mexican sp. of *Phlepsius*. (Cicadel) [10] 46: 85-94, ill. (*). Mexican sp. of leafhoppers of the gen. *Texanus*. (Cicad.) [91] 34: 228-39, ill. (*). **Drake and Carvalho.**—Four new American Tingidae. [19] 39: 41-44. **Drake & Hambleton**—Four new American Tingitidae. [10] 46: 94-96. **Harris & Drake**—New apterous Aradidae from the Western Hemisphere. [10] 46: 128-32 (k). **Hungerford, H. B.**—Synonymic notes in the genus *Glaenocoris*. [19] 39: 32-34. **Knight, H. H.**—*Lygus* Hahn: 6 n. sps. from Western N. Am. (Mirid). [81] 18: 471-77. **Neiva e Lent.**—Triatomideos do Chile (Reduvid). [111] 39: 43-74, ill. **Pelaez, D.**—Algunas observaciones sobre la esp. mas Antigua del gen. *Sphonogophorus* (Homopt. Membracid). [35] 4: 171-80, ill. **Plummer, C. C.**—Cinco nuevos membracidos de Mexico. [An. Esc. Nac. Cie. Biol. Mexico] 3: 155-61, ill. **Sailer, R. I.**—The genus *Solubea*. (Pentatom.)

[10] 46: 105-27, ill. (k,*). **Usinger, R. L.**—Genus *Ilyocoris* (Naucorid). [103] 17: 76-7. **Wood, S. W.**—Reptile associates of wood rats and cone-nosed bugs. [38] 43: 44-48. **Wygodinsky, P.**—Contribuicao ao conhecimento do gen. *Salyavata* (Reduvid). [32] Zool. (6): 27 pp., ill. (S,*).

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The Naming of Infra-Specific Categories *

By E. GORTON LINSLEY, University of California, Berkeley

The existence of infra-specific categories has been recognized throughout the history of Zoological Nomenclature, Linnaeus having coined the term "*varietas*" to designate them. Since the time of Linnaeus, however, it has gradually become apparent that an infinite number of infra-specific variations exist in nature, running the gamut from those characteristic of a single individual to those expressed in whole populations. Experimental evidence is gradually revealing the nature and basis of many of these variations but the question as to which of these should be named remains a source of controversy. Sharp¹ early expressed the view that ". . . the giving of distinct and definite names to varieties [*sensu lato*] is likely to induce fallacy in our minds, and . . . there is no sufficient argument by which it can be justified. . . . The purposes of science will be best served by there being no names for varieties, but . . . every author who specializes varieties should do so by means of a letter or figure, or combination of the two." Gunder,² on the other hand, defends the naming of races (subspecies), forms ("local forms," "general forms," "seasonal forms," "sexual forms"), "transition forms," and hybrids, under a system of polynomial nomenclature. The majority of working taxono-

* This essay is the first of several invited opinions and analyses of the question of naming sub-sub-specific categories. Interested readers are invited to contribute to this series. THE EDITORS.

¹ Sharp, D. 1873. The object and method of Zoological Nomenclature. London, 39 pp.

² Gunder, J. D. 1932. Macrolepidoptera: Species and lower concepts. Ent. News, 43: 169-175, 236-240, 261-268.

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mists have thus far selected an intermediate course between these two extremes. In the absence of authority in the matter (the International Code of Zoological Nomenclature leaves most of the questions unanswered) and because of the controversial nature of the subject, the view here discussed should be recognized solely as an expression of personal opinion upon the invitation of the editors of ENTOMOLOGICAL NEWS.

PHILOSOPHICAL CONSIDERATIONS

Before we can proceed to a discussion of "namable" categories, it is necessary to review the objects of Zoological Nomenclature. These are two-fold. The first objective is to provide uniform, reasonably permanent names for organisms as a basis for recording facts and exchanging ideas about them. The second objective is to meet the needs of a classification for the organisms which will express phylogeny and relationship and permit an orderly arrangement of these facts and ideas. Opposing requirements are necessary in order to meet these two objectives, the former requiring rigidity and permanence, the latter flexibility to meet changing concepts and the discovery of new facts. The binomial system of nomenclature, with the species as the basic unit, has survived by means of a compromise involving ideally permanent specific names for individual organisms while allowing the utmost flexibility in their arrangement under higher categories to suit the purposes of classification. These higher categories have evolutionary significance and the different levels represent stages or steps in evolutionary history.

When we extend our nomenclature to infra-specific categories it would seem most reasonable to do so by expanding the binomial system on the basis of the objectives which are met in the remainder of the system. If other objectives are to be met,³

³ McAtee (1920, Ent. News, 31: 46-55, 61-65) calls attention to the consideration ". . . of making a collection appear to have been really classified, and to have names by which the forms can be referred to in exchanging . . .," and Gunder (1932, Ent. News, 43: 169-175, 236-240, 261-268) states that "without names, the initiative of discovery and the 'glory' thereof is destroyed for the amateur and typical collector . . ." I must confess that on scientific grounds these arguments hold little appeal

some new system of nomenclature should be devised entirely independent of the binomial system. If we expand our system on the basis of the objectives applying elsewhere, the naming of infra-specific forms would be limited largely to those expressing population phenomena with a primarily genetic basis.⁴ These naturally occurring infra-specific populations would be grouped in the category subspecies and would exhibit "recognizability" correlated with geographical, biological, ecological, or physiological characters. In general practice the differences between such subspecies are not usually discontinuous but are expressible in a bimodal curve. Phylogenetically, the various bases for the subspecies are more or less on a par and separate categories, as suggested by Davis,⁵ would seem to be unnecessary. (We recognize but a single category for species which exhibit predominantly physiological, biological or ecological characters when they meet the genetic tests for the concept.) When it is desirable to distinguish between different types of subspecies in discussions they can be simply described as a physiological subspecies (or race) or a geographical subspecies (or race). A problem may, however, arise occasionally, when, within a given species, subspecies exist that appear to be on markedly different levels. Cases may also be encountered where very distinct sub-

for me. Without in any way minimizing the great contribution that has been made to our science by the amateur and collector, it must be borne in mind that collections, like names, are merely means to an end, both are but tools of our science. The needs of the science must be met first.

⁴ A somewhat similar view is expressed by Klots (*Ent. News*, 41: 298-302, 324-327, 1930) but opposed by Forbes (*Bull. Brooklyn Ent. Soc.*, 29: 65-67, 1934) who states that the distinction between forms expressing inherited characters and those expressing environmental effects is of no importance in this problem and is best expressed in some way other than by nomenclature. He would recognize three categories, *namable* (90 per cent determinable without reference to locality label), including subspecies, dimorphic forms, seasonal forms, etc., *unnamable* (monstrosities, mutilations, accidents, etc.), and *potentially namable* (including weakly defined local forms 75 to 90 per cent determinable, certain types of frequent aberration, hybrids, etc.).

⁵ Davis, H. F. C. 1941. Taxonomic categories. *Australian Jour. Sci.*, 4: 49-52.

species appear to have been further segregated into what might be equivalent to "subsubspecies." Hovanitz⁶ meets such a problem in *Colias chrysotheme* by recognizing two "races" one of which has one, the other five, subspecies. Only the subspecies, however, are given scientific names (trinomial). This would seem to be a desirable procedure and is somewhat similar to that advocated by Rothschild,⁷ who would treat all "local forms" of one species as coequal in value. The main objection to Hovanitz' procedure is his use of the term "race" as of higher value than subspecies. Where the two terms have been given different values, the race is usually placed at a lower level than the subspecies.⁸ However, in common practice the two terms are interchangeable and the introduction of a distinction between them at this time would provide much confusion.

How then shall other types of infra-specific variation be treated? First, it should be made clear that all normal (natural), recurring variation should be recorded, either by separate descriptions or by general statements covering norms and extremes, depending upon the continuity, deviation, and nature of the variation. This can be done without resorting to the use of formal, scientific names.⁹ Gunder's statement¹⁰ that "without names definite description would be impossible, for writers never describe accurately except when naming . . ." is absurd and requires no refutation. However, it is common practice for workers in many groups of insects to name varieties (in the sense of recurrent discontinuous variations in a single interbreeding population) and it would probably be difficult, if not

⁶ Hovanitz, W. 1943. The nomenclature of the *Colias chrysotheme* complex in North America. Amer. Mus: Novit., 1240: 1-4.

⁷ Rothschild. 1918. On the naming of local races, subspecies, aberrations, seasonal forms, etc. Trans. Ent. Soc., London, pp. 115-116.

⁸ Ginsburg, I. 1938. Arithmetic definition of the species, subspecies and race concept, with a proposal for a modified nomenclature. Zoologica (N. Y.), 23: 252-286.

⁹ Ferris (Principles of Systematic Entomology, p. 56) points out that "The recognition of the genetic status of the various forms associated with the species . . . should not be confused with the problem of the giving of formal scientific names. The two are distinct things."

¹⁰ Gunder, J. D., 1932, l. c., p. 240.

actually undesirable, to attempt to suppress this practice. If the varieties selected for naming have a predominantly genetic, rather than environmental, basis, it is possible that they may have some evolutionary significance and thus meet the requirement previously stated. In my opinion, however, infra-specific variants other than subspecies and varieties should not be named, but may be designated by standard terminology or symbols. Here the workers in the Aphididae and Formicidae have set an excellent example.¹¹

NOMENCLATORIAL CONSIDERATIONS

Inseparable from the question as to which kinds of infra-specific variants are worthy of names is the question as to the status of infra-specific names. The International Code of Zoological Nomenclature provides for subspecific names as follows: "The scientific designation of animals is . . . trinomial for subspecies." Thus the Code recognizes but a single infra-specific category, in contrast to those of the Botanical Code which include, in descending order, subspecies, variety, sub-variety, form, and subform, etc. As in the case of other categories recognized by the Zoological Code, the term "subspecies" is not defined but has generally been interpreted as applying to the taxonomic category immediately below the species. On this basis it has been argued that categories lower than the subspecies have no status in nomenclature (Krombein,¹² Riley,¹³ Hovanitz,¹⁴ etc.). The British National Committee on Entomological Nomenclature¹⁵ proposes the following: "The name of

¹¹ Wheeler, W. M. 1926. *Ants*. Columbia Univ. Press, New York, xxv + 663 pp. Imms, A. D. 1934. *A general textbook of Entomology* (3rd Ed.). Dutton & Co., New York, xii + 727 pp.

¹² Krombein, D. V. 1938. Corrections and additions to a recent catalogue of the Tiphidae. *Ent. News*, 49: 184-189.

¹³ Riley, N. D. 1939. When is a name a subspecific name? *Ent. News*, 50: 31-33.

¹⁴ Hovanitz, W. 1938. The interpretation of the term subspecies and the status of names applied to lower categories in Lepidoptera. *Ent. News*, 49: 39-41.

¹⁵ Report of the British National Committee on Entomological Nomenclature. 1928. *Proc. Ent. Soc. London*. 13 pp.

a subspecies cannot be used in the genus either for another species or for the subspecies of another species. "Names" of lower rank are not subject to this restriction, and, therefore, their existence does not invalidate their subsequent use for species or subspecies even in the same genus, as they are not subject to the Law of Priority. . . . If a form of lower rank than subspecies is found to be either a species or subspecies, the "name" it bears should be retained (unless there is some other objection to it), and would date from the time at which it attained the higher status, carrying with it the name of the author who made the change.' Unfortunately, advocates of this viewpoint fail to agree (see Sabrosky¹⁶) as to when a name should be considered as subspecific and thus available under the code.¹⁷ Riley would reject names for categories lower than the subspecies even when proposed in trinominal form (*Alpha alba longula*, n. ab.) whereas such names would be automatically accepted as subspecific by Hovanitz. However, since the code states that the designation of subspecies is "trinominal" and (Article 17) that "if it is desired to cite the subspecific name, such name is written immediately following the specific name, without the interposition of any mark of punctuation. Example: *Rana esculenta marmorata* Hallowell," it would seem justifiable to regard such names as subspecific when there is no indication to the contrary. This does, perhaps, also make possible the use of a ternary (rather than strictly trinominal) form for other types of infra-specific variation by the interposition of punctuation and explanatory terms, as *Alpha alba*, var. *machulata* Smith, as permitted by the Botanical Code. By extending this procedure, a variety within a subspecies could be designated as *Alpha alba catalinae*, var. *nigra* Jones. This would meet the two most

¹⁶ Sabrosky, C. W. 1939. The nomenclature of categories lower than species. Ent. News, 50: 197-203.

¹⁷ An objection has also been raised to the second part of the British proposal on the grounds that it "deprives the original author of due credit for the name." In this connection it should be remembered that authority citation for scientific names is not for purposes of individual credit but for the purpose of fixing responsibility and providing a bibliographical clue to the publication where the name was validated.

serious objections to polynomials, namely their length and awkwardness and their inability to express relationship (i.e., within a species, the same color variety may exist in more than one subspecies, or seasonal form, etc.). The use of ternary (and rarely quaternary) names will suggest relationship with sufficient accuracy for most of our purposes and the explanatory term will indicate the nature of the variation. Such procedure should also serve the purpose of keeping the names outside of the rulings of the Code and make them available for repeated use in the same genus for parallel types of variation.

In conclusion it is my opinion that the burden of proof should rest with the namer of lower categories. Names for such categories should be proposed only after careful deliberation and analysis, preferably (but not exclusively) in the course of experimental, revisional, or monographic studies. If we proceed thus cautiously, we can concentrate on re-evaluating the names that have already been applied at the species level while those at infra-specific levels are growing slowly and on a sound basis. We can thus avoid burying ourselves under a mass of infra-specific names for forms of uncertain status, names that can be unravelled and placed satisfactorily only at some date in the far distant future, if at all. It would seem that in the present state of our knowledge, the various demands upon scientific nomenclature can best be met by treating infra-specific variation as follows:

A. Namable (to be designated by scientific names).

1. Subspecies (= geographical, biological, ecological, or physiological race).
 - a. Name proposed in trinominal form without interposition of explanatory term or punctuation (*Alpha alba catalinae* n. subsp.; not *Alpha alba* subsp. *catalinae* n.) and thereafter written in the same manner (*Alpha alba catalinae* Smith).
 - b. Name has same nomenclatorial status as a specific name.
 - c. Typical form (in the nomenclatorial, not biological sense) is written as *Alpha alba alba* Smith.

- B. Demonstrably namable (to be named upon demonstration of the nature of the variation).
1. Varieties (recurrent discontinuous variations in a single interbreeding population).
 - a. Name proposed in ternary or quaternary form, rather than trinomial or quadriminomial, with interposition of a comma and explanatory term (*Alpha alba*, var. *maculata* Smith; *Alpha alba catalinae* var. *nigra* Jones).
 - b. Name has no nomenclatorial status under the Code and is hence available for repeated use in the same genus for parallel types of variation (*Alpha alba*, var. *maculata* Smith; *Alpha beta* var. *maculata* Jones).
- C. Unnamable (to be designated by standard terminology or symbols but not by scientific names).
1. Alternate generations (*Alpha alba*, agamic form; *Alpha alba*, bisexual form; etc.).
 2. Castes (*Alpha alba*, soldier; *Alpha alba*, ergate; *Alpha alba*, ♀ deālate; *Alpha alba* ♂; etc.).
 3. Polymorphic forms (*Alpha alba*, minor ♂; *Alpha alba*, major ♂; *Alpha alba*, brachypterous ♂; *Alpha alba*, fundatrix; *Alpha alba*, migrant; etc.).
 4. Seasonal forms (*Alpha alba*, vernal form; *Alpha alba*, Brood I; etc.).
 5. Pathological forms (*Alpha alba*, phthisogyne; *Alpha alba*, mermithogyne; etc.).
 6. Continuous variations within a single interbreeding population.
 7. Freaks and teratological specimens.

A New Species of *Psychoda* from New York (Psychodidae, Diptera)

By WILLIAM F. RAPP, JR.

Dr. C. H. Curran of the American Museum of Natural History recently turned over to me some undetermined Psychodidae

which were in the collection at the Museum. Among the specimens was one apparently undescribed species from New York.

***Psychoda angustafona* new species**

Male.—Antennae thin, gray-haired, no prominent terminal knob (fig. 1, a); face and occiput black, the front with gray hair. Palpi short, with gray hair. Thorax with dense gray hair except on the scutum where there are only a few hairs. Legs brownish black in color, with scattered gray hairs. Abdomen black with gray bands at the segmental lines, dorsum not too thickly clothed with hairs, sides thick with gray hairs.

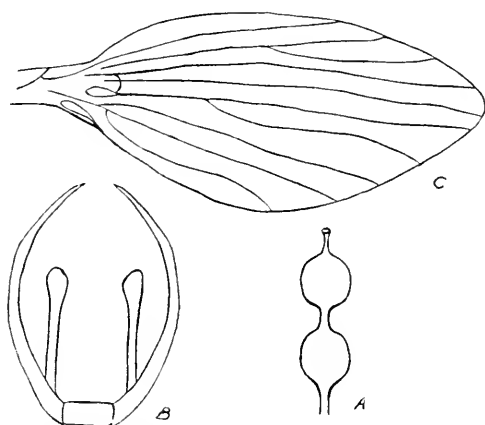


FIG. 1. *Psychoda angustafona* n.sp. a. antenna, b. claspers, c. wing.

Claspers prominent (fig. 1, b), black, tips grayish, outer edges with gray hairs. Wings with scattered gray hairs, base of wing narrow (fig. 1, c). Length of wing 1.75 mm.

Female.—Same as male in appearance, genital segment with a prominent spine, brownish with a black tip.

Types.—Holotype, male, allotype, female, paratypes, eleven males and fifteen females, North Greece, Monroe County, New York, May 1, 1936, all collected by R. L. and A. W. Post. The types are in the American Museum of Natural History.

This species may easily be recognized by the terminal part of the antenna.

Nuptial Flight of the Ant *Prenolepis imparis* Say

By HORACE GROSKIN, Ardmore, Pennsylvania

At my home at Ardmore, Montgomery County, Pennsylvania, there are twelve colonies of *Prenolepis imparis* Say. These nests are located in clay soil covered with moss in shady locations.

On April 8, 1944, clear, temperature 70° F., at 3 P.M., there was a great nuptial flight of the above species at my place, with many hundreds of winged forms in the air at a height of from ten to twenty feet. On the following day, April 9th, clear, temperature 78° F., at 2 P.M., we had another large nuptial flight of the same species on another part of the property. The males in both flights appeared to be very much more numerous than the females; the sex being easily determined in the air, by reason of the fact that the females are very much larger than the males.

On April 8th, while I was observing the marriage flight, my attention was attracted to one of the colonies located in the moss at the base of a red maple tree, *Acer rubrum*. At the entrance to this nest, and on the ground around it, there was a large number of virgin queens, males and workers swarming. When the winged forms first came out of the nest and reached the surface of the ground, they appeared very timid, moving slowly over the ground, keeping rather closely together with their wings closed, apparently not realizing the power of flight in their wings at that time. Gradually, some of these winged forms started climbing slowly on the nearest objects available, such as plant stems, blades of grass, tree trunks, stone wall, etc. Soon a few individuals on the ground opened and spread their wings as if they had suddenly discovered the value of their equipment, made a few short hops, and then flew into the air. Other individuals, after crawling around on the ground for a while, climbed grass blades and suddenly opened their wings and flew right into the air without making any hops. Approximately less than about one-half of the winged forms, which came out of the nest, flew

into the air, the balance continued to swarm about on the ground or climb vegetation until after sundown, when nearly all of those that had not participated in the nuptial flight gradually re-entered the nest. The nuptial flight ceased after sundown and half an hour later there were no ants in the air or on the ground.

During the nuptial flight on April 8th, while I was observing the activities of the ants around the nest, a mated pair came out of the air and dropped to the ground directly in front of me, and seeing that they were alive, and that their genital segments were still joined, I collected them in that position and placed them in the cyanide vial, where they remained in copula even unto death. This mated pair has been deposited in the collection of the Academy of Natural Sciences of Philadelphia.

Contributions to the Knowledge of Chinese Coccinellidae. VI. Occurrence of *Perilitus coccinellae* (Schrank), a Parasite of Adult Coccinellidae, in Yunnan (Hymenoptera, Braconidae)

By C. L. LIU, Tsing Hua University, Kunming, China

Unlike Diptera, the Hymenoptera contains only a limited number of imaginal parasites. The best known is undoubtedly the Euphorine Braconid, *Perilitus coccinellae* (Schrank) (= *Dinocampus coccinellae*), which parasitizes various species of adult Coccinellidae.

The distribution of this species is cosmopolitan. Balduf* has summarized the literature on this subject and found it recorded from New Zealand, Europe, North America and Hawaii. He concluded that "it occurs in many countries of at least the north temperate zone, and is perhaps generally distributed in most of this area."

Under the name *Dinocampus terminatus* (Nees), the species was previously reported from Japan. What appears to be the first record of its occurrence in continental Asia was made in

* Balduf, W. V. The bionomics of *Dinocampus coccinellae* Schrank. Ann. Ent. Soc. Am. 19: 466, 1926.

April, 1939, when a cocoon, which gave rise to an adult in due time, was collected in Kunming, Yunnan. Subsequently another cocoon was brought back from Kūchin, about 120 kilometers northeast of Kunming. Altogether eleven cases came under observation from 1939 to 1942, the other nine records being all from the vicinity of the Kunming city, which is situated on Lat. N. 25° 3' 21" and has an altitude of 1922.1 meters. Its climate is therefore decidedly temperate.

In six of these cases, *Coccinella septempunctata* L. served as the host; in four cases, the host was *Adonia variegata* Goeze; and in one case, *Macronaemia hauseri* Weise. The last named is recorded for the first time in this connection, it having been described from Yunnan in 1905. The first parasitized host was collected in April and the cocoon was formed on the stopper of the vial in which the beetle had been confined. All the remaining cases were taken from the field with the host sitting over the parasite cocoon in the characteristic fashion. Parasitized hosts were collected from April to August, but at no time of the year were they abundant. The Kunming specimens were collected on the leaves of *Artemisia strongylocephala* var. *sinensis* Pamp. and *Cirsium chloropis* Petr., and the single Kūchin specimen was found on the foliage of *Daucus carota* L.

On July 13, a specimen of *C. septempunctata*, collected on June 30, was confined with a newly emerged parasite, which was seen to take an immediate interest in the prospective host, pursuing it actively and attempting to oviposit. After forty-eight hours, the beetle was isolated. On Aug. 11, the parasite larva emerged and constructed its cocoon on the cotton stopper. Two weeks later, on Aug. 25, the adult parasite emerged and lived for 28 days on honey and water, dying on Sept. 22. The host remained alive for a few days after the issuing of the parasite. Although this host was not laboratory bred, the fact that it did not give rise to a parasite cocoon two weeks after capture seems to indicate that the experimental parasitization had been successful. A laboratory bred specimen of *Epilachna* n. sp. was offered a freshly emerged parasite, but it did not show any interest in it. Half an hour later, a *C. 7-punctata* was

substituted, and very soon afterwards, the parasite made several attempts at oviposition. The beetle appeared quite excited and at times ran about rapidly. At other times, when it remained stationary, it would raise its hind leg in attempting to brush its annoyer away. Three other hosts, *Coelophora biplagiata* Swartz, *Chilomenes sexmaculata* F. and *Halysia san-scrita* Muls., were tried but all resulted in unsuccessful parasitization.

A New Genus of Scorpions in the Southwest

By STANLEY MULAİK and HAROLD G. HIGGINS,
Department of Biology, University of Utah

In an examination of a series of scorpions collected by the senior author, a number of interesting forms was found. Among these were forms described in this paper as the new genus *Diplops*. The combination of characters in this genus raises some doubts as to its family relationship, though it is most nearly encompassed by the family Chactidae to which it is tentatively assigned.

This family was formerly represented in the United States by one species, *Broteas alleni* Wood in California. *Diplops* differs from *Broteas* in the possession of a series of diagonally arranged rows of teeth in the chela in place of one continuous row; in the absence of teeth on the lower margin of the movable finger of the chelicera, and in the characters of the pectines. The types are divided between the Zoological Museum of the University of Utah and the Academy of Natural Sciences of Philadelphia.

Diplops new genus

This genus is characterized by a pair of lateral eyes, legs furnished with a pair of pedal spurs between the tarsus and pro-tarsus, a brush-like row of long slender bristles on the tarsus; small, narrow, slightly crescentic tracheal slits; absence of teeth on the lower margin of the movable finger of the chelicera.

Sternum with parallel sides, intermediate lamellae of pectines broken up into three parts. There is no bristle or tubercle beneath the sting, nor is there a keel on the underside of the caudal segments.

Diplops desertorum new species

This is a relatively small species measuring about 27 mm. long of which the tail is about half the length. The dorsum is golden buff * in color with a black median stripe which is continued to the fifth caudal segment where it forks. A lateral stripe borders the edge of the scutes and extends on the tail where it is much broken up giving a distinctive mottled effect.

The carapace is longer than broad and very smooth. The front margin is essentially straight, the back margin is convex at the mid-dorsal line where there is a slight notch. From the back margin a shallow furrow arises which passes forward and divides at the rear of the black eyepatch. These furrows disappear near the front of the eyes.

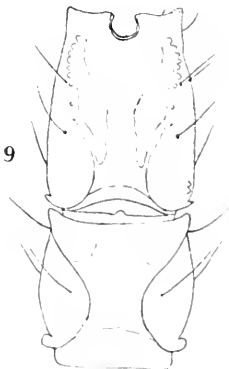
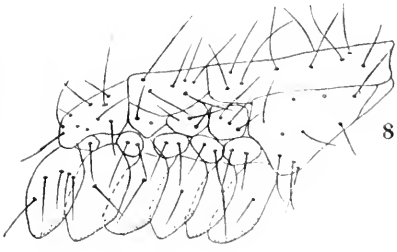
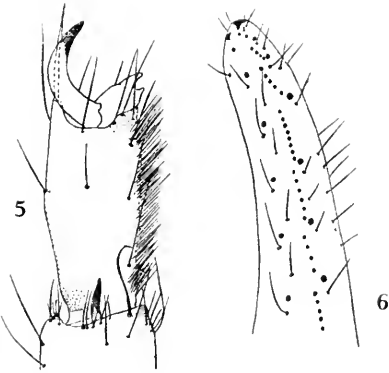
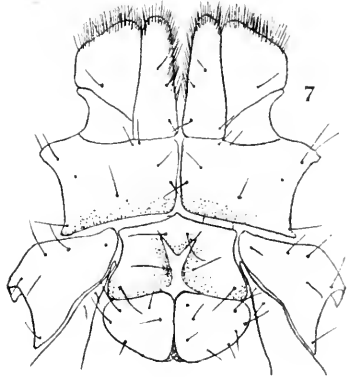
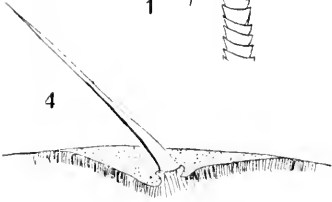
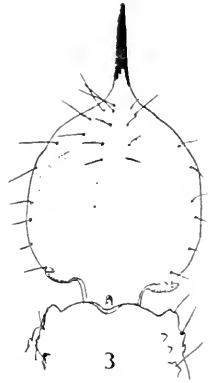
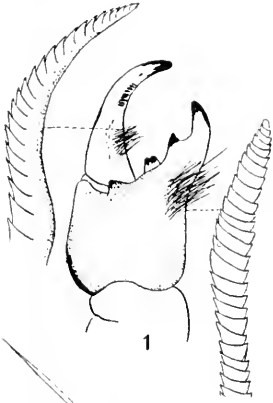
The dorsal eyes are set to the front of the middle of the carapace and more than their diameter apart. There are two lateral eyes on each side within a pigmented area.

The tail, burnt orange in color, is stout and smooth below except under the posterior portion of the fifth segment which has a number of tubercles, some of which are arranged in two lateral rows. The sting is stout and without a tubercle or spine beneath.

The sternum is wider than long, the sides slightly diverging. A broad furrow extends from the back, forking into two diverging grooves which disappear a short distance from the front border.

The chela is burnt orange in color and is moderately stout, without keels, and marked by a number of narrow longitudinal stripes. The movable finger has seven short rows of tubercles set diagonally and these are flanked at a distance by six larger tubercles.

* "Saratoga" of Maerz and Paul, "Dictionary of Color" (1930), plate 11J8.



The movable finger of the chelicera has near its middle on the ventral side a brush of about twenty-five long, fine, scaly hairs. About halfway between these and the tip of the finger is a comb of twelve bristles. Ventral to the hairs is a series of about seven minute oval fissures. Beyond the last tooth of the comb is another fissure which appears to be the opening of a sac. These fissures are possibly sensory.

The legs have a spine on each side at the base of the tarsae. Along the ventral side of the tarsae is a brush-like row of long slender bristles. There is a median claw which has near its ventral base two small secondary claws.

The pectines are small and possess six teeth. There are three median pieces beyond the fulcrum. The two halves of the genital operculum are united along their entire median border. The sternal scute to which the pectines are attached is wider than long. Its posterior border is straight, the lateral borders are subparallel, and the front border broadly and deeply emarginate.

Measurements of the holotype: total length 27.3 mm., carapace 3.5 mm., tail 15 mm.; the first segment is one-half of the third, the third segment is one-half of the fifth. Localities: ARIZONA: 16 miles east of Tucson, December 28, 1940, female *holotype* and six paratypes collected by Stanley and Dorothea Mulaik. CALIFORNIA: 6 miles west of Bishop at 4450 feet. Female paratype collected March 16, 1941 by Allen Mulaik; and at Mt. Springs, San Diego County, January 8, 1941, female paratype.

Explanation of Figures of *Diplops desertorum* new species

FIG. 1. Ventral view of the chelicera showing two of the fine hairs much magnified.

FIG. 2. Lateral view of the extremity of the tail.

FIG. 3. Dorsal view of the extremity of the tail.

FIG. 4. Section through one of the trichobothria below the lateral eyes.

FIG. 5. Lateral view of the tarsa of the seventh leg.

FIG. 6. Movable finger of the chela.

FIG. 7. View of the region surrounding the sternum.

FIG. 8. Right pectin, ventral view.

FIG. 9. Dorsal view of segments four and five of the tail.

Undescribed Species of Crane-flies from the
Eastern United States and Canada
(Dipt.: Tipulidae). Part IX

By CHARLES P. ALEXANDER, Massachusetts State College,
Amherst, Massachusetts

The preceding part under this general title was published in ENTOMOLOGICAL NEWS, 55: 125-129, 1944. At this time I am discussing three interesting crane-flies, one of which I collected at high altitudes in the Black Hills, South Dakota, where there is a surprising union of characteristic eastern types of Tipulidae with fewer forms that are typical of the Rocky Mountains and westward. A second species was collected by Dr. Victor E. Shelford and was included in materials sent to me for confirmation of identification by Dr. Alan Stone. The third fly resulted from extensive collections made at Camp Claiborne, Louisiana, by Major Emory Burgess. I am greatly indebted to all of these entomologists for the opportunity of naming these interesting flies. Except where stated to the contrary, the types of the novelties are preserved in my collection.

Dolichopeza (Oropeza) dakota new species

Allied to *venosa*; mesonotal praescutum and scutum, with the thoracic pleura, conspicuously patterned with black; knobs of halteres infuscated; tarsi brown; wings infumated, patterned with darker, including the conspicuous dark brown stigma; costal border weakly darkened; a broad seam along vein *Cu*, particularly in cell *Cu*₁; *Rs* oblique, *Sc*₂ ending about opposite one-fourth to one-fifth its length; petiole of cell *M*₁ shorter than *m*; abdominal tergites obscure yellow on sides, broadly blackened medially, sternites blackened on more than the basal half, the posterior borders broadly yellow.

♀. Length about 12 mm.; wing 11.5 × 3.3 mm.

Frontal prolongation of head brownish gray, sparsely pruinose, provided with scattered long yellow setae; palpi yellowish brown. Antennae with scape and pedicel testaceous yellow, flagellum black; first flagellar segment (female) elongate, nearly as long

as the succeeding two taken together, constricted at near mid-length; remaining segments subcylindrical, their verticils chiefly unilateral in distribution. Head with front buffy yellow, with a small brown median spot before the antennal fossae; posterior portion of head brownish gray.

Pronotum obscure brownish yellow, more infuscated medially. Mesonotal praescutum with the ground color brownish gray, with three entire black stripes; scutal lobes each with a conspicuous black central area; median region of scutum, at and behind the suture, with a black line; scutellum medium brown, the sides more yellowed, parascutella infuscated; mediotergite medium brown; pleurotergite testaceous yellow. Pleura yellow, heavily patterned with dark brown, sparsely pruinose; the chief dark areas appear as major marks on the anepisternum, ventral sternopleurite and meron; dorsopleural membrane pale. Halteres yellow, base of stem more brightened, knob weakly infuscated. Legs with the coxae yellow, the fore and middle pair slightly more infuscated on outer faces; trochanters yellow; remainder of legs light brown or yellowish brown, the tips of femora and tibiae narrowly brownish black; tarsi brown. Wings relatively short and broad; ground color infumated, patterned with darker, including the short-oval dark brown stigma; cells *C* and *Sc* darker brown than the ground; a brown seam along vein *Cu*, as in *venosa*, chiefly in cell Cu_1 but slightly encroaching on cell *M*; veins beyond cord and 2nd *A* less evidently bordered by brown, the latter most distinct; veins brown. Venation: Sc_2 entering R_1 about opposite one-fourth to one-fifth the length of the oblique *Rs*, Sc_1 far from its tip; Sc_2 alone exceeding one-half the length of *Rs*; petiole of cell M_1 short, about one-third to nearly one-half *m*.

Abdominal tergites obscure yellow on sides, broadly and conspicuously blackened medially; the yellow coloration becomes more extensive behind so the posterior portions of the segments are chiefly pale; sternites broadly blackened on about the basal two-thirds, the posterior borders broadly yellow; genital shield blackened; cerci compressed, horn-yellow, the upper edges blackened.

Habitat.—SOUTH DAKOTA. *Holotype*: ♀. Harney Peak, Black Hills, altitude 6,700 feet, July 15, 1942 (C. P. Alexander). The fly was captured along a small stream about midway between Sylvan Lake and the summit of Harney Peak, in a dense growth of Western White Spruce.

The closest relative of the present fly is *Dolichopeza* (*Oropeza*) *venosa* (Johnson), a characteristic fly of northeastern North America, that has been recorded from as far west as Michigan. The present insect differs from *venosa* in various regards of coloration of the wings and body, and in the venational details, such as the longer, more oblique *Rs*, with *Sc*₂ some distance beyond its origin; the stigma is smaller so the pale coloration of cell *R*₁ at its anterior end is much more extensive. The discovery of the male sex will almost certainly provide additional and even stronger specific characters. The subgenus *Oropeza* Needham is well-distributed over entire eastern North America but to this date no species had been discovered farther west than Minnesota.

***Limonia* (*Limonia*) *shelfordi* new species**

Similar in general appearance to *fusca*; general coloration black, the surface more or less polished; rostrum and antennae black throughout, the flagellar segments with very long verticils; halteres elongate, black, the extreme base of stem yellow; legs brownish black, the tarsal segments paler, obscure brownish yellow; wings with a strong blackish suffusion, without a stigma; abundant macrotrichia in cells of outer fourth of wing; *Sc* relatively long, ending opposite two-thirds to three-fourths *Rs*; *R*₁₊₂ and *R*₂₊₃ subequal; abdomen black, the intermediate segments with their posterior borders obscure yellow; male hypopygium of very peculiar structure; a single dististyle, more or less quadrate in outline, bearing a slender blackened rod or style, the mesal face of main body produced into an outer slender lobe and a stouter more cephalic one, the latter bearing a tubercle with four long setae; gonapophyses with mesal-apical lobe long and nearly straight.

♂. Length about 7.5 mm.; wing 8–8.5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments subcylindrical to elongate-oval, with distinct apical necks and much shorter similar basal pedicels; verticils unusually long and conspicuous, the longest (at midlength of organ) fully three times the segment; terminal segment elongate, nearly twice the penultimate. Head dull black; anterior vertex relatively wide, about two and one-half times the diameter of scape.

Thorax brownish black to black, without definite pattern, the surface subnitidous. Halteres elongate, black, the extreme base of stem yellow. Large brownish black, the tarsal segments paler obscure brownish yellow. Wings with a strong blackish suffusion, the prearcular and costal fields slightly more darkened; no stigmal area; veins darker brown than the ground. Numerous macrotrichia in cells of outer fourth of wing, involving cells Sc_1 to M_4 , inclusive, especially abundant in the outer portions of cells. Venation: Sc relatively long, Sc_1 ending about opposite two-thirds to three-fourths Rs , Sc_2 near its tip; Rs long, approximately three to four times the basal section of R_{4+5} ; vein R_2 faint, R_{1+2} extending far beyond it so R_{1+2} and R_{2+3} are subequal in length; cell 1st M_2 relatively short-rectangular, shorter than any vein beyond it; $m-cu$ close to fork of M .

Abdomen in part bicolored, black, the caudal third to fourth of the intermediate segments obscure yellow or brownish yellow, the outer segments uniformly blackened. Male hypopygium of entirely different structure from that of *fusca*. Ninth tergite transverse, occupying the entire width of abdomen, the caudal margin truncated or nearly so, with three groups of elongate black setae, the median area more extensive. Basistyle stout, its ventromesal lobe low and rounded, with numerous very long setae. Dististyle much smaller in total area than the basistyle, of irregular conformation; in general, the shape is quadrate, bearing on the face a long, nearly straight, black rod that is presumably homologous with the dorsal dististyle of *Dicranomyia* species, this acute at tip; main body of style with scattered long erect setae; rostral portion a slender delicate lobe that gradually narrows outwardly; also on mesal face a shorter obtuse lobe that bears a tubercle with about four long spinous setae forming a

sparse pencil. Gonapophysis with mesal-apical lobe long and nearly straight, slender. Aedeagus straight, the caudal margin very gently emarginate, the outer lateral angles produced into pale, inwardly-directed points.

Habitat.—WEST VIRGINIA, KENTUCKY. *Holotype*: ♂, Olive Hill, Carver's Cave, KENTUCKY, in mixed hardwoods, August 5, 1943; Shelford's No. S 1837; United States National Museum. *Paratype*: Broken, sex?, Cheat Range, Durbin, WEST VIRGINIA, in basswood-maple growth, August 2, 1943; Shelford's No. S 1467; Alexander Collection.

I take particular pleasure in naming this distinct fly for the collector, Dr. Victor E. Shelford, to whom I am indebted for many kindnesses while at the University of Illinois, 1919-1922, and to whom all entomologists are indebted for his supervision of the master work "Naturalist's Guide to the Americas," 1926.

The only other regional crane-fly of similar appearance is *Limonia (Limonia) fusca* (Meigen), with a very extensive range throughout the Holarctic Region. Both species have the same blackened body and appendages, and with numerous macrotrichia in the outer cells of the wing. In *fusca*, the venation is quite distinct, with R_2 close to the tip of the vein and in approximate alignment with the free tip of Sc_2 , while the male hypopygium differs in all regards of structure. The present fly may well be the same species mentioned but not described by Rogers from the George Reserve, Livingston Co., Michigan (Mus. Zool., Univ. Michigan, Misc. Pub. 53: 80-81; 1942).

Gonomyia (Lipophleps) burgessi new species

Size medium (wing, male, 4 mm.); general coloration of body light brown and sulfur yellow; white pleural stripe conspicuous, bordered both above and beneath by dark brown; legs brownish black to black; wings tinged with brown, the prearcular and costal fields yellow; R_s unusually long, nearly equal to its anterior branch; cell 1st M_2 strongly widened outwardly, its breadth across outer end approximately two-thirds M_{3+4} ; abdominal tergites light brown, the lateral borders yellow; male hypopygium with the outer lobe of basistyle elongate, constricted

at near midlength, provided with relatively few setae of moderate length; outer dististyles appearing as symmetrical, very long, curved spines that gradually narrow to their tips; phallosome with paired blades, the long outer pair only a trifle widened at tip.

♂. Length about 3.5 mm.; wing 4 mm.

Rostrum and palpi black. Antennae with scape yellow above, blackened beneath; flagellum black, with the usual elongate verticils. Head light sulfur yellow, the central portion of vertex more infuscated.

Pronotum and pretergites light sulfur yellow. Mesonotal praescutum yellowish brown with three darker brown stripes, the humeri and broad lateral borders light yellow; scutum broadly yellow medially, the lobes patterned with reddish brown; scutellum yellow with a conspicuous brown central spot at base; mediotergite yellow on anterior portion, with a darkened area at cephalic border; posterior portion more reddish yellow, infuscated medially; pleurotergite reddened ventrally, yellow above. Pleura with a broad whitish longitudinal stripe extending from and including the fore coxae, crossing the ventral pleurites to the abdomen, passing beneath the halteres, bordered both above and below by dark brown; remainder of pleura and sternum paling into medium brown. Halteres yellow. Legs with the coxae yellow, the fore pair more whitened; middle coxae slightly darkened at base; remainder of legs passing through brownish black to black. Wings with a rather strong brownish tinge, the prearcular and costal fields yellow; stigma long-oval, very slightly darker brown; veins pale brown, more yellow in the brightened areas. Venation: *Sc* relatively long, *Sc*₁ ending a short distance before origin of *Rs*, *Sc*₂ at its extreme tip; *Rs* unusually long when compared with related species, only a little shorter than its anterior branch, the latter without trichia; in one wing of type, basal section of *R*₅ angulated and weakly spurred at near midlength, in opposite wing straight; *m-cu* about one-fourth its length before fork of *M*; cell *1st M*₂ strongly widened outwardly, its breadth across outer end approximately two-thirds *M*₃₊₄.

Abdominal tergites light brown, narrowly darker medially, the lateral borders yellow; sternites clearer yellow; hypopygium brownish yellow. Male hypopygium with the outer lobe of basistyle unusually slender, more or less constricted at midlength to appear weakly bulbous; setae of apex and outer margin few in number, as compared with allied forms, the mesal face glabrous. Outer dististyle a long curved black spine that narrows very gradually to the needle-like tip; styles of the two sides symmetrical. Inner dististyle much longer than in *producta*, about two-thirds as long as the lobe of the basistyle, with a single fasciculate seta. Phallosome with the apical blades paired, symmetrical, elongate, their apices broadly obtuse and only a trifle dilated.

Habitat.—LOUISIANA. *Holotype*: ♂, Camp Claiborne, April 14, 1942, at light (Emory Burgess).

This interesting fly is named in honor of the collector, Major Emory Burgess, who was in charge of insect control at Camp Claiborne between 1941 and 1944. The only near relatives are the Tropical American *Gonomyia (Lipophleps) producta* Alexander and *G. (L.) prolixistylus* Alexander, which have the general structure of the phallosome the same and are entirely different from the superficially similar *G. (L.) puer* Alexander. The present fly is well-distinguished by the coloration of the body and wings; the venation, as the long *Rs* and strongly widened cell *1st M*₂; and by the structure of the male hypopygium, particularly the lobe of the basistyle and both dististyles.

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Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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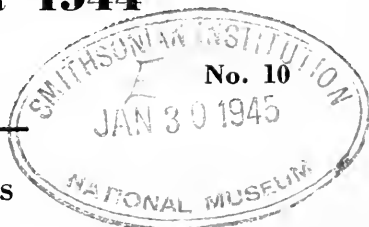
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DECEMBER 1944

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No. 10

Some Butterflies of the Mountains of Eastern Arizona

By E. YALE DAWSON and T. B. BLEVINS

The authors had opportunity during the 1936 and 1937 summers of abundant rubber and gasoline to visit a number of excellent butterfly collecting areas in eastern Arizona, mostly at fairly high altitudes where the lepidoptera were at the peaks of their flights in late June. Some of the comparatively inaccessible mountain regions had seldom been visited by entomologists and promised to yield interesting species for the quest. The species noted in this account are not all of those taken, but represent the more significant, or the more unusual species of particular localities, records of which it is hoped will be of interest to other collectors who may thereby be encouraged to explore these regions more fully for lepidoptera in post-war times. The determinations have all been checked and verified by the junior author and agree with the McDunnough check list of Dec., 1937, except for forms very recently described.

Fresnal Canyon at 2300 feet on the western slope of the Baboquivari range was already quite dry and brown by June 5, and the more ephemeral spring butterflies were mostly gone. Around mesquite trees and desert acacia bushes, however (nasty for netting), *Apodemia palmerii* was abundant, occasionally accompanied by *Atlides halesus* wherever the desert mistletoe (*Phoradendron*) occurred on the mesquite. *Danaus berenice strigosa* soared lazily about as *Asterocampa antonia*, *Anthanassa texana*, *Antigonus pulverulenta*, *Melitaea perse* and *Pholisora ceos* flitted through openings in the shrubbery, occasionally alighting on late flowering composites. On a moist

spot of sand near the drip of a water pipe, a great number of *Leptotes marina* congregated, now and then joined by *Eurema mexicana*, *Polygonus amyntas arizonensis*, or *Libythea bachmanii*. The latter species was only occasional there, although at some seasons in that part of Arizona it migrates in immense swarms. Thousands of these butterflies were seen late one August clinging to shade trees in the town of Gila Bend.

At about 4000 feet on the slope of the mountain, we took considerable numbers of *Megisto rubricata* as they flew up from clumps of dry grass.

During the second week of June we collected around the west base of the Santa Catalina range just north of Tucson, finding, near the town of Oracle (app. 5000 ft.) *Celotes nessus*, *Atrytonopsis lunus*, *A. edwardsi*, *Strymon oslari* and *Apodemia mormo deserti*, usually associated with a yellow bush composite. A second visit some two weeks later saw us netting an abundance of *Strymon leda ines*, *Hemiargus isola* and *Copaeodes aurantiaca* which flew in numbers about the opening flowers of the large clumps of desert acacia.

On the upper slopes of the Santa Catalina range (7000 ft.), where steeply inclined canyons were wooded with oaks, *Neonympha henshawi* and *Megisto rubricata* were common, flitting through the shady groves and hiding themselves from time to time by alighting on the dry, brown leaves covering the sloping ground. Out on the sunny ridges we found *Chiodes albofasciatus* and took *Basilarchia astyanax arizonensis* on the wing, but it was not until we reached the edge of the pine belt at about 7500 feet that we encountered the really excellent collecting. We were fortunate to find the *Ceanothus* bushes in full flower, attracting by their sweet, pungent aroma a host of insects that settled on the flower clusters to become stupefied by the intoxicating sweetness. Forceps proved a far better tool than a net, for, from the community of insects on each inflorescence, it was possible to select exactly the desired specimens and stealthily to remove them without disturbing the other unsuspecting attendants at the gluttonous feast. In this manner we chose for our day's catch some excellent series of *Apodemia*

nais, *Anthanassa texana*, *Poanes taxiles*, *Amblyscirtes cassus*, *A. exotera*, *Callophrys apama* and *Erora quaderna sanfordi* (described by Clench, 1942). *Hypaurotis chrysalus* showed now and then a flash of its dazzling purple wings above the scrub oaks, but evaded capture. *Thorybes pylades* formed a community centering around a slope covered with wild pea vines (*Vicia*).

The pine groves and moist stream beds of the mountain top were less abundantly inhabited by butterflies, but at some advantageous places *Papilio daunus*, *Neophasia terlooii* and *Eurema mexicana* could be taken on the wing with a skillfully handled net, as they flew through the glades. *Erynnis pacuvius*, a great rarity, was also taken.

On the way toward a visit to the Chiricahua mountains we stopped to spend a few hours in Miller's canyon on the lower slopes of the Huachuca range (4000 ft.). The canyon was dry and the forest floor deep with fallen leaves from which an abundance of *Megisto rubricata* and *Neonympha henshawi* were aroused and driven into our nets. These species had the peculiar habit of flying after dusk, and that evening several satyrs were attracted to our light traps along with over a thousand moths. *Heterochroa bredowii*, *Papilio daunus*, *Anaea aidea*, *Euptoieta claudia* and *Basilarchia astyanax arizonensis* were also to be had, but required much more active handling of the net.

At Rustler's Park in the Chiricahua mountains (7500 ft.), the early morning sunbeams had hardly broken through the forest before skippers appeared on the woodland sunflowers, still heavy with dew, and among the wild iris patches in the small clearings. *Poanes taxiles* arose early, followed by *Amblyscirtes bellus*, *A. cassus* and *A. exotera*. By mid-day we found a dripping spring whose moist, sunny borders attracted the skippers, including *Butleria polingii*, as well as considerable numbers of *Paramecera xicaque*. *Euptoieta claudia* and *Eurema mexicana* occasionally settled to rest, but were usually on the wing as was *Basilarchia weidemeyerii angustifascia*.

For real thrills, a butterfly hunter should enter the White mountains of Arizona from Clifton on the south, during the last week of June. The variety and abundance of butterflies to be had within the short distance from the lower sonoran desert country to the boreal heights is little short of fantastic. We found *Nathalis iole*, *Euptoieta claudia* and *Phyciodes picta* on Mesquite flowers as we started into the mountains. At 3500 feet, most of the vegetation was already dry, but a few remaining blossoms yielded *Melitaea theona bollii* to our nets. At 5000 feet however, we again encountered the sweet, fragrant *Ceanothus* in full flower, and there, as in the Catalina mountains, its intoxicating honey drew a multitude of butterflies to the heavily scented bushes. All of the following species were to be had in excellent numbers, although the first three were in predominance: *Apodemia nais*, *Callophrys apama*, *Erora quaderna sanfordi*, *Chlosyne lacinia crocale*, *C. lacinia nigrescens*, *Atrytonopsis deva*, *Butleria pirus*, *Amblyscirtes cassus*, *Nathalis iole*. At 6000 feet, *Papilio daunus*, *Basilarchia weidemeyerii angustifascia*, *B. astyanax arizonensis*, *Eurema mexicana* and *Heterochroa bredowii* were on the wing and best captured as they crossed the open road, for the shrubbery is both dense and continuous at this altitude. The *Ceanothus* flowers here were especially frequented by the blues: *Plebeius icarioides lycea*, *Glaucopsyche lygdamus arizonensis*, and *Lycaenopsis pseudargiolus cinerea arizonensis*. At 7000 feet, near Stray Horse Camp, we succeeded in netting the wary *Hypaurotis chrysalis* and also found *Cecropterus cellus*, *C. pseudocellus*, *Pieris napi pseudonapi*, *Poanes taxiles*, *Hesperia uncas* and *H. pahaska williamsi*.

In mid-afternoon a sudden overcasting of the sky and chilling drop in temperature foretold of an approaching storm, and for a time it appeared that our butterfly collecting was over. As we drove on a way, however, we came to one of the marginal clearings of the extensive, mountain meadows called Hannagan's (app. 9000 ft.). It was filled with yellow sunflowers and to our astonishment, we found that actually thousands of butterflies had been feeding in the field during the sunny afternoon

and now, immobilized by the cold, were still resting on the flowers. Two species were dominant: *Euphydryas magdalena* and *Melitaea pola arachne*. Of these we indeed reaped a rich harvest, all with our forceps, selecting and rejecting specimens at will until the abounding field was deluged by the anticipated rain.

Next day we returned to this meadow to find the butterflies no longer stiff and stupified, but very much alive and active. Having nearly satisfied ourselves as to the two species captured in such abundance the day before, we largely ignored them in favor of the many others new to our nets. *Colias alexandra edwardsi*, *Argynnis nausicaa* and *A. eurynome luski* were the more spectacular inhabitants of the meadows, but by the end of the day our nets had swept up *Phyciodes nycteis drusius*, *P. mylitta pallida*, *Coenonympha ochracea subfusca*, *Butleria polingii*, *Euptoieta claudia*, *Polygonus amyntas arizonensis*, *Mitoura spinatorum*, *M. siva*, *Erynnis persius frederickii* (described by Freeman, 1939), *Minios charon*, *Plebeius aquilo rustica*, *Pieris napi pseudonapi*, *Papilio daunus*, *P. rutulus arizonensis* and many others.

From Hannagan's Meadow, Mount Thomas rises 1500 feet to mark the highest point of the range, and in search of the rare *Erebia magdalena* we set out for its boreal heights. *Polites draco*, *Hesperia nevada*, *Coenonympha ochracea subfusca* and *Oarisma garita* were taken on the upward trail, but at the summit a snow storm struck and drove us back to camp. Rains drenched the mountains and our search for *Erebia magdalena* ended fruitlessly, though our captured treasure of other species had already far exceeded our most optimistic hopes. Perhaps a reader of this account will chance upon its peak of flight should he strike out for the thrills of the butterfly quest in the Arizona mountains as we did. Whichever of these or other mountain ranges of this varied state he may chose to visit, splendid catches of rare butterflies in this grandly scenic region will surely beacon his early return. Good hunting!

No Joy in an Insect-Free World

By ROGER CONANT, Curator, Philadelphia Zoological Gardens

[The following letter appeared in the Philadelphia EVENING BULLETIN on October 4, 1944. It is reproduced here with the permission of the author, and at the request of the editors. Actually we suspect that the wholesale devastation of all insects will not be brought about by the much-advertised DDT, but the ecological or conservation point of view should always be kept in mind in connection with such "dreams."—The Editors.]

An item appeared on the editorial page of *The Bulletin* a few days ago about the use of the new insecticide DDT. It was concerned with the fact that the Pennsylvania Department of Agriculture recently sprayed a 20-acre tract of forest land in Lackawanna County with this substance and that inspections made two and four months later showed that all gypsy moths had been killed—also all flies, mosquitoes, and other insects.

The value of DDT is inestimable. We have heard how its use enabled the American authorities to eliminate typhus-carrying lice from the citizens of Naples, thus preventing a disastrous epidemic. We have heard how DDT may be expected to perform miracles when the war is over and it is available for civilian use. Much is promised, for it appears that after an object is sprayed any insect which touches it during a period of several months thereafter will be killed.

In private homes, hotels, restaurants, fur storage vaults, stables, and similar places DDT probably will be invaluable, but I should like to mention an important fact which has attracted the interest of many scientific minds but which, to the best of my knowledge, has not yet been called to the attention of the public. Unless this insecticide is used with caution it can become a very dangerous boomerang.

Many insects are unmitigated pests, but the wholesale slaughter of the harmful kinds, in the fashion employed in the Lackawanna County forest, also kills all other insects—even beneficial types and those which are of no economic value. Insects, good and bad, are the staff of life of millions of song-birds. They nourish the trout and bass which are so esteemed by sportsmen, and they help to feed other animals of economic

importance—such as the skunk, an important fur bearer. Indirectly they furnish provender for innumerable other animals.

If fields and forests are sprayed on a wholesale scale, what is to become of the bee industry? And, most important of all, what about the insects which pollinate the plants? We could raise mighty few fruits and vegetables indeed were it not for the hordes of insects which, in their travels, carry pollen from one plant to another.

I am confident that the manufacturers of DDT and the wild-life and agricultural authorities are aware of the serious potentialities of this insecticide, as well as they are aware of its encouraging benefits. I simply would like to point out the above facts to your readers who, in a burst of enthusiasm, might be tempted to use DDT indiscriminately as soon as it is on the market. A farmer or suburban gardener could very well ruin his crop or flower bed if he used this product without exercising care and followed directions precisely. If an insect-free world is every achieved, mankind probably will not be on hand to witness and enjoy it.

Rockefeller Foundation in 1943

In the annual report for 1943 the Rockefeller Foundation records the re-discovery of *Anopheles gambiae* in Brazil. This time, however, this most dangerous malarial vector was found in planes arriving from Africa and around airport buildings. The situation was handled promptly before the species became established. The immediate danger is over, but the incident emphasizes the danger attendant upon the establishment of international air service. Public health must become even more international and airplane inspections be most rigid if serious introductions and outbreaks are to be avoided.

The Foundation also announces re-opening of its yellow-fever laboratory at Lagos, West Africa. This laboratory is to serve as a center for distributing yellow-fever vaccine and as a consultative headquarters. This laboratory has considerable historic significance since it was here that yellow-fever vaccine was first prepared and cultures obtained which furnish all the current vaccines.

Electron Micrographs of Mosquito Microtrichiae

By A. GLENN RICHARDS, JR., Zoological Laboratory,
University of Pennsylvania

It is rather generally recognized that a considerable variety of cuticular details lies beyond the range of resolution of the light microscope. In the last several years it has been possible to examine some of these structures with the high resolution RCA electron microscope.¹ The details revealed are sometimes quite unexpected. Recently, incidental to some other work, an entire wing of the malarial mosquito, *Anopheles quadrimaculatus* Say, was examined. Somewhat to our surprise the wing membrane



proved to be so extremely thin that the detailed structure of the minute microtrichiae arising from the wing surface could be observed directly. High magnification electron micrographs were taken of approximately a dozen of these.² One entire microtrichia and the distal portion of another were traced to get the line drawings reproduced here at a magnification of 10,000 \times .

Stereo pictures show that the microtrichiae chosen for tracing are lying flat and accordingly are favorable for measuring. The entire microtrichia is about 10 microns long, and tapers from 0.57 micron at the base to about 0.12 micron at the rounded tip. The most striking feature is the ringed appearance due to circular thickenings around the shaft. These show most distinctly because of the crenulate edge they give in silhouette, but dark bands across the microtrichial pictures at these points in-

¹ See Journ. N. Y. Entom. Soc., 50: 147-167, 245-247, 1942; Journ. Morph., 71: 135-183, 1942; Journ. Applied Physics, 13: 748-758, 1942; Sci. Monthly, 55: 187-192, 1942.

² Stereoscopic electron micrographs taken by Dr. R. G. Picard of RCA.

dicates that, as one would expect, the thickenings go all the way around the shaft. Usually the rings are placed at right angles to the axis of the microtrichia but in some regions the rings appear slightly tilted to the axis of the shaft. Nevertheless they are clearly rings and not a helix ("spiral"). The thickened rings have a spacing of 0.1 to 0.2 micron but their elevation from the shaft is only some 0.015 to 0.03 micron.³

The base of each microtrichia is surrounded by an irregular area of greater density. On the probable assumption that the chemical material is the same (or of the same density), this indicates that each microtrichia arises from an area of slightly thicker membrane. It is not desirable to attempt an estimate of the thickness of the mosquito wing membrane from these pictures. Clearly, though, the great transparency to 60 kilovolt electrons shows the membrane must be extremely thin, probably considerably less than 0.1 micron for the sum of upper and lower membranes. The thickened areas at the bases of the microtrichiae are considerably thicker and may be as much as 0.25 micron.

In an analysis of iridescent wing scales of butterflies we noted,⁴ "It may be a coincidence, but it seems remarkable that so many structures in the scales, the vanes, the supporting rods and the supporting membrane, too, are crossed by thickenings 0.12 to 0.20 micro apart." Analyses of physical colors in insects (Süffert, Mason, etc.) show that spacings of this magnitude and somewhat larger are common throughout many insect groups. Now we find similar spacings on mosquito micro-

³ Annulated shafts, however, are not found on the microtrichiae of all insects. Electron micrographs of microtrichiae from the wings of a housefly and a thrips show smooth edges. Likewise, electron micrographs of setae from various sources (*e.g.*, mosquito larvae) show smooth edges. Data obtained with the light microscope deal only with variations of a greater magnitude but one can say that such annulated shafts seemingly have not been recorded (see summary by Ferris, *Can. Entom.*, 66: 145-150, 1934).

⁴ T. F. Anderson & A. G. Richards, Jr., *Journ. Applied Physics*, 13: 748-758, 1942. A brief non-technical digest of this was given in *Entom. News*, 55: 190-193, 1944.

trichiae. As we suggested, these periodic thickenings probably do not represent a molecular spacing as such but they may well be related to the mode of deposition of the material.⁵

The discovery that similar spacings are found in iridescent and colorless structures leads one to inquire how spacings of similar magnitude may in one case produce color, in another case not. Such "submicroscopic" spacings conceivably might not result in the production of color because (1) the spacings may be below the minimum necessary to produce interference effects (0.19 micron); (2) the spacings may be hidden or improperly oriented; (3) the parts may be so constructed and distributed that color effects are not produced; or (4) the part may be too opaque for the spacings to be effective. Examples of all of these possibilities have now been found with the electron microscope.

We are faced by the fact that a wide variety of cuticular parts of entirely different gross structure show spacings in this range but not of exactly the same measurement. This fact may perhaps be interpretable in terms of imbibition or similar phenomena. It is well-known that various chemicals (water and certain organic liquids) cause different degrees of swelling (imbibition) with resulting change of color in insect cuticles. It is possible that some fundamental spacing, general throughout insect cuticles, is modified by the addition of other substances to give the slightly different spacings found in different insects.

In the past this problem has been studied by analysis of the interference effects (colors) sometimes produced; this indirect method is highly accurate in certain respects but is limited in scope. In the electron microscope we have an instrument with which this problem can be studied directly for a fairly wide range of cuticular structures. It is interesting to see how generally systematic spacings are found in insect structures, both colored and colorless, and to note how many of them fall within this narrow range.

⁵ A much smaller, possibly molecular framework was found in butterfly scales. This meshwork showed lines only approximately 0.006 micron wide and 0.02 micron apart.

Notes Upon Flies of the Genus *Solva* Walker

By F. M. HULL, University of Mississippi

Four species of flies belonging to or close to the genus *Solva* Walker, have been collected by the author in Mississippi. Two of these appear to be undescribed. Three of these species present certain differences from the genotype of *Solva* and for them I erect a new subgenus. Ten species of *Solva* have previously been described from North America, several of which appear to be wide-spread.

Genus *Solva* Walker

Phloophila new subgenus

Eyes bare. Males dichoptic. Antennae set a little below the head in profile as in *Solva*. Third antennal segment with eight annuli. Body more compact than in *Solva*. Hind femora in all the known species considerably enlarged and bearing rows of small teeth upon the ventral surface. Wings with venation in general similar to *Solva* but with the vein M_3 and the vein Cu_1 arising from the same point; the vein M_3 sometimes evanescent. All the veins strongly microsetate above and in some cases below, in contrast to the limited distribution upon the first two or three veins in *Solva*.

Subgenotype: *pallipes* Loew.

Both Leonard* and Malloch* have previously called attention to the differences between *pallipes* and the other species of *Solva*. Malloch pointed out that the larvae and pupae of *pallipes* Loew present characteristics justifying its separation.

Phloophila crepuscula new species

This species is related to *pallipes* Loew in the black teeth upon the hind femora but is quite distinct in the very different, shorter and rather swollen antennae, as well as the entirely black, oval more widened abdomen, and the venational difference.

Male. Length 4.5 mm. *Head*: the vertex, front and face are black; the eyes are margined with white pubescence and

* Leonard, M. D., Rev. of N. Amer. Rhagionidae, page 43 (1930); Malloch, M. R., Bull. Ill. St. Lab. of Nat. Hist., Vol. XII, art 3, p. 341 (1917).

white pile that expands inwardly and gradually upon the lower half of the front leaving the middle bare. The pile of the face and front and vertex is silvery. The antennae are dark brown upon the first joint and light brownish-yellow upon the second and almost white upon the ventral and medial surfaces of the remaining apical part; the apical and dorso-lateral surface of which is blackish; the antennae are much shorter and considerably wider, especially upon the basal half of the third joint, than in *pallipes* Loew. *Thorax*: quite convex and rounded and shining black with short, appressed, whitish pile which has a very faint, scarcely noticeable yellowish tinge. The humeri, sides of the pleura below the mesonotum and the broad middle of the scutellum are pale yellow. The sides and base of the scutellum are blackish. *Abdomen*: broader, wider, more oval and more flattened than in *pallipes* and wholly shining black except for the usual, transverse, basal, oval, yellowish, non-chitinized area that lies below the metanotum. Halteres pale yellow. *Legs*: including the coxae, but excepting the extreme base of the hind coxae and the last three tarsal joints, entirely pale whitish-yellow. The distal tarsal joints are pale brown, the base of the hind coxae dark brown. Pile of the legs pale except for a double row of very short, black, tooth-like spines along the outer ventral margin of the hind femora upon the distal half. *Wings*: hyaline, the veins dark brown. The vein M_3 , or the second section of the fifth longitudinal vein, is reduced and it fails by nearly half its length to reach the margin.

Female. Uniformly larger, measuring 6.5 mm.; similar in every respect to the male except for larger size and still broader and more oval abdomen.

Holotype: a male, allotype female, two paratype males and eleven paratype females, all taken at the University, MISSISSIPPI, upon windows in May, and usually in the late afternoon during the years 1940-42.

Phloophila pygmea new species

This species is related to *pallipes* Loew and differs in the differently shaped and colored antennae, and the dark brown, black tipped palpi.

Female. Length 4.5 mm. *Head*: the front, face and vertex are black, the front has an appressed band of whitish pile, the hairs directed towards the midline above and this band is divergent upon the lower half of the front until it reaches the eye margin at the base of the antennae. The hairs of the two sides intercross upon the upper half of the front. Palpi dark brown with black tip. The antennae are elongate and rather slender but less tapering than in *pallipes* Loew. *Thorax*: moderately convex and shining black with sparse, appressed, whitish-yellow pile which is not conspicuously formed into bands or stripes as it is in *pallipes*. The humeri, the lateral margins of the thorax just below the mesonotum and the scutellum except very narrowly upon the base and narrowly on the sides, are brownish-yellow. *Abdomen*: rather short and moderately broad; it is shining black with extremely slender, yellow margins upon the posterior margin of the third and fourth segments and with a trace of these upon the second segment. The sixth and seventh segments are entirely shining black without the yellow spots characteristic of *pallipes*. *Legs*: pale yellow, the apices of the hind femora are very narrowly brown, the distal tarsal joints light brown. The hind femora are more slenderly thickened than in *pallipes* and have two rows of very tiny, black, spine-like teeth upon the outer ventral margin almost as far as the base. *Wings*: greyish hyaline, the veins dark brown, the venation similar to *pallipes*.

Holotype: a female. Oxford, MISSISSIPPI, May, 1941.

The antennae upon the medial and ventral surfaces are dark reddish-brown instead of whitish-yellow, the remainder of the antennae is brownish-black.

Phloophila pallipes Loew

This species is almost always abundant late in every spring season and is commonly found on windows.

Solva americana Wiedemann

Twenty-six specimens of this fine species have also been collected at Oxford, Mississippi, upon laboratory windows, in May. Of them only two were females.

**A Few Additions and Corrections to R. E.
Blackwelder's "Checklist of the Coleop-
terous Insects of Mexico, Central
America, the West Indies, and
South America. Part I"**¹

By HUGH B. LEECH, Vernon, British Columbia

On page 2 of his most useful checklist² Blackwelder requests the publication of any additions and corrections noted by its users. Upon comparing the pages listing water beetles (*Haliplidae*, *Dytiscidae*, *Gyrinidae*, *Limnebiidae* and *Hydrophilidae*) with my monograph of the water beetles of Lower California (*in press*, California Academy of Sciences), it appears that at least 20 species, all from Baja California, should be added.³ Bibliographical references are not given here, as Dr. Blackwelder will cite all literature in full in the last part of his checklist.

†**Canthydrus lineatus* Horn 71-329. Type locality is Baja California.

†*Canthydrus levis* Fall 09-161. Type locality is Baja California.

†**Desmopachria dispersa* Crotch 73-388. Type locality is Baja California.

†*Bidessus cinctellus* LeC. 52-206. Recorded from Baja California by Horn 94-313.

†*Bidessus amandus* LeC. 52-207. Recorded from Baja California by Horn 94-313.

†**Hygrotus fraternus* LeC. 52-209. Recorded from Baja California by Horn 96-368.

†**Deronectes addenda* Crotch 73-393. Type locality is Baja California.

¹ Contribution No. 2321, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

² Smithsonian Institution, Washington, D. C., United States National Museum Bulletin 185, pp. xii + 188, 1944.

³ Species preceded by an asterisk (*) I have seen from Baja Calif.; those by (†) are additions to Blackwelder's list.

- †**Deronectes funerea* Crotch 73-392. Type locality is Baja California.
- †**Copelatus chevrolati* Aubé 38-389. Recorded from Baja California by Horn 94-314.
- †*Agabus regularis* LeC. 52-203. Recorded from Baja California by Horn 94-314.
- Rhantus anisonychus* Crotch 73-409. Recorded from Baja California by Grossbeck 12-324. He was not certain of the identification.
- †*Rhantus flavogriseus* Crotch 73-409. Recorded from Baja California by Horn 94-314.
- **Thermonetus basillaris* Harris 29-1, is the correct spelling of the specific name, and the correct bibliographical reference.
- Hydaticus bimarginatus* Say 31-5. Recorded by Horn 96-368; probably based on a misidentification.
- Cybister elliptica* LeC. 52-202. Recorded from Baja California by Horn 94-315; thought to have been misidentified.
- †*Thermonetus*⁴ *peninsularis* Horn 94-362. Type locality is Baja California.
- †**Ochthebius interruptus* LeC. 52-210. Recorded from Baja California by Horn 90-23.
- †*Helophorus lecontei* Knisch 24-88. Listed (as *H. obscurus* LeConte) by Horn 94-315, from Baja California.
- Berosus infuscatus* LeC. 54-365. The citation should be 55-365.
- †**Berosus rugulosus* Horn 73-124. The type was from Baja California.
- Berosus salvini* Sharp 82-79 and *B. hoplites* Sharp 87-765 are distinct species, and not, as Knisch (1922) claimed, subspecies of *punctatissimus* LeConte.
- "*Berosus stramineus* Say 25-188" is an unfortunate mixture of two citations,
- One should be: *Berosus stramineus* Knisch 22-124,
the other: *Berosus striatus* Say 25-188.
- Tropisternus laevis mergus* Say 37-171. The citation should be 35-171.

⁴ Blackwelder uses this generic name as if it were of feminine gender, though by his own rules (1941-138) it must be masculine.

Tropisternus ellipticus LeC. 54-368. The citation should be 55-368; several other LeContean species of 1855 are cited as of 1854. But see the reference to *Tropisternus sublaevis* LeConte on p. 171.

†**Tropisternus salsamentus* Fall 01-214. Recorded from "Basse Californie" by d'Orchymont, 1922.

Chaetarthria. The generic name is credited to Stephens 1835-401. I believe it can be given an earlier date, Stephens 1833, Nomencl. British Ins., ed. 2, p. 22.

Paracymus dibilis Sharp, should be *debilis*. Blackwelder separates the genera *Paracymus* and *Anacaena*, but d'Orchymont (1933: 302-304) points out that on the basis of the world fauna the two are virtually inseparable. In fact d'Orchymont would place *debilis* Sharp in *Anacaena*.

†**Anacaena signaticollis* Fall 24-87. This was listed (as *infuscatus* Mots.) from Baja California by Horn 94-317.

†**Helochaeres normatus* LeC. 61-341. Recorded from Baja California by Horn 73-126; 90-252; 94-316.

†*Helochaeres maculicollis* Mulsant 44-379. Recorded from Baja California by Horn 96-368.

†*Cymbiodyta dorsalis* Motschulsky 59-177. Recorded from Baja California by Horn 94-316.

Phaenonotum estriatum Say. I am a little puzzled by the spelling of the specific name. The species was originally described by Say 35-171, as *Hydrophilus exstriatus*. Why Blackwelder should prefer the LeContean emendation *estriatum* when he does not, for instance, accept Dejean's emendation *Thermonectus* of his own 1833 *Thermonectus*, is hard to understand. If the spelling *estriatum* is to be used, the reference would be to LeConte 53-36, rather than to 55-373 (not 54-373).

Cercyon rufescens Horn 95-233. Described as from Baja California.

Notes and News in Entomology

Under this heading we present from time to time short reviews, notes, news and comments about entomology and entomologists. Contributions from readers are earnestly solicited. The editors wish more readers would contribute to this section. Trivial notes are commonly the most interesting reading.

The Classification of Entomologists: The classification of entomologists made by Brunnich in 1764, recently unearthed by Dr. H. B. Weiss and reprinted in the May number of the "News" is quaint but not without interest to the present-day entomologist. However, Dr. Weiss aptly comments that Brunnich's distinctions do not hold at the present time, and the classification needs to be completely revised and modernized.

I have often thought that a classification of entomologists should be made, but it should be made on the simple basis of the degree of imagination possessed by them rather than on the basis of their special interests. There are imaginative entomologists and those without imagination, and one needs only to page through the volumes of any present-day journal of that field to be able to sort one from the other.

I had not gone far, however, with my meditations on such a classification when I discovered that Oliver Wendell Holmes had already done the job for me. While of course he did not mention entomologists, his three category classification fits aptly in that field. He says: "There are one-story intellects, two-story intellects, and three-story intellects. All fact collectors, who have no aim beyond the facts, are one-story men. Two-story men compare, reason, generalize, using the labors of the fact-collectors as well as their own. Three-story men idealize, imagine, predict * * *."

Other writers have their similar ideas about the unimaginative person. W. Somerset Maugham, in his book "On a Chinese Screen," after describing the haphazard writings of a certain journalist, says: "He had seen everything at haphazard * * *. He was the field naturalist, who patiently collects an infinity of facts, but has no gift for generalization; they remain facts that await the synthesis of minds more complicated than his own. His collection was unrivalled but his knowledge of it slender. He had an insatiable curiosity. But I think his experiences were merely of the body and were never translated into experiences of the soul * * *. That was certainly why with so much to write about, he wrote tediously, for in writing, the important thing is less richness of material than richness of personality."

Aldous Huxley likewise has a word for the man of imagination. "Without imagination, without sensitiveness, it would be impossible to be a successful man of science. It would be difficult to find a great scientific man who has not been touched by a sense of wonder by the strangeness of things."

A portrait of a man of imagination may be found in the writings of Robert G. Ingersoll. Says he: "A man of imagination,—that is to say, of genius,—having seen a leaf and a drop of water, can reconstruct the forests, the rivers and the seas. Really, to know one fact is to know its kindred and neighbors. Shakespeare, looking at a coat of mail, instantly imagined the society, the conditions that produced it, and what it produced."

The adoption of the three category classification of Holmes would be a boon to entomology. Many rising students of the science eager to graduate into the "three-story" class, would encourage the development and make full use of the imagination in their researches, and produce works perhaps as great or even greater than those of Darwin, Bates, Wallace, Forel, Fabre and Wheeler, all of whom have made fullest use of their powers of imagination.—But after all, one must not permit his own imagination to grow too robust in this expectation. PHIL RAU.

Fireflies Active in Rain: Although such records may exist, I cannot recall ever having seen in print, the fact, so well known to many, that fireflies are active during moderate evening showers. Most nocturnal insects do not fly about while it is raining, but I have often noted *Photinus marginellus* Lec., and *Photuris pennsylvanica* DeG., flying leisurely during moderate June rains. Our standard texts are not explicit about this matter. Many fail to note this characteristic activity of the Lampyridæ. True, Comstock's "Introduction to Entomology" mentions the activity of Lampyridæ on warm, moist evenings, but such a statement gives one the impression of dampness, rather than of actual rain. I have never seen them flying during a heavy, beating downpour, but many are not deterred by moderate showers, and after the shower they appear in larger numbers.—H. B. WEISS.

Permanent "Sleeping" Quarters of *Chalybion cæruleum* (Linn.), (Sphecidae, Hymen.): Every summer, from the middle of June, through August, over a period of five years, small

aggregations (10 to 15) of the blue mud-dauber wasp, *Chalybion caruleum* (Linn.) have used the same inside corner of a cloth awning, on the porch of my house, for a roosting place during the night. This corner is formed where the sloping top and the front and side pieces meet. Through five consecutive summers, the same awning has been in place and every day from 30 minutes to an hour before sunset individuals would arrive singly and after some preliminary flying and crawling over the awning, finally settle in the corner close to one another. On cloudy afternoons they would appear earlier. On sunny mornings they had left before I appeared on the scene, but when the weather was cloudy and cool or raining they would remain until such conditions had disappeared.

The other corner of the same awning and other corners of adjoining awnings were never selected. As September approached, the number of individuals in the sleeping aggregation declined to five or six, and even during the summer nights the number was not always constant, but varied from night to night between 10 to 15. The selection of the same "sleeping" quarters year after year by different individuals seems to indicate that this particular corner possesses an odor that does not disappear from the end of one summer to the beginning of another, and that is renewed each summer by a new "sleeping" aggregation.—HARRY B. WEISS.

An unusual faunistic study: While making an index to the first fifty volumes of the Journal of the New York Entomological Society, my attention was attracted by the paper entitled, "A contribution to the study of the fauna of the grave. A study of one hundred and fifty disinterments, with some additional experimental observations," by Murray Galt Motter. This was published in Volume VI, No. 4, p. 201-231, Dec., 1898, and shows the findings on human cadavers interred from one to seventy-one years within the city limits of Washington, D. C. These findings belonged chiefly to the Acarina, Thysanura, Coleoptera and Diptera. This is a subject that has not received much attention from American entomologists, due, no doubt, to obvious difficulties inherent in such a study. For this reason many years will no doubt elapse before much is added to our present knowledge in this field.—H. B. WEISS.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, 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.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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.

NOTE: The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, left, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—(See also under Special.) **Allan, P. B. M.**—Some notes on hibernating larvae I. [9] 77: 125-6 (cont.). **Beltran, E.**—El problema de las clasificaciones zoológicas y la enseñanza de la zoología. [35] 5: 83-98. **Birkmann, G.**—Obituary. [68] 99 (2580): 463. **Boyden, A.**—Systematic relationship in animals. [129] 89: 568. **Bridges, C. B.**—Mutants of *Drosophila melanogaster*. Completed and edited by Katherine S. Brehme. 257 pp., 128 text figs., 3 pls. Carnegie Inst. of Wash., Publ. 552. 1944. Review by Th. Dobzhansky in [68] 100: 52. **Bruch, Carlos.**—Obituary. 1873-1943. Bibliography. [106] 169-83, port. **Dendy, J. S.**—Fate of animals in stream drift when carried into lakes. [27] 14: 333-57. **Dorsey, C. K.**—Mosquito survey activities at Camp Peary, Virginia. [7] 37: 376-387. **Evens, E. D.**—Method for fixing insects with legs, etc., extended. [Microscope] 5: 211. **Hermes, William Brodbeck.**—Biography. [Mosquito News] 4: 38, 46-47, port. **Jaeger, E. C.**—Source-book of biological names and terms. [C. C. Thomas, Springfield, Ill., 256 pp., ill.] **Pierce, W. D.**—Entomophobia. [38] 43: 78-80. **Sevastopulo, D. G.**—Prepupational travel. [9] 77: 107-9. **Smart, J.**—Handbook for the identification of insects of medical importance. [Brit. Mus. Publication] 269 pp., ill., 1943. **Smith & Kelly.**—Thirteenth or 1943 annual insect population summary of Kansas. [103] 17: 81-98. **Turner, H. J.**—Terminology in natural science. [21] 56: 69-70, 79-80. **Wadley & Wolfenbarger.**—Regression of insect in-

tensity on distance from center of dispersion as shown by a study of the smaller European bark beetle. [47] 69: 279-88. **Wolcott & Martorell.**—Seasonal cycle of insect abundance in Puerto Rican cane fields. [Jour. Agr. Univ. P. Rico] 27: 85-104, ill., 1943.

ANATOMY, PHYSIOLOGY, MEDICAL—**Augustson, G. F.** (See under smaller orders.) **Barnes, H. F.**—Studies of fluctuations in insect populations. X. Prolonged larval life and delayed subsequent emergence of the adult gall midge. [97] 12: 137-38. **Beall, G.**—Multiple generation *Pyrausta nubilalis* on plants other than corn in Ontario. [29] 74: 13-15. **Blewett & Fraenkel.**—Intracellular symbiosis and vitamin requirements of 2 insects, *Lasioderma serricorne* & *Sitodrepa panicea*. [Proc. R. Soc. London, B] 132: 212-21. **Brown, J. H.**—Sylvatic plague. A note on the probable relationship of flea index to epizootic plague in ground squirrels in Alberta. [13] 36: 70-71. **Caspari, E.**—Action of the gene A on the tryptophane metabolism of *Ephestia kühniella*. [129] 89: 545. **Colton, H. S.**—Anatomy of the female American lac insect, *Tachardiella larrea*. [Bull. Museum of Northern Ariz.] 21: 1-24, ill. Abstract in [129] 89: 573. **Cook, Wm. C.**—Studies of the vitality of the beet leafhopper during the fall and winter in California, as related to the fat content of the insects. [84] 25: 327-40. **Davidson, J.**—On the relationship between temperature and rate of development of insects at constant temperatures. [97] 13: 26-38. **Dobzhansky & Epling.**—Contributions to the genetics, taxonomy and ecology of *Drosophila pseudoobscura* and its relatives. Carnegie Inst. of Wash. Publ. 554. 183 pp. (Review by **E. Mayr** in [68] 100: 11-12.) **Dobzhansky & Spassky.**—Genetics of natural populations. XI. Manifestations of genetic variations in *Drosophila pseudoobscura* in different environments. [Genetics] 29: 270-90. **Duncan, J.**—Factors affecting the increase in population of the corn borer, *Pyrausta nubilalis* in 1943. [29] 74: 10-11. **Evans, A. C.**—Observations on the biology and physiology of wireworms of the genus *Agriotes*. [20] 31: 235-49. **Fano, U.**—Experiments on mutations induced by neutrons in *Drosophila melanogaster* sperms. [Genetics] 29: 361-69. **Fedotov, D. M.**—Some observations on the internal state of imago of *Eurygaster integriceps* (Hemiptera). [99] 42: 408-11. **Fisher, Corbet & Williams.**—Relation between the number of species and the number of individuals in a ran-

dom sample of an animal population. [97] 12: 42-58.

Flanders, S. E.—Uniparentalism in the hymenoptera and its relation to polyploidy. [68] 100: 168-69.

Flanders, S. E.—(See under Hymenoptera.)

Galvao, Correa & Grieco.—Alguns dados sobre a manutencao de colonias de *Nyssorhynchus* em laboratorio. [94] 9: 85-102, ill.

Glass, B.—Effect of x-rays upon the action of a specific gene in *Drosophila melanogaster*. [Genetics] 29: 436-46.

Goldschmidt, R. B.—Parallelism of scalloping and plexation in the wings of *Drosophila*. [129] 89: 561.

Griswold, G. H.—Studies on the biology of the webbing clothes moth (*Tineola bisselliella*). [Cornell U. Agr. Exp. Sta.] Memoir 262, pp. 1-59, ill.

Imms, A. D.—On the constitution of the maxillae and labium of Mecoptera and Diptera. [53] 85: 73-96, ill.

Kettlewell, H. B. D.—Temperature experiments on the pupae of *Heliothis peltigera* and *Panaxia dominula*, with the manifestation of the mendelian law at a given temperature only. [Proc. & Trans. S. London Ent. & Nat. Hist. Soc.] 1943-44: 69-81, ill.

Kosmachevsky, A. S.—*Melolontha* larvae as affected by soil humidity. [99] 40: 248-50.

Lewis & Bletchley.—Emergence rhythm of the dung-fly *Scopeuma* (= *Scatophaga*) *stercararia*. [97] 12: 11-18.

Light, S. F.—Experimental studies on ectohormonal control of the development of supplementary reproductives in the termite gen. *Zootermopsis*. [Univ. Cal. Publ. in Zool.] 43 (17): 413-54, ill.

Losina-Losiusky, L. K.—Fluctuations in the intensity of breathing in insects as related to temperature and development. [64] 1943: 125-134, [Russian, English summary.]

Michener, C. D.—Comparative study of the appendages of the eight and ninth abdominal segments of insects. [7] 37: 336-351, ill.

Payne, N. M.—Growth curves of two coleopterous larvae (*Epilachna corrupta*) and (*Laemopholeus minutus*). [129] 89: 551.

Pickles, W.—Variations in the ground plan of a nest of the ant *Tapinoma nigerrima*. [97] 12: 109-14.

Rohdendorf, B. B.—On the evolution of flight in insects. [99] 40: 170-72.

Schneirla, T. C.—Nomadism in the swarm-raiding army ants as an instance of animal migration. [129] 89: 552.

Sharrer, B.—Role of the corpora allata in the development of *Leucophaea maderae* (Orthop.). [129] 89: 539.

Snodgrass, R. E.—Feeding apparatus of biting and sucking insects affecting man and animals. [Smithsonian Misc. Coll.] 104 (7): 1-113, ill.

Stunkard, H. W.—Studies on the life history of the oribatid mite

Galumna sp., intermediate host of *Moniezia expansa*. [129] 89: 550. **Thorpe, W. H.**—Types of learning in insects and other arthropods. [Brit. Jour. Psychol., Gen. Sect.] 33: 220-34; 34: 20-31, 66-76, 1943-44. Review by **G. E. Hutchinson** in [Amer. Scientist] 32: 291. **Villee, C. A.**—Phenogenetic studies of the *aristapedia* alleles of *Drosophila pseudoobscura*. [129] 89: 562. **Williams, J. L.**—The comparative anatomy of the internal genitalia of psychid moths. [57] 75: 251-60, ill. **Wishart, G.**—An increase in the multiple generation of the European corn borer in Ontario and its relation to parasite establishment. [29] 74: 11-13. **Wulff & Jahn.**—Correlation of electrical and chemical changes in the dark-adapted insect eye. [129] 89: 544. **Zee & Pai.**—*Corpus allatum* and *corpus cardiacum* in *Chironomus* sp. [90] 78: 472-80.

ARACHNIDA AND MYRIOPODA—**Baker, E. W.**—*Tideidos Mexicanos* (Acarina: Tydeidae). [35] 5: 73-82, ill. (*). **Carl, J.**—K. W. Verhoeff's system der Siphonophoriden; kritisch betrachtet. [Rev. Suisse Zool.] 51: 253-65, ill. **Chamberlin, R. V.**—Some records and descr. of Amer. Diplopods. [95] 56: 143-52, ill. (*). **Chickering, A. M.**—Salticidae (jumping spiders) of Michigan. [Pap. Mich. Acad. Sci. A. & L.] 29: 139-222, ill. (k). **Cooley & Kohls.**—Argasidae of N. Amer., C. Amer. & Cuba. [Amer. Midland Nat.] Mon. 1: 152 pp., ill. **Keifer, H. H.**—Eriophyd studies XIV. [Bull. Dept. Agr. Calif.] 33: 18-38, ill. (*). **Lundblad, O.**—Hydracarina-fauna Sudbrasilienens u. Paraguays. [K. Svenska Vet-Akad. Handl.] (3) 20, No. 13: 192 pp., ill. (*). **McLean, G.**—Observations on a spider parasite. [Irish Nat. Jour.] 8: 205-7, ill. **Smith, C. N.**—Life history of the tick *Ornithodoros coriaceus*. [7] 37: 325-335. **Starling, J. H.**—Ecological studies of the Paupoda of the Duke forest. [27] 14: 291-310. **Tragardh, I.**—Further contributions towards the comparative morphology of the Mesostigmata (Acarina). VI. [83] 34A (20): 10 pp. **Verhoeff, K. W.**—Some Californian Chilognatha. Diplopoda article. 142. [38] 43: 53-70, ill. (*). **Vogelsang, E. V.**—Contribucion al estudio de la parasitologia animal en Venezuela. XV. Acarina de los animales domesticos y salvajes. [46] 3: 51-56, ill. **Wells, F. L.**—Diurnal behavior cycle in spiders. [68] 99 (2582): 513.

THE SMALLER ORDERS—**Augustson, G. F.**—Flea gen. *Thrassis* and sylvatic plague, with the descr. of *T. brennani* n. sp. [17] 30: 237-40. **Banks, N.**—Neuroptera

of northern S. Am. III. [46] 3: 1-35 (*). **Bianchi, F. A.**—Nesothrips Kirk. Supersedes Oedemothrips Bag. [37] 12: 31-38, ill. **Bonet, F.**—Tullberginos de Mexico (Collembola). [35] 5: 51-72, ill. (*). Sobre la clasificación de los Oncopoduridae (Collembola), con descripción de especies nuevas. [An. Esc. Nac. Cien. Biol.] 3: 127-55, ill. **Cable, R. M.**—The Indian rat flea, *Xenopsylla cheopis*, in Indiana. [Proc. Indiana Acad. Sci.] 52: 201-02. **Carriker, M. A., Jr.**—Studies in Neotropical Mallophaga. IV. [46] 3: 65-104 (*). **Cowley, J.**—Preliminary report on the Odonata collected by S. Feliksiak & Jaczewski in Canada and N. Foundland. [9] 77: 123-24. **Imms, A. D.**—(See under Anatomy.) **Kennedy, C. H.**—The female of *Aeshna rufipennis*. [7] 37: 372-375, ill. **Kloet & Hincks.**—Nomenclatorial notes on 2 gen. names in Trichoptera. [9] 77: 97. **Robert, A.**—Premier aperçu sur les Odonates du comte d'Abitibi. [98] 71: 149-171. **Ross, H. H.**—Caddis flies or Trichoptera of Illinois. [Bull. Ill. Nat. Hist. Surv.] 23: 1-326, ill. (*). **Sommerman, K. M.**—Bionomics of *Amapsocus amabilis*. [7] 37: 359-364, ill. **Wright, M.**—Notes on dragonflies in the vicinity of New Smyrna Beach, Fla. [39] 27: 35-9. **Wright & Peterson.**—Key to the genera of anisopterous dragonfly nymphs of the U. S. and Canada. [43] 44: 151-56.

ORTHOPTERA—(See also under Special.) **Duck, L. G.**—Bionomics of *Schistocerca obscura*. [103] 17: 105-119. **Rehn & Rehn.**—Upper Amazonian locust group *Hippacres* (Acridid). [41] 96: 201-26, ill. (*). **Zeuner, F. E.**—The fossil Acrididae. IV. Acrididae incertae sedis and addendum to Catantopinae. [75] (110) 11: 359-83.

HEMIPTERA—**Colton, H. S.**—Anatomy of the female American lac insect, *Tachardiella larrea*. [Bull. Mus. No. Ariz.] 21: 24 pp., ill. (See also under Anatomy.) **DeLong, D. M.**—New gen. (*Tenucephalus*) and sps. of Mexican leafhoppers related to *Parabolocratus*. [43] 44: 236-37, ill. **Fennah, R. G.**—Nomenclatorial notes on *Lateranaria*, *Fulgora*, and *Delphax*. [95] 57: 43-44. **Froeschner, R. C.**—Contributions to a synopsis of the Hemiptera of Missouri. III. Lygaeidae to Nabidae. [119] 31: 638-83, ill. (k). **Harries, F. H.**—Differential effects of temperature on the development of the beet leafhopper. [47] 69: 127-35. **Harris, H. M.**—Concerning American *Rhopalini* (*Rhopalid*). [43] 19: 99-106, ill. **Hayward, K. J.**—El pulgon amarillo de la cana de azúcar (*Silpha flava*) en Tucuman. [Circ. Esc. Exper. Agr. Tucuman] 125: 8 pp., ill. **Knull,**

D. J.—Notes on leafhoppers with descriptions (Cicadellid). [43] 44: 239-42 (*). **McKenzie, H. L.**—Miscellaneous diaspid scale studies. [Bull. Dept. Agr. Cal.] 33: 53-59, ill. (*). **Oman & Beamer.**—Some n. sps. of *Cuerna* (Cicadellid). [103] 17: 119-20, cont. **Plummer, C. C.**—Cinco nuevos Membracidos de Mexico. [An. Esc. Nac. Cien. Biol.] 3: 155-62, ill. **Tissot & Pepper.**—Two new aphids from *Rhododendron* and related plants. [39] 27: 21-34, ill.

LEPIDOPTERA—**Baker, A. D.**—History and distribution of the pea moth, *Laspeyresia nigricana* in Canada. [29] 74: 29-40. **Comstock, J. A.**—Four Californian moths associated with cat-tails. [38] 43: 81-83. **Comstock, W. P.**—Insects of Porto Rico and the Virgin Islands. Lepidoptera: *Rhopalocera Papilionoidea* and *Hesperioidea*. [Sci. Surv. P. R. & Virg. Isl.] 12: 421-622, ill. (*). **Comstock & Dammers.**—Larva & pupa of *Arzama gargantula*. [38] 43: 84-85, ill. **Dethier, V. G.**—Observations on the life history of *Cucullia asteroidea*. [4] 76: 161-2, ill. **Griswold, G. H.**—(See under Anatomy.) **Lichy, R.**—Sur une ♀ inconnue d'un sphingide tres rare du Venezuela. [46] 3: 57-63. **McDunnough, J.**—New microlepidoptera with notes (Eucosomid). [4] 76: 153-56. **Rippon, C.**—Rearing of lepidoptera. [Proc. & Trans. S. London Ent. & Nat. Hist. Soc.] 1943-44: 40-44. **Turner, H. J.**—Observations on lepidoptera in a little known area of S. Amer. (A review). [21] 56: 80-82. **Warren, B. C. S.**—Review of the classification of the Argynnidi, with a systematic revision of the gen. *Boloria* (Nymphalid). [36] 94: 1-102, ill. **Williams, J. L.**—(See under Anatomy.) **Wiltshire, E. P.**—Studies in the geography of lepidoptera. [21] 56: 73-74.

DIPTERA—(See also under Special.) **Alexander, C. P.**—New nearctic craneflies. Part XXI. [4] 76: 166-72. *Tipulidae* nuevos o poco conocidos de Venezuela. [46] 3: 35-50, ill. New or little known *Tipulidae* LXX. Neotropical sps. [75] (11) 11: 284-311. **Beltrán, E.**—Correct names of parasites in human malaria. [68] 100: 384-85. **Bridges, C. B.**—(See under General.) **Brues, C. T.**—Generic name of the sand fly (*Phlebotomus*). [68] 99 (2578): 427. **Correa & Cerqueira.**—Descricao de *Anopheles* (*Kerteszia*) *laneanus*, n. esp. de anofelino de campos do Jordao. [94] 9: 111-17, ill. (S). **Correa & Ramos.**—Notas sobre o estudo da biologia do *A. tarsimaculatus* em Caraguatatuba. [94] 9: 105-108. Contribuicao ao conhecimento da distribuicao geografica dos anofelinos do Estado de S. Paulo.

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This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Specimens of the genus *Calendra* (*Sphenophorus*) from North America. Will exchange Eastern U. S. *Calendra* or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

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