









ENTOMOLOGICAL NEWS

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JANUARY, 1937

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Communications on observations made in the course of your studies should be noted; also abilities of any specimens you consider of interest.

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ENTOMOLOGICAL NEWS

VOL. XLVIII.

JANUARY, 1937

No. 1

Insect Remains.

By H. ELLIOTT McCLURE, University of Illinois, Urbana, Ill.

In the past two years, while studying soil populations, the question has often come to mind, "What becomes of all of the millions of insects that live on the soil surface and what are their chances of preservation?" Obviously, the answer is, "They all die and disintegrate and the chances of preservation are very small."

In an effort to answer this more accurately, in October and November of 1934 ten random one-foot-square samples of soil-surface debris and soil, scraped to a depth of one fourth of an inch, were taken into the laboratory and the living insects driven from them by means of a modified Berlese funnel. Then the debris and dirt were examined by hand with a hand lens for insect remains. Since this time over 100 square feet have been examined with results comparable to those given here.

The samples were taken in an open floodplain forest near Danville, Illinois. At this time of year all of the summer forms were dead, dying, or in hibernacula. These insects, in dying, crawled or dropped to the soil surface and it is believed, but not demonstrable, that the insect remains on the surface in the winter are of the insects of the preceding summer. As quickly as the insects die they are attacked by ants, collembola, millipeds and other forms, so that their bodies are soon broken up into the component segments or sclerites.

From the ten square feet of debris were driven 1320 arthropods and 20 snails, and in the debris were found the remains of 239 arthropods and the shells of 62 snails. The live insects averaged 132 per square foot and the remains 23.9 per square foot. There were 5.5 times as many living insects as recognizable remains.

Of the insect remains 172, or 72%, could be identified to order, 50, or 21%, to family, and only 7, or 3%, were readily recognizable to species. These were, of the beetle remains: *Pelidnota punctata* Linn., 1 elytron; *Phyllotreta vittata* Fabr., 2 elytra; *Notoxus* sp., 2 elytra and abdomen; Hemiptera: *Hymenarcys equalis* (Say), one nearly complete insect; *Solubca pugnar* (Fabr.), one nearly complete insect; *Meneclis incertus* (Fabr.), one nearly complete insect; *Triphleps insidiosus* (Say) one nearly complete insect. Many of the other insect remains, especially the elytra of many beetles, would be recognizable to specialists of the group concerned. The pentatomids were probably the remains of insects that had just died and the sclerites had not yet broken apart. The beetle elytra were identified by the markings.

In contrast to the insects, 58 snails, or 93%, were identifiable as to genus or species. These were:

<i>Retinella indentata</i> (Say)	29
<i>Euconulus fulvus</i> (Müller)	20
<i>Succinea avara</i> Say	3
<i>Punctum pygmaeum</i> (Drup.)	3
<i>Gastrocopta armifera</i> (Say)	1
<i>Gastrocopta pentadon</i> (Say)	1
<i>Polygyra</i> sp. (Fragment)	1
	—
	58

Although there were only one-fourth as many snails as insect remains, due to their structure, there were eight times as many recognizable snails as there were recognizable insects.

The parts of the insects which are most durable are: Hemiptera: scutellum, pronotum, meso- and metathorax, abdominal sterna, and hemelytra; Coleoptera: elytra, head capsule, pronotum, legs, meso- and metasterna and hind wings; Lepidoptera: parts of moth pupae, head capsules of larvae, and bits of wings; Hymenoptera: forewings, head capsule, abdomen, and metathorax; Homoptera: forewing; Diptera: wings and thorax, head capsule and puparial shell; spiders: cephalothorax and legs. 28% of the insect remains were unrecognizable bits of chitin.

Among the living insects taken from the same ten square feet 37.8% were mites and 11.4% were collembola. No remains of either of these were found, probably because of their minuteness. Of the living insects 24% were Coleoptera and of the remains, 35.4% were Coleoptera. Diptera and dipterous larvae composed 10% of the living insects, but dipterous remains were only 1.4% of the total. Spiders formed 1% of the living forms, but 5.7% of the remains. Pentatomids formed 4% of the remains, but only .15% of the living insects. 9.7% of the remains were hymenopterous and, of the live insects, 1.1%. The accompanying tables gives further information.

Snails possess greater potentiality for preservation than insects, for as they die, the numbers of remains are increased on the soil surface from year to year, unless covered by some deposit. Because of this, there were three times as many snail remains as living snails on 10 square feet. With insects the opposite is true, for there are fewer recognizable remains on the soil surface than there are living forms. These become consistently less identifiable, due to detrition, as they age. Assuming that it is possible from these observations to draw any conclusions, it may be stated, that for each snail shell found, there have been at least 300 insects which have died, leaving little or no recognizable remains. Furthermore, assuming that these insect remains are not more than one year old, it may be said, that, at the end of each year, the insects possess only an 18.1% possibility of preservation and the snails, 93%.

Table 1. Showing the numbers of macroscopic dead and living organisms on the soil surface of ten square feet in open woodland during the months of October and November, 1934.

ORGANIC REMAINS			LIVING ORGANISMS		
Group	No.	%	Group	No.	%
Mollusca	62		Mollusca	20	
Arachnida	14	5.7	Arachnida	15	1.0
			Acarina	500	37.8
			Annelida	20	
			Cheliferidae	50	3.7
			Chilopoda	10	.7
Pentatomidae	10	4.0	Pentatomidae	2	.15
Coreiidae	1	.4	Lygaeidae	12	.9
Miridae	2	1.0	Collembola	150	11.4
Misc. Hemiptera	15	6.0	Misc. Hemiptera	5	.3

ORGANIC REMAINS		LIVING ORGANISMS	
Scarabaeidae	5 2.0	Thysanoptera	20 1.5
Carabidae	10 4.0	Misc. Coleoptera	320 24.2
Cerambycidae	1 .4	Lepidoptera larvae	7 .53
Chrysomelidae	2 1.0	Formicidae	15 1.0
Anthicidae	2 1.0	Chalcididae	? .15
Misc. Coleoptera	65 27.0	Chrysopidae	1 .1
Lepidoptera	10 4.0	Psocidae	1 .4
Formicidae	10 4.0	Cicadellidae	2 1.0
Misc. Hymenoptera	14 5.7	Sarcophagidae	1 .4
Chrysopidae	3 1.0	Diptera puparia	3 1.0
Psocidae	1 .4	Locustidae	1 .4
Cicadellidae	2 1.0	Unrecognizable chitin..	67 28.0
Sarcophagidae	1 .4		
Diptera puparia	3 1.0		
Locustidae	1 .4		
Unrecognizable chitin..	67 28.0		
Total Arthropods..	239 98.4	Total Arthropods..	1300 97.7
Snails per square foot..	6.2	Snails per square foot..	2
Arthropods per sq. ft..	23.9	Arthropods per sq. ft..	130
Total arthropods identifiable:		Total arthropods identifiable:	
To order	172 72%	To genus	1300 100%
To family	50 21%		
To genus	7 3%		
Total snails identifiable:		Total snails identifiable:	
To genus	58 93%	To genus	20 100%

The Coleoptera or Beetles of Georgia.

P. W. FATTIG, Emory University, Georgia.

(Continued from Volume XLVII, page 238.)

In addition to those mentioned in Part I, I wish to thank Dr. W. J. Brown, of the Department of Entomology, Department of Agriculture, Ottawa, Canada, for determining many of the Elateridae.

ELATERIDAE.

8554—*ADELOCERA IMPRESSICOLLIS* Say. Valdosta III, 21, '31.

8560—*A. MARMORATA* Fab. Stone Mt. V, 10, '31; Atlanta, N, 18, '28.

8561—*A. DISCOIDEA* Web. Atlanta VI, 2, '29; VII, 13, '30; Stone Mt. VI, 8, '30; VI, 16, '29; VI, 18, '30; VI, 25, '30; Yonah Mt. VI, 10, '36.

8562—*A. AVITA* Say. Atlanta V, 12, '36; Quitman VI, 17, '31.

8564—*LACON RECTANGULARIS* Say. Folkston V, 8, '32.

8565—*L. CURTUS* Lec. Albany VII, 30, '31.

8571—*ALAEUS OCULATUS* Linn. Macon IV, 13, '31; Stone Mt. IV, 16, '31; IV, 24, '32; Tallulah Falls IV, 21, '31; Atlanta V, 21 to VII, 3 (7); Albany VI, 1, '32.

8572—*A. MYOPS* Fab. Camilla IV, 3, '36 (4); Thomasville IV, 4, '36; Cordele IV, 12, '31; Perry IV, 13, '31; Thomson IV, 17, '36 (4); Stone Mt. IV, 17, '31 to V, 11, '31 (198); Milledgeville IV, 18, '36 (3); Warrenton IV, 18, '36 (4); Douglasville IV, 25, '27; Folkston V, 8, '32; Cairo VI, 18, '31.

A. sp. Swainsboro V, 1, '36.

8576—*HEMIRHIPUS FASCICULARIS* Fab. Columbus IV, 29, '31.

8593—*PYROPHORUS PHYSICERUS* Germ. Albany VI, 18, '31.

8596—*MONOCREPIDIUS LIVIDUS* DeG. Atlanta VI, 5 to VIII, 20 ('30); Hazelhurst VI, 6, '36; Head River VI, 26 to VIII, 16 (9); Rome VI, 29, '31; St. Simons Island VII, 22, '29; Albany VII, 30, '31; Cuthbert VII, 31, '31; Blairsville VIII, 31, '29.

8597—*M. AVERSUS* Lec. Rome V, 26, '31.

8600—*M. LEPIDUS* Lec. Cairo VI, 18, '31.

8601—*M. VESPERTINUS* Fab. Cairo VI, 18, '31; Macon VI, 21, '29; Atlanta VII, 7 to VIII, 2 (6).

8602—*M. SCISSUS* Schfr. Cornelia V, 16, '28.

8607—*M. AURITUS* Hbst. Atlanta VI, 8, '36; VI, 11, '36; VI, 13, '36 (2); West Point VI, 19, '32.

8609—*M. BELLUS* Say. Cornelia V, 16, '28.

8611—*M. BLANDULUS* Lec. Athens VI, 13, '32.

CONODERUS DIFFORMIS Fall. Hazelhurst VI, 17, '36; VI, 22, '36.

C. FUSCOSUS Blatch. Hazelhurst VI, 6, '36; VI, 17, '36 (2).

8613—*AEOLUS AMABILIS* Lec. Macon IV, 30, '28.

8617—*PITYOBIUS ANGUINUS* Lec. Brunswick VI, 5, '29.

8619—*LIMONIUS AURIPILIS* Say. Atlanta V, 21, '36; V, 22, '36; VII, 4, '29; Rome V, 26, '31.

8625—*L. PROPENUS* Cand. Stone Mt. IV, 24 to V, 29 (4); Atlanta V, 2, '34; V, 13, '34; Lithonia V, 5, '36; Toccoa V, 14, '30.

8629—*L. PLEBEJUS* Say. Kennesaw Mt. V, 14, '36; Yonah Mt. V, 30, '34.

8633—*L. QUERCINUS* Say. Stone Mt. V, 29, '36; Clarkesville V, 31, '36 (5); Atlanta VI, 1, '36 (2); VI, 13, '36 (2); Yonah

Mt. VI, 10, '36 (2); VI, 20, '35; Tray Mt. VI, 11, '36; Unicoi Gap VI, 28, '35.

8635—*L. BASILARIS* Say. Kennesaw Mt. V, 14, '36; Cornelia V, 16, '28; Clarkesville V, 31, '36; Tray Mt. VI, 11, '36; VI, 19, '36; Yonah Mt. VI, 23, '35 (2).

8653—*L. DEFINITIS* Zieg. Kennesaw Mt. V, 7, '36 (3).

8654—*PHELETES NIMBATUS* Say. Savannah IV, 11, '31.

8662—*ATHOUS BRIGHTWELLI* Kby. Yonah Mt. VI, 10, '36 (2); Atlanta VI, 12, '29; Athens VII, 2, '31.

8667—*A. CUCULLATUS* Say. Dalton V, 25, '31; Atlanta VI, 21, '29.

8669—*A. EQUESTRIS* Lec. Perry IV, 13, '31.

8679—*A. LENGI* Dury. Hartwell VI, 13, '32.

8715—*LUDIUS PYRRIOS* Hbst. Atlanta V, 13, '29; VI, 12, '29; VI, 19, '30; Fort Valley VI, 1, 31; Yonah Mt. VI, 10, '36; Blairsville VI, 26, '31; Head River VII, 10, '36.

8717—*L. BIVITTATUS* Melsh. Cornelia VI, 16, '29.

8728—*L. SIGNATICOLLIS* Melsh. Kennesaw Mt. IV, 26, '36; Atlanta V, 19, '32 (2); Dahlonega VI, 22, '32.

8748—*L. SULCICOLLIS* Say. Tate VI, 27, '32.

8757—*L. TRIVITTATUS* Lec. Tray Mt. VI, 11, '36; VI, 19, '36; Griffin VI, 12, '27; Neel Gap VI, 14, '31.

8761—*L. AETHIOPS* Hbst. Hiawassee V, 28, '34; Yonah Mt. VI, 22, '35.

8780—*L. INFLATUS* Say. Yonah Mt. VI, 10, '36.

8781—*L. CRASSUS* Lec. Douglasville VII, 15, '27.

8797—*L. DIVARICATUS* Lec. Stone Mt. VI, 18, '30; Toccoa VII, 3, '31; Canton VII, 17, '31.

L. sp. Atlanta V, 29, '29.

8813—*HEMICREPIDIUS DECOLORATUS* Say. Barnesville VI, 12, '27.

8814—*H. MEMNONIUS* Hbst. Atlanta VI, 11 to VII, 18 (7).

8817—*H. BILOBATUS* Say. Atlanta VI, 30 to IX, 11 (7).

8853—*MELANACTES PICEUS* DeG. Yonah Mt. VI, 10, '36.

8855—*M. MORIO* Fab. Atlanta VI, 21, 28; VII, 5, '31.

8858—*M. REICHEI* Germ. LaGrange VI, 10, '32.

8861—*PARALLELOSTETHUS ATTENUATUS* Say. Yonah Mt. VII, 28, '34.

8869—*ORIGMUS CAROLINENSIS* Schfr. Stone Mt. VII, 19, '29.

8873—*ORTHOSTETHUS INFUSCATUS* Germ. Atlanta VI, 6, '27; VII, 5, '31; VIII, 8, '28; VIII, 16, '34; Cairo, VI, 18, '31; Blue Ridge VI, 26, '31; Rome VI, 29, '31.

- 8878—*DOLOPIUS LATERALIS* Esch. Blue Ridge VI, 26, '31.
D. sp. Blairsville VI, 25, '31.
- 8883—*SERICUS SILACEUS* Say. Augusta VI, 9, '32; Yonah Mt. VI, 10, '36 (3); Tray Mt. VI, 11, '36.
- 8897—*AGRIOTES OBLONGICOLLIS* Melsh. Clayton V, 28, '34; Tray Mt. VI, 19, '36.
- 8906—*GLYPHONYX RECTICOLLIS* Say. Hamilton VI, 17, '31; Newman VI, 17, '31 (2); Blue Ridge VI, 26, '31; Ellijay VI, 27, '31 (2); Jefferson VII, 2, '31 (3).
- 8907—*G. TESTACEUS* Melsh. Cleveland VII, 10, '31.
- 8909—*G. QUIETUS* Say. Toccoa VIII, 16, '29.
G. sp. Atlanta V, 19, '36.
G. sp. Newnan VI, 19, '31.
- 8934—*ELATER NIGRICOLLIS* Hbst. Cleveland VII, 10, '31.
- 8935—*E. LINTEUS* Say. Tate VI, 27, '32.
- 8936—*E. SELLATUS* Dej. Kennesaw Mt. IV, 14, '36; Jasper VII, 17, '31.
- 8940—*E. VERTICINUS* Beauv. Canton VII, 17, '31.
- 8948—*E. COLLARIS* Say. Athens VI, 13, '32.
- 8955—*E. OBLIQUUS* Say. Jasper VII, 17, '31.
- 8956—*E. PUSIO* Germ. Tate VII, 17, '31.
- 8960—*E. PEDALIS* Germ. Rockmart VI, 25, '32.
E. sp. Yonah Mt. VI, 10, '36; Tray Mt. VI, 19, '36.
- 8978—*BLAUTA CRIBRARIA* Germ. Rome VI, 20, '32.
- 8980—*MEGAPENTHES LIMBALIS* Hbst. Stone Mts. VI, 8 to VII, 6 (10); Toccoa VI, 16, 29; Atlanta VI, 16 to VII, 4 (8); Cartersville VII, 4, '34.
- 8983—*M. RUFILABRIS* Germ. Atlanta VI, 30, '27.
- 8994—*DICREPIDUS RAMICORNIS* Beauv. Rome VI, 29, '31.
- 8996—*ISCHIODONTUS SCLATUS* Say. Atlanta VII, 7, '30; VII, 17, '35.
I. sp. Atlanta VII, 4, '31.
- 9009—*ANCHASTUS FUSCUS* Lec. Atlanta VIII, 5, '34; VIII, 11, '34.
- 9010—*A. BICARINATUS* Lec. Albany VI, 1, '32.
- 9015—*MELANOTUS SCREBICOLLIS* Lec. Atlanta VI, 23, '27; Stone Mt. X, 27, '29.
- 9019—*M. DECUMANUS* Er. Camilla IV, 3, '36; Warrenton IV, 18, '36 (4); Atlanta V, 4 to X, 7 (11); Stone Mt. V, 11, '31; V, 12, '31; VI, 16, '32; Yonah Mt. V, 30, '34.
- 9021—*M. DESPECTUS* Cand. Dalton VI, 7, '31.
- 9031—*M. LEONARDI* Lec. Cleveland VII, 10, '31.
- 9035—*M. COMMUNIS* Gyll. Stone Mt. III, 22, '36; Gainesville V, 17, '36; Atlanta VI, 1, '35; Snellville VI, 12, '31; Mon-

roe VI, 12, '31; Blairsville VI, 15, '29; Yonah Mt. VI, 15, '36.
 9036—*M. FISSILIS* Say. Okefenokee Swamp V, 6, '33; Stone Mt. V, 9, '31; Atlanta VI, 4 to IX, 11 (7); Washington VI, 9, '32; Head River VI, 12, '36; VI, 26, '36.

9040—*M. PARUMPUNCTATUS* Melsh. Yonah Mt. V, 30, '34.

9043—*M. EMISSUS* Lec. Rome VI, 20, '32.

9044—*M. INFAUSTUS* Lec. Quitman VI, 17, '31.

9048—*M. PERTINAX* Say. Jasper VII, 17, '31.

9051—*M. AMERICANUS* Hbst. Blue Ridge V, 14, '31; Yonah Mt. VI, 10, '36 (2); Tray Mt. VI, 11, '36 (2); VI, 19, '36 (2).

9053—*M. INSIPIENS* Say. Sandersville V, 31, '31.

9058—*M. MOROSUS* Cand. Canton VII, 17, '31.

M. sp. Blairsville VI, 25, '31; Rome VI, 30, '31.

M. sp. Atlanta VII, 2, '31.

M. sp. Atlanta VI, 30, '30.

M. sp. Stone Mt. V, 10, '31; Atlanta VI, 20, '30; VII, 28, '29.

9071—*CARDIOPHORUS CARBISCE* Say. Sandersville V, 31, '31.

9082—*C. CONVEXUS* Say. Folkston V, 18, '32; Stone Mt. V, 26, '27.

9083—*C. FLORIDAE* Cand. Savannah IV, 11, '31.

9087—*C. GAGATES* Er. Brunswick IV, 12, '31; Yonah Mt. VI, 10, '36 (2); Tray Mt. VI, 19, '36 (2).

9114—*HORISTONOTUS CURIATUS* Say. Cornelia VI, 28, '31.

9117—*H. UHLERI* Horn. Rome VI, 30, '31.

MELASIDAE.

9135—*DELTOMETOPUS AMOENICORNIS* Say. Jonesboro VI, 26, '32.

9141—*DROMAEOLUS STRIATUS* Lec. Tate VI, 27, '32.

9157—*MICRORHAGIA TRIANGULARIS* Say. Jonesboro VI, 26, '32.

9166—*NEMATODES ATROPOS* Say. Jonesboro VI, 26, '32.

9179—*ANELASTES DRURYI* Kby. Toccoa VI, 16, '29; Atlanta VIII, 20, '34.

THIROSCIDAE.

9182—*DRAPETES GEMINATUS* Say. Jonesboro VI, 26, '32.

9191—*AULONOTHROSCUS PUNCTATUS* Bonv. Calhoun VI, 28, '32.

9202—*THROSCUS HORNII* Bl. Augusta VI, 9, '32.

BUPRESTIDAE.

9208—*POLYCESTA ANGULOSA* Duv. Americus VI, 20, '31.

9247—*ACMAEODERA ORNATA* Fab. Atlanta IV, 23, '27; Blairsville V, 14, '31.

- 9272—*A. PULCHELLA* Hbst. Folkston V, 8, '33.
9286—*A. TUBULUS* Fab. Brunswick IV, 12, '31; Atlanta IV, 20, '27; Toccoa V, 14, '30; Stone Mt. VI, 9, '28 (2).
9291—*PTOSIMA GIBBICOLLIS* Say. Columbus V, 27, '31.
9316—*CHALCOPHORA VIRGINIENSIS* Drury. Stone Mt. IV, 2 to IX, 20 (13); Atlanta IV, 6 to VIII, 7 (6); Savannah IV, 11, '31; Kennesaw Mt. IV, 14, '36 (2); Eatonton IV, 22, '36; IV, 28, '36; V, 5, '36; V, 15, '36; Conyers V, 5, '36; Waycross V, 8, '33; Toccoa V, 14, '30; Dahlonega VI, 22, '32 (12); Cartersville, VII, 4, '34.
9319—*C. GEORGIANA* Lec. Stone Mt. V, 7, '32; Sparta V, 21, '36 (2).
9332—*TRACHYKELE LECONTEI* Gory. Dahlonega VI, 22, '32.
9333—*DICERCA DIVARICATA* Say. Hiawassee V, 28, '34.
9337—*D. PUNCTULATA* Schon. Stone Mt. IV, 28, '27.
9341—*D. OBSCURA* Fab. Stone Mt. IV, 24, '32; Madison VI, 8, '32; Cairo VI, 18, '31; Macon VII, 30, '31.
9342—*D. LURIDA* Fab. Atlanta VII, 12, '30; Stone Mt. VIII, 2, '29.
9343—*D. LEPIDA* Lec. Stone Mt. V, 7, '32.
9344—*D. SPRETA* Gory. Hiawassee V, 28, '34.
9365—*BUPRESTIS STRIATA* Fab. Okefenokee Swamp V, 7, '33; Folkston V, 7, '33; Ellijay VI, 27, '31.
9364—*B. AFRICANS* Hbst. Stone Mt. IV, 17, '32 (2); IV, 21, '32; IV, 24, '32.
9365—*B. DECORA* Fab. Gainesville IV, 13, '27; Atlanta V, 6, '30.
9366—*B. SALISBURYENSIS* Hbst. Atlanta VII, 12, '30.
9367—*B. LUNEATA* Fab. Atlanta VII, 16, '27.
9374—*B. RUFIPES* Oliv. Americus VI, 20, '31.
9377—*B. FASCIATA* Fab. Tray Mt. VII, 12, '35.
9386—*MELANOPIHILA OBTUSA* Horn. Atlanta VII, 12, '30.
9389—*M. NOTATA* Cast. Atlanta VI, 1, '32.
9396—*ANTHAXIA QUERCATA* Fab. Stone Mt. V, 25, '28 (3); Toccoa VI, 16, '29.
9399—*AGRILAXIA FLAVIMANA* Gory. Clayton V, 28, '34.
9400—*CHRYSOBOTHRIS CHRYSOELA* Ill. Jesup V, 5, '30.
9401—*C. SEXFASCIATA* Schffr. Cairo VI, 19, '31.
9407—*C. SCITULA* Gory. Atlanta VI, 1, '27.
9448—*C. PUSILLA* Cast. Blairsville V, 14, '31.
9461—*C. DENTIPES* Germ. Savannah IV, 11, '31; Stone Mt. IV, 21, '32 to VI, 19, '32 (123); Okefenokee Swamp V, 7, '33 (48); Americus VI, 20, '31.

- 9464—*C. FLORICOLA* Gory. Okefenokee Swamp V, 6, '33 (5); Toccoa V, 14, '30.
 9466—*C. FEMORATA* Oliv. Stone Mt. IV, 21, '32; VII, 20, '27; Cornelia V, 16, '28.
 9479—*C. HARRISI* Hentz. Cornelia V, 16, '28.
 9481—*ACTENODES ACORNIS* Say. Cornelia V, 16, '28.
 9482—*A. BELLULA* Mann. Toccoa V, 14, '30.
 9483—*A. CALCARATA* Chev. Waycross V, 15, '32.
 9488—*AGRILUS CONCINNUS* Horn. Milledgeville V, 28, '31.
 9498—*A. ACUTIPENNIS* Mann. Athens VI, 13, '32.
 9502—*A. FUSCIPENNIS* Gory. Columbus V, 27, '31.
 9513—*A. RUFICOLLIS* Fab. Dahlonga VI, 22, '32.
 9520—*A. EGENUS* Gory. Hiawasse V, 28, '34.
 9523—*A. ARCUATUS* Say. Hiawasse V, 28, '34.
 9529—*A. IMBELLIS* Cr. Blue Ridge V, 14, '31.
 9531—*A. FALLAX* Say. Cairo VI, 18, '31.
 9539—*A. OTIOSUS* Say. Toccoa VI, 19, '29.
 9565—*PACHYSCHIELUS SCHWARZI* Kerr. Folkston V, 8, '33.
 9567—*P. OVATUS* Say. Jasper VII, 17, '31.
 9568—*BRACHYS TESSELLATUS* Fab. Cairo VI, 18, '31.
 9572—*B. AEROSUS* Melsh. Baxley V, 6, '30.
 9574—*B. OVATUS* Web. Jesup V, 6, '30.
 9576—*B. CUPRASCENS* Blatch. Cairo VI, 18, '31.
 9578—*TAPHIOCERUS GRACILIS* Say. Hartwell VI, 13, '32.
 9580—*T. LAEVICOLLIS* Lec. Toccoa VI, 16, '29.

A New *Agaporus* (Dytiscidae-Coleoptera).

By H. C. FALL, Tyngsboro, Massachusetts.

In the early summer of 1934 I received from Mr. C. A. Frost an example of an *Agaporus* purporting to be *conoides*. Fortunately the specimen was a male, and though in superficial appearance it strongly resembled *conoides*, on closer inspection it was found not to possess the secondary sexual characters of the latter species; in fact except for the more pointed form and darker thorax, in which respects it agreed closely with *conoides*, the general characters were more nearly those of *difformis*. The following comparative description will enable the student to discriminate between the three species.

Agaporus latens, n. sp.

Size: intermediate between *conoides* and *difformis*, being slightly larger than the former and a little smaller than the

latter. Dimensions of the type—length 5.3 mm.; width 2.4 mm.

Form and color nearly as in *conoideus*, the body in these two being more pointed behind, and the brownish piceous or blackish thorax contrasting more sharply with the paler head and elytral base than in *difformis*, in which, while the type of coloration is the same, the thorax is of a reddish brown tint little or not at all darker than the adjacent head and elytral base.

Punctuation of upper surface nearly as in *difformis*, the elytra more closely punctate than in *conoideus* and nearly or quite lacking the intermixed fine punctules of the latter species.

Sides of body beneath finely sparsely punctate, with oblique fine scratches both on the ventral segments and coxal plates, much as in *difformis*; in *conoideus* the oblique scratches are lacking on the coxal plates, which are more numerous and distinctly punctate than in the other two species. Prosternal process somewhat less dilated posteriorly than in *difformis* and with the reflexed edges and median line less elevated. In *conoideus* the prosternal process is more broadly convex medially and the lateral edges scarcely elevated.

Femora of male not fimbriate posteriorly. In *difformis* the hind femora, and in *conoideus* both middle and hind femora of male are fimbriate. Anterior protarsal claw of male gradually dilated beneath for two-thirds its length but not appreciably contorted. In *difformis* the anterior claw is dilated and somewhat contorted; in *conoideus* the anterior claw is not dilated but is acutely toothed beneath.

Length 5.2 to 5.6 mm.; width 2.3 to 2.6 mm.

Described from six examples from the following localities: 1 ♂, vicinity of Dover, NEW HAMPSHIRE, IX, 28, '32; 2 ♂s Sherborn, MASSACHUSETTS, VI, 18, '34 (Frost); 2 ♂s, 1 ♀ Peekskill, NEW YORK, VI, 26, '90 (J. D. Sherman).

The type is one of the Sherborn males, now in the writer's collection, and is one of a small series taken by Mr. Frost in a small temporary pool in the woods. An attempt to secure further specimens a week or two later, Mr. Frost writes, was unsuccessful, the water having become much warmer and partially dried up from evaporation. The Peekskill specimens were obtained from friend Sherman very many years ago in one of my first exchanges. They with others were all supposed to be *difformis* and he seemed to be the only source of supply of

this rare species. It now turns out that of my series of eight Peekskill specimens of *difformis*, five are really that species and three are *latens*. The same date of capture (VI, 26, '90) occurs in both series. It is interesting to remark that Mr. Sherman also took his specimens from woodland pools.

New Colorado Asilidae (Diptera).

By MAURICE T. JAMES, Colorado State College,
Fort Collins, Colorado.

***Heteropogon maculinervis*, new species.**

Related to *curranii* Pritchard, to which it readily traces in Pritchard's key; but its general form is more robust, the cross-veins are more heavily infumated, and the scutellum lacks marginal bristles; in the male, the upper part of the mystax and the pile around the base of the antennae are white, in contrast to the heavier black bristles of the mystax, and the brush of the middle tibia is black, dense, and with a corresponding tuft of black hairs opposite it on the femur.

♀. Head and appendages black, whitish-pilose, the heavier bristles of the mystax black, those of the vertex, occiput, and antennae variably whitish to black; the integument obscured by a yellowish bloom.

Thorax black, whitish-pilose and yellowish to brownish pruinose; in well-preserved specimens the brown pruinosity forms two narrowly-divided dorsal stripes which expand before and behind the suture to cover most of the dorsum; bristles mostly black; coxae, trochanters and femora black, tibiae and tarsi reddish, the latter darkened apically; bristles of tibiae mostly whitish, some on the anterior tibiae above black; those of the tarsi mostly black.

Abdomen black, with bluish reflections above, clothed with sparse microscopic whitish pile above and conspicuous whitish tufts laterally; segments one to four with small posterior triangles of whitish pollen; the remaining segments may have the integument reddish laterally; venter variably yellowish to black. Wings smoky hyaline, more so apically; the cross-veins heavily clouded with brown. Length, 11-12 mm.

♂. Differs only sexually and as above indicated; the genitalia are strong and for the most part, red.

Abdomen black, white-pilose; the pruinosity gray and moderately sparse dorsally, brownish and denser laterally, and densely white ventrally; no pale interruptions in the ground color.

All coxae reddish, somewhat paler basally; tarsi, except for the yellow basitarsi, black; anterior femora and tibia pale yellow, narrowly reddish or pale brownish above; the middle tibiae brown above, except basally, their femora brown below, black above, except basally and apically; the posterior femora strongly clavate, the tibiae less so, both segments brownish to black, darker above, except for the constricted basal portions of both segments and the extreme apices of the femora, which are pale yellow. Wings hyaline, vein M_2 not angularly bent. Length, 10 mm.

Holotype: ♀, North of Eads, COLORADO, July 29, 1933 (H. G. Rodeck and M. T. James). University of Colorado Collection. *Paratype*: ♀, same data. Colorado State College Collection.

Taken resting on the bare sand in a wind-blown area one mile north of Eads.

Leptogaster coloradensis, new species.

♀. Head black in ground color; the face and especially the oral margin white-pollinose. Mystax white, rather sparse. First and third antennal segments, including style, black, the second red.

Thorax black; brownish-pollinose dorsally, white pollinose laterally; bristles black. Abdomen uniformly black, white-pollinose, and with sparse white pile.

Legs yellow; the tarsi darkened, the apices of the tarsomeres black, the fifth segments of all tarsi, and all the segments of the posterior tarsi, almost wholly black; posterior tibiae darkened toward the apex, black at extreme apex; bristles and pile of legs concolorous with background. Halteres yellow, knobs black. Wings hyaline; vein M_2 variable, angularly bent or not so. Length, 10 mm.

♂. Hind femora more strongly clavate than in the female, and with the constricted basal portion lemon-yellow. Otherwise as in the female.

Holotype: ♀, 6 miles north of Boulder, COLORADO. June 22, 1933 (M. T. and Helen B. James). *Allotype*: ♂, same data. *Paratypes*: ♀, same data, ♀ Boulder, Colorado. June 5, 1932 (M. T. James), ♀, Hamilton, Colorado, July 3, 1928 (S. C. McCampbell).

The Boulder specimens were taken in areas of close grass-land adjacent to the foothills.

The types of the species here described as new are in the author's collection, unless stated otherwise.

Notes on Coleoptera with Descriptions of New Species (Buprestidae and Cerambycidae).

By JOSEF N. KNULL, Ohio State University, Columbus, Ohio.

BUPRESTIDAE.

POLYCESTA ELATA Lec. Dead and dying oaks in Gillespie County, Texas, are heavily infested by this species. The larvae are heart-wood feeders and the adults leave large holes in the trunks where they emerge. "Cat faces" on living trees frequently contain these exit holes.

Acmaedera sabinae, n. sp.

Form and markings similar to those of *A. conoidea* Fall, only smaller; head, pronotum and ventral surface bronzy, shining, elytra piceous, with two irregular yellow stripes on each elytron, one near suture and the other along costa, stripes joined back of humerus and interrupted at middle.

♂ Head convex; surface reticulate, moderately pubescent; antennae reaching slightly beyond hind angles of pronotum when laid along lateral margins, serrate from the fifth joint.

Pronotum wider than long, widest in the middle; sides broadly rounded; surface densely punctate, punctures separated by their own diameter in middle, closer and more numerous laterally, moderately pubescent, pubescence along sides consisting of plumose hairs. Scutellum not evident.

Elytra at the widest part wider than base of pronotum; sides sinuate back of base, nearly parallel on basal two-thirds, serrate on apical third; disk convex; surface with rows of closely-set punctures which are larger at base, interspaces with single rows of fine punctures; a short recumbent hair arises from each fine puncture.

Abdomen beneath closely, finely punctate; last ventral segment broadly rounded, with a slight indication of a subapical carina. Front margin of prosternum straight, not retracted at sides. Entire ventral surface clothed with white plumose hairs which are replaced by recumbent hairs in central portion of first four abdominal segments.

Length 4 mm.; width 1 mm.

Described from three specimens collected by the writer on the blossoms of mesquite (*Prosopis juliflora* D. C.) in Sabina Canyon, near Tucson, ARIZONA, June 11, 1935. Holotype and paratypes in writer's collection.

According to Fall's¹ key this species would run to *A. conoidca* Fall; however, the vestiture of the ventral surface together with the non-retracted anterior margin of the prosternum will separate the two species. Prof. Fall has kindly compared a specimen with those of *A. conoidca* Fall.

***Psiloptera riograndei*, n. sp.**

Form oblong, moderately convex blackish-bronze on both surfaces, most of the punctures on head, pronotum and elytra cupreous.

♂—Head convex, slight median depression; surface confluent punctate, irregular callosities in middle, moderately pubescent; antennae reaching to middle of pronotum when laid along side margins, serrate starting with the third joint, second joint longer than wide, third joint at least twice the length of second, fourth joint shorter than third, joints four to eleven inclusive gradually diminishing in length, last joint without a terminal process in either sex.

Pronotum wider than long, widest at base; sides broadly arcuate from base to apex; disk convex, a slight indication of median depression on anterior half and one in front of scutellum, also one each side at base; surface coarsely punctured, punctures becoming smaller and more numerous toward sides, irregular raised smooth areas in central portion, pubescence sparse, confined to sides. Scutellum round, smooth.

Elytra wider than pronotum at base; sides nearly parallel on basal two-thirds, broadly rounded on apical third, apices emarginate; disk convex; surface irregularly punctate, irregular smooth areas forming indistinct costae.

Body beneath coarsely confluent punctate, prosternum deeply striate on each side; first abdominal segment longitudinally excavated at middle. Last abdominal segment truncate.

Length 16 mm.; width 5 mm.

♀—Differs from the male by being slightly larger, more convex beneath, pubescence of ventral surface not as long.

Described from a small series of both sexes collected along the Pecos River and Devil's River, TEXAS, on May 23, 1935, by the writer. Male holotype, allotype and paratypes in author's collection.

¹ H. C. Fall, Jour. N. Y. Ent. Soc., v. 7, pp. 1-37, 1899.

This species somewhat resembles *P. cupreopunctata* Schffr. Mr. W. S. Fisher kindly compared a specimen with the cotypes in the National Museum collection. He states that *P. cupreopunctata* Schffr. differs by being more convex above, in having the pronotum widest near the middle, the elytra longitudinally costate, punctures much coarser and less arranged in longitudinal rows, especially toward the sutural margins, the prosternal process between the anterior coxae narrower and more deeply grooved on each side.

(To be continued.)

Balloon Drift and Insect Drift.

Beetles closely related to the introduced European elm bark beetle, the principal carrier of the Dutch elm disease, have been taken in airplane traps at a height of half a mile and this, in connection with the well known autumn drift of hundreds of miles of the cotton moth as well as some other insects, establishes a probability that elm bark beetles may be carried long distances and possibly infect elms remote from areas where the Dutch elm disease occurs. It is not feasible to follow small insects in upper air currents. It is possible to gain an idea of what may occur by liberating small balloons bearing numbered tags. The Bartlett Tree Research Laboratories are releasing, over a period of two months, 5,000 balloons for the purpose of getting additional data on wind drift from localities within the area where Dutch elm disease occurs.

This balloon program is an extension of work with the New York State Conservation Commission from 1923-25 inclusive. During that period nearly 20,000 balloons were released and 1260 tags returned, a recovery of approximately 6%. The balloons were released from a total of 21 stations ranging from Canaan, Conn., and Millbrook, New York, along the Connecticut and Hudson valleys, approximately to the international boundary. Although all these balloons were liberated from points in eastern New York or western New England, only 11% were returned from points in New York state and 84% from the New England states. There were received in addition 20 tags from Nova Scotia, five from New Brunswick and one from Newfoundland, this last was found approximately 775 miles from the point of release.

The finders of balloons are requested to fill in the blanks and mail the tags without undue delay. —E. P. FELT, Bartlett Tree Research Laboratories, Stamford, Connecticut.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JANUARY, 1937.

In the NEWS for February, 1936, pages 43 and 44, we published a statement of our receipts and expenditures for 1935, showing a deficit of \$219.15. We also made an appeal for additional subscribers to help overcome this loss and to keep the journal going. Some additional subscriptions have been the result of the efforts of kind supporters of recent years and other friends have generously given direct financial help. To all of these we give our hearty thanks.

Our standing at the end of 1936 is approximately as follows:

Financial Statement of Entomological News, Dec. 31, 1936
Receipts Estimated

Subscriptions (378 October report)	\$1088.00
Advertisements	126.09
Sales	36.43
Donations	67.50
Total	\$1318.02

Expenditures to November 30th

Printing Numbers 1-9	\$1054.20
Corrections	52.00
Postage	38.08
Supplies (Envelopes, \$25.80; Misc. Exp., \$25.86)...	51.66
	\$1195.94
December Number 10, including index, estimated....	175.00

Total

\$1370.94

We have taken the number of subscriptions as of October, 1936, as most nearly representing our condition for the year, for some subscriptions do not begin with the volume in January, but run for twelve months from other starting dates. So estimated, the total number is twenty-five more than in 1935; we had hoped for an increase of seventy-three to wipe out the 1935 deficit.

We have omitted the costs of, and the contributions toward, illustrations and extra pages, as these nearly balance.

As stated above the deficit for 1935 was \$219.15, that for 1936 \$52.92, a total for the two years of \$272.07.

The deficit for 1936 shows an encouraging decrease, largely due to donations of \$67.50. We can hardly count, however, on such generosity in making up an annual budget. We are, therefore, putting into effect, with the present January number, some economies which, we hope, will not seriously detract from the appearance of the NEWS and will surely not lessen its usefulness.

The familiar pink covers, of forty-seven years, give way to white paper of the same weight and quality as the reading pages within. A change to a cheaper method of binding also is thereby rendered possible. An illustration on the front cover disappears. We shall continue to furnish twenty-five free copies of their articles to authors, but these will be "run of form," that is, without removal of the conclusion of the preceding article or of the beginning of the succeeding article in cases where conclusion and beginning fall on the first and last pages of the article in question. These free separates will be unbound, uncut and without covers.

Of course those who wish separates with the extraneous matter removed, bound and trimmed and with printed covers can obtain them by ordering them when returning proof, at the prices indicated at the bottom of the second page of the cover.

As an offset to these reductions our printing contract for 1937 calls for 30 pages of reading matter as against 28 in 1936. This will increase, even though slightly, promptness of publication.

These decreases in estimated costs will not permit many improvements in the ability of the NEWS to meet the demands of its clientele, and we renew our appeal of last year for additional subscribers.

New List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Psyche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Ciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bollettino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal. R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janeiro. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chilena de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Comparée. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národního musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungsmechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Científica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten über morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memórias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biología Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memórias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Termite Nests—a study of the Phylogeny of Behavior.

Under this title is published in *Science*, for January 8, 1937, an abstract of a paper presented by A. E. Emerson at the recent Chicago meeting of the United States National Academy of Sciences. From it we take the following: Wood-eating roaches, similar to the hypothetical ancestor of the termites, excavate galleries in wood but make no constructions. The Kalotermitidae excavate wood and construct partitions indicating responses to humidity and mechanical or chemical factors. The Mastotermitidae exhibit a quantitative advance in nest construction compared to the Kalotermitidae. The Hodotermitidae show a further advance with subterranean nests, elaborate carton construction and food storage. The Rhinotermitidae have separately evolved subterranean adjustment and in some species show building activities in response to social factors as well as physical factors. Excavated subterranean nests of the Termitidae exhibit the influence of mechanical and spatial factors. Materials may be dirt, wood or excrement, cemented by saliva or excretions. Structures consist of covered tunnels, roads, rain-shedding projections and ridges, nests of characteristic size and differentiation, ventilation pores in the walls, stored food and fungus gardens. Sterile workers and nymphs of sterile soldiers and workers construct the nests in the Rhinotermitidae and Termitidae.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first ins'allments.

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—**Ancona, H.**—Contribuciones, etc. II. Insectos de los manantiales y aguas estancadas de la region de Actopan, Hgo. [112] 1936: 265-267. **Doane, Van Dyke, Chamberlin & Burke.**—Forest Insects. A Textbook for the use of students in forest school, colleges, and universities, and for fore- $\text{\textcircled{C}}$ workers. New York, McGraw-Hill Book Co., 1936. xii + 463 pp., ill. **Imms, A. D.**—The ancestry of insects. [Trans. Soc. Brit. Ent.] 3: 1-32, ill. **Lemche, H.**—The primitive colour pattern on the wings of insects and its relation to the venation. Preliminary notice. [Vedenskab. Meddel.] 99: 45-64, ill.

ANATOMY, PHYSIOLOGY, ETC.—**Andre, M.**—Sur le *Pediculoides ventricosus* (Acarina). [Bull. Mus. Nat. Hist. Nat., Paris] 8: 337-341, ill. **Eaus, A.**—Die Reduktion der Flügel und Flügelinneskuffeln bei Lepidopteren. [46] 32: 1-46, ill. **Berretta, L.**—Genese della membrana peritrofica nell'intestino degli ortoteri. [Bull. Ist. z. Univ. Palermo] 13: 117-132, ill. **Boving, A. G.**—Description of the larva of *Plectris aliena* (Scarab.) and explanation of new terms applied to the epipharynx and raster. [10] 38: 169-185, ill. **Carleton, M.**—The anatomy and histology of the alimentary canal of the adult *Nebria brevicollis* (Coleo: Carabidae). [Trans. Soc. Brit. Ent.] 3: 119-128, ill. **Cook, J. H.**—A contribution towards a study of *Calosoma inquisitor* (Carabidae, Col.). [Trans. Soc. Brit. Ent.] 3: 79-118, ill. **Eltringham, H.**—On the eyes of tsetse flies. [36] 85: 281-285, ill. **Everly, R. T.**—The alimentary tract of the margined blister beetle, *Epicauta cinerea marginata*. [43] 36: 204-216, ill. **Garbowski, T.**—Von der Wiederholbarkeit einmaliger instinktiver Handlungen (Auf Grund von Versuchen mit der Verpuppung der Gabelschwanze). [100] B. 2: 319-348, ill. **Glasgow, J. P.**—Internal anatomy of a caddis fly, *Hydropsyche colonica*. [53] 79: 151-179, ill. **Gurney, A. B.**—The external morphology and phylogenetic position of the woodland cave cricket (*Ceuthophilus brevipes*, Orthop.: Tettigoniidae). [6] 44: 281-316, ill. **Hallock, H. C.**—Recent developments in the use of electric light traps to catch the Asiatic garden beetle. [6] 44: 261-279, ill. **Hinton, H. E.**—Notes on the biology of *Dryops luridus* (Coleo: Dryopidae). [Trans. Soc. Brit. Ent.] 3: 67-78, ill. **Ide, F. P.**—The significance of the outgrowths on the prothorax of *Ecdyomurus venosus* (Ephemeroptera). [4] 68:

234-238, ill. **Jawlowski, H.**—Über den Gehirnbau der Kafer. [46] 32: 67-91, ill. **Koch, A.**—Die Symbiose des Splintkafers, *Lictus linearis*. [46] 32: 92-136, ill. **Koch, A.**—Experimentelle Untersuchungen an *Oryzaephilus surinamensis* (Cucuj.). [46] 32: 137-180, ill. **Lemche, H.**—The primitive colour-pattern on the wings of insects and its relation to the venation. [Vidensk. Medd. Dansk Naturhist. Foren., Copenhagen] 99: 45-64, ill. **Liche, H.**—Beiträge zur Ethologie der Dermestiden (Coleo.). [100] B, 2: 141-162, ill. **Mellanby, H.**—The later embryology of *Rhodnius prolixus* (Hemiptera). [53] 79: 1-42, ill. **Mikulski, J. S.**—The effect of constant and alternating temperatures on the survival of some developmental stages of *Tribolium confusum*. On the changes of developmental velocity of some developmental stages of *Tribolium confusum* (Coleo: Tenebrionidae) when influenced by constant temperature changes. [100] B, 2: 361-372; 373-385. **Newell & Baxter.**—On the nature of the free cell-border of certain mid-gut epithelia. [53] 79: 123-150, ill. **Opczynska-Sembratowa, Z.**—Recherches sur l'anatomie et l'innervation du coeur de *Carausius morosus* (Orth: Phasmidae). [100] B, 2: 411-436, ill. **Painter, R. H.**—The food of insects and its relation to resistance of plants to insect attacks. [90] 70: 547-566. **Riley, W. A.**—Caustic potash preparations of insects and insect parts. [Tr. Am. Micro. Soc.] 55: 510-512. **Smith, C. L.**—The relation between the degree of fineness of pyrethrum powder produced by different periods of grinding to toxicity of insects and to deterioration by light and air. [6] 44: 317-339, ill. **Ting, P. C.**—The mouth parts of the Coleopterous group Rhynchophora. [Microent.] 1: 93-114, ill. **Tischler, W.**—Ein Beitrag zum Formen-schen der Insekten. [89] Abt. All. Zool., 57: 157-202, ill. **Zacwilichowski, J.**—Über die innervation und die Sinnesorgane der Flügel von *Aphrophora alni* (Homoptera: Cercopidae). Über die Aferfrühlingsfliege *Isopteryx tripunctata* (Plecoptera). [100] B, 2: 85-100; 267-284, ill. **Wigglesworth, V. B.**—The function of the corpus allatum in the growth and reproduction of *Rhodnius prolixus* (Hemiptera). [53] 79: 91-121, ill. **Williams, C. B.**—The influence of moonlight on the activity of certain nocturnal insects, particularly of the family Noctuidae, as indicated by a light trap. [Phil. Trans. R. Soc. London] (B), 226: 357-389, ill. **Wundrig, G.**—Die Sehorgane der Mallophagen, nebst vergleichenden Untersuch-

ungen an Liposceliden und Anopluren. [89] Abt. Anat., 62: 45-110, ill.

ARACHNIDA AND MYRIOPODA.—Chickering, A. M.—Additions to the list of known sps. of spiders from Barro Colorado Island, Panama. [Trans. Amer. Micr. Soc.] 55: 449-456. Jacot, A. P.—Two unrecorded spp. of Scutacaridae from the southern Appalachians. [4] 68: 225-229, ill. (*). Locket, G. H.—Regeneration in Arachnida. [31] 138: 885-886. Lowrie, D. C.—New localities for the blackwidow spider. [68] 84: 437. Palmer, E. L.—Spiders and their kin. [Cornell Rur. Sch. Leaf.] 30, no. 2, 32 pp., ill.

THE SMALLER ORDERS OF INSECTS.—da Fonseca, F.—Sobre o macho de *Tunga travassosi*, e o parasitismo de *Euphractes sexcinctus* por *Tunga penetrans*. (Siphonap.). [105] 6: 421-424, ill. Hood, J. D.—Studies in Neotropical Thysanoptera. II. [105] 6: 424-460, ill. (*). Priesner, H.—Ueber einige neue und wenig bekannte Thysanopteren. [107] (B) 5: 208-214. Tillyard, R. J.—Kansas Permian Insects. Pt. 16. The Order Plecoptera: The fam. Doteridae, with a note on the affinities of the order Protolymenoptera. [Amer. Journ. Sci.] 32: 435-453, ill. (*).

ORTHOPTERA.—Caudell & Allard.—An undescribed var. of the wingless grasshopper *Podisma glacialis* v. *amplificera* n. var. [10] 38: 147-148, ill. Hayes, C.—The common stick insect. [31] 138: 886. Hubbell, T. H.—A monographic revision of the genus *Centhophilus* (Gryllacrididae, Rhaphidophorinae). [Univ. Fla. Publ. Biol. Sci.] 2: 551 pp., ill. Jules, F.—La mante *Paratenodera sinensis* dans le Quebec. [98] 63: 240. Slifer & King.—An internal structure in the Cyrtacanthacrinae (Acrid.) of possible taxonomic value. [6] 44: 345-348. Uvarov, B. P.—Locusts as an international problem. [Current Sci.] 5: 191-193. Zeuner, F. E.—The recent and fossil Tympanophorinae (Tettigon.). [36] 85: 287-302, ill.

HEMIPTERA.—Caldwell, J. S.—Seven n. spp. of the gen. *Aphalara* (Cherm.). [43] 36: 220-224, ill. DeLong, D. W.—Some n. gen. of leafhoppers related to *Thamnotetix* (Cicadell.). [43] 36: 217-219. DeLong & Davidson.—Further studies of the gen. *Empoasca* (Cicadell.). IV. Eleven n. spp. of *Empoasca* from the U. S. [43] 36: 225-230, ill. Gottfried, I.—Note on the song of the periodical

cicada. [10] 38: 166. **Knowlton & Smith.**—Capitophorus Aphids infesting Artemisia. [4] 68: 229-234, ill. (*). **Mendes, D.**—Uma n. sp. do gen. Tachardiella (Coccidae). [105] 6: 374-376, ill. **Oman, P. W.**—Distributional and synonymical notes on the beet leafhopper, Eutettix tenellus (Cicadell.). [10] 38: 164-165. **Oman, P. W.**—South American leafhoppers of the genus Xerophloea (Cicadell.). [105] 6: 394-401, ill. (*). **Sim, R. J.**—Five lace-bug spp. not previously reported from New Jersey (Tingit.). [6] 44: 280.

LEPIDOPTERA.—**Biedermann, R.**—Note sur trois Erycinides d'Amérique du Sud. [25] 41: 252-260, ill. (*). **Bourquin, F.**—Notas biológicas sobre Cecidipta excocariae (Pyr.). [105] 6: 384-388, ill. **Hoffmann, C. C.**—Contribuciones al conocimiento de la fauna de Actopan, Hgo. I. Algunas observaciones sobre la fauna de Lepidopteros en la época seca. [112] 1936: 259-263. **McDunnough, J.**—A critical review of the treatment of North American Parnassius species by Felix Bryk in Das Tierreich. [4] 68: 216-225. **Murray, D. T.**—South African Butterflies. A monograph of the family Lycaenidae. London, John Bale, Sons & Danielsson, 1935. viii + 195 pp., ill. **Richards, A. G.**—A generic synopsis of the Phoberia-Melipotis Drasteria-Boryza series of Erebinæ (Noct.). [105] 6: 338-374, ill. (*). **Sim, R. J.**—Hesperid larva defoliating kudzu vine. [6] 44: 316. **Warren, B. C. S.**—Monograph of the genus Erebia. British Museum, London. 407 pp., ill.

DIPTERA.—**Bonen, P.**—The larval stages of Scatopse. [Vedenskab. Meddel.] 99: 33-43, ill. **Dozier, H. L.**—Observations on breeding places and winter activities of mosquitoes in the vicinity of New Orleans, La. [10] 38: 148-155, ill. **da Fonseca, F.**—Flebotomus das cercanias da cicade de S. Paulo, com a descripcao de Flebotomus arthuri e alphabeticus (Psych.). [105] 6: 323-327, ill. (S*). **Hering, M.**—Neue sudamerikanische Trypanea-Arten (Trypet.). [105] 6: 327-332, ill. **Hopkins, G. H. E.**—Mosquitoes of the Ethiopian Region. I.—Larval bionomics of mosquitoes and taxonomy of Culicine larvae. London, British Museum, 1936. 250 pp., ill. **Hull, F. M.**—A curious new syrphid fly from Peru. [10] 38: 167-168. **James, M. T.**—N. spp. and records of Colorado Diptera. [6] 44: 341-344.

Komp, W. H. W. A.—(*Anopheles*) *chiriquiensis*, a n. sp. from Panama. [10] 38: 156-160, ill. *Anopheles* (*Nyssorhynchus*) *anomalphyllus*, a n. sp. from Panama and Costa Rica. [10] 38: 156-160; 160-164, ill. **Lopes, H. de Sousa.**—Sobre tres especies novas de Richardiidae do Brasil. [105] 6: 475-480, ill. **Sturtevant & Dobzhansky.**—Observations on the spp. related to new forms of *Drosophila affinis*, with descriptions of seven. [90] 70: 574-584, ill. (*). **Townsend, C. H. T.**—On *Cochliomyia hominivorax*. Notes on Aldrich's 1926 species of *Cylindromyia*. A new Phasiine parasite of *Dysdercus* (Tachin.) [105] 6: 485-487; 488; 489 (S*). **Twin, C. R.**—The blackflies of eastern Canada (*Simuliidae*) Part II. [Canadian Jour. Res.] 14: 131-150, ill. (*).

COLEOPTERA.—**Blackwelder, R. E.**—Revision of the North American beetles of the Staphylinid subfamily Tachyporinae - Pt. 1: Tachyporus. [50] 84: 39-54 (*). **Borgmeier, T.**—*Globicornis fulvipes*, atacando couro de livros no Rio de Janeiro (Dermes.). [105] 6: 489-490. **Chagnon, G.**—Contribution a l'etude des coleopteres de la province de Quebec. [98] 63: 241-251, ill. **Eggers, H.**—Borkenkäfer aus Sudamerika (*Ipidae*). [105] 6: 388-394, ill. (S*). **Fisher, W. S.**—A new sphindid beetle from Cuba [115] 10: 201-202. **Hinton, H. E.**—A n. sp. of *Ataenius* from Mexico (Scarab.) [105] 6: 471-474, ill. **Hustache & Bruch.**—Description y notas biologicas acerca de un curculionido mirmecofilo. [105] 6: 332-338, ill. (*). **Liche, H.**—Beitrag zur ethologie der Dermestiden (100) (B), 2: 141-162, ill. **Liebke, M.**—Die Gattung *Lachnophorus* (Carab.). [105] 6: 461-468. (S*). **Ritcher, Chamberlin & Seaton.**—Additional collection records for *Phyllophaga spreta* (Scarab.). [10] 38: 185-186. **Thery, A.**—Quelques Buprestides nouveaux du Bresil. [105] 6: 469-471, ill. (*). **Uhmann, E.**—Schlussel der mir bekannten *Cephalolia*-Arten (*Chrysom.*: *Hisp.*). [105] 6: 481-485 (S).

HYMENOPTERA.—**Bequaert, J.**—Color variation in the South American social wasp, *Polistes carnifex* (Vesp.). [105] 6: 376-383. (*). **Cushman, R. A.**—The Ichneumonflies of the genus *Brachcyrtus*. [50] 84: 17-24, ill. (*). **Cushman, R. A.**—*Poecilocryptus* and *Poecilopimpla* (Ichneumon.). [91] 26: 464-466. **Marsh, F. L.**—Egg placing by *Dibrachys boucheanus* (Chalc.). [4] 68: 215-216. **Muesebeck, C. F. W.**—The genera of parasitic wasps of the Bra-

conid subfamily Euphorinae, with a review of the Nearctic species. [U. S. D. A. Misc. Publ.] No. 241, 37 pp., ill. (*). **Richards, O. W.**—Further notes on the nomenclature of British aculeate Hymenoptera. [107] B, 5: 169-173. **Santschi, F.**—Fourmis nouvelles ou interessantes de la Republique Argentine [105] 6: 402-421, ill. **Wheeler, W. M.**—A singular Crematogaster from Guatemala (Formic.). [5] 43: 39-48, ill. (*). **Wheeler, W. M.**—Ecological relations of Ponerine and other ants to termites. [Proc. Amer. Acad. Arts & Sci.] 71: 159-243, ill. (*).

SPECIAL NOTICES.—An index to the authors (other than Linnaeus) mentioned in the catalogue of the works of Linnaeus preserved in the libraries of the British Museum. Ed. 2., 1933. Brit. Mus. N. H. 1936. 59 pp. **Dictionary** of biological equivalents. German-English. By E. Artschwager, Baltimore. 1930. 239 pp., ill. **Handbuch** der zoologie. von Kuekenenthal u. Krumbach, Bd. 4, hft. 2. Insecta 2. pp. 1757-1884. **Mosquitoes** of the Ethiopian region. I Larval bionomics of mosquitoes and taxonomy of Culicine larvae. By G. H. E. Hopkins. Brit. Mus. N. H. 1936: 250 pp., ill. **Nomenclator animalium** generum et subgenerum. Preuss. Akad. Wissensch. zu Berlin. Bd. 5 Lief 22. Rhynch-Som. pp. 3058-3212. **Spinnentiere** oder Arachnoidea VII: Wassermilben oder Hydracarina II. (Hydrachnellae und Halacaridae). K. Viets. [Die Tier. Deutschlands] 1936: 289-574. **Upper Permian Insects** of New South Wales: III. The Order Copeognatha IV. The Order Odonata. V. The Order Perlaria or Stone-flies. R. J. Tillyard. [Proc. Linn. Soc. N. S. W.] 60: 265-279; 374-384; 385-391, ill. (*).

Doings of Societies.

The thirteenth annual meeting of the Rocky Mountain Conference of Entomologists was held August 16 to 21, 1936, inclusive, at the University summer camp, Centennial, Wyoming. The camp is located in a timbered area of the Medicine Bow Range of the Rocky Mountains, about 40 miles west of Laramie, Wyoming, and 100 miles north and west of Ft. Collins, Colorado. Members of the families of the entomologists joined in the gathering, meals being served in the large central lodge, with sleeping quarters in small cabins located in

the timber along a beautiful mountain stream. A total of 97, representing 17 states, were present. The following are those directly interested in entomology:

C. H. Richardson, Iowa; Leslie B. Daniels, Galen Hinkle, John L. Hoerner, C. R. Jones, Eleanor Davis McLaughlin, Miriam A. Palmer, Sam C. McCampbell, Elizabeth Heiss, Elmer Reed, Louis G. Davis, Maurice T. James, Asa C. Maxson, Geo. M. List, Max A. Sisson, J. H. Newton, Colorado; W. J. Schoene, Virginia; Reginald H. Painter, E. G. Kelly, Arthur L. Goodrich, Kansas; Fred D. Butcher, W. B. Mabce, Robert L. Shotwell, J. R. Parker, Montana; F. A. Fenton, Oklahoma; H. C. Severin, South Dakota; John C. Hamlin, W. W. Henderson, J. S. Stanford, C. J. Sorenson, Geo. I. Reeves, Utah; L. M. Gates, Otis Wade, Nebraska; Leonard Haseman, Ralph Voris, Missouri; Loyd L. Stitt, Arizona; C. L. Corkins, John W. Scott, L. Floyd Clarke, Margaret Greenwald, Wm. B. Owen, C. L. Farrar, A. P. Sturtevant, John D. Hitchcock, A. W. Woodrow, C. H. Gilbert, Wyoming; J. J. Davis, Indiana; R. L. Post, Elvira Rosenbauer, New York; J. H. Bigger, Illinois; C. L. Fluke, Wisconsin; H. L. Parten, Minnesota.

The following is a list of the more formal subjects discussed:

ORTHOPTERA—The Cairo, Egypt, International Grasshopper Conference, J. R. Parker; Reports of the Grasshopper Conditions and the Research and Control Work by States, F. A. Fenton, Okla.; E. G. Kelly, Kansas; Leonard Haseman, Mo.; S. C. McCampbell, Colo.; L. M. Gates, Nebr.; C. H. Richardson, Iowa; H. C. Severin, So. Dak.; C. L. Corkins, Wyo.; Fred D. Butcher, No. Dak. and Mont.; J. H. Bigger, Ill., and J. J. Davis, Indiana; The Grasshopper Problem, Fred Butcher; Grasshoppers in Oklahoma, F. A. Fenton (Motion Pictures); The 1936 Grasshopper Control Campaign in Jefferson County, Colo., L. G. Davis; Grasshopper Adult and Egg Surveys, R. L. Shotwell; Ecology of Grasshoppers, H. C. Severin; Intensive Area Studies of Grasshoppers, J. R. Parker; Laboratory Studies of Grasshopper Baits, C. H. Richardson; Orthoptera Classification, W. W. Henderson; The Mormon Cricket Prob-

lem, C. L. Corkins; The Sudden Rise of the Mormon Cricket Population, J. R. Parker.

COLEOPTERA—Staphylinid Beetles, Ralph Voris; The Alfalfa Weevil Situation in Nebraska, L. M. Gates; Blister Beetles, H. C. Severin.

DIPTERA—Florissant Diptera, M. T. James; Syrphidae Studies, Elizabeth M. Heiss; Bombyliidae and Certain Other Diptera, R. H. Painter; Mosquitoes, Wm. B. Owen.

HEMIPTERA—Lygus Bugs in Relation to Alfalfa Seed Production, C. J. Sorenson; Studies of Lygus Bugs in Arizona, Loyd L. Stitt.

HOMOPTERA—Aphids, M. A. Palmer; Plant Lice of the Sugar Beet, A. C. Maxson; The Tomato Psyllid as Related to Potatoes, L. B. Daniels; The Tomato Psyllid as Related to Tomatoes, Geo. M. List; A Progress Report on Control of Squash Bug, *Anasa tristis* De G., J. L. Hoerner.

LEPIDOPTERA—The Codling Moth in Virginia, W. J. Schoene; The Influence of Weather on Codling Moth in Missouri, Leonard Haseman; Codling Moth in Indiana, J. J. Davis; Codling Moth Control Work in Colorado, J. H. Newton.

APICULTURE—Work of the Intermountain Bee Laboratory, A. P. Sturtevant; Bee Behavior in Commercial Production, C. L. Farrar.

GENERAL—The Need of Keys for the Common Insects of the Rocky Mountain Region, J. W. Scott; Spray Residue Removal, C. L. Fluke; Peach Mosaic Control, Max A. Sisson; Extension Projects, E. G. Kelly; Resistance of Plants to Insect Attack, R. H. Painter; Enemies of Fish in the Yellowstone National Park, John W. Scott.

It was agreed that the Wyoming summer camp and the Colorado State College forestry lodge at Pingree Park, Colorado, where all previous meetings have been held, are both very desirable meeting places. The selection of the meeting place for next year was left to the officers. Those selected for 1937 were C. P. Gillette, Chairman; Claude C. Wakeland, Vice-Chairman; Geo. M. List, Secretary, and C. R. Jones, Treasurer.—GEORGE M. LIST, *Secretary*.

OBITUARY

On Monday, October 26th, 1936, HENRY G. KLAGES passed away in his seventy-seventh year, leaving his widow, Frances Rinkhoff Klages and a daughter, Mary, now Mrs. John C. Robinson of Lynchburg, Virginia. For thirty-three years he served on the staff of the Carnegie Museum, Pittsburgh, Pennsylvania, as assistant in the Section of Entomology, where he was entrusted with the responsibilities of mounting, arranging, and identifying beetles of the Museum collection under the guidance of the Curator. Although Mr. Klages did not have the advantage of academic training in entomology in his youth, nevertheless his keen interest in beetles, his discriminating and observing mind, his acquaintance with specialized literature and his prodigious memory qualified him as an entomologist of unusually practical competence. In performing his preparatorial duties in the Museum he acquired a familiarity with a wide range of insect groups outside of his favorite specialty. As an enthusiastic amateur entomologist he assembled with great care and diligence a fine collection of coleoptera from the local region and augmented it by extensive material from other regions of the United States and Canada. This private collection of his was constantly enlarged as opportunity would arise.

This institution is indebted to Mr. Klages for large series of insects gathered in different places in the vicinity of Pittsburgh during his frequent field explorations and has also acquired from him a whole collection of beetles at the beginning of Mr. Klage's association with the Museum.

In 1902 he published in the *Annals of the Carnegie Museum* "Supplement to Dr. John Hamilton's List of the Coleoptera of Southwestern Pennsylvania." It is regrettable that he did not contribute more frequently to coleopterological literature.

The biography of Mr. Klages is an example of a worthy self-made man who devoted himself painstakingly and successfully to his chosen field. He was born July 29, 1860, in the part of Pittsburgh known as the Southside. His parents were Doctor Gustav A. and Eliza Klages, his father receiving his

Doctorate in Medicine and Philosophy in the University of Heidelberg. On account of the meager circumstances of his family, Mr. Henry Klages had to relinquish school at an early age and earn his living. He became engaged as a glass blower in a factory but found time to give his attention to the study of entomology. He would also often indulge in preparing skillful drawings as a recreation and means of keeping illustrated records. His love for systematic collecting did not limit itself to the field of natural history. He was a keen philatelist, having assembled a valuable collection of stamps from many lands.

The loss of Mr. Henry Klages by the Museum is not to be easily replaced and all his friends and colleagues on the staff mourn his passing away and will preserve affectionate memories of his kindly, loyal, and sympathetic personality.—A. AVINOFF.

Dr. CARROLL FOX, medical director of the United States Quarantine Station at Rosebank, Staten Island, and chief quarantine officer of the port of New York, died of heart disease on May 24, 1936, at the United States Marine Hospital at Stapleton, Long Island. He was 61 years old and had been in the Public Health Service for 37 years. He was born in Philadelphia and entered the Health Service after two years as pathologist in the State Hospital in Scranton, Pennsylvania. He was sanitary adviser to the Navy during the World War. (*The Pennsylvania Gazette*, University of Penna., Oct. 15, 1936.) Dr. Fox specialized in the study of fleas and contributed papers to the *NEWS* and other journals on those insects; his last, in our pages, appeared in July, 1929, and described three new species, one of them from Ecuador and two from California. He was the author of a text book *Insects and Disease of Man* (Philadelphia, Blakiston, 1925). The title page of that volume states that he was lecturer on medical entomology to the class of student officers, Hygienic Laboratory, Washington, D. C., one time Assistant Director of Health, Philippine Islands and Associate Professor of Hygiene, Medical School, University of the Philippines. He received his M.D. degree from the University of Pennsylvania in 1897.

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- 1020.—Cresson (E. T., Jr.).—Descriptions and notes on genera and species of the Dipterous family Ephydriidae. II. (Trans., 62, 257-270, 1936)30

HYMENOPTERA.

- 1016.—Mitchell (T. B.).—A revision of the genus Megachile in the Nearctic region. IV. Taxonomy of subgenera Xanthosarus, Phaenosarus, Megachiloides and Derotopsis (Megachilidae.) (Trans., 62, 117-166, 4 pls., 1936) 1.00
- 1013.—Pate (V. S. L.).—Studies in the nysomine wasps. I. Species of Psamma etes, a n. subg. of Hoplisoides (Sphecidae). (Trans., 62, 49-56, 1936)20

ODONATA.

- 1015.—Needham and Fisher.—The nymphs of North American Libelluline dragonflies. (Trans., 62, 107-116, 2 pls., 1935)20

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- 1019.—Hebard (M.).—Studies in Orthoptera which occur in N. Amer. north of the Mexican boundary. VI. A revision of the genus Arethaea (Tettigoniidae). (Trans., 62, 231-256, 2 pls., 1936)40

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(Continued on third page of cover).

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EXCHANGES

(Continued)

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ENTOMOLOGICAL NEWS

FEBRUARY, 1937

Vol. XLVIII

No. 2

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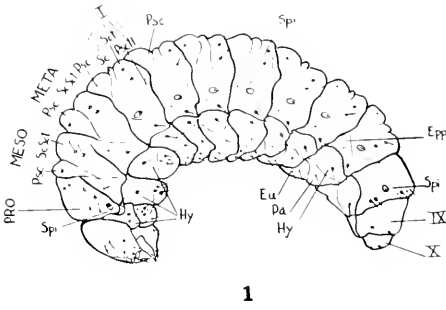
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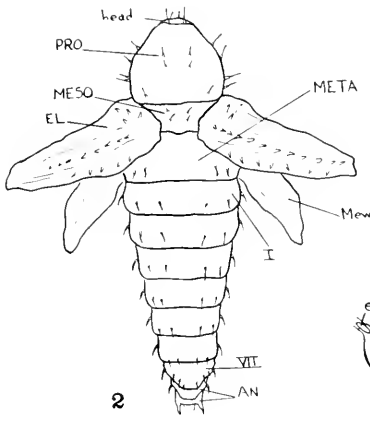
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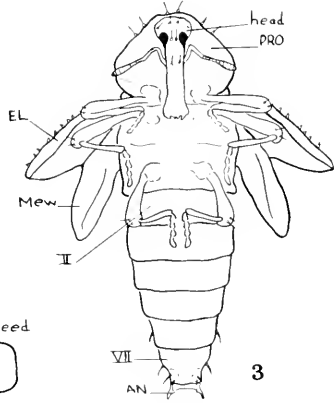
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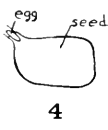
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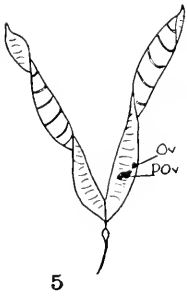
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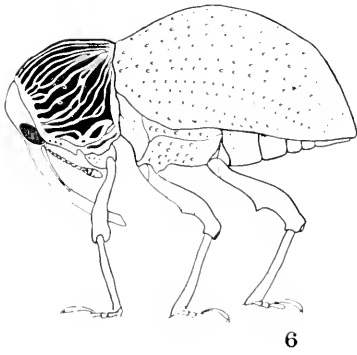
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PARTRIDGE-PEA WEEVIL, *CHALCODERMUS COLLARIS*—ALSTERLUND

ENTOMOLOGICAL NEWS

VOL. XLVIII.

FEBRUARY, 1937

No. 2

Notes on the Biology of the Partridge-pea Weevil, *Chalcodermus collaris* Horn. (Coleop., Curculionidae)¹.

By JOHN ALSTERLUND, University of Illinois, Urbana, Illinois.
(Plate I.)

The genus *Chalcodermus* Schon. comprises a small group of snout-beetles, seven species being listed for North America by Leng (1920, 1933).² The only species whose biology is recorded in literature is *Chalcodermus acneus* Boh., the cowpea curculio, of which the best account is by Ainslie.³ *Chalcodermus vittatus* Champ. has been bred from the seed pods of *Cardiospermum halicababum* L., or balloon vine, in Texas.⁴ No other biological data, apart from brief host plant notes made in general collecting, are recorded for North American species of *Chalcodermus*.

In the autumn of 1933 the writer reared *Chalcodermus collaris* Horn. from the seed pods of *Cassia chamaecrista* L., or partridge pea, at Urbana, Illinois.

All material was reared from the single host plant mentioned, *C. chamaecrista*, a low, yellow-flowered legume, fairly common around Urbana along roadsides and railroad embankments. It blooms in greatest abundance during the latter part of August, bearing flat pods (Fig. 7) about five cm. long, which contain a single row of from twelve to fourteen seeds. The seeds reach maturity in approximately three weeks, at which time the pod is dry and brittle; in a few days the seeds are expelled by a sudden springing open of the pod, the two halves remaining typically twisted (Fig. 5).

¹ Contribution No. 174 from the Entomological Laboratories of the University of Illinois.

² Leng, C. W. Catalogue of the Coleoptera of America, North of Mexico, 1920. Also supplement, 1933.

³ Ainslie, G. G. The Cowpea Curculio, U. S. D. A. Bur. Ent. Bull. 85, pt. 8, pp. 133-146.

⁴ From collections of U. S. National Museum, courtesy A. G. Boying.

Adult.—The adult weevils vary from four to six mm. in length, from eyes to tips of elytra. The thorax is dark brown, covered with smooth undulating ridges (Fig. 6). The elytra are a bronze or light copper color, with irregular black mottlings.

The sexes are very similar in appearance. The writer is unable to give any means for separation on external characters. No mating pairs were ever seen, the present observations probably having started too late in the summer for this activity.

Oviposition.—Oviposition of *C. collaris* extends from approximately August 15 to October 1. The amount of oviposition is dependent on the supply of the preferred young pods, which are most numerous about September 1.

The preparation for oviposition is lengthy. The female, clinging head upward with tarsi gripping the sides of the pod, first digs a feeding puncture or pre-oviposition hole (Fig. 7, POv). About one-half hour of steady probing results in a raggedly torn area, somewhat smaller than the insect's thorax, in the shell of the pod; the seeds within are only rarely pierced. The weevil then moves up about its own body length and makes a second puncture (Fig. 7, Ov). The second puncture is always on the side of the pod to which the seeds are attached, but the location for it is chosen without apparent trial. The female plunges her beak in full length to complete the puncture, which terminates in the basal corner of the seed near its attachment (Fig. 4). After having consumed approximately another one-half hour with the second excavation, the female turns about and inserts an egg into it, actual oviposition requiring only a few seconds.

The punctures and the tissue between and just around them discolor rapidly, turning from whitish to dark rusty brown in a few days, leaving a very characteristic ragged scar (Fig. 7), resembling an inverted question mark.

Egg.—The egg when laid is approximately one mm. long and one-third as wide, cylindrical, glistening white and tapering gently at each end. When about to hatch, it is thicker and blunter, and the young larva is easily visible through the chor-

ion. The length of the egg stage varied from three to six days.

Larva.—There are four larval instars. All are legless, and white in color except for the brown head capsule. The first three instars differ from the last in being nearly circular in cross-section, and in having smooth body segments, only a few faint lines on the third instar larva giving any indication of intrasegmental pleats. The fourth instar larva (Fig. 1) is distinctly unlike those preceding. It is somewhat flattened ventrally, with rows of fleshy swellings along the ventro-lateral margins, which enable it to crawl vigorously. It bears deeply impressed sutures and many transverse folds.

Following are the head capsule widths of the instars, taken in each case as the greatest transverse diameter on the cephalic aspect:

Instar	First	Second	Third	Fourth
Head width in mm.	.35 - .47	.52 - .58	.75 - .81	.93 - 1.0

The first instar larva on hatching is partially inside the seed and begins to feed on the tender tissue surrounding it. Larvae hatched out on moist blotting paper appeared incapable of movement: they stood upright, attached to the paper by the tip of the abdomen, with the head stretching to and fro, the mandibles moving mechanically. Normally the young larva molts after a day's feeding. Newly hatched larvae were kept alive for three days without food, but they did not molt.

The second instar also averaged one day in length. The third instar averaged three days. The seed in which the egg is laid often decays rapidly, and the later instar larvae generally tunnel through several seeds to complete growth.

The fourth instar varied from ten to twelve days, making a total of from fifteen to eighteen days for the entire larval period. Normally, by about the middle of the fourth instar the pod has matured and become dry and brittle, with the seeds hard and unfit for food. The larva now leaves the plant in one of two ways. If the pod is still intact, the larva bores a ragged hole in one of the narrow sides and drops to the ground. In most cases, however, before the larva can bore out, the halves of the pod spring open to release the seed, forcibly ejecting the

larva also.

This fact was first noticed in rearing fourth instar larvae from a jar full of dried pods. Within a day after collection, all of the pods had opened, depositing the larvae and seeds in the bottom of the jar. Another lot of sixty infested pods was collected and each pod placed in a separate glass vial. One larva in the lot bored out, leaving the pod closed; but a daily inspection of vials containing an opened pod and an ejected larva showed that the edges of about ten per cent of such pods were marked with remnants of exit hole injury. Most of the mature larvae, then, while capable of boring out, are anticipated, either entirely or while attempting to emerge, by the natural dehiscence of the pod.

Once out of the pod, active fourth instar larvae crawl about energetically till they find loose soil or an object against which to brace, whereupon they burrow to a depth of one to two inches.

The prepupal phase occupies the last three to five days of the fourth instar, in the larval burrow. Prepupae are similar in appearance to active larvae, but in behavior exhibit the internal changes that are taking place. Active fourth instar larvae crawl vigorously, at the rate of about ten centimeters per minute; early prepupae, if disturbed, attempt to move, but always tumble over after one or two convolutions. Advanced prepupae when disturbed merely wriggle, and after a few seconds lie perfectly still.

Molting.—Molting of larvae is accomplished by splitting of the head capsule along the epicranial suture and passage of the exuvia backward by writhings of the body, the larva lashing out with its head toward the exuvia. The molted head capsule passes along the ventral surface. A third instar larva was observed when the old capsule had just been worked off the head. The exuvia was passed along the entire length of the rest of the body in approximately ten minutes. The exuvia consists mainly of head capsule, together with a tightly wadded ring of body material. It often clings to the tip of the abdomen until the following molt.

Pupa.—Pupation occurs in the soil soon after the larvae leave the pods. Pupae (Figs. 2, 3) measure from four to seven mm. in length, and are milky-white when young, the compound eyes and appendages darkening toward the end of the pupal period. Thoracic segments are distinct. Seven dorsal and six ventral abdominal segments are visible, plus two short anal segments (AN). Pupae when disturbed wriggle the abdomen dorso-ventrally with wings held slightly spread, as in Figs. 2 and 3. Length of the pupal stage varied from nine to twelve days.

Wintering.—The adults remain in the larval burrows in hibernation during the winter. Adults dug up were between one and two inches below the surface in a cinder embankment.

Data are lacking for habits of the species during late spring and mid-summer, but there is probably only one generation a year. The seasonal history of a related economic pest, *Chalcodermus aeneus* Boh., the cowpea curculio, has been studied in South Carolina by Ainslie (*l.c.*), who says of it:

"It seems to be true that only one generation is produced annually, but in localities where two distinct crops of cowpeas can be matured, there may prove to be two generations of beetles."

An associated form, the only other insect found living within the seed pods of *Cassia chamaecrista*, was a lepidopterous larva of the family *Gelechiidae*. It was observed in the field on three occasions, and each time was in the act of crawling into a pod through either the feeding or oviposition puncture of *C. collaris*. A few specimens were found inside of pods apparently feeding on the seeds. An attempt to rear them failed. Two of the immature larvae were sent to Mr. Carl Heinrich of the U. S. National Museum, who reported the family determination above. Mr. Heinrich also stated that the species "resembles that of *Stegasta bosquella* Chambers which also feeds on *Cassia chamaecrista* but it lacks the characteristic red coloring on the thoracic segments of that species and differs in slight details of setal arrangement. Your specimens are immature larvae while our example of *bosquella* is a full grown specimen. However, I do not think your specimens are *bosquella*. What species or genus they are I cannot say."

Notes on Coleoptera with Descriptions of New Species (Buprestidae and Cerambycidae).

By JOSEF N. KNULL, Ohio State University, Columbus, Ohio.

(Continued from page 17)

Chrysobothris kelloggi, n. sp.

♂—Robust, depressed; dark purple above, beneath cupreous, shining.

Head convex, occiput longitudinally carinate; front flat, a small callosity on each side; surface coarsely punctate, becoming rugose below, clothed with recumbent pubescence; eyes narrow, about evenly rounded above and below; epistoma broadly, deeply emarginate; antennae extending to middle of pronotum when laid along side margin, joints compact, not diminishing in width toward tips, third joint one and one-half times length of fourth.

Pronotum about twice as wide as long, flat; anterior margin slightly sinuate, middle lobe not prominent; basal margin emarginate at middle of each elytron, median lobe acutely rounded; surface with a wide, sparsely punctured, smooth central area extending over half of pronotum, punctures confluent at sides, a well marked lateral depression each side near front, two slight depressions on each side of median line, one at middle and one at base. Scutellum small, triangular.

Elytra wider than pronotum at base; sides subparallel at base, constricted back of humeral angles then broadly, arcuately rounded to separately rounded apices; disk flat, irregularly confluent punctured, each elytron with a well defined costa parallel to suture, also three, irregular, transverse chitinized areas.

Abdomen beneath coarsely punctate, sparsely pubescent; first and second segments channeled; last ventral finely serrate, without marginal ridge, deeply arcuately emarginate at apex. Prosternum not lobed in front, surface punctate, densely pubescent; prosternal process expanded behind coxal cavities. Anterior femora with a large obtuse tooth on inner margin, outer edge of tooth and femur serrate. Anterior and middle tibiae arcuate, posterior tibiae straight; anterior tibia with an obtuse tooth one-fourth from apex.

Length 7 mm.; width 3.5 mm.

Described from a unique male collected at Silver City, NEW MEXICO, on January 28, 1934, by R. T. Kellogg. Holotype in writer's collection.

According to Horn's² key, this species would come in group III, near *C. speculifera* Horn. However the tooth on the anterior tibia is broader and farther from the tip than it is in *C. speculifera* Horn. It can be separated from its near relatives by its broad depressed form.

***Chrysobothris chiricahuae*, n. sp.**

Size and form of *C. floricola* Gory, depressed; dark bronze head, pronotum and ventral surface more shining than elytra.

♂—Head convex, occiput longitudinally carinate; front with a small callosity on each side in middle; surface densely, irregularly punctate, clothed with long white pubescence; eyes narrow, equally rounded above and below; epistoma deeply emarginate in front; antennae extending to middle of pronotum, when laid along side margin, joints not narrowed toward apex, compact, third joint only slightly longer than fourth.

Pronotum twice as wide as long, widest back of middle, narrower in front than at base; sides rounded in front, parallel at middle, obliquely rounded at base; anterior margin with median lobe only slightly produced, broadly rounded; basal margin broadly, arcuately emarginate at middle of each elytron, median lobe acutely rounded; surface densely, coarsely punctate, punctures confluent in middle and along sides, slight indication of median depression, a strong lateral depression on each side in front, a small callosity on each side at base. Scutellum small, triangular.

Elytra much wider than pronotum; sides broadly rounded in front, sinuate back of humeral angles, then arcuately narrowed to rounded tips, serrulate; disk with two well marked basal depressions on each side at base, each elytron with an irregular, transverse depression in front of middle, back of middle and two on apical third, depressions densely punctate, three irregular costae on each elytron, the one along suture extending from basal third to tip, the other two irregular and interrupted by depressions; surface irregularly punctate.

Abdomen beneath coarsely punctured, ventral segments channeled in the middle, last ventral serrate along lateral margin, submarginal ridge lacking, deeply arcuately emarginate at apex. Prosternum with a broadly rounded lobe in front; surface densely punctate on all but median line, clothed with long white pubescence; prosternal process expanded behind coxal cavities. Anterior femora with a large obtuse tooth on inner

²G. H. Horn, Trans. Amer. Ent. Soc. 13, p. 65, 1886.

margin which is serrate on outer edge. Anterior and middle tibiae arcuate, each bearing a tooth one-third from apex, tooth of anterior tibia broadly rounded, tooth on middle tibia obtuse, hind tibia straight.

Length 11 mm.; width 4.5 mm.

♀—Differs from the male by being more robust, last abdominal segment not as deeply and broadly emarginate at apex, anterior and middle tibiae unmodified, front not as pubescent.

Holotype male labeled Chiricahua Mountains, ARIZONA, June 23, 1933, F. H. Parker collector. *Allotype* female from the same locality collected by the writer on June 2, 1935. The female was taken on pine slash at an elevation of about 8000 feet, which leads me to believe that the insect breeds in pine. Type material in author's collection.

According to Horn's² key, this species would fall in group III, near *C. speculifera* Horn. It can be separated from the closely related species by the size and the fact that the anterior and middle tibiae are both dentate.

CHRYSOBOTHRIS ACUTIPENNIS Chev. Adults were reared from dead branches of *Acacia felicioides* Car. collected at Brownsville, TEXAS. The larvae work beneath the bark and enter the sapwood for pupation.

Agrilus osburni, n. sp.

Size and form of *A. juglandis* Knull; head, antennae, sides of pronotum and legs green, elytra piceous, rest of insect dark bronze with an aeneous reflection.

Head convex, faint indication of a median depression; surface granulose in part, becoming rugose on occiput, lower half clothed with recumbent white pubescence; antennae reaching to basal fourth of pronotum when laid along lateral margin, serrate from the fourth joint.

Pronotum wider than long, base and apex of about equal width, widest in middle; sides broadly rounded in front then narrowed to base; when viewed from the side the marginal and submarginal carinae are separated in front and united very near the base; anterior margin sinuate, with broad median lobe; base bisinuate, median lobe emarginate in front of scutellum; disk convex, with two broad indistinct median depressions, lateral depressions deep, prehumeral carinae prominent; surface transversely rugose. Scutellum transversely carinate.

Elytra at base wider than base of pronotum; sides parallel

near base, constricted in front of middle, then broadly rounded on apical half to rounded apices, serrulate near tips; disk convex, sutural margins elevated posteriorly, basal depressions deep; surface imbricate-punctate.

Abdomen beneath densely punctate; first and second segments chameled at middle but not conspicuously pubescent; suture between first two segments well defined, but obliterated at side margins. Median line of ventral pubescence lacking. Prosternal lobe broadly rounded in front, feebly emarginate at middle. Posterior tarsi shorter than tibiae. Tibiae slender, all three pairs armed with a distinct tooth on inner margin at apex. Tarsal claws similar on all feet, cleft near the middle, the outer tooth acute, the inner one broad and turned inward, the tips nearly touching.

Length 5 mm.; width 1.2 mm.

Described from two male specimens collected by the writer at Put-in-Bay, OHIO, July 7, 1935. Holotype and paratype in writer's collection. I take pleasure in naming this beetle after Dr. R. C. Osburn.

This species would come next to *A. juglandis* Knull according to Fisher's³ key; however, the median depression on the first two ventral segments of the abdomen will distinguish it. The male genitalia are unlike any of those figured by Fisher. In general outline they resemble those of *A. atricornis* Fisher, with the addition of translucent appendages at the ends of the lateral lobes.

***Agrilus santaritae*, n. sp.**

♂—Narrow, elongate; head, pronotum and ventral surface greenish bronze, elytra dark bronze.

Head with a broad deep depression extending from vertex to epistoma; surface irregularly rugose; eyes large, more broadly rounded beneath, than above; antennae short, extending to middle of pronotum when laid along side margin, serrate from the fourth joint, outer joints wider than long.

Pronotum slightly wider than long, width of base and apex about equal; sides arcuately expanded to back of middle, sinuate at base; when viewed from the side, marginal carina slightly sinuate, submarginal carina inferior in front, the two carinae joined back of middle; anterior margin feebly sinuate, median lobe broadly rounded; basal margin slightly emarginate at

³ W. S. Fisher, U. S. Nat. Mus. Bul. 145, pp. 1-347, 1928.

middle of each elytron; disk convex, with two shallow median depressions, a broad lateral depression on each side along side margin, prehumeral carinae well indicated, oblique; surface coarsely, transversely rugose, punctate between rugae, a dense patch of recumbent white pubescence in each lateral depression. Scutellum transversely carinate, granulate.

Elytra as wide as widest part of pronotum; sides broadly arcuate at base, strongly constricted in front of middle, expanded back of middle, tips narrowly rounded, serrulate; disk flattened, sutural margin elevated posteriorly, basal depressions deep; surface irregularly granulose, pubescence very short, inconspicuous.

Abdomen beneath transversely rugose; first and second ventral segments convex, unmodified, suture between first two ventrals plainly indicated at sides; pubescence of middle portion very short; sides of meso- and metasternum, posterior coxal plates and ventral portions of abdominal segments clothed with dense patches of recumbent white pubescence. Prosternal lobe broadly rounded in front; prosternal process with sides parallel, not expanded back of coxae, acute at apex.

Posterior tarsi longer than the tibiae; tibiae slender, acute, anterior and middle pairs mucronate on inner side at apex; tarsal claws dissimilar, anterior pair cleft near tips, teeth of about equal length, posterior and middle pairs cleft near the middle, inner tooth much broader and shorter than the outer one, tips slightly turned inward.

Length 7.8 mm.; width 1.5 mm.

Described from two male specimens collected in the Santa Rita Mountains, ARIZONA, on August 12, 1935, by F. H. Parker. Holotype and paratype in writer's collection.

According to Fisher's³ key, this species runs to *A. inhabilis* Kerr. The more narrow constricted form of this beetle, together with the shape of the front margin of the prosternum and length of posterior tarsi will serve to separate the two species.

The genitalia are approximately the same as those figured by Fisher³ for *A. restrictus* Water, however, the sides near the apex are serrulate.

Mr. E. T. Cresson, Jr. kindly compared the species with the lectotype of *A. inhabilis* Kerr in the Academy of Natural Sciences and informs me that the two are not conspecific.

AGRILUS SUBTROPICUS Schffr. Adults were taken on the foliage of black persimmon (*Bryodendron texanum* Sch.) at Brownsville, TEXAS, from May 16 to 19. The number taken on widely separated trees would indicate that this might be the host of the species.

AGRILUS PARKERI Knull. Adults reared from black oak, (*Quercus* sp.) slash collected by the writer in Miller Canyon, Huachuca Mountains, ARIZONA. L

TRIGONOGYA RETICULATICOLLIS Schffr. Adults were taken from the foliage of swamp ash (*Fraxinus caroliniana* Mill.) at Brownsville, TEXAS, from May 12 to 19. The species probably breeds in the small branches of this tree.

CERAMBYCIDAE.

ZAMODES OBSCURUS Lec. Mr. A. B. Champlain presented me with a specimen of this rare beetle which emerged from a natural finished hickory table at Glenside, PENNSYLVANIA, on June 19, 1934. The table had been in use two years before the adults started to emerge. No doubt oviposition occurred before the furniture was built.

CHION CINCTUS var. *ochraceus* Bates. Adults were chopped from their pupal cells in a dead ironwood (*Ostrya virginiana* K. Koch) at Hot Springs, ARKANSAS, on June 20, 1934.

Obrium glabrum, n. sp.

Brunneous above and below, glabrous, each elytron marked with dark brown stripes as follows: an oblique band on apical third running from side margin toward suture, a wider transverse band back of middle and a transverse band near tip.

Head densely punctate; eyes large, deeply emarginate; antennae reaching to end of elytra, scape stout, second joint as long as wide, joints three to seven inclusive, gradually increasing in length, joints eight to eleven inclusive, gradually decreasing in length.

Pronotum as broad as long, much wider in front than at base; each side with an obtusely rounded tubercle at middle, strongly constricted at base; disk convex, a transverse depression at base running around sides; surface minutely sparsely punctate, a long brunneous, ciliate hair arising from each puncture. Scutellum triangular.

Elytra at base wider than the widest part of pronotum; sides constricted back of humerus, broadly rounded in apical

half to rounded apices, disk convex, punctures large, sparse, irregularly placed, a long brunneous, ciliate hair arising from each puncture.

Ventral portion of abdomen glabrous, second segment deeply emarginate, apical margin clothed with a dense fringe of brunneous hairs, third segment emarginate, fourth and fifth concave. Legs sparsely pubescent, femora clavate.

Length 4.3 mm.; width 1.3 mm.

Described from a unique female in the Wenzel collection, Ohio State University, labeled Davis Mountains, TEXAS, July 10, H. A. Wenzel, collector.

This species is close to *O. constricticollis* Schffr. However, it can be distinguished by the arrangement of the punctures and markings on the elytra. Mr. W. S. Fisher has kindly compared the specimen with the type of *O. constricticollis* Schffr.

LEPTOSTYLUS BIUSTUS Lec. Adults reared from small branches of dead hackberry (*Celtis mississippiensis* Bosc.) collected at New Orleans, LOUISIANA.

LEPTOSTYLUS KNULLI Fishr. Found breeding in pine slash at Hot Springs, ARKANSAS.

LOCHMAEOCLES TESSELLATUS Thoms. This species breeds in dead trunks and branches of hackberry (*Celtis*) and *Acacia felicoides* Carr. at Brownsville, TEXAS. The larvae work beneath the bark and frequently enter the sapwood for pupation. The pupal cells are very roughly constructed and when the loose bark is removed most of the cells are exposed. The adults mature the latter part of May.

HEMIERANA MARGINATA Fab. Found breeding in ironweed (*Vernonia* sp.) in Gillespie Co., TEXAS. Adults were present the latter part of May and they have the same girdling habit in egg-laying as the genus *Oberca*.

Obituary.

We deeply regret to announce the deaths of two prominent entomologists:

Prof. CYRUS R. CROSBY, of Cornell University, died at Ithaca, New York, January 11, 1937, of a heart attack.

Dr. ROBIN J. TILLYARD was killed in an automobile accident, on January 13, 1937, according to a despatch from Sydney, Australia, published in the daily papers.

Notes on the Distribution and Hosts of Some Western Thysanoptera.

By STANLEY F. BAILEY, University of California.

Since the previous paper published in this journal * by the author, additional records of western thrips have been accumulating which it seems advisable to bring together at this time. Unless otherwise designated, the collections were made by the author in California.

1. *ERYTHROTHRIPS FASCICULATUS* Moulton. J. J. duBois collected 22 females of this rather uncommon species on *Adenostoma fasciculatum* on Bear Creek (Lake County), July 5, 1935.

2. *OROTHRIPS KELLOGGII* Moulton. Collected at Berkeley, Penryn, Cobb Mountain, Mt. St. Helena, Geyserville, and near Williams, rather commonly in the spring in manzanita and madrone flowers. Males seldom seen.

3. *O. YOSEMITI* Moulton. Like the above species, taken rather commonly in the spring on *Ceanothus* spp. and wild mustard. New localities include Vacaville, Penryn, Mt. Diablo, and Sequoia National Park. The males appear to be more common than those of *kelloggii*.

4. *ANKOTHRIPS ROBUSTUS* Crawford. Found frequently in the blossoms of *Ceanothus* and manzanita in the spring and early summer in Arroyo Seco, Lake and Colusa Counties, and on Mt. Tamalpais.

5. *A. GRACILIS* Moulton. Four males with numerous females were taken at Tujunga on *Adenostoma fasciculatum* on June 16, 1932. On "chamise" at Bear Creek (Lake County), J. J. duBois collected 11 females on July 5, 1935.

6. *A. YUCCAE* Moulton. This species has previously been recorded only from the type locality (Riverside County) by Moulton when first described. Ten adults (4 males and 6 females) and hundreds of larvae were collected from blossoms of *Yucca whipplei* on July 3, 1935, at Flintridge (Los Angeles County).

*Some Notes on California Thrips (Thysanoptera). Ent. News, Vol. 44:14-15, 1933.

7. *AELOTHRIPS FASCIATUS* (L.). This cosmopolitan species has been taken at Sumner, Washington, on mallow, July 27, 1934, by Ralph Schopp and on gladiolus at Tacoma, Washington, August 5, 1934, by C. F. Doucette.

8. *A. KUWANAH* var. *CRUCIFER* Hood. This variety (described 1935) has been taken at Davis on *Ceanothus cyaneus* on July 5, 1931, (6 females) and at Penryn, on March 12, 1935, and on June 3, 1935, one female each on *Ceanothus cuneatus* and lupine.

9. *HELIOTHRIPS HAEMORRHOIDALIS* (Bouché). Three additional records of this greenhouse species being injurious out-of-doors may be given: K. D. Sloop collected specimens at Anaheim injuring verbenas, and leaf injury to toyon at Berkeley and an ornamental shrub (undetermined) at Napa has been observed. All three records are of September, 1935. D. C. Mote on January 11, 1934, found this species on azaleas at Eugene, Oregon.

10. *HERCOTHRIPS FASCIATUS* (Perg.). This species, so injurious to beans in California, may now be recorded on beans and caragana from Powell, Wyoming. The office of the State Entomologist submitted specimens from that locality collected on September 4, 1935.

11. *H. FEMORALIS* (Reuter). The sugar beet thrips can now be listed from Sumner, Washington, having been found in a greenhouse on *Solanum* sp. by Ralph Schopp on July 11, 1934.

12. *CHIROTHRIPS ACULEATUS* Bagnall. This European grain-infesting species has been found on pears at Marysville, June 4, 1931. (Determination: J. B. Steinweden). Also we can list Rhododendron as a host at Berkeley on July 10, 1935, wheat at Davis on June 8, 1935 (both sexes), and yarrow at Napa on July 8, 1935.

13. *LIMOTHRIPS ANGULICORNIS* Jablon. The following new records for this species may be listed as follows: June 27, 1931 Davis—*Lactuca scariola*. Oct. 22, 1931, Vernalis—Under bark of grape vine. J. F. Laniman. June 30, 1934, Concord—Tomatoes. O. Whipple. January 21, 1935, Davis—Under bark of apple. June 10, 1935, Davis—Sweet corn. June 30, 1935, Near Irvine—Under sycamore bark. August 25, 1935,

Davis—Under sycamore bark. November 6, 1935, Davis—Under apple bark. These data and other observations indicate that this species has only one or two generations in the spring and summer and hibernates beneath bark.

14. *L. CEREALIMUM* (Haliday). This species, very injurious to grain in central and northern Europe, may now be recorded from California. Six females were collected in flight in residence in Alhambra, June 6, 1932. Determination: J. D. Hood.

15. *APTINOTHRIPS RUFUS* (Gmelin). New locality and host records include the following: July, 1914, Berkeley, on dog fennel, by E. R. deOng; July 18, 1935, Sumner, Washington, on lily bulbs, by Ralph Schopp; December 11, 1935, Davis, on dandelion.

16. *SERICOTHRIPS VARIABILIS* (Beach). This widespread North American *Sericothrips* may further be known from Jackson, March 31, 1935, on *Ceanothus*; Mt. Diablo, April 12, 1935, on *Ceanothus*; Sequoia National Park, June 23, 1935, on *Ceanothus*; Davis, September 23, 1935, on grape leaves (by R. M. Bohart); Westley, September 6, 1935, on *Asclepias mexicana*, and Davis, November 25, 1935, on oak leaves (by R. M. Bohart).

17. *SCIRTOTHRIPS CITRI* (Moulton). This interior economic species has been found occurring on mountain balm 5 miles from Laguna Beach on June 30, 1935.

18. *S. LONGIPENNIS* (Bagnall). J. B. Steinweden collected several specimens on *Begonia* at San Francisco, September 25, 1935.

19. *DREPANOTHRIPS REUTERI* Uzel. One specimen was taken by R. M. Bohart at Davis, September 23, 1935, on grape leaves.

20. *ANAPHOTHRIPS ZEAЕ* Moulton. Like *L. angulicornis*, this species apparently overwinters under bark since G. L. Smith found one specimen in the hibernacula of the peach twig borer, Yuba City, February 18, 1933, and the writer took a specimen beneath apple bark at Davis, January 21, 1935. A large series was collected on sweet corn at Davis, June 10, 1935.

21. *ODONTOTHRIPS LOTI* Haliday. *O. loti* was found commonly on lupine on Mt. St. Helena, April 10, 1935, and J. B.

Steinweden (in correspondence) reports this species taken on Mt. Ranier, Washington, during the summer of 1935, also on lupine.

22. *SCOLOTHRIPS SEXMACULATUS* (Perg.). This well-known predaceous species was observed in all stages throughout the summer of 1934, at Davis. They were feeding upon red spiders which were infesting hops grown in a greenhouse. Additional records of this species from California include the following: July 17, 1929, Berkeley—On *Ccstrum*. J. F. Lamiman, August 18, 1932, Davis—Corn. June 29, 1935, Costa Mesa—Beans. August 9, 1935, Shafter—Cotton. August 31, 1935, Sacramento—*Burcus* sp. September 23, 1935, Davis—Grape leaves.

23. *FRANKLINIELLA OCCIDENTALIS* (Perg.). This is one of the most commonly encountered thrips in California and its distribution is now extended to Sumner, Washington, where it was collected by Ralph Schopp on ocean spray flowers, June 25, 1934, and to Powell, Wyoming, where Miss Greenwald found individuals on rabbit brush, alfalfa, and dahlia under date of September 25, 1935.

24. *F. GOSSYPHII* (Morgan). Attention should be called to the finding of this species at Hemet, California, January, 1934, by H. J. Quayle (reported in *Journ. Ec. Ent.*, 28:1100, 1934) and H. L. McKenzie, on citrus. Determination: Moulton.

25. *TAENIOTHIRIPS INCONSEQUENS* (Uzel). The pear thrips can now be recorded from Sumner, Washington, on cherry, May 24, 1933, and April 26, 1935, by Ralph Schopp, and from the following California localities: Davis, April 2, 1930, on pear by F. H. Wymore; Kelseyville (Lake County) on pear, April 13, 1934, by C. E. Scott; Scott's Valley and Lakeport (Lake County), on March 25, 1935; Newcastle, April 2, 1935, on pear; Mt. St. Helena, April 10, 1935, on madrone.

26. *T. EBRIORHII* (Moulton). Four females of this very uncommon species, previously recorded only from Santa Clara County, were taken on July 2, 1935, at Encinitas on *Chaenactis glabriuscula*.

27. *T. SIMPLEX* Morison (*T. gladiolus* M. and S.). The gladiolus thrips is known to occur in the following California countries: Alameda, Contra Costa, Humboldt, Los Angeles, Marin, Monterey, Napa, Orange, Sacramento, San Francisco, San Diego, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Tehama, Ventura, and Yolo. It has been observed to pass the winter in the open both in the San Francisco Bay region and the Sacramento district.

28. *T. THIRIPS TABACI* Lind. While the published records of the distribution of the onion thrips include almost every state, there appears to be none from Wyoming. Miss Greenwald of the State Entomologist's Office collected *T. tabaci* at Powell, Wyoming, on a large number of hosts, including onions, alfalfa, corn, beans, elm, cosmos, etc., between September 16 and 27, 1935.

29. *T. TREHERNEI* Pr. In the literature we find this species previously recorded only from British Columbia. We may now report it as having been taken at Sumner, Washington, on September 3, 1932, by Ralph Schopp on dandelion, by A. J. Hanson, at Puyallup, Washington, on June 10, 1933, on dandelion, by Miss Greenwald on September 27, 1935, at Powell, Wyoming, on dandelion, cosmos, and caragana, and by R. M. Bohart at Davis, California, on December 13, 1935, on dandelion.

30. *T. NIGROPILOSUS* Uzel. The first record of this species in California is found in a letter from J. B. Steinweden to E. O. Essig under date of June 2, 1933. Steinweden collected many specimens in a greenhouse in San Francisco injuring gloxinia. Later collections extend its distribution and host range (in greenhouses) to chrysanthemums at Renton, Washington, on October 3, 1935, by W. D. Courtner, and to asters at Berkeley on May 5, 1935, by H. Rex Thomas.

31. *T. NIGROPILOSUS* f. *BRACHYPTERA* Uzel. The brachypterous form has been collected by Ralph Schopp on chrysanthemum in a greenhouse at Sumner, Washington, January 9, 1935, and by the writer on dandelion at Davis, December 17, 1935.

32. *T. MADRONII* Moulton. The following new records may be listed for this species: August 13, 1929, Davis—Dandelion. September 1, 1933, San Francisco—Gladiolus. J. B. Steinweden. April 24, 1934, San Francisco—Hawthorne. J. B. Steinweden. April 4, 1935, Berkeley—Madrone. April 17, 1935, Mt. Tamalpais—Lupine. April 25, 1935, Mt. St. Helena—Lupine. April 26, 1935, Tomales Bay—Ceanothus—L. J. Berry. May 9, 1935, Hayward—Cow parsnip. June 16, 1935, Grass Valley—Wild snapdragon. J. J. duBois. July 8, 1935, Napa—Wild sunflower. August 11, 1935, Meadow Valley—Monkey flower. E. O. Essig. October 6, 1935, Berkeley—Avocado.

33. *MICROCEPHALOTHIRIPS ABDOMINALIS* (Crawford). On August 31, 1931, this species was taken on zinnia at Colusa (State Dept. Agr., No. 31932-B) at Sacramento on zinnia, September 24, 1934, and by Ralph Schopp on *Helenium* sp. at Porter, Washington, on September 17, 1935.

34. *POECILOTHIRIPS ORNATUS* (Hood). Wm. W. Baker collected this species under lichen on maple at Puyallup, Washington, February 6, 1935.

35. *RHYNCHOTHIRIPS ILEX* (Moulton). The distribution of the toyon thrips now includes the following California counties: Alameda, Colusa, Contra Costa, Eldorado, Lake, Los Angeles, Marin, Mendocino, Napa, Placer, Sacramento, Santa Clara, Santa Cruz, San Benito, San Diego, San Francisco, San Mateo, Solano, Sonoma, and Yolo.

36. *LIOTHIRIPS VARICORNIS* Hood. The so-called hollyhock thrips has been found at Laguna Beach on *Malvastrum* by E. O. Essig, July 1, 1921, and at Maxwell by S. B. Freeborn on hollyhock, April 27, 1926. At Davis adults have been taken all year on hollyhock, either on the roots, stems, or leaves.

37. *L. VANECKEI* Pr. The lily thrips was first found in California in 1924 by H. S. Smith on lily bulbs in Los Angeles County (Watson, Fla. Ent., 8:29, 1924). On December 21, 1934, it was taken at Ukiah on lily bulbs (*Lilium roczi*) by N. G. Buhn (State Dept. Agr., No. 34L51).

38. *HAPLOTHRIPS FASCICULATUS* (Crawford). Numerous specimens of both sexes gathered from wild buckwheat at Antioch on September 15, 1935, and October 6, 1935, by R. M. Bohart.

39. *H. LEUCANTHEMI* (Schrank). On plantain at Sumner, Washington, August 21, 1933, by W. D. Courtner.

40. *NEOHEGERIA VERBASCI* (Osborn). Common on mullein from the following localities: Sumner, Washington—Nov. 12, 1931. Ralph Schopp and Vancouver—August 10, 1934, both in Washington. Natoma, February 4, 1935, Placerville, February 5, 1935, Jackson, March 31, 1935. Penryn, all year.

41. *LEPTOTHRIPS MALI* (Fitch). The records here given are thought to be new for the "black hunter": October 21, 1929, Penryn—plum. L. M. Smith. January 24, 1935, Geyserville—Manzanita. April 10, 1935, Mt. St. Helena—Madrone. April 19, 1935, Lodi—Walnut. L. M. Smith. May 7, 1935, Fairfield—Walnut. June 24, 1935, Visalia—Sycamore. July 2, 1935, Vista—Toyon. July 5, 1935, Bear Creek (Lake County)—Chamise. J. J. duBois. August 10, 1935, Echo Lake—Tamarack. J. F. Laniman. September 1, 1935, Calistoga—Walnut. All year, Davis—Apple leaves (in summer) and under bark in winter. September 30, 1935, Powell, Wyoming. Miss Greenwald.

42. *HOPLANDROTHRIPS ARMIGER* (Jones). W. D. Butler collected this species at Napa, May 28, 1929, on redwood (State Dept. Agr. No. 29211) and the writer took one specimen under bark of sycamore at Bakersfield on August 21, 1935.

43. *KARNYOTHRIPS FLAVIPES* (Jones). This thrips has been taken at Sacramento by C. Haenggi on sycamore, April 23, 1931 (State Dept. Agr. No. 31408). The writer has collected it all year at Sacramento under sycamore bark and in several additional localities: namely, Lodi, July 26, 1935, Bakersfield, August 21, 1935, Byron, September 15, 1935, and Berkeley, September 20, 1935.

44. *MEGATHRIPS HESPERUS* (Moulton). (Comb. nov. by J. D. Hood in correspondence with the writer under date of October 14, 1935.) Approximately two dozen specimens were found on oak bark at Pasadena on June 9, 1932, by A. T. McClay and on May 20, 1935, at Fort Seward, H. J. Rayner collected one specimen by beating.

**Six new Species of Graminella and Chlorotettix
(Homoptera Cicadellidae) from the eastern United
States.**

By DWIGHT M. DELONG, Dept. Zoology and Entomology,
Ohio State University.

Graminella mohri n. sp.

In form and general appearance resembling *T. pallidula* Osborn, but smaller and with distinct genitalia. Length 2- 2.5 mm.

Vertex bluntly angled, almost one-third wider between eyes than length at middle, elytra rather long and narrow.

Color: Straw yellow without definite markings. Elytra venation paler.

Genitalia: ♀ last ventral segment with lateral margins very short then obliquely produced inwardly to rounded lobes, between which the posterior margin is concavely rounded to a median rounded and slightly produced tooth. Margin rather broadly embrowned either side.

♂ plates rather long and pointed, combined width at base a little more than length. Style long and narrow, basal narrow inner portion almost as long as apical half. Oedagus entirely different from that of *pallidula*. In ventral view bifurcate at apex, so as to form a pair of vertical plates. In lateral view with a rounded, bulbous apex then slightly constricted between this and a broader basal half. The lateral spines at apex are on dorsal portion.

Type locality Erie, PENNSYLVANIA. *Holotype* male; *allotype* female and male and female *paratypes* in author's collection. Male and female *paratypes* in Illinois Natural History Survey collection.

Described from a large series of specimens from Presque Isle (Erie) Pa., collected by the author, July 4, and 21; August 1 and 29, and Sept. 5, 1919; a series from Clay County, KANSAS, collected August 1, 1906; a large series of specimens from Zion, ILLINOIS, collected July 25, 1934, by Dr. T. H. Frison, Dr. H. H. Ross and the writer, and a large series of specimens collected from a sand prairie at Thompson, Illinois, June 30, 1935, by Dr. H. H. Ross and the writer. This species occurs abundantly upon the sand plain of the margins of the Great Lakes and apparently it is widely distributed. It has been previously confused with *pallidula*. I take pleasure in

naming this species for Dr. Carl Mohr, who has given valuable assistance during the past two seasons in studies of the Cicadellidae of Illinois.

***Graminella oquaka* n. sp.**

In form, size and coloration resembling *pallidula* Osborn, but with fainter markings and distinct genitalia. Length 2.5 and 2.7 mm.

Vertex bluntly angled, about one-fourth wider between eyes than length at middle. Elytra longer than abdomen.

Color dull yellowish, vertex with four black or brownish spots just above margin between ocelli. These are frequently very faint. Ocelli black. Veins of elytra pale.

Genitalia: ♀ last ventral segment with lateral margins extending about half the length of the segment, then obliquely sloping to broadly rounded lobes between which the posterior margin is concavely rounded to a median slightly produced blunt tooth.

♂ plates rather broad and short, combined width at base greater than length, outer margins rather broadly, convexly, rounded at base then sloping to blunt apices. Styles only a little longer than broad, the basal narrow inner portion short. Oedagus appearing similar to *mohri* but narrower and deeper cleft at apex in ventral view. In lateral view with a much larger apical portion broader and not constricted at base. Lateral spine at apex at ventral edge of oedagus.

Described from a large series of male and female specimens collected at Oquaka, ILLINOIS, July 3, 1934, by Dr. H. H. Ross and the author, from bunch grass on a sand prairie, and a series of specimens collected at Thompson, Illinois, June 30, 1935, by the same collectors and from a similar habitat. This species is a Mississippi sand prairie form and might easily be mistaken superficially for *pallidula*. It can, however, be easily separated by the structures of the internal genitalia.

Type locality Oquaka, ILLINOIS. Male *holotype*, female *allotype* and male and female *paratypes* in the Illinois Natural History Survey Collection, Urbana, Illinois. Male and female *paratypes* in the author's collection.

Chlorotettix brevidus n. sp.

Resembling *unicolor* in general appearance but smaller darker green in color and with distinct male genitalia. Length 4.5 mm.

Vertex broadly rounded, about three times as wide between eyes as length at middle.

Color dark green tinged with yellow, veins of elytra especially dark green.

Genitalia: ♀ last ventral segment almost twice as long as preceding. Posterior margin shallowly concave between a pair of broad, slightly produced lobes. Between the inner pair the segment is deeply notched more than one-third the distance to the base. The sides of the v-shaped notch are straight and the apex is embrowned.

♂ plates triangular, sharply angled at apices, a little longer than combined width at base. Ventral margins of ninth segment not overlapping but forming a keel which is conspicuous caudal to the plates. Also the caudal notch in the pygofer near the posterior margin is shorter and more sharply notched at base than in the case of *unicolor*. The oedagus is the same form and type as *unicolor* but the terminal processes are proportionately shorter, in every case being conspicuously shorter than the basal portion of the oedagus.

Type locality Thompson, ILLINOIS. Described from a series of four male and nine female specimens collected at Thompson, Illinois, July 8, 1934, by Dr. H. H. Ross and the author, one male specimen from Oak Lawn, Illinois, July 27, 1934, taken by the same collectors and one specimen from Zion, Illinois, collected July 25, 1934, by Dr. H. H. Frison, and the author. Male *holotype*, female *allotype* and male and female *paratypes* in the collection of the Illinois Natural History Survey, Urbana, Illinois. Male and female *paratypes* in the author's collection.

Chlorotettix obsenus n. sp.

Resembling *unicolor* in form and appearance but smaller and with distinct genitalia. Length 4.5 mm.

Vertex broadly rounded but produced at middle about two thirds its length before anterior margins of the eyes. Not quite three times as wide between the eyes as length at middle.

Color pale green tinged with yellow.

Genitalia: ♀ last ventral segment more than twice as long

as preceding. Lateral margins produced about two-thirds its length, then gradually obliquely sloping to form produced lobes of the last ventral segment, between which the margin is excavated about one-third the distance to the base. The posterior margin is gently sloping to the central fourth which is more abruptly and almost concavely notched. The base of the broad v-shaped notch is embrowned.

♂ plates triangular, about as long as combined basal width, greatly exceeded in length by the pygofer. Oedagus in ventral view constricted at about two-thirds its length then bifurcate forming two slender terminal processes which are not more than half as long as the basal portion. In the case of *unicolor* these are as long as basal portion.

Type locality Zion, ILLINOIS. Described from five male and five female specimens collected at Zion, Illinois, from grasses and sedges in a marsh habitat by Dr. T. H. Frison, Dr. H. H. Ross, and the author, and one male specimen from St. Anne, Illinois, July 20, 1934, by Dr. H. H. Ross and the author. Male *holotype*, female *allotype*, and male and female *paratypes* in the Illinois Natural History Survey collection. Male and female *paratypes* in the author's collection.

Chlorotettix filamenta n. sp.

Resembling *balli* in general form and appearance but with distinct genitalia. Length 4 mm.

Vertex produced, bluntly angled, twice as wide between eyes as medium length.

Color green tinged with yellow, without darker markings.

Genitalia: ♂ plates triangular, outer margins convexly rounded at base then concavely rounded before apices which are narrow but bluntly rounded. Combined width at base a little greater than length. Oedagus similar to that of *balli* in type, but differing by having the inner branch of each bifurcate process at the apex at least twice as long as the corresponding branch in *balli* and the outer branch is at least four times as long as the corresponding portion in the case of *balli*.

Type locality Marshall, ILLINOIS. Described from two male specimens collected at Marshall, Illinois, September 27, 1934, by Dr. T. H. Frison, and Dr. H. H. Ross, and one male specimen collected at Havana, Illinois, August 30, 1917. *Holotype* and *paratype* males are in the Illinois Natural History Survey collection, Urbana, Illinois. *Paratype* male in the author's collection.

***Chlorotettix serrata* n. sp.**

In coloration and general appearance resembling *scutellatus* Osborn, but with more rounded head and distinct genitalia. Length 4 mm.

Vertex rather broadly rounded, about three times as wide as length at middle. Pronotum more than twice as long as vertex. Vento-caudal edge of pygofer with a row of conspicuous saw teeth.

Color: Yellow with brown markings. Vertex with a transverse brown band between anterior margins of eyes sometimes interrupted at middle. A pair of dark spots on basal angles of scutellum visible as they extend anteriorly under the pronotum. Inner margin of claval area with a faint brown line.

Genitalia: ♀ last ventral segment rather long, posterior margins broadly rounded, deeply broadly notched at middle more than half way to base.

♂ plates longer than combined width at base, gently convexly rounding from base to apices which are acutely angled. Oedagus short, in lateral view thickened on basal two-thirds, apical third narrowed, curving abruptly dorsally and anteriorly. Another portion arises about the middle dorsally and extends anteriorly with the apex curved dorsally.

Type locality Brownsville, TEXAS. Described from a series of four female specimens collected at Brownsville, Texas, November 22, 1910, and Mission, Texas, December 4, 1910, and two males collected at Tampico, MEXICO, December 29, 1908. Male *holotype*, female *allotype* and female *paratypes* in collection of Illinois Natural History Survey, Urbana, Illinois. Male and female *paratypes* in the author's collection.



**Prof. C. L. Metcalf, Chairman of Biological Sciences
at Illinois.**

Professor C. L. METCALF, head of the department of entomology at the University of Illinois, has been appointed chairman of the division of biological sciences, composed of the departments of bacteriology, botany, entomology, physiology, psychology and zoology.—*Science*, Jan. 15, 1937.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

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No. 3

Oviposition of *Perithemis* (Odonata, Libellulidae).

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

Only a few authors have published observations on the oviposition habits of *Perithemis tenera* (Say), the common amber-winged libelluline of the eastern and southern states. Williamson (1900, Ind. Dept. Geol. Nat. Res., 24 Ann. Rpt., p. 318) wrote, "As in other related species (*Celithemis* and *Sympetrum*) the male retains his hold of the head of the female as she flies along near the surface of the water, occasionally striking the water with her abdomen to release the eggs."

In the following year, Needham (1901, N. Y. St. Mus. Bull. 47: 512) stated that he had worked out the life history of the species at Galesburg, Illinois, in 1895, and he recorded the following observations. "The female is sometimes held by the male while ovipositing, but I have seen her oftener unattended, dropping her eggs on bits of floating dead pond scum by many successive dips made at very nearly the same spot. When a female was taken in hand and 'dipped' to the surface of water in a tumbler, 10 to 20 eggs were liberated by her at each descent."

In the same paper the egg of this species was described. "The egg is oblong oval, at first, white, turning brownish gray after a few hours; its surface is closely beset with minute tuberculate granulations. The gelatinous envelope is scanty."

Both of these statements were repeated without change in "The Handbook" (Needham and Heywood, 1929, A Handbook of the Dragonflies of North America, Thomas, Springfield.) (Page 207.)

Borror (1929, O. Jr. Sci., 30: 412) wrote, "one female was observed ovipositing in the water contained in a little pool

formed by a lily leaf. Another was observed ovipositing on a piece of submerged vegetation."

Sometime during the summer of 1933 Mrs. Leonora K. Gloyd told me of the late E. B. Williamson showing one of his collecting parties, of which she was a member, how the egg mass of this species exploded as it sank in the water. Since that time I have observed oviposition of this species whenever possible, hoping to see this phenomenon. Only one "perfect performance" has been seen.

On July 31, 1934, at a lake near Huntingburg, Indiana, I saw a female *tenera* ovipositing by striking the tip of her abdomen against a small water-soaked stick which extended a few inches above the surface of the water. She remained near the stick and within a few inches of the surface of the water during the time that she was under observation. Successive "dips" were made from a height of three or four inches. The completion of each dip took the female to a corresponding altitude on the opposite side of the stick, where she turned and began another descent. The tip of the abdomen was struck against the stick at or near the surface of the water. This stick was later removed for examination and found to be covered with a gelatinous mass of about one-fourth inch thickness along that part of its length which had been near the surface of the water, extending from slightly above this point to approximately two inches below. After the insect had been observed for a few minutes, she was captured. When she was held by the wings and her abdomen struck against the surface of water, a mass of eggs was released. This mass dropped through the water for a short distance—perhaps, an inch or two—then "exploded," scattering the individual eggs over a comparatively large area. This was repeated several times; the mass of eggs released each time became smaller and smaller until each appeared to consist of only two or three eggs. However, all of the masses, even those consisting of only two eggs, "exploded".

Oviposition by this species has been observed on several other occasions during the past two summers but no other ovipositing female was captured for closer observation. In no case was

the female accompanied by a male during oviposition. Sometimes the eggs were deposited by striking the tip of the abdomen against bits of floating algae or pieces of sticks and stems extending from the water, sometimes by striking the abdomen against the surface of small pools of water in lily leaves, or in hoof prints along the margin of a pond. I have never been able to make close enough observation to determine if the "explosion" occurs when the egg mass is deposited in this manner.

Many females of this species which were not ovipositing when captured have been induced to extrude masses of eggs by striking the abdomen against the surface of water. However, none of these masses "exploded," although the eggs separated readily after being in water a short time.

Sometime ago I discovered in the field notes turned over to me by Mr. Williamson a short time before his death, a record of his (first?) observation of this phenomenon. It was made at Viberg Lake, Allen County, Indiana, August 14, 1921, and is recorded as follows: "Female oviposits unattended by male. Female was held until bunch of eggs extruded; abdomen was touched to water. Bunch of eggs sank an inch or two and burst, scattering eggs widely."

Females of other libelluline genera common in Indiana (*Sympetrum*, *Celithemis*, *Libellula*) captured in the act of ovipositing were tested in the same manner. Egg masses usually were secured by striking the abdomen against the surface of water but none of these "exploded."

Notes and Descriptions of West American Cerambycidae (Coleoptera). III.¹

By E. GORTON LINSLEY,² University of California, Berkeley, California.

¹The previous papers in this series appeared in Entom. News, 1934, 65:161-165, 181-185, and 1935, 66:161-166.

²The writer is indebted to Mr. W. S. Fisher for examination of the two forms described below as new genera and for comparison of these with material in the collection of the United States National Museum and to Dr. Edwin C. Van Dyke, Mr. A. T. McClay, and Mr. H. L. McKenzie for the privilege of studying material from their collections.

Methia juniperi new species.

♂ : small, short, dark piceous, sparsely clothed with short, fine, suberect hairs; antennae piceous; elytra pale testaceous.

Head transverse, width across eyes as great as that of pronotum across middle; surface coarsely, moderately closely punctate; eyes convex, separated above (♂) by more than the diameter of the antennal scape; antennae slender, moderately pubescent, two-thirds as long again as the body (♂); scape subconical, without trace of an apical tooth.

Pronotum a little wider than long, sides rounded, base only very feebly constricted; surface finely, closely punctured, sparsely clothed with moderately long, recumbent pubescence. Elytra about twice as long as broad, much shorter than the body and attaining only basal portion of second abdominal segment; sides gradually narrowed to apical one-third; apices separately rounded, a little dehiscent. Legs slender, moderately finely punctured, clothed with long, suberect, pale hairs; tarsi slender, first segment of posterior pair subequal in length to second and third together.

Ventral surface finely punctured, sparsely clothed with pale, suberect hairs. Length 6mm., breadth 1.3mm.

Holotype male (No. 4150 Calif. Acad. Sci. Ent.), from Palmdale, Mojave Desert, CALIFORNIA, November 21, 1935, reared from *Juniperus californica* by Mr. A. T. McClay, who very kindly submitted the specimen to me for study. The type was reared from twigs which had been girdled by the larvae of *Styloxus bicolor* Ch.&Kn.

This species is related to *M. aestiva* Fall, but may be readily separated by the greatly abbreviated elytra which attain only the second abdominal segment, the absence of a tooth at the apex of the antennal scape, the uniformly punctured pronotum which is wider than long, the dark color of the head, thorax, and abdomen, and the short, sparse pubescence of the antennae and upper surface. From *falli* Martin, which it resembles in general form, it may be distinguished by the widely separated eyes on the vertex (♂), narrowly rounded and dehiscent elytral apices, and by the difference in color.

The species of *Methia* are nearly all rare in collections. *M. mormona* Linell (1896), the earliest described of our western

species, appears to be the most widely distributed and abundant. It occurs throughout the Great Basin area and exhibits considerable variation in size and coloration in various portions of its range. A small series sent to the writer from Globe, Arizona by Mr. Frank Parker, differs from the typical form in being pale testaceous rather than dark brownish piceous, and the elytra are without ornamentation. This pale form appears to be merely a color variety and examples were captured along with typical specimens. *M. aestiva* Fall (1907) and *M. arizonica* Schifr. (1908) are probably represented in collections by less than two dozen examples each. *M. falli* Martin (1920) is known at present only by the type. *M. brevis* Fall (1929) was likewise described from a unique but a second example has been recorded from Lower California.³ In the writer's collection are three additional males from San Diego County, California, and what appears to be a female of this species from Claremont, California. The latter is stouter and more robust than the males, and the elytra are ornamented with pale vittae.

PSEUDOMETHIA, new genus.

Head transverse; labrum ciliate with long fine hairs; palpi very unequal in length, the maxillary longer, last segment subcylindrical, apex truncate; eyes very large, convex, coarsely faceted, emarginate; antennal tubercles not strongly elevated, separated by a narrow furrow on vertex; antennae longer than the body, basal segments rather stout, segments three to five very finely, feebly carinate; scape subconical, more than twice as long as broad, second segment wider than long, about one-fourth the length of the scape, third segment not quite as long as scape, enlarged apically, fourth segment about one-fourth longer than third, subcylindrical, fifth, sixth, and seventh segments subequal in length, about twice as long as scape, remaining segments becoming a little shorter and more slender to the apex.

Pronotum about as long as broad, sides with an obtuse, con-

³ Linsley, E. G., *Studies in the Cerambycidae of Lower California*, Pan-Pacific Ent. 10:59, 1934.

ical, lateral tubercle a little behind the middle. Elytra abbreviated, not attaining apex of first abdominal segment; apices separately rounded. Legs slender; anterior femora feebly clavate, middle and posterior pairs slender; tarsi elongate, narrow, first segment of posterior pair much longer than second and third segments together. Anterior coxae prominent, conical, cavities large, confluent, angulated externally, open behind; middle coxal cavities open externally. Abdomen with six visible segments; sixth ventral segment of male excavated at apex.

Genotype: *Pseudomethia arida* n. sp.

This genus is based upon a species which diverges markedly in the structure and proportions of the antennae from other known Methiini, but which seems better placed in this tribe than in any other described group. In the previously known Methiini the antennae are very long and slender (usually about twice as long as the body in the male, a little longer than the body in the female), with the segments narrow and rather uniform in width, the second very small, often scarcely visible, the third segment longer than either the scape or following segments. In the present genus the basal antennal segments are stout, the antennae but little longer than the body in the male, the second segment large and conspicuous, the third segment shorter than either the scape or fourth segment and slightly enlarged at the apex, and segments three to five very finely and feebly carinate.* The posterior tarsi (which are short in other Methiini) are very long and slender, distinctly more than half as long as the tibiae, and the pronotum is armed laterally with an obtuse, conical tubercle.

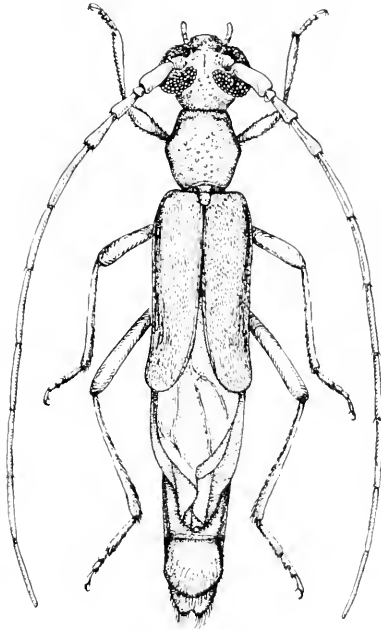
Pseudomethia arida new species (fig).

♂: small, slender, brownish, testaceous. Head sparsely clothed with short, fine, pale hairs; vertex coarsely punctured with numerous small punctures intermixed; eyes separated on vertex by approximately the diameter of the antennal scape, less widely separated below; antennae sparsely clothed with very short, fine pubescence and with one or two long setae at apex of segments. Pronotum moderately punctured, clothed

* These carinae are visible only under low power magnification.

with short, fine, suberect, pale hairs intermixed with scattered, long, erect setae. Elytra somewhat granulate-punctate, surface clothed with short, suberect, sparse pubescence. Legs more densely clothed with long flying hairs. Ventral surface shining; abdomen very finely, sparsely, punctured and pubescent. Length 7 mm., breadth 1.3 mm.

Holotype male (No. 4161 Calif. Acad. Sci. Ent.), taken from *Simmoudsia californica*, in the desert about ten miles



Pseudomethia arida n. sp.

west of Indio, CALIFORNIA, on September 9, 1935, by Mr. Howard L. McKenzie, to whom the writer is indebted for the specimen.

A small, uniformly brownish species, somewhat suggestive of a *Methia* but readily distinguishable by the generic characters.

GYMNOPSYRA, new genus.

Head short, transverse; eyes coarsely granulated, emarginate; labrum transverse, ciliate; palpi short, antennal tubercles depressed, contiguous; antennae eleven-segmented, stout, shorter

than the body (♀), segments three to seven with a stout spine at the apex, three to ten ciliate at apex; scape stout, slightly conical, about as long as segments two and three together; second segment a little longer than broad, third segment about four times as long as second, fourth segment about one-fourth shorter than third, segments five, six, and seven subequal in length to third, remaining segments slightly shorter, more slender, except eleventh which is longer than tenth.

Pronotum a little broader than long, sides rounded. Scutellum transverse, subtriangular. Elytra about three times as long as broad, parallel-sided; apices rotundate-truncate. Legs slender; femora not clavate; tibiae carinate; tarsi with first segment of posterior pair subequal to two following together. Prosternum narrow between the coxae; anterior coxae globular, cavities feebly angulated; mesosternum broad between the coxae, separating them by about twice the distance between the anterior coxae; middle coxae globular, cavities closed externally.

Genotype: *Gymnopsyra phoracanthoides* n. sp.

A genus apparently related to *Psyrrassa* and *Stenosphenus* but differing from these in the non-carinate antennae, rotundate rather than emarginate or spinose elytral apices, and the rounded, coarsely sculptured pronotum (in *Psyrrassa* the pronotum is cylindrical, in *Stenosphenus* wedge-shaped, in both genera usually sparsely punctured and shining). The spine on the third antennal segment is moderate as in *Stenosphenus* and the elytral punctation is of the *Stenosphenus* type (the punctures coarse and dense in the basal area and becoming very much finer, sparser apically).

Gymnopsyra phoracanthoides new species.

♀: elongate, piceous, shining, sparsely clothed with very short, fine hairs; antennae and legs rufo-piceous. Head coarsely, moderately closely punctured. Pronotum very coarsely, densely punctured, the punctures tending to become confluent; disc with a small, smooth, median polished area. Scutellum finely punctured, finely pubescent along apical margin. Elytra very coarsely punctured at base, the punctures becoming much finer, sparser apically. Prosternum coarsely punctured, anteriorly transversely rugose. Mesosternum coarsely, closely punctured.

Metasternum and abdomen more sparsely and less coarsely punctured, sparsely clothed with pale, suberect hairs. Fifth ventral abdominal segment truncate at apex (♀). Length 12 mm., breadth 3 mm.

Holotype female (No. 4152 Calif. Acad. Sci. Ent.) from Glen Ranch, Alpine, TEXAS, 1926, O. C. Poling collector (Van Dyke Collection, Calif. Academy of Sciences).

The Membracidae of Nebraska (Homoptera).

By HAROLD C. JONES, Berry College, Mount Berry, Georgia.

The investigation summarized in this paper is concerned with the tree-hoppers found in Nebraska by associates of the University of Nebraska during the half century preceding 1933. Data are offered regarding abundance, geographic and seasonal occurrence and host relations. The writer has studied the membracids in the collection of the University of Nebraska, Department of Entomology, and has made special field studies during the years 1932 and 1933. Many specimens, with pertinent data, were collected during a trip through the peripheral counties of Nebraska in the summer of 1932.

The nomenclature and arrangement of species herein used follows that of W. D. Funkhouser's General Catalogue (1927). Of the fifty genera and one hundred eighty-five species listed by Funkhouser as occurring within the United States, the Nebraska fauna includes eighteen genera with forty species and six varieties. The species verified by a specialist, Dr. E. D. Ball, Economic Zoologist of the Arizona Agricultural Experiment Station, are succeeded by the symbol (B). The author gratefully acknowledges the valuable assistance of Dr. Ball, as well as that of Professors M. H. Swenk, D. B. Whelan and Raymond Roberts of the University of Nebraska.

CAMPYLENCHIA LATIPES (Say) (B). Of general distribution; collected from May 20 to September 25, most commonly in July. This is the most abundant treehopper in the state, being represented by about 400 specimens in the collection. Alfalfa is the favorite host and is at times reported damaged by this insect. The wide variety of hosts includes: oak, snowberry (*Symphoricarpos* spp.), rose; and more than 20 herbaceous species, of which alfalfa, sweet clovers, ragweeds and

goldenrod are the most frequent.

ENCHENOPA BINOTATA (Say). Collected from the northern more wooded parts of Nebraska: Cass, Lancaster, Rock, Keya Paha, Dawes and Sioux Counties, June 29 to July 25; 36 specimens of each sex. Hosts: bittersweet (*Celastrus scandens*), oak, ash, hickory, and but one herb, ragweed.

ACUTALIS TARTAREA Say. A single male specimen, collected at Plattsmouth, Cass County, July 3. Miss Branch (1914) reported giant ragweed (*Ambrosia trifida*) as the host of this species in Kansas.

MICRUTALIS CALVA (Say) (B). The smallest treehopper of our region. It is often abundant on ironweed in moist pastures. Collected, June 5 to November 27, in Douglas, Cuming, Pawnee, Lancaster, Jefferson, Nuckolls, Franklin and Harlan Counties, Nebraska. Seventy females and twenty-five males. Hosts: Ironweed (*Fernonia baldwini*), honey locust, sand-bar willow, Canada fleabane (*Leptilon* sp.), alfalfa, *Euphorbia marginata*, wild hemp (*Cannabis* sp.), and common sunflower.

M. CALVA var. No. 9, Ball and Stone Monograph (MSS). (B). A very pale color variety. Taken in Lancaster, Jefferson and Harlan counties; July 28 to September 27. Not common.

STICTOCEPHALA COLLINA Van Duzee (B). Rare in Nebraska, taken in only the extreme western counties. The records are previous to 1909. Two females were collected in Monroe Canyon and a male in the "Badlands," both locations in Sioux County, 1908. Dr. Ball reports having taken a female of this species at Kimball, Kimball County. These few individuals were collected during August 2 to 12.

S. FESTINA (Say). One specimen, a male, collected at Omaha, Douglas County, Nebraska, November 8, seems to be of this species. It is known from the four bordering states, Iowa, Missouri, Kansas and Colorado.

S. INERMIS (Fabricius) (B). A common species of wide distribution. In Nebraska it has been taken in Dixon, Douglas, Cass, Lancaster, Gage, Colfax, Webster, Antelope, Rock, Keya Paha, Cherry and Sioux counties. The 68 females and 69 males in the collection were taken during June to mid-August. Host plants include eleven species of herbs, of which grass, bush morning glory, prairie clover, wild hemp and sunflower are most frequent, also such shrubs as snowberry, bittersweet and rose, and trees; willows and oak.

S. LUTEA (Walker) (B). Taken from willow and grass in

Cuming, Lancaster, Keya Paha, Brown and Dawes counties during the season May 17 to July 9. 25 ♀ and 9 ♂ specimens collected.

CERESA BOREALIS Fairmaire (B). Chiefly northern, taken from Rock, Holt, Burt, Cass, Cuming, Lancaster, Gage, Pawnee, Keya Paha, Cheyenne and Dawes counties during the period from July 3 to August 17. It prefers the moist wooded areas favoring its hosts: wild hemp, alfalfa, *Psoralea* sp., giant ragweed, common ragweed, Canada anemone, prairie clover, snowberry, smooth sumac, elderberry, apple, elm and oak. 49 ♀, 115 ♂. *C. brevicornis* Fitch is a synonym.

C. BREVIS Walker (B). One specimen collected on low prairie, near Lincoln, Nebraska, July 19, 1928, by Professor Whelan has been identified as of this species by Dr. Ball. The species is catalogued by Dr. Funkhouser as occurring only farther east, in Kentucky and New York.

C. BUBALUS (Fabricius) (B). The widespread and abundant "buffalo tree hopper." It occurs throughout the state. 211 ♂, 158 ♀ specimens of the collection were taken from June 24 to October 8. Alfalfa is preferred; wild hemp and ragweed are favorites among the remaining twenty-three herbaceous hosts. Seven tree species and five shrub species serve as hosts.

C. CONSTANS (Walker) (B). Three specimens, Rock and Keya Paha counties, collected from July 24 to August 12, on ragweed (*Ambrosia*). Van Duzee records basswood (*Tilia* sp.) as a host of this species.

C. DICEROS (Say) (B). Prefers wooded parts of the state. The 29 ♂ and 19 ♀ were taken from Cass, Burt, Dakota, Cuming, Lancaster, Gage, and in the west, Dawes and Sioux counties. Hosts: elderberry and grape. Nymphs have been taken from strawberry. Seasonal range: July 3 to August 10.

C. TAURINA Fitch (B). A common species, widely distributed in Nebraska. It prefers the undergrowth in wooded areas. Hosts include ragweed, alfalfa, wild hemp, white sweet clover, millet and knotweed (*Polygonum* sp.); snowberry and elderberry; apple, willows, white elm and oak. Seasonal occurrence: July 1 to October 7.

C. VITULUS (Fabricius) (B). One female each from West Point, Niobrara and Hogans Bridge, north central Nebraska; mid-July to early August.

CARYNOTA MERA (Say) (B). One female, from Lincoln, August 8, on Ironweed.

THELIA UHLERI Stal. (B). Two males, one from Lincoln,

July 14, and one from Glen, Sioux County, August 10. Wild Plum is the host.

GLOSSOXOTUS UNIVITTATUS (Harr.) (B). A male and a female, collected June 8 and 24, respectively, at Springview Bridge, Brown County; on oak.

G. TURRICULATUS (Emmons). In his monograph on the Telamonini Dr. Ball reports having examined material of this species from Nebraska. Hawthorn (*Crataegus* sp.) is the host.

G. CRATAEGI (Fitch). Dr. Funkhouser credits L. Bruner with determination of this species from Nebraska. No specimens in the collection.

HELIRIA GIBBERATA Ball. A female of this species (specimen now in the Osborn collection) is recorded by Ball from Lincoln, Nebraska, on Hackberry.

PALONICA PYRAMIDATA (Uhl.) (B). A female from Omaha and a male from Cards, Keya Paha County, taken on July 25, represent this species for Nebraska. Dr. Ball notes that he has taken this species in abundance on black willow wherever he has collected. A single specimen of the variety *declivata* is recorded by Ball, collected by Barber in northwest Nebraska. This is an arbitrary variety and occurs everywhere with the typical *Palonica pyramidata*.

P. VIRIDIA Ball (B). A specimen taken at Lincoln, in hibernation on cottonwood, was determined some years ago by Ball as *Telamona viridia*. The usual host is cottonwood (*Populus deltoides*).

TELAMONA AMPELOPSIDIS (Harris) (B). Dr. Ball has determined a specimen of this species taken in Nebraska by W. D. Pierce. Five other female specimens of the species in the University collection, taken on Virginia Creeper at Whitney, Dawes County, are dated from July 20 to August 4.

T. COMPACTA Ball (B). A single specimen taken at West Point, Cuming County, in June, represents this species in the Collection.

T. MACULATA Van Duzee. This species is recorded by Ball as having been collected in Nebraska by W. D. Pierce, on bur oak.

T. MONTICOLA (Fabricius) (B). A female specimen in the University collection has been determined by Ball as *T. querci* Fitch, a synonym of *T. monticola* (Fabricius). This specimen is from Springview Bridge, June 16. A second female in the collection, from the same place, dates June 20.

T. RECLIVATA Fitch (B). A female from Springview Bridge and two females from West Point, the three collected during

late June, bear Dr. Ball's identification as belonging to this species. Oaks are the usual hosts.

T. WESTCOTTI Goding (B). One female, taken at Glen, Sioux County, August 15. Bur oak is the favorite host.

ARCHASIA GALEATA (Fabricius) (B). Three females, two from Springview Bridge, June 16, and one from Lincoln, July 11. Hosts: oak.

ATYMNA QUERCI (Fitch) (B). Thirteen females have been taken at Carns and Springview Bridge, during season from June 16 to July 28, on oak.

CYRTOLOBUS FULIGINOSUS (Emmons.) var. undet. Ball. A male collected at Crete, Saline County, May 21, 1932, by Miss D. M. Johnson, has been identified by Dr. Ball as a variety of *C. fuliginosus*.

C. MACULIFRONTIS (Emmons). (B). Taken at Ulysses, Butler County, at West Point, and at Carns and Springview Bridge, June 16 to August 12. 150 ♀, 75 ♂, mostly from oak.

C. VAU (Say) (B). A common species on oak. Taken at Carns, Keya Paha County, Springview Bridge, Brown County, and at West Point, Cuming County, June 16 to July 16. 44 ♂, 16 ♀.

C. VAU, var. *INERMIS* Emmons (B). Possibly a common variety, but easily confused with *C. maculifrontis*. Three females, taken at Carns and Springview Bridge, June 17 to 20, have been determined by Dr. Ball as probably of this variety.

VANDUZZEA VESTITA Goding (B). Found generally over the state, except in the Northwest, on a variety of herbs, shrubs and trees; wild indigo and snowberry are the most frequent hosts. Seasonal range: July 16 to August 23.

ENTYLIA CARINATA Forest. (B). Two males, taken at Weeping Water, Cass County, September 24.

E. CONCISA Walker (B). An uncommon but gregarious species. Found at Nebraska City, Otoe County, and at the Nebraska Fisheries, Sarpy County. 30 ♀ were collected on thistle (*Carduus undulatus*), apparently ovipositing. May 27. Dr. Ball opines that *E. carinata* Forest is the correct name for the entire group, and that the other names (*E. concisa*, etc.) should be relegated to varietal positions.

PUBLILIA CONCAVA (Say) (B). Nebraska City, north and west to Carns, May 12 to September 25, 89 ♀, 7 ♂. Hosts: ragweed, oak and sunflower (*Helianthus maximilianus*).

P. CONCAVA var. *NIGRIDORSUM* Goding (B). A female from ragweed, at Carns, July 1.

P. MODESTA Uhler. Taken at Carns, west to the northwest

border of the state; June 20 to July 30. 60 ♂, 39 ♀. Hosts: *Ambrosia* (ragweed) and oak.

P. MODESTA var. *BICINCTURA* Goding (B). A male, taken at Carns, July 30.

P. RETICULATA VanDuzee (B). Collected at Weeping Water, Nehawka and Plattsmouth, Cass County, Fort Crook, Sarpy County and at Nebraska City, May 15 to July 5. 20 ♀, 6 ♂.

In addition to the Membracids listed above as having been taken in the state of Nebraska according to the records given, the following species probably occur within the state since they have been taken from two or more sides of Nebraska and usually from host plants known to occur within our borders: *Acutalis semicrema* (Say), *Glossonotus acuminatus* (Fabr.), *Heliria cristata* (Fairm.), *Palonica pyramidata* var. *nasuta* Ball., *P. trunculata* Ball., *Telamona collina* (Walker), *T. decorata* Ball., *T. extrema* Ball., *T. spreta* Goding, *T. tiliac* Ball., *T. tristis* Fitch var. *tristis* Fitch, *T. tristis* Fh. var. *coryli* Fitch, *T. unicolor* Fitch, *Archasia belfragei* Stal., *Smilia camelus* (Fabr.), *Cyrtolobus fenestratus* (Fitch), and *Ophiderma salamandra* Fairmaire.

On some Thysanoptera from American Conifers.

By J. DOUGLAS HOOD, University of Rochester, Rochester,
New York.

Two of the species treated below are new; the other is widely distributed in Europe, but has not previously been recorded from America. The types of the new species are in the author's collection.

TÆNIOTHRIPS PINI (Uzel), Figs. a and b.

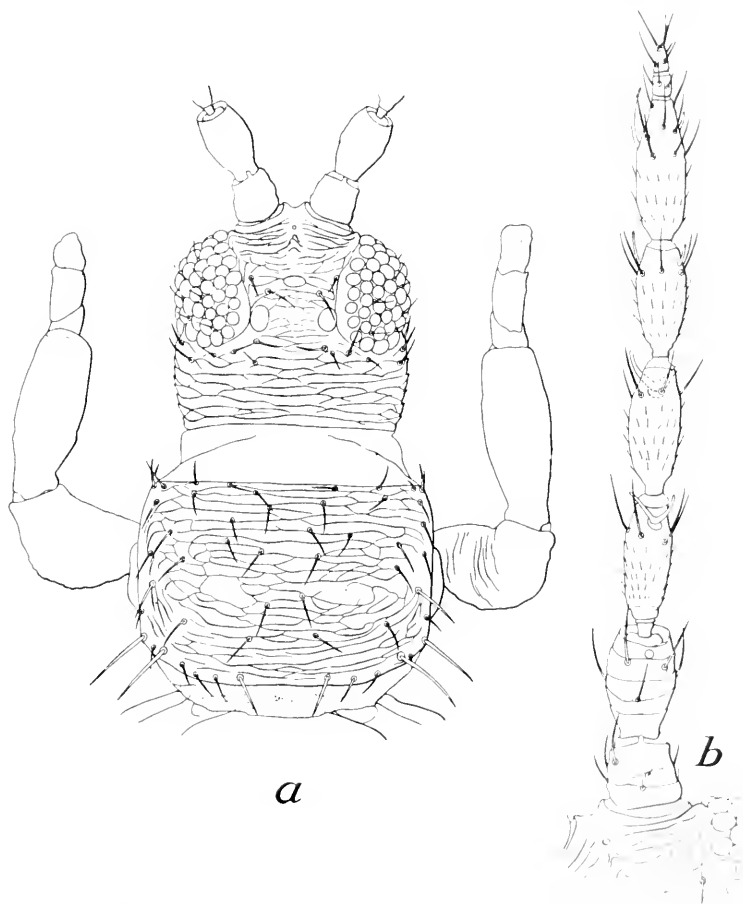
In Europe this species is known from Bohemia, Austria, Germany, Poland, England, Sweden, and Finland. It feeds upon the leaves of pine, spruce and fir. I found it to be very common in August and September, 1931, on young needles of black spruce (*Picea mariana*) growing on several islands in Lake Superior, near Grand Portage, Minnesota (23 ♀ ♀ are before me). It was also observed on the same plant in Canada, just across the Pigeon River from Minnesota, though no specimens were collected.

The above material has been compared with authentic

European specimens by both Dr. Priesner and myself and, aside from the slightly darker color of the American individuals, there are no differences.

Oxythrips coloradensis sp. nov.

♀ (macropterous). Length about 1.3 mm. (slightly distended, 1.4 mm.). Color yellow in head and prothorax (the



Teniothrips pini (Uzel), ♀. *a*, head and prothorax (all setae omitted from appendages; sculpture necessarily accentuated); *b*, right antenna. (Drawn by Mrs. Philip T. Bassett; camera lucida.)

latter slightly darker), orange-yellow in pterothorax and abdomen; legs yellow; fore wings pale yellowish, somewhat gray at apex; antennae with segment I yellow, paler than head, II-V light yellowish brown, II and III yellow at base, IV somewhat darkened at apex and often paler at or near base, V-VIII nearly uniform brown, not darker than apical portion of IV, V often pale basally; setae or antennae pale gray, all other setae pale yellowish; ocellar pigmentation brilliant vermilion.

Head about 1.13 times as long as greatest width across cheeks and about 1.1 times as long as transocular width, broadest near base, the cheeks almost perfectly straight and tapering slightly to eyes, where the width is about 0.94 that across eyes; vertex flattened, its front evenly declivous; frontal costa with a small but distinct notch; dorsal surface of head cross-striate posterior to ocelli, the striae producing a distinct serration of the cheeks; two pairs of minute (14 micra) setae forming a slightly arcuate line across head in front of median ocellus, the median pair 22-25 micra apart, the other pair about 54 micra apart; interocellars 27 micra long and arising just outside the ocellar triangle; three pairs (11-14 micra) behind inner, posterior margin of eyes (the middle of these more anterior than the others and usually about 15 micra behind posterior margin of eyes); three additional pairs of setae in front of middle of cheeks. Eyes relatively small, about 0.4 the length of head, slightly protruding, measuring as follows, in micra, in one paratype: dorsal length 55 micra, width 34 micra, interval 61 micra. Ocelli of posterior pair about on a line marking off posterior fourth of eyes, their diameter about 13 micra; interval about 28 micra, distance from median ocellus about 20 micra; median ocellus much smaller. Antennae only 1.7 times the length of head and about 1.86 times the transocular width, of perfectly normal structure; segment III about 46 micra; VI without sub-apical, transverse, ventral suture.

Prothorax about 0.75 as long as head and only 1.4 times as wide as long; dorsal surface with a few indistinct cross-striae both anteriorly and posteriorly; major seta at posterior angles 25-33 micra long; posterior margin with three pairs of setae between the major pair, the innermost of these about 20 micra and longest. Legs normal in structure; fore tarsus with a minute terminal tooth on inner surface. Wings of fore pair with about 25 short setae on costal margin, those at middle of wing about 25 micra; fore vein typically with $1 + 4 + 3$ setae in basal third, 1 beyond middle, and 2 near tip; hind vein with 7-9 (usually 9) nearly equally-spaced setae.

Abdomen of normal form and structure; setae on tergum IX normal in structure (i.e., not as in *O. flavus*), the dorsal pair about 73 micra, dorso-lateral 87 micra, lateral 74 micra; X not elongate or tubiform, its dorsal setae 74 micra, dorso-laterals 87 micra; tergum VIII without comb.

Measurements of ♀ (holotype), in mm.: Length about 1.3 (slightly distended, 1.38); head, length 0.143, width across eyes 0.131, least width just behind eyes 0.123, greatest width across cheeks 0.127; prothorax, median length of pronotum 0.107, greatest width 0.148; mesothorax, greatest width 0.204; metathorax, greatest width 0.186; fore wings, length 0.707, width at middle 0.042; abdomen, greatest width (at segment IV) 0.241; segment X, length 0.079, greatest subbasal width 0.062.

Antennal segments:	1	2	3	4	5	6	7	8
Length (micra)	21	40	46	38	36	41	9	13
Width (micra)	27	25	18	19	19	20	8	5
Total length of antenna	0.244 mm.							

COLORADO: Boulder, June 14, 1924, L. O. Jackson, miscellaneous collecting, 3 ♀ ♀; Boulder (Gregory Canyon), June 21, 1924, L. O. Jackson, in flowers of *Pinus scopulorum*, 6 ♀ ♀ (including *holotype*).

This very distinct little species is allied to *ajuga* by the presence of a minute terminal tooth on the fore tarsus, but differs conspicuously from that species and its other congeners in that the head is distinctly longer than wide and the cheeks nearly straight.

Oxythrips pinicola sp. nov.

♀ (macropterous). Length about 1.2 mm. (distended, about 1.5 mm.). *Color* yellowish brown, somewhat paler anteriorly, the pterothorax with an orange cast, the abdomen overlain with gray; legs dull yellow, femora and sometimes the tibiae lightly and obscurely shaded with brownish on outer surface; wings of fore pair very pale yellowish gray, the veins just perceptibly darker; antennae with segment I pale yellowish and about concolorous with tibiae, II very slightly darker and shaded with grayish, III a trifle darker than II, more yellowish in color, somewhat infusate apically, IV-VIII yellowish gray-brown, darker than abdomen, IV and V often yellowish basally, VII and VIII paler than VI; ocellar pigmentation bright red.

Head about 0.74 as long as greatest width across cheeks and about 0.77 as long as transocular width, broadest at basal third

of cheeks, these tapering to eyes and very slightly narrowed to base; vertex somewhat rounded, its front nearly vertical; frontal costa rather deeply notched; dorsal surface cross-striate between posterior ocelli and base of head, the more posterior striae heavier, more distinct, and producing a serration of the cheeks; one pair of small setae (23 micra apart) in front of median ocellus, a second similar pair directly laterad of median ocellus and close to inner margins of eyes, an interocellar pair 33 micra long just outside the ocellar triangle, three pairs (16-20 micra) near inner, posterior margin of eyes (the middle of these more anterior than the others and on a line with posterior margin of eyes), and two shorter (13 micra) pairs at anterior third of cheeks, all of these setae pale yellowish. *Eyes* about 0.5 the length of head, very slightly protruding, somewhat more than one-half as wide as their interval, measuring as follows, in micra, in one paratype: dorsal length 58, width 38, interval 74. *Ocelli* of posterior pair situated a trifle in advance of middle of eyes, their diameter 15 micra, interval 36 micra, distance from median ocellus 23 micra; median ocellus 13 micra. *Antennae* about 2.56 times the length of head and very nearly twice the transocular width, of perfectly normal structure, though longer and more slender than usual; segment III 44-55 micra (averaging 49 micra); VI without subapical, transverse, ventral suture. *Mouth-cone* about 113 micra long (measuring from base of labrum); maxillary palpal segments 16, 11, and 14 micra, respectively.

Prothorax about 0.96 as long as head and 1.9 times as wide as long; dorsal surface with two or three heavy, interrupted cross-striae close to posterior margin and with its anterior portion more faintly striate; major seta at posterior angles yellow and 64 micra long; posterior margin with four pairs of setae between the major pair, the innermost of these about 23 micra and longest. Legs normal in structure; fore tarsus not toothed. Wings of fore pair with about 32 pale yellow setae on costal margin, those at middle of wing about 43 micra; fore vein with 4 + 4 in basal third, 1 at middle, and 2 near tip; hind vein with about 9 nearly equally spaced ones.

Abdomen of normal form and structure: setae on tergum IX brownish yellow, normal in structure (i.e., not as in *O. flavus*), the dorsal pair about 105 micra, dorso-lateral 111 micra, lateral 113 micra, ventro-lateral 97 micra; X not elongate or tubiform, its dorsal setae about 97 micra, dorso-laterals 87 micra; tergum VIII without comb.

Measurements of ♀ (holotype), in mm.: Length about 1.2 (fully distended, 1.44); head, length 0.115, width across eyes 0.150, least width just behind eyes 0.145, greatest width across cheeks 0.155; prothorax, median length of pronotum, 0.100, greatest width 0.192; mesothorax, greatest width 0.270; metathorax, greatest width 0.239; fore wings, length 0.882, width at middle 0.067; abdomen, greatest width (at segment IV) 0.308; segment X, length 0.090, greatest subbasal width 0.078.

Antennal segments: 1 2 3 4 5 6 7 8

Length (micra): ... 23 43 53 47 40 57 12 19

Width (micra): ... 30 28 23 21 19 20 7 5

Total length 0.294 mm.

♂ (macropterous). Length about 0.92 mm. (fully distended, 1.13 mm.). Color light grayish yellow, decidedly paler than in female, the structure essentially as in that sex; antennal segment III about 46 micra, VI without transverse line; major pronotal seta 40-50 micra; fore wings with 4 + 3 setae in basal third of anterior vein and 2 near tip, posterior vein with 8-9; abdominal tergum IX with a close group of four stout setae arising from tubercles near posterior margin, the anterior pair closer together than the posterior pair, stouter, and about 12 micra long, the posterior ones about 8 micra.

Measurements of ♂ (allotype), in mm.: Head, length 0.107, width across eyes 0.124, greatest width across cheeks 0.127; interocellar setae 0.027; prothorax, median length of pronotum 0.088, greatest width 0.165; mesothorax, greatest width 0.217; metathorax, greatest width 0.199; fore wings, length 0.686, width at middle 0.054; abdomen, greatest width (at segment III) 0.192.

Antennal segments: 1 2 3 4 5 6 7 8

Length (micra): ... 18 37 46 40 33 47 10 16

Width (micra): ... 24 24 19 17 17 18 7 5

Total length of antenna 0.247 mm.

COLORADO: along Elk Creek, near Fraser, July 7, 1927, J. D. Hood, in flowers of *Pinus edulis* Engelm., 10 ♀♀, 1 ♂ (including ♀ *holotype* and ♂ *allotype*) [Hood No. 609].

OREGON: Crater Lake National Park, July 21, 1927, J. D. H., on *Ribes cereum* Coult., growing among pines, 1 ♀ [Hood No. 681].

This species is a member of the *ulmifoliorum* group, heretofore unknown from the western hemisphere. The definition of the nine European representatives has not been satisfactorily

accomplished. Nevertheless, the present species should be separable by the longer antennae, particularly by the long third segment. From the American *divisus* it is readily known by the darker color, shorter tenth urotergum, and the absence of a ventral transverse line or suture near the apex of the sixth antennal segment. The other species known from the United States (*ajuga* and the new species *coloradensis*) both have a terminal fore-tarsal tooth.

◆

**Notes on the Occurrence of *Strymon maesites*
(Herrick-Schäffer) in Florida (Lepid.: Lycaenidae).**

By FRANK N. YOUNG, University of Florida,
Gainesville, Florida.

Up until a few years ago, the occurrence of *Strymon maesites* (Herrick-Schäffer) in Florida was extremely problematical. No records of it occur in popular works, such as Dr. Holland's *Butterfly Book*, nor in any technical papers with one exception: J. Harold Matteson in his brief paper on the *Rhopalocera of Miami*,* gives two records from Miami (a male taken in 1929 and a female in 1923). Neither Seitz nor Bates make any mention of these Florida records.

Nevertheless, *Strymon maesites* is locally rather numerous in Southern Florida. It has been taken frequently in widely varied habitats around Miami by the writer and other local collectors. The first recent record seems to be a specimen taken by Mrs. C. N. Grimshaw in Lawrence Park (April 4, 1933). The specimens on which these notes are largely based were taken by the writer in a distinctive littoral habitat in Brickell Hammock, along the edge of Biscayne Bay south of the Miami River. The dates on these specimens range from July 4, 1933, to July 10, 1935. The longest period over which *maesites* was on the wing was from May 29 to July 10, 1934. During this period a large series was taken at the original habitat, several specimens on palmetto blossoms in the hammock, and two more in a pine wood in the northwest section

* Privately printed.

of Miami. Another record was made during this period by Mrs. C. N. Grimshaw (a female from North Miami Beach during June, 1934). The total number of specimens taken was well over two dozen, which seems to indicate that the species is probably commoner here than in its native habitat in Cuba.

Most of the specimens were in rather good condition which largely excludes the possibility of their having come from Cuba in the adult form. They are extremely swift fliers, and this, with their habit of sitting on the highest flowers available, probably accounts for their rarity in collections. Towards the end of the flight-period in July specimens become badly weathered. The males were at all times much commoner and much more damaged than the females.

The habitat from which the majority of the specimens were taken is located along the edge of the limestone "cliffs" on the west side of Biscayne Bay. Back of the beach is the extensive tropical growth of Brickell which furnishes refuge for many other tropical insects. Most of the specimens of *macsites* were taken from the flowers of a group of button-wood trees on the beach. The surrounding vegetation consists largely of grasses, *Bidens*, nicker-beans, and other typically littoral plants. Along with *macsites*, *Strynom m-album*, *martialis*, *ccerops* and *columnella*, *Lycacna catalina* and *Callidryas statira* were taken from the same button-wood trees.

Specimens were positively determined by Dr. Marston Bates, of the Museum Comparative Zoology, as *Strymon macsites* (Herrick-Schäffer). The specimens are now in the collections of Dr. A. E. Brower, Mr. W. C. Fields, Mr. Oskar Zielinski, Mr. E. A. Ferguson, Mr. B. H. Pickel, Mrs. C. N. Grimshaw, the collection of the M. C. Z. at Harvard and in the private collection of the writer.

Corrections

ENT. NEWS, Vol. XLVIII, page 2, January, 1937.

for Drup read Drap. (Draparnaud.)

for *pentadon* read *pentodon*.

**A New Species of Sawfly, *Hartigia cowichana*, from
Canada (Cephalidae-Hymenoptera).**

By DONALD T. RIES, Ithaca, New York.

In studying a series of Cephidae received from Canadian National Collections, Ottawa, Canada, and Illinois Natural History Survey, Urbana, Illinois, two specimens were found belonging to the genus *Hartigia* that represented a new species.

They very closely resemble *Cacnocephus aldrichi* Bradley in both size and color, but morphological characters such as the presence of two transverse cubital veins in the hind wing and a single preapical spur on each posterior tibia, shape of left mandible, posterior tarsal claw, and teeth on the ovipositor, structure of antennae and shape of the clypeal margin definitely place them in the genus *Hartigia*.

They differ from the known species of this genus not only in color and appearance but also in structural characters.

Hartigia cowichana new species.

Black, except base of abdomen which is red, tibiae and tarsi amber; wings smoky-hyaline.

♀ — Head transversely subquadrate, very slightly concave behind; vertex closely and evenly covered with setiferous punctures; ocellular line greater than postocellar line; a distinct oblique impunctate depression laterad of posterior ocelli; ocellar basin shallow and broad; lateral ocellar line about equal to diameter of posterior ocelli; front bluntly raised between antennae; front below antennae evenly punctured and covered with bronze pubescence; antennae with 25 segments, distinctly clavate beyond 3rd segment, tapering slightly at apex, base black, lighter brown from 6th segment to apex; head black, except for small irregular spot on temples and a small spot in clypeocular space yellow; mandibles black with yellow near base, tips mahogany-colored; palpi brown.

Pronotum densely punctured and covered with bronze pubescence; anterior margin concave and slightly upturned; posterior margin indented medially; mesonotum evenly and closely punctured; scutellum shining and sparsely punctured; mesepisternum closely and evenly punctured; membranes of thorax yellowish white.

Wings yellowish-smoky-hyaline with base of costa yellow, stigma and remainder of veins brown; all coxae, trochanters,

femora (except small apical portion which is amber), and basal portion of apical tarsal joint and claws brown; tibiae and remainder of tarsi deep amber.

Abdomen compressed, brownish-black except 2nd and 3rd tergites orange, a small orange spot on 4th tergite just in front of spiracle, lateral margins of 2nd and 3rd tergites with narrow white line, lateral portions of 3rd sternite washed with brownish orange, lower lateral margin of 6th tergite and caudal margin of 6th sternite washed with indistinct orange, hind margins of 7th and 8th tergites edged with yellowish white, and small yellowish white at base of saw-sheath; saw-sheath brownish black, short, blunt and slightly curved downward; saw amber. Length 15 mm.; length of fore wing 9 mm.

♂ — Unknown.

Holotype: ♀ Victoria, BRITISH COLUMBIA, Canada, May 9, 1922 (W. R. Carter), Catalogue Number 4091 in Canadian National Collection, Ottawa, Canada.

Paratype: ♀ Vancouver, British Columbia, Canada, June 6, 1930 (H. Leech), in Academy of Natural Sciences, Philadelphia, Pennsylvania.

The biology and host plant of this species are unknown.

OBITUARY

The death of LAWRENCE BRUNER, Professor of Entomology in the University of Nebraska since 1895, as having occurred on January 30, 1937, is reported in *Science* for February 12th. According to *Who's Who in America*, he was born in Catawauqua, Lehigh County, Pennsylvania, March 2, 1856, the son of Uriah and Amelia (Brobst) Bruner. He was a student at the University of Nebraska, where he received a honorary degree of Bachelor of Science in 1897, having been an instructor in entomology there, from 1890 to 1895. He was well known as an investigator of the Orthoptera in Argentina and in the United States, and as author of two reports on the Destructive Locust of Argentine, papers on Locusts of Paraguay and of Peru, on the Saltatory Orthoptera of Brazil, the second volume on Orthoptera of the *Biologia Centrali-Americana*, a preliminary catalogue of Philippine Orthoptera, and many other entomological contributions. Some of his collections of Orthoptera were acquired by Mr. Morgan Hebard, of Philadelphia.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, part, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Ballou, C. H.—Insect notes from Costa Rica in 1935. [Insect Pest Surv. Bull., U. S. Bur. Ent.] 16: 437-497. Barnes, H. F.—Recent advances in entomology. [Sci. Progr.] 31: 518-526. Blaufuss, A. H.—The care of living material in the laboratory. [Turtox News.] 15: 4-5, ill. Donisthorpe, H.—An extract. [21] 49: 8-9. Grankina, K.—Washing of the soil as a method for recording small soil insects. [Lenin Ac. Ag. Sci. Plant Prot.] No. 9: 124-125. Hayward, K. J.—Random notes on Argentine collecting. 3. The Riverain forests of the Chacosantafecino. [21] 49: 5-8. Lhomme, L.—Lettre ouverte sur la preparation des papillons de petite taille. [Amat. Papillons] 8: 124-137, 147-151. Park, T.—Experimental studies of insect populations. [90] 71: 21-33. Roi.—Elements biogeographiques de l'Irlande [Ann. Soc. Sci. Bruxelles] B, 56: 433-458, ill. Ruediger, E.—Entomologie und zeitung. [Ent. Jahrbuch] 1937: 83-86. Tiensuu, L.—Insect Life on plants attacked by Aphids. [Ann. Ent. Fenn.] 2: 161-169. von Tunkl, F. F.—Die romantik in der Entomologie. [Ent. Jahrbuch] 1937: 74-82, cont. Woicott, G. N.—An animal census of two pastures and a meadow in northern New York. [Ecolog. Monogr.] 7: 1-90.

ANATOMY, PHYSIOLOGY, ETC.—Adamczewski.—Etude sur la morphologie des espèces du genre Cnephasia (Tortricidae) et sur leur distribution géographique en Pologne. [Ann. Mus. Zool. Polonici] 2: 263-294, ill. Asana

- & **Kichijo**.—The chromosomes of six species of ant-lions. [Jour. Fac. Sci. Hokkaido Imp. Univ.] 5, Zool.: 121-136, ill.
- Baden, V.**—Embryology of the nervous system in the grasshopper, *Melanoplus differentialis* (Orth: Acrididae). [Journ. Morph.] 60: 159-188, ill.
- Barbarossa, R.**—Osservazioni sulla morfologia dell'addome e sull'armatura genitale del Grillotalpa (Orth.) [Arch. Zool. Ital. Turin] 23: 479-492, ill.
- Beadle & Ephrussi**.—Development of eye colors in *Drosophila*: the mutants bright & mahogany. [90] 71: 91-95.
- Berio, E.**—Osservazioni sulla morfologia e nomenclatura dell'apparato copulatore dei Lepidotteri. Che cosa siano realmente l'uncus e lo scaphium. [Festschrift E. Strand, Riga, 1936.] 2: 205-211, ill.
- Bonneville, P.-P.**—Recherches sur l'anatomie microscopique des termites. [Arvernia Biol.] 1936: 1-123, ill.
- Bushnell, R. J.**—The development & metamorphosis of the mid-intestinal epithelium of *Acanthoscelides obtectus* (Coleoptera). [Journ. Morph.] 60: 221-241, ill.
- Camerlengo, A.**—Osservazioni sulla morfologia del torace del Grillotalpa (Orth.) [Arch. Zool. Ital. Turin] 23: 453-478, ill.
- Emery, W. T.**—Hessian fly eggs and freezing temperatures. [103] 10: 28-29.
- Fleming, Baker & Koblitsky**.—The insecticidal action of lead arsenate on the larvae of the Japanese beetle in different types of soil. [47] 53: 771-779.
- Gabler, H.**—Beitrag zur Kenntnis von Stigmenbau und Funktion der Lepidopteren-Puppen. [97] 56: 584-590, ill.
- Gala, C.**—Sur quelques effets de la poudre de chorion sur la biologie de la mouche *Drosophila melanogaster*, varieties Wild et Vestigial. [Bull. Internat. Acad. Tchecq. Sci., Prague] 36: 68-70.
- Goldschmidt, R.**—Does the quantity of chromatin produce a genetic effect? [90] 71: 83-86.
- Haskins & Enzeman**.—Modifications of the compound eye of *Drosophila melanogaster* arising under X-irradiation. [90] 71: 87-90, ill.
- Hester & Cunningham**.—The effects of endocrines on the development rates of fleshflies. [J. Elisha Mitchell Sc. Soc.] 52: 38-50.
- Husain & Mathur**.—Studies on *Schistocerca gregaria*. VIII.—Influence of Carbon dioxide on development of black pigmentation in *Schistocerca gregaria* (Orthopt: Acrididae). [Ind. J. Agr. Sci.] 6: 1005-1030, ill.
- Huxley & Wolsky**.—Zur Frage der Entwicklungs-physiologischen Determination des Arthropodenauges. [97] 56: 571-572.
- Koch & Krogh**.—La fonction des papilles anales des larves de Dipteres. [Ann. Soc. Sci. Bruxelles] B, 56: 459-461.
- Kozhantshikov, W.**—To the problem of the vital thermal optimum. III. The loss of

energy during the pupal development in *Agrotis* and *Ephestia* as a function of temperature. [Trav. Inst. Zool. Acad. Sci. USSR] 4: 313-388. [Russian, English summary]. **Maki, Takadi.**—Studies of the skeletal structure, musculature and nervous system of the Alder-fly, *Chauliodes formosanus* (Neuropt: Sialidae. [Mem. Fac. Sci. & Agr. Taihoku Imp. Univ., Formosa] 16: 117-243, ill. **Naville & de Beaumont.**—Recherches sur les chromosomes des Neuropteres. [Arch. Anat. Microscop., Paris] 32: 271-302, ill. **Newcomer, E. J.**—Effect of cold storage on eggs and young larvae of codling moth. [12] 29: 1123-1125, ill. **Ohmachi, Fumiye.**—A comparative study on the chromosome complements in Grylloidea (Orth.) [Ent. & Phytopath.] 4: 696-705, ill. [in Chinese]. **Paladino, G.**—Osservazioni sulla morfologia del capo *Grillotalpa* (Orth.). [Arch. Zool. Ital. Turin] 23: 423-451, ill. **Pflugfelder, O.**—Die Entwicklung der optischen Ganglien von *Culex pipiens* (Diptera). [34] 117: 31-36, ill. Vergleichend-anatomische, experimentelle und embryologische untersuchungen ueber das nervensystem und die sinnesorgane der Rhynchoten. [Zoologica] 34, hft. 93: 1-56, ill., cont. **Potvin & Giroux.**—Elevage d'une Mante en laboratoire. (Orth.). [98] 64: 19-21. **Wilson, F. H.**—The segmentation of the abdomen of *Lipeurus heterographus* (Mallophaga). [Journ. Morph.] 60: 211-219, ill. **Woodruff, L. C.**—Autopsy and regeneration in the roach, *Blattella germanica*. [103] 10: 1-9. **Woodworth, C. E.**—Effect of reduced temperature and pressure on honeybee respiration. [12] 29: 1128-1132, ill. **Yonge, C. M.**—Evolution & adaptation in the digestive system of the Metazoa. [Biol. Revs.] 12: 87-115. **Zabinski, J.**—Inconstancy of the number of moults during the post-embryonal development of certain Blattidae. [Ann. Mus. Zool. Polonici.] 11: 237-240.

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A Note on the Nesting Habits of the Roach-Hunting Wasp, *Podium (Parapodium) carolina* Rohwer (Hym).

By PHIL RAU, Kirkwood, Missouri.

In the spring of 1934 I gathered some nests of the mud-daubing wasp, *Sceliphron caementarium*, that had been used and resealed with a leaf-pulp by the bee, *Osmia cordata*. These nests were placed on a shelf in an open-faced shelter in my back yard with the hope of naturalizing the emerging *Osmia* bees. In June of the same year when I again inspected the mud nests, I found that the *cordata* bees had come and gone and that while most of the openings were plugged with a wad of leaf-paste, which is characteristic of *cordata*, four of them were plugged with a clear resin-like gum. My first thought was that the *Osmias*, being unable to find leaf-paste, had gathered this material from plants instead.

The four mud nests, each with a cell sealed in this unique manner, were placed in a large jar for observation. Nothing having emerged from them during the following twelve months, three of the four cells were opened on May 2, 1935, and I then found to my surprise, that each contained from one to three wood-roach nymphs about one-third grown. These were identified by Mr. Ashley B. Gurner as *Parcoblatta pennsylvanica* (De Geer). Fortunately the fourth and unopened cell gave me an adult wasp a month later. This was identified by Miss Sandhouse as *Podium (Parapodium) carolina*.¹

A closer examination of the nests shows that the roach-hunter is a gatherer of mud as well as of resin, for she makes mud partitions in the tube as well as mud plugs for the doorways. She later daubs the mud-plug as well as a small portion

¹Miss Sandhouse writes that the specimen has been retained since it is only the second specimen which has been received since the species has been described by Mr. Rohwer.

of the surrounding territory with the resin. The emerging wasp has no difficulty in biting its way to freedom through this double layer. An examination shows also, that the mother wasp sweeps any rubbish such as old *Osmia* cocoons, spiders' webs and *Dermestes*' shedding-skins to the rear of the cell and entombs it by building a wall of mud. She prefers this method to that of laboriously carrying it out bit by bit.

The resinous substance became hard and slightly darker in color as the months slipped by, and I had often wondered where the wasps had obtained it. Recently Dr. Edgar S. Anderson of Missouri Botanical Garden, generously offered to examine the material microscopically. He reports that "Clear material of this sort might be nectar (not likely), a gum or resin. Gums and resins are often confused by biologists but they are two quite different substances, though they may exist in mixtures. Gums are water soluble, more or less, and they char when burned. Resins are insoluble in water and more or less soluble in alcohol, ether, etc. They burn with a bright flame. Gums come from the break down of plant tissues; resins are the secretions of special glands or ducts. The material daubed on the clay was insoluble in water, soluble in alcohol and burned with a clear bright flame, leaving no residue. When dissolved in alcohol the concentrate, examined under the microscope showed cells of a conifer (apparently a hard pine). It is a resin therefore, which the wasp probably found exuding from pine lumber nearby since no hard pines are found in your vicinity."

Here, then, we have a rare wasp, probably tropical in origin, working its way northward in the Mississippi Valley,² using roaches for prey as do most of the sister species of the genus, gathering mud for wall-partitions and doorway-plugs and then superimposing upon the doorway plug a plaster of resin which

²Williams, F. X. (Bull. Exp. Stat. Hawaiian Sug. Platn. Ass'n. 19; 114, 1928) says "Cockroach wasps of the genera *Podium* and *Trigonopsis* inhabit tropical America although *Podium luctuosum rufipes* and *P. carolina* are known to occur in southern United States. They are mainly arboreal, although being mud-daubers are usually captured on the ground gathering nest material."

she has undoubtedly obtained from exudations on man-made lumber. This coating is probably for the purpose of making the nest water-proof but since the nest is built in the shelter of a building, one wonders from whence came the idea for the water-proof coating.

Are these habits in a transplanted species new, and are they in the process of being fixed into permanency, or are they vestiges from former times and other climes? This water-proof coating, small as it is, and useless as it is as a protective measure for weather and parasites, is undoubtedly a vestigial hang-over of former days when in the tropics the nests were arboreal and the coating was very necessary.

That enemies and weather are factors worthy of every protection in the tropics is brought out by Howes (Insect Behavior 1919, p. 33) who says that the roach-killer, *Podium rufipes*, is a solitary mason-wasp that has taken advantage of houses and buildings provided by man since it affords "safer quarters for her nest which originally she cemented to the concave sides of stumps of forests trees." He says further that when the nests are built in shutters of houses, and are conspicuous because they are made of an orange-red clay, it is a "regular habit of the wasp" to quickly cover her handiwork with neatly arranged layers of termites' wings, cast-off spiders' skins and other bits of refuse.

Through the observations of Williams also, we have a record of the nest building habits of several species of *Podium*: *Podium flavipenne* of British Guiana, (*loco citato* p. 118) is a cockroach hunter that digs a burrow in the ground two inches deep. She carries water in her mouth to soften the clay as she makes her excavations; and for *Podium haematogastrum* of Brazil, also a cockroach hunter, he says that several generations of this species nested in a large termite mound; and they also nest in burrows in banks and in level ground. Williams further mentions four species of *Podium* wasps (*P. goryanum*, *P. aurcosericum*, *P. brevicolle*, and *P. rufipes*) which are masons and build typical mud-daubing nests.

Thus we see that our own *Podium carolina* is not only unique

in using the abandoned cells of another insect since her sisters of various species are either excavators in the earth or builders of houses of masonry, but she is also unique in her sparing use of resin in a climate where the nests no longer need such protection.

Bibliography of Prof. George Hazen French.

By JOHN K. KARLOVIC, University of Chicago.

A search for the more important writings of Prof. French revealed the astonishingly large number of approximately 236 titles, pertaining to many branches of science. A large number of them are of popular interest and of an educational value to the farmer and truck gardener and were published in leading agricultural magazines and papers. Many of them are of a scientific nature and professional guidance to entomologists and men of research and were issued in extensive reports and journals. The more important publications of the latter kind may be cited as follows. A biographical notice of Prof. French (1841-1935) by the present writer was published in the NEWS for November, 1935.

- * Lepidoptera. ** Preparatory Stages of. †Fungous diseases.
- 1877 *Lepidoptera. Trans. Ill. St. Hort. Soc., New Ser., 11; 179-204.
- 1878 *7th Rept. Ill. St. Ent., Pt. 1: 79-106, Pt. 2: 135-273.
A New Species of Phigalia. [*cinctaria*]. Can. Ent., 10: 157-158.
- 1879 *Report of Curator, 5th Ann. Rept. Prin. to Trus., So. Ill. St. Norm. Uni., 25-42.
A New Species of Arctia. [*rectilinea*]. Can. Ent., 11: 45-46.
Some New Species of Noctuidae. [*Dicopsis vitis*, *Orthosia signata*, *Heliolithis illinoiensis*]. Can. Ent., 11: 76-78.
- 1880 Two New Species of Ichneumonidae. [*Microgaster utilis*, *Macrocentus iridescens*]. Can. Ent., 12: 42-43.
Prairie Farmer, 51: 10.
- 1881 The Corn-Root Worm. 11th Rept. Ill. St. Ent., 65-72.
Trans. Ill. St. Dept. Agr., 19: 65-72.

- The Wheat-Straw Worm. 11th Rept. Ill. St. Ent., 73-81. Trans. Ill. St. Dept. Agr., 19: 73-81.
- The Corn-Worm or Boll-Worm. 11th Rept. Ill. St. Ent., 82-104. Trans. Ill. St. Dept. Agr., 19: 82-104.
- Raspberry and Strawberry Insects. Trans. Ill. St. Hort. Soc., New Ser., 15: 191-208.
- Some New Varieties of *Catocala*. [*Catocala lachrymosa* Guen. vars. *exelina*, *zclica*, *C. innubens* Guen. var. *hinda*, *C. robinsoni* Grote var. *curvata*]. *Papilio*, 1: 110-111, 218-219.
- Notes on the Preparatory Stages of *Papilio cresphontes*. *Cram.* *Can. Ent.*, 13: 177-179.
- 1882 Synopsis of the Noctuidae of Illinois, 31 pp. Advocate print, Greenville, Ill.
- ***Plusia biloba*, Sth. *Papilio*, 2: 113-115.
- ***Catocala cara*, Guen. *Papilio*, 2: 167-169.
- ***Arctia nais*, Drury. *Papilio*, 2: 176-179.
- Two New Species of *Isosoma*. [*allynii*, *elyni*]. *Can. Ent.*, 14: 9-11.
- A New Species of *Ichthyura*. [*palla*]. *Can. Ent.*, 14: 33-35.
- ***Homoptera lunata*, Drury. *Can. Ent.*, 14: 130-134, 180.
- ***Agrotis amexa*, Tr. *Can. Ent.*, 14: 207-210.
- 1883 A New Zygaenid, *Triproceris martenii*, n. sp. *Papilio*, 3: 191-192.
- A New *Catocala*. [*sara*]. *Can. Ent.*, 15: 163-164.
- ***Epilachna borealis*, Fab. *Can. Ent.*, 15: 189-191.
- 1884 ***Catocala amatrux*, Hubn. *Papilio*, 4: 8-10.
- A New Species of *Gnophaela*. [*arizonæ*]. *Papilio*, 4: 20-21.
- ***Drasteria erichtea*, Cramer. *Papilio*, 4: 148-149.
- ***Catocala ilia*, Cram. *Can. Ent.*, 16: 12-15.
- 1885 A New *Pamphila* [*myus*]. *Can. Ent.*, 17: 33-34.
- ***Ichthyura palla*, French. *Can. Ent.*, 17: 41-44.
- ***Ichthymus ornata*, *Can. Ent.*, 17: 248-250.
- 1886 †The Death and Decline of Orchards. Trans. Ill. St. Hort. Soc., New Ser., 20: 149-167.
- ***Tetracis trianguliferata*, Paek. *Can. Ent.*, 18: 105-107.
- 1887 A New *Homohadena*. [*elda*]. *Can. Ent.*, 19: 5-6.
- ***Apatela felina*, Grote. *Can. Ent.*, 19: 48-50.
- 1888 ***Catocala desperata*, Guen. *Can. Ent.*, 20: 28-31.
- Some New Noctuidae [*Cucullia hartmanni*, *Hadena exelina*]. *Can. Ent.*, 20: 69-71.
- ***Catocala palaeogama*, Guen. *Can. Ent.*, 20: 108-111.

- ***Catocala immubens*, Guen. Can. Ent., 20: 170-172.
 1889 Notice sur le genre *Leptarectia* Strecker. Ann. Soc. Ent. France, 58: 493-498.
 A New Species of *Neonympha* [*mitchelli*]. Can. Ent. 21: 25-27.
 Notes of Some California Moths. Can. Ent., 21: 35-36.
 [*Arctia shastacensis* Behrens MS.]
 Some Texas, Arizona and California Moths. Can. Ent., 21: 161-163.
- ***Leptarectia californiae*, Walker, with Notes on the Genus. Can. Ent., 21: 210-213, 221-226.
- 1890 The Butterflies of the Eastern United States, 1st Edition, 408 pp., J. B. Lippincott Co., Philadelphia.
 Some New Colorado Moths. [*Cossus brucci*, *Tolyte distincta*, *Halisidota occidentalis*, *subalpina*]. Can. Ent., 22: 44-52.
 Some New Moths [*Crocota rosa*, *Hemaris brucci*, *Platyserura gigantea*]. Can. Ent., 22: 133-135.
 Subdivision of Genera. Can. Ent., 22: 251-253.
- ***Tolyte vellea*, Stoll. Can. Ent., 22: 255-257.
- 1891 ***Arctia rectilinea*, French. Can. Ent., 23: 130-132.
- ***Smerinthus ophthalmicus*, Bd. Can. Ent., 23: 143-144.
- 1892 Notes on Pear Insects. Trans. Ill. St. Hort. Soc., New Ser., 26: 62-65.
- ***Catocala stretchii*, Behr. Can. Ent., 24: 229-232.
- ***Catocala illecta*, Walker. Can. Ent., 24: 307-308.
- 1894 *Some Results of Experimental Work. Trans. Ill. St. Hort. Soc., New Ser., 28: 221-226.
 Insecticides and Spraying. Trans. Ill. St. Hort. Soc., New Ser., 28: 233-239.
 Description of two New Deltoid Moths. [*Pseudaglossa forbesii*, *Pallachira hartii*]. Ill. St. Lab. Nat. Hist., Bull., 4: 8-9.
- ***Catocala recta*, Grote. Can. Ent., 26: 97-99.
- 1895 **Partial Preparatory Stages of Some Moths. [*Catocala minuta*, *Acrotis brocka*, *Apatela spinigera*]. Can. Ent., 27: 331-332.
- 1896 The Butterflies of the Eastern United States, 2nd edition, 414 pp., J. B. Lippincott Co., Phila.
 Abstract of Talk on Sense Organs of Insects. Trans. Ill. St. Hort. Soc., New Ser., 30: 237-240.
- 1897 A New Species of *Ancyloxypha* [*longleyi*]. Can. Ent., 29: 80.
- ***Pyrus tessellata*, Scud. Can. Ent., 29: 283-285.

- 1898 Mammal of Dissection and Histology, 140 pp., J. B. Lippincott Co., Phila.
- 1900 The Butterflies of the Eastern United States, 3rd Edition, 425 pp., J. B. Lippincott Co., Phila.
- The Genus *Catocala*. [*Catocala barnesii*, n. sp.]. Can. Ent., 32: 188-191.
- A Parasite the Supposed Cause of Some Cases of Epilepsy. [*Gastrophilus epilepsalis* n. sp.]. Jour. App. Micr., 3: 1089-1090; Can. Ent., 32: 263-264.
- 1901 Revision of the Genus *Catocala*. Can. Ent., 33: 12-14.
- More About the Red-Winged Catolacae. Can. Ent., 33: 205-207.
- 1902 The Yellow-Winged Catolacae. Can. Ent., 34: 95-98.
- 1903 Insects Injurious to the Apple. Trans. Ill. St. Hort. Soc., New Ser., 37: 530-535.
- 1904 *Gastrophilus epilepsalis* Larvae and Epilepsy. Can. Ent., 36: 83-84.
- 1906 Bitter Rot and San Jose Scale. Trans. Ill. St. Hort. Soc., New Ser., 40: 429-434.
- 1914 The Butterflies of the Eastern United States, 4th Edition, 429 pp., J. B. Lippincott Co., Phila.
- 1916 A New Species of *Catocala* [*julietta*]. Can. Ent., 48: 72.

An Annotated List of the Ants of Arizona (Hymen.: Formicidae).

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From the summits of Arizona's many heavily timbered mountains to the floors of her vast deserts and valleys is a wealth of insect life, including numberless ants. The variety of ant life is surpassed only by the number of teeming colonies of each species.

Much of the state is desert. Sandy, dry and unbroken soil lies in the north and a moister region occupies the centre. These areas are especially rich in ant species. In the desert the struggle for existence has been most severe and the survivors of past periods have well established and distributed themselves in a hostile environment. Certain habitat restrictions have limited the spread of many species, so that some of them are found in rather small and isolated areas. These

"pockets" are continually being discovered, and it is chiefly through the results of these "finds" that a sizable state list has been made possible.

I shall not attempt to discuss any ant extensively, or to annotate those species which have been collected by investigators other than myself. The notes appearing herein are original. Notes on ants which are merely listed have been heretofore published, and may be gleaned from the works of Wheeler, Smith, Olsen, Cole and others.

That this list is probably by no means complete has been foreseen and recognized by the writer. It may be considered merely a starting point to which additional data may be appended as time goes on. I have drawn freely from the publications of Drs. Wheeler, Smith and Olsen. To those who have made possible this contribution to the fauna of Arizona, I am gratefully indebted.

Subfamily Ponerinae.

1. *STIGMATOMMA PALLIPES* subsp. *ARIZONENSE* Wheeler. Huachuca Mts. (W. M. Mann).
2. *PONERA OPACICEPS* Mayr. Grand Canyon (Wheeler).
3. *ODONTOMACIUS HAEMATODA* subsp. *DESERTORUM* Wheeler. Tucson (Wheeler); Phoenix (Cole). A few workers of this interesting subspecies were running about at night in a grassy lot in Phoenix. The nest was not located.
4. *O. HAEMATODA* subsp. *CONINODIS* Wheeler. Huachuca Mts. (Wheeler, Mam).
5. *O. CLARUS* Roger. Huachuca Mts. (C. Schaeffer).

Subfamily Dorylinae.

6. *ECITON (ACAMATUS) OSLARI* Wheeler. Nogales (Oslar).
7. *E. (A.) ARIZONENSE* Wheeler. Nogales (Oslar).
8. *E. (A.) MEXICANUM* (F. Smith). Nogales (Oslar).
9. *E. (A.) HARRISI* (Haldeman). Nogales (Oslar); Palm-erlee (Schaeffer).

Subfamily Myrmicinae.

11. *PSEUDOMYRMA PALLIDA* F. Smith. Huachuca Mts. (Schaeffer).
12. *MYRMECINA GRAMINICOLA* subsp. *AMERICANA* Emery. Grand Canyon (Wheeler).
13. *M. GRAMINICOLA AMERICANA* var. *BREVISPINOSA* Emery. Grand Canyon (Wheeler).

14. *MONOMORIUM MINIMUM* Buckley. Grand Canyon (Wheeler, Cole); Prescott (Wheeler); Jacobs Lake (Cole).

At Bright Angel Point on the south rim of the Grand Canyon, I found this species inhabiting small nests in the dark, rather dry porous soil beneath rocks. Winged castes were in the nests on July 20, 1931. The ground was deeply strewn with needles of *Pinus ponderosa*. Spruce, cedar and some *Artemisia* were present.

15. *SOLENOPSIS AUREA* subsp. *AMBLYCHILA* Wheeler. Huachuca Mts. (Wheeler).

16. *S. HUACHUCANA* Wheeler. Huachuca Mts. (Wheeler).

17. *S. MOLESTA* (Say). Flagstaff, Williams (Cole). The colonies were small and were all beneath flat stones.

18. *S. MOLESTA* var. *VALIDIUSCULA* Emery. Williams (Cole). One large colony was found beneath a rock in a yellow pine forest.

19. *S. GEMINATA* (Fabricius). Phoenix (Wheeler); Tucson (Fenner).

20. *S. GEMINATA* subsp. *RUFA* (Jerdon). Tempe (Wheeler).

21. *S. XYLONI* (McCook). Phoenix, Huachuca Mts., Oracle, Texas Pass (Wheeler); Kingman, Peach Springs, 16 Mi. S. of Prescott (Cole).

At Kingman and Peach Springs were small nests adjacent to fence posts in fine dry soil. Near Prescott the ants inhabited many small crater nests in a sandy arroyo. The colonies were large. Associated vegetation consisted chiefly of *Pinus ponderosa* seedlings, *Opuntia* and several grasses.

22. *S. XYLONI* var. *MANIOSA* (Wheeler). Yuma, Tempe, Yucca, Gila Bend Mts., Benson (Wheeler); Thatcher (R. V. Chamberlin); Tucson (Wheeler, Cole); Douglas (Cole).

A hole in the fine sand near Douglas marked the nest of a medium-sized colony of this ant. Long files of workers extended to and from the nest opening. At Tucson one colony inhabited a nest beneath a flat rock in the dry desert.

23. *S. XYLONI* subsp. *AUREA* (Wheeler). Yuma, Grand Canyon, Phoenix, Casa Grande, Pinaleno Mts., Coyote Mts. (Wheeler).

24. *S. XYLONI* subsp. *AMBLYCHILA* (Wheeler). Huachuca Mts. (Wheeler).

25. *PHIEDOLE CERES* Wheeler. Grand Canyon (Wheeler).

26. *P. KINGI* subsp. *TORPESCENS* Wheeler. Tucson (Wheeler).

27. *P. TEPICANA* subsp. *CAVIGENIS* Wheeler. Huachuca Mts. (Wheeler).
28. *P. FIMBRIATA* Roger. Nogales (Osler).
29. *P. VIRAGO* Wheeler. Tucson (Wheeler).
30. *P. SPADONIA* Wheeler. Tucson (Wheeler).
31. *P. MILITICIDA* Wheeler. Hereford (Wheeler, Mann); Benson (Wheeler).
32. *P. VINELANDICA* Forel. Grand Canyon (Wheeler); Tuba City, Douglas (Cole).
- A few minute crater nests of this species were observed along a small stream at Navajo Springs, near Tuba City. The area was very rocky and protected by high cliffs on the east. Vegetation was abundant, and consisted chiefly of *Opuntia*, *Yucca*, grasses and *Ephedra*. The soil was moist near the stream but very dry elsewhere.
33. *P. VINELANDICA* subsp. *BUCCALIS* Wheeler. Ash Fork, Prescott (Wheeler).
34. *P. VINELANDICA* subsp. *CEREBROSIOR* Wheeler. Tucson (Wheeler).
35. *P. VINELANDICA LONGULA* var. *CASTANEA* Wheeler. Huachuca Mts. (Wheeler); Tuba City (Cole). Workers and soldiers of this variety were collected from a small nest beneath a rock at Navajo Springs, near Tuba City.
36. *P. CALIFORNICA* subsp. *MICULA* Wheeler. Huachuca Mts. (Wheeler).
37. *P. CRASSICORNIS* subsp. *VALLICOLA* Wheeler. Huachuca Mts. (Wheeler).
38. *P. COCKERELLI* Wheeler. Prescott (Cockerell, Wheeler); Tempe (F. H. Simmons).
39. *P. DESERTORUM* Wheeler. Ash Fork, Prescott, Grand Canyon (Wheeler); Phoenix, Tucson (Wheeler, Cole); Seligman, 40 Mi. S. Prescott (Cole).
- A few workers were foraging in the desert near Seligman. South of Prescott I collected workers from a small crater mound of sand. At Phoenix and Tucson populous colonies were beneath stones on the sandy desert plains.
40. *P. DESERTORUM* var. *MARICOPA* Wheeler. Grand Canyon (Wheeler).
41. *P. BARBATA* Wheeler. 20 Mi. E. Needles, California (Cole). Three workers of *P. barbata* were found near a road east of Needles. The nest was not located.
42. *P. XEROPHILA* subsp. *TUCSONICA* Wheeler. Phoenix, Tucson, Douglas, 30 Mi. E. Kingman (Cole); Tucson (Wheeler).

43. *P. XEROPHILA TUCSONICA* var. *GILVESCENS* Wheeler. Phoenix, Tucson (Wheeler); Tucson (Cole).
44. *P. PROSERPINA* Wheeler. Tempe (Wheeler).
45. *CREMATOGASTER LINEOLATA* Say. Grand Canyon (Wheeler, Cole); Flagstaff (Cole).
46. *C. LINEOLATA* var. *CERASI* Fitch. Seligman (Cole).
47. *C. LINEOLATA LAEVIUSCULA* var. *CLARA* Mayr. Arizona (Emery); Kingman, Douglas (Cole).
48. *C. LINEOLATA* subsp. *COARCTATA* Mayr. Tucson (Wheeler).
49. *C. ARIZONENSIS* Wheeler. Tucson, Phoenix (Wheeler).
50. *STENAMMA (APIAENOGASTER) fulvum* var. *TEXANUM* Emery. Grand Canyon (Wheeler).
51. *APIAENOGASTER TEXANA* Emery. Grand Canyon (Wheeler).
52. *A. TEXANA* var. *FURVESCENS* Wheeler. Huachuca Mts. (Wheeler, W. M. Mann).
53. *A. SUBTERRANEA* subsp. *OCCIDENTALIS* Emery. Jacobs Lake (Cole).
54. *NOVOMESSOR COCKERELLI* (Ern. André). Benson, Santa Catalina Mts., Gila Bend Mts., Hereford, Oracle, Tempe, Yucca (Wheeler); Florence (C. D. Lebert); Huachuca Mts. (Biedermann); Tucson (Wheeler, Cole); Kingman, Prescott, Phoenix, Douglas (Cole).
55. *N. ALBISETOSUS* (Mayr). Pinaleno Mts., Texas Pass (Wheeler); Huachuca Mts. (Wheeler, Creighton); Bisbee (L. C. Murphree); Bonita (J. C. Bradley); Globe (H. C. Markman); Nogales (Osler, Murphree); 55 Mi. S. Prescott, Phoenix (Cole); Baboquivari Mts., Coyote Mts.

The nests found by the writer were beneath flat rocks with small pebbles distributed around the entrances.

56. *VEROMESSOR ANDREI* (Mayr). Phoenix, 10 Mi. E. Needles, Calif. (Cole). The nests at both localities were of the usual crater mound type, each with a single large entrance surrounded by chaff.

57. *V. PERGANDEI* (Mayr). Nortons, Tempe, Casa Grande, Gila Bend Mts., Santa Catalina Mts., Yucca, Yuma (Wheeler); Ft. Mojada (J. Henderson); Tucson (Wheeler, G. von Kroekow, E. A. Carpenter, N. C. Skinner, Cole); Phoenix (Cole).

The mound observed at Tucson was large and symmetrical, about 6 inches high and 18 inches in diameter, and in a very dry section of the desert. There was a large central opening at the bottom of each deep crater.

(To be continued.)

On Mounting Micro-Diptera.¹

By CURTIS W. SABROSKY, Michigan State College.

The recent appearance of directions for collectors on mounting tiny insects has prompted the writer to call attention to what he regards as a far more desirable and practicable method. Detailed directions are given below for this method (fig. 1), together with a discussion of advantages and disadvantages of the common methods illustrated herewith.

In many groups, such as the small, hard-shelled Coleoptera and hard-bodied Hymenoptera (e.g., Chalcidoidea), the minuten nadeln are obviously not so practicable, but in Diptera and in small neuropteroid insects such as the Coniopterygidae, they may be used to considerable advantage. The Diptera, in particular, have fairly soft bodies and have body juices which are ample for attaching the specimens firmly to the pin.

The writer's experience as a collector and specialist in Micro-Diptera, and the experience of other dipterists such as R. H. Painter and F. M. Hull, have led to their adoption of the following as the neatest, most compact, and most desirable method of mounting small flies. It results in specimens in the best condition and in the most convenient position for manipulation during microscopic examination.

The general method is not entirely new, but the long established vertical manner of preparing minutens (fig. 2) seems to have prevented its popular adoption. Mr. Nathan Banks, in his excellent and comprehensive bulletin on "Directions for Collecting and Preserving Insects" (1909, U. S. Nat. Mus., Bul. 67, pp. 55, 56, fig. 98e), described it briefly and figured it along with other ways of mounting small insects.

The method may be summarized as follows:

1. *Take a thin sheet of good cork and cut it into small squares, making them as uniform as possible in order to present a neat appearance. The cutting can be done rapidly with a razor blade mounted in a holder. The cork sheet is cut into*

¹Journal Article No. 268 (N. S.) from the Michigan Agricultural Experiment Station.

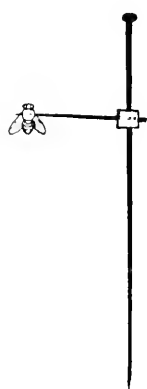


FIG. 1



FIG. 2

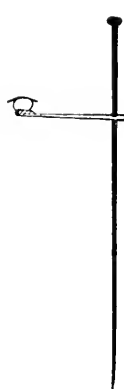


FIG. 3



FIG. 4

long strips, and the squares cut from these. Two or three strips may be used at a time, if one is careful to cut them off squarely.

As to the size of the pieces, a cork 3 mm. square and $1\frac{1}{2}$ to 2 mm. thick has been found to present a neat, compact appearance in the collection without detracting attention from the specimens themselves. Smaller ones are good, just as long as they are adequate for holding the two pins. Larger ones can be used, but they appear bulky. Since the insects to be mounted are rather small, the size of the mounts should be kept within reasonable bounds, lest the result be a collection of cork pieces among which one must peer carefully to find the accompanying specimens.

2. Push the large insect pin through the squares, using a pinning block for uniform height. Either no. 2 or no. 3 pins are good; I prefer no. 3 because they do not buckle or snap back as do smaller sizes. (According to Banks, the minuten is first pushed through the cork, then into the insect, and finally the large pin is "inserted through the cork square." I believe that mounting will be expedited by taking the last step first.)

3. While holding the 'large pin plus cork' in one hand, *pick*

up a *minuten* with tweezers and push it through the cork square at right angles to the large pin (fig. 1). The blunt end of the *minuten* should project a bit, so that one can use tweezers and orient the insect to any desired position. The double mount is now ready for use.

It is hardly necessary to state that the angle, depth, etc., of the *minuten nadeln* are important not only in determining the appearance of the collection but also in facilitating examination under the microscope. The collection will also appear neater if one is careful always to place the *minuten* on the same side of the pin, either on the side towards him (preferred by the writer) or on the opposite side.

4. Place the insect on its left side, and impale the specimen at the desired angle. The head of the insect will then always be away from you in dorsal aspect, and the insect will be to the left of the main pin. These are the accepted positions. In order to insure a solid mount, press the insect gently against a thumb or finger until you feel the pin prick. The *minuten* will then project a slight distance through the specimen, but not enough to damage the pleura or increase the difficulty of determination.

Better mounts will result if the pinning is done under a binocular microscope, so that the *minuten* actually impales the insect. In most small Diptera, the *best plane of mounting* is probably the lateral one, with the *minuten* passing through the right and left pleura at or near the suture which separates mesopleura and pteropleura. Thus the entire dorsal aspect, the important mesonotal bristles and hairs, and the legs, are left undisturbed, and the left pleura is practically intact. In handling under the microscope, with the main pin horizontal to the base, the fly is seen in lateral aspect, which is probably the most advantageous for observing the principal characters. Furthermore, pinning through the pleura usually causes the wings to be extended, either horizontally or at a 45° angle, and this aids in the study of the wing venation. If a large series is available, several specimens may also be mounted in other planes.

From these detailed directions, the process may appear to be

too complicated for practical use. A very little practice, however, will enable one to cut the corks, pin, and insert the minuten fairly rapidly. Time is saved by concentrating on each step, and by cutting or pinning a large quantity before passing to the next step. For field work, a considerable number of completed mounts is made up in advance of the time when they will be needed.

Advantages and disadvantages of the various methods.

1. The principal advantage of the method outlined above (fig. 1) lies in the lessening of danger to the specimen. (By placing the labels *parallel* to the minuten, one may also give further protection). With the minuten perpendicular to the main pin, it is a simple and safe matter to rotate by twirling the head of the pin between two fingers, in order to examine the insect from various angles. The specimen is far enough from the head of the pin so that there is little or no danger of damaging it.

Regarding the objection that insects tend to flip off the minuten, it can be stated that there is far less trouble in this method than with points. There is practically no trouble if the minuten passes *through* the insect and not merely between the legs. The method possesses an added advantage for Diptera in that it does not require any affixing substances (shellac, glue, etc.), which may obscure important characters.

2. Insects mounted under the old minuten method (fig. 2) are difficult to handle with any degree of dispatch and safety. The position of the minuten results in the insect being placed near the head of the pin. If you are then removing or replacing specimens, with the head of the pin held between thumb and forefinger, there is great danger and likelihood of touching the insect on its precarious perch. Needless to say, one does not have to lean very hard against a fly only two to three millimeters long before something gives way.

If a person uses pinning forceps (which are not so necessary if one will only mount on a solid pin, such as a no. 3), the danger from handling is not as great. The poor specialist must then be pitied, for even if forceps are used to remove specimens from box or tray, he must still take hold of the pin with

his fingers in order to orient the specimen under the microscope. With the minuten parallel to the large pin, and with the tiny insect consequently so near to the thumb and finger hold, such orientation too often produces dire results. In olden times, this method might have been called the guillotine.

3. For best results, micro-Diptera should not be mounted in any way which requires the use of a gluing medium. Such materials all too frequently mess up the important bristles, hairs, pollen, or scales, and render the specimen practically worthless and next to impossible to identify with any degree of certainty. Cresson (1913, ENT. NEWS, 24, pp. 8-12) ably states the objections to the gluing method, and emphasizes the fact that such media often cause the fly to become greasy and discolored, and thus multiply the difficulties of determination.

Of the various methods of gluing now in use, the point method (fig. 3) is the least objectionable, and indeed is to be preferred to the old minuten method. Points possess the same advantages of ease and safety in manipulation that are found in the minuten method proposed in this paper. Furthermore, if the amount of glue is reasonable and the insect is not almost submerged, the various aspects of the fly can be examined without much trouble.

The tendency to flip off, which is a serious objection, is far more pronounced with points than with minuten. In order to mount rapidly on points, one usually tips several in glue before attaching the insects. A surface film forms quickly on most of the mounting media now in use. The result is that specimens often appear to be firmly affixed, whereas they are really adhering very slightly. The point then becomes an admirable springboard from which the insect may be propelled with the greatest of ease.

4. The most objectionable method of mounting, in my opinion, is that in which the insect is stuck directly to the main pin, without a secondary mount (fig. 4). This method possesses the undesirable features of the other methods, to say nothing of necessitating a game of hide-and-seek around the pin. The

large pin, plus the amount of glue necessary to attach the specimen, often obscures from one-half to three-fourths of the insect, besides greatly increasing the danger from discoloration. If a smaller pin is used, it is objectionably slender and more difficult to handle.

Of all the methods, the writer wishes especially to urge the adoption of the double mount with the *minuten nadeln* perpendicular to the main pin. It has the most advantages and the least objections of any of the methods. The student who adopts the mount will feel amply repaid by the fine condition of his material, either for display or for study.

The Use of the Headlight in Collecting Nocturnal Spiders.

By HOWARD K. WALLACE

The use of lights in night collecting and field observations has no doubt furnished much valuable material and data for biological investigations. Because of its adaptation to certain types of problems I feel certain that the method must have been used by many biologists, though how extensively I have no means of knowing. However, competent and experienced investigators from several parts of the country, who have recently accompanied me on field trips, have expressed surprise and enthusiasm at the results obtained by the use of the headlight in night collecting. It is the purpose of this article to bring certain aspects of the use of the headlight¹ to the attention of interested persons.

For some years it has been the custom of graduate and undergraduate students connected with the Department of Biology of the University of Florida to make frequent excursions into the field at night with headlights, and these trips have done much to arouse in them an interest along various lines of biological research. Several years ago the author became interested in spiders and began making a collection of Florida material.

¹ The Winchester three-cell, focusing type, is the light most generally used, and considered most satisfactory, among my acquaintances.

Someone suggested the possibility of illuminating the eyes as a means to collecting and this suggestion was followed out with gratifying results. In fact the excellency of this method led to the development of a special interest in one family of spiders, the Lycosidae. The eyes of all the members of this family that I have encountered shine brilliantly, sparkling green, red, or yellow, and in at least some parts of the country collecting, ordinarily, is a simple matter. The spider, blinded by the shaft of light, apparently is not disturbed by the presence of the collector and as a rule remains motionless and is easily taken with forceps. Furthermore, every lycosid spider within reach of the headlight, whose eyes are accessible to the light rays, can be spotted. The reflections from the minute eyes of some of the smaller species, such as *Arctosans* and *Piratan*s, are difficult to detect but they *can* be collected in this manner. Other species seem to be highly sensitive to vibrations set up in the ground or weeds and bushes by the approach of the collector and drop into their burrows or retreat into inaccessible tangles of vegetation. These, like *Lycosa carrana* Bryant, and *Lycosa watsoni* Gertsch, are difficult to catch and I find it much more profitable to collect for them at night.

The value of the light is well brought out by the following experience: one afternoon a strip of black, mucky beach, about one hundred yards long and thirty yards wide, on the edge of a lake and almost devoid of vegetation of any kind, was collected over carefully for fully ninety minutes. Two Lycosids were seen and taken. This same area was collected with a headlight about an hour after sunset on the evening of the same day. Literally thousands of eyes could be seen and specimens were collected as fast as I could go through the motions of picking them up and dropping them into a bottle. In this connection it is worth noting that almost all, if not all, of the members of the family Lycosidae in Florida are nocturnal in habit.

Interestingly enough, collectors from the East and Northwest report much poorer results with the headlamp and this was borne out in part by my experiences during the past summer. I found spiders in abundance along the Atlantic coastal

plain and piedmont regions as far north as Virginia and in goodly numbers in Indiana, but in the mountains of North Carolina, Virginia, and Pennsylvania the results of night-collecting were poor. The scarcity of spiders encountered might be attributed to several factors—a much less populous fauna, adverse weather conditions, or predominance of diurnal habits. T. H. Hubbell reports spider eyes just as abundant, on one occasion, on the shore and in the adjacent pine woods around Higgin's Lake, Michigan, as he has ever seen them in Florida. Also, that he observed many spider eyes in western Texas and Arizona during the past summer. It appears that an accurate estimation of the value of night-collecting for any particular region, at least for spiders, awaits the headlight exploration of a wider variety of environments and geographical regions.

Lycosids are not the only spiders easily collected and observed at night. The eyes of species in the families Pisauridae, Thomisidae, and Ctenidae have been illuminated and web-spinning individuals may be located by lighting up their webs. Small species living in leaf mould, other decaying organic matter, under rocks, under stones, etc., are easily spotted when they begin to move about after their hiding-places have been disturbed. Blinded by the shaft of light, or perhaps due to a retardation of their physiological activities brought on by environmental conditions obtaining during the night, they do not move about as actively or find other hiding-places as readily as they do in daylight.

The following is a partial list of the uses of the headlight as put into practice by my associates or acquaintances:

Mr. A. F. Carr, Jr., herpetologist, uses the headlight extensively for collecting purposes and also for making field observations. He finds it especially productive in the matter of collecting frogs, both large and small, particularly when they are concentrated in or near water during the breeding season. The eyes of some can be illuminated while the smaller individuals can be located by their calls or songs and approached within arm's length while blinded. The fact that the beam of light directs attention to a limited area helps in detecting their form

or movement. Snakes, turtles, salamanders and lizards are also readily taken while blinded. Mr. Carr also recommends the use of the headlight for making observations on the breeding habits of fish, which, in many instances, are not so disturbed by the light as they are by shadows during the day. He suggests that this is an excellent way of observing reef fishes, squids, and other marine forms which cannot be approached before sunset. The same applies in general to the bottom fauna of bodies of fresh water.

Professor T. H. Hubbell has contributed the following information concerning the Orthoptera: Although it is not possible to illuminate their eyes, night collecting in general is very useful. Many orthops move about at night whereas they are quiescent during the day. The headlight is used because of its convenience. It focuses attention on a small area, makes it possible to keep moving forms in view by simply turning the head, and leaves both hands free for the manipulation of collecting apparatus. A great many diurnal orthops living on the ground, in grasses, bushes and the like, under certain meteorological conditions climb to the tops of weeds and grasses to sleep, are detectable from a distance, and can be picked off with ease. These include many swift-flying forms. Others can be roughly located at night by their songs and by moving up carefully, stopping and turning off the light when they cease singing until they resume their songs, can be approached close enough for collection. Sometimes this procedure requires a great deal of patience but their songs can be learned in this manner and subsequent records made without actually taking the specimens. Mr. B. B. Fulton of North Carolina State University and Mr. E. S. Thomas of the Ohio State Museum are particularly successful practitioners of this method. Many Orthoptera live in trees and are seldom seen on the ground. The first clue to their whereabouts is usually furnished by their songs and after that it is often possible to locate them with a spot-light and subsequently knock them out of the tree with a .22 rifle loaded with dust shot. Giant katydids have been shot out of the tops of oak trees in this manner. Some grasshoppers with specific

food plants spend the day concealed within the interior of the bush and come out at night to feed. The advantage of the light in this case is demonstrated in one instance wherein Hubbell and Walker, collecting *Schistocerca ceratiola*, caught eleven hundred specimens at night and only twelve during the day. One unusual night's work in South Florida yielded two thousand specimens of miscellaneous Orthoptera, found asleep on plants.

Many other insects and representatives of other groups may be collected using various applications of the headlight method. The eyes of moths and crayfish glow very similarly with a soft, red luminescence. Beetles, ants, Dermaptera, dragonflies, antlions and many other forms have been taken at night.

In the opinion of several of my associates as well as myself, such routine collecting methods as turning over logs and stones, sifting leaf mould, tearing open rotten logs, looking under loosened bark on dead trees, sweeping and beating, often yield better results at night with a headlight, especially in regard to particular forms. It has also been suggested as a means of observing breeding, feeding, and other activities of many nocturnal animals.

A New *Leptinopterus* from Brazil (Coleoptera: Lucanidae).

By BERNARD BENESH, North Chicago, Illinois.

The subjoined short diagnosis of a member of the South American genus *Leptinopterus*, describes an insect apparently new to science; it was recently received through the kindness of Dr. E. Franz of the Senckenberg Museum, Frankfurt a. M., Germany. The insect was labelled *Psalidostomus vestitus* Burmeister,¹ the specific name being retained for designation of this interesting stag-beetle.

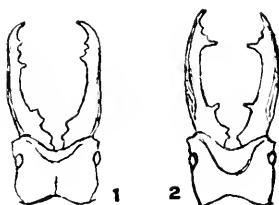
Leptinopterus vestitus (Burmeister Ms.?) n. sp.

This species is a close relative of *L. gracilipes* Didier,² from which it can readily be distinguished by its slender body and vestiture.

¹ Burmeister proposed the name in his *Handbuch der Entomologie* 1847, volume V, page 377; the generic name is preoccupied, being used for a South American genus of Prioninae.

² Didier, *Études sur les Coléoptères Lucanides* 1928, p. 80.

Head nearly quadrate, broadest in front, tapering to base, frontally depressed, convex towards the occiput (in *gracilipes* with a distinct longitudinal sulcus), finely granulate, dark castaneous. *Antennæ* piceous, shining, 8th, 9th and 10th joint forming the clava, latter entirely spongy. *Mandibles* asymmetrical, massive, canaliculate on top, rounded laterally, porrect, slightly curved from basal third to apex, apex diagonal with three teeth, posterior the longest and pointing directly inward; basally left mandible with a strong, bifid tooth, right with an obtuse conical tooth, and anterior to these another small tooth.



1. *L. gracilipes*
After Planet Didier

2. *L. vestitus*
n. sp.

Thorax broader than long, darker than the head, minutely punctate, covered sparsely with golden pile, anteriorly bisinuate and densely fringed with long golden hairs, sides gently narrowing to base, posterior angles diagonal, base nearly straight; disk glabrous, with a feeble longitudinal depression. *Elytra* gradually tapering to apex, of much paler color than the head, finely punctulate, clothed with golden pile, obliterated in the scutellar area, becoming much more dense toward the lateral margins. Scutellum rounded (in *gracilipes* it appears to be heart-shaped), nearly invisible, being densely covered by long, prostrate, golden hairs.

Ventrally, mandibles black from the basal third to apex, cherry-red at base, mouth parts and gula blood-red, becoming much darker on the genæ; prosternum deep castaneous, meso- and metasternum and abdomen black, shining. *Legs* very slender, intermediate and posterior entirely black; anterior tibiae deep castaneous, armed externally with three strong spines, distal longest; femora black; tarsi black.

Principal measurements: overall length (mandibles included) 24.5 mm; mandibles 8.5 mm; head 6.5 mm wide; prothorax 6.25 mm wide and 3.5 mm long; elytra 6 mm wide and 9 mm long.

Habitat:—BRAZIL; Minas Geraes—Passa Quatro.

Type a unique ♂, in the author's collection, accession number 3165. The female is unknown.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., APRIL, 1937.

ENTOMOLOGY AT THE CONVOCATION WEEK MEETINGS,
DECEMBER 28, 1936, TO JANUARY 2, 1937.

Our annual summary of the entomological items of the programs of the American Association for the Advancement of Science and Associated Societies, held at Atlantic City, New Jersey, follows.

The number of papers bearing on insects, including those in symposia and non-duplicating demonstrations, were:

Entomological Society of America	44
American Association of Economic Entomologists	94
*American Society of Zoologists	29
*American Society of Parasitologists	8
Mycological Society of America	2
American Society of Naturalists	1
Ecological Society of America	1
*Genetics Society of America	16
Linnological Society of America	2
American Society of Horticultural Science	1
*Potato Association of America	8
 Total	 206

These papers were distributed in subject as follows:

i	Geographical Distribution
*General Entomology ..	8
Collecting and Rearing Methods	3
Entomological Instruction	2
*Cytology	12
Embryology and Life History	9
Anatomy and Morphology	3
*Physiology	33
Ecology	8
Behavior	1
	tion
	*Genetics
	Evolution
	Taxonomy
	Parasites and Diseases of Insects
	*General Economic Entomology
	*Insecticides
	*Apiculture
	*Arthropods Affecting Man
	*Do. do. other Animals
	4
	8
	1
	5
	5
	14
	27
	13
	13
	7

Do. do. Cereals and Field Crops	18	Heteroptera	4
Do. do. Truck Crops	10	Anoplura	1
*Do. do. Households	3	*Thysanoptera	4
*Do. do. Ornamental and Greenhouse Plants	3	Colleoptera (excluding Japanese Beetle)	19
Do. do. Fruits and Fruit Trees	8	Japanese Beetle	1
*Do. do. Forest and Shade Trees	3	*Hymenoptera (excluding Honey Bee)	12
Do. do. Miscellane- ous Plants	4	* Honey Bee	7
ii		Trichoptera	1
*Acarina	6	Lepidoptera (excluding the three following) . .	10
Orthoptera	19	Codling Moth	6
Isoptera	1	Oriental Fruit Moth	1
Ephemera	1	Corn Borer	3
Odonata	1	*Diptera (excluding <i>Dro-</i> <i>sophila</i>)	20
*Homoptera	17	* <i>Drosophila</i>)	16
		Siphonaptera	1

Many of these figures are duplications, both between sections i and ii and also within sections. Increases in numbers of papers over the corresponding figures for 1935-36 are starred (*). Decreases are not indicated; in some subjects they are considerable. The total number of papers, 206, is below those for 1935-36 and 1934-35 (239 for each year).

Both entomological societies met in Haddon Hall, their meeting rooms being at opposite ends of the same hall. The Entomological Society was presided over by Prof. H. B. Hungerford, University of Kansas; the Secretary was Prof. C. E. Mickel, University of Minnesota. The annual address was given by Dr. Edith M. Patch, University of Maine, on "Without Benefit of Insects," at the combined Entomologists' dinner, December 29, at 6 P. M.

The President of the Economic Entomologists was Mr. Leonard S. McLaine, of the Department of Agriculture, Ottawa, and the Secretary, Prof. E. N. Cory, University of Maryland.

A joint symposium of the two societies on Insects Affecting Man was held on December 28. To the great joy of all entomologists, it was presided over by Dr. L. O. Howard, who also occupied the seat of honor at the Entomologists' dinner.

Entomologists were represented also in the symposium of the Ecological Society on Experimental Populations, December 29, and in that of many societies on Supra-specific Variation in Nature and in Classification, on December 31.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Anon.—The venus flytrap in action. [Nat. Mag.] 29: 154-155, ill. **Brownell, L. W.**—Some American insect galls. [Nat. Mag.] 29: 159-161, ill. **Claassen, P. W.**—On preparing specimens for determination. [Ward's Ent. Bull.] 4: 1-2. **Curran, C. H.**—Insect lore of the Aztecs. [Nat. Hist., N. Y.] 39: 196-203, ill. **Johnson, H. A.**—Attractivity of light for Anopheles mosquitoes. [Jour. Tenn. Acad. Sci.] 12: 104-106, ill. **Kemner, N. A.**—Det femte Nordiska Entomologimötet i Lund 3-6 augusti 1936. [Opuscula Entomologica] 1: 65-101. **McDunnough, J. H.**—Directions for collecting and preserving insects. [Dom. Canada, Dept. Agr.] Circ. 110: 14pp., ill. **Passmore, L.**—The tarantula builds her eggsac. [Nat. Mag.] 29: 166-167, ill. **Plaumann, F.**—Im Urwald. [17] 54: 213-216. **Rosa, A. F.**—The influence of bird migration upon the distribution of mimetic species of Lepidoptera. [9] 70: 32-37, ill.

ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—The physiology of insect senses. [70] 16: 225-280, ill. **Agrell, I.**—Der Sexualdimorphismus der ausseren Genitalien bei den Collembolen, nebst Bemerkungen über Verschiedenheiten in Grosse und Frequenz der Geschlechter bei denselben. [Opus. Entom., Lund] 1: 119-127, ill. **Auel, H.**—Einfluss der Witterungselemente auf die Grosse von *Pieris brassicae* (Lepid.). [65] 23: 596-602. **Auerbach, C.**

—The development of the legs, wings, and halteres in wild type and some mutant strains of *Drosophila melanogaster*. [Trans. Ry. Soc. Edinb.] 58: 787-816, ill. **Clancy & Beadle**. —Ovary transplants in *Drosophila melanogaster*: Studies of the characters singed, fused and female-sterile. [92] 72: 47-56. **Cooper, K. W.**—Reproductive behaviour and haploid parthenogenesis in the grass mite, *Pediculopsis graminum* (Acarina, Tarsonemidae). [Proc. Nat. Acad. Sci.] 23: 41-44, ill. **Dethier, V. G.**—Gustation & olfaction in Lepidopterous larvae. [92] 72: 7-23, ill. **Dreyer, T. F.**—Wing abnormality in *Locustana pardalina*. [Nature] 139: 197, ill. **Fortner, G.**—Zur Ernährungsfrage der *Simulium*-larve. [46] 32: 360-383, ill. **v. Frankenberg, G.**—Die "Selbstamputation" der Eintagsfliegen. [46] 32: 384-390, ill. **Hohorst, W.**—Die Begattungsbiologie der Grille *Oecanthus pellucens*. [46] 32: 227-275, ill. **Hoppe, E.**—Untersuchungen über die Vitalität zweier Stämme von *Habrobracon juglandis* unter verschiedenen Bedingungen. [65] 23: 559-577. **Johnson, H. A.**—Attractivity of light for *Anopheles* mosquitoes. [J. Tenn. Acad. Sci.] 12: 104-106, ill. **Krawany, H.**—Die metamorphose von *Leptocerus alboguttatus*, *Synagapetus armatus* und *Rhyacophila horticornis*. [Internationale Revue] 34: 1-14, ill. **Marsh, F. L.**—Ecological observations upon the enemies of *Cecropia*, with particular reference to its Hymenopterous parasites. [84] 18: 106-112. **Profft, J.**—Beiträge zur Symbiose der Aphiden und Psylliden. [46] 32: 289-326, ill. **Schuch, K.**—Beiträge zur Ernährungsphysiologie der Larve des Hausbockkäfers (*Hylotrupes bajulus*). [65] 23: 547-558, ill. **Schulze, P.**—Trilobita, Niphosura, Acarina. Eine morphologische untersuchungen über plangleichheit zwischen Trilobiten und Spinnentiere. [46] 32: 181-226, ill. **Seidel, F.**—Entwicklungs physiologie. Arthropoda. [Fortschr. Zool.] 1: 413-421, ill. **Steiner, P.**—Beitrag zur Fortpflanzbiologie und Morphologie des genitalapparates von *Boreus hiemalis*. [46] 32: 276-288, ill. Hausbockuntersuchungen. (1 Mittl.) Über den Einfluss von Temperatur und Feuchtigkeit auf das Eistadium und Bemerkungen zur Biologie der Imago. [65] 23: 531-546, ill. **Thalenhorst, W.**—Versuche über die Wirkung von Kontaktstaubemitteln auf *Pieris brassicae* unter besonderer Berücksichtigung der Abhängigkeit von biotischen und abiotischen Faktoren. (Zugleich ein Versuch zur Ausgestaltung der Prüfungsmethodik.) [65] 23: 615-652, ill. **Weber, H.**—Morphologie und entwicklungs-

geschichte der Arthropoden. [Fortschr. Zool.] 1: 111-121. **Weyrauch, W.**—Weiteres über den Internodiallylauf als Ausdrucksbewegung. [89] Abt. Syst., 69: 241-252. **Wiles, Tombllyn, Zuccherro, Chidester.**—The effect of desiccated thyroid, anterior pituitary, adrenal cortex, and iodine upon inheritance, growth and maturation of *Drosophila melanogaster*. [W. Va. Acad. Sci., Proc. Montgomery Meeting] Series 35, No. 15: p. 41. **Zschorn, J.**—Beiträge zur Skelettbildung bei Arthropoden. [89] Abt. Anat., 62: 323-348, ill.

ARACHNIDA AND MYRIOPODA.—**Chickering, A. M.**—The Clubionidae of Barro Colorado Island, Panama. [Trans. Amer. Micr. Soc.] 56: 1-47, ill., (*). **Jacot, A. P.**—More primitive moss-mites of North Carolina. [J. Elisha Mitchell Sci. Soc.] 52: 247-253, ill., (*). New moss-mites, chiefly midwestern, II. [Amer. Midl. Nat.] 18: 237-250, ill. **Roewer-Bremen, C. F.**—Zwei sonderbare Pachylinen aus Peru. [Verof. Deut. Kol.-u. Uebersee-Mus. Bremen] 1: 341-343, ill. **Stoner, D.**—A method of dispersal of the black widow spider. [68] 85: 219. **Wilson, J. W.**—Oribata and Belba from Florida (Acarina, Oribatinae). [J. Elisha Mitchell Sci. Soc.] 52: 255-268, ill., (*).

THE SMALLER ORDERS OF INSECTS.—**Koen, J.**—The dragonflies of the Reelfoot Lake area. [J. Tenn. Acad. Sci.] 12: 129-153, ill. **Putnam, W. L.**—Biological notes on the Chrysopidae. [Can. J. Res.] D, Zool., Sec., 15: 29-37, ill. **Thompson, G. B.**—Notes on Mallophaga, V. [75] 19: 261-265.

ORTHOPTERA.—**Chopard, L.**—Orthopteres fossiles et subfossiles de l'ambre et du copal. [24] 105: 375-386, ill., (*). **Urguhart, F. A.**—Some notes on the sand cricket (*Tridactylis apicalis*). [Canadian Field-Naturalist] 51: 28-29, ill.

HEMIPTERA.—**DeLong, D. M.**—The gen. *Cyperana* & *Paluda* (Cicadellidae). [Amer. Midl. Nat.] 18: 225-236, ill., (*). **DeLong & Caldwell.**—The genus *Dikraneura*—a study of the male genitalia—with descriptions of n. spp. [10] 39: 17-34, ill. **Green, S. C.**—Aquatic Hemiptera of Reelfoot Lake. [J. Tenn. Acad. Sci.] 12: 154-162, ill. **Jensen-Haarup, A. C.**—Einige neue Pentatomidenarten aus der sammlung des Zoologischen Museums in Hamburg. [17] 54: 169-171, ill., cont. (S*). **McKenzie, H. L.**—Morphological differences distinguishing California red-scale, yel-

low scale, and related species (Diaspididae). [67] 6: 323-336, ill.

LEPIDOPTERA.—**Dethier, V. G.**—Gustation and olfaction in lepidopterous larvae. [92] 72: 7-23, ill. **Gehlen, B.**—Sphingiden aus Venezuela. [Verof. Deut. Kol. u. Uebersee-Mus. Bremen] 1: 305-306. **Hoffmann, F.**—Beitrag zur Lepidopterenfauna von Sta. Catharina, Brasilien. [17] 54: 163-164. **Meyrick, E.**—On Venezuelan Pyralidina and Microlepidoptera [Verof. Deut. Kol.-u. Uebersee-Mus. Bremen.] 1: 321-334, ill. **Stephan, J.**—Schmetterlingsleben auf den Galapagos-Inseln. [17] 54: 165-168. **Watson, F. E.**—New Hesperiiidae from the Antilles. [40] No. 906, 10 pp.

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SPECIAL NOTICES.—**Beller & Bhenchitr.**—Preliminary list of insect pests and their host plants in Siam. (With notes on their injury, miscellaneous foods and utilization of the host plants.) [Dept. Agr. & Fish., Bangkok, Siam, Tech. Bull.] No. 1, 68 pp.

JOURNAL OF THE FEDERATED MALAY STATES MUSEUM, Vol. XVIII, Part 1. This is a volume of 212 pages, containing articles on many groups of insects. Its publication is due to the indefatigable zeal of Mr. H. M. Pendlebury, of the Selangor Museum at Kuala Lumpur, an admirable institution which I had the pleasure of visiting in 1928. An American entomologist might think that these articles, on the fauna of a region so remote, had little interest for him, but there is much that is of general interest. I select a few items:

(1) Kimmins, of the British Museum, reports on the Odonata collected by the Oxford University Sarawak Expedition, and takes occasion to list the species known from Borneo. There are 213, of which about 45% are known only from that island. But of the Libellulidae only about 9.5% are apparently endemic, whereas all the Cordulegasteridae and Platystictidae appear to be endemic.

(2) Kleine, of Stettin, gives an account of a collection of beetles of the families Brenthidæ and Lycidæ. He remarks on the existence of a whole series of Lycidæ, of diverse genera, and also a few Brenthidæ, which occur in the mountains, and distinguished by their black color. The lowland species are variegated.

(3) Corbet and Pendlebury have a very interesting article

on the butterflies of the genus *Amathusia*. They think that certain species of this genus may be quite distinct in one region, yet intergrade in another, and state that there is an undoubted case in *Neptis*: *N. naudina* and *yerburyii* are abundantly distinct in Burma and the Malay Peninsula "and yet in Java the two are connected by intergrades and constitute a single species." May we not presume that in the former case there is some physiological barrier to crossing, which has been broken down in the latter? There is one minor criticism which may be made. The authors describe a new species as *Amathusia holman hunti*. As they write it one might infer that *hunti* was a subspecies of *holman*. The name is not a binomial, nor is it a trinomial. It should surely be written *A. holman-hunti*.

T. D. A. COCKERELL.

A Record of *Vespa crabro* Linnaeus from North Dakota (Hymenoptera: Vespidae).¹

The writer recently had an opportunity to examine a single male specimen of *Vespa crabro* Linnaeus collected at Tioga, North Dakota about the middle of September, 1933, by D. Elmo Hardy. A record of this interesting European species so far west should be of considerable interest to hymenopterists since it has been formerly known definitely only from a limited area in the far eastern states. Published records from Chicago and other parts of Illinois are, according to Dr. Bequaert (*Entomologica Americana*, Vol. XII, No. 2, p. 86, 1931), not based upon specimens but upon information which is not considered entirely reliable. According to this same writer the species has been recorded authentically only from parts of the states of New York, New Jersey, Connecticut, Pennsylvania, Delaware, and Maryland.

Mr. Hardy, who collected the specimen referred to above, states that the insect was found flying low over an open field and that no other specimens were seen. Whether the species is permanently established in North Dakota or has been merely accidentally brought into the state may be determined only by future collecting in that region.

C. LYNN HAYWARD.

¹Contribution No. 67, Department of Zoology and Entomology, Brigham Young University, Provo, Utah.

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—Tabanidae (Horseflies and Deerflies). Exchange, purchase, or for determination. G. B. Fairchild, P. O. Box 272, Monticello, Fla.

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Wanted—To get in touch with Specialists who will make determinations for a share of our duplicates. We have many undetermined specimens from all parts of Iowa.—H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

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ENTOMOLOGICAL NEWS

MAY, 1937

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No. 5

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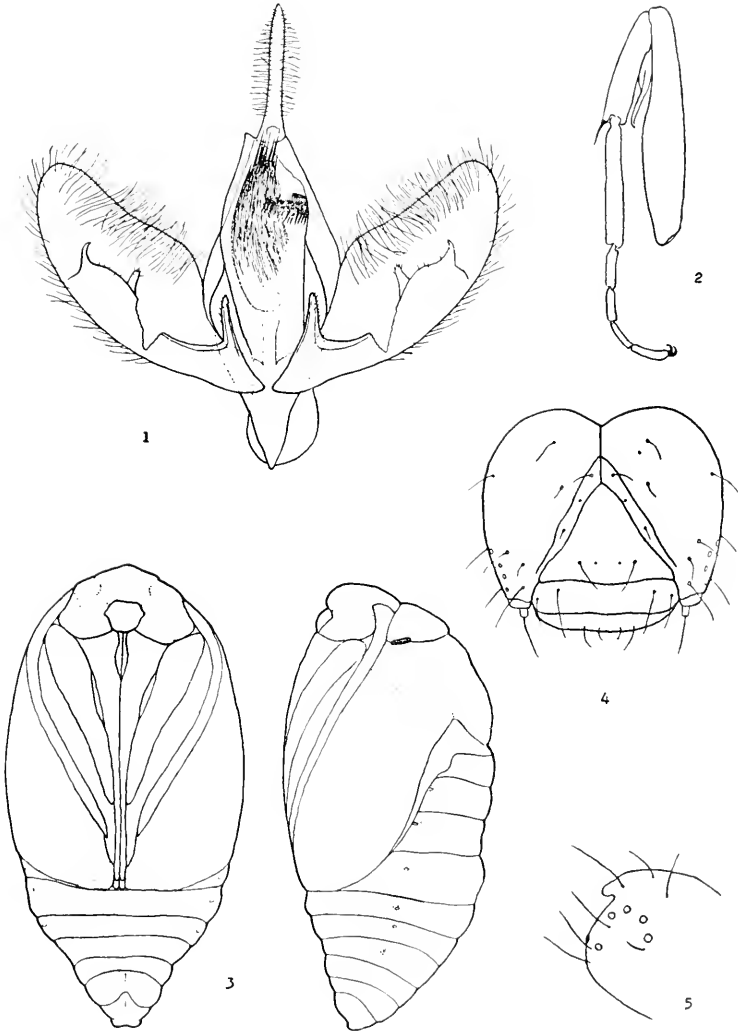
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CIRRHOPHANUS TRIANGULIFER—JONES.



CIRRHOPHANUS TRIANGULIFER—JONES.

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***Cirrhophanus triangulifer* Grt. (Lepidoptera, Noctuidae) in Delaware.**

By FRANK MORTON JONES, Wilmington, Delaware
(Plates II and III)

Cirrhophanus triangulifer was superficially described by Grote in 1872 as the type of a new genus, from a specimen "shown me in St. Louis by a gentleman whose name and address I have recently unfortunately forgotten." In 1883, C. V. Riley, the aggrieved owner whose name was "unfortunately forgotten," published a figure of the venation of *triangulifer*, described its leg structure, its peculiar frontal protuberance, and the exsertile ovipositor of the female; and believing that "structure is a very safe guide to habit," concluded that its larva must be an endophyte—an inference indeed suggested by some of these characters, but not borne out by later knowledge of its habits. Though having an extensive geographical range, and though conspicuously beautiful among our eastern *Noctuids*, in the sixty-five years since its first description this insect has accumulated few references in our literature, none of which refer to its early stages.

In Delaware, my acquaintance with this insect began on September 3, 1911, when I found a moth sitting by day in the flower-head of *Bidens involucrata*, the golden yellow-brown of its wings matching closely the color of the flower. No further observations were made for six years, when on August 28, 1917, I found two more of these moths, each sitting quietly in a flower of this same species. Among these three, all flown examples, both sexes of the insect were represented. Their lethargic daytime presence in the flowers did not seem to be a feeding habit, yet by three successive observations it seemed assured that these flowers, matching so closely their own colors, must be a habitual daytime resting-place of the moths. This suggested the further possibility that the flower-heads or the

ripening seeds might prove to be the larval food of the species.

Rather casual search was made from time to time, but it was not until mid-September, 1933, that I found a few small golden-yellow *Noctuid* larvae feeding in and on the flower-heads of *Bidens involucrata*. These larvae, too, matched the flower-heads closely in color, so most of them were found by looking for mutilated flowers from which the larvae had eaten some of the conspicuous yellow rays. That year, however, I did not succeed in carrying any of these larvae to the pupal stage; and the next year, though more larvae were found feeding in the flowers, the whole colony was so pervaded with a fungoid disease that only a single earthen cocoon was secured, and from this nothing emerged.

In September, 1935, more larvae were collected from widely scattered stations for the plant, from these larvae eight earthen cocoons were secured, from which there emerged (August, 1936) three large *Hymenopterous* parasites of as many species, two *Tachinid* flies, and on August 22, a flawless female of *triangulifer*, confirming the conjectured identity.

As stated, the small flower-inhabiting larvae, when first found, were yellow, closely matching the colors of the composite flower. Two larval stages succeeded this, in which increasing size inhibited the occupancy of a flower-head, and in these later stages the larva is usually to be found stretched longitudinally along the plant-stem beneath the flower (Plate II). Its resting attitude is characteristic: the head is retracted, the slightly swollen anterior segments are arched, and its sphinxlike attitude is enhanced by a rather prominent and acute dorsal hump on the eleventh segment. These later larval stages show wide individual differences in color-tone, ranging from greenish-yellow through olive to a more prevalent form of deep velvety brown. The intricate color-pattern varies in intensity as well as in tone, but remains otherwise identical throughout these phases.

The last-stage larva has a length (extended) of about 30-35 mm., a greatest breadth of about 5 mm., and a head-width of 3.1 mm. The head (Plate III, fig. 4, front view; fig. 5, eye arrangement) is smooth, moderately polished, and marbled with

darker flecks which become concentrated into a dark vertical band on the face of each epicranium, apically broad and diffuse, narrow and more dense below and bordered laterally with a paler clear area. The pattern of the thoracic and abdominal segments is intricate, its more evident features being as follows: a narrow dorso-median band bordered on either side with a narrower dark line, all more distinct on the thoracic segments except as partially obscured on T1 by mottlings which mark the position of a cervical shield, which, however, is not present as a chitinized plate; on the thoracic segments a strongly-contrasting pale line, which passes just below the spiracle of T1, and which on the abdominal segments is continued as a series of interrupted oblique dashes, on A1 encircling the spiracle, on succeeding segments forked below the spiracle and sending a strong ray down the outside of each abdominal proleg. The most conspicuous markings of all are a series of oblique segmental spots, broadly tear-shaped, the backward-directed point of each spot originating close to the dorso-medial lines, thence expanding widely, forward and downward, and becoming more diffuse as it reaches the level of the spiracles. These spots are much more strongly marked on segments T2, T3, A1, A2, rendering these four segments conspicuously darker than those following. The spiracles are yellowish-brown with narrow black margins, and the setigerous tubercles are inconspicuous.

Pupation takes place in the ground. The earthen cell (Plate II) is not composed of earth loosely compacted by the movements of the larva, nor of earth-fragments held together with silken threads, but is firm, compact, and thin-walled throughout, as though cemented. Rounded at the ends, it is from 16 to 19 mm. in length, 8 to 11 mm. wide, and its walls, exclusive of the earth-fragments which roughen its exterior, are usually less than one millimeter in thickness. In spite of this apparent fragility of construction, the cell is almost nutlike in its resistance to breakage. The interior is smooth, apparently unlined, and the contained pupa almost fills the cavity and to some degree seems moulded to its shape.

Only a single living example of the pupa was available for study. Its form is shown, Plate III, fig. 3. Length, 14 mm.; width, 7 mm. The cuticle is thin and delicate, dull ochraceous orange in color, with the dorso-caudal edges of the abdominal segments darker. The front is elevated but not acutely pro-

duced. The labial palpi are visible, the prothoracic femora narrowly so. The cremaster is low, broad, rounded, and destitute of spines or setae. The mesothoracic spiracle is conspicuous as a narrow pillow-shaped protrusion, strangely changing from black to shining white with changes in the angle of reflected light. Pupation occurs in late September or early October; emergence of the adult, the following August.

With this knowledge of the larval habits of *triangulifer* and of its earthen cocoon, it is apparent that if Riley correctly interpreted the function of the peculiar frontal protuberance of the moth as an aid in emergence from a confined space, then that structure relates—not to escape from a tunnel in root or stem, but to exit from the tough-walled cocoon. This character, therefore, does not justify an association of *triangulifer* with *Nonagria*; and though at various times a relationship with *Nonagria*, with *Heliothis*, even with *Plusia*, has been suggested, it departs from all of these in venation, in leg-structure (Plate III, fig. 2, showing single-spined fore tibia), and in the male genitalia (Plate III, fig. 1). Neither is it, in these characters, close to *Cosmia orina* Gn., which precedes it on our list, but in all of them it closely resembles *Basilodes* (compared with *chrysoptis* Grt.) which follows it, and with which its real relationship seems to lie.

Bidens involucrata, with which I have found *triangulifer* in these observations scattered over a quarter of a century, is not a native of Delaware, though now in late summer its flowers transform our tidal marshes into a sheet of gold. While this plant made its appearance here about the year 1900 as an invader from the southwest, there are in Delaware ten similar (and truly native) representatives of the genus. Nor is this plant genus the insect's sole foodplant, for I am informed by Mr. Geo. P. Engelhardt that years ago he bred *triangulifer* in considerable numbers from larvae collected near Washington, D. C., on a tall yellow-flowered wing-stemmed Composite (probably *Verbena*). Though thus not confined even to a single plant genus, the observed correspondence between larval and foodplant colors, between the moth and its day-time resting-place, suggest a relation analogous to that existing between *Rhodophora florida* and *Ocnothera*, with similar significance.

A Slave-making *Leptothorax*. (Hymen.: Formicidae)¹.

By LAURENCE G. WESSON, JR., Haverford College.

A single colony of an interesting new species of *Leptothorax* was taken in a large oak gall near Jackson, Ohio, near the end of July, 1935.

***Leptothorax* (*Mychothorax*) *duloticus* sp. n.**

Worker: (Fig. 1), length 2.4-2.6 mm. Head longer than broad, somewhat narrower in front than behind; the posterior

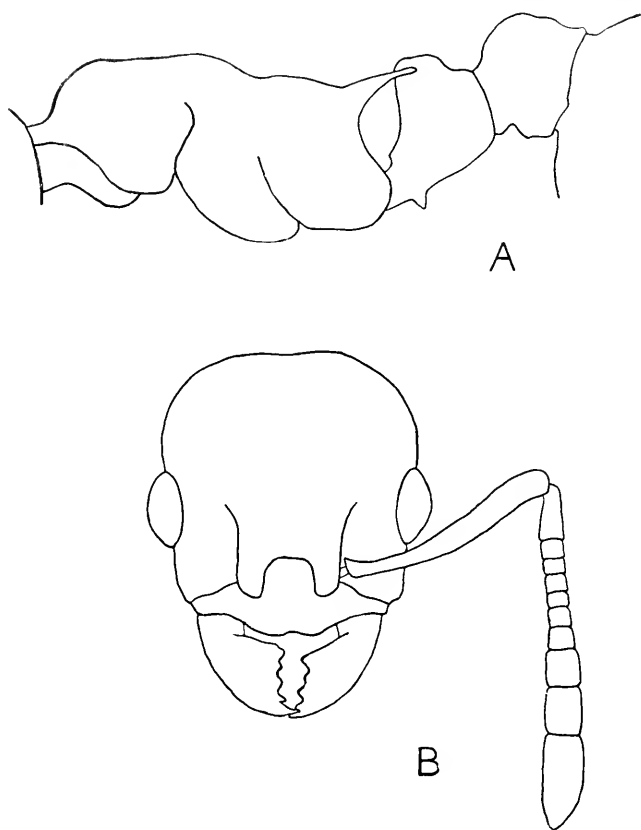


Fig. 1. *Leptothorax duloticus* sp. n. A. thorax of worker in profile. B. head of same from the front.

¹ Contribution No. 19 from the Dept. of Biology of Haverford College.

corners broadly rounded, the posterior border faintly excised. Mandibles 5-toothed, robust; teeth coarse, short and blunt. Clypeus convex, not impressed in the middle; the anterior border narrowly and rather shallowly notched in the middle, the sides sinuate. Antennae 11-jointed; scape extending to the posterior border of the head; first funicular joint as long as the succeeding joints; joints 2-7 slightly broader than long; remaining 3 joints forming a distinct club which is nearly as long as the remainder of the funiculus. Eyes broadly oval, large, the longest diameter equal to $1/4$ the length from base of mandibles to posterior corner of head.

Thorax moderately robust, the humeral angles rounded. Mesoepinotal constriction broad and shallow. Promesonotal suture distinct. Epinotal spines long, thick, blunt, divergent, somewhat recurved; length about $1\frac{1}{3}$ times the distance apart at their bases and about as long as the epinotal declivity. Petiole viewed from above with sides straight and subparallel; about $1\frac{1}{4}$ times longer than broad. Node high; in profile, the anterior slope is slightly concave; the posterior slope shorter, strongly convex, subangulate; seen from the rear the node is compressed, the summit somewhat concave with angular corners. Ventral tooth prominent, directed downward. Postpetiole seen from above slightly greater than $1\frac{1}{2}$ times the width of the petiole; in profile the dorsal surface is convex and evenly rounded; the anterior angles prominent but obtuse. Gaster and legs of the usual shape for *Mychothorax*.

Head, thorax, petiole and postpetiole very densely and coarsely punctate; in addition the head bears faint irregular rugae on the front and vertex, coarser and subparallel rugae on the cheeks and around the antennal insertions; top of thorax bearing faint irregular rugae. Mandibles feebly shining, with sparse, irregular, longitudinal striations. Clypeus rather shining, with several longitudinal rugae. Epinotal declivity, gaster and legs smooth and shining.

Body bearing sparse, long, erect, obtuse hairs on vertex of head, thorax, petiole and postpetiole; less obtuse and more numerous on the gaster. Antennae, legs and gaster bearing acute, fine reclinate hairs, rather dense on the antennae, less numerous on the gaster and legs.

Color light brown; funiculi and a band across the middle of the gaster darker.

Female: length 3.25 mm. Anterior margin of clypeus shallowly but distinctly emarginate. Antennal scape reaching to midway between the eye and the posterior corner of the head.

Eyes and ocelli large. Thorax stout, of the usual female shape; showing distinct traces of having borne wings. Epinotal spines shorter and stouter than in the worker; length about $2/3$ the distance apart at the bases. Petiolar node as seen from behind lower and more rounded than in the worker.

Head, petiole and postpetiole rather densely punctate, the punctures wide and shallow giving a subreticulate appearance; faintly shining and distinctly rugose. Clypeus shining, with 8-10 longitudinal rugae. Mesonotum and scutellum feebly shining, with fine sparse longitudinal rugae. Pleurae shining, finely and sparsely punctate. Pronotum and epinotum finely, irregularly and rather closely reticulate-rugose, the rugae with a longitudinal trend. Gaster and legs smooth and shining. Integument covered with scattered fine appressed hairs which are more numerous on the antennae; front and vertex of head, thorax, petiole, postpetiole and gaster with additional long erect slender pointed yellow hairs.

Color light brown with a darker band across the middle of the gaster; antennal insertions and a ring around each ocellus, black.

The 11-jointed antennae, marked mesoëpinotal constriction and the general shape of the petiole definitely place *L. duloticus* in *Mychothorar*. Apparently close to *L. (M) hirticornis*, it is easily separated from that species by the well-defined notch in the anterior border of the clypeus, the long rather thickened spines, the long erect obtuse hairs, and the normal character of the female thorax. Other salient characters of the species are the large eyes, the coarsely and densely punctured integument and the long antennal scapes.

Described from a female and 4 workers which are deposited in the author's collection.

This colony, when opened, was found to contain, in addition to 5 *L. duloticus*, 11 workers of *L. curvispinosus* and 12 workers of *L. longispinosus*. Both of these latter species were abundant in the locality. The mixed colony arose either by the adoption of a *duloticus* female into a mixed *curvispinosus-longispinosus* colony, or through slave raids by *duloticus* workers on one or both of these species. That the former method is highly improbable is indicated by the very infrequent discovery of mixed *curvispinosus-longispinosus* and of *duloticus*

colonies. That *duloticus* is indeed a slavemaking species is borne out by the following observations.

The *duloticus* colony, together with its accompanying *curvispinosus* and *longispinosus* workers was transferred to an artificial nest, and a colony of *curvispinosus* in a twig, broken open to expose the brood, was placed about 3 inches away. The temperature was quite warm. The *duloticus* were very active, spending a considerable portion of their time running agitatedly around the nest. In about 20 minutes a worker *duloticus* found the *curvispinosus* nest and began to examine it. She was soon seized by a *curvispinosus* worker, but after they had fought for a few minutes they separated. The *duloticus* worker continued her exploration for a few minutes until she found an unguarded pupa, which she picked up and carried back to the home colony. The arrival of the pupa caused a little excitement in the *duloticus* nest. About 5 minutes later she returned to the *curvispinosus* colony followed by a second *duloticus* and two *curvispinosus* workers. The latter soon grappled with workers from the introduced colony while the two *duloticus* each picked up a pupa and returned to their nest with them. Meanwhile a third *duloticus* found the colony, picked up a pupa and returned to her nest with it. These three *duloticus* continued to return at irregular intervals and carry off the *curvispinosus* brood until they had taken all but some eggs and young larvae which were being carried about by the *curvispinosus* workers of the raided nest. The *curvispinosus* submitted almost without resistance, in the main quietly allowing the *duloticus* to walk among them. Occasionally one offered resistance but the combats never lasted more than a few minutes, ending either with the flight or injury of the *curvispinosus*. The whole procedure was slow and unsteady, requiring nearly 2½ hours to carry off some 14 pupae and larvae, and would undoubtedly have taken considerably more time had the *curvispinosus* resisted very much. Probably this passivity was due to demoralization of the colony when it was opened.

In the artificial nest the *duloticus* were often observed to drink honey and occasionally to tend the brood: observations

which would indicate that these ants are not wholly dependent on their slaves for support. When moving from one nesting site to another, the *duloticus* were carried by the *curvispinosus* and *longispinosus* workers.

These observations immediately suggested a comparison between *L. duloticus* and *Harpagoxenus*. *Harpagoxenus* is the only other genus known to enslave species of *Leptothorax*; and it is closely related to the subgenus *Mychothorax* of *Leptothorax*, from which it probably arose.² *Harpagoxenus* includes only two species, one in Europe and one in the eastern United States. Both species are advanced obligatory slavemakers, and both display many highly specialized morphological characteristics. Of the origin and development of the highly specialized behavior of *Harpagoxenus*, there has been no inkling. It is this gap between *Harpagoxenus* and the independent species of *Mychothorax* which *L. duloticus* with its primitive slavemaking behavior as indicated by the disorganized character of its slave raids, the apparent absence of specialized structural characteristics and the survival, in attenuated form perhaps, of most of the instincts of independent *Formicidae*, can fill; taking a position between them which is analogous to the position of *Formica sanguinea* between *Polyergus* and *Formica fusca*. There is no apparent indication that *L. duloticus* is on the direct line of descent of *Harpagoxenus*, or even that the two forms arose from an immediate common ancestor. It is quite possible that *L. duloticus* is a distinct branch of *Mychothorax*, a group which shows a very strong general tendency toward symbiotic habits. Discovery of the male of *duloticus* will probably shed considerable light on the phylogenetic relationships of that species. But whether *Harpagoxenus* and *L. duloticus* had a common ancestor, or whether they arose independently, there can be little doubt that *L. duloticus* is probably very close to an hypothetical early stage in the evolution of the form of slavemaking behavior whose highest development is displayed by *Harpagoxenus*.

² Creighton, *Harpagoxenus americanus* slave raids pp. 11-26 Psyche 34, 1927.

Fabricius as the First Designator and Original Inventor of Genotypes.

By RENÉ MALAISE, Swedish Museum of Natural History,
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In the ENTOMOLOGICAL NEWS, Vol. XLVII, Nr. 8, page 214, October 1936, the Acting Secretary of International Commission on Zoological Nomenclature, Mr. C. W. Stiles, gave "Notice of possible Suspension of Rules of Nomenclature in Certain Cases."

Firstly, the so-called "Erlanger List" of 1801 is proposed to be suppressed. This suppression is well founded because:

1) This list was published in a non-scientific journal, although the author of the list, viz. Panzer, could very well have published it in such a journal as he himself was the publisher of one.

2) The enumeration of species is clearly meant as examples, which is proved by the naming, in some cases of several species, in others of none, as belonging to the different genera. According to the rules, examples cannot be interpreted as selection of types; compare Science, n. s. Vol. 26, Nr. 668, p. 521, Oct. 18, 1907, "the meaning of the expression 'select type' is to be rigidly construed; mention of a species as an illustration or example of a genus does not constitute a selection of a type." For that same reason the "Example" of species enumerated after each genus in the works of Latreille earlier than 1810 cannot be accepted as a type-selection. Even in this work of 1810, "Table des genres avec l'indication de l'espèce qui leur sert de type," it is more than questionable whether Latreille really had the intention of designating genotypes in the same sense as we have it to-day, because in later works, when monographing whole genera of *Lepidoptera*, he never selects any types. This work of his of 1810 has been definitely accepted as designation of types and may well remain as such, but Latreille was not the first to designate types, because Fabricius had already done so several years before Latreille and in the

see Proc. U. S. N. M. 1925: 129-131
ent Tijdschrift 1938: 99-106

modern sense. In all the later works of Fabricius, *c.g.*, "Systema Piezatorum" of 1804, and also in some earlier ones, although not so frequently, he designates one species and never more than one in every genus, with the exception of some genera already known and not erected by himself. As already pointed out by Roman (Entomologisk Tidskrift, 1933, p. 37) and others before him, Fabricius is to be considered as the inventor of genotypes in the modern sense. Not to recognize him as the first designator of genotypes because he did not use the very name "type," but preferred to mark his types through a special and very elaborate description of the mouthparts, would be as ridiculous as to try to deprive Columbus of the fame of discovering America because he did not name it so.

To show that this designation was recognized of old the following is quoted from:

- 1) Curtis (British Entomology, Vol. III, Hymen. Part I, pl. et. fol. 736, April, 1839) "1st Bassus of Fabricius is Gravenhorst's 3rd family Cryptus, *seductorius* being the type given in the Piezatorum; 2ndry. . . ." This citation was quoted literally, although with some minor changes in the spelling, by Morley (Revision of Ichneumonidae, Part II, p. 62, 1913).
- 2) Bergroth (Entom. Nachrichten, XX, p. 197, 1894) "Auch Fabricius war der Typus-begriff ganz klar. Namentlich hat er in seinen späteren Schriften, theilweise schon in der Ent. Syst., in seinen Gattungen je eine Art als Typus dadurch ausdrücklich bezeichnet, dass er dieselbe ausführlicher, unter hinzufügung auch oder nur generischer Detailcharaktere, wie sie bei den übrigen Arten nicht angegeben werden, in einigen Arbeiten sogar mit besonderen Lettern beschrieben hat. . . . Mit Recht bezeichnet Reuter in seiner "Revisio Synonymica Hemipterorum" Fabricius als den Ersten, der Wirkliche Gattungstypen aufgestellt und so fasste schon früher Stål die Sache."

In the following list the genotypes are enumerated as desig-

nated and named by Fabricius in his "Systema Piezatorum" and to show, that it was not, *e.g.*, the first species in every genus that was designated, the number of the designated species in the genus is given and following it the actual number of all species in that same genus. (Example: "*Cimber marginata* 6:12," means that of 12 species belonging to the genus *Cimber*, he selected the sixth species as genotype).

Cimber marginata 6:12. *Tarpa cephalotes* 1:2. *Hylotoma enodis* 10:29. *Tenthredo scrophulariae* 1:63. *Lyda pratensis* 10:16. *Oryssus coronatus* 1:1. *Sircr*...0:15. *Xiphodria camelus* 1:3. *Ichneumon*...0:85. *Cryptus serratorius*¹ 18:103. *Bassus seductorius* 4:33. *Bracon denigrator* 33:40. *Pelecinus polycerator* 1:1. *Pimpla vagatoria* 2:33. *Joppa dorsata* 1:9. *Salix bicolor* 1:3. *Banchus venator* 1:15. *Ophion luteus* 1:46. *Foenus jaculator* 1:3. *Cynips*...0:23. *Diplolepis*...0:24. *Cleptes ignita*¹ 4:10. *Eucharis*...0:5. *Chalcis*...0:33. *Leucospis*...0:6. *Chrysis*...0:33. *Parnopes carnea* 1:1. *Ezania*...0:8. *Tryporylon figulus*¹ 2:6. *Podium rufipes* 1:2. *Ceropales maculata*¹ 1:9. *Pompilus viaticus* 12:63. *Dryinus*...0:5. *Pelopocus lunatus*¹ 4:11. *Sphex sabulosus* 1:4. *Pepsis arenaria* 1:47. *Chlorion lobatum* 1:7. *Larra*...0:14. *Bembex*...0:21. *Liris aurata* 3:13. *Thynnus*...0:4. *Tiphia*...0:23. *Bethylus villosus* 1:8. *Scolia*...0:39. *Hellus 6 punctatus* 1:7. *Elis sexcincta* 1:7. *Cephus pygmaeus* 3:6. *Synagris carnuta* 1:1. *I'espera*...0:78. *Polistes lanio*¹ 1:57. *Zethus cocculcopennis* 1:6. *Eumenes petiolata*¹ 1:23. *Masaris*...0:1. *Celonites*...0:1. *Prosopis albipes* 4:14. *Mellinus mystaceus* 1:13. *Philanthus*...0:25. *Crabro*...0:25. *Pemphredon leucostoma*¹ 1:9. *Oxybelus uniglumis* 2:7. *Hylacus florissomnis* 3:8. *Andrena carbonaria* 1:26. *Megilla tricolor* 7:33. *Dasygaster hirtipes* 1:3. *Xylocopa violacea* 3:17. *Bombus terrestris* 4:56. *Centris dimidiata* 1:36. *Euglossa cordata* 3:4. *Anthidium manicatum* 1:11. *Apis mellifica* 1:12. *Anthophora lanata*¹ 1:41. *Eucera*...0:10. *Melecta histrio* 1:7. *Epeolus variegatus* 1:3. *Nomada*...0:19. *Formica herculeana* 1:75. *Lasius niger* 1:10. *Cryptocerus atratus*¹ 1:5. *Atta 6-dens* 2:6. *Myrmecia forficata* 3:11. *Dorylus*...0:3. *Mutilla*...0:51.

In many cases the above list will cause changes that are

¹ Not originally included, or for other reasons doubtful if valid as genotype.

² Compare: Entomol. Tidskr., vol. 58 nos. I-II, p. 65 (1937).

most unwelcome, but any attempt to rule out the designations of Fabricius will only be temporary, as the truth in the end will survive, and it is generally considered that the author himself knows best which species is the most typical of his own genus. It would be most unfair to Fabricius to punish him for not inventing the name at the same time as the idea, since he has marked out his selections so clearly. If, through ignorance of the designations of Fabricius, or for some other reasons, a code or rule has been enforced to accept as valid only such designations as mention the word "type," this is wrong and is a mistake that must be corrected.

Regarding my own special group, the *Tenthredinidae*, the changes will be:

- 1) In the so-called Erlanger List, *Tenthredo scrophulariae* was type of the genus *Allantus*, but will now become the type of *Tenthredo*. Already in older times, when only the fauna of Europe was considered, difficulties arose to keep these two genera apart, but as our knowledge, especially of the Asiatic fauna, grew, it became necessary to merge the two genera into one. This has also been done in a monograph of the South-Palaearctic and Indo-Malayan Sawfly-fauna, of which the present author has just completed the manuscript of the first part. The former genus *Tenthredella* Rhw. (*Tenthredo* Konow et auct. plur.) can only be retained as a subgenus.

After this suppressed list of 1801, *Allantus* was first used by Panzer in 1805, Heft 87, Nr. 18, as the name for a genus and in that Heft with *A. lateralis* as the only species. More species were included in later Hefts, but at first the genus *Allantus* was monobasic. The use of *Allantus* in connection with *Tenthredo togata* cannot be accepted, as being doubtful from the publisher's point of view and against his opinion and accordingly against article 30, II, a and b in Rules of Zool. Nomenclature (Science vol. 26). *A. lateralis* belongs to the genus *Laurentia* A. Costa, which latter genus becomes a synonym of the older *Allantus* Panz.

- 2) As *Pseudoclastellaria marginata* L. is the genotype of *Cimber* Ol., the genus we hitherto have called *Cimber* will be without a name and I propose therefore to call it *Neocimber* n. n. with *Tenthredo* (*Cimber*) *lutea* L. as genotype.
- 3) With *Lyda pratensis* as genotype, the genus *Lyda* will be restored and is no longer a synonym of *Pamphilus*.

An Annotated List of the Ants of Arizona. (Hym.: Formicidae).

By A. C. COLE, JR., Dept. of Entomology, University of Tennessee.

(Continued from page 101)

58. *POGONOMYRMEX APACHE* Wheeler. North Miller Canyon, Huachuca Mts. (Wheeler).

59. *P. BARBATUS* subsp. *RUGOSUS* Emery. Grand Canyon, Tempe, Florence, Jerome (Wheeler); Cactus Plain (F. H. Snow); Tucson (Wheeler, Cole); Tuba City, Cameron, Douglas, 40 Mi. S. Prescott, 74 Mi. S. Phoenix (Cole).

The nests at all localities visited by the writer were flat craters, 8 to 10 inches in diameter, in coarse sand. Several colonies were aggregated in each area, which was invariably dry desert.

60. *P. BARBATUS* subsp. *CURVISPINOSUS* Cole. 36 Mi. S. Prescott (Cole). This is the locality of the type. The ants were in a flat mound of pebbles in the center of the federal highway.

61. *P. BARBATUS* var. *FUSCATUS* Emery. Oracle, Pinaleno Mts., Tempe, Bowie (Wheeler).

62. *P. BARBATUS* var. *MOLEFACIENS* Buckley. Pinaleno Mts., Jerome, Benson, Oracle, Hereford, Palmerlee, Palmarcoles (Wheeler); Huachuca Mts. (Wheeler, Biedermann, W. M. Mann); Tempe, Prescott (Cockerell); Kit's Peak (Clark & A. N. S. P.); Phoenix (Wheeler, Cole); Tucson, Douglas (Cole).

63. *P. BARBATUS* var. *NIGRESCENS* Wheeler. Gila Bend Mts., Casa Grande, Bowie, South Catalina Mts. (Wheeler).

64. *P. CALIFORNICUS* Buckley. Grand Canyon, Yuma, Phoenix, Yucca, Welton, Tempe, Nortons (Wheeler); Wilcox (A. K. Fisher); Kingman, Cameron, Tuba City, Prescott, Tucson, Douglas (Cole).

The nests observed by the writer varied from large crater mounds of pure sand in a stream margin area of *Opuntia*,

Yucca, Kochia and Ephedra near Tuba City, to flat sandy craters in an arroyo with seedling pines and grasses near Prescott.

65. *P. CALIFORNICUS* var. *ESTEBANIUS* Pergande. Tucson, Tempe, Florence, Gila Bend Mts., Yucca, Yuma (Wheeler); Thatcher (R. V. Chamberlin); Phoenix (Wheeler, Cole); 25 Mi. E. Needles, Calif. (Cole).

66. *P. CALIFORNICUS* var. *HINDLEYI* Forel. Thatcher (R. V. Chamberlin).

67. *P. CALIFORNICUS* subsp. *BARNSEI* M. R. Smith. Maricopa Co. (O. L. Barnes).

68. *P. CALIFORNICUS* subsp. *MARICOPA* Wheeler. Pinalino Mts., Phoenix, South Catalina Mts., Benson, Tucson, Yuma, Nortons, Welton, Dragoon Mts. (Wheeler); Sanford, Graham Mts., Ash Creek (E. G. Holt); Huachuca Mts. (W. M. Mann); Coyote Mts. (Clark & A. N. S. P.); Douglas (Cole).

69. *P. DESERTORUM* Wheeler. Tucson and desert east, Benson, Tempe (Wheeler); Thatcher (R. V. Chamberlin); Bowie (Cornell Univ. Exped.); Kingman (Cole).

70. *P. DESERTORUM* var. *FERRUGINEUS* Olsen. Tucson (Pergande, P. Klingenberg).

71. *P. HUACHUCANUS* Wheeler. Huachuca Mts., South Catalina Mts., Dragoon Mts., Oracle (Wheeler); Seligman (Cole).

72. *P. OCCIDENTALIS* Cresson. Huachuca Mts., Ash Fork, Pinaleno Mts. (Wheeler); Grand Canyon, Prescott (Cole, Wheeler); Williams, Peach Springs, Seligman, Cameron, The Gap, Marble Canyon, Flagstaff (Cole).

73. *P. SIMILIS* Olsen. Oracle (Wheeler).

74. *P. (EPHEBOMYRMEX) PIMA* Wheeler. Tucson, Phoenix, South Catalina Mts., Bowie, Casa Grande, Tempe, Florence (Wheeler).

75. *P. (E.) TOWNSENDI* Wheeler. Fort Grant, Pinaleno Mts. (Cornell Univ. Exped.); Tucson (Wheeler).

76. *MYRMICA MEXICANA* Wheeler. Grand Canyon (Wheeler); San Francisco Mts. (W. M. Mann).

77. *M. BREVINODIS* var. *SULCINODOIDES* Emery. Prescott (Cole).

78. *M. MUTICA* Emery. Jacobs Lake (Cole).

79. *M. SCABRINODIS* Nylander. Grand Canyon (Wheeler).

80. *M. SCABRINODIS LOBICORNIS* var. *GLACIALIS* Forel. Grand Canyon (Wheeler); San Francisco Mts. (W. M. Mann).

81. *M. SCABRINODIS LOBICORNIS* var. *FRACTICORNIS* Emery.

Flagstaff, Williams (Cole).

82. *LEPTOTHORAX NITENS* Emery. Grand Canyon (Wheeler).

83. *L. NEOMEXICANUS* Wheeler. Grand Canyon (Wheeler).

84. *L. CURVISPINOSUS RUGATULUS* var. *COCKERELLI* Wheeler. Huachuca Mts. (Biedermann, Mann, Wheeler).

85. *XIPHOMYRMEX SPINOSUS* subsp. *INSONS* Wheeler. Huachuca Mts. (Wheeler).

86. *X. SPINOSUS* subsp. *WHEELERI* Forel. Huachuca Mts. (Wheeler).

87. *X. SPINOSUS* subsp. *HISPIDUS* Wheeler. Tucson, Phoenix (Wheeler).

88. *ATTA* (*TRACHYMYRMEX*) *ARIZONENSIS* Wheeler. Huachuca Mts. (Wheeler); Palmerlee (C. Schaeffer).

89. *A. (T.) DESERTORUM* Wheeler. Tucson (Wheeler).

90. *A. (MOELLERII) VERSICOLOR* Pergande. Yucca (Wheeler); Tucson (Fenner, Wheeler); 30 Mi. E. Kingman, 36 Mi. S. Prescott, Phoenix (Cole).

Subfamily *DOLICHODERINAE* Lund.

91. *LIOMETOPUM APICULATUM* Mayr. Huachuca Mts. (Biedermann); Grand Canyon (Cole).

92. *L. APICULATUM* subsp. *LUCTUOSUM* Wheeler. Grand Canyon (Wheeler, Cole); Prescott (Wheeler).

93. *DORMYRMEX PYRAMICUS* Roger. Grand Canyon (Wheeler, Cole); Jacobs Lake, Prescott, Tucson, Williams, Flagstaff (Cole).

I found numerous colonies of this ant at all the localities cited. Some were beneath rocks, others occupied small mounds of sand or other finely-divided soil particles. At Grand Canyon the small nests were on mound faces of *Pogonomyrmex occidentalis* Cresson, and at Prescott they were scattered between nests of *Myrmecocystus mexicanus horti-deorum* McCook. All were in rather moist habitats.

94. *D. PYRAMICUS* var. *BICOLOR* Wheeler. Grand Canyon, 16 Mi. S. Prescott, Douglas, Phoenix, Tucson (Cole).

This pretty variety of *D. pyramicus* inhabits more zeric places than does the typical species. Its small crater mounds are constructed in sand.

95. *TAPINOMA SESSILE* Say. Grand Canyon (Wheeler, Cole); Huachuca Mts. (Wheeler, Biedermann).

96. *IRIDOMYRMEX ANALIS* André. Grand Canyon (Wheeler); Marble Canyon, 47 Mi. S. Prescott, Phoenix (Cole). *I. analis* lives in very small crater nests of fine sand.

97. *I. PRUINOSUS* var. 12 Mi. E. Needles, Calif. (Cole).

98. *FORELIUS MACCOOKI* Forel. 30 Mi. E. Kingman, Cameron, 36 Mi. S. Prescott (Cole).

This ant appears superficially to be identical with *Iridomyrmex analis* André, and it inhabits similar places. The ant lives in aggregations of minute sandy craters in the drier parts of the desert. The workers are very aggressive.

Subfamily CAMPONOTINAE.

99. *PRENOLEPIS IMPARIS* Say. Grand Canyon (Wheeler, Cole); Huachuca Mts. (W. M. Mann).

100. *P. IMPARIS* var. *ARIZONICA* Wheeler. Huachuca Mts. (W. M. Mann).

101. *P. (NYLANDERIA) GUATEMALENSIS* Forel. Grand Canyon (Wheeler).

102. *LASIUS BREVICORNIS* Emery. Prescott, Flagstaff (Cole).

103. *L. NIGER* var. *AMERICANUS* Emery. Grand Canyon (Wheeler, Cole); Williams (Cole).

104. *L. NIGER* var. *SITKAËNSIS* Pergande. Flagstaff (Cole). This ant was rather common beneath small stones on the grassy forest floor of a yellow pine and Englemann spruce forest.

105. *L. NIGER* var. *NEONIGER* Emery. Flagstaff (Cole).

106. *L. UMBRATUS* subsp. *SUBUMBRATUS* Viereck. Williams (Wheeler).

107. *L. (ACANTHOMYOPS) INTERJECTUS* subsp. *ARIZONICUS* Wheeler. Huachuca Mts. (Wheeler, Biedermann, W. M. Mann).

108. *FORMICA SANGUINEA* subsp. *SUBNUDA* Emery. San Francisco Mts. (W. M. Mann).

109. *F. SANGUINEA* subsp. *PUBERULA* Emery. Graham Mts. (E. G. Holt).

110. *F. RUFÆ* subsp. *OBSCURIPES* Forel. Thatcher (R. V. Chamberlin); Williams, Flagstaff (Cole).

111. *F. PERPILOSA* Wheeler. Tucson, Benson (Wheeler, Cole); Tempe (Cockerell); Cameron, Douglas (Cole).

At Cameron I saw many crater nests in very sandy soil. The colonies were populous and contained much brood. The nests were scattered between mounds of *Pogonomyrmex barbatus* subsp. *rugosus* Emery.

112. *F. FORELIANA* Wheeler. Huachuca Mts. (Biedermann).

113. *F. FUSCA* L. San Francisco Mts. (W. M. Mann).

114. *F. FUSCA* var. *SUBSERICEA* Say. Williams (Cole).

115. *F. FUSCA* var. *SUBAENESCENS* Emery. Prescott (Cole). At this place there were many earthen mounds, about 4 inches

in diameter with single central openings, in a forest of young pine.

116. *F. FUSCA* var. *ARGENTEA* Wheeler. Grand Canyon, Williams (Wheeler); Graham Mts. (E. G. Holt); San Francisco Mts. (A. K. Fisher); Huachuca Mts. (H. A. Wenzel).

117. *F. FUSCA* var. *NEORUFIBARBIS* Emery. Grand Canyon (Wheeler).

118. *F. FUSCA* var. *GELIDA* Emery. Grand Canyon (Wheeler).

119. *F. NEOGAGATES* Emery. Ash Fork (Wheeler); Grand Canyon, Williams (Wheeler, Cole); Flagstaff (F. E. Pratt).

120. *F. NEOGAGATES LASIOIDES* var. *VETULA* Wheeler. Prescott (Cole).

121. *F. SUBPOLITA* Mayr. Grand Canyon (Wheeler, Cole). I was surprised to find but one colony of this species in the Coconino Forest, for the place is decidedly within the ant's normal range and the habitat is a suitable one. An examination of the literature failed to indicate the ant's presence in other Arizona localities.

122. *F. RUFIBARBIS* var. *GNAVA* Buckley. Grand Canyon, Phoenix, Prescott, Tempe, Tucson, Benson, Huachuca Mts. (Wheeler); Huachuca Mts. (W. M. Mann).

123. *F. COMATA* Wheeler. Flagstaff (Cole).

124. *F. MOKI* Wheeler. Prescott, Grand Canyon (Wheeler).

125. *MYRMECOCYSTUS MEXICANUS* var. *HORTI-DEORUM* McCook. Cameron, Prescott, Phoenix (Cole).

Apparently this ant is an occasional invader of the true desert, inasmuch as it was found near Phoenix. Its pebble mounds are usually constructed on rocky ridges at much higher elevations.

126. *M. MELLIGER* Forel. Grand Canyon (Wheeler).

127. *M. MELLIGER* var. *SEMIRUFUS* Emery. Yucca (Wheeler); Phoenix, Tucson (Wheeler, Cole); The Gap, Marble Canyon, Cameron, 57 Mi. N. Cameron, Tuba City (Cole).

This is probably one of the most common desert ants. Its shallow crater nests of sand are almost everywhere in dry areas. Workers are very active.

128. *M. MELLIGER SEMIRUFUS* var. *TESTACEUS* Emery. Phoenix (Wheeler, Cole).

129. *M. MELLIGER SEMIRUFUS* var. *ROMAINEI* Cole. Cameron (M. Romaine).

130. *M. MELLIGER* var. *JESUITA* Wheeler. Cameron (Cole).

131. *M. MELLIGER* subsp. *MIMICUS* Wheeler. Jerome, Tempe, Yucca, Ash Fork (Wheeler); Tucson, Phoenix

(Wheeler, Cole); 30 Mi. E. Kingman, 16 Mi. S. Prescott (Cole).

This ant is typically a desert dweller. It constructs shallow crater mounds 8 to 10 inches in diameter. The colonies observed by the writer were large and contained no repletes.

132. *M. MELLIGER* subsp. *MENDAX* Wheeler. Grand Canyon (Wheeler).

133. *M. MELLIGER* subsp. *ORBICEPS* Wheeler. Ash Fork, Tucson (Wheeler); Cochise Co. (Biedermann).

134. *CAMPONOTUS SCHAEFFERI* Wheeler. Palmerlee (C. Schaeffer); Huachuca Mts. (Biederman, Oslar).

135. *C. ACUTIROSTRIS* var. *CLARIGASTER* Wheeler. Grand Canyon (Wheeler).

136. *C. SAYI* Emery. Prescott, Phoenix (Wheeler); Graham Mts. (E. G. Holt).

137. *C. FALLAX* subsp. *RASILIS* Wheeler. Arizona (Wheeler).

138. *C. FALLAX RASILIS* var. *PAVIDUS* Wheeler. Arizona (Wheeler).

139. *C. MACULATUS* subsp. *VICINUS* Mayr. Grand Canyon (Wheeler); Flagstaff, Prescott, Williams (Cole).

This form nests beneath logs at higher elevations in the State.

140. *C. MACULATUS VICINUS* var. *LUTEANGULUS* Wheeler. Huachuca Mts. (Wheeler).

141. *C. MACULATUS VICINUS* var. *NITIDIVENTRIS* Emery. Grand Canyon (Wheeler, Cole); Flagstaff, Prescott (Cole).

This ant is common at higher elevations and almost invariably nests beneath rocks. It is a typical pine forest insect.

142. *C. MACULATUS VICINUS* var. *INFERNALIS* Wheeler. Williams (Wheeler).

143. *C. MACULATUS* subsp. *MACCOOKI* Forel. Grand Canyon (Wheeler); Prescott (Cole).

144. *C. MACULATUS* subsp. *SANSABEANUS* Buckley. Huachuca Mts. (Wheeler).

145. *C. MACULATUS SANSABEANUS* var. *TORREFACTUS* Wheeler. Grand Canyon (Wheeler).

146. *C. MACULATUS* subsp. *BULIMOSUS* Wheeler. Huachuca Mts. (Wheeler, Mann, Biedermann).

147. *C. FUMIDUS* var. *FESTINATUS* Buckley. Arizona (Wheeler).

148. *C. FUMIDUS* var. *SPURCUS* Wheeler. Huachuca Mts. (Wheeler).

149. *C. VAFER* Wheeler. Huachuca Mts. (Wheeler).

150. *C. ACUTIROSTRIS* var. *CLARIGASTER* Wheeler. Grand

Canyon (Wheeler).

151. *C. OCREATUS* subsp. *PRIMPILARIS* Wheeler. Huachuca Mts., Nogales (Wheeler, Mann, Biedermann).

152. *C. MINA* subsp. *ZUNI* Wheeler. Tucson (Wheeler).

153. *C. (COLOBOPSIS) ULCEROSUS* Wheeler. Huachuca Mts. (Wheeler).

Marked Migrant Butterflies (Lepid.: Nymphalidae).

Under this title, in the *Entomologist's Record and Journal of Variation* (London), for October, 1936, Mr. T. Bainbrigge Fletcher, formerly Imperial Entomologist for India, comments on the absence of information on the actual movements of individuals and continues: "To attain this necessitates the marking of individual butterflies in such a way that each individual may be recognizable at any time or place. . . . After trials of several methods, . . . I have marked individuals with numbers on small labels applied directly to the wing. The process is quite simple. After netting, the specimen is examined for sex and any individual peculiarities (condition, chips, splits or tears of the wings, markings, etc.), which are noted in a register; a small patch on the upper surface of the right fore wing is then rubbed clear of scales and a small label is attached to this bare patch with Canada balsam; the butterfly is then placed in a glass-bottomed box for a few minutes, to allow the adhesive to harden, and it is then released. The label, which does not incommode its flight in the least, is written in waterproof Indian ink on tracing paper, a small sheet of labels being written up and each one cut off as required. . . . Any combination of letters or of numbers can be used, provided that each marker has his distinct series. It is desirable to descale the portion of the wing to which the label is to be applied, as in some of my earlier experiments, in which I did not descale, I found that the labels sometimes became detached by being pulled off with the patch of the underlying scales; since practising descaling I find that the label is very rarely lost. . . . During this season I have marked up to date (27. ix. 36) 67 *V. atalanta*, 7 *V. cardui* and 1 *V. io*. Of the *V. cardui* one individual remained here and was seen frequently for ten days after release. Of the *V. atalanta* six remained for two or three days, . . . one for seven days and one for twelve days; so that only three individuals out of seventy-five remained for any appreciable period, all the rest flying off again at once or almost at once."

On Certain Words Used in Connection with the Coccoidea (Homoptera).

By G. F. FERRIS, Stanford University, California.

The fact that an officially encouraged glossary of entomological terms is in course of preparation makes it opportune to call attention to certain errors of terminology which are at present current in the literature of the scale insects.

One of these errors has to do with the word "puparium." In its most generally accepted usage this word is applied to the sclerotized larval skin within which pupation takes place in certain of the Diptera and thus has a very precise meaning. But it has been employed by writers dealing with the scale insects in two meanings, neither of which has exactly this application. It has been used for the scale of the Diaspididae, both male and female, which is formed from shed skins and secretion, although there is no pupa involved in the case of the female at all. In the male there is a stage which may be regarded as a pupa, but this is not enclosed within a shed skin. The word has also been used in connection with a phenomenon, of rather common occurrence in the Coccoidea, which has more similarity to that which occurs in the Diptera.

In many species of Coccoidea, of various families, the adult female and even as many as two preceding larval stages, remains within a heavily sclerotized larval skin which serves as a protection as does the enclosing larval skin of a dipterous puparium. To this sclerotized larval skin the term "puparium" has been applied, even though it has been recognized that the application is not entirely proper, since there is no pupa involved. A recent author dealing with a group of species, almost all of which are "puparial," has called attention to this inexactness, but has employed the word in the absence of any other.

It is here suggested that in these cases the term "pupillarium," with the adjective "pupillarial," might suitably be used. The term is apt, since one of the meanings of the word "pupilla" is a "ward," and in the scale insects in which this phenomenon occurs the adult female, or other enclosed stage, is

peculiarly the ward of the earlier larval form. Furthermore, the fundamental resemblance of this phenomenon to that which occurs in the Diptera is not obscured by the use of this term.

The term "pupillarium" may therefore be defined as "a sclerotized larval skin within which later stages may remain enclosed in forms, such as Coccoidea, in which no pupal stage exists."

Another word which needs definite stabilization is the one which refers to a shed skin. The Latin word "exuviae," a feminine noun, was employed only in the plural form, very much like our word "clothes," to designate cast-off garments or a skin. In the case of insects, such as the Diaspididae, where two shed skins enter into the composition of the scale, we really need a singular form to indicate a single skin in contradistinction to the totality of skins. There has been much looseness of usage—in which the present writer has participated. Smith's glossary lists "exuvia-iae-ium: the cast skin of a larval insect." and apparently all these forms have been used rather indiscriminately to apply either to a single cast skin or to more than one.

MacGillivray called attention to this situation and employed the singular, "exuvia." Since this appears to be the form which the Romans would have used if they had employed the singular, and such a form is much needed, it would seem to be reasonable to adopt it. Attention is called to the matter here since MacGillivray's note is buried in the midst of a mass of terminology much of which is not so clearly supportable, and it might easily be overlooked.

Another word for which present definitions are somewhat unsatisfactory is "pygidium." The word is employed on the one hand to indicate "the last dorsal segment left exposed by the elytra," which is morphologically a most inexact expression, since this segment is not necessarily always numerically the same, and on the other hand to designate "in Diaspinae, the compound terminal segment," which again is morphologically meaningless. The word, however, has become so firmly established in the literature of the scale insects that it would be very difficult to secure the acceptance of any other at this late date.

It may, nevertheless, be defined with somewhat more precision.

With due regard to what appears to be the actual morphological situation it may be redefined in its application to the scale insects as follows: "in the Diaspididae, the terminal and dorsally more or less scleriotic portion of the abdomen formed by the modification and partial fusion of the fifth to eleventh segments." Its more exact definition as applied to other groups is no present concern of the writer.



OBITUARY

[The following was received by a correspondent of Prof. Wheeler.]

HARVARD UNIVERSITY

Cambridge, April 21, 1937.

SIR:

With great regret I inform you of the death of

WILLIAM MORTON WHEELER

Professor of Entomology, *Emeritus*, and Associate Curator of Insects in the Museum of Comparative Zoölogy, which occurred on the nineteenth instant, in the seventy-third year of his age.

Funeral services will be held in The Memorial Church on Thursday, April 22, at 2 P. M.

Your obedient servant,

JAMES BRYANT CONANT.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—**Buckell, E. R.**—Notes on ticks and insect parasites of game animals in British Columbia. [Proc. Ent. Soc. Brit. Col.] no. 31: 10-16. **Craighead et al.**—The relation of insects to slash disposal. [U. S. D. A., Dept. Circ.] no. 411. 12 pp. **Felt, E. P.**—Balloons as indicators of insect drift and of Dutch elm disease spread. [Bartlett Tree Res. Labs., Sci. Contrib., Bull.] no. 2: 3-10, ill. **Hopping, G. R.**—Entomological illustrating. [Proc. Ent. Soc. Brit. Col.] no. 32: 20-22. **Jacot, A. P.**—Principles of scientific publication. [6] 45: 127-129. **Jaeger, J. M.**—More than mere insects. [Nature Mag.] 28: 205-207, ill. **Needham, Galtsoff, Lutz, Welch, et al.**—Culture Methods for Invertebrate animals. Ithaca, Comstock pub. Co., 1937. 590 pp., ill.

ANATOMY, PHYSIOLOGY, ETC.—**Beadle, Clancy & Ephrussi.**—Development of eye colours in *Drosophila*: pupal transplants and the influence of body fluid on vermilion. [Proc. Roy. Soc., London] B, 122: 98-105. **Carter, W.**—Aphis transmittal of *Commelina nudiflora* mosaic to pineapple. [7] 30: 155-161, ill. **Eckert, J. E.**—Honeybee monstrosities. [7] 30: 64-69, ill. **Fife, L. C.**—Number of instars of the pink boll-worm collected in squares and in bolls of cotton. [7] 30: 57-63. **Fox, H.**—Seasonal trends in the relative abundance of Japanese beetle populations in the soil during the annual life cycle. [6] 45: 115-126. **Her-**

ing, M.—Analogie, Homologie und Funktions-wechsel der Basaldornes am Lepidopteren-Vorderflügel. [Parnassiana] 4: 17-20, ill. Die Genital-Morphologie von Parnassius autoerator. [Parnassiana] 4: 38-42, ill. **Heriot, A. D.**—Notes on the moulting of mites and insects. [Proc. Ent. Soc. Brit. Col.] no. 32: 8-10. The crumena of the Coccidae and the Adelges. [Proc. Ent. Soc. Brit. Col.] no. 33: 22-24. **Hilton, W. A.**—Nervous system. LXI. Insects, Orthoptera. [13] 29: 18-23, ill. **Kirkpatrick, T. W.**—Colour vision in the triangulin larva of a Strepsipteron (Corioxenos antestiae). [107] A, 12: 40-44, ill. **Klingstedt, H.**—Chromosome behaviour and phylogeny in the Neuroptera. [31] 139: 468-469. **Kozhantchikov, I.**—In the periodicity of mass production of insect pests. The influence of temperature and humidity on the pupal development of Agrotis segetum and on the quantity of the next generation. [Bull. Plant Prot., Leningrad] no. 19. 36 pp., ill. **Maple, J. D.**—The biology of Ooencyrtus johnsoni, and the role of the egg shell in the respiration of certain Encyrtid larvae (Hymen.). [7] 30: 123-154, ill. **Prochazka, R.**—Etude sur l'importance morphomatique et systematique des ailes des Malacodermata (Coleoptera). [74] 14: 100-132, ill. **Pumphrey & Rawdon-Smith.**—Synaptic transmission of nervous impulses through the last abdominal ganglion of the cockroach. [Proc. Roy. Soc., London] B, 122: 106-118, ill. **Rehberger, K.**—Studies on the mouth organs of Malacodermata (Coleoptera). [74] 14: 44-57, ill. **Richards & Miller.**—Insect development analyzed by experimental methods: a review. Pt. 1. Embryonic stages. [6] 45: 1-60, ill. **Salt, G.**—The sense used by Trichogramma to distinguish between parasitized and unparasitized hosts. [Proc. Roy. Soc., London] B, 122: 57-75. **Sargent, W. D.**—The internal thoracic skeleton of the dragonflies (Odonata, Anisoptera). [7] 30: 81-95, ill. **Speyer, W.**—Die Entwicklung von Psylla mali. [110] 3: 267-283. **Tauber, O. E.**—The effect of ecdysis on the number of mitotically dividing cells in the hemolymph of the insect Blatta orientalis. [7] 30: 35-39.

ARACHNIDA AND MYRIOPODA.—**Davis, N. W.**—A Cyphophthalmid from South America (Phalangida). [6] 45: 133-134, ill. **Gregson, J. D.**—A preliminary report of the lizard-tick relationship on the coast of British Columbia. [Proc. Ent. Soc. Brit. Col.] no. 31: 17-21. The production of artificial conditions conducive to winter feeding of ticks. [Proc. Ent. Soc. Brit. Col.] no. 32: 6-7.

THE SMALLER ORDERS OF INSECTS.—**Blake, C. H.**—What are termites? [Bull. N. Eng. Mus. Nat. Hist.] no. 83: 1-9, ill. **Claasen, P. W.**—N. spp. of stoneflies (Plecoptera). [103] 10: 42-51, ill. **Edinger, O. H.**—The Sminthuridae of Southern California (Collembola). [13] 29: 1-17, ill. (*). **Glendenning, R.**—The status of the gladiolus thrips in British Columbia. [Proc. Ent. Soc. Brit. Col.] no. 33: 13-14. **Malcomson, R. O.**—Two n. Mallophaga. [7] 30: 53-56, ill. **Spencer, G. J.**—A check list of the fleas of British Columbia with a note on fleas in relation to sawdust in homes. [Proc. Ent. Soc. Brit. Col.] no. 32: 11-17. **Spieth, H. T.**—An Oligoneurid from North America (Ephemera). [6] 45: 139-145, ill.

ORTHOPTERA.—**Hubbell, T. H.**—A n. apterous grouse-locust from western Florida. [114] no. 350, 8 pp., ill. **Jacob, J. K.**—The European house cricket, *Gryllus domesticus*, now in Vancouver. [Proc. Ent. Soc. Brit. Col.] no. 32: 18-19. **Qadri, M. A. H.**—On a gynandromorphous *Forficula auricularia*. [107] A, 12: 45-46, ill. **Roberts, R. A.**—Biology of the bordered Mantid, *Stagmomantis limbata*. [7] 30: 96-109, ill. Biology of the minor Mantid, *Litaneutria minor*. [7] 30: 111-121, ill.

HEMIPTERA.—**Beamer, R. H.**—Three n. western spp. of *Erythroneura* (Cicadellidae). [7] 30: 31-33, ill. Notes on *Hebecephalus* with three n. spp. (Cicadellidae). [103] 10: 59-62, ill. **DeLong, D. M.**—Some n. spp. of *Ballana* (Cicadellidae). [43] 37: 105-124. **Dow, R.**—Is brood XI extinct (Cicadidae)? [Bull. N. Eng. Mus. Nat. Hist.] no. 83: 10-13. **Downes, W.**—Additions to the list of B. C. Hemiptera. [Proc. Ent. Soc. Brit. Col.] no. 31: 46-48. **Ferris, G. F.**—Contributions to the knowledge of the Coccoidea. IV. Illustrations of thirty-six genotypes of the Diaspididae. [Microentom.] 2: 1-45, ill. **Hungerford, H. B.**—A new *Potamobates* from Mexico (Gerridae). [103] 10: 63-65. **Lobdell, G. H.**—Two-segmented tarsi in Coccids; other notes. [7] 30: 75-80. **McKenzie, H. I.**—Morphological differences distinguishing California red scale, yellow scale, and related species (Coccidae). [67] 6: 323-335, ill. **Metcalf & Bruner.**—The Cicadellidae of Cuba. [J. Agr. Univ. Puerto Rico] 20: 915-973, ill. (*). **Olds, H. F.**—The distribution of the rhododendron white fly in British Columbia. [Proc. Ent. Soc. Brit. Col.] no. 32: 23-25. **Spencer, G. J.**—The bedbugs of British Columbia [Proc. Ent.

Soc. Brit. Col.] no. 31: 43-45. **Tuthill, L. D.**—The gen. *Euphalerus* in America n. of Mexico (Psyllidae). [103] 10: 69-72. (*). **Whitehead & Eastep.**—The seasonal cycle of *Phylloxera notabilis* (Phylloxeridae). [7] 30: 71-74.

LEPIDOPTERA.—**Bryk, F.**—Zur Synonymie von *Tithorea* Doubl. (Danaidae) (*Elzunia* n. gen.). [Parnassiana] 4: 20-21. **Fernald, H. T.**—An unusual type of butterfly migration. [39] 19: 55-57. **Forbes, W. T. M.**—A new "silver-marked" *Eucosma* (Olethreutinae). [6] 45: 131-132, ill. **Hoffmann, F.**—Beiträge zur Naturgeschichte brasilianischer Schmetterlinge. [14] 50: 430, 511-512, 525-528. **Llewellyn-Jones, J. R. J.**—Some food plants of Lepidopterous larvae. List 2, 3, and 4. [Proc. Ent. Soc. Brit. Col.] no. 31: 28-32, no. 32: 29-31, no. 33: 32-34. **Meyrick, E.**—Exotic Microlepidoptera. 5: 65-96. (S*). **Seitz, A.**—The Macrolepidoptera of the world. *Fauna americana*. Pt. 265, pp. 1193-1208, ill. Pt. 266, pp. 1185-1216, ill. Pt. 266, pp. 1217-1240, ill. Pt. 268, pp. 389-396, ill. Pt. 269, pls. only *Fauna palaeartica*, Supplement, Pt. 63, pp. 217-240. **Tietz, H. M.**—The genotypes of the North American *Hadeninae* (Noctuidae). [6] 45: 61-107. **Walkden, H. H.**—Notes on the life history of the bronzed cutworm in Kansas (Noctuidae). [103] 10: 52-59.

DIPTERA.—**Alexander, C. P.**—New or little known spp. of West Indian Tipulidae. [J. Agr. Univ. Puerto Rico] 20: 877-882, ill. **Fairchild, G. B.**—A preliminary list of the Tabanidae of Florida. [39] 19: 58-63. **Getzendaner, C. W.**—The introduction and propagation of *Digonichaeta setipennis*, a parasite of the European earwig. [Proc. Ent. Soc. Brit. Col.] no. 33: 8-12. **Jacob, J. K.**—Winter insects in British Columbia [Proc. Ent. Soc. Brit. Col.] no. 33: 30-31. **Townsend, C. H. T.**—Manual of Myiology. Pt. 4, 303 pp.

COLEOPTERA.—**Brannon, L. W.**—Life history of the squash beetle in Alabama (Coccinellidae). [7] 30: 43-51, ill. **Felt & Bromley.**—A new ambrosia beetle, *Nyloborus germanus*, in America. [Bartlett Tree Res. Labs., Sci. Contrib., Bull.] no. 2: 20. **Heberdey, R.**—Drei neue Anthiciden aus der Sammlung des Deutschen Entom. Inst. Berlin-Dahlem. [109] 4: 62-64 (S). **Heller, K. M.**—Ergänzende Bemerkung über kartoffelschädigende Russelkäfer (Curculionidae). [110] 3: 284-285, ill. (S*). **Hopping, R.**—Observations on the nomenclature and taxonomy of Coleoptera.

[Proc. Ent. Soc. Brit. Col.] no. 31: 33-35. **Hustache, A.**—Contribution aux Zygopinae de l'Amérique meridionale. [33] 77: 71-109. **Leech, H. B.**—The family history of *Nicrophorus conversator* (Silphidae). [Proc. Ent. Soc. Brit. Col.] no. 31: 36-40. **Obenberger, J.**—De novis generis *Leioptenra* speciebus (Buprestidae). [74] 14: 145-156. (S). **Olds, H. F.**—The life history and habits of the red-legged ham beetle "*Necrobia rufipes*". [Proc. Ent. Soc. Brit. Col.] no. 33: 40-41. **Pic, M.**—Nouveaux Coleopteres du Musee Zool. de Hamburg (Anobiidae and Dermestidae). [Ent. Nachr.] 10: 193-196 (S). Quelques observations sur les Coleopteres Nilionidae. [Ent. Nachr.] 10: 196-198. **Prell, H.**—Beitrage zur Kenntnis der Dynastiden. [14] 50: 495-496. (S*). **Prochazka, R.**—(See under Morphology and Physiology.) **Ross, E.**—Ueber Schmückkafer und deren Verwendung bei verschieden Völkern. [14] 50: 457-466. **Sanderson, M. W.**—A n. sp. of Phyllophaga and notes on another Scarabaeid. [103] 10: 66-69, ill. **Schedl, K.**—Scolytidae und Platypodidae. [109] 4: 66-70 (S*). **Seevers, C. H.**—N. spp. of termitophilous Staphylinidae from tropical America and the Solomon Islands. [7] 30: 1-23, ill. **Spaeth, F.**—Bestimmungstabelle der Gattung *Charidotis* (Chrysomelidae). [74] 14: 66-99. (S*). **Wolcott, G. N.**—The life history of *Diaprepes abbreviatus* at Rio Piedras, Puerto Rico (Curculionid: Otiiorhynchinae). [J. Agr. Univ. Puerto Rico] 20: 883-914, ill.

HYMENOPTERA.—**Fahringer, J.**—Opuscula braconologica. Bd. 4: 257-520. **Gobeil, A. R.**—Observations sur la mouche a scie (Tenthredinidae). [98] 44: 81-88, ill. **Hase, A.**—Neue Beobachtungen über die Männchen und Weibchen der Schlupfwespe *Nemeritis canescens* (Ichneumonidae). [109] 4: 47-61, ill. **Krombein, K. V.**—Studies in the Tiphidae. 1. A review of the genera of Myzininae. [7] 30: 26-30. **Marsh, F. L.**—The biology of the Ichneumonid *Spilocryptus extrematis*. [7] 30: 40-42. **Rayment, T.**—Biology of a new Halictine bee and specific descriptions of its parasites. [110] 3: 288-294, ill. **Smith, M. R.**—The Ants of Puerto Rico. [J. Agr. Univ. Puerto Rico] 20: 819-875, ill. **Wheeler & Wheeler.**—New Hymenopterous parasites of ants (Eucharidae). [7] 30: 163-175, ill. (S).

SPECIAL NOTICES.—**The Tsetse flies of E. Africa.** A first study of their ecology with a view to their control. By G. F. M. Swynnerton. [36] 84: 579 pp., ill.

FOREST INSECTS. A Textbook for the Use of Students in Forest Schools, Colleges, and Universities, and for Forest Workers. By R. W. DOANE, E. C. VAN DYKE, W. J. CHAMBERLIN and H. E. BURKE. 1st ed. Pp. xii + 463, figs. 234. McGraw Hill Book Co., New York and London. \$4.50. This volume brings together in a convenient form a great deal of practical information on the life histories of forest insects and the methods in use for their control. Short introductory chapters deal with the importance of forest insects, the general principles governing their control and the special methods in use against bark beetles. Then follow chapters dealing with individual taxonomic groups, giving detailed accounts of many important economic species together with briefer references to related forms. Almost 200 pages are devoted to beetles, 80 pages to lepidopterous insects; and there are shorter chapters of 20 to 30 pages each on hemipterous, dipterous and isopterous pests. Each of the twelve chapters is provided with several pages of a classified bibliography. Added together this bibliography comprises a total of about 26 pages. An appendix lists the coniferous trees with their pests and there is an excellent index of 29 pages.—R. G. SCHEMIEDER.

CULTURE METHODS FOR INVERTEBRATE ANIMALS. A Compendium prepared cooperatively by American zoologists under the direction of a committee from Section F of the American Association for the Advancement of Science. By PAUL S. GALTSOFF, FRANK E. LUTZ, PAUL S. WELCH and JAMES G. NEEDHAM (Chairman); assisted by many specialists whose names appear in connection with their respective contributions to this volume. Pp. xxxii + 590, 84 figs. Comstock Publishing Co., Inc., Ithaca, New York, 1937. Price \$4.00—This volume contains 316 separate articles, contributed by 186 individual zoologists. One general article, of 36 pages, deals with marine aquaria; another, of 10 pages, with fresh water aquaria and the collection of aquatic and terrestrial forms. Craneflies, mosquitoes, surgical maggots and *Drosophila* each occupy from 7 to 9 pages, while all the remaining articles are quite brief. In every case the method described is that found most useful by the contributor, who is frequently an outstanding authority on the form in question. Almost half the book, 260 pages, containing 161 articles, is devoted to insects. Methods for culturing and obtaining a continuous supply of many species are given, methods that have been developed for use in the study of economic entomology both medical and agricultural, for use in genetic research and for investigations of life histories and biology. A perusal of the contents of this book will no doubt often suggest some available form useful in research problems requiring a continuous supply of living material.—R. G. SCHEMIEDER.

ATLAS OF THE SCALE INSECTS OF NORTH AMERICA. By G. F. FERRIS. Stanford University Press, Stanford University California. London: Humphrey Milford, Oxford University Press. 28 x 21.5 cm. Serial No. 1, Introduction, January, 1937, and some other numbers are before us, accompanied by an explanatory leaflet on green paper. From the Introduction we learn that "This work represents an attempt to make possible the definite identification of every species of scale insect now known from North America, or which may become known during the course of its preparation. . . . The word 'Atlas' has been used in the title to convey an implication that this work will be essentially a collection of plates of illustrations with textual material reduced to the barest minimum that will suffice for necessary explanation." It is thought that the number of species to be treated will be as many as 750 and the time to be occupied in publication something less than ten years. Each species will be dealt with in a separate serial number, without pagination, in loose-leaf form, each number comprising a plate of pen and ink drawings reproduced by photolith, as is also the accompanying text. Single numbers, in any combination or quantity, may be obtained from the Stanford University Press. The plates are standardized as to contents and lettering and illustrate chiefly the adult female, but often details of the first and second stages also. A provisional classification is set forth in the Introduction. The "family Coccidae must be stepped up at least to a superfamily, Coccoidea*, in order to provide a better graded series of categories for the thousands of species still to be discovered." Within the Coccoidea eleven families are recognized. "In his use of generic names the author will endeavor to be reasonable, recognizing the interest of the non-systematist in nomenclatorial stability, but none the less refusing to yield in what he feels to be scientific honesty merely to please others." The question is considered to some further extent in an interesting manner. That Prof. Ferris's Atlas will be highly useful we can not doubt, and we hope that he will be able to carry it on to its projected end. At the same time Prof. Ferris is also issuing Contributions to the Knowledge of the Coccoidea in the lately established journal "MICROENTOMOLOGY, Contributions to Entomology from the Natural History Museum of Stanford University," as in Vol. II, pt. 1, March 24, 1937, similar in style and illustrations to the 'Atlas'.—P. P. CALVERT.

* Tillyard, Insects of Australia and New Zealand, 1926, p. 170, and possibly others have done this, while Dr. Pierce has the *order* Coccoptera, ENT. NEWS, 47: 257-263, Dec., 1936.

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—Tabanidae (Horseflies and Deerflies). Exchange, purchase, or for determination. G. B. Fairchild, P. O. Box 272, Monticello, Fla.

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Wanted.—To get in touch with Specialists who will make determinations for a share of our duplicates. We have many undetermined specimens from all parts of Iowa.—H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Wanted.—Communication with anyone who has or is collecting Lepidoptera in Burlington County, New Jersey. Also anyone having a microscope for sale.—E. P. Darlington, New Lisbon, N. J.

Wanted for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, Columbia or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

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EXCHANGES

(Continued)

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ENTOMOLOGICAL NEWS

JUNE, 1937

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ENTOMOLOGICAL NEWS

VOL. XLVIII.

JUNE, 1937

No. 6

Moulting in Some Lepidoptera.¹

By BERTHA M. HESS, Philadelphia, Penna.

This subject was brought to my attention by Dr. Calvert who, during his work on dragonflies, (1934, pp. 12-14) found that splits in the exuviae in the different moults were not of the same extent. On endeavoring to compare these results with the manner in which other insects split the cuticle at each moult, there was such a dearth of literature on this subject, that Dr. Calvert suggested to me the raising of various kinds of caterpillars to ascertain whether, at different moults of the same species of caterpillars, and in corresponding moults of different species of caterpillars, the splits in the exuviae are located in the same places and are of the same relative extent, or whether they are located in different places and are of different extents.

The caterpillars used for this study were those of the Tussock Moth (*Hemerocampa leucostigma*), the Fall-web worm (*Hyphantria cunea*), and the Tent Caterpillar (*Malacosoma americana*).

HEMEROCAMPA LEUCOSTIGMA (Liparidae).

The observations recorded in this paper were made from larvae hatched from an egg mass found on an English walnut tree in Philadelphia. Fresh leaves from this tree were fed to the larvae every day from the time they left the egg until they reached the pupal stage. The first nine larvae emerged on May 27, 1933, and the eggs continued to hatch until June 8. The caterpillars were transferred from the egg mass to the leaves with a fine camel's hair brush, to the number of 177. Others may have hatched out and crawled to the leaves themselves, as the latter were always placed so as to touch the twig on which

¹ A thesis in Zoology presented to the Faculty of the Graduate School of the University of Pennsylvania in partial fulfillment of the requirements for the degree of Master of Arts.

the egg mass was tied. Each larva measured 2.227mm in length, width of head being 0.454 mm. On June 3rd, the exuviae from the first moult were found. These had to be sought for with the hand lens.

The method used in studying all the exuviae, was first to examine all, for the manner in which they were split, and then to measure at least ten of each moult.

First exuvia. In almost every case the head capsule was detached from the rest of the exuvia, and in those few cases in which it remained attached it was at one point only, on the ventral surface of the first thoracic segment, and became easily detached at the slightest handling. The head capsule did not rupture at all, although in the exuviae of all the moults, except the last larval moult, the lines which form the Y-suture along which the rupture often takes place in the moulting of other insect larvae, were readily discernible. There was visible, however, the large occipital foramen through which the oesophagus and the nerve cord enter the body. The skin, as it was pushed caudad after it ruptured, became much plaited, or transversely wrinkled, but the foramen retained its circular shape. The skin, subsequently dried, shows the opening of this large cavity at the forward end of the thorax where the head had been joined to it. The exuviae, although covered with long hairs, were transparent enough to enable one to detect the somites. The first exuviae did not show any tussocks. Each exuvia was so light that the slightest breath would blow it away. In order to keep it in place on a slide for examination, it was necessary to float it in a drop of water. The hairs kept the skin a little above the surface of the water and thus prevented it from getting soft and collapsing. The skins always ruptured in the sagittal line on the dorsal surface, if they ruptured at all. Of the eighty-three exuviae of the first moult examined, 3 did not rupture at all, the head capsule only being detached, 75 showed a rupture through the three thoracic segments only, 4 showed a rupture through the three thoracic and the first abdominal segments, and 1 showed a rupture through the three thoracic and the first and second abdominal segments.

Measuring the skins. In order to measure the skins, they were soaked in very hot water for at least fifteen minutes, then put on a slide under the dissecting microscope and gently pulled until all the wrinkles and folds were smoothed out. The exuviae so treated must therefore be longer than the corresponding part of the caterpillars when alive. The skins were then measured under a Bausch and Lomb compound microscope with a 16mm objective from which the lower lens had been removed and a No. 5 eye-piece in which was a micrometer. The measurements were then converted into millimeters. The distances measured were from the center of the third thoracic leg to the center of the first proleg where each joined the body; then from the first to the second proleg, from the second to the third, the third to the fourth, and from the fourth to the last; and the sum was the whole distance from the third thoracic leg to the last proleg. The average length of ten skins thus measured was 2.04 mm. The range was from 1.6798 mm to 2.497 mm, which indicates a great probability of error in the method employed. Caterpillars after the first moult measured 3.859 mm. full length.

Second Exuviae. At the second moult 148 skins showed the following splits, 146 split along the mid-dorsal line and of these, 66 split in the three thoracic segments only, 78 split in the three thoracic and the first abdominal segments, 1 split in the three thoracic and the first and second abdominal segments, 1 split in the three thoracic and the first abdominal segments with a split between the first and second abdominal segments, 1 showed no dorsal split, but the thorax was split from the abdomen, 1 showed no dorsal split, but the first and second thoracic segments were somewhat separated and the third thoracic from the abdominal.

The average length of the second moulted skins from the third thoracic leg to the last proleg was 2.95 mm; the range was from 2.724 to 3.859. After the second moult the two spots on the dorsal part of the abdomen which are red in the last larval instars, now appear, but are orange in color, the head being also this color.

Third exuviae. Several larvae just entering on the third instar measured 5.359 mm including the head. The average length of the exuviae from the third thoracic leg to the last proleg was 6.60 mm. The skins from this moult were much more easily examined than those of the preceding ones, not only because they were much larger, but also because the tufts or tussocks of hair appeared and these definitely marked the first four abdominal segments. At this third moult the splits in the exuviae were as follows: 166 split in the mid-dorsal line and of these 27 split through the three thoracic segments only, 124 split through the three thoracic and the first abdominal segments, and 15 split through the three thoracic and the first and second abdominal segments.

Fourth exuviae. At the fourth moult the splits in the exuviae were as follows:—all split along the mid-dorsal line, none of the skins were split through the thorax only, 106 split in the three thoracic and the first abdominal segments, and 9 split in the three thoracic and the first and second abdominal segments. The average length of the fourth exuviae from the third thoracic to the last proleg was 12.132 mm. The range was from 9.761 mm to 12.619 mm.

Fifth exuviae. At the fifth moult the skins split as follows:—all split along the mid-dorsal line, none split through the thorax only, 50 split in the three thoracic and first abdominal segments, and 7 split in the three thoracic and the first and second abdominal segments. The average length of the fifth exuviae was 17.64 mm; the range was from 15.436 mm to 20.430 mm. This was the last moult before the spinning of the cocoons.

Last larval moult. There is a marked difference in the size of the exuviae of the last larval moult, which takes place inside the cocoons. Unlike all the other moults of this caterpillar, the head capsule was attached to the rest of the skin, with no exceptions, and in this moult only does the head show the Y-split. Twenty of these skins were measured and their size and manner of splitting divided them into two definite groups. Using the same measurements as in the other moults,

that is, from the third thoracic leg to the last proleg, 10 of these skins measured from 12.485 mm to 14.528 mm with an average length of 13.45 mm. In these skins the rupture extended from the Y-split in the head, through the thorax in the mid-dorsal line. The other 10 skins measured from 17.479 to 20.203 mm, with an average of 19.26 mm. In these skins the rupture extended from the Y-split in the head, through the thorax and the first abdominal segment, in the mid-dorsal line. Thus the larger exuviae were split through one more segment than the smaller. The larger ones were no doubt females, the smaller ones probably being males. At this last moult 72 skins showed the following splits, 45 Y-split in head, and through the thorax only, 18 Y-split in the head and through the thorax and first abdominal segment, 2 Y-split in head and through the thorax and first and second abdominal segments, 7 with the head crushed, split through the thorax only.

The pupal moult. The pupal skins ruptured in the mid-dorsal line through the two wing-bearing segments, the meso- and meta-thorax, connecting with a transverse split, between the thorax and the abdomen, extending along the dorsal edge of the wings to the lateral line of the pupae. Another split starting on the ventral surface, outlined the ventral edge of the wings, thus separating them from the legs and mouth parts, and continued around to the anterior dorsal surface, separating the pro-thorax from the meso-thorax. These pupal skins were much shorter than the exuviae of the caterpillar, and were very transparent and delicate; the slightest touch causing them to break. They retained the shape after the adult had emerged. These skins were measured dry, with a rule, the female skins being much larger than the male. The following measurements are for the entire length of the pupal exuviae; 6 female measured from 19 to 23 mm. Average 20.33; 12 male measured from 15 to 17 mm. Average 15.085.

Measurements of the heads. The detached heads, 212 in number, including those from every moult, before the spinning of the cocoon, were measured dry, for width. Where the measurements of five or more heads were the same, they are recorded below.

No. Heads Measured	Width in Mm.	Probable Sex	Probable Moults	Growth Ratio
8	0.4541	♂♀	1st	
8	0.6810	♂♀	2nd	1.50 ♂♀
7	0.9988	♂ }	3rd	1.47 ♂
9	1.1350	♀ }	3rd	1.66 ♀
11	1.4982	♂ }	4th	1.50 ♂
37	1.5890	intersex? }	4th	
14	1.6798	♀ }	4th	1.48 ♀
28	2.270	♂ }	5th	1.51 ♂
9	2.3608	intersex? }	5th	1.48 intersex?
7	2.4970	♀ }	5th	1.49 ♀

L. O. Howard (1899, p. 13) says of the tussock moth larvae, "They cast the skin five times, exhibiting a different character after each moult. The larval stage lasts on an average from one month to five weeks. The larva transforms to pupa within a few hours after completion of the cocoon, and remains in the pupal condition from ten days to two weeks."

(To be continued)

Three Unusual Host Records for Cuterebrine Larvae (Diptera: Oestridae).

By E. F. KNIPLING and W. G. BRUCE, Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

The Cuterebrinae, commonly referred to as rodent warbles or bots, have been reported from a wide range of host animals, principally rodents. Records of the occurrence of these larval parasites in other kinds of animals such as cats and dogs are, however, not uncommon. Hall¹ records *Cuterebra* spp. from cats and cites cases involving Cuterebrinae in other hosts.

In recent years a number of larval specimens of this group of Diptera collected from cats and dogs have been referred to the Bureau of Entomology and Plant Quarantine for determination. Unfortunately, so little is known concerning the larval characteristics of the various species that specific determinations are possible only in rare instances.

¹Hall, M. C. 1921. *Cuterebra* larvae from cats, with a list of those recorded from other hosts. Jour. Amer. Vet. Med. Assn. 59: 480-484.

In this paper the writers report three cases of the occurrence of *Cuterebra* spp. in what are considered accidental hosts. These records are from a cow, a pig, and a mule. Hall cites a record by Townsend (1917) of a *Boyeria*² larva taken from the throat of a pig. A reference is also cited which reports *Cuterebra* from deer in Europe. Apparently the literature on the subject³ contains no records of the occurrence of Cuterebrinae in cattle and mules.

Information on the cases herein reported is as follows:

CASE 1: On September 26, 1935, W. J. Platt extracted one warble from the back of a cow owned by L. C. Eubank of Bushnell, Sumter County, Florida. The specimen proved to be a second-instar larva of *Cuterebra buccata* Fab. The animal was reported as having in its back another warble which was not obtained.

CASE 2: On November 21, 1935, a second-instar larva of *Cuterebra* sp. (not *C. buccata*) was removed from the windpipe of a 2- to 3-months'-old-pig from the vicinity of Valdosta, Georgia. The owner of the pig and collector of the larva, G. T. Boyett, stated that the animal had appeared healthy in every respect but that it suddenly began coughing violently and within an hour it had died. The owner made a post-mortem examination of the pig and found that the larva had penetrated the windpipe. The larva, together with the portion of the windpipe in which it was lodged, was examined by one of the writers.

CASE 3. An examination of a lot of larvae of *Cochliomyia americana* C. and P. collected from the shoulder of a mule revealed the presence of a second-instar *Cuterebra* larva which proved to be *C. buccata*, the same species as that taken from the cow in case 1. Through correspondence the collector of the larva, H. A. Woodle, county agent, stated that all of the larvae in this lot of specimens, including the *Cuterebra*, were

² The writers include the genus *Boyeria* of authors in the genus *Cuterebra*.

³ J. L. Webb, of the Bureau of Entomology and Plant Quarantine, kindly reviewed the literature on the occurrence of *Cuterebra* in the various hosts.

taken by him from a mule in Edgefield County, South Carolina, on July 16, 1935. The owner of the animal was W. B. Mathis. Aside from the unusual host record in this case, the collection is of interest in that the *Cuterebra* larva probably served as the predisposing cause of the infestation by *Cochliomyia americana*.

A New Species of Cryptophagus, found Associated with Ants. (Coleoptera: Cryptophagidae).

by FRANK E. BLAISDELL, SR., Stanford Medical School and Associate in Research California Academy of Sciences, San Francisco, California.

The species described below was found under bark on an old log and in association with ants. It is evidently new as it cannot be identified among the thirty-two species listed by Thos. L. Casey in his Review of the Cryptophagidae.¹ The species is described as follows:

Cryptophagus blumii n. sp.

Form oval to slightly ovate, a little more than twice as long as wide, in profile moderately convex dorsally. Color more or less dark ferrugineous, luster dull; body surface microscopically granulate, the punctures very minutely submuricate. Pubescence very short and inconspicuous, recumbent, a little longer and more abundant on the under surface of the body, distinctly denser on the abdomen.

Head triangular, almost twice as wide as long before the post-ocular line; sides convergent, not narrowed by the antennal insertions, margins slightly and broadly arcuate over the antennal fossae, thence feebly sinuate to the epistomal apex, the latter truncate and equal in width to about one-fourth of the width across the eyes; labrum short and broadly arcuate at apex; frons moderately convex, somewhat densely punctate, punctures relatively coarse, well defined and separated by a distance equal to their diameters, slightly denser laterally. Eyes strongly convex and prominent, minutely setigerous; facets somewhat coarse and convex. Antennae stout, in length equal to the pronotal width; segments nine, ten and eleven forming a club that is gradually formed beyond the eighth; funicular segments four to nine inclusive subquadrate and smallest, each very slightly

¹ Jour. N. Y. Ent. Soc., Vol. VIII, No. 2, June, 1900, p. 92.

narrowed to base; second and third equal in length and more robust, especially the former; first large and more or less quadrate; ninth a little wider than the eighth and subquadrate, tenth transverse and a third wider than long, eleventh widest, irregularly oval and slightly oblique at apex.

Pronotum transversely oblong, about one-fourth to almost one-third wider than long; apex transverse in moderate circular arc, angles slightly prominent anteriorly, arcuato-oblique, the obliquity due to the moderate oval truncature which is not polished and slightly unguiculate posteriorly; sides parallel, feebly convergent apically, scarcely sinuate behind the nodes, median denticles minute or obsolete, thence to base scarcely at all arcuate, marginal bead very narrow and not reflexed, marginal fimbriae moderately short and directed backward; base feebly arcuate in middle two-fourths, thence broadly and feebly sinuate to the subrectangular angles, marginal bead distinct but not coarse; disk moderately convex, small impressions are more or less discernable against the basal margin at junction of middle and lateral thirds, internal to which small, raised impunctate callus-like spots may be slightly evident; at sides of the disk the submarginal surface is broadly and very feebly impressed, beginning arcuately from each basal impression and thence forward parallel to the margin toward apex.

Elytral oval, widest at middle, about two-fifths longer than wide and not quite three times as long as the pronotum, base feebly and broadly emarginate, adapted to the prothoracic base, finely beaded; humeri narrowly rounded and exposed; sides broadly and moderately arcuate, converging in apical third to the rounded apex, the latter slightly emarginate at the suture, lateral margin very narrow; disk moderately convex from side to side, arcuately and gradually declivous in apical third; surface finely punctate, punctures shallow and less sharply defined than on the pronotum, each with a very short decumbent hair; parasutural striae very fine and absent in basal fourth or third.

Legs moderate in length, rather slender; metafemora and tibiae subequal in length; tibiae gradually widening from base to apex, the anterior slightly arcuate; metatarsi two-third as long as their tibiae. Abdomen feebly convex, finely and densely punctate.

Males a little less robust, body a little more convergent anteriorly and the abdomen less convex. Female usually a little more robust, less narrowed anteriorly and the abdomen a little more convex.

Measurements. (Types) Length 2.25-2.5 mm.; width 1.0-1.6 mm.

Holotype, male, No. 4193, and *allotype*, female, No. 4194, in author's collection, Museum of the California Academy of Sciences. Collected in Glacier Park, MONTANA, July, 1935, by Mr. John E. Blum, to whom the species is dedicated. Five specimens were secured. One paratype in the Author's collection and two in that of Mr. Blum.

Blumii by Casey's table falls near *fungicola* Zimm. but differs notably in the character of the pubescence, body luster and punctation, as well as in size. In *fungicola* the pubescence is moderate in length and subdecumbent; body oblong, shining and dark testaceous in color; the measurements indicate a smaller species, it occurs in Indiana and Carolina (Zimm.). The body in *blumii* is evidently more strongly convex dorsally.

Most of the species of *Cryptophagus* are attracted to and inhabit musty, mouldy vegetable matter if not too moist; some of the species frequent certain blossoms, as of the chinquapin oak (*Castanopsis sempervirens* Dudley).

Colored Glass Beads for recording data concerning Alcoholic Specimens.

It is obviously desirable to mark all specimens in such a way that it can be told by inspection what data have been recorded concerning them. One may wish to know whether a given specimen has been catalogued, measured, spotted on a distribution map, recorded in print, or figured; it is also important to have types, paratypes and other noteworthy specimens distinctively labelled. A part of such information is ordinarily conveyed by written or printed labels, but the method is so laborious and slow that most workers simply fail to record all the information about their specimens which would prove useful to themselves and others.

The use of minute beads of colored glass offers an easy solution to the problem, so far as alcoholic material is concerned. Different colors of beads are assigned particular meanings; thus a red bead may designate a type, a blue bead a specimen recorded in the literature, etc. Such beads are permanent in color, easily seen in the vial (since they always rest on the bottom and can be "read" from any direction), harmless to delicate specimens because of their small size and globular form, and are relatively inexpensive and easy to obtain in quantity. Their use of course does not do away with the necessity

for labels; name, date, collector, catalogue, and particularly type designations should never be recorded by symbols. But the use of the beads is so easy that it does make possible the recording of additional valuable information without loss of time, simply by dropping the proper bead into the vial with the specimen at the time of recording the data.—H. K. WALLACE and T. H. HUBBELL, Department of Biology, University of Florida.

A Note on Reakirt's Types of *Chrysophanus mariposa* (Lepid.: Lycaenidae).

By JOHN W. CADBURY, 3D, Philadelphia, Pennsylvania.

In connection with another paper in course of preparation on a collection of butterflies from Northern British Columbia, the writer disclosed some information on Reakirt's types of *Polyommatus mariposa*. The following is in large part taken from two letters from Mr. William J. Gerhard of the Field Museum in Chicago.

In the collection of butterflies above referred to is a single specimen of *Chrysophanus mariposa* Reakirt.¹ While making comparisons with the series of *mariposa* contained in the collections of the Academy of Natural Sciences of Philadelphia, I ran across a specimen labeled in handwriting as follows: "mariposa Reak. Type California," and below this a printed label "ex collection Skinner." Desiring further information as to the status of this specimen, I wrote Mr. Gerhard and he replied in a letter dated Chicago, January 20, 1937, as follows:

"I am glad to say that most of Reakirt's types were acquired by Herman Strecker in some unknown manner and are still with, or in the unchanged Strecker Collections in the Field Museum. There are, however, several or more species described by Reakirt, but where the types of them are is not known.

"In his supplement No. 3, to his *Lepidoptera-Rhopaloceres* and *Heteroceres*, issued in 1900, Strecker enumerates the types in his collection. Among them are listed seventy-six (76) of Reakirt's types, four of which are enumerated as *Polyommatus mariposa* Reak. Three ♂, one ♀ California. On comparing these specimens rather hastily, I find they agree fairly well, and

¹ In the use of this generic name I follow Holland. See his *Butterfly Book*, new and thoroughly revised edition—Doubleday, Doran & Co., Inc., publishers, 1931, p. 248.

no doubt are types. In his description, unfortunately, Reakirt does not state the number of specimens he had before him when describing the species, and hence it is difficult to decide whether you have one of the types in the Academy or not.

"As was the custom forty or fifty years ago, an author of a new species did not select one specimen of a series and mark it type, and the remaining specimens paratype. All of the specimens were considered types and later co-types. Therefore the four *mariposa* types of Reakirt are simply marked 'Orig. Types, California, Coll. Reakirt.' There are no more data.

"When Strecker prepared supplement No. 3, he labeled all of the types in his collection with a small red-bordered name label which served as a pin label in all cases. However, he did not indicate his types of the genus *Catocala* in such a manner, probably because he no longer knew which specimens of the series were really the types. But he did write 'Orig. Types or Type' on the name label, and where there was only one specimen there is no doubt. But where there are many specimens, it is not known which one can be regarded as the type".

I therefore wrote to Mr. Gerhard and asked him to designate the best male specimen of *mariposa* as the lectotype, the remaining specimens paratypes. The specimen at the Academy will also become a paratype.

In his second letter, dated Chicago, March 4, 1937, Mr. Gerhard states that the types and paratypes of the Museum's insect collection are not yet catalogued and numbered, and that he has therefore simply pin-labeled the 3 ♂ and 1 ♀ types of *P. mariposa* Reak. as follows:

"A ♂. <i>L(ycaena) Mariposa</i> ."	
Califa.	Reak.
Orig.	Coll.
Types	Reak.

Also on this specimen he placed a red pen-printed label "Electotype, Cadbury, 1937." The other specimens are labeled as in "a" with the additional labels: "b. ♂," "c. ♂," and "d. ♀," respectively. Mr. Gerhard states that the ♀ is the best specimen of the four, and that "a. ♂" is the best of the males. At the head of the series is pinned a larger, red-bordered label bearing exactly the same information as the smaller individual pin-labels illustrated above.

I take this opportunity to thank Mr. Gerhard for this information and his trouble on my behalf.

A New Euphoria from Texas
(Coleoptera: Scarabaeidae).

By MARK ROBINSON, Philadelphia, Pennsylvania.

Euphoria casselberryi, n. sp.

Shape oblong, shining, except elytra and posterior edges of pronotum and apex of scutellum. Piceous, elytra pale yellowish brown except the suture, margins and a few spots on the first costae. Pronotum with a median stripe expanding on each end and a stripe along the anterior three-quarters of the margin of pale yellowish brown.

Clypeus longer than broad, parallel, anterior angles rounded, apical margin feebly emarginate. Head coarsely and densely punctate, clothed with long yellowish pubescence.

Pronotum broader than long, narrower in front, sides in posterior half parallel, base slightly emarginate. Disk moderately convex, surface densely regularly punctate except a smooth place along basal margin. Pubescence rather long and erect. Scutellum coarsely punctured on each side near the base.

Elytral disk feebly convex, vaguely bicostate and sparsely punctured, each puncture bearing a moderately long yellowish hair. Pygidium feebly convex, rugose and clothed with pale yellow hairs.

Body beneath and legs clothed with long yellowish hairs. Metasternal button round and hairy in front. Abdomen rather coarsely punctured.

Anterior tibiae tridentate. Antennal club about as long as the stem.

Length, 14.0 mm.; breadth, 7.0 mm.

Type: ♂, Davis Mountains, TEXAS, June 30, 1930 (G. P. Engelhardt). In author's collection.

Paratypes: 3 ♂, same data, June 30, 1931, and June, (W. T. Davis) (G. P. Engelhardt).

Casselberryi resembles the Mexican species *avita* Janson, but differs, among other things, by having a shining thorax and lacking the two spots on each side of the median line on the pronotum. I take pleasure in naming this species after my good friend Mr. R. C. Casselberry.

Notes on *Ceraticelus formosus* Banks and *C. rugosus* Crosby (Araneae: Linyphiidae).

By C. R. CROSBY.

In 1892 Banks described *Ceratinella formosa* from a female from Ithaca, New York. In 1905 I described *Ceraticelus rugosus* from two males from Sea Cliff, Long Island, New York. In the females of both species the dorsal abdominal sclerite is confined to the front of the abdomen. In 1925 Crosby and Bishop considered them identical and placed *rugosus* as a synonym of *formosus*. Collections made by Miss Bryant, Mr. Emerton and myself have shown that the favorite habitat of this spider is the ocean beach close to the water's edge. I have often wondered how Mr. Banks happened to find a specimen so far inland as Ithaca, New York.

On October 20, 1936, at Lavergne, Tennessee, I collected two females which had the dorsal abdominal sclerite confined to the front of the abdomen. Later through the kindness of Dr. J. M. Shaver of Peabody College, I had the opportunity of examining a collection of spiders made at the same place by Miss Adelpia Meyers in the course of an ecological investigation some time previously. Here I found three males that obviously belonged with the females I had just caught.

I brought these specimens home with me and compared them with my specimens of *rugosus*. They are not the same. I took them to Cambridge and with the assistance of Mr. Banks and Miss Bryant compared the females with Banks' type of *formosus*. They seem to be identical. The males from Lavergne, Tennessee, which belong with these females are easily distinguished from the males from the New England coast by structural characters.

From this it is evident that *C. formosus* Banks and *C. rugosus* Crosby are distinct species and that the male of the former has at last been found.

CERATICELUS FORMOSUS Banks.

Ceratinella formosa Banks, Proc. Acad. Nat. Sci., Phila., 1892, p. 33, pl. 2, f. 55. ♀ only described.

♂. Length, 1.4 mm. Cephalothorax relatively more slender and elongate than in *rugosus*, the head narrower, thorax dull orange yellow and head dark gray, nearly black; in *rugosus* concolorous. Sternum gray over dull orange yellow with the margin blackish, not so smooth and shining as in *rugosus*. Endites and chelicerae much darker. Legs light orange yellow. Palpi darker distally, tarsus nearly black. Abdomen has the dorsal sclerite extending backward about as far as in *rugosus* but much narrower, not occupying the whole width of the abdomen; soft parts dark gray to nearly black.

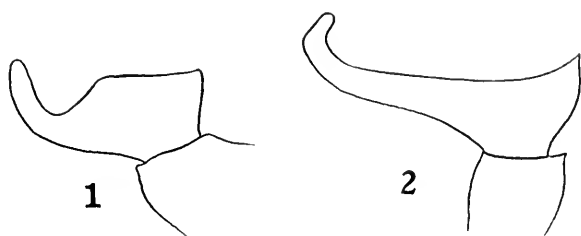


Fig. 1. Lateral view of tibia of male palpus of *Ceraticelus formosus*
Fig. 2. Of *C. rugosus*.

The palpus closely resembles that of *rugosus* in all respects except the tibia. The principal difference is in the tibial apophysis; in *formosus* it is shorter and broader; the tip is broadly rounded.

♀. Length, 1.6 mm. Cephalothorax relatively broader than in the male; there is less contrast in color between head and thorax since there is more gray on the former; in one specimen the whole cephalothorax is nearly black. Palpi distinctly darker distally. Dorsal abdominal sclerite confined to anterior part. The epigynum almost the same as in *rugosus*.

Type localities: *Holotype* female, Ithaca, NEW YORK, *allotype* male, Lavergne, TENNESSEE.

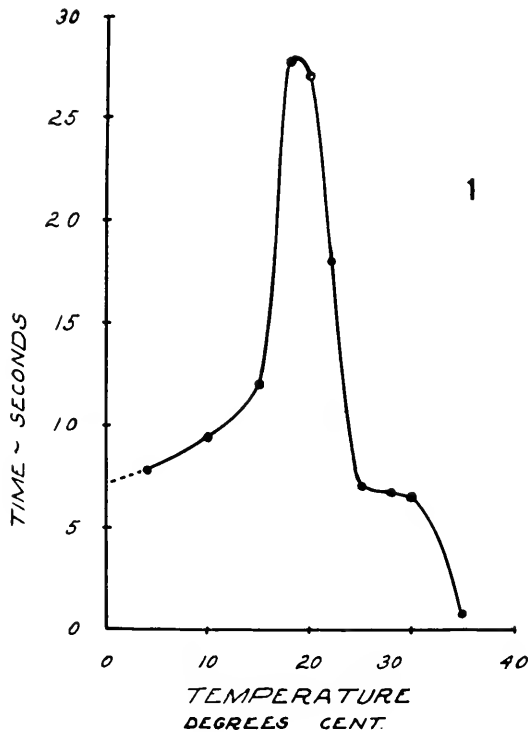
Tennessee: Lavergne, Oct. 20, 1936, 2 ♀ (Crosby); Nov. 1, 2 ♂ (Myers), July 5, 1 ♂ (Myers).

Death Feigning in *Sitophilus granarius* L., the granary weevil. (Coleoptera: Curculionidae).

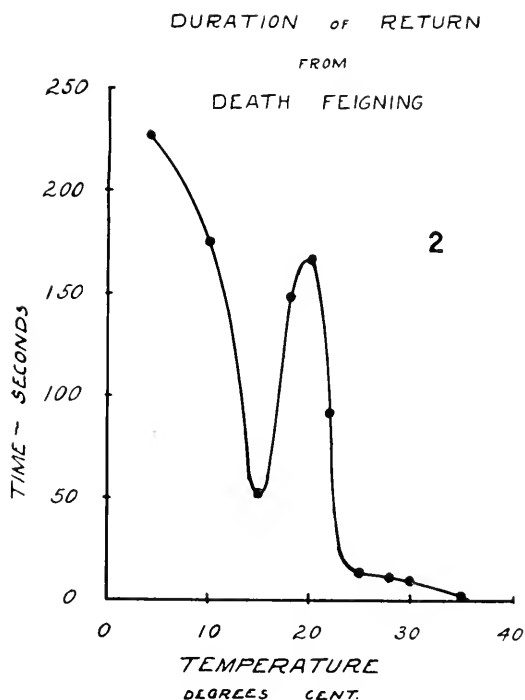
By NELLIE M. PAYNE.

In a mixed population of granary weevils there were found to be a certain number which were unable to assume the death feigning position at room temperature. Others were observed to hold the typical position for the species for only a short time. In a population of 1000 beetles of unknown ancestry taken at random from a can of infested wheat, it was found that 7 were unable to assume the position described as death feigning at

DURATION OF DEATH FEIGNING



Temp. °C.	DURATION OF DEATH FEIGNING Time in Seconds			DURATION OF RETURN FROM DEATH FEIGNING Time in Seconds		
	Max.	Min.	Avg.	Max.	Min.	Avg.
4	17	1.5	7.8	395	42	227
10	20	2	9.4	326	38	175
15	23	5	12.	94	25	52.2
18	43	20	27.7	215	76	148
20	38	16	27.	236	68	166.5
22	25	9	18	130.1	34.5	91
25	10	4	7	23.9	1	11.9
28	10.2	2.5	6.7	21	2	10.1
30	10	1	6.5	18.4	3	8.4
35	.1	1	.7	0.1	less than .1	less than .1



20°C. and that 116 of those able to assume this position could not do so at 25°C. With rise in temperature the number of beetles unable to feign death increased. With decrease in tem-

perature the number of beetles unable to feign death remained about the same as at 20°C; both the length of time necessary for the righting reaction and the number of trials that were necessary before the beetle had regained a normal position steadily increased. At temperatures of 20°C. and above, the beetles required but one trial to right themselves. At temperatures below 20°C., beetles regularly required more than one trial. Low temperatures increased the righting time more than the duration of the feign. (Table 1 and fig. 1.). The minimum time required for the righting reaction came at 40°C., at which the righting time was less than one-tenth of a second. A second minimum or low value for the righting time was observed at 15°C. (Fig. 2.)

Not only could a quantitative difference, namely the time required for the reflex, but also a qualitative difference could be distinguished between the death feigning reaction at high and low temperatures. At high temperatures the beetles righted themselves quickly and accurately. At low temperatures there was a general clumsiness in the righting reaction. Beetles would move around in circles, some times clockwise, some times counterclockwise. Spiral movements in both directions were observed with the same beetle. At times a beetle would spin about on one of the hind legs before it righted itself. Spiral movements were not observed above 20°C. The effect of temperature on the righting reaction was especially marked with one beetle which was able to assume the death feigning position and to right itself in less than 5 seconds at a temperature of 25°C. At 10°C. this same beetle was unable to right itself at the end of 4 minutes but when warmed under an electric light completed the righting reaction in less than one-tenth of a second.

As observed by Zaehner (1930), Bleich (1928) and others, the death feigning position is not identical with the position in death. In *Sitophilus*, dead beetles generally have all the legs extending at right angles from the body. The first pair of legs may be extended beyond the head. The antennae are held straight, generally with the flabellum at right angles to the

scape. In so-called "death feigning" the position assumed does not closely resemble that of true death. The legs are folded upon the thorax and the antennae folded at the proximal segment of the flabellum. A death feigning weevil may lie either on its side or on its back. Dead beetles generally fall over on their sides but may lie on their backs. A lateral view of the dead beetle and of the death feigner present striking differences. In one case the legs are so closely folded that they hardly make any silhouette against a background. In the other the out-stretched legs are a prominent feature of the beetle profile.

If death feigning be interpreted as a protective reaction it must be assumed that the enemies of the beetle in question must be rather poor observers. It must also be assumed that the beetle does not need protection for as long a time at high temperatures as at low.

Temperature was maintained within .5 of a degree of the temperature recorded in the table. Air temperature, not the temperature of the beetle, was recorded. Beetles were marked with dots of white paint, on the head and corners of the elytra. For example a dot on the head was beetle one, a dot on the head and one on the anterior right part of the elytron was two, a dot on both the anterior corners of the elytra, three, etc. Time was recorded with a stopwatch. This method was accurate enough for the low temperatures but not at high where the actual duration of either righting or the death feigning proper was less than one-tenth second.

LITERATURE CITED.

- BLEICH, O. E. 1928 Thanatose and Hypose bei Coleopteren. Experimentelle Untersuchungen. Zeitschr. f. Morphol. u. Ökologie der Tiere. 10: 1-61.
- ZACHER, F. 1930 Untersuchungen zur Morphologie und Biologie der Samenkäfer (Bruchidae-Lariidae). Beiträge zur Kenntnis der Vorratsschädlinge 6, Beitrag Arb. Biol. Reichsanstalt. f. Land. u. Forstwirtschaft. 18: 233-384.

Asiphonaphis and Aphis Studies (Homoptera: Aphididae).¹

By GEORGE F. KNOWLTON ²

The following report deals with three species of *Asiphonaphis*, two of which are here described as new,³ and several

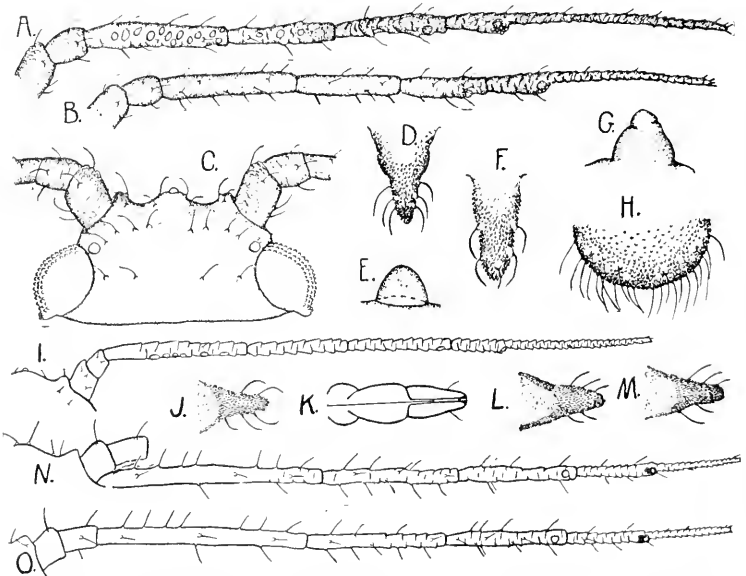


Fig. 1. *Asiphonaphis pruni* W. and D. Alate, A, C-D. Apterous, B, E-H; E, lateral, and G, prothoracic tubercle. *A. utahensis* n. sp. Alate, I-J. *A. carolinensis* n. sp. Apterous, K-O.

species of *Aphis* whose distribution in the west is incompletely known.

ASIPHONAPHIS PRUNI W. and D. Bountiful, June 1929 (H. J. Pack). Drawings are of specimens from Baraboo, Wisconsin, July 25, 1912 (A. C. Burrill).

Asiphonaphis utahensis n. sp.

Alate vivipara.—Size 1.41 to 1.71 mm. long to base of cauda, and 0.67 to 0.8 mm. wide across the abdomen; head and thorax black; antennae dusky to blackish, 1.03 to 1.24 mm. long; an-

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

² Associate Entomologist.

³ The writer is indebted to the U. S. National Museum and Dr. P. W. Mason for the opportunity to study the material of the two *Asiphonaphis* species here described.

tennal III, 0.24 to 0.32 mm. long with 5 to 8 sensoria; IV, 0.17 to 0.22; V, 0.17 to 0.2; VI, 0.1 to 0.13 + 0.24 mm.; rostrum reaching second coxae; rostral IV + V 0.114, tip slenderly obtuse; hind tibiae 0.73; hind tarsi 0.11; first and seventh abdominal tubercles largest, remainder present; abdomen with dusky lateral patches which converge on first, sixth and seventh abdominal segments; small to larger, irregular dorsal dusky areas also occur; cauda black, 0.08 mm. long on median line, 0.11 total length.

Taxonomy.—*Asiphonaphis utahensis* differs from *A. pruni* W. and D. in having fewer than 10 sensoria on antennal III and none on antennal IV; hairs on antennae sparse and inconspicuous.

Collected upon *Salsola pestifer* at Thompsons, UTAH, September 13, 1929 (W. A. Shands). *Type* in the U. S. National Museum.

***Asiphonaphis carolinensis* n. sp.**

Apterous ovipara.—Size 1.71 to 1.74 mm. long and 0.88 to 0.94 wide across the abdomen; antennae dusky, 1.19 to 1.35 mm. long; antennal III, 0.34 to 0.41 mm. long; IV, 0.22 to 0.24; V, 0.21 to 0.23; VI, 0.13 to 0.146 + 0.2 mm.; rostrum reaching third coxae, tip slenderly obtuse; rostral IV + V, 0.1; legs slender and largely blackish; hind tibiae 0.91 to 0.98; hind tarsi 0.14 to 0.16; lateral tubercles conspicuous, rather slender, on abdominal segments 1 to 7; areas along margins of abdomen appear broken up, possibly glandular; cauda black.

Taxonomy.—*Asiphonaphis carolinensis* has unguis less than twice the length of base, instead of nearly three times base, and more slender lateral tubercles and fewer hairs near tubercles than in *A. pruni* W. and D. The pattern of dorsal and lateral dusky blotches, present in *A. utahensis* K. is lacking in *A. carolinensis*.

Collected on stem of (?) host, Florence, SOUTH CAROLINA, November 22, 1934 (C. F. Rainwater). *Type* in the U. S. National Museum.

APHIS CANAE Will. Buhl, Idaho, October 1930 (D. E. Fox).

A. CARBOCOLOR Gill. Castleford, Idaho, September 12, 1932 (Fox).

A. CHRYSOTHAMNI Wilson. Abundant on young bark of *Chrysothamnus nauseosus* at Brigham, Utah, June 8, 1928;⁴ Malad, Idaho, June 1933.

⁴ Unless otherwise indicated, collections are by the writer.

A. CHRYSOTHAMNICOLA G. and P. Feeding upon the brown, older twig bark of *Chrysothamnus nauscosus* at Amalga, Utah, September 1, 1926, the specimens being rather sluggish and not easily disturbed. Rostral IV + V is significantly longer than in *A. chrysothamni* Wil. Hollister, Idaho, October 30, 1930 (Fox). Eagele, Colorado, August 24, 1935.

A. ERIOGONI Cowen. Hollister, Idaho, October 1930 (Fox).

A. FRASERAE G. and P. Burley, Idaho, October 1930 (Fox).

A. HERMISTONII Wilson. On *Artemisia tridentata*, Eden, Utah, July 27, 1925.

A. INCOGNITA H. and F. On *Symphoricarpos*, Cowley Canyon, Utah, May 31, 1934 (T. O. Thatcher).

A. LUGENTIS Will. Castleford and Blue Gulch, Idaho, September 12, 1932 (Fox).

A. LUPINI G. and P. On blue *Lupinus*, Florence, Montana, June 17, 1912 (H. F. Dietz).

A. LUTESCENS Monell. Hansen, Idaho, October 1930 (Fox).

A. MINUTISSEMA (G. and P.) On *Artemisia tridentata*, 20 miles west of Castleford, September 30, 1932, and Twin Falls, October 23, 1930, in Idaho (Fox).

A. MONARDE Oest. Twin Falls, Idaho, October 30, 1930 (Fox).

A. NEILLIAE Oest. Murtaugh and Wendell, Idaho, October 1930 (Fox).

A. OENOTHERAE Oest. Hansen, Idaho, October 30, 1930 (Fox).

A. OESTLUNDI Gill. Hansen, Idaho, October 30, 1930 (Fox).

A. OREGONENSIS Wilson. On *Artemisia tridentata* at Brigham, May 17, 1933; Snowville, June 1928 (V. M. Tanner), in Utah.

A. SALICETI Kalt. Buhl and Castleford, Idaho, October 1930 (Fox).

A. SENECIO-RADICIS (G. and P.). Hansen, Idaho, October (Fox).

A. SENSORIATA G. and B. Hollister, Idaho, October (Fox).

A. SOLIDAGINIFOLIAE Will. Berger and Castleford, Idaho, October (Fox).

A. SPIRAECOLA Patch. Twin Falls, Idaho, October 1930 (Fox).

**New List of Titles of Publications Referred to by Numbers
in Entomological Literature in Entomological News.**

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Ciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Entomologische Zeitschrift. Frankfort-M.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
27. Bollettino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janeiro. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chilena de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Comparée. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie, Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národního musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungsmechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Científica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten über morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memórias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biología Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memórias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the *Entomological News* are not listed.

GENERAL.—Brues, C. T.—Aberrant feeding behavior among insects and its bearing on the development of specialized food habits. [Quart. Rev. Bio.] 11: 305-319, ill. Bruner, Lawrence—Obituary by Barber & Gurney. [10] 39: 59-60, ill. Bushby, L. C.—The gamut of sound in the insect world. [Wonders Animal Life] Part. 23: 725-730, ill. Calman, W. T.—The origin of insects. [Proc. Linn. Soc.] 1935-36: 193-204, ill. Das, S. M.—Insects and disease. [Current Science] V: 503-505. Dow, Robert Percy.—Obituary by G. P. Englehardt. [19] 32: 1-4, ill. Eidmann, H.—(see under Hymenoptera) Fracker, S. B.—Technique of large-scale operations in pest control. [10] 39: 41-59. Heikertinger, F.—Werden die Tagfalter von Vögeln gefangt? [97] 57: 1-21. Horn, W.—Ueber einen Insekten-Gott der Chinesen. [110] 4:67. Nikolskaja, M. N.—The Chalcidoid parasites of some injurious flies of grain crops. [72] 27: 1-27, ill. Pechuman, L. L.—An annotated list of the insects found in the bark and wood of *Ulmus americana* in N. Y. S. [19] 32: 8-21. Steiniger, F.—Beobachtungen und Bemerkungen zur Mimikryfrage. [97] 57: 47-58. Williams, C. B.—Butterfly travellers. [Nat. Geog. Mag.] 71: 568-584, ill.

ANATOMY, PHYSIOLOGY, ETC.—Balli, A.—Ricerche sul digiuno nella larva *Bombyx mori* (Lepid.). [Boll.

R. Stanz. Sper. Gelsicol. Bachicolt. Ascoli Piceno] 16: 33-42. **Baltzer, F.**—Analyse des Goldschmidtschen Zeitgesetzes der Intersexualität auf Grund eines Vergleiches der Entwicklung der *Bonellia*—und *Lymantria*-Intersex.—Zeitlich gestaffelte Wirkung des Geschlechtsfaktors (Zeitgesetz) oder Faktorengleichzeitigkeit (Gen.—Gleichgewicht). [87] 136: 1-42. **Barth, R.**—Muskulatur und Bewegungsart der Raupen zugleich ein Beitrag zur Spannbewegung und Schreckstellung der Spinnerraupen. [89] Abt. Anat., 62: 507-566, ill. **Beadle, G. W.**—The development of eye colors in *Drosophila melanogaster* as studied by transplantation. [90] 71: 120-126. Development of eye colors in *Drosophila*. Fat bodies & Malpighian tubes as sources of diffusible substances. [Proc. Nat. Acad. Sci.] 23: 146-152. **Becker, E.**—Ueber das Pterinpigment bei Insekten und die Färbung und Zeichnung von *Vespa* besonderen. [46] 32: 672-751, ill. **Beeson & Bhatia**—On the biology of the Bostrychidae (Coleopt.) [Indian Forest Records] 2: 223-323, ill. **Bhattacharya, G.**—Nuptial relation of *Diacamma vagans*. [Current Sci.] 5: 428, ill. **Carpentier, F.**—Le thorax et ses appendices chez les vrais et chez les faux *Gryllotalpides*. [Mem. Mus. R. Hist. Nat. Belgique] (2) Fasc. 4: 86 pp., ill. **Christensen, P. J. H.**—Zur Histologie und Embryologie der ueberwinterten Eier von *Orygia antiqua*. [89] Abt. Anat., 62: 567-582, ill. **Fisher, R. C.**—The genus *Scolytus* in Great Britain, with notes on the structure of *S. destructor*. [35] 24: 110-130, ill. **Grandi, G.**—Morfologia ed etologia comparata di Insetti a regime specializzato. VII. La morfologia comparata delle larve di alcuni Imenotteri Tentredinidi. [Boll. Ist. Ent. R. Univ. Bologna] 7: 222-254, ill. (see under Hymenoptera) **Hamilton, A. G.**—The mechanism of respiration of locusts and its bearing on the problem of inhalation of poison dusts. [22] 28: 53-68, ill. **Haskins & Enzmann.** Studies on the anatomy of the respiratory system of *Drosophila melanogaster*. [Journ. Morph.] 60: 445-458, ill. **Hodge, C.**—Some effects of diet on the gastric epithelial cells of the grasshopper, *Melanoplus differentialis*. [92] 72: 203-211. **Howland, Sonnenblick & Glancy.**—Transplantation of wing-thoracic primordia in *Drosophila melanogaster*. [90] 71: 158-166, ill. **Jepson, W. F.**—The morphology of the larva of *Serica brunnea* (Scarabaeidae). [22] 28: 149-165, ill. **Kuhn & Plagge**—Prä-determination der Raupenaugenpigmentierung bei *Ephestia kubniella* durch den Genotypus der Mut-

ter und durch arteigene und artfremde Implantate. [97] 57:113-126, ill. **Lartchenko, C. I.**—Le cycle évolutif du corps adipeux de *Loxostege sticticalis* et *Feltia segetum* et sa relation avec fécondité. [72] 27: 29-75, ill. (Russ., with French summary) **Lepesme, P.**—L'action externe des arsenicaux sur le criquet pèlerin (*Schistocera gregaria*). [Bull. Soc. Hist. Nat. Afr. Nord] 28: 88-104, ill. **Lison, L.**—Études histophysiologiques sur le tube de Malpighi des Insectes. I. Élimination des colorantes acides par le tube de Malpighi chez les Orthopteres. [Arch. Biol., Paris] 48: 321-360. **MacGill, E. I.**—The biology of Thysanoptera with reference to the cotton plant. VIII. The relation between variations in temperature & the life cycle. [35] 24: 95-109, ill. **Madwar, S.**—Biology & morphology of the immature stages of Mycetophilidae (Diptera). [Phil. Trans. R. Soc., Lond.] B, 227: 1-110, ill. **Maercks, H.**—Ueber die Sicherheit der Voraussage von Schlupfterminen bei Schadinsekten. [110] 4: 17-30, ill. **Malucelli, P.**—Casi teratologici osservati nel *Bombyx mori* (Lepid.). [Boll. R. Staz. Sper. Gelsicol. Bachicolt. Ascoli Piceno] 16: 14-24, ill. **Mariani, M.**—Una nuova specie di *Eustantonia* e studio sulla morfologia comparata delle larve del genere (Lepidopt: Momphidae) [27] 68: 97-103, ill. **Metz, C. W.**—Deficiencies & structural variations within the grand chromosomes in relation to the problem of gene structure. [Proc. Nat. Acad. Sci.] 23: 137-142. **Needham, N. V.**—A bacterial disease of *Aphis rumicis*, apparently caused by *Bacillus lathyri*. [35] 24: 144-147. **Park, T.**—The inheritance of the mutation "pearl" in the flour beetle, *Tribolium castaneum*. [90] 71: 143-157, ill. **Paul, H.**—Transplantation und Regeneration der Flügel zur Untersuchung ihrer Formbildung bei einem Schmetterling mit Geschlechtsdimorphismus, *Orgyia antiqua*. [87] 136: 64-111, ill. **Popov, V. B.**—Ein Fall von teratologischem Hermaphroditismus bei *Andrena agilissima* (Hymenoptera: Andrenidae). [72] 26: 160-164, ill. (Russ., with German summary). **Poulson, D. F.**—Chromosomal deficiencies and the embryonic development of *Drosophila melanogaster*. [Proc. Nat. Acad. Sci.] 23: 133-137. **Reuter, E.**—Elytren und Alae während der Puppen- und Käferstadien von *Calandra granaria* & *C. oryzae*. [89] Abt. Anat., 62: 449-506, ill. **Richter, A. A.**—On the elytral venation of Coleoptera. [72] 26: 25-28, ill. (in Russ., with English summary). **Schomann, H.**—Die Symbiose der Bockkafer. [46] 32: 542-612, ill. **Servadei,**

A.—Contributi alla conoscenza dei Tentredinidi (Hymenoptera Symphyta) della Rose. III. *Claudius difformis*. [Boll. Ist. Ent. R. Univ. Bologna] 7: 169-196, ill. **Slifer, E. H.**—The origin & fate of the membranes surrounding the grasshopper egg; together with some experiments on the source of the hatching enzyme. [53] 79: 493-506, ill. **Smith, L. M.**—Growth, reproduction, feeding & wing development of the mealy plum aphid in relation to climatic factors. [47] 54: 345-364, ill. **Sotavalta, O.**—Some cases of gynandromorphism in a hatch of *Lasiocampa quercus* (Lepidopt: Lasiocampidae). [Ann. Ent. Fennici] 3: 30-32, ill. **Thiem, H.**—Vom Blattrippenstecher (*Rhynchites paucillus*) als Obstbaumschadling. [110] 4: 1-17, ill. **Thimann & Beadle.**—Development of eye colors in *Drosophila*: Extraction of the diffusible substances concerned. [Proc. Nat. Acad. Sci.] 23: 143-146. **Ting, P. C.**—Feeding mechanisms of weevils, their function, and relationship to classification. [Mo. Bull. Cal. D. Agr.] 22: 161-165, ill. **Veneroso, A.**—Ancora sull'attività lipolitica del *Bombyx mori* (Lepid.). [Boll. R. Staz. Sper. Gelsicol. Bachicolt. Ascoli Piceno] 16: 25-27. **Walker, E. M.**—The larval stages of *Wohlfahrtia vigil* (Diptera: Sarcophagidae). [Journ. Parasitology] 23: 163-174, ill. **Weyrauch, W.**—Weiteres über den Internodienlauf als Ausdrucksbewegung. [89] Abt. Syst., 69: 241-252, ill. **Wilson & Pollister.**—Observations on the sperm formation in Centruroid scorpions with especial reference to the Golgi material. [Journ. Morph.] 60: 407-443, ill.

ARACHNIDA AND MYRIOPODA—**D'Amour, Becker & Van Riper.**—The Black Widow spider. [Quart. Rev. Bio.] 11: 123-160, ill. **Peters, H.**—Studien am Netz der Kreuzspinne (*Aranea diadema*). I. Die Grundstruktur des Nestes und Beziehungen zu Bauplan des Spinnkörpers. [46] 32: 613-649, ill. **Schulze-Rostock, P.**—XIII. Die Ixodoidea der Galapagos Inseln. [Meddel. Zool. Mus., Oslo] Nr. 45: 155-162, ill. **Stiles, K. A.**—The first record of the black widow spider for Iowa. [68] 85: 334. **Verhoeff, K. W.**—Zur Kenntnis der Rhinocricidae. [34] 118: 90-102, ill. (S*). **Strickland, E. H.**—The distribution of the black widow spider in Alberta. [4] 68: 284-285.

THE SMALLER ORDERS OF INSECTS—**Bird & Denning.**—A migration of the dragonfly *Libellula quadrimaculata*. [4] 68: 283-284. **Blake, C. H.**—What are termites?

[Bull. N. Eng. Mus. N. H.] No. 83: 3-9. **Emerson, A. E.**—Termite architecture. Termite problem. [Nat. Hist.] 39: 241-248; 249-254, ill. **von Hagen, W.**—The queen termite. [Nat. Hist.] 39: 255-259, ill. **Hood, J. D.**—Studies in Neotropical Thysanoptera. III. [105] 7: 96-115, ill. (*). **Ide, F. P.**—The subimago of *Ephoron leukon* & a discussion of the imago instar (Ephemera). [4] 69: 25-29, ill. **Mills, H. B.**—A. N. A. Oncopodura (Collembola [4] 69: 67-69, ill. (*). **Morison, G. D.**—A n. sp. of Plesiiothrips from Argentina. [75] 19: 469-472, ill. **Spieth, H.**—The life history of *Ephemera simulans* in Lake Wawasee (Ephemera). [4] 68: 263-266. **Thompson, G. B.**—A brief survey of the spp. of Mallophaga described from (1) Anseriformes & Ciconiiformes (Phoenicopterii); (2) from Falconiformes. [75] 19: 370-371; 379-380. **Tillyard, R. J.**—Kansas Permian insects, Part 16. The order Plectoptera (contd.): The family Doteridae, with a note on the affinities of the order Protohymenoptera. [Am. Jour. Sci.] 32: 435-453, ill. (*). Kansas Permian insects, Part 17. The order Megasecoptera & additions to the Palaeodictyoptera, Odonata, Protoperlaria, Copeognatha & Neuroptera. [An. Jour. Sci.] 33: 81-110, ill. Kansas Permian Insects, Pt. 18. The order Embiaria. [Amer. J. Sci.] 33: 241-257, ill. (*). **Werneck, F. L.**—Sobre uma nova especie do genero *Gyropus* (Gyropidae). [Mem. Inst. Oswaldo Cruz] 31: 845-849, ill.

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To Coccinellidologists.

The Office of the Pan American Union at Washington, D. C., informs us that Mr. Felisberto C. Camargo, Chefe do Departamento da Horticultura, Instituto Agronomico do Estado de S. Paulo, Caixa Postal No. 28, Campinas, Brazil, is desirous of getting in touch with those interested in the Coccinellidae. He has many Coccinellidae of Brazil in his collection, which he would be glad to exchange with individuals in this country who might send him specimens for identification.

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—Tabanidae (Horseflies and Deerflies). Exchange, purchase, or for determination. G. B. Fairchild, P. O. Box 272, Monticello, Fla.

Exchange.—Lepidoptera of the Western United States for rare American or tropical specimens. C. W. Herr, Woodburn, Ore. R-3.

Wanted—Insects in exchange for Japanese insects or to buy. Tell me your wishes. Hiromu Yamamoto, Matsuo-Kozan. Iwategun Iwateken, Japan.

Would like to exchange Southern California insects for any North American Mutillidae (wingless wasps or velvety ants). Curtis Brown, 2950 G St., San Diego, California.

Wanted.—To get in touch with Specialists who will make determinations for a share of our duplicates. We have many undetermined specimens from all parts of Iowa.—H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Wanted.—Communication with anyone who has or is collecting Lepidoptera in Burlington County, New Jersey. Also anyone having a microscope for sale.—E. P. Darlington, New Lisbon, N. J.

Wanted for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, *Columbia* or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

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EXCHANGES

(Continued)

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Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American **Cephidae**. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

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ENTOMOLOGICAL NEWS

JULY, 1937

Vol. XLVIII

No. 7

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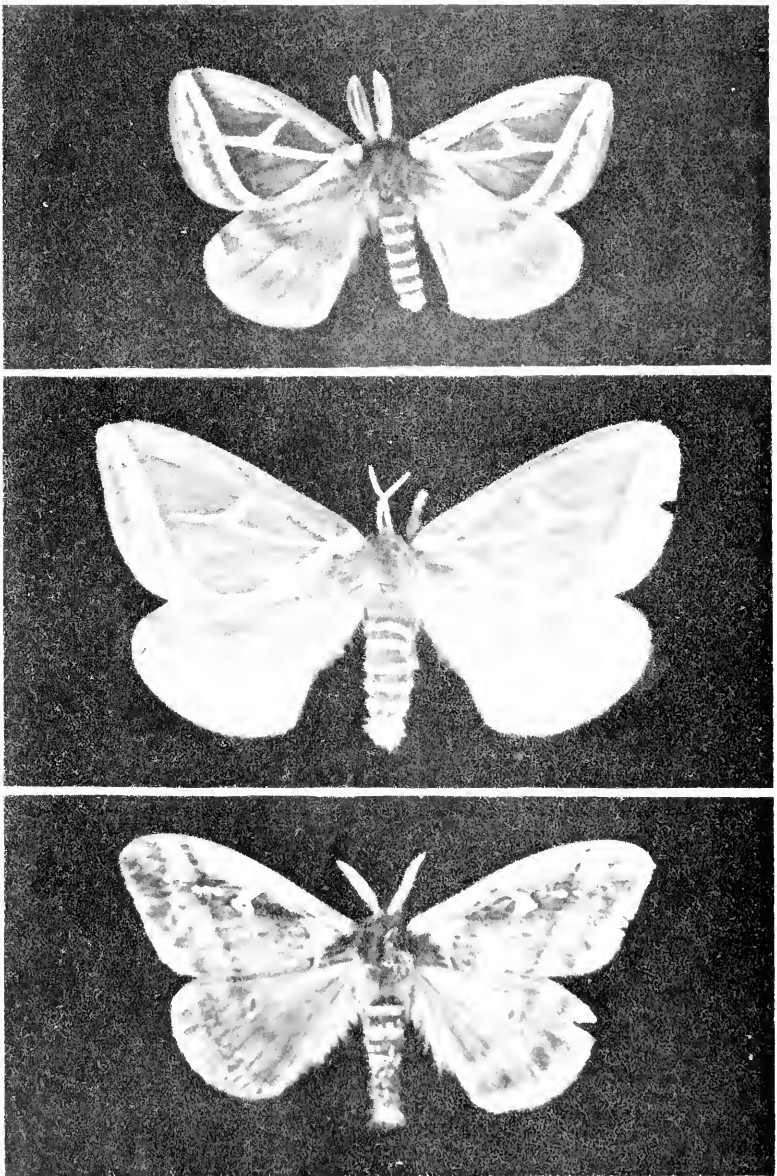
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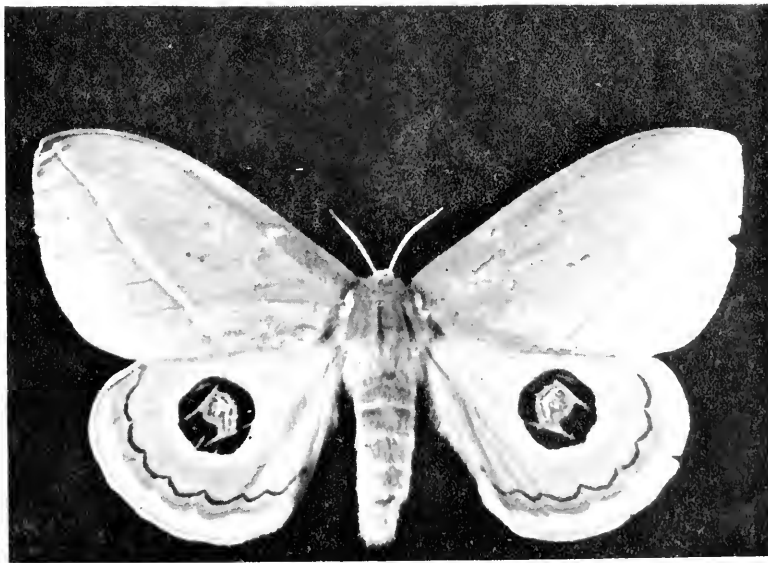
Stated Meetings of The American Entomological Society will be held at 8.00 P. M., in 1937, on the fourth Thursday of each month excepting June, July, August, November and December, and on the third Thursday of November and December.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the "News" will furnish reprints of articles, without covers, over and above the twenty-five given free at the following rates: One or two pages, twenty-five copies, 35 cents; three or four pages, twenty-five copies, 70 cents; five to eight pages, twenty-five copies, \$1.40; nine to twelve pages, twenty-five copies, \$2.00; each half-tone plate, twenty-five copies, 30 cents; each plate of line cuts, twenty-five copies, 25 cents; greater numbers of copies will be at the corresponding multiples of these rates. Printed covers for 50 copies, \$4.00 or more, according to number of pages bound.



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AUTOMERIS SUAVINA N. SP., 4 ♀, 5 ♂, —JOHNSON

ENTOMOLOGICAL NEWS

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JULY, 1937

No. 7

New species of Saturniidae (Lepidoptera)

By FRANK JOHNSON, New York City.

(Plates IV and V.)

Dirphia undulinea n. sp. (Plate IV, figs. 2 ♀, 1 ♂).

♀: Head, thorax and fore wing dark olive brown; antennae pinard yellow. Abdomen black above crossed by segmental light cadmium lines; abdomen below dark olive brown; a lateral series of white points.

Fore wing: a thick white spot at base of costa from which two white lines diverge, one to middle of inner margin, the other close below median vein, slightly interrupted near discocellular, then joined by a white line on discocellular, and continued along vein 4 to subterminal line, the latter slightly sinuous from close to apex to inner margin before tornus; the termen paler with a narrow dark shade adjoining the subterminal line, and diffuse dark spots towards apex. Fore wing below more grayish brown, the subterminal line indicated by diffuse whitish spots on interspaces.

Hind wing above light cinnamon drab, faintly suffused with roseate; a minute whitish point at end of cell; a broad dark medial shade, and a broader subterminal shade. Hind wing below deep brownish drab a light brownish gray shade, and a fine black streak on discocellular; a vinaceous gray lunular dentate subterminal line.

Expanse: 70 mm.

Habitat: Sta. Catharina, BRAZIL. The unique female above described is the *type* of the species. I subsequently received a male which is also figured, Plate IV, fig. 1.

Dirphia tripicata n. sp. (Plate IV, fig. 3.)

♂: Antennae chamois. Head, thorax and abdomen above fuscous; abdomen dorsally with some fine pale transverse lines; white points laterally, and some roseate hairs at base laterally; anal hairs apricot buff.

Fore wing: a large pale vinaceous lilac space at base, somewhat triangular, broad at costa, narrowing to a point at submedian vein, dark edged on basal side; medial space dark slate violet, expanding at subcostal, containing a short white streak below cell, a larger heart-shaped spot at discocellular, containing a fine dark line and a point, and a series of white points

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below vein 5, termen broadly light vinaceous roseate with a dark postmedial inbent from costa and a similar subterminal shorter line; from vein 6 to vein 3 a dark slate violet patch, its inner edge incurved; a wavy subterminal line from vein 6 to vein 3. Fore wing below mostly vinaceous, darkest at base of costa and in cell; a pale spot on discocellular traces of a dark incurved subterminal line, and a wavy line above tornus.

Hind wing above with the base broadly deep pink, the medial space vinaceous fawn, the termen broadly dull indian purple. Hind wing below as in fore wing; a fine, dark, wavy medial line; a similar lunular subterminal line.

Expanse: 63 mm.

Habitat: Sta. Catharina, BRAZIL. Possibly an aberration of *D. trisignata* Feld.

Automeris suavina n. sp. (Plate V, figs. 4 ♂, 5 ♀).

♂: Antennae tawny olive. Head, collar and thorax sorghum brown; abdomen above black; thorax and abdomen below, including anal hairs avellaneous.

Fore wing vinaceous fawn with darker shading at base and terminally on interspaces before and beyond the subterminal line, terminally the dark shading is broken into spots; traces of an antemedial line; a black line at base of wing, followed on inner margin by roseate hairs; the discal spot formed of fine short lines, partly double, somewhat outcurved at costa; subterminal line whitish, distally dark edged, from costa close to apex, straight to vein 1 about middle of margin. Fore wing below light russet vinaceous; a large black discal spot containing a small white spot; subterminal line black, cut by veins.

Hind wing above; the inner margin broadly deep roseate from base to subterminal line; annulus large, somewhat oval, black finely edged by a yellow line, and containing a small cluster of grayish scales and a very fine white streak, the postmedial space to line purplish vinaceous; the subterminal line lunular dentate, black, sharply defined, outwardly edged with livid brown; termen flesh pink, narrowing towards costa. Hind wing below like fore wing; a white point at discocellular and a slight black shade; a postmedial fine, dark wavy line; a very faint subterminal shade.

♀: Head and thorax saccardo's olive; abdomen dorsally from base deep grayish olive; beyond middle with transverse lines and the two terminal segments entirely also the underside deep olive buff.

Fore wing largely purplish citrine, darkest on basal third of costa; a distinct pale antemedial line, outcurved on costa, then nearly vertical; the discal points indistinct, the subterminal line as in male.

Hind wing above to line as in male, but the inner margin not so red; the ocellus with more numerous grayish scales; lines and termen as in male. Hind wings below nearest ecru drab, but somewhat suffused with roseate also the veins; the base and costa of fore wing somewhat darker; the discal spots and lines as in male.

Expanse: ♂ 77 mm., ♀ 82 mm.

Habitat: Sta. Catharina, BRAZIL. The male described is the *type* of the species.

The types of all three species will be placed in the U. S. National Museum, Washington.

Projected Monograph of Coleoptera of Alabama.

A cross-section survey of wildlife conditions will begin this month in three of Alabama's state parks with the lowly beetle serving as a biological index for the study, according to field reports received by the National Park Service at its regional headquarters in Richmond, Va.

Six-month studies have been arranged for Chewacla State Park, near Auburn; De Soto State Park, near Fort Payne, and Monte Sano State Park, near Huntsville. An enrollee of a Civilian Conservation Corps camp at each park will be chosen to make collections of the insects and forward them with appropriate information to the Alabama Museum of Natural History. When the youths are selected, they will receive intensive training for two weeks as members of the Museum's annual entomological expedition. Similar studies are planned tentatively for other parks of the state system.

Final reports on findings at each park will serve as a basis for general biological study designed for preservation or improvement of environmental conditions favorable to propagation and development of wild animal and bird life. The survey also will contribute data for publication of a monograph on the "Coleoptera of Alabama" to be issued by the Museum of Natural History. The work has been in progress for nearly 20 years. The cooperative park program is expected to advance publication by 10 years.

General development work at all parks of the state network is being carried forward by CCC units under joint supervision of the National Park Service and the Alabama Commission of Forestry, represented by Col. Page S. Bunker. Dr. Walter B. Jones is director of the Museum.

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, Regional Office, Region One, Richmond, Virginia.

Insect Stamps.

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

For a number of years I have been collecting information about the use of, or the reference to insects in various fields of human activity, such as: musical compositions inspired by insects, literary references to insects, insect designs in art, heraldry, and philately, etc. I have found such "supplementary" entomological material of considerable value in insect nature study work with Boy Scouts and high school Biology students and of some use, even, in teaching Entomology to university students. My interest in "insect stamps" was reawakened by reading, "A Veteran's Appeal" in the April, 1935, issue of THE NEWS (p. 107). Through the assistance of Richard McP. Cabeen, stamp editor of the Chicago Tribune and other philatelists, I have obtained information of nine issues of postage and revenue stamps of entomological interest.

The most popular entomological design on stamps is the beehive, i.e., the traditional dome-shaped straw skep. This has appeared on at least four issues of stamps, including a Hungarian postage stamp, a United States proprietary issue and two American local stamps.

The Hungarian stamp is one of the 60 to 80 varieties of the Banet issue. This issue was one of several printed at Temesvar during the short time between the Serbian evacuation and the Roumanian occupation. Although used to some extent for postage these stamps were employed chiefly for paying the salaries of postal authorities! This particular stamp is catalogued as a 50-feller surcharge on a 10-feller stamp, but I have been unable to secure copies of any except the original type without surcharge. The hive appears in the design immediately below the central circular medallion. The stamp is printed in violet brown. I do not know of any significance of the hive in the design.

The beehive forms the central design on stamps of the Chi-

cago and the Dupuy & Schenck (New York) "Penny Post." In the Chicago stamp the hive appears in an oval medallion, surrounded by a ribbon bearing the words, "CHICAGO" above and "PENNY POST" below, then grill work and finally lines forming a box. The Dupuy & Schneck stamp consists merely of the picture of a hive and lettering ("DUPUY & SCHENCK" and "PENNY POST") enclosed in a rectangular box. The former stamp is orange brown on white paper, the latter black on light grey paper. Both of these stamps are very rare and I have not seen the originals, but Mr. H. C. Needham, an authority on local issues, has kindly sent me for examination "good counterfeits" from his reference collection. He also furnished me (in litt., May 18, 1935) the following information concerning the stamps:

"Chicago Penny Post was established in Chicago as a local Delivery Post about 1862 by Edward Cooke; he was in that year a Newsman, residence 208 West Jackson Street; was associated with S. C. Griggs & Co., booksellers; . . ."

"Dupuy & Schenck: In February, 1842, Henry J. Dupuy and Jacob H. Schenck were mail carriers under Alexander M. Greig in the business of the then City Despatch Local Post. This post was taken over by the Governmental Postmaster at New York City on or about August, 1842, and became known as the United States City Despatch Post. Mr. Greig retired in November, 1844, and these two men were among those who signed a memorial and best wishes for his future success. The stamp was in use apparently from 1846 to 1848 inclusive."

Charles N. Crittenton, who manufactured "Pike's Toothache Drops" and "Glenn's Sulphur Soap" about the time of the Civil War, used a revenue stamp with a bee hive design. The hive, with a background of pine trees and a flowering shrub in the foreground, forms the design of a central oval medallion. The stamp appeared in two values, one and two cents, the former in both blue and black, the latter in black. I have wondered if the products contained either honey or beeswax. Mrs. C. L. Manning, Philatelist of the U. S. National

Museum, furnished me the following information about private proprietary stamps:

"Stamps of special design were supplied by the United States Government to manufacturers for the payment of the tax on patent medicines. These stamps were printed by the Government and in addition to the face value, representing the tax, the firms desiring these special stamps were required to pay the cost of engraving the individual dies, making the plates, etc."

Since the preceding article was written Mr. Curtis Benton, a very enthusiastic entomologist-philatelist, has called my attention to some additional "insect stamps". In the 1932 series of stamps issued for Italian Somaliland three values (1.25, 1.75 and 2 lire, in dark blue, red orange and carmine, respectively) had a design consisting of a large termite nest with a native standing beside it. In 1934 the 1.25 lira value was surcharged, "ONORANZE AL DUCA DEGLI ABRUZZI", to form part of the Abruzzi commemorative issue. A set of stamps issued by Spain in 1934 in commemoration of the 300th anniversary of the death of Lope de Vega included a 15 centimo, myrtle green stamp, which shows some sort of an insect lying on its back—obviously dead. The design was taken from a bookplate of de Vega, and the insect is said to have been intended to represent a critic of the great author. The identity of the insect is in doubt—it resembles, somewhat, both a cockroach and a lamellicorn beetle.

Moulting in Some Lepidoptera.

By BERTHA M. HESS, Philadelphia, Penna.

(Continued from page 156.)

HYPHANTRIA CUNEA (Arctiidae).

The *Hyphantria cunea* caterpillars were taken from an apple tree after they had begun their web. As there were no apple trees in the vicinity of my home, they were fed apricot leaves. F. E. Lutz (1921, page 168 states): "It occurs on more than a hundred kinds of trees, apple and ash being their favorites." They seemed to feed very well on apricot leaves, but they did

not spin much silk and were rather sluggish in their movements. Upon removing some of the old apple leaves to examine them for the shed skins, there were, besides some skins, a number of caterpillars which were tightly fastened to the leaf by a cocoon which was also fastened to the caterpillar between the first four pairs of prolegs. These cocoons were 5 mm long. On the fresh leaves other caterpillars were still crawling which also had these cocoons fastened to them. All of them which were thus parasitized, were removed. However, every day there were from six to ten more caterpillars fastened to the side of the tin in which the nest was kept, or to the cloth which covered it, or to the leaves. Not one escaped. They all died in this manner when only 15 mm long. L. O. Howard (1897, pp. 24-25) describes this parasite, *Apanteles hyphantriae* Riley, as follows;—"This species which is an extremely common and important parasite of *Hyphantria cunea* . . . attacked only half-grown caterpillars of the web-worm. . . . When affecting *Hyphantria*, the white cocoon is formed almost under the middle of the half-grown caterpillar, and is fastened securely to the object its host happens to rest upon, and slightly to the host itself. . . . But one *Apanteles* is found in a caterpillar, so that each white cocoon indicates the death of a victim."

The only skins obtained, were those cast by the larvae before they showed the parasite's cocoon. These were very hairy; much more so than either the tussock moth or the tent caterpillar. The head capsule was intact, showing only the occipital foramen, where it had joined the thorax. Although the skins were transversely wrinkled from being pushed down off the posterior end of the caterpillar, they were not invaginated.

The skins were examined dry, being placed on a slide with a few drops of water to prevent their being blown away. The dried exuviae, with the exception of the thorax, retained the shape of the larvae. Not one of the skins obtained in the two moults showed the mid-dorsal rupture.

First exuviae. Most of these skins showed a lateral split on each side of the thorax, separating the ventral surface with

the three pairs of thoracic legs from the dorsal surface, which retained only the meso- and meta-thorax. The pro-thorax was pulled off with, and still attached to, the head. The skins split as follows:—7 showed no split whatever, the head was separated; 16 showed lateral splits on each side of the thorax, dorsal prothorax was missing; 1 showed a lateral split on each side of three thoracic segments with no segments missing; 3 showed lateral splits on each side of the thorax, with the dorsal surface of the three segments missing.

Second exuviae. None of these had split at all, and in only one case was a little nick seen on each side of the prothorax. 68 skins were examined.

Of the 29 head capsules measured, ranging in width from 0.8626 to 1.4528 mm, 25 had the dorsal prothorax still attached and 4 had not.

MALACOSOMA AMERICANA (Lasiocampidae).

Abandoned nests of *Malacosoma americana*, or Tent caterpillar, were cut from the wild cherry trees June 23, 1933; and after examining the exuviae contained therein, it was discovered that those from the first moult were missing. F. E. Lutz (1921) says of the tent caterpillar, "Their first act seems to be to spin a temporary silken tent around what is left of the egg mass. If this is in a good place from which to go out for food, they may make their permanent tent here, but usually they move, in several days, to a fairly large fork of a tree and there construct the web." Accordingly on April 20, 1934, fresh nests of the tent caterpillar, which the latter were just beginning to spin were cut from the wild cherry tree for observation, and for obtaining the exuviae from the first moult. The larvae were fed fresh wild cherry leaves until May 11, when the nests were destroyed and the exuviae taken out. At this time the larvae destroyed with the nest were of various lengths, ranging from 6 mm to 39 mm. As moulting takes place within the nest, these slightly hairy exuviae were entangled in the silken web. Besides being transversely wrinkled, they were flattened; the skins being stuck together and hardened, and were very brittle. Being of a very dark

color, with two broad, black lines on the dorsal surface, running the length of the larvae, it was impossible to detect any splits in the skins in this shortened, hardened, opaque condition. Soaking in water for a week did not soften them. However boiling for 10 minutes in 10% solution of sodium hydroxide did soften the skins so that they could be examined. Both examination and measuring were done with wet skins. They were put on a slide under the dissecting microscope and gently pulled until all the folds were smoothed out. Often they pulled out to twice their length in the dried state. The distance was then measured between each pair of legs, starting with the third thoracic leg and ending with the last proleg. The same method was used as that described on a previous page for the tussock moths. At the same time the manner of the splitting in the exuviae was noted and recorded. The figures of the measurements were then arranged in order from the smallest to the largest.

First exuviae. 9 exuviae measured in this moult ranged in size from 2.633 mm to 3.859 mm; 8 skins showed no split whatsoever in the thorax; 1 skin showed a split in the mid-dorsal line through the first 2 thoracic segments; 1 attached head measured 0.454 mm in width; 1 attached head measured 0.4994 mm. Although the majority of the head capsules were detached from the rest of the exuviae, a few remained attached, and these were measured. None showed any splits.

Second exuviae. 16 skins measured from this moult varied in length from 4.313 mm. to 5.448 mm. 1 of these skins showed no split whatsoever, the others split along the mid-dorsal line; 8 through 2 thoracic segments and 7 through 3 thoracic segments. 4 attached heads measured 0.681 mm. in width.

Third exuviae. 18 skins were measured from this moult. The smallest measured 7.137 mm and the largest 8.9438 mm; 18 split along the mid-dorsal line in 3 thoracic segments; 4 attached heads measured 1.089 mm. and 1 head measured 1.362 mm.

Fourth exuviae. 104 skins seem to belong to this moult. In all these skins there is not more than 0.5 mm difference be-

tween any two successive sizes. All of these skins were taken from the abandoned nests of 1933. The smallest of these measured 10.609 mm, and the largest 16.798 mm. All split in the mid-dorsal line and of these, 5 split through the first and second thoracic segments, 93 split through three thoracic segments and 6 split through three thoracic and one abdominal segment. The smallest head from this moult measured 1.4528 mm.

Fifth exuviae. 35 skins were measured in this moult. These were the largest skins found in the web, and should therefore be the last moulted skins before the larvae spun the cocoons. All split along the mid-dorsal line, 27 through the thorax only and 8 through the thorax and the first abdominal segment.

Last larval moult. These skins were shed after the larvae had spun the cocoons. The head capsules were still attached to the rest of the exuviae, but badly crushed. These skins were jammed in a tight ball about 5 mm in diameter, in the bottom of the cocoons. They were boiled for 20 minutes, but even this failed to cause them to open. They were pulled open with the needles, but this damaged them too much to make accurate measurements. Most of the skins showed only the split through the three thoracic segments.

The pupal skins. The mid-dorsal split was through all three thoracic segments, connecting with a transverse split between the thorax and abdomen on the dorsal surface, extending along the dorsal edge of the wings for two abdominal segments. There was no ventral split.

MOULTING FISSURES OF CATERPILLARS REMOVED FROM THEIR COCOONS.

In 1935 some further observations were made to ascertain if the splits in the exuviae of the last larval moult from caterpillars which had been removed from their cocoons are of the same extent as the splits in exuviae from caterpillars left within the cocoons.

It was rather difficult to judge when was the best time to remove the caterpillars from the pupal case. If removed immediately after spinning the cocoon, some would spin a second

cocoon. If allowed to rest awhile after the cocoon was finished before being taken from it, many caterpillars would remain inert, and would not moult but would die. If allowed to remain in the cocoon a day, they had already moulted in the cocoon.

Hemerocampa leucostigma, July 6, 1935, 20 caterpillars spun cocoons and were removed from them and placed on tissue paper in a cardboard box, with a wet blotter in one end. 1 respun a cocoon and was again removed but died later; 13 others died also; 6 moulted outside the cocoon. From these pupae 2 adults emerged (female) July 14; 2 adults emerged (females) July 15; 1 adult emerged (female) July 16; 1 adult emerged (male) July 17.

Manner of splitting of last larval exuviae:—All had the head capsule still attached to the rest of the exuvia, showing the Y-split and the split continued down the mid-dorsal line of the thorax and the first abdominal segment; one exuvia broke. This corresponds exactly to the extent of the splits of the exuviae of the female caterpillars within the cocoons as mentioned on a previous page. The pupal skins also ruptured normally.

Malacosoma americana, June 6, 1935, 85 cocoons were removed from four nests; 52 had already transformed to pupae, 15 were parasitized and discarded, 18 were still caterpillars. The 52 pupae were placed on tissue paper in a cardboard box and 19 hatched out as moths; many of the others were parasitized, for every day large wasps were found in the box, although it was kept in a screened, enclosed shed. Of the 18 caterpillars, 4 taken from the cocoons in the morning, moulted before 9 p. m., June 6; 1 shed its skin before 9 a. m. June 7; 2 spun a cocoon, were removed and later moulted; 11 died.

In all the larval exuviae, the head capsule remained attached; 4 split in the mid-dorsal line through the thorax only, 2 split through the thorax and the first abdominal segment, 1 split through the first two thoracic segments. These splits differ little or none from those in the exuviae taken from the pupal cases mentioned on a previous page. The pupal skins also

ruptured the same way. It therefore matters little whether a caterpillar moults within the cocoon or out of it, the extent of the split is the same.

SOME PREVIOUS DESCRIPTIONS OF MOULTING IN LEPIDOPTERA.

Eidmann (1924, pp. 590) stated, "Bekanntlich reisst die Cuticula bei der Häutung stets an der gleichen Stelle, der sogenannten Häutungsnaht, oder-linie, die sich bei der weitaus grössten Mehrzahl der Insekten auf der Dorsalseite des Körpers von der ersten Abdominalsegmenten in der Medianlinie über den Thorax bis zum Kopf erstreckt, wo sie sich Y-oder T-förmig gabelt. . . . Bei den Raupen der Lepidopteren . . . wird zunächst der Kopf an der Verwachsungsstette mit dem Körper abgesprengt und die Larvae arbeitet sich aus dem Sackförmigen Futteral heraus." He evidently does not include the last larval moult in the cocoon.

K. L. Henriksen (1932) gives an interesting description, particularly of the moulting of the pupal skin. He states, "As well known since the time of Reaumur (1734), the caterpillars of Lepidoptera moult through a rent along the 3 thoracal segments, posteriorly also often traversing the first abdominal segment. Anteriorly this splitting line may continue into the head and form the usual Y (for instance in *Vanessa*), but in other instances (for instance Hesperidae) no opening of the head capsule takes place; the head of the new instar is drawn back through the occipital foramen of the old head capsule and out through the rent in the thoracic region. As the obtect pupa of the Lepidoptera is more specialized than the common exarate pupa of other insects, also a more specialized moulting manner might probably be expected in the Lepidoptera, and this is also the case, as already Reaumur (1734) has described. The base is indeed still the paired sagittal rent, which however only traverses the dorsum of the 2 wing-bearing segments, but not the pronotum nor the head, instead of which supplementary rents have appeared. From the posterior point of the sagittal split the rent continues to each side along the hind border of the wing buds, either stopping on the side in about the height of the spiracles (*Vanessa*) or continuing around the venter. Then they may join the lower part of another rent,

which is in every case present, outlining the entire part medially to the wings, viz the head, antennae and legs; the uppermost, dorsal point of this latter rent joins the anterior point of the dorsal sagittal rent. Thus the pupal cuticle . . . opens anteriorly either through 3 flaps (1 ventral, 2 dorsal) or will break into 4 separate pieces."

When the author began raising the caterpillars, their future sex was not taken into consideration. The larvae were all raised in one large tin, irrespective of when they emerged from the egg. Mosher and Webber (1914), who raised larvae of the gypsy moth, kept the larvae of one age in the same tray, using smaller trays for the small larvae and larger ones for the older larvae. "These trays had a band of tangle foot one inch wide, on the upper inside margin, to prevent the escape of the larva or intrusion of others. Each tray was inspected daily and it was found that those larva which pupated in the fifth stage produced male moths, while those larva having a sixth stage developed females." They report Prof. C. H. Fernald (1896), p. 305 as stating that out of a batch of 55 newly hatched larvae (of the gypsy moth) 52 completed their transformations with the following results, 1 female moulted 6 times, 29 females moulted 5 times, 9 females moulted 4 times, 7 males moulted 5 times and 6 males moulted 4 times.

Gaines and Campbell (1935, p. 460) state: "The frequency of the head measurements showed that the larvae from corn and hegari had 6 instars, whereas those from cotton had 7 instars."

If these variations occur in gypsy moths and corn ear worms, they may occur in other species also. The only means the author employed to determine to which moult the exuviae belonged, were their appearance and length. All of the largest exuviae found would then, no doubt, be those of future females.

Determination of the Exuviae. Dyar (1890) pointed out that "the widths of the head of a (Lepidopterous) larva in its successive stages follow a regular geometrical progression." If this be true of the heads it may be approximately true of the

length of the body. Taking the reciprocal ratio of that of Dyar, (dividing the length of the live tussock larva just emerged from the egg, into that of the larva just finishing the first moult) we got a ratio of 1.70; the length of the second instar larva into that of the third gives us the ratio of 1.38. Dividing the average length of the exuviae of each moult into that of the succeeding moult we get the following ratios;—1.45; 2.24; 1.83; 1.45. These ratios with the exception of the second, fall within the range of 1.28 to 1.84 noted by Calvert (1929, p. 251) as given by Ripley for *Agrotis ypsilon*. Such being the case, the allotting of the exuviae to the different moults seems to be correct. However, for the present purpose, it is the nature of the splitting and not the exact determination of the moults, that is the more important.

There is still the question as to whether the fall-web worm would have exhibited the mid-dorsal split in later moults. If not, this species shows a deviation from the generally accepted statement, that Lepidopterous larva moult by a mid-dorsal split on the thorax.

The Tussock Moth, the Tent Caterpillar and the Fall web worm all show in the majority of the exuviae of each species and in the same moult, splits of the same extent, but there is a minority which varies in this respect. The majority of the exuviae of all larval moults, except the last larval of the Tussock Moth, split to the same extent. The same is true for the Tent Caterpillar. The Fall-web worm has the two lateral splits through the thorax in the first moult, at least, while the other two species show a mid-dorsal split and sometimes none at all.

LITERATURE CITED.

CALVERT, P. P. 1929. Different rates of Growth among animals with special reference to the Odonata. Proc. Amer. Phil. Soc 68: 227-274.

ID. 1934. The rates of growth, larval development and seasonal distribution of dragonflies of the genus *Anax* (Odonata; Aeshmidae) Proc. Amer. Phil. Soc. 73: 1-70, 3 pls.

DYAR, H. G. 1890. The number of moults of Lepidopterous larvae. Psyche 5: 420-422.

EDMANN 1924. Untersuchungen über Wachstum und Häutung der Insekten. Zs. Morph. Oekol. Tiere Berlin 2:566-610, 16 fig.

FERNALD, C. H. 1896. In Forbush, E. H. and Fernald, C. H. The Gypsy Moth, Boston, Mass. Wright & Potter Printing Co., State Printers.

GAINES J. C. AND CAMPBELL F. L. 1935. Dyar's rule as related to the number of Instars of the Corn Ear Worm, *Heliothis obsoleta* (Fab.) Collected in the Field. Annals of the Entomological Society of America. 28: 445-461, 6 figs.

HOWARD, L. O. 1897. A study of Insect Parasitism. U. S. Dept. of Agr. Technical Series No. 5: 22-23.

Id. 1899. Three insect enemies of Shade Trees. U. S. Dept. of Agr. Farmers Bulletin No. 99. pp. 12-20.

HENRIKSEN, K. L. 1932. The manner of moulting in Arthropoda. Notulae Ent. XI: 103-127.

LUTZ, F. E. 1921. Field Book of Insects. G. P. Putnam, N. Y.

MOSHER, F. H. AND WEBBER, R. T. 1914. The relation of variation in the number of larval stages to sex development in the Gypsy Moth Jour. Econ. Entom. 7:368-373.

Some Records of Orthoptera From South-western Pennsylvania

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A collection of Orthoptera, made by the junior author during the summer of 1936 in the vicinity of Washington, Pennsylvania, possesses considerable interest. It was obtained in a section from which only meagre data on the group have hitherto been published and reveals an unexpected extension of range for several species whose main distributional area is far to the south or west of this region. The collection was brought to New York and submitted to the senior author, who checked over and verified or corrected the provisional determinations made in the field.

According to Merriam's map of the life zones of the United States, the locality at which these specimens were secured lies near the line of contact between the Transition zone and the Carolinian division of the Upper Austral Zone. The former extends as a wide band from New York State across Pennsylvania and is thence carried along the Appalachians and the higher portions of the Alleghany plateau as far as northern Georgia. In Pennsylvania and West Virginia the western margin of this zone roughly coincides with the eastern limits of the Ohio River drainage basin, which otherwise lies wholly within the Upper Austral Zone. The mixed character of the fauna, which is thus implied, is substantiated by the present series of Orthoptera. Certain species in this series as *Orphulella speciosa*, *Eucoptolophus sordidus*, *Neoconocephalus ensiger*, and especially *Scudderia pistillata*, are generally northern in distribution; while others, as *Syrbula admirabilis*, *Hippiscus rugosus*, *Trachyrhachis kiowa fuscifrons*, and *Melanoplus differentialis*, are typically austral in range.

The topography of the region in which Washington is situated is similar to that of the general Alleghany Plateau. As is shown on the topographic maps of the Amity and Claysville quadrangles published by the United States Geological Survey, the surface in the general vicinity of the town ranges in altitude from about 1000 feet in the lowest valleys to 1250 to 1400 feet on the summits of the larger hills. The latter elevation corresponds to the general altitude of the original, nearly level surface of the plateau, out of which the present diversified topography of the region has been carved. Consequently, although at a distance the summits present a nearly level skyline suggestive of an ancient stage of peneplanation, the present surface is remarkably rough and rugged, having been cut up by erosion into a confused network of short ridges, separated from one another by deep and generally narrow valleys. Hence, when viewed from the valleys, the scenery presents more nearly the aspect of a district of low mountainous elevations than of the deeply dissected table-land, out of which the geological structure of the country shows the present surface to have been produced through erosion.

Formerly the country about Washington was heavily forested, but practically all the original timber has long been removed and at the present time about all that is left are scattered tracts of second-growth timber springing up on the more precipitous slopes or capping some of the higher summits. Hardwoods predominate, the oaks forming the most conspicuous component.

The rapid and extensive removal of its forests was doubtless due in large part to exploitation of the rich coal and oil deposits of the region. It was presumably also responsible for the present impoverished state of the soil, which, except for occasional minor tracts of alluvium in some of the wider valleys, is generally thin and full of angular stony fragments.

The following list includes only the species of Orthoptera represented in the collection and doubtless falls far short of being a complete list of all species of the group represented in the region. In view of the fact that the Alleghany Plateau is one of the outstanding centers of distribution for brachypterous melanopli, it is rather surprising to find none of that group in the collection. However, the extensive deforestation, to which the country about Washington has evidently been subjected, may perhaps account for the absence of these characteristically sylvan and usually locally restricted types. Doubtless future field work on a larger, and more intensive, scale will bring to light such forms, as well as other sylvan types similarly noted for their highly restricted habitat relations.

NOMOTETTIX CRISTATUS COMPRESSUS Morse. VIII 30, 1 ♂, 3 ♀, 1 juv. ♂.

Reference of the specimens to this race is made with some hesitation. They are not typical, having the distinctive racial characters much less clearly defined than in typical material of *compressus* from west-central Tennessee, and approximating *cristatus cristatus*, to which race the present material is evidently transitional, as would be expected from its geographical location. Occurring in a hay stubble field on level, partly moist ground near a small stream.

ACRYDIUM ORNATUM Say. VIII 30, 3 ♂, 1 ♀, 4 juv. ♂, 4 juv. ♀. Taken in the same surroundings as the preceding.

A. ARENOSUM ANGUSTUM (Hancock). VIII 30, 1 ♂. Associated with *ornatum*.

TETTIGIDEA LATERALIS LATERALIS Say. VIII 23-30, 10 ♂, 11 ♀, 4 juv. ♂, 5 juv. ♀. Occurring in the same places as the other grouse-locusts and apparently the most abundant local representative of the group.

SYRBULA ADMIRABILIS (Uhler). VIII 30, 1 ♀. Taken in a field of timothy stubble on nearly level ground in the bottom of a ravine. This is apparently the first record of the occurrence of this attractive grasshopper in Pennsylvania and its presence at Washington at an altitude of fully 1000 feet would seem to indicate a much greater northward extension of its range in the lowlands of the Ohio drainage than is the case east of the Appalachians where its northernmost known limits are Burlington and Lakehurst, N. J., both localities less than 50 feet above sea-level.

ORPHULELLA SPECIOSA (Scudder). VII 9-26, 3 ♀, 1 juv. ♀. Occurring on stony ground in a closely cropped hillside pasture.

DICHRMORPHIA VIRIDIS (Scudder). VII 25-VIII 23, 1 ♂, 3 ♀, 1 juv. ♀. Hay stubble field on nearly level moist ground near stream.

ARPHIA XANTHOPTERA (Burmeister). VIII 23-30, 2 ♂, 3 ♀. Associated with the preceding. Also taken on higher ground of rocky roadbed and adjoining slopes of hillside.

A. SULPHUREA (Fabricius). VI 21-VII 9, 2 ♂. Rocky ground of pasture at hill summit near small woodland tract.

CHORTOPHAGA VIRIDIFASCIATA (De Geer). VI 12-VII 12, 1 ♂, 4 ♀. Generally distributed in early summer in fields and pastures.

ENCOPTOLOPHUS SORDIDUS (Burmeister). VIII 22-30, 6 ♂, 12 ♀, 2 juv. ♀. Widely distributed in fields and pastures.

PARDALOPHORA APICULATA (Harris). VI 21, 2 ♂, 2 ♀; VIII 30, 1 juv. ♂, 3rd instar. Grazed hillside pasture in briery tracts of short, dry grasses. One female has the tegmina definitely maculate and in general appearance so closely resembles *phoenicoptera* (Burm.) that it was at first mistaken for that species, but a later examination showed it to be only an aberrant example of the present species.*

HIPPISCUS RUGOSUS (Scudder). VIII, 23-30, 1 ♀, 1 juv. ♂, 1 juv. ♀. Hillside pasture on stony soil in low and sparse herbage. Apparently the first record of the species for western Pennsylvania and a north-eastern limital record in the Mississippi drainage area.

* The reverse condition in which *P. phoenicoptera* exhibits the colorational pattern of *apiculata*, is shown in a male taken by the senior author June 27, 1936, at Ocean View, New Jersey, which in all structural features is typical *phoenicoptera*.

DISSOSTEIRA CAROLINA (Linnaeus). VII 5-19, 1 ♂, 1 ♀, 1 juv. ♂, 1 juv. ♀, adult as early as the first date. Practically ubiquitous.

SPILARAGEMON BOLLI Scudder. VII 26-VIII 30, 1 ♂, 5 ♀. Hillside pastures on stony ground near wooded tracts.

S. PLANUM Morse. VIII 8-23, 2 ♂, 2 ♀. Apparently a western limital record of this mountain-dwelling species. Taken in an open pasture on stony ground in the same general type of surroundings as *bolli*. One male approaches the latter in the form of the pronotal crest, but the other is typical of the species in this feature.

TRACHYRHACHIS KIOWA FUSCIFRONS (Stal). VII 13-24, 4 ♂, 2 ♀, 2 juv. ♀. Local on stony surface of old, abandoned roadbed on lower slope of hill. This record, the first of the species from Pennsylvania, extends its range far to the east of its previously known limits in that direction.

MELANOPLUS MEXICANUS (Saussure). VII 9-12, - 1 ♂, 1 ♀. On stony ground of old, weedy field on hill summit.

M. FEMUR-RUBRUM (De Geer). VIII 8-23, 1 ♂, 3 ♀, 2 juv. ♂, 1 juv. ♀; earliest adults, VIII 16. Swarming everywhere in fields, meadows and pastures.

M. DIFFERENTIALIS (Thomas). VII 23-VIII 23, 2 ♂, 4 juv. ♂, 6 juv. ♀; earliest adults, VIII 8. Partly moist tract in valley bottom near stream. Apparently a north-eastern limital record of the species, if one disregards the secondarily established colonies occurring, east of the Appalachians, in the lower Delaware valley and the coastal sections of New Jersey.

MELANOPLUS BIVITTATUS (Say). VII 9-26, 3 ♂, 2 ♀, 1 juv. ♀ (VII 12). Lower hill slopes, mostly in damp situations.

SCUDDERIA TEXENSIS (Sauss. & Pict.). VIII 8-23 1 ♂, 3 ♀. Meadows in valley bottom.

S. PISTILLATA Brunner. VII 26, 1 ♂. Weedy and bushy hillside field. Appears to be a western limital record in the southward extension of the range of this northern species along the mountains.

S. CURVICAUDA (De Geer). VII 26, 1 ♂. Bushy hillside field.

NEOCOCEOEPHALUS ENSIGER (Harris). VII 23-VIII 26, 3 ♂, 1 juv. ♂, 1 juv. ♀; earliest adults, VIII 8. Partly marshy tract near stream in valley bottom.

ORCHELIMUM VULGARE Harris. VIII 8, 2 ♂. Weedy field.

COCEOEPHALUS FASCIATUS (De Geer). VII 23-VIII 22, 1 ♂, 3 ♀. Weedy meadow in lowlands.

C. STRICTUS (Scudder). VIII 30, 1 ♀. Weedy meadow.

NEMOBIUS FASCIATUS (De Geer). VIII 30, 1 juv. ♀, not racially determinable, but presumably the typical form of the species.

GRYLLUS ASSIMILIS FABRICIUS. 1 ♀, undated. Residential grounds.

OECANTHUS NIGRICORNIS QUADRIPUNCTATUS Bentenmüller. VIII 16, 2 ♂, 2 ♀. Weedy pasture and grassy tracts in dry stream bed. One of each sex shows a slight approach toward *nigricornis nigricornis* F. Walker in having a narrow, median black band extending from the occiput to the middle of the pronotum and in the blackish tint of most of the ventral surface of the abdomen.

Pairing of Males of *Samia cecropia*. (Lep.: Saturnidae).

By H. E. WOODCOCK, Chicago, Illinois.

The amateur naturalist should not spurn the most simple and well known experiments in the thought that they can develop nothing new—that conditions may enlarge or vary the results, sometimes in a surprising manner, is evidenced by the following recital.

Early in June the writer placed a newly emerged female *Samia cecropia* in a box with a screened lid. The next morning as late as 9 A. M. over 50 males were present. That night I placed another female in the same box and left both outside during the night. At 7 A. M. the following morning the box was literally covered with males and there were also a number on the ground and on surrounding plants.

The temperature was in the fifties; quite chilly, and the insects were extremely lethargic—so much so that I picked up practically all of them, only one or two taking flight. Placing the catch on a sheet inside, I counted carefully as I took them one by one from the box, and found 130 specimens. Quite probably some had left prior to daybreak and indeed during the day I found several more around the yard under bushes and other plants.

There was not, however, a single specimen in the whole catch that would be accepted by a collector as a fitting specimen, all being badly battered and worn, wings broken and frayed. All antennae, however, were intact.

There were among the group picked up, four "pairs" i.e., males, which were quite securely attached to each other at the point of the abdomen containing the claspers. As closely as I could ascertain, the claspers of one of them had been driven

into the body of the other so close to the claspers that I thought at first they were merely hung together by the claspers, but a fairly strong pull failed to separate them. A drop of body fluid, nearly the size of a green pea was oozing from the body of the insect pierced, lending weight to the idea that the claspers had actually penetrated the body. I did not, unfortunately, examine them under a glass to be sure of this, but I am certain that a strong pull did not separate them. I placed a pair outside in a bush, and found them still so joined together hours later. I then put a pair in a killing jar and in their struggles they came apart. This pair I sent to Mr. Gerhard of the Field Museum to ask him to verify the fact they were both males. He verified this and remarked on the drop of (then) hardened fluid, on the abdomen of one of them. I gave Mr. Gerhard a full report on this incident. None of the males, up to this point, had been allowed to get into the box with the females.

My own theory, a matter of conjecture only, is that the unusual crowd of males all endeavoring for hours to reach the two females, created such a strong sensual atmosphere that these pairs of males sought to mate with each other. Nothing else can account for it unless it be their manner of mortal combat (use of the claspers) of which I have never read. Mr. Gerhard believes the male claspers sufficiently chitinized to pierce the abdomen of another male. I have been told there is no record of such an incident, and in previous years I have never seen it either, but I have also never seen over 130 males trying to reach one pair of females at the same time.

The above occurred in the back yard of my home, which, while in the city limits of Chicago, is still within a mile of the western boundary.

New Records from Bait Traps. (Dipt., Coleop., Corrodentia).¹

By S. W. FROST, The Pennsylvania State College.

Since the publication of my paper "A Summary of Insects Attracted to Liquid Baits,"² determinations have been made of a number of additional species. Mr. Maurice T. James, Colorado Agricultural Experiment Station, identified twelve species of Stratiomyidae taken from baits in the vicinity of Arendtsville, Pennsylvania, during 1928. The habits of the Stratio-

¹ Authorized for publication on October 6, 1936, as paper No. 741 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

² ENT. NEWS XLVII: 64-68, 89-92, 1936.

myidae are not too well known and hence notes on these species seem worth while. They are found on plants and apparently do considerable feeding on nectar and drops of liquid on foliage. It is not strange that they were taken in considerable numbers in baits. The baits consisted chiefly of various brands of refiner's syrup diluted with twenty parts of water. Nine of the 18 genera mentioned in the "List of Insects of New York State" were taken. The species are: *Allognosta fuscitarsis* Say, June 26, July 3, 24; *Actina viridis* Say, June 26, Oct. 8; *Geosargus cupararius* Linn., June 26, Oct. 8; *Microchrysa flavicornis* Meig, June 24, Oct. 1; *Stratiomyia norma* Wied., July 7, Sept. 11; *S. mcigenii* Wied., July 7, 24, Aug. 21; *S. quarternaria* Loew, Aug. 14; *Odontomyia interrupta* Oliv., May 7, 14; *O. virgo* Wied., July 7; *O. borealis* James, July 10; *Eupararyphus tetraspilus* Loew, June 26, July 3; and *Oxyccra picta* V. d. W., June 26.

There are a few records of Trupaneidae. *Rhagoletis cingulata* Loew, was taken during June from traps hung close to cherry trees. Another species, *Procecidochares atra* Loew, was taken on September 27.

Mr. J. N. Knull, Ohio State University, made the following determinations of Cerambycidae which are additions to the species listed previously; *Centrodera picta* Hald., May 13; *Anoplodera nitens* Forst., June 29; *Strangalia luteicornis* Fab., June 29, July 7; *Xylotrechus colonus* Fab., May 1, 18; *Clytoleptus albofasciatus* Lap., May 18; *Lciopus fuscicularis* Harris; and *Typocerus velutina* Oliv., July 7.

Two psocids, identified by Dr. P. J. Chapman, were taken in baits; *Psocus petiolatus* Banks, Oct. 14, and *Polypsecus corruptus* Hagen, Oct. 4.

The unusual *Oncodes incultus* O. S. (Cyrtidae) which is parasitic on spiders, was taken in traps that were hung on a hickory tree some distance from the orchards.

Stylogaster biannulata Say, is the only representative of the Conopidae taken in baits.

OWING to non-receipt of corrected proof from several authors in time for inclusion in the July NEWS, we have been obliged to depart from our usual policy and to extend one continued article beyond our customary limit.—EDITOR.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, part, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed

GENERAL.—Ahmad, T.—Importance of the study of insect ecology in applied Entomology. [Indian Jour. Agr. Sci.] 7: 156-167. Bruner, Lawrence.—Obituary by E. P. Van Duzee. [55] 13: 68. Kesselyak, A.—Ueber einen Zweckmassig abgeanderten Exhanstor. [79] 23: 53-54, ill. Kinsey, A. C.—Supra-specific variation in nature and in classification. [90] 71: 206-222, ill. L'Heritier, Ph.—Etude de variations quantitatives au sein d'une espece. *Drosophila melanogaster* (Diptera). [Arch. Zool. Exp. Gen., Paris] 78: 255-356, ill. Pictet, A.—Un physiologiste des Insectes. Le Dr. Frank Brocher, 1866-1936. [41] 16: 749-761. Ruediger, E.—Maria Sibylla Merian. [17] 54: 391-394. Scheerpeltz, O.—Ueber Totung, Konservierung und Praparation von Kafern. [79] 23: 1-10, ill.

ANATOMY, PHYSIOLOGY, ETC.—Becker, E.—Die Farbstoffe der Insekten. [17] 54: 338-340; 346-347; 368-370. Carpentier, F.—Le thorax et ses appendices chez les vrais et chez les faux Gryllotalpides. [Mem. Mus. R. Hist. Nat. Belg.] (2). Fasc. 4. 86 pp., ill. Chevais, S.—Sur la structure des yeux implantés de *Drosophila melanogaster*. [Arch. Anat. Miscr., Paris] 33: 107-112, ill. Eggert, B.—Die imaginalen Tracheenkiemen von *Protonemura nitida* (Plecoptera). [34] 118: 113-117, ill. Florkin, M.—Contributions a l'etude du plasma sanguin des insectes. [Acad. R. Belgique Classe Sci. Mem.] 16, fasc. 5: 69 pp. Gaunitz,

C. B.—Tvestjärten, *Forficula auricularia*, som blodsugare. [28] 58: 75-79. **Goodrich, A. L.**—The head capsule of a Trichopterous pupa, *Dicosmoecus atripes* (Limnophilidae). [Trans. Amer. Miscr. Soc.] 56: 243-248, ill. **Gouin, F.**—Metamorphoses de quelques Chironomides. [Rev. Franc. Ent.] 4: 53-60, ill. **Hertz & Imms.**—On the responses of the African migratory locust to different types background. [Pro. Roy. Soc. London] (B) 122: 281-297. **Jucci, C.**—La attività secretiva delle ghiandole serigene nei bachi da seta (*Bombyx mori*). [Boll. di Zool.] 8: 25-38. **Kann, F.**—Temperatureinflüsse auf die Wachstumsstadien von *Dixippus* [*Carausius*] *morosus* (Orthopt.: Phasmidae). [Biol. Gen.] 13: 25-66, ill. **Kuwana, Z.**—Reducing power of the body fluid of the silkworm. [Japan. Journ. Zool.] 7: 273-303. The excretion of uric acid in the silkworm larva. [Japan. Journ. Zool.] 7: 305-309. Statistics of the body weight of the silkworm. [Japan. Journ. Zool.] 7: 311-346. **Mellanby, K.**—Water and fat content of tsetse flies. [31] 139: 883. **Nolte, H. W.**—Beiträge zur Kenntnis der symbiontischen Einrichtungen der Gattung *Apion*. [46] 33: 165-200, ill. **Roy, D. N.**—The physiology of digestion in the larvae of *Gastrophilus equi* (Diptera). [116] 29: 150-162. On the function of the pharyngeal ridges in the larvae of *Calliphora erythrocephala* (Diptera). [116] 29: 143-149, ill. **Turdakow, F.-A.**—Die Präembryonale Auswahl beim Maulbeer-seidenspinner (*Bombyx mori*). [Arch. Zool. Exp. Gen., Paris] 78: 231-253. **Van Dam, L.**—Ueber die Atembewegungen und das Atemvolumen von *Phraganea* Larven, *Arenicola marina* und *Nereis virens*, sowie über die Sauerstoffausnutzung bei *Anodonta cygnea*, *Arenicola marina* und *Nereis virens*. [34] 118: 122-128. **Wiesmann, R.**—Zur Diapause der Kirschfliege, *Rhagoletis cerasi*. [41] 16: 727-729.

ARACHNIDA AND MYRIOPODA.—**Anon.**—Spiders and their kin. [Cornell Rur. School, Cornell Univ.] Leaflet 30, No. 2: 3-32, ill. **Bryant, E. B.**—N. spp. of southern spiders. [5] 43: 87-101, ill. **Fox, I.**—Notes on North American Lycosid spiders. [10] 39: 112-115, ill. (*). **Gertsch & Wallace.**—New American Lycosidae with notes on other species. [40] No. 919, 22 pp., ill. **Kessel & Kessel.**—(See under Diptera.) **Madsen, H.**—Biology of a littoral mite [Greenland] [31] 139: 715. **Masters, E.**—The black widow spider. [Bull. Nat. Hist. Soc. Md.] 6: 6 pp., ill. **Peters, H.**—Studien am Netz der Kreuzspinne (*Aranea*

diadema). II. Ueber die Herstellung des Rahmens der Radialfaden und der Hilfspirale. [46] 33: 128-150, ill.

THE SMALLER ORDERS OF INSECTS.—**Adamson, A. M.**—Preliminary report on termites and termite damage in Trinidad, West Indies. [Trop. Agric.] 14: 141-149, ill. **Bailey, S. F.**—The Jones collection of Thysanoptera. [55] 13: 89-93. **Banks, N.**—Notes on some Hydropsychidae (Trichoptera). [5] 43: 126-130, ill. (*). **Bohart, R. M.**—A preliminary study of the genus *Stylops* in California, Pt. II, (Strepsiptera). [55] 13: 49-57, ill. (*). **Silvestri, F.**—Description of a n. sp. of *Symphylurinus* (Dicellura) from Central America. [40] No. 920, 3 pp., ill. **Tillyard, R. J.**—Kansas Permian Insects. Pt. 19. The Order Protopleraria. Family Probnisidae. [16] 33: 401-425, ill. (*). **Upholt, W. M.**—Two new Mayflies from the Pacific coast. [55] 13: 85-88. **Williams, F. X.**—Notes on the biology of *Gynacantha nervosa* (Aeshninae), a crepuscular dragonfly in Guatemala. [55] 13: 1-8, ill.

ORTHOPTERA.—**Cappe de Baillon, Favrelle & de Vichet.**—Parthenogenese et variation chez les Phasmes. [78] 71: 129-189, ill. **Carpentier, F.**—(See under Physiology.) **Elsa, J. E.**—A new locality for *Grylloblatta*. [55] 13: 57. **Gurney, A. B.**—Studies in certain genera of American Blattidae. [10] 39: 101-112, ill. (S*).

HEMIPTERA.—**Anon.**—The periodic cicada or "17 year locust". [Nat. Hist. Soc. Md.] Special Bull. May, 1936: 4 pp. **DeLong, D. M.**—Some new Deltocephaloid Leafhoppers from Illinois (Cicadellidae). [55] 13: 32-34. The genus *Chlorotettix* (Cicadellidae): some notes on synonymy. [55] 13: 34-35. **Essig, E. O.**—A new Aphid from California (Aphidae). [55] 13: 46-48, ill. **Helmsing & China.**—On the biology and ecology of *Hemiodocus veitchi* (Pelodriidae). [75] 19: 473-489, ill. **Jensen-Haarup & Wagner.**—Einige neue Pentatomidarten aus der Sammlung des Zoologischen Museums in Hamburg. [17] 54: 321-324, ill. (S*). **Van Duzee, E. P.**—Note on *Idiocerus provaucherii* (Bythoscopidae). [55] 13: 8. A few new Hemiptera. [55] 13: 25-31. A peculiar structure in a Fulgorid. [55] 13: 31.

LEPIDOPTERA.—**Anon.**—Familiar butterflies of Maryland. [Nat. Hist. Soc. Md.] July, 1936: 30 pp. **Anon.**—Familiar moths of Maryland. [Nat. Hist. Soc. Md.] May, 1930: 19 pp., ill. **Bell, E. L.**—N. gen. & spp. of Neotropical Hes-

periidae, with notes on some others (Rhopalocera). [40] No. 914, 17 pp., ill. **Boursin, C.**—Beitrage zur Kenntnis der "Agrotinae-Trifinae" XX. 1. Morphologische und systematische Studie über die Gattung *Athetis*. [17] 54: 364-368; 388-391, ill. (*). **Chermock & Chermock.**—Two new races of *Papilio rudkini*. [38] 36: 8-10. Two new races of *Papilios* from Manitoba. [38] 36: 11-13. **Clark, A. H.**—The butterflies of Virginia. [Expl. & Field Work Smiths. Inst.] 1936, No. 3407: 47-52, ill. **Clark & Williams.**—Records of *Argynnis diana* & of some other butterflies from Virginia. [91] 27: 209-213. **Comstock, J. A.**—A new record and life history (Noctuidae). [38] 35: 169-174, ill. Miscellaneous notes on western Lepidoptera. [38] 36: 19-23, ill. **Comstock & Dammers.**—Life history of *Papilio rudkini*. [38] 36: 13-18, ill. **Comstock, Sperry & Sperry.**—Notes on the life history of *Oeneis daura*. [38] 35: 165-169, ill. **da Costa, A. A.**—Morphidões do distrito federal. [Rev. Inst. Biol. Veg. Jard., Rio de Janeiro] 11: 213-237, ill. **Cross, F. C.**—A new race of *Plebeius scudderi* (Lycaenidae). [55] 13: 88. **Dammers, C. M.**—A remarkable instance of a food-plant selection by a butterfly. [38] 36: 23-24, ill. **Forbes, W. T. M.**—The *Persius* group of *Thanaos* (Hesperiidae). [5] 43: 104-113, ill. (*). **Haydon, S.**—The Papilionidae of Maryland: a short descrip. of the swallowtail butterflies of this state with notes on the various stages of their life histories. The Satyridae of Maryland: a short description of the satyrid wood-nymph butterflies of this state with notes on the various stages of their life histories. [Pro. N. H. Soc. Md.] Mar., 1933; Feb., 1934: 14 pp., 10 pp. **Hovanitz, W.**—Note on *Argynnis skinneri* (Nymphalidae). [55] 13: 60. **Lange, W. H.**—Food plant records for two *Epinota* spp. [55] 13: 48. California pine tip moths of the gen. *Rhyacionia*. [38] 36: 25-34, ill. **Matsumura, S.**—Geographical distribution of Lepidoptera in Pacific countries. [Pro. Fifth Pacific Sci. Cong.] 5: 3503-3514. **Meadows, D.**—An annotated list of the Lepidoptera of Santa Catalina Island, California. Pt. I. Rhopalocera. [38] 35: 175-180, (*). **Testout, H.**—Les types de Lépidoptères dans la collection Donzel. [Ann. Soc. Linu. Lyon] 80: 45-76, ill. **Zikan, J. F.**—Neue Nymphaliden-Arten und Formen aus Brasilien. [17] 54: 328-331; 385-387.

DIPTERA.—**Curran, C. H.**—The Neotropical spp. of *Melanostoma* and allies (Syrphidae). [40] No. 926, 4 pp. (*). Two new Tachinidae (Diptera) parasitic on *Polybia*

spp. (Hymen.: Vespidae). [40] No. 923, 4 pp. **Hennig, W.**—Tylidae (Micropezidae) aus der Sammlung des British Museum of Natural History. Nachtrage zur "Revision der Tyliden.-II." [75] 19: 521-523. (S*). **L'Heritier, Ph.**—(See under General.) **James, M. T.**—A preliminary preview of certain families of Diptera from the Florissant Miocene Beds. [Jour. Paleontology] 11: 241-247, ill. The genus *Comantella* (Asilidae). [55] 13: 61-63. (*). **Keilin & Tate.**—A comparative account of the larvae of *Trichomyia urbana*, *Psychodes albipennis*, and *Phlebotomus argentipes* (Psychodidae). [116] 29: 247-258, ill. **Kessel & Kessel.**—The life history of *Guarax arene*, an egg predator of the black widow spider, *Latrodectus mactans* (Chloropidae). [55] 13: 58-60. **Knipling, E. F.**—The biology of *Sarcophaga cistudinis*, a sp. of Sarcophagidae parasitic on turtles and tortoises. [10] 39: 91-101, ill. **de Oliveira Castro, G. M.**—Sobre as "cores metallicas" dos olhos dos Tabanidas. [15] 9: 33-40. **Patton, W. S.**—The blood-sucking species of the genus *Musca* and the evolution of the blood-drawing proboscis in the genus. [Pro. Fifth Pac. Sci. Cong.] 5: 3361-3366. **Philip, C. B.**—New horseflies from the southwestern United States (Tabanidae). [55] 13: 64-67. **Williamson & Zain.**—A presumptive Culicine host of the human malaria parasites. [31] 139: 714, ill. **Zia, Y.**—Comparative studies of the male genital tube in Coleoptera Phytophaga. [Sinensia] 7: 319-352, ill.

COLEOPTERA.—**Blaisdell, F. E.**—A third n. sp. of *Centronopus* from California (Tenebrionidae). [55] 13: 95-96. **Blake, D. H.**—A new Chrysomelid beetle of the genus *Monoxia* from Lower California. [Zoological] 22: 89-91, ill. **Cazier, M. A.**—A new California Omus (Cicindelidae). [55] 13: 94. Review of the willistoni, fulgida, parowana and senilis groups of the genus *Cicindela*. [38] 35: 156-163, ill. (*). **Darlington, P. J.**—West Indian Carabidae, III: New species and records from Cuba, with a brief discussion of the mountain fauna. [115] 11: 115-136. (*). A new Oedemerid beetle from Cuba. [5] 43: 102-103. **Hatch, M. H.**—Note on the Coleoptera fauna of Alaska. [55] 13: 63. **Haydon, S.**—*Dynastes hercules* & *Dynastes tityrus*: a brief comparison between two beetles of the family Scarabaeidae, one native to Maryland and the other of the South American fauna. [Pro. N. H. Soc. Md.] Aug., 1931: 1-5, ill. **Hopping, R.**—The Lepturini of America N. of Mexico. [Can.

Dept. Mines & Resources] Bull. 85: 42 pp., ill. **Jeannel, R.** Notes sur les Carabiques (Premiere note). [Rev. Franc. Ent.] 4: 1-23, ill. (*). **Kleine, R.**—Ein neuer Nemocephalus aus Argentinien (Brenthidae). [Ann. Nathist. Mus. Wien] 48: 141-142. **Marshall, M. Y.**—A new Melyrid of the genus Tanaops. [38] 35: 16+165. **Mutchler, A. J.**—Three n. spp. of Tytthonyx from Cuba (Cantharidae). [40] No. 924, ill. **Parsons, C. T.**—Notes on North American Nitidulidae: Pocadius. [5] 43: 114-118, ill. (*). **Portevin, G.**—Liodides nouveaux des collections du Museum. [Rev. Franc. Ent.] 4: 31-36, ill. (S*). **Ross, E. S.**—A n. sp. of Dendrophilus from California (Histeridae). [55] 13: 67-68. **Saylor, L. W.**—New Scarab genera from lower and southern California. [38] 36: 35-37, ill. **Spaeth, F.**—Ueber die Regierungsrat E. Reimoser in Argentinien und Paraguay 1907 und 1908 gesammelten Hispinen (Chrysomelidae) [Ann. Nathist. Mus., Wien] 48: 142-166. (*). **Ting, P. C.**—Collecting notes. [55] 13: 24. **Van Dyke, E. C.**—Weevl larvae annoying to householders. [55] 13: 93. **White, E. E.**—Notes on the Dytiscid beetle, *Agabus lineatus*. [55] 13: 84. **Zia, Y.**—(See under Diptera.)

HYMENOPTERA.—**Bequaert, J.**—A study of the North American *Odynerus hidalgo* (Vespidae). [55] 13: 9-14 (*). **Cockerell, T. D. A.**—The Bees of Barbados. [9] 70: 111-113. (S*). **Cros, A.**—*Osmia longispina*, etude biologique. [33] 77: 175-185. **Frisch, J. A.**—The life history of the hunting wasp, *Ammobia ichneumonina*. [Bull. Nat. Hist. Soc. Md.] 5: 7-12, ill. **Linsley & M'chener**—Some n. gen. & spp. of North American parasitic bees. [55] 13: 75-84. **Malaise, R.**—Old and new gen. of Arginae (Tenthredinidae). [28] 58: 46-59, ill. Gattungstabelle sowie neue Arten und Gattungen der Unterfamilie Perreyiinae (Tenthredinidae). [28] 58: 60-65, ill. **Mickel, C. E.**—The Mutillid wasps of the genus *Timulla* which occur in North America north of Mexico. [70] 17: 1-119, ill. (*). **Timberlake, P. H.**—N. spp. of *Andrena* from California. [55] 13: 69-74.

SPECIAL NOTICES.—**Neue Untersuchungen über die Fossil Insekten mit Ergänzungen und Nachträgen sowie Ausblicken auf phylogenetische, palaeogeographische und allgemein biologische Probleme.** By A. Handlirsch [Ann. Nathist. Mus., Wien] 48: 1-140.

MELANISMUS, ALBINISMUS und RUFINISMUS. Ein Beitrag zum Problem der Entstehung und Bedeutung Tierischer Färbungen. By W. F. REINIG (Scientific Assistant at the Prussian Acad. of Sciences). Pp. 122, figs. 27. Georg Thieme, Leipzig, 1937. Price RM 5.20. To Linnaeus, only morphological variations were significant; not until Darwin, Wallace and Bates showed that variations in color when correlated with ecological and distributional data, might shed light on the origin of species, did color variations become also a subject of scientific interest. Since that time so many observations on the occurrence of extremes of coloration have been made and so many breeding experiments of very unequal significance carried out that the present concise critical review of the whole subject of color anomalies, covering the literature down to and even including part of 1937, is indeed very welcome. This volume deals with the anomalies known as melanisms, albinisms and rufinisms in mammals, birds, reptiles and, especially, in insects. The figures are all of lepidoptera not only because these forms are the most aesthetic but also because most of the experimental work has been done on them. It is also evident that, of the 3 color anomalies, melanism has received most attention. Dark individuals are often larger and sturdier, and the dark color itself is sometimes adaptive (industrial melanism) whereas the reverse is generally true for albinos. These qualities of melanic forms have inspired many efforts to produce experimentally, melanisms which would prove heritable, in order to establish the Lamarckian contention that environment may not only change the appearance of an individual but also induce a corresponding change in the genetic constitution of that individual so that its offspring will inherit the change regardless of environment. In fact, a number of investigators, down to J. W. H. Harrison (1935), believed that they had accomplished such induction. It is true that certain environmental conditions, temperatures, humidity, feeding of chemicals, etc., do produce melanic individuals which resemble those resulting from gene mutations, and it is this similarity in appearance between genetic and environmentally conditioned melanism that has misled those investigators who were not trained geneticists into believing that a heritable change had been induced by an environmentally conditioned change of color. In the more recent type of such experiments, e. g., those of Harrison and Garrett, 1926, 1935, occasional dark specimens, appearing in an inbred line of *Selenia* which was being fed salts of heavy metals, are asserted to be the result of "induction," whereas most geneticists will recognize

such an appearance as an ordinary mutation. Indeed, Harrison's own tables, 1935, record dark individuals in the controls. As regards the geographical distribution, it is well known that although melanic individuals and races may occur anywhere within the range of a species, they are more frequent on islands, on mountains, on moors, in industrial regions and in the vicinity of large cities. In addition, the author calls attention to the concentration of melanic forms at the boundaries of the range of a species. He goes on to express his conviction that melanism, wherever it occurs, is the same sort of thing, that it is fundamentally the same biological phenomenon, and that the causative factor must be some condition common to all the situations in which concentrations of melanic forms occur. Since no climatic or other imaginable environmental factors exist which all these situations have in common, the only common factor remaining appears to be isolation. This, then, is the author's theory. In all the situations mentioned, there is a discontinuity in the range of a species and small populations exist isolated from the general range. Recessive genes for dark color may be present, or may appear by mutation, in such an isolated population just as they do anywhere else. When such genes exist in a small population the more intensive inbreeding which necessarily occurs in a small group will spread the gene through the population more rapidly and the frequency with which 2 individuals each having one dark gene mate, by chance, with each other will be greater than in a large population with little inbreeding. Some of the offspring of such matings will have 2 genes for dark color, i.e., be homozygous, and therefore will be actually dark in color.

The proportion of melanic individuals appearing in succeeding years will, even in the isolated population remain small unless selection occurs. Natural selection may gradually increase this proportion and even lead to the formation of a dark local variety, especially when the dark form is at the same time stronger and larger than the type, or has specific physiological characteristics better suited to the particular environment. In industrial regions the dark color will have positive selection value as a concealing color. Albinism is treated by the author the same way. Types are classified, geographical distribution is discussed and again the theory of isolation is applied. Albinos are usually less sturdy and generally possess negative selection value. Red anomalies are less well understood. Red may occur in place of black as in occasional red moles, or in legs of beetles of the genus *carabus*, either as an individual or

a racial character. The bibliography includes papers by 160 different authors.

R. G. SCHMIEDER.

FRAGMENTS OF ENTOMOLOGICAL HISTORY Including Some Personal Recollections of Men and Events. By HERBERT OSBORN. Columbus, Ohio. Published 1937. Pp. vii, 394, including 44 plates of portraits, 3 plates of entomological laboratories. \$4.50. This is the fourth American book on the history of entomology which has appeared in the nineteen-thirties, the other three being Dr. Howard's anecdotal History of Applied Entomology, 1930; Prof. Essig's History of [Pacific U. S.] Entomology, 1931, and Mr. Weiss's Pioneer Century of American Entomology, 1936. The third of these was noticed in the NEWS for July, 1936. Prof. Osborn's "Fragments" "is a record of certain events and sketches of personalities known to the writer," "*not* . . . an attempt at an adequate summary or even as an outline of the development of the science of entomology as a whole." Chapter I, "Early Steps in Entomology," emphasizes the factors in the rapid development of Economic Entomology in the United States, as compared with that in Europe, as due largely to the invasions of the Colorado Potato Beetle, Rocky Mountain Locust, Cotton Worm, Gipsy Moth, Boll Weevil, San Jose Scale, European Corn-borer and Mediterranean Fruit Fly following each other in quick succession. Chapter II, "The Nineteenth Century," includes some new material on the Melsheimer family, especially an autobiography of Frederick Valentin Melsheimer, supplied by his great-great-granddaughter, Mrs. Ethel Melsheimer Miller, librarian in the Dept. of Zoology and Entomology at The Ohio State University. Chapter III, "Federal Service in Entomology" is largely a list of personnel. Chapter IV, "State Entomologists, Inspectors and Quarantine Officers" and V, "Experiment Station Entomology," furnish fuller data on the historical side. Chapter VI, "Entomological Instruction in Colleges" is very unequal, as the author evidently appreciates in his postscript (page 335). It is regrettable that more opportunity was not given to those connected with such institutions as the University of Pennsylvania, to take the case best known to the reviewer, to give more exact data on courses in entomology which have been pursued by students for thirty or more consecutive years. Chapters VII and VIII deal with Entomological Societies and Publications. The longest chapter in the book is IX, "Personal Sketches," pages 140-286, containing a great mass of informa-

tion on many entomologists, with numerous portraits. Chapter X gives data on Insect Collections in public and institutional museums. Chapter XI, Some Regional Notes, discusses entomology in the mid-west (the area from Ohio and Kentucky to the Dakotas and Colorado), the Southern States and, more briefly, South and Central America, Mexico, the West Indies and Canada. Chapter XII, Miscellaneous Notes, sketches faunistic studies, problems in nomenclature, studies of fossil insects, entomological libraries and entomological illustration. The index is extensive for names of individuals and for the entries under Experiment Station, Instruction and State Entomologists. It occupies nine pages of fine type, three columns to the page. It would have been more helpful if institutions had also been indexed. The U. S. National Museum, the Museum of Comparative Zoology and others are referred to several times in the book, but we cannot find them in the index. Prof. Osborn's "Fragments" will undoubtedly be of value to that future historian whom he describes on page five of his introduction.—P. P. CALVERT.

Some Current Items.

The issue of *Science* for June 4, 1937, is of special interest to entomologists. It contains an appreciative obituary of Prof. WILLIAM MORTON WHEELER by four of his colleagues at Harvard: L. J. Henderson, Thomas Barbour, F. M. Carpenter and Hans Zinsser. "Wheeler, like the great physicians, could not forget the inconceivable complexity of things as they are and the intricacy of the web of events, but he possessed that intuitive and imaginative understanding which is the naturalist's compensation for his lack of the clear analysis of the physicist." There is an announcement of the death on May 15, of Dr. LEE BARKER WALTON, professor of biology at Kenyon College, Gambier, Ohio, at the age of sixty-six years; in 1927 he published a theory on the origin of insects from annelid worms. The celebration by Washington entomologists, on May 27, of the eightieth birthday of Dr. L. O. HOWARD, which occurred on June 11, is noticed. Prof. W. V. Balduf, of the University of Illinois, writes on "The Volume of Entomological Literature," which he estimates at 100,935 items for the period 1913-1934. He thinks that "entomology should encourage the preparation of occasional summary studies of its literature."

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.

Exchange.—Lepidoptera of the Western United States for rare American or tropical specimens. C. W. Herr, Woodburn, Ore. R-3.

Wanted—Insects in exchange for Japanese insects or to buy. Tell me your wishes. Hiromu Yamamoto, Matsuo-Kozan. Iwategun Iwateken, Japan.

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Wanted.—To get in touch with Specialists who will make determinations for a share of our duplicates. We have many undetermined specimens from all parts of Iowa.—H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Wanted.—Communication with anyone who has or is collecting Lepidoptera in Burlington County, New Jersey. Also anyone having a microscope for sale.—E. P. Darlington, New Lisbon, N. J.

Wanted for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, *Columbia* or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrys'ididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorulla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

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- 1026.—Mitchell (T. B.).—A revision of the genus *Megachile* in the Nearctic region. VI. Taxonomy of subgenera *Argyropile*, *Leptoraehis*, *Pseudocentron*, *Acentron* and *Melanosarus*. (Trans., 63, 45-83, 2 pls., 1937)..... .85
- 1028.—Pate (V. S. L.).—Studies in the Pemphredonine wasps. I. New genera and species of the *Amnoplanoide* complex (Sphecidae). (Trans., 63, 89-125, 2 pls., 1937) .. .80

NEUROPTERA.

- 1025.—Denning (D. G.).—The biology of some Minnesota Trichoptera. (Trans., 63, 17-43, 1 pl., 1937)55

ORTHOPTERA

- 1027.—Rehn (J. W. H.).—On two species of Phasmidae from Colombia with description of a new species. (Trans., 63, 85-87, 1 pl., 1937)..... .20
- 1030.—Hebard (M.).—New genera and species of the *Melanoplus* found within the U. S. and Canada. X to XIV, the *saltator*, *femur-nigrum* (Supplement), *indigenus* (Supplement), *mancus* and *texasus* groups of the genus *Melanoplus*. (Acrididae). (Trans., 63, 147-173, 2 pls., 1937)55

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EXCHANGES

(Continued)

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Stated Meetings of The American Entomological Society will be held at 8.00 P. M., in 1937, on the fourth Thursday of each month excepting June, July, August, November and December, and on the third Thursday of November and December.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

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ENTOMOLOGICAL NEWS

VOL. XLVIII.

OCTOBER, 1937

No. 8

Colonial Habits of Certain Caterpillars. (Lepid.: Notodontidae).

By C. BROOKE WORTH, M.D., Swarthmore College,
Swarthmore, Pa.

Packard,¹ in his monograph on the Bombycine moths, sets forth the theory that hairy, arboreal caterpillars have evolved from smooth, ground- or shrub-dwelling, ancestral forms. That author was equipped to formulate hypotheses; this one is not, for I am not a lepidopterist or even an entomologist.

This morning, however, I happened to discover a colony of larvae which were subsequently identified at the Academy of Natural Sciences of Philadelphia as *Datana integrerrima*, and their colonial habit was so remarkable that I determined to record my observations and impressions.

The colony, consisting of about 200 individuals, was situated in a young walnut tree, and the larvae were just completing their final moult. They had congregated in a cluster underneath a branch of the tree. A small amount of silk had been spun to anchor them to the branch, and from this they depended as an irregularly globular mass. A few of the caterpillars nearest the branch were holding on to the bark, as if to reinforce the inadequate silk anchor. The chief number of larvae, however, reposed in the hanging globe; this resembled an inert body measuring 8 in. x 4 in. x 3 in. which, when touched, transformed itself into a writhing aggregate of furry worms.

The larvae were just casting off their skins. A fly, one of the *Tachinidae*, buzzed about, surveying the moult with pregnant anticipation. As each skin was shed, the fly would promptly deposit 5 or 6 eggs on the caterpillar's soft head. In an hour or two the head, red at first, became black and hard. A female Ichneumon fly (*Ichneumonoidca*) also stood guard, but I did not see it use its spear-like ovipositor.

¹ Packard, 1895. Bombycine Moths. Mem. Nat. Acad. Sci. Vol. 7.

So much for observation. From the layman's point of view I inferred that the colonial habit of *D. integerrima* larvae is a definite assurance for their perpetuation. The protection afforded is not, however, of the utmost efficiency. Let us suppose that the original caterpillars which adapted themselves to arboreal life and developed hairs were not colonial—since colonial life always indicates specialization. They would, in spite of the hairs, be vulnerable to the attacks of parasitic insects, particularly when moulting. Then let us suppose that they began to congregate at moulting time, purely by chance. In forming a globular mass, they would still present numerous vulnerable individuals on the surface of the globe, but the ones in the interior would be protected. This would be a wasteful method, as it would sacrifice a large proportion of the colony for the sake of a small, favored portion; however the slaughter among non-colonial forms of caterpillars is equally great, if not greater, so that the society of *D. integerrima* and the like would function on a definite survival coefficient or pattern.

In calculating the protective-efficiency index of this form of colonial life in a very rough way, let us assume that the sphere contains 200 cubic units (i.e., caterpillars), not taking into account that the caterpillar's shape is cylindrical rather than cubical. Since the volume equals $\frac{4}{3} \times \pi \times R^3$, we can arrive at the area in "square caterpillars" as follows:

Volume (Cubic Caterpillars) equals $\frac{4}{3} \pi R^3$

R equals 3.6 (Linear Caterpillars).

Area (Square Caterpillars) equals $4 \times \pi \times R^2$

Area equals 163 (Square Caterpillars).

Thus, in a colony of 200 larvae, 163, or over three-quarters of them, will be exposed on the surface to parasitic invasion, and the protective-efficiency index of the spherical habit of congregation will be such that only 1 in 5 individuals will be protected (18½% by this crude method).

By one more geometrical step it can be inferred that the size of the colony will increase through the evolutionary period, and thus the complexity of colonial adaptation will be gradually enhanced. For the larger the sphere, the smaller will be the

relative number of surface individuals. For example, consider a colony twice as large, containing 400 larvae. By similar calculations one finds that the area equals 276 "square caterpillars," and the protective-efficiency index becomes 1 in 3 (31% protected). Thus a greater number of healthy larvae—not only in absolute units, but also in proportion to the initial population—would mature from the large colony. Hence an evolutionary factor would be introduced concerning the number of eggs laid by the mature female moths, or else concerning the laying of eggs by several moths in a spot where the future colonies could coalesce.

But since the larvae at the center of the ball were the ones destined to propagate the race, it would follow that with each succeeding generation the larval balls would be formed more compactly, each individual seeking by inherited instinct to gain the most central position. Indeed such a result was evident in the colony which I saw today, for the caterpillars were so thickly clustered that very few were left to grasp the branch, and they all seemed in imminent danger of falling to the ground. Thus a physical limit has been set to the size of the colony and of the sphere.

A refinement of this crude colonial form—if I may suggest that two such isolated phenomena can be regarded as parts of a sequence—is found in the tent caterpillar group (Lasiocampidae). Here clustering is also the rule, during the moult and between foragings. But in this case the silken support has been perfected as a mechanical device; it has also been extended to form an actual protection around the cluster. The *D. integerrima* colony presents a furry surface, the individual larval hairs being analagous in point of function to the tent or nest of the tent caterpillars, but not nearly so efficient.

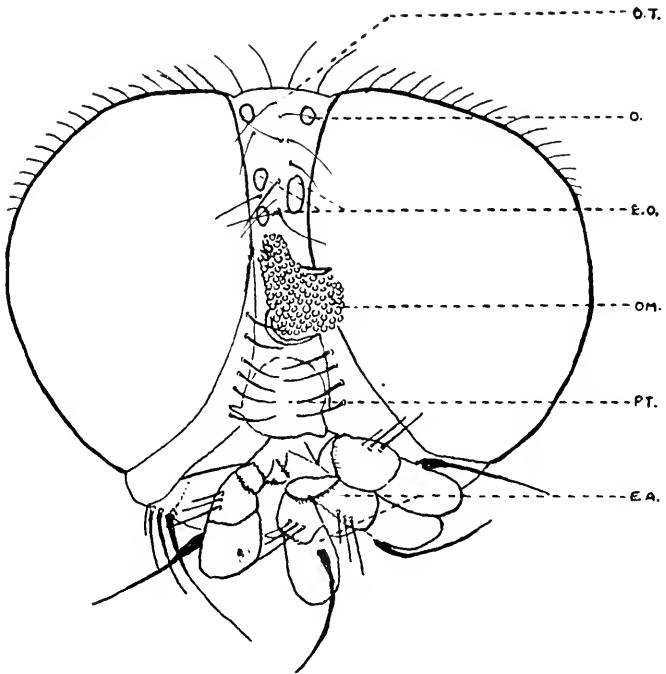
I therefore have the temerity to suggest an extension of Packard's evolutionary thesis: that colonial caterpillars evolved from solitary arboreal forms whose hairs did not constitute adequate protection from insect parasites; that in *D. integerrima* we see an early, inefficient colonial habit; and that among the tent caterpillars we find the perfected mechanism.

**An Abnormal Specimen of *Hylemyia hinei* Malloch
with Notes on Synonymy and Distribution (Diptera,
Muscidae).**

By FRED M. SNYDER, University of Wisconsin, Madison.

References to Muscidae having an abnormal number of ocelli and antennae are very few. The occurrence of such a fly, especially when it is a little-known species, may be of interest.

The specimen, a male, was captured on willow catkins (*Salix discolor* Muhl.), May 5, 1936, at Madison, Wisconsin. Figure 1 is a fronto-dorsal view of the head of this fly. There are several remarkable abnormalities. Inserted between the normal pair of antennae is an extra pair (E.A.). The normal number



of ocelli is three. In this particular specimen the usual two

posterior ones (O) are present but instead of the usual median anterior ocellus there are three extra lateral ones (O.E.), two upon the right side, and one upon the left side. The shape and position of this latter ocellus might suggest that it is a fusion of two as appear on the right side. Running from near the most anterior right ocellus to the facial plate is a mass of small lenses which are either a group of extra ocelli or ommatidia (OM). Whether or not this represents ocelli or the rudiment of a median third compound eye, is impossible to say. The specimen is somewhat teneral and the ptilinum (PT) is still extruded. In normal specimens the eyes are separated by the width of the anterior ocellus. The ocellar triangle (OC) in this specimen is greatly elongated to accommodate the extra ocelli and the eyes are widely separated. In general the head is slightly asymmetric due to the extra organs which are present. The rest of the body together with the bristling is normal in all respects.

The writer is indebted to Dr. H. C. Hockett for the following synonymy, *Hylemyia ithacensis* Hockett = *Hylemyia hinei* Malloch.

Hylemyia hinei Malloch¹ was originally described from Savonski, Naknek Lake, Alaska, from material collected by J. S. Hine. Hockett² redescribed this species from Ithaca, New York, as *Hylemyia ithacensis*. The excellent figures of the very characteristic male genitalia given by Hockett makes identification of this species easy. This species was quite common around Madison, Wisconsin, from April 29 to May 24, 1936; a few were also taken during May in 1935. Extensive collecting later in the year did not again yield this species.

The males were taken very commonly on rocks and leaves of low-growing bushes, especially during the sunny late afternoons. Females were less numerous and were collected only on willow catkins, as were a few males.

¹ Malloch, J. R. Ohio Jr. Sci. xx, p. 278, 1920.

² Hockett, H. C. Cornell Univ. Ag. Expt. Sta., Mem. 77, p. 28, 1924.

Insect Stamps.

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

(Continued from page 186*).

To my mind the most beautiful of all insect stamps is the Lebanon sericultural issue. This series, consisting of six stamps of identical design, was issued in connection with a "Congrès Sericicole" at Beyrouth in 1930. The six values (4, 4½, 7½, 10, 15 and 25 piastres) are printed in rather bright colors—black brown, vermillion, dark blue, dark violet, dark green and claret, respectively. The design consists of a larva, a cocoon and a moth of the silkworm and a (mulberry?) twig, bearing two leaves. The moth and larva are on the leaves and the cocoon is attached to the twig by a number of fine lines (which represent the veins of leaves otherwise consumed?). The caterpillar is apparently full grown but the leaves show no sign of having been fed upon.

The Japanese have long loved the dragonfly, because, it is said, an emperor viewing his kingdom from the summit of Fuji-yama compared it to a dragonfly with outspread wings. Since that time much folklore has grown up around this insect in Japan, and "The Land of the Dragonfly" has used a design of its revered namesake on an issue of stamps. This issue, used in 1923, included two values (10 and 20 sen), which are deep brown and deep blue, respectively. The figure of a dragonfly appears at either end of a bar carrying figures and letters indicating the value. The wings of the near side only are shown; as is usual in artists' designs of insect wings the venation vaguely resembles that of a leaf.

Three Dutch colonies, Curacao, Surinam, and "Nederlandsch Indie" used a series of stamps with figures of a moth in the design from 1902 to 1909. A sphinx moth is shown in each of the four triangular spandrels surrounding the circular medal-

* Omitted by oversight at the end of the second paragraph on page 186.—ED.

lion of the stamp. The design was used for all values from 10 to 50 cents. The issue included six, eight and 41 varieties for the three colonies, respectively. The stamps are printed in many colors and shades; a few are bi-colored. The design is supposed to have been adopted for the Dutch Indies "on account of the fact that at least one of the islands is noted for its beautiful moths." The same design may have been furnished to the American colonies to save the expense of making new dies.

Where and When to find the Orthoptera of Pennsylvania, With Notes on the Species Which In Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

In Pennsylvania 133 species and 4 races of Orthoptera are known and 16 species and 1 race in addition should be found, which brings the total to 154. There are also 7 introduced and established species and 1 other such which should be found, making in all 162 species and races. A single native species of the Dermaptera should be found and there is one introduced and established species.

Considering New Jersey, its coastal and Pine Barrens fauna includes 1 additional species of Dermaptera, 23 species and 2 races of Orthoptera, and there are also 1 northern and 2 introduced species of the latter, this equalling 28 species and races or a total for Pennsylvania and New Jersey of 190.

I am particularly indebted to Dr. H. Fox and Mr. E. S. Thomas for their aid in checking the approach toward Pennsylvania of species from New Jersey and Ohio respectively and other assistance has been rendered by James A. G. Rehn, A. B. Gurney, W. T. Davis, H. R. Roberts and T. H. Hubbell.

The work has been done to aid those interested in collecting Orthoptera in Pennsylvania. Large and important areas in the State are very poorly known from this angle and field work will undoubtedly provide much interesting and more exact data on many species. Few, if any, new species are, however, to be expected.

DERMAPTERA.

LABIIDAE.

Though *Vostox brunnicipennis* (Serville) was described from Pennsylvania and later reported from Maine and New Jersey, these records are all almost certainly erroneous. The northeasternmost authentic record for this southern species is Wingham, Virginia. It lives largely under dead bark in a slightly moist immediate environment.

LABIA MINOR (Linnaeus). Introduced from Europe and now established, widespread and common in Pennsylvania. Most liable to be found in manure piles. Flies about at twilight on warm evenings. Appears adult in Spring.

Although not as yet known from the State, *Doru aculeatum aculeatum* (Scudder) should be found in extreme southeastern Pennsylvania as I have specimens from Edgewood, Maryland, only twenty miles south of the state line and it is known on the coast from Snake Hill near Jersey City, New Jersey, and Bayside, Long Island, New York. It lives in the sheaths of sedges and tall marsh grasses and appears adult in late summer, hibernating in soft debris until spring.

ORTHOPTERA.

BLATTIDAE.

BLATTELLA GERMANICA (Linnaeus). Introduced from Europe. Now established, widespread and very common, particularly in old houses along plumbing. Domiciliary throughout Pennsylvania. Present adult throughout the year.

ISCHNOPTERA DEROPELTIFORMIS (Brunner). Confined to the lowlands of southern Pennsylvania where it is rare. Northern limits are West Creek and Riverton, New Jersey, and Wayne, Linglestown and Charter Oak (material examined), Pennsylvania. Terrestrial and found near or in open woods under litter, most frequently in damp places. Appears adult in early June.

PARCOBLATTA VIRGINICA (Brunner). Common throughout Pennsylvania. Sylvan, found under leaves and dead bark during the day. Males are sometimes attracted to light at night, females best secured by means of molasses traps. Appears adult in late May.

P. UHLERIANA (Saussure). Same as the last species but less abundant in the boreal areas.

P. DIVISA (Saussure and Zehntner). A woodland species, very rare and probably confined to the southeastern portion of the State. Northern limits Anglesea and Wildwood Junction, New Jersey, and Swarthmore, Pennsylvania (a single male from the latter locality). Appears adult in early June.

P. PENNSYLVANICA (DeGeer). Present throughout the woodlands of Pennsylvania but usually scarce. Appears adult in late May.

PERIPLANETA AMERICANA (Linnaeus). An established adventive from the Old World. Domiciliary. Occurs throughout Pennsylvania, particularly in cities.

P. AUSTRALASIAE (Fabricius). Adventive from the Old World and only occasionally found in this latitude as it prefers subtropical and tropical regions. Was (probably temporarily) established in a greenhouse at Radnor, Pennsylvania.

BLATTA ORIENTALIS (Linnaeus). Introduced from the Old World and now extensively established in temperate and subtropical North America. Often very abundant indoors in Pennsylvania, particularly in old city houses. Adults sometimes appear in great numbers in Philadelphia, in May.

PYCNOSCELUS SURINAMENSIS (Linnaeus). A tropical adventive which in this latitude becomes established only indoors. Occurs infrequently in greenhouses (North Wales, Penna., v, 7, 1925, C. Doucette) and zoological gardens. Parthenogenetic in America.

CRYPTOCERCUS PUNCTULATUS Scudder. Originally recorded from Pennsylvania and since reported only from Pittsburg but probably present throughout the mountains of the State as it is known north to southwestern New York. May be extremely local. Lives in burrows in damp decaying sapwood of logs, usually chestnut or pine. Present adult in May.

MANTIDAE.

STAGMOMANTIS CAROLINA (Johannson). Rockville, Pennsylvania, x, 12, 1912, (J. A. Good), 1 ♂, [Pa. Bureau of Plant Industry]. An immature female from Chestertown, Maryland,

in the Academy collection affords a northeastern limital point of distribution. Appears adult in the fall.

TENODERA ANGUSTIPENNIS Saussure. Introduced from Asia in northern Delaware and now known from adjacent New Jersey and Maryland, this species will probably spread into extreme southeastern Pennsylvania if it has not already done so. It appears adult late in summer.

T. SINENSIS Saussure. Introduced from Asia in Philadelphia, this species is now common in southeastern Pennsylvania and is known up the Delaware River as far as Trenton. It appears adult late in the season and is best located on hedges and bushes on warm fall days.

PHASMIDAE.

DIAPHEROMERA BLATCHLEYI ATLANTICA (Davis). Rare and in Pennsylvania confined to the southeastern lowlands, this interesting and apparently parthenogenetic species is represented in the series before me by material from the vicinity of Philadelphia, Swarthmore, Malvern and Pottstown. Appears adult in late July.

D. FEMORATA (Say). Present throughout Pennsylvania. Arboreal, preferring oak and wild cherry. Becomes adult in the late summer and though usually decidedly scarce, sometimes appears locally in large numbers and has been known to defoliate trees and bushes. When cooler days come this insect is inclined to wander about and is then more apt to be noticed.

ACRIDIDAE.

ACRYDIINAE.

NOMOTETTIX CRISTATUS CRISTATUS (Scudder). Present in northern portions and mountains of Pennsylvania. Found locally in small numbers in open woodlands and sometimes in pastures. Adults present in spring, summer and fall.

NOMOTETTIX CRISTATUS COMPRESSUS (Morse). Found in southeastern Pennsylvania. A less boreal race of similar habits. Sometimes locally abundant.

ACRYDIUM SUBULATUM (Linnaeus). Probably present throughout the colder sections of the State, elsewhere very

local and confined to boreal spots. Abundant in the marshes at Tinicum Island in southeastern Pennsylvania; this and Hancock's Bridge, New Jersey, are southern limits on the Atlantic Coast. Prefers damp spots in fields, marsh areas and moist swales. Appears adult in late summer, some early in the spring.

A. ACADICUM ACADICUM (Scudder). Also a boreal insect but probably often numerous locally throughout Pennsylvania. Prefers grassy hillsides in the open. Present adult through spring, summer and fall.

A. ORNATUM (Say). Generally distributed in Pennsylvania except in the most boreal areas. Often extremely abundant and present adult throughout spring, summer and fall. Prefers open areas of short grass and occurs both in dry and moist environment.

A. ARENOSUM ANGUSTUM (Hancock). Locally exceedingly abundant except in the more boreal portions of Pennsylvania, preferring damp sandy soil and particularly bare sand along streams. Present adult through summer and fall.

NEOTETTIX FEMORATUS (Scudder). Very rare in Pennsylvania and known only from the southeastern portion at Willow Grove and Pink Hill, other northern limits on the Atlantic Coast being Milltown, New Jersey, and Staten Island, New York. Found in areas of poor soil on dry hillsides in moist spots, on sand, etc. Appears adult in late May.

PARATETTIX CUCULLATUS CUCULLATUS (Burmeister). Found throughout Pennsylvania and locally sometimes exceedingly abundant on bare sands along streams particularly in the most arid portions of the State. Appears adult in late May.

TETTIGIDEA LATERALIS PARVIPENNIS (Harris). Moderately numerous probably throughout Pennsylvania and adult from spring to late fall. Prefers richer grasses than the other Grouse Locusts, but is found in a great variety of environment, forest undergrowth, meadows, roadsides, etc.

Although *Tettigidea armata* Morse is not yet known from Pennsylvania, it should be sought in wet spots in woodland undergrowth, particularly along streams, in the southeastern portion of the State. Though widespread in the South, it is

coastal this far north as far as Staten Island, New York. A very local insect, which is present adult in the spring, summer and fall.

ACRIDINAE.

PSEUDOPOMALA BRACHYPTERA (Scudder). Extremely local and usually very scarce this far south, this handsome species is yet known only from two serpentine outcrops in the extreme southeastern portion of Pennsylvania, though it should be sought in favorable local environment throughout the lowlands. It prefers dry areas of poor soil with bunch grass, *Andropogon* sp. Appears adult early in July.

METALEPTA BREVICORNIS (Johannson).¹ Known only from Goshen and Harrisburg and probably restricted to southeastern Pennsylvania. There undoubtedly present in the lower Delaware Valley as it is known from localities on the New Jersey side. Peculiar to tall grasses and sedges near water and in swamp areas. Appears adult in late July.

SYRBULA ADMIRABILIS (Uhler). Undoubtedly very scarce and local as far north as the lowlands of southern Pennsylvania. Material is before me from Fairmount Park in Philadelphia, and Glenolden in the southeastern and Washington in the southwestern section of the State. Prefers grasses in dry areas, waste places and open woodlands. Appears adult in mid-July.

ERITETTIX SIMPLEX SIMPLEX Scudder. Scarce and very local but probably present through all but the Canadian Zone of Pennsylvania though as yet known only from Kintnersville (Fox in litt.) and the southeastern portion where it is confined to grassy areas on poor soil. Appears adult early in May.

ORPHULELLA SPECIOSA (Scudder). A common species preferring short grass in dry open environment throughout Pennsylvania. Appears adult early in July.

O. PELIDNA (Burmeister). A species which should be found throughout Pennsylvania but which apparently is very seldom seen. Prefers *Andropogon* in fields and open woodland grasses. Appears adult early in July. Only Pennsylvania records are Perkasio, Bartram's Garden, Mount Airy and Pink Hill, all southeastern.

¹ This species has been referred to the genus *Trixalis* for many years.

DICHRMORPHA VIRIDIS (Scudder). Common in lush weeds and grass throughout Pennsylvania except in the coldest areas, but like most other Orthoptera rarely present in the rich grass pastures near Philadelphia. Appears adult early in July. The rare macropterous phase is not yet known from this State.

CHLOEALIS CONSPERSA Harris. Prefers woodland grasses in a dry environment. Probably present throughout Pennsylvania but much more numerous in the mountains and hills and limited to the colder spots in the warmer portions of the State. Appears adult in early July.

CHORTHIPPUS LONGICORNIS (Latreille). Very common locally in the higher grasses of moist areas in the Pennsylvania mountains, in upland bogs and in the Delaware River marshes. Known southeast to Essington and Fern Hill. Appears adult in June.

As *Stethophyma platyptera* (Scudder) has been taken from Thompson, Connecticut, to Lane, South Carolina, it should certainly be sought in the bogs of Pennsylvania, particularly in the more austral areas. In the east it is one of the most striking and rare of the grasshoppers. It is now known to be a decidedly less boreal species than the two other North American members of the genus. It should appear adult in Pennsylvania in late June.

STETHOPHYMA LINEATUM (Scudder). Known only from Lopez and Tinicum Island, the distribution of this boreal species, though highly discontinuous, probably includes all of the State. A southeastern limit is Hancock's Bridge in southern New Jersey. Peculiar to marsh grasses the insect, when once found, may be present in large numbers or very scarce in exceedingly restricted areas. One such on Tinicum Island appeared to be about a hundred yards in width, the similar surrounding marsh being uninhabited by the species. It appears adult in late June.

(To be continued)

**Life History of the Wheel-Bug, *Arilus cristatus*
(Linn.) (Hemiptera: Reduviidae).***

By J. N. TODD, Entomology Division, S. C. Experiment Station,
Clemson, South Carolina.

The Wheel-bug was more abundant than usual in the vicinity of Clemson College during the fall of 1934. On the afternoon of November 14 two fresh egg masses along with numbers of the adults were collected. After determining that very little was known regarding this insect, it was decided to conduct a detailed study of its life history.

The eggs were kept in a screened cage in the screened portion of the experiment station insectary under conditions which were practically the same as outdoors and were examined at regular intervals throughout the winter. During hatching, the insects appearing on a certain day were transferred to petri dishes which were used for life history cages. Filter papers were placed in the bottom of the petri dishes to facilitate cleaning. A few stems of alfalfa were kept in the cages to maintain adequate humidity and to serve as food for the insects supplied as prey for the wheel-bugs.

Most of the insects that were used as food for rearing were collected from alfalfa with a sweep net. During the first instar, aphids and garden flea hoppers from alfalfa were the principal food. As the nymphs increased in size, larger insects were placed in the cages. Many species of common grasshoppers, several species of curculios, several species of blister beetles, numerous species of lepidopterous larva, and the Mexican bean beetle as both larva and adults constituted the major portion of the food. Some nymphs while molting were destroyed by grasshoppers, so it was necessary to paralyze all grasshoppers before placing them in the life history cages. The cages were checked each day and any individual that had molted during the intervening period noted. During the first instars, several nymphs were kept in the same cage and transferred only after

* This paper is Technical Contribution No. 44 from the South Carolina Experiment Station.

molts. As the third instar was attained individual cages were provided. The cages were cleaned and the food replenished as needed.

The first eggs were noted hatching April 12 and the last April 19, 1935. A period of exceptionally cold weather caused all the insects hatched the first four days to die. The first instar nymphs were sticky, so much so that it was almost impossible to transfer them from one cage to another without injury. This condition became less noticeable as the individuals molted and was lost entirely after the second instar.

As revealed by the present study *Arilus cristatus* (Linn.), passes through five nymphal instars. There is only one generation per year in the locality of Clemson College, S. C., and the winter is passed in the egg stage. The duration of each stage is given in Table 1.

TABLE I. LIFE HISTORY DATA.

This table gives the duration, in days, of each instar and the total time required for development. Maximum, minimum and average times are given.

Instar	Average	Males			Females		
		Min.	Max.	Av.	Min.	Max.	Av.
I	21.13	18	24	20.6	18	25	21.3
II	14.10	9	32	13.8	11	20	14.1
III	14.95	12	22	15.9	10	20	14.7
IV	16.83	11	24	17.3	11	24	16.9
V	32.02	23	38	28.9	26	46	33.9
Total	99.51	84	114	96.7	88	118	101.4

A total of 41 individuals were reared through to adults. Of this number 27 or slightly over 65 per cent were females. In the fall of 1934 approximately 80 per cent of the adult specimens collected at Clemson College were females. Perhaps there are normally more females than males produced in this species.

It will be noted from the data above that the males developed in a shorter period of time than the females—the average difference being slightly less than five days. It is interesting to note that the third and fourth instars in the female are shorter than in the male.

Four females reared in captivity deposited eggs during the last part of October and the first part of November. These egg masses were not deposited normally and did not hatch.

Wheel-bugs were collected at Clemson College throughout the summer of 1935 and the stages obtained always corresponded to those under observation, thus demonstrating that development under artificial conditions was synchronous with that occurring in nature.

Further observations were made during the summer of 1936 to verify the results of the previous season. An egg mass which was deposited on October 22, 1935, hatched on April 30, 1936. Individuals were reared to the adult stage from this egg mass in ninety-two (92) days; which confirms the previous season's data.

Under natural conditions the wheel-bug is very vicious in all stages of development. This viciousness was not so pronounced in individuals under observations in cages. It was noted that specimens collected in the field became accustomed to being handled in a very short time.

On June 13, 1935, a wheel-bug nymph was collected in a bean patch at Clemson College feeding on an adult Mexican bean beetle.

A New Race of *Oeneis chryxus* (Dbl. & Hew.) (Lepidoptera: Satyridae).

By WILLIAM HOVANITZ, University of California, Berkeley

In the summer of 1935 twelve specimens of *Oeneis chryxus* (Dbl. & Hew.) were taken by the author at Sonora Pass, Alpine County, California. A note of this species having been found in the Sierra Nevada was published the same year. However, since that time, the author is of the opinion that these specimens represent a new race for which is proposed the name

OENEIS CHRYXUS stanislaus Hovanitz, subsp. nov.

Differing from *Oeneis chryxus chryxus* (Dbl. & Hew.) in: *male*, upper surface, discal cell of primaries totally grey; veins

of primaries lined with black; clear yellow-brown ground color with no black discoloration; one white-centered ocellus between M 1 and M 2 on primaries and one between Cu 1 and Cu 2 on secondaries, in all ocelli the white color being more prominent than the black; under surface, as in *chryxus* except that the ocelli are as above and the line separating the discal from the limbal area on the primaries is continuous from the costal margin to the inner margin. *Female*, as in *Chryxus* except in the character of the ocelli as in male.

Differing from *Oeneis chryxus icallida* (Mead) in: *male*, ocelli smaller on both upper and lower surfaces of wings; ground color yellow-brown instead of whitish; black lining of veins on upper surface primaries not quite as wide but much wider than *chryxus*; *female*, nearly identical except that the color is as in male instead of whitish.

The above comparisons are based upon the types but it has been attempted to take characters which are applicable to the entire series and, when necessary, to take only a mean of those which are variable. In the female the ocelli may vary from two to four on the forewing (in the type there is three) while one is constant for the secondaries. Color is fairly constant in both male and female and is as shown in Holland's figures of *gigas* Butl. (Butterfly Book, Pl. 27, f. 1, 2, 1931), only slightly lighter in the females. A greater contrast between the black and white of the under side secondaries than in *chryxus* seems to be constant. A key which to a certain extent will separate these races follows:

Male. I Veins of limbal area of primaries heavily lined with black on upper surface

a. Ground color white or whitish *icallida*¹

b. Ground color brown or yellow-brown

1. Grey areas of upper side not sharply defined or contrasted with ground color; white spot in ocelli not very prominent, if present *chryxus*²

2. Great contrast between ground color and grey areas; white spot in ocelli prominent *stanislans*

II Veins of limbal area of primaries only but very little lined with black on upper surface *chryxus*²

¹ *icallida* (Mead): Canadian Ent. 10, 196, 1878.

² *chryxus* (Dbl. West & Hew.): Gen. Diurn. Lep. 2, 383, 1851.

Keys are rigid while organisms are not and it is to be expected that in categories below a species the former must give way. As a whole, though, the above key should hold true.

This race, *stanislaus*, inhabits a life zone below that of *ivallda* which is in the Hudsonian and Arctic-Alpine. Perhaps, though, the Canadian life-zone in which it is found is broken by the cold downward draft from the Leavitt Meadows two thousand feet above and this may be a local race isolated by the Canadian above and below and by unfavorable conditions on either side.

Holotype ♂ Deadman Creek, tributary of the Middle Fork Stanislaus River, border of Tnolumne Co. and Alpine Co. CALIFORNIA. Elevation 8400 feet. July 17, 1935. Placed in the collection of the California Academy of Sciences.

Allotype ♀. Same locality and date and placed in the same collection.

Ten other specimens taken at same locality and date, but not designated paratypes, in the author's collection.

Alleged Designation of Genotypes by Fabricius.

Please allow space for a reference to a discussion of the alleged designation of genotypes by Fabricius. It is in Proc. U. S. Nat. Mus. (1), 1925, pp. 129-131, and is sufficient reply to the article on this subject in ENTOMOLOGICAL NEWS for May, 1937, 48 (5), pp. 130-134. The claims that have been made for Fabrician genotype designations, at least in Rhynchota, are false.

W. L. McATEE, Biological Survey, U. S. Dept. of Agriculture, Washington, D. C.

Pyrameis virginiensis in France (Lepid.: Nymphalidae).

In the June, 1937, issue of *Lambillionca*, organ of the *Union des Entomologistes Belges*, (xxxvii, p. 144), appeared a short article of interest to American lepidopterists. The author is M. Jean Mauny, of Mortagne-sur-Gironde, Charente-Inférieure, France.

M. Mauny reports that "On the fifth of last October, at a place called l'Échalier, overlooking the Gironde river three kilometers from Mortagne, I captured a very unusual butterfly flying in a field of blooming alfalfa with a great number of *Pyrameis cardui* L. It presents all the external characters of *P. virginiensis* Drury.

"According to Dr. Stichel (Seitz, I, p. 200, Fr. ed.), the native habitat of *virginiensis* is North America, but it has been taken on numerous occasions on the Canary Islands, where it seems to be a native.

"*Cardui* is numbered among those species which have been observed most often in migration, while its habitat is cosmopolitan.

"Although an arrival from North America would seem most improbable, is it not possible to suppose that there occurred a migration from the Canaries, reaching Charente-Inferieure, of *cardui*, among which a few *virginiensis* were mingled?

"On the other hand, could not this specimen be the result of an evolution of *cardui* toward *virginiensis*; or since the two species are assumed to have a common origin, are we not confronted with an example of a return to ancestral form?"

A third explanation for the presence of our "Hunter's Butterfly" on the west coast of France may be found in the fact that the locality mentioned by M. Mauny is not far from the important and busy port of Bordeaux. Possibly a few chrysalids on produce from America were overlooked by the officials, the imago of which escaped into the countryside in due course of events and consorted with their cousins, the "Painted Ladies", where they were taken shortly thereafter by our French colleague.

RICHARD M. FOX, Philadelphia, Penna.

Melsheimer Tablet Unveiled at New Holland, Pennsylvania.

Glowing tributes from the fields of science, education and religion were paid to the memory of Rev. Frederick Valentine Melsheimer, Sunday, August 29, 1937, at the unveiling of a memorial tablet to the "father of American Entomology" and the founder of one of the first common schools of Pennsylvania at New Holland.

Approximately 150 persons witnessed the unveiling of the tablet by Mrs. Fisher Ehrehart, of Hanover, great great granddaughter of Rev. Melsheimer.

In presenting the tablet to the borough of New Holland, Dr. Herbert H. Beck, president of the Lancaster County Historical Society, declared "we have been the first to commemorate, honor, revive and perpetuate the memory of Frederick Valen-

tine Melsheimer." Dr. Beck congratulated the New Holland Lions Club for "suggesting and so actively supporting" the plan to erect the tablet.

The memorial, a bronze plaque, $23\frac{3}{4} \times 17\frac{3}{4}$ inches, on a slab of granite, about five feet high, on the lawn in front of the New Holland High School building reads: "Memorial to Frederick Valentine Melsheimer, 1749-1814. Known to science as Father of American Entomology. To religion as Lutheran Pastor Here and Elsewhere. To education as Second President of Franklin College and Founder of a Common School One Block East of This Site in 1787. The Lancaster County Historical Society 1937."

Dr. John A. Schaeffer, president of Franklin and Marshall College, representing the field of education, reviewed the achievements of Rev. Melsheimer as an educator.

Rev. C. G. Bachman, pastor of St. Stephen's Reformed church, New Holland, told the assemblage that while Rev. Melsheimer's fame may rest largely on his contributions to science and education, his life work was in the field of religion. He told of Rev. Melsheimer's thirty-eight years of service in the Lutheran ministry with pastorates at New Holland, Maytown, Manheim, Muddy Creek, Bergstrasse, Strasburg, Annville, Jonestown and Hanover.

Speaking for the field of science, Dr. Stuart W. Frost, Professor of Entomology at Pennsylvania State College, credited Rev. Melsheimer with the "first serious and conscientious study of insects in America." He said that while his was not the first study of that nature in the new continent, his work, begun shortly after moving to New Holland in 1785, has been generally recognized by authorities as outstanding. He said Rev. Melsheimer also is generally credited with outstanding contributions on natural history and mineralogy and that it has been reported that he was the author of a book on astronomy.

Extracts from a paper on Rev. Melsheimer, prepared by M. Luther Heisey, librarian of the Lancaster County Historical Society, were read by J. Paul Kochel, secretary of the New Holland Lions Club.

R. E. Whitmore, of the club and chairman of the committee in charge of the event, accepted the memorial on behalf of the borough.

Vocal selections were given by a quartette.

Lancaster (Penna.) Intelligencer-Journal, August 30, 1937.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the Journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Adams J. A.—Temperature preference of the Firebrat, *Thermobia domestica* (Thysanura). [Iowa St. Coll. Jour. Sci.] 11: 259-265, ill. Anon.—Common names of insects. [12] 30: 527-560. Bird, R. D.—Records of northward migration of southern insects during drought years. [4] 69: 119-120. Bishopp, F. C.—Popularizing entomology. [12] 30: 565-566. Delong & Davidson—Methods in study and preservation of leafhopper genitalia. [12] 30: 372-374. Dove, W. E.—(see Diptera). Dow R.—Brood XI is not extinct yet [Periodical cicada]. [Bull. N. Eng. Mus. N. H.] No. 84: 3-4. Felt, E. P.—Dissemination of insects by air currents. [12] 30: 458-461. Howard, L. O.—Biographical Notice. By Walton & Bishopp. [10] 39: 121-132, ill. Howard, L. O.—Symposium: Insects affecting man. [12] 30: 9-10. Levereault, P.—Our morphological terms and interpretations. [19] 32: 51-60, ill. McLaine, L. S.—Entomology in relation to industry. [12] 30: 1-9. Marshall & Musgrave—(See under Lepidoptera.) Reynolds, J. M.—A further contribution to the problem of segmentation in the Arthropoda. [Amer. Jour. Sci.] 34: 30-63. Riley, W. A.—Scientific approach in insecttherapy. [12] 30: 49-51. Robinson, W.—Some therapeutic uses of insects and their products. [12] 30: 41-48. Snipes, Tauber & Gunderson.—Two methods of measuring egestion time from large insects. [Iowa St. Coll. Jour. Sci.] 11: 253-257, ill.

ANATOMY, PHYSIOLOGY, ETC.—**Bhatia & Keilin.**—On a new case of parasitism of snail (*Vertigo senesii*) by a dipterous larva. [116] 29: 399-408, ill. **Haydak, M. H.**—The influence of a pure carbohydrate diet on newly emerged honeybees. [7] 30: 258-262. **Headlee, T. J.**—Some facts underlying the attraction of mosquitoes to sources of radiant energy. [12] 30: 309-312. **Howland & Glancy.**—The effect of compression on bristle growth in wild-type self-implants of *Drosophila melanogaster*. [90] 71: 429-430, ill. **Mathur & Soni.**—Studies on *Schistocerca gregaria*. IX. Some observations on the histology of the blood of the desert locust. [Indian Jour. Agr. Res.] 7: 317-326, ill. **Murray, J. A.**—Technique for paraffin sections of formal-fixed insect material. [Jour. R. Micro. Soc.] 57: 15. **Pruthi, H. S.**—Biology of the desert locust *Schistocerca gregaria*. [Current Science] 5: 608-609. **Querci, O.**—Effects of radiant heat on the development of some butterflies. [21] 49: 73-76. **Roonwal, L. M.**—Studies on the embryology of the African migratory locust, *Locusta migratoria migratorioides*. II. Organogeny. [Phil. Trans. R. Soc. London] (B) 227: 175-244, ill. **Salt, R. W.**—Studies on the freezing process in insects. [Univ. Minnesota Agr. Exp. Sta.] Tech. Bull. 116: 3-41, ill. **Scott, E. A.**—The eyes of insects and their adaptation to habit and environment. [13] 29: 33-44, ill. **Snipes & Tauber.**—Time required for food passage through the alimentary tract of the cockroach, *Periplaneta americana*. [7] 30: 277-284, ill. **Wolsky, A. A.**—Production of local depressions in the development of *Drosophila* pupae [31] 139: 1069-1070, ill. **Wray, D. L.**—The embryology of *Calendra callosa* the southern corn billbug (*Rhynchophor.*). [7] 30: 361-409, ill.

ARACHNIDA AND MYRIOPODA—**Bishopp & Smith.**—A n. sp. of *Ixodes* from Massachusetts. [10] 39: 133-138, ill. **Chamberlin & Ivie.**—New spiders of the family Agelenidae from western North America. [7] 30: 211-241, ill. **da Fonseca, F.**—Notas de Acareologia. XVIII. Generos e especies de acarianos parasitos de ratos. XIX. Generos e especies de acarianos parasitas de mamiferos. XX. Especies de acarianos do genero *Laelaps*, parasitas de ratos do Brasil. XXI. Gymnandromorfismo em *Amblyomma cajennense*. XXII. *Liponissus haematophagus* sp. n. XXIII. Novas especies de Trombiculinae dos generos *Trombicula*, *Hannemania* e *Neoschongastia*. XXIV-A. Representante

brasileiro do genero *Dermanyssus*. (B) Nota sobre o nome generico *Paralaelaps* [73] 10: 17-23; 25-32; 33-37; 39-41; 43-46; 47-50; 51-59; ill. **Fox, I.**—Notes on North American lycosid spiders. [10] 39: 112-115, ill. **Gertsch, W. J.**—New American spiders. [40] No. 936: 7pp., ill. **Jacot, A. P.**—Six new mites from Western North Carolina. [10] 39: 163-166. **de Mello-Leiato, C.**—Novos Licosidas do Brasil. [Ann. Acad. Brasileira Sci.] 9: 87-90, ill. (*). **Parker, Philip, Davis & Cooley.**—Ticks of the United States in relation to disease in man. [12] 30: 51-69.

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SPECIAL NOTICES.—*Bibliotheca Zoologica Fenniae. Opera annorum 1901-1930.* Par H. Lindberg. [Acta pro. Fauna et Flora Fennica]. 59: 438. **Code universal des couleurs.** Par E. Seguy. Paul Lechevalier, Paris. Small octavo containing 48 plates showing 720 colors. **Fauna of British India**—including Ceylon and Burma. Moths Vol. 5. Sphingidae. By Bell and Scott. 537 pp., ill. **Monograph of the British Neuroptera.** By J. F. Killington. Vol. II. 306 pp., ill. London, 1937. **Monographie der Europäischen Arten der Gattung Cryptophagus.** von N. Bruce. [Acta Zool. Fennica] 20: 167 pp., ill. **Notes on Ceratopogonidae (Diptera).** By J. W. S. Macfie. [107] 6: 111-118. **Revision der tribus Ophionini (Ichneumonidae).** By N. F. Meyer. [56] 16: 15-24.

PROCEEDINGS OF THE TWENTY-FOURTH ANNUAL MEETING OF THE NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION, held at Atlantic City, New Jersey, March 17, 18 and 19, 1937. New Brunswick, N. J., 239 pp., many figures.—These proceedings present much practical information and considerable scientific data of interest to mosquito workers. Discussions of the papers are enlightening and afford an opportunity to learn of experiences elsewhere and of modifications of established mosquito control principles employed over a wide variety of sections. Mosquito control workers can ill afford not to peruse the present issue. Past copies should prove valuable as references. An interesting topic presented is the protection from mosquitoes at outdoor meetings, an activity which would popularize any mosquito control campaign by affording temporary protection to outdoor public gatherings. Such protection would be especially valuable in demonstrating the desirability of mosquito-free environments. A summary is given of work on mosquitoes throughout the world and should prove a boon to the busy worker who has little time to peruse the literature. Much contained in the summary is not available elsewhere, having been gathered direct by letter. Valuable information is presented on directions for applying mosquito repellents for protection of outdoor gatherings; on the relation of mosquito prevalence to human comfort; the successful use of publicity in mosquito control campaigns; new and significant mosquito control developments in this country during 1936; the effect of rainfall on mosquito prevalence; studies of mass mosquito migration across open bodies of water; relation of mosquito control work to conservation activities, and other equally important subjects.—J. LYNNE ROBERTSON, JR., P. A. Sanitary Engineer, Malaria Investigations, United States Public Health Service.

THE BIOLOGICAL CONTROL OF INSECTS. With a Chapter on Weed Control. By HARVEY L. SWEETMAN, Assistant Professor of Entomology, Massachusetts State College. With a Foreword by L. O. HOWARD. Ithaca, New York, Comstock Publishing Co., Inc., 1936. Pp. xii, 461, 142 text-figs. and also portraits of Doctors L. O. Howard (frontispiece), W. R. Thompson, A. Paillot, H. S. Smith, C. P. Clansen and F. A. G. Muir. \$3.75—This is an important ecological and entomological book, dealing both with the pure and the applied (economic) phases of its subjects. Chapter I considers the theoretical basis of biological control, Chapter II the resistance of plant hosts, Chapters III-V and XII the non-insectan enemies of insects,

viz.: bacteria, fungi, viruses, protozoa, nemathelminthes and vertebrates. Chapters VI-XI and XIII, 227 pages, or nearly half the book, are concerned with insects and arachnids attacking insects. The final chapter, XIV, treats of the biological control of pest plants. There is a glossary of $5\frac{1}{4}$ pages, of terms not defined in the text. The list of references to literature, pp. 390-420, is arranged in 14 sections, corresponding to the chapters, the authors cited arranged alphabetically in each section; we wonder why a single alphabetical list for the whole book would not be more convenient. The index is extensive, 41 pages.

We share Dr. Howard's marvel "at the knowledge and industry of the writer, at his grasp of the big subject, and at his careful weighing of the facts and evidences." The information on parasitic insects is widely scattered and the way it is brought together in this book will be of the greatest help to all who wish to become acquainted with it. Attention is given in the first chapter to definitions of terms and the forms adopted are not always those in wide use. The author sums up his results by saying "The major revision under the above definitions is to remove the forms variously called occasional, transitory, erratic and temporary parasites from the field of parasites and to classify them as predators" (p. 11). So many and important are the topics discussed in this book that it would require much more space than is here available to merely mention them. Of general interest is Chapter IX, Some Biological Relations of Insect Parasites and Predators to their Hosts, dealing with host selection and specificity, parasitism versus predatism, types of life cycle of parasitic insects, development of endoparasites and behavior of adult parasites. With the author's conclusion that, "Actually there appears to be relatively little difference in the specificity of parasites and predators," we must stop, congratulating him and his readers on his most valuable work.—P. P. CALVERT.

HOW TO KNOW THE INSECTS. An illustrated key to the more common families of insects, with suggestions for collecting, mounting and studying them. By H. E. JAKUES, Professor of Biology, Iowa Wesleyan College. Biological Survey Publication No. 1, Iowa Academy of Science. Planigraphed by John S. Swift Co., Inc., Pp. iv, 140, 251 figs. To be obtained from the author at 709 North Main, Mt. Pleasant, Iowa. Cloth \$1.80, spiral and side staple binding \$1.00.—A clear, well-arranged little book, $8\frac{1}{2} \times 5\frac{1}{2}$ inches, dealing with

the place and development of insects (7 pp.), directions for collecting and mounting them (25 pp.), keys to 25 orders (17 pp.), and to about 154 families of the Odonata, Orthoptera, Coleoptera, Hemiptera, Homoptera, Neuroptera, Lepidoptera, Diptera and Hymenoptera (65 pp.) At least one representative of each family is figured. There is a couple of pages on the Iowa Insect Survey, a list of orders and families, often with the number of known Iowa species added for each family, and an index and glossary. A useful manual for the beginner.—P. P. CALVERT.

ANIMAL COMMUNITIES IN TEMPERATE AMERICA as illustrated in the Chicago Region. A Study in Animal Ecology. By VICTOR E. SHELFORD, The University of Illinois. Second edition May, 1937. The Geographic Society of Chicago Bulletin No. 5. Published for the Society by The University of Chicago Press, Chicago, Illinois. Pp. xiii, 368, 306 figs., 9 diagrams. \$3.00.—A review of the first edition of this book was published in the NEWS for February, 1914, pp. 82-85. The preface to this second impression states: "The second impression of this book is unchanged excepting for the correction of typographical and clerical errors. An annotated Bibliographical Appendix [pp. 337-344] has been added which will enable the reader to go on with the subject. The community nomenclature has changed materially in the twenty-five years which have elapsed since the book was written. These changes are, however, not so serious and it has been possible to provide for the correction of them in a table [p. 337]. These corrections were previously published in the journal *Ecology*. The taxonomic nomenclature has been left in the original form." We have not compared the present edition with the first, page for page, but we refer interested readers to our preceding review.—P. P. CALVERT.

A MONOGRAPH OF THE BRITISH NEUROPTERA by FREDERICK JAMES KILLINGTON, Editor of the Transactions and Journal of the Society for British Entomology. Vol. II, pp. xii, 306, pls. 16-30, text figs. 69-115. Printed for the Ray Society, sold by B. Quaritch, Ltd., 11 Grafton St., New Bond St., London, W. I. This volume (No. 123 of the Series, is issued to the subscribers to the Ray Society for the year 1936. Price 25 shillings.—Volume I of this work was noticed in the NEWS for October, 1936, pp. 226-227. Volume II continues the systematic account begun in Volume I, chapter 6, and deals with

6 genera and 24 species of Hemerobiidae and 2 genera, 14 species, of Chrysopidae, pp. 1-246. At least some description of the early stages of 19 of the species of Hemerobiidae and of all the 14 species of Chrysopidae is given. Appendix A gives directions for collecting, preserving and rearing these insects, pp. 247-252. Appendix B, pp. 253-256, transfers the five British species, which in the body of the work were referred to *Boriomyia* Banks, to a new genus *Kimminsia*, while *Boromyia* Banks, 1904, is regarded as valid, instead of *Boriomyia* Banks, 1906, necessitating a new fixation of type for *Boromyia* (*fidelis* Banks, one of the included species in 1904, instead of *disjunctus* Banks, type fixed in 1906, but not included in 1904). *Allotomyia* Banks, 1930, thus becomes a synonym of *Boriomyia* Banks, 1904. Corrigenda and Addenda occupy pp. 257-259, the bibliography pp. 260-291 and the Index to the two volumes pp. 293-306.—P. P. CALVERT.

Seventh International Congress for Entomology, Berlin, 1938.

By Resolution adopted by the Executive Committee for International Congresses for Entomology, the SEVENTH INTERNATIONAL CONGRESS FOR ENTOMOLOGY will convene in Berlin, from August 15th to 20th, 1938.

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A. General Entomology:

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B. Applied Entomology:

(1) Medical and Veterinary-medical Entomology, (2) Agriculture and Sericulture, (3) Forest Entomology, (4) Agricultural Entomology (a) Viticulture and Pomiculture, (b) Agriculture and Olericulture, (c) Vermin; (5) Means and methods for fighting vermin.

The Management of the Congress would deeply appreciate the participation of numerous Representatives of Scientific and Practical Entomology in the Congress to be convened in Berlin. All entries for participation, and all inquiries, should be addressed to the Secretary-General, Professor Dr. Martin Herzig, Invalidenstrasse 43, Berlin N. 4, Germany.

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.

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ENTOMOLOGICAL NEWS

NOVEMBER, 1937

Vol. XLVIII

No. 9

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Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

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Zodion fulvifrons Say (Diptera: Conopidae), a Parasite of the Honey Bee.

By H. C. SEVERIN, South Dakota State College, Brookings, South Dakota.

On October 1, 1936, the writer received about 150 specimens of honey bees from a beekeeper residing at Sisseton, South Dakota, together with a complaint that he was experiencing a rather heavy loss of young worker bees in one of his hives. The bees which were sent were all workers and while many of them were young bees, others were not. When the bees arrived they were dead, but the correspondent stated that most of these bees were still alive but very weak when he picked them up in front of his hive. The weakened bees were being dragged out of the hive by the normal bees and were dropped on the ground in front of the hive. The correspondent further stated that apparently only worker bees were affected, although drones were plentiful in this particular hive.

When the bees were examined, it was found that fully 50 per cent were infested with fly larvae. The larvae were always located in the abdomen of the host, the posterior end being directed backward, the attenuated anterior end forward. Usually but one fly larva was found in a bee, but occasionally two maggots were found living peacefully within the abdomen of the same worker bee.

When the parasitized bees were received, the majority were placed in a glass rearing jar containing moist sand. Within a day some of the fly maggots had pupated, while others required an additional day or two before doing so. Pupation took place within the abdomens of the bees in all cases, and in all instances except one, the puparia were entirely within the abdomens of the bees. In the exception, the parasitic maggot

had evidently ruptured the intersegmental membrane between two segments of the abdomen and had made its way partly through the rupture and then pupated.

The rearing jar containing the puparia was kept in a well heated room whose temperature ranged between 70° and 80° F. At the end of two weeks, flies began to emerge from the puparia, and at the end of the third week all the puparia had given rise to flies. The reared flies were identified as a species of *Zodion*, but were sent to the United States National Museum for further identification. Dr. David G. Hall, of the Bureau of Entomology and Plant Quarantine, identified the flies as *Zodion fulvifrons* Say and reported that the species had been received at the United States National Museum three times as a parasite of the honey bee, once from Laredo, Texas, once from Norwichtown, Connecticut and now from Sisseton, South Dakota. It is of further interest that the collection of insects of South Dakota State College contained five additional specimens of this species of fly, all taken by the writer during the month of August at Brookings, South Dakota. Evidently this species of fly has a rather large range, but just how important it is in an economic way to the beekeeper can only be determined by further investigation. It should be noted here that the genus *Physocephala*, family Conopidae, contains several species whose larvae have been found to be parasitic in honeybees.*

The Parasites of the Fall Webworm.
***Hyphantria cunea* Drury. (Lep.: Arctiidae).**

By RALPH B. SWAIN, Department of Biology, University of Colorado.

The fall webworm, *Hyphantria cunea* Drury, periodically a serious pest of deciduous trees in the United States and Canada, is thought to be largely controlled by insect parasites and predators. During the course of graduate work at the Colorado

* Van Duzee, M. C. 1934. Conopidae from North Dakota and the Rocky Mountain Region. *Ann. Ent. Soc. America*, 27: 315-323.

State College, the writer reared nine species of parasites not previously recorded from this host. The specimens were kindly determined by Mr. R. A. Cushman, Mr. A. B. Gahan, and Mr. C. F. W. Muesebeck of the United States National Museum, and Dr. H. J. Reinhard of the Agricultural Experiment Station at College Station, Texas. In the following lists, the names preceded by one asterisk are of species reared from webworms in the Fort Collins, Colorado area; those preceded by two asterisks are of species from the same locality, but here recorded for the first time as parasites of *Hyphantria*. The lists, it is hoped, include the names of all the dipterous and hymenopterous insects known to be parasites of the fall webworm. These lists are a portion of a thesis written in partial fulfillment of the requirements for the Master of Science Degree at the Colorado State College.

THE TACHINID PARASITES (Diptera).

<i>Achaetoneura alctia</i> Riley (15).	<i>Masicera entfitchiae</i> Town. (21).
<i>Achaetoneura frenchii</i> Will. (15).	<i>Nemoraca nigricornis</i> Town. (21).
<i>Auctia hyphantriae</i> Tothill (15).	<i>Panzeria radicum</i> Fabr. (4).
<i>Bombyliomyia abrupta</i> Wied. (15).	<i>Phorocera claripennis</i> Macq. (15).
<i>Compsilura concinnata</i> Meig. (2).	** <i>Phorocera floridensis</i> Town. (Det. H. J. Reinhard.)
<i>Ernestia ampelus</i> Walk. (18).	<i>Tarichocta aldrichi</i> Town. (9).
<i>Ernestia johnsoni</i> Tothill (18).	<i>Winthemia</i> sp. (15).
<i>Hyphantrophaga hyphan-</i> <i>triae</i> Town. (20).	<i>Zenillia blanda</i> O. S. (15).
<i>Lydella hyphantriae</i> Tothill (19).	* <i>Zenillia blanda virilis</i> A. & W. (15) (Det. H. J. Rein- hard.)
	<i>Zenillia protuberans</i> A. & W. (15).

THE PRIMARY HYMENOPTEROUS PARASITES.

BRACONIDAE.

<i>Rogas hyphantriae</i> Gahan (8).	(12).
<i>Apanteles diacrisiae</i> Gahan	<i>Apanteles hyphantriae</i> Riley (13).

- Apanteles lacticolor* Vier. (1).
*Metcorus communi*s (Cress.) (13).
 ***Metcorus acronyctae* Mues. (Det. C. F. W. Muesebeck.)
Metcorus bakeri C. & D. (3).
Metcorus hyphantriae Riley (13).
Metcorus versicolor Wesmael (11).

ICHNEUMONIDAE.

- Amblyteles brevicinctor* (Say) (15).
Amblyteles subcyanus (Cress.) (15).
Itopectis conquisitor (Say) (6).
Ercmotylus glabratus (Say) (14).
Labrorynchus sp. (15).
Therion morio (Fabricius) (9).
Therion sassacus Vier. (15).
Casiniaria orgyiæ (How.) (15).
Xconortonia major (Cress.) (15).
Hyposoter fugitivus (Say) (1).
 ***Hyposoter fugitivus pacificus* Cush. (Det. R. A. Cushman.)
Hyposoter pallipes (Prov.) (13).
 **Hyposoter pilosulus* (Prov.) (7). (Det. R. A. Cushman.)
Eulimneria valida (Cress.) (17).

SCELIONIDAE.

- Telenomus bifidus* Riley (13).

CHALCIDOIDEA.

- Syntomosphyrum esurus* Riley (1).
 **Elachertus hyphantriae* Crawford (5). (Det. A. B. Gahan.)
Elachertus marylandicus Gir. (15).
Euplectrus sp. (13).
 ***Trichogramma minuta* Riley (Det. A. B. Gahan.)

SECONDARY HYMENOPTEROUS PARASITES.

ICHNEUMONIDAE.

- **Hemiteles tenellus* (Say) (13). (Det. R. A. Cushman.)
 Hosts: *Metcorus hyphantriae* Riley, *M. acronyctae* Mues.,
Hyposoter pilosulus (Prov.)
Hemiteles spp. (Two species, not *tenellus*.) (13).
 Hosts: *Apanteles hyphantriae* Riley, *Metcorus hyphantriae* Riley.
 ***Gelis utahensis* (Strick.) (Det. R. A. Cushman.)
 Host: *Hyposoter pilosulus* (Prov.)

CHALCIDOIDEA.

- **Perilampus hyalinus* Say (16). (Det. A. B. Gahan.)

Hosts: *Hyposoter fugitivus* (Say), *H. pilosulus* (Prov.)
Panstenon sp. (13).

Host: *Apanteles hyphantriae* Riley.

Spilochalcis sp. (13).

Host: *Meteorus hyphantriae* Riley.

Eupelmus sp. (13).

Hosts: *Apanteles hyphantriae* Riley, *Meteorus hyphantriae* Riley.

**Dibrachys cævus* Walker (1). (Det. A. B. Gahan.)

Hosts: *Eulimneria valida* (Cress.), *Hyposoter fugitivus* (Say), *H. pilosulus* (Prov.), *Itoplectis conquisitor* (Say), *Meteorus hyphantriae* Riley, *M. acronyctæ* Mues.

Habrocytus sp. (8).

Host: *Rogas* sp.

***Hyopteromalus percursor* Gir. (Det. A. B. Gahan.)

Hosts: *Meteorus acronyctæ* Mues., *Hyposoter pilosulus* (Prov.)

***Hyopteromalus* sp. (Det. A. B. Gahan.)

Host: *Hyposoter pilosulus* (Prov.)

Pteromalus spp. (Two unidentified species.) (13).

***Catolaccus acneoviridis* (Gir.) (Det. A. B. Gahan.)

Hosts: *Meteorus acronyctæ* Mues., *Hyposoter pilosulus* (Prov.)

Cirrospilus sp. (13).

Host: *Apanteles hyphantriae* Riley.

Elasmus atratus How. (10).

Hosts: *Apanteles hyphantriae* Riley, *Hyposoter pallipes* (Prov.)

TERTIARY HYMENOPTEROUS PARASITES.

CHALCIDOIDEA.

***Tetrastichus doteni* Crawford (Det. A. B. Gahan.)

Hosts: *Dibrachys cævus* Walker, *Catolaccus acneoviridis* (Gir.) The above two species were reared from both *Hyposoter pilosulus* (Prov.) and *Meteorus acronyctæ* Mues.

BIBLIOGRAPHY.

1. BRITTON, W. E. 1918. Conn. Agr. Exper. Sta. Bull. 203: 319-324.
2. BRITTON, W. E. and CAFFREY, D. J. 1914. Conn. Agr. Exper. Sta. Rept. for 1913, p. 222.
3. COOK, A. J. and DAVIS, G. C. 1891. Mich. Agr. Exper. Sta. Bull. 73. See the 30th Ann. Rept. of the Sec'y. of the State Bd. of Agr., pp. 213-214.

4. COQUILLET, D. W. 1897. U. S. D. A. Div. of Ent. Tech. Ser. No. 7, p. 19.
5. CRAWFORD, J. C. 1911. Proc. U. S. Nat. Mus. Vol. 39, p. 622.
6. CRIDDLE, N. 1924. Ont. Ent. Soc. 54th Ann. Rept. pp. 16-18.
7. DUSTAN, A. G. 1921. Proc. Ent. Soc. of Nova Scotia, No. 6, p. 81.
8. 1923. Proc. Acad. Ent. Soc. No. 8, pp. 73-94.
9. HEWITT, C. G. 1914. Dom. of Can. Dept. of Agric., Rept. of the Div. of Ent. for year ending Mar. 31, 1914, pp. 851-876.
10. HOWARD, L. O. 1891. Insect Life, Vol. 4, p. 254.
11. MUESEBECK, C. F. W. 1918. Jl. Agr. Res. Vol. 14, p. 200.
12. 1920. Proc. U. S. Nat. Mus. No. 58, p. 551.
13. RILEY, C. V. 1888. U. S. D. A. Div. of Ent. Bull. No. 10 (2nd revised ed.) pp. 36-58.
14. 1890. Insect Life, Vol. 3, p. 155.
15. SCHAFFNER, J. V. and GRISWOLD, C. L. 1934. U. S. D. A. Misc. Publications No. 188, p. 37.
16. SMITH, H. S. 1912. U. S. D. A. Bur. Ent. Tech. Ser. No. 19, Pt. iv.
17. TIMBERLAKE, P. H. 1912. U. S. D. A. Bur. Ent. Tech. Ser. No. 19, Pt. v.
18. TOTHILL, J. D. 1921. Can. Ent. Vol. 53, No. 10, pp. 226-230.
19. 1922. Can. Dept. Agr. Bull. N. S. 3, (Ent. Bull. 19) pp. 107, pls. 6, figs. 99.
20. TOWNSEND, C. H. T. 1891. Psyche, Vol. 6, No. 186, pp. 176-177.
21. 1893. Psyche, Vol. 6, No. 206, p. 467.

Record of a Butterfly Migration (*Pyrameis cardui*) (Lepid.: Nymphalidae).

By R. W. DAWSON, University of Minnesota.

On August 2, 1935, the writer drove by car from Edgemont, South Dakota to Wheatland, Wyoming, through the path of a migrating swarm of the thistle butterfly *Pyrameis cardui*. The butterfly was first noted as common near Edgemont at about

nine o'clock in the morning. But the reverie of peace and contentment that pervades one when driving in this country dulled the writer's sense of perception for more than an hour before the realization came that a butterfly migration was in full swing. Then the car was stopped and a count of the butterflies made. The data recorded in the field follow:

Lusk, Wyoming, 10.30 A. M., temperature 74 F., elevation 5,300 feet, sky clear, light southwest wind; 148 butterflies crossed a measured section of 150 feet on the highway during a five-mile count. The butterflies were flying in parallel lines directly into the wind over a grassy plain and were from two to three feet above the ground. Mute, but positive, evidence that the butterflies were not of local origin was offered by the numerous thistle stalks along the highway which were in nearly complete and perfect foliage.

After this stationary count seven additional counts of five-minute periods were made while driving at an average speed of thirty miles per hour and recording the butterflies crossing the highway within an estimated distance of one hundred feet in front of the car—a distance convenient for vision under the circumstances.

These counts follow:

10.45 to 10.50, near Lusk	63 butterflies
11.10 to 11.15, near Keeling	9 butterflies
11.50 to 11.55, near Shawnee	7 butterflies
12.00 to 12.05, near Orin	40 butterflies
1.55 to 2.00, near Glendo	48 butterflies
2.10 to 2.15, near Glendo	23 butterflies
2.25 to 2.30, near Wheatland	0 butterflies

From Wheatland, Wyoming, onward no further evidence of migration was noted, apparently the pathway of the moving swarm had been crossed, but it required a drive of 160 miles (42 west and 118 south) to accomplish it.

Dr. Harold Shepard informs me that he saw a continuation of the flight the following day between the mouth of Shell Canyon and Graybull, Wyoming. The butterflies were "numerous" and flying east of south-east. The time was late afternoon.

The above recorded migration is the third which the writer has been privileged to witness. The first was of the snout butterfly *Lybethia bachmanni*, August 20, 1916, at Mitchell, Nebraska, the second, of *Kricogonia lycide*, March 24, 1933, near Artesia Wells, Texas. These two records with some additional notes have been reported by Dr. C. B. Williams.

In recording this note it is the writer's hope that he may help others to see and record insect migrations in this country. They are probably much more frequent and important than is generally realized.

The Coleoptera or Beetles of Georgia (V).

By P. W. FATTIG, Emory University, Georgia.

(Continued from Volume XLVIII, page 10.)

PSEPHENIDAE.

9586—PSEPHENUS HERRICKI DeKay. Blue Ridge VI, 27, 31 (2).

DRYOPIDAE.

9597—PELENOMUS OBSCURUS Lec. Quitman VI, 17, 31.

9603—HELICHUS LITHOPHILUS Germ. Hamilton IV, 28, 31; V, 20, 31; Ellijay V, 14, 31; VI, 27, 31 (2); Columbus V, 20, 31 (9); Cartersville V, 22, 31 (4); Dahlongega V, 23, 31 (5); Dalton V, 23, 31 (5); Ringgold V, 23, 31; V, 25, 31 (3); Rome V, 23, 31; V, 26, 31 (3); VI, 30, 31 (2); VII, 17, 31 (5); Summerville V, 26, 31 (7); Milledgeville V, 31, 31; Macon VI, 1, 31 (2); Monroe VI, 12, 31 (2); Blue Ridge VI, 27, 31; Alpharetta VII, 9, 31; Jasper VII, 17, 31 (6).

9604—H. FASTIGIATUS Say. Hamilton IV, 28, 31; V, 20, 31 (2); Newman IV, 28, 31 (3); V, 19, 31 (3); Blue Ridge V, 14, 31; VI, 27, 31 (8); Dalton V, 23, 31; Milledgeville V, 31, 31 (2); Macon VI, 1, 31 (2); Snellville VI, 12, 31 (2); Cleveland VI, 24, 31; Hiawasee VI, 26, 31 (2); Ellijay VI, 27, 31 (4).

9604—H. BASALIS Lec. Hamilton IV, 28, 31; V, 20, 31 (2); Ellijay V, 14, 31; VI, 27, 31 (4); Dalton V, 23, 31 (3); Blue Ridge VI, 27, 31 (7); Ball Ground VI, 27, 31; Dahlongega VII, 9, 31.

HELMIDAE.

9608—STENELMIS SINUATA Lec. Thomasville VI, 18, 31.

9610—S. BICARINATA Lec. Cairo VI, 18, 31.

21075—S. FUSCATA Blatch. Augusta VI, 9, 32.

S. sp. Blue Ridge VI, 27, 31; Ellijay VI, 27, 31.

HELMIS DIETRICHII Musgrave. Wrens VII, 7, 31.

9640—MACRONYCHUS GLABRATUS Say. Dalton V, 23, 31 (6); Milledgeville V, 31, 31 (9); Monroe VI, 12, 31 (4); Ball Ground VI, 27, 31; Jasper VII, 17, 31 (2).

9642—ANCYRONYX VARIEGATUS Germ. Milledgeville V, 31 31; Monroe VI, 12, 31.

HETEROCERIDAE.

9646—HETEROCERUS UNDATUS Melsh. Thomasville VI, 19, 31.

9650—H. COLLARIS Kies. Perry VI, 21, 29.

9652—H. PUSILLUS Say. Calhoun VIII, 15, 28.

DASCILLIDAE.

9659—EURYPOGON NIGER Melsh. Blue Ridge VI, 26, 31.

9674—ECTOPRIA NERVOSA Melsh. Dahlonega VII, 9, 31.

9681—EUCINETUS MORIO Lec. Dahlonega VII, 9, 31.

HELODIDAE.

9689—HELODES THORACICA Guer. Royston VI, 13, 32.

9692—CYPHON RUFICOLLIS Say. Hartwell VI, 13, 32.

9696—C. OBSCURUS Guer. Blue Ridge VI, 14, 29.

9698—C. VARIABILIS Thunb. Savannah IV, 11, 31.

9699—C. PADI Linn. Savannah IV, 11, 31.

9703—PRIONOCYPHON DISCOIDEUS Say. Jonesboro VI, 26, 32.

9704—P. LIMBATUS Lec. Athens VI, 13, 32.

9709—SCIRTES ORBICULATUS Fab. Forsyth VI, 21, 29.

9716—PTILODACTYLA SERRICOLLIS Say. Blairsville VI, 15, 29.

DERMESTIDAE.

9725—DERMESTES CANINUS Germ. Stone Mt. VIII, 12, 32 (53); VIII, 13, 32 (20).

9732—D. VULPINUS Fab. Folkston V, 8, 32.

9734—D. FRISCHI Kug. Baxley V, 5, 30.

9770—TROGODERMA ORNATA Say. Atlanta V, 6, 27.

9785—T. VERSDOLOR Crautz. Douglasville IV, 25, 27.

9805—CRYPTORHOPALUM HAEMORRHIDALE Lec. Atlanta V, 8, 32.

9816—C. RUFICORNE Lec. Austell V, 9, 32.

9829—ANTHRENUS SCROPHULARIAE Linn. Atlanta V, 9, 32.

9836—A. FASCIATUS Herbst. Tate VI, 27, 32.

9837—A. MUSEORUM Linn. Toccoa VI, 16, 29.

9844—ORPHILUS ATER Er. Jasper VII, 17, 31.

BYRRHIDAE.

9897—CURIMOPSIS STRIGOSA Melsh. Fort Valley VI, 1, 31.

9913—EULIMNICHUS OBSCURUS Lec. Augusta VI, 9, 32.

9917—E. ATER Lec. Washington VI, 9, 32.

9918—E. NITIDULUS Lec. Cartersville VI, 20, 32.

9923—*LIMNICHODERUS OVATUS* Lec. Canton VII, 17, 31.

RIHYSODIDAE.

9944—*RIHYSODES AMERICANUS* Lap. Rome VI, 20, 32.

OSTOMIDAE.

9957—*CORTICOTOMUS CYLINDRICUS* Lec. Jonesboro VI, 29, 32.

9966—*AURORA CYLINDRICA* Serv. Thomasville VI, 19, 31.

9976—*TEMNOCHILA VIRESCENS* Fab. Okefenokee Swamp V, 5, 33; V, 7, 33; Thomasville VI, 19, 31; Perry VI, 21, 29; Stone Mt. XI, 17, 29.

9977—*TENEBOIDES MAURITANICUS* Linn. Atlanta I, 4, 33 (3).

9985—*T. SEMICYLINDRICUS* Horn. Cordele IV, 13, 31.

9989—*T. COLLARIS* Sturm. Fort Valley VI, 1, 31.

9994—*T. CORTICALIS* Melsh. Ellijay VI, 27, 31.

9997—*T. OBTUSUS* Horn. Jasper VII, 17, 31.

NITIDULIDAE.

10016—*CERCOMETES ABDOMINALIS* Er. Ellijay VII, 17, 31.

10029—*COLOPTERUS MACULATUS* Er. Newnan VI, 28, 27.

10031—*C. UNICOLOR* Say. Dalton VII, 24, 31.

10035—*CONOTELUS OBSCURUS* Er. Madison IX, 27, 27.

10043—*CARPOPHILUS DIMIDIATUS* Fab. Columbus IX, 15, 31.

10047—*C. MELANOPTERUS* Er. West Point VI, 19, 32.

10050—*C. TEMPESTIVUS* Er. Jesup VIII, 31, 30.

10060—*C. ANTIQUUS* Melsh. Jasper VII, 17, 31.

10064—*HAPTONCUS LUTEOLUS* Er. Athens VI, 12, 31.

10065—*NITIDULA BIPUNCTATA* Linn. Toccoa VII, 3, 31.

10073—*EPURAEA HELVOLA* Er. Gainesville VIII, 16, 29.

10074—*E. RUFa* Say. Blairsville VI, 15, 29.

10077—*E. ERICHSONI* Reit. Rockmart VIII, 7, 28.

10080—*E. CORTICINA* Er. Canton VII, 17, 31.

10093—*E. LABILIS* Er. Atlanta VI, 12, 32.

10098—*STELIDOTA GEMINATA* Say. Folkston V, 8, 32.

10099—*S. OCTOMACULATA* Say. Tate VII, 17, 31.

10100—*S. STRIGOSA* Gyll. Clarkesville VII, 25, 31.

10105—*LOBIOPA UNDULATA* Say. Macon VI, 21, 29.

10109—*PHENOLIA GROSSA* Fab. Gainesville VIII, 1, 35.

10113—*AMPHICROSSUS CILIATUS* Oliv. Rockmart VIII, 7, 28.

10115—*CYCHRAMUS ADUSTUS* Er. Macon VI, 21, 29.

10116—*C. ZIMMERMANNI* Horn. Hartwell VI, 13, 32.

10117—*POCADIUS HELVOLUS* Er. Ellijay VI, 27, 31.

10122—*OXYCNEMUS HISTRINA* Lec. Cartersville VI, 19, 32.

10125—*PALLODES SILACEUS* Er. Toccoa VII, 3, 31; Atlanta VII, 5, 29; X, 7, 30.

10129—*CRYPTARCHA AMPLA* Er. Talking Rock VII, 17, 31.

10136—*GLISCHIROCHILUS OBTUSUS* Say. Clarkesville VII, 25, 31.

10137—*F. FASCIATUS* Oliv. Gainesville VI, 24, 31.

10138—*G. SANGUINOLENTUS* Oliv. Tate VI, 27, 32.

10139—*G. CONFLUENTUS* Say. Dahlonga VII, 9, 31.

RHIZOPHAGIDAE.

10146—*RHIZOPHAGUS RECTUS* Csy. Calhoun VI, 28, 32.

10157—*R. CYLINDRICUS* Lec. Atlanta III, 8, 29.

MONOTOMIDAE.

10163—*MONOTOMA FULVIPES* Melsh. Cleveland VII, 10, 31.

10176—*HESPEROBAENUS RUFIPES* Lec. Cedartown VI, 25, 32.

10179—*EUROPS PALLIPENNIS* Lec. Cornelia VII, 25, 31.

CUCUJIDAE.

10194—*ORYZAEPHILUS SURINAMENSIS* Linn. Jonesboro VII, 16, 27; Atlanta XI, 21, 29 (4).

10198—*SILVANUS BIDENTATUS* Fabr. Rome VII, 17, 31.

10199—*S. PLANATUS* Germ. Dalton VII, 24, 31.

10204—*CATHARTUS ADVENA* Watl. Hartwell VI, 13, 32.

10211—*CATOGENUS RUFUS* Fab. Newman VI, 19, 32; Stone Mt. VII, 19, 29.

10225—*LAEMOPHLOEUS BIGUTTATUS* Say. Hiawassee V, 28, 34.

10235—*L. CHAMAEROPIS* Sz. Blue Ridge VI, 26, 31.

10248—*L. PUNCTATUS* Lec. Rockmart VI, 22, 32.

10251—*L. ROTUNDICOLLIS* Csy. Helen VII, 11, 34.

10265—*LATHROPUS VERNALIS* Lec. Albany VII, 30, 31.

10273—*BRONTES DUBIUS* Fab. Stone Mt. III, 22, 26.

10274—*B. DEBILIS* Lec. Yonah Mt. V, 30, 34.

10275—*HEMPEPLUS MARGINIPENNIS* Lec. Fort Valley VI, 1, 31.

EROTYLIDAE.

10282—*LANGURIA MOZARDI* Latr. St. Simons Island IV, 30, 36 (4); Stone Mt. V, 3, 31 (5); Kennesaw Mt. V, 13, 34 (5); Foccoa V, 14, 30; Buford V, 17, 36 (5); Yonah Mt. VI, 10, 36 (4); Atlanta VII, 8, 28; VIII, 9, 31 (2).

10283—*L. DISCOIDEA* Lec. Canton VII, 17, 31.

10291—*L. COLLARIS* Lec. Douglasville VII, 15, 27.

10292—*ACROPTEROXYS GRACILIS* Newm. Jonesboro VI, 12, 27.

10301—*ISCHIYRUS QUADRIPUNCTATUS* Oliv. Jefferson VI, 12, 32.

10303—*I. EXTRICATUS* Cr. Albany VII, 30, 31.

10304—*PSEUDISCHIYRUS BRUNNEA* Lac. Atlanta VII, 8, 31.

10308—*TRITOMA SANGUINIPENNIS* Say. Jonesboro VI, 12, 27.

10309—*T. PULCHER* Say. Clarkesville VII, 25, 31.

- 10311—*T. AFFINIS* Lac. Ellijay VII, 17, 31.
 10314—*T. ANGULATA* Say. Atlanta V, 24, 29 (3).
 10316—*T. ATRIVENTRIS* Lec. Atlanta V, 24, 29 (3).
 10317—*T. BIGUTTATA* Say. Clermont VII, 10, 31.
 10319—*T. HUMERALIS* Fab. Toccoa V, 14, 30.
 10319b—*T. HUMERALIS RUFICEPS* Lec. Tallulah Falls VI,
 28, 31.
 10327—*TRIPLAX FESTIVA* Lac. Rome VI, 20, 32
 10328—*T. FLAVICOLLIS* Lac. Macon VI, 21, 29.
 10334—*T. THORACICA* Say. Atlanta VI, 9, 29 (3); X, 5,
 30 (3); Americus VI, 20, 31.
 10347—*MEGALODACNE FASCIATA* Fab. Griffin VI, 12, 27.
 10348—*M. HEROS* Say. Stone Mt. VII, 12, 29 (2); VIII,
 9, 28; Atlanta VIII, 6, 27 (2).

CRYPTOPHAGIDAE.

- 10361—*LOBERUS IMPRESSUS* Lec. Thomasville VI, 19, 31.
 10365—*TOMARUS PULCHELLUS* Lec. Dahlonega VII, 9, 31.
 10397—*CRYPTOPHAGUS AMPUTATUS* Csy. Cornelia VI, 16,
 29.
 10408—*C. FUNGICOLA* Zimm. Calhoun VI, 28, 32.

MYCETOPHAGIDAE.

- 10490—*MYCETOPHAGUS PUNCTATUS* Say. Stone Mt. IV, 28,
 27 (2); Atlanta VI, 20, 29; Toccoa VII, 3, 31.
 10491—*M. FLEXUOSUS* Say. Perry VII, 20, 29.
 10492—*M. SERRULATUS* Csy. Blue Ridge VI, 26, 31.
 10495—*M. TRIBALTEATUS* Csy. Blairsville VI, 15, 29.
 10502—*M. FINI* Zieg. Cornelia VII, 25, 31.
 10505—*M. PLURIGUTTATUS* Lec. Toccoa VI, 16, 29.
 10509—*TYPHAEA FUMATA* Linn. Cairo VI, 18, 31.
 10517—*LITARGUS DIDESMUS* Say. Tallulah Falls VI, 28, 31.

COLYDIIDAE.

- 10526—*SYNCHITA LATICOLLIS* Lec. Neel Gap VII, 9, 31.
 10530—*S. FULGINOSA* Melsh. Rome VII, 17, 31.
 10531—*S. GRANULATA* Say. Fort Valley VI, 1, 31.
 10533—*EUCICONES MARGINALIS* Melsh. Blue Ridge VI,
 26, 31.
 10535—*ACOLOBICUS LINEATICOLLIS* Horn. Augusta VIII,
 29, 30.
 10536—*BITOMA CARINATA* Lec. Cedartown, VII, 16, 31.
 10538—*B. QUADRICOLLIS* Horn. Griffin VI, 12, 27.
 10541—*B. QUADRIGUTTATA* Say. Yonah Mt. V, 30, 34.
 10571—*LASCONOTUS PUSILLUS* Lec. Lagrange VI, 19, 32.
 10576—*AULONIUM PARALLELOPIPEDUM* Say. Blood Mt. V,
 29, 32.

- 10578—*A. TUBERCULATUM* Lec. Blairsville V, 14, 31.
 10580—*COLYDIUM LINEOLA* Say. Yonah Mt. V, 30, 31.
 10586—*SOSYLUS COSTATUS* Lec. Augusta VI, 9, 32.
 10591—*PYCNOMERUS SULCICOLLIS* Lec. Cartersville VII,
 24, 31.
 10598—*CERYLON CASTANEUM* Say. Dalton VI, 7, 31.
 10604—*PHILOTHERMUS GLABRICULUS* Lec. Dahlonega VII,
 9, 31.

MURMIDIIDAE.

- 10607—*MYCHOCERUS DEPRESSUS* Lec. Gainesville VI, 24, 31.

LATIIRIDIIDAE.

- 10618—*DASYCERUS CAROLINENSIS* Horn. Cleveland VII, 10,
 31.
 10621—*METOPHTHALMUS AMERICANUS* Mots. West Point
 VI, 19, 32.
 10682—*CORTICARIA CAROLINA* Fall. Hartwell VI, 13, 32.
 10712—*MELANOPHTHALMA AMERICANUS* Mamm. Yonah Mt.
 V, 30, 34.

ENDOMYCHIDAE.

- 10726—*APHORISTA VITTATA* Fab. Stone Mt. V, 22, 31
 (27); Toccoa VI, 16, 29; Newman VI, 19, 32; Ellijay VII,
 17, 31.
 10727—*MYCETINA PERPULCHRA* Newm. Hiawasse V, 28,
 34.
 10734—*EPIPOCUS PUNCTATUS* Lec. Winder VI, 13, 32.
 10736—*E. BIVITTATUS* Gerst. Colquit VI, 18, 31.
 10744—*RHYMBUS ULKEI* Cr. Milledgeville V, 28, 31.
 10745—*R. MINOR* Cr. Cornelia V, 16, 28.
 10753—*ENDOMYCHUS BIGUTTATUS* Say. Blairsville VI, 15,
 29.

PHALACRIDAE.

- 10772—*PHALACRUS PUMILIO* Lec. Blairsville VI, 15, 29.
 10773—*P. POLITUS* Mels. Yonah Mt. VII, 12, 34.
 10786—*OLIBRUS PALLIPES* Say. Toccoa V, 14, 30; Atlanta
 IX, 4, 32 (2); IX, 22, 32.
 10855—*STILBUS PUSILLUS* Lec. Augusta VI, 9, 32.

Bees Taken by the Rev. Bernard Rotger in Southwest Colorado (Hymen.: Apoidea).

By T. D. A. COCKERELL, Boulder, Colorado.

Some years ago the Rev. Bernard Rotger, of the Theatine Fathers (Sacred Heart Parish) came from the Balearic Islands and settled at Durango, Colorado. Already a keen amateur entomologist, he took up the study of the new fauna

with enthusiasm, being in fact the first resident entomologist to work in that part of Colorado. The present short paper gives an account of a few of his captures, but there will eventually be much more to record as the result of his labors.

Tetralonia rotgeri n. sp.

♀. Length about 13 mm., anterior wing 9.4; robust, black, with pale greyish or whitish hair, the hind tibiae and basitarsi with bright ferruginous hair; hind spur of hind tibia not hooked at end. Closely related to *T. annae* Ckll., *T. patruelis* (Ckll.) and *T. pagosana* Ckll., the four being separable thus:

Clypeus not at all polished, with no sort of shining ridge; hair band of second tergite broad in middle, narrowed laterally, leaving a broad wedge-shaped black area

pagosana Ckll.

Clypeus shining, coarsely punctured, with a more or less evident median ridge

Light bands on third and fourth tergites narrow, apical, occupying much less than half the exposed part of tergites; hair of venter mainly dark red (Wyoming)

patruelis (Ckll.)

Light bands on third and fourth tergites broad, occupying more than half of exposed part of tergites

Abdominal hair bands broader and greyer; hair of middle of fifth tergite very dark brown*rotgeri* Ckll.

Abdominal hair bands narrower, on third and fourth tergites conspicuously narrower and whiter; hair of middle of fifth tergite warm reddish*annae* Ckll.

In *T. annae* and *T. patruelis* the hair of the scutellum is divided into two eye-like light spots; this is not apparent in *T. rotgeri*. The first four tergites of *T. rotgeri* are practically covered with pale greyish hair, leaving no black area at sides of second. The basal part of the depression of second tergite is dullish, with excessively minute punctures. Hair of thorax above in the type slightly yellowish, in the cotype silvery white. Wings dusky but not reddish. Hair of venter partly black and partly white. Pygidial plate nearly as in *T. annae*, but rather broader at base.

COLORADO: Pagosa Springs, 7100 ft. alt., June 2, 1935 (Rotger 12). *Cotype* from same place, May 7, 1934. *Type* in University of Colorado Museum.

The bees obtained by Father Rotger show a mixture of

Eastern, Rocky Mountain, and Southwestern elements. Some are only known from Southwestern Colorado. I have studied only part of the collection, including the following:

ANDRENA (*TRACHANDRENA*) *ABJUNCTA* Ckll. La Posta, April 25, 1934. Female, the sculpture at base of metathorax coarser than in the type. Previously known only from Mesa Verde National Park, but I find that a specimen taken by A. Wetmore at Lake Burford, New Mexico, June 2, 1918, and determined by Viereck as *A. swenki* V. and C., is really *A. abjuncta*.

A. (*T.*) *CRATAEGI* Roberston. Pagosa Junction, May 9, 1934. Female. Described from Illinois, and widely distributed in the East and Rocky Mountains.

A. PLATYRHINA Ckll. Archuleta County, May, 1934. Female. Differs from the hitherto unique type (from Mesa Verde National Park) by flagellum dusky reddish beneath, nervures mostly ferruginous, hair bands on tergites 2 to 4 white. The abdomen is moderately shining, and the anterior wings have a dusky cloud at apex. I am assuming that the divergence from the type shown by this specimen and the *A. abjuncta* is a matter of variation only, but more material should be examined. In the case of *A. abjuncta*, it is noteworthy that the specimen was taken in April, whereas the type was taken July 6.

A. PRUNORUM Ckll. La Plata County, July 8, 1935. Male. A common species of the Rocky Mountain region. The specimen has the scape red in front, and the clypeus and lateral marks white.

A. HIRTICINCTA Provancher. Pagosa Junction, alt. 6270 ft. Sept. 6, 1935. Male, with the abdominal bands peculiar, dense and pale yellowish. The species is very widely distributed.

A. ARGEMONIS Ckll. Pagosa Junction, Aug. 14, 1934. Male. Described from New Mexico. Dr. Bequaert took it in the Platte Canyon, Colo., in July.

A. MIMETICA Ckll. Arboles, alt. 6000 ft., April 24, 1936, both sexes. This handsome blue species was described from New Mexico. It is new to Colorado.

ANTHOPHORA NEOMEXICANA Ckll. La Posta, alt. 6000 ft.,

June 19, 1935. Common in Colorado and New Mexico.

A. SIMILLIMA Cresson. Lone Tree, alt. 6800 ft., May 11, 1934. Common in Colorado.

EMPHOROPSIS CITULUS Ckll. Pagosa Junction, May 9, 1935. Two males. Previously known from a male taken in Mesa Verde National Park.

XENOGLOSSODES ERIOCARPI Ckll. Tiffany, alt. 6100 ft., Sept. 11, 1934. Female. Described from New Mexico; new to Colorado.

XENOGLOSSA PRUINOSA Say. Durango, alt. 6500 ft., Aug. 7, 1934. Both sexes. Common in the Central States and west to the Rocky Mountains. It goes east to the Atlantic Coast and southwest to Arizona.

TETRALONIA EDWARDSII Cresson. Lumberton, Rio Arriba County, New Mexico, alt. 6900 ft., June 3, 1935. Male. A western species, going east as far as Colorado.

MELISSODES OBLIQUA Say. Stollsteimer, alt. 6500 ft., July 9, 1935. Males. A very widely distributed species.

OSMIA NOVOMEXICANA Ckll. Pagosa Springs, June 2, 1935. Females. Described from New Mexico; the Colorado Agricultural College has it from Fort Collins.

LITHURGUS APICALIS Cresson. Arboles, May 25, 1934. Male. Common in Colorado.

A List of the Sarcophagidae of New York (Diptera).

By HAROLD C. HALLOCK,¹ Ithaca, New York.

In "A List of the Insects of New York" (Cornell University Agri. Exp. Sta. Mem. 101, pp. 823-826, 1928) 54 species of the family Sarcophagidae are recorded as known definitely to occur in the State. This list included two manuscript names, *Laccoprosopa avium* Curran and *Sarcophaga spuria* Curran. It seems best to drop these names from the list as *L. avium* was described in 1891 under the name of *Laccoprosopa sarcophagina* Townsend and the specimen to be designated as *S. spuria* has been lost and the description never published.

¹The writer wishes to express his sincere appreciation to Professor Robert Matheson for his kind interest and encouragement during this study and to Mr. David G. Hall, United States Bureau of Entomology, for verification of many determinations.

Since the fall of 1934 the writer has had the opportunity to study the Cornell University collection of approximately 2000 specimens of Sarcophagidae taken in various localities in the State. The intensive collecting by Mr. F. S. Blanton, of the United States Bureau of Entomology, on Long Island produced many new records. Several other valuable records have been furnished by Mr. H. K. Townes and Mr. L. L. Pechuman of the Department of Entomology, Cornell University.

The following list of 74 species gives all the Sarcophagidae now known to occur in the State. Only new locality records are given in this paper and the reader is referred to the 1928 list for the former locality records, which are not repeated.

Subfamily AGRINAE.

ERYTHRANDRA PICIPES B. & B. (*Brachicoma apicalis* Coq.)
Black Mt., Lake George, Sept. (Aldrich).

LACOPROSOPA SARCOPHAGINA Town. (*avium* Curr.)
Ithaca. Reared from larvae parasitic on young crows by I. Dobrosky.

WOHLFAHRTIA VIGIL Walk. Lockport (Pechuman); Williams-
ville. Reared from young puppies (Matheson); Utica,
Reared from pustules on the neck of 4 months old baby
(Matheson); Florida (Frost). Jun. to Aug.

Subfamily MACRONICHINAE.

MACRONICHIA (*Amobia* R.-D.) AURATA Coq. Owego, Ithaca
(West); Tuxedo (Curran). Jun. 26 to Aug. 28.

M. CONFUNDENS Town. Tuxedo Jul. 24-28 (Curran).

Subfamily MORINIINAE.

OPSODEXIA BICOLOR Coq. Hancock, Aug. 3, Millwood, Jun.
21 (Townes).

OPPIOPSIS SHELDONI Coq. Babylon, Jul. 15 (Blanton).

Subfamily MILTOGRAMMINAE.

METOPIA CAMPESTRIS Fall. Babylon, Half-Way Hollow
Hills, Islip, L. I. (Blanton); Tuxedo (Curran); Poughkeepsie
(Townes). May to Sept.

M. INERMIS Allen. Owego, Ithaca (West). Jun. to Aug.

M. LEUCOCEPHALA Rossi. Poughkeepsie, Rome, Hancock
(Townes) Jn. to Aug.

M. LEUCOCEPHALA Rossi. Poughkeepsie, Rome, Hancock

(Townes); Babylon, Riverhead, Heckscher Pk., L. I. (Blanton); Tuxedo (Curran). May to Sept.

M. OPACA Allen. Baiting Hollow, L. I. May 29 (Huckett).

M. TESSELLAPA Allen. Ithaca Jul.

SPHENOMETOPIA TERGATA Coq. Babylon May 18, (Blanton); N. Fairhaven Jul. 4 (West).

EURABA GRISEA Desv. Babylon (Blanton).

OPSIDIA GONIOIDES Coq. Babylon (Blanton).

PROSINELLA FULVICORNIS Coq. Babylon, Oak Beach, Fire Island, L. I. (Blanton) Yonkers (Pechuman), Jun. to Aug.

P. FUMOSA Allen. Tuxedo Jul. 23-24 (Curran).

GYMNOPROSOPA FILIPALPUS Allen. Babylon (Blanton); Middletown (Spoooner); Tuxedo (Curran). Jl. to Sept.

G. POLITA Town. Babylon, Dix Hills, L. I. (Blanton) May to Aug.

HILARELLA HILARELLA Zett. Babylon (Blanton). Jun. to Sept.

OESTROHILARELLA ARISTALIS Coq. Oswego (Allen).

AMOBIA (*Pachyophthalmus*) *DISTORTUS* Allen. Babylon, Wyandanch (Blanton); Baiting Hollow, L. I. (Huckett); Tuxedo (Curran) Jun. to Aug.

A. FLORIDENSIS Town. Babylon (Blanton); Baiting Hollow (Huckett) Jun. to Sept.

A. SIGNATUS Meig. Baiting Hollow (Huckett); Babylon, Montauck, Islip, Wyandanch, Half-Way Hollow Hills, L. I. (Blanton), May to Aug.

SENOTAINIA LITORALIS Allen Rhinebeck Jul. 27 (Crosby).

S. RUBRIVENTRIS Macq. Baiting Hollow (Huckett); Babylon, Islip, Riverhead, L. I. (Blanton) May to Sept.

S. RUFIVENTRIS Macq. Babylon (Blanton). Jul. to Aug.

S. TRILINEATA V. d. W. Babylon, Islip, Selden, Brentwood, L. I. (Blanton); Shokan (Townes); Tuxedo (Curran). May to Aug.

TAXIGRAMMA HETERONEURA Meig. Islip Jul. 5 (Blanton).

Subfamily SARCOPIAGINAE.

HYPOPELTA SCROFA Ald. Ithaca, Jun. 14.

METOPOSARCOPIAGA IMPORTUNA Walk. (*pachyprocta* Park.) Babylon, Heckscher Pk., Dix Hills, L. I. (Blanton). May to Aug.

SARCOPHAGA ALACEDO Ald. Babylon, Aug. 5 (Blanton).

S. ALDRICHI Park. Ithaca (Hallock); Oneonta (Townes); Babylon, Heckscher Pk., L. I. (Blanton). May to Jul.

S. ATLANTIS Ald. McLean; Herkimer (Shannon); Islip (Blanton) Jun. to Aug.

S. BARBATA Thom. (*fulcata* Pand.) Babylon (Blanton). Jun. to Sept.

S. BULLATA Park. Babylon, Islip, Fire Island Beach, L. I. (Blanton) May to Aug.

S. CIMBICIS Town. Tuxedo (Curran); Brewster (Pechuman); Babylon Riverhead, Heckscher Pk., L. I. (Blanton); Poughkeepsie, Oneonta, Rome, Troy (Townes). May to Oct.

S. CINGARUS Ald. Oneonta (Townes); Babylon (Blanton); Tuxedo (Curran). Jun. to Aug.

S. CISTUDINIS Ald. Wading River. Reared from a box turtle by A. Miller, Collected in Sept. 1934.

S. COOLEYI Ald. Ithaca, May.

S. FLAVIPALPIS Ald. Ithaca; Rock City; Conquest (Shannon.) Jun. to Aug.

S. FLETCHERI Ald. Malloryville (Reared from pitcher plants by Baker & Hallock); McLean (Hallock) July.

S. FULVIPES var. TRIPLASIA V. d. W. (*dissidia* Park.) Niagara Falls.

S. HAEMORRHOIDALIS Fall. Babylon (Blanton); Tuxedo (Curran). Jun. to Sept.

S. HOUGHII Ald. Babylon, Heckscher Pk., L. I. (Blanton); Ithaca (Hallock). May to Jun.

S. HUNTERI Hough Babylon (Blanton) June 2.

S. JOHNSONI Ald. Pelham Pk., New York City (Pechuman); Babylon, Oak Beach, L. I. (Blanton). Jun. to Sept.

S. LAAKEI Hall Babylon, Aug. 5 (Blanton).

S. LATISEOTA Park. Babylon (Blanton); Tuxedo (Curran); Troy, Poughkeepsie (Townes). Jun. to Sept.

S. LATISTERNA Park. Rensselaer (Leonard); Babylon, Half-Way Hollow Hills, L. I. (Blanton); Kings Ferry (Hallock.) May to Aug.

S. L'HERMINIERI R.-D. (*communis* Park., *pullinervis* Thom.) Tuxedo (Curran); Middleport (Pechuman); Rome

(Townes); Trumbull Corners (Hallock). May to Sept.

S. MISERA var. EXUBERANS Pand. (*dur exuberans* Pand.) Ithaca. Jun. to Aug.

S. MISERA var. ILARPAX Pand. Pelham Pk., New York City Aug. 1 (Pechuman).

S. MISERA var. SARRACENIOIDES Ald. (*dur sarracenioides* Ald.) Babylon, Half-Way Hollow Hills, L. I. (Blanton); Pelham Pk., New York City (Pechuman). May to Sept.

S. NIAGARANA Park. Niagara Falls.

S. NOX Hall. Babylon, Jun. 21 (Blanton).

S. PARALLELA Ald. West Hills, L. I. Jun. 21 (Blanton).

S. PUSIOLA V. d. W. (*peniculata* Park.) Red Hook (Leonard); Tuxedo (Curran). Jun. to Sept.

S. RAPAX Walk. (*Helicobia helcis* Town.) Babylon (Blanton); Tuxedo (Curran); Canajoharie, Rome, Oneonta, Troy, Hancock, (Townes). May to Sept.

S. REVERSA Ald. Ithaca (Hallock) Aug. to Sept.

S. SARRACENIAE Riley. Ithaca, Jul. 1 (Hallock).

S. SCOPARIA var. *nearctic* Park. Tuxedo (Curran); Oneonta, Canadaigua (Townes). May to Sept.

S. SECURIFERA Vill. (*dalmatina* Sch.) Brooklyn (A. Miller); Yonkers (Pechuman). Jun. to Sept.

S. SETIGERA Ald. Richmond, L. I. Jun. 16 (Leonard).

S. SIMA Ald. Ithaca, Thatcher Pk. (Leonard); Conquest (Shannon); Trenton Falls (Leonard & Forbes). May to Aug.

S. SINUATA Meig. Freeville; Rome, Troy (Townes). May to Oct.

S. STIMULANS Walk. (*quadrisctosa* Coq.) Babylon (Blanton). May to Aug.

S. SUETA V. d. W. (*ochracia* Ald.) Babylon, Aug. 5 (Blanton).

S. UNCATA V. d. W. (*marginata* Ald.) Babylon, May 22 (Blanton).

S. UTILIS Ald. McLean Jun. to Sept.

S. VENTRICOSA V. d. W. (*assidua* Walk.) Babylon (Blanton); Tuxedo (Curran); Milford Center (Townes). Jun. to Oct.

S. YORKII Park. Niagara Falls.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June Issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, part, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed

GENERAL.—Ahmad, T.—Importance of the study of insect ecology in applied entomology. [Ind. J. Agr. Sci.] 7: 156-167. Bird, R. D.—Insect photography. [4] 69: 167-170. Cann, F. R.—Insect damage in timber and wooden exhibits in museums. [Museums Journ.] 37: 281-291, ill. Cotton & Good.—Annotated list of the insects & mites associated with stored grain and cereal products, and of the arthropod parasites & predators. [U. S. D. A. Misc. Publ. no. 258] 81 pp. Dow, R.—Climbing for insects. [Appalachia] 21: 409-412. Downes, J. A.—Fossil Insects. [Proc. & Trans. S. Lond. Ent. & Nat. Hist. Soc.] 1936-37: 108-112. Jones, F. M.—Relative acceptability and poisonous food-plants. [107] (A) 12: 74-76. Kesselyak, A.—Ueber einen zweckmassig abgeanderten Exhaustor. [79] 23: 53-54, ill. Lagos & Canevari.—Fauna entomologica del Palomar. [104] 8: 77-80, ill. (S). Merian, Maria Sibylla.—von E. Ruediger. [17] 54: 391-394. Morrison-Scott, T. C. S.—The effectiveness of protective adaptations in insects with particular reference to an examination of stomach-contents of birds from Jidda. [93] 107, A. Gen.: 51-68. Morse, A. P.—The scientific work of, By R. Dow [5] 44: 1-11, ill. Myers, J. G.—Mimetic and other associations between neotropical insects and spiders. [107] (A) 12: 70-72. Schneider, H.—Entomologische Naturereignisse in Uruguay. [17] 54: 537-538. Weiss, H. B.—Important nursery insects of New

Jersey. [N. J. Dept. Agr.] Circ. 274, 69 pp., ill. The criminal prosecution of insects. [6] 45: 251-258. **Wheeler, Wm. Morton**.—Obituary by Melander & Carpenter. [7] 30: 433-437. Obituary. By Henderson et al. [Bull. New Eng. Mus. Nat. Hist.] No. 84: 12-17, ill.

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OBITUARY

GEORGE HAMILTON FIELD, long an active entomological collector in southern California and formerly Curator of Insects on the staff of the San Diego Society of Natural History, died in San Diego on June 12, 1937, in his 87th year. Born in Boston, Massachusetts, on October 4, 1850, he graduated from high school at Winchester, Massachusetts, in 1868, and then took a short course at Eaton's Commercial College, Boston. Moving west in 1869, he was first a cowboy on the cattle trail between Kansas and Texas, and then worked a farm in Coffey County, Kansas. In 1884 he married Josephine Vogel, by whom he had five sons and one daughter. Leaving Kansas in 1889, he and his family went to San Diego, California, where he lived until his death. For 26 years he was head janitor of the city schools of San Diego, resigning in 1919.

His first introduction to natural history was about 1895, when, through the influence of George W. Dunn, he started a collection of beetles, using cigar boxes as cabinets. Thereafter, his interest in insects, exercised chiefly during vacations and other spare time, increased and broadened until, after his retirement in 1919, he centered his main attention upon it. He confined his personal collecting to San Diego and Imperial Counties, California, and Lower California, Mexico, but he secured good representations from other parts of North America through exchange and gift. Besides making his own collection, he collected insects for Frank A. Merrick, William Barnes, J. McDunnough, H. G. Dyar, J. B. Smith, J. A. Grossbeck, W. G. Wright, H. C. Fall, E. C. Van Dyke, A. Fenyès, W. S. Wright and others.

In 1934 he donated his entire collection, including cases, books and entomological apparatus, to the San Diego Society of Natural History. The number of insect specimens totalled some 30,000, about two-thirds of which were beetles, the remainder chiefly butterflies and moths. He was always meticulously careful in matters of preparation and arrangement, and the collection was a model in these respects. In recognition of this gift, he was elected a patron of the San Diego Society of Natural History, an honor accorded to only three other living persons. Previously he had been Secretary of the Society (1919-1920), and Curator of Insects (1920-1922).

Personally, George Field was of a modest, lovable character, possessed of a keen sense of humor, and with his own happy philosophy of life. Commercialism was furthest from his mind, and he once made the statement that the sale of two specimens of the rare scarabæid, *Dinacoma marginata* Casey, which he took at Ocean Beach, to F. E. Blaisdell for \$1.50 each was about all he ever made out of his collecting.

Primarily a collector and not a taxonomist or writer, Field published no new descriptions, and his only contribution to entomological literature was "Notes on the larvae of *Datana robusta* Strecker," *Journal of the New York Entomological Society*, Vol. 15, pp. 54-56, 1907. However, he discovered

about 40 species of insects that were new to science and of these he had a number named in his honor. In Lepidoptera these include: *Thaumtopsia fieldellus* B. & McD., *Tallula fieldi* B. & McD., *Tornos fieldi* Grossb., *Phasianc fieldi* Swett, *Zophodia fieldella* Dyar and *Pterophorus fieldi* Wright. In Coleoptera the following species bear his name: *Thycc fieldi* Fall, *Coniontis fieldi* Blaisdell and *Trichochrous fieldi* Blaisdell.

It is a matter of regret that Field did not live to see in print "A List of the Beetles of San Diego County, California," by Ian Moore, which was published by the San Diego Society of Natural History with the date June 15, 1937—the day of his funeral. It was based in large part upon the collections he had made.

CLINTON G. ABBOTT*.

Entomologists whose recent deaths have not been mentioned in the NEWS include VERNON LYMAN KELLOGG, professor of Entomology at Stanford University, 1894-1920, student of Mallophaga, Blepharoceridae, mouth parts of Lepidoptera and general entomological subjects, on August 8th, in his 70th year (an obituary notice by Robert A. Millikan is in *Science* for September 3, 1937); PETER WALTER CLAASEN, professor of Biology at Cornell University, writer on the Plecoptera, on August 16th, in his 52nd year; Baron WALTER ROTHSCHILD, lepidopterist, founder of a great museum at Tring, England, on August 27, aged 69; EDSON FORBES HITCHINGS, state entomologist of Maine, 1905-1911, on September 8th, aged 84 years; Dr. SIGMUND GRAENICHER, student of bees and flowers, on September 16th, in his 83rd year (an obituary notice by Prof. T. D. A. Cockerell is in *Science* for October 22, 1937); and LEON HOWARD WORTHLEY, of the U. S. Bureau of Entomology and Plant Quarantine, on October 9th, aged 60 years.

*These data based upon information furnished by Mr. Field and upon a biographical sketch in Essig's "History of Entomology," Macmillan Company, pp. 629-630, 1931.

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 for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, Columbia or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorulla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

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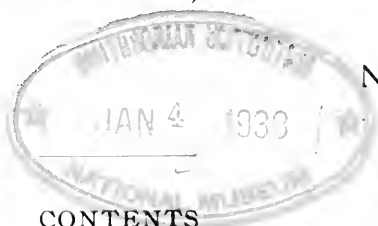
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ENTOMOLOGICAL NEWS

DECEMBER, 1937

Vol. XLVIII

No. 10



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PAPILIO POLYXENES ABERR. FORSYTHAE-WOOD.

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A New Aberration of *Papilio polyxenes* Fabr. (Lepid.: Papilionidae.)

By WILLIAM C. WOOD, Mahopac, New York.

(Plate VI.)

PAPILIO POLYXENES forsythae new aberration.

About a year ago Mrs. L. E. Forsyth of Florida City, Florida, secured five male specimens of a striking aberration, which emerged with other members of the same brood, reared on dill. The four of these which I have seen are all very much alike and differ from the typical *P. polyxenes* as described below.

The markings and coloration of the secondaries above are as usual, but the primaries are strikingly different. The marginal row of spots of the primaries connects with the submarginal row, making a single row of transverse bands instead of the double row of spots. These bands are about ten centimeters in length and give a strikingly different appearance to the wing. In fact, the primaries are almost the exact counterpart of those of *P. calverlyii* Grote.

Beneath, the primaries repeat the pattern of the upper side. In three out of four specimens the secondaries below follow the normal pattern and coloration of the typical *polyxenes*, but one specimen has the usual blue of the space between the marginal and discal rows of spots replaced by a greenish yellow, sprinkled with fine red scales.

Type ♂, in my collection. Two *paratypes* ♂♂ including the form just described, also in my collection. One paratype ♂, in the American Museum of Natural History. The fifth specimen I have not seen, but Mrs. Forsyth tells me it is the same thing as my specimens. She had sent it to Mr. Arthur H. Forsman, of Los Angeles, California.

It gives me pleasure to dedicate this striking aberration to Mrs. Forsyth.

Where and When to find the Orthoptera of Pennsylvania, With Notes on the Species Which In Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

(Continued from page 225)

OEDIPODINAE.

ARPHIA SULPHUREA (Fabricius). Appearing adult in late April, this species is moderately numerous in dry undergrowth of open woodlands and waste fields throughout Pennsylvania.

A. XANTHOPTERA (Fabricius). Supplants the former species in similar environment late in the Summer. Is probably generally more abundant. Appears adult early in August.

CHORTOPHAGA VIRIDIFASCIATA (DeGeer). Present throughout Pennsylvania. Common and generally distributed in colonies in open weedy and grass areas. Appears adult in mid-April and, persisting adult throughout the season, may prove to be partially double-brooded in parts of the State.

ENCOPTOLOPHUS SORDIDUS SORDIDUS (Burmeister). Present throughout Pennsylvania and often abundant in weedy areas in the open, except possibly in the Canadian Zone. Adults do not appear until mid-August.

CAMNULA PELLUCIDA (Scudder). Limited to the more boreal portions of the Canadian Zone in the mountains of Pennsylvania and with distribution there highly discontinuous. Appears in colonies in upland pastures of dry short grass. Becomes adult early in July. Yet known only from Tobyhanna, South Sterling, North Mountain, Shady Nook and Ebensburg in the Pennsylvania collections before me, but occurs south to Sounding Knob, Virginia at 4000 feet.

HIPPISCUS RUGOSUS Scudder. Limited to the lowlands of Pennsylvania, northern limits in the East are Caldwell, New Jersey² and I have material from Perkasio, Rockville and Washington, Pennsylvania. Present in open woodland and upland pastures, small series only are known. Appears adult in early August.

PARDALOPHORA APICULATA (Harris). Probably present

² The records for Maine and Massachusetts are probably erroneous.

throughout Pennsylvania. Appears adult in late April. Local and not abundant, in colonies in the open preferring areas of poor soil.

DISSOSTEIRA CAROLINA (Linnaeus). Common and generally distributed in dry dusty places throughout Pennsylvania. Appears adult in late June or early July.

SPHARAGEMON PLANUM Morse. Present at moderate elevations throughout the mountains of Pennsylvania where it is very local, occurring on rock outcrops, gravelly areas, rocky hillsides and ridges. When located probably often numerous³. Sussex, New Jersey, is a northeastern limit. Appears adult in mid-July.

S. BOLLI BOLLI Scudder. Moderately common throughout Pennsylvania in woodland undergrowth particularly about oaks. Appears late in June.

As *Spharagemon collaris* (Scudder) is known from Riverside and Woodbury across the Delaware in New Jersey it is almost certain to be found on sand or sandy waste land along that river in southeastern Pennsylvania, though not yet known from this State. It appears locally quite numerous early in July.

The same is true of the sand-loving *Scirtetica marmorata marmorata* (Harris), known from Bridgeboro and Woodbury Heights in adjacent New Jersey, except that this insect is probably scarcer and even more local.

PSINIDIA FENESTRALIS FENESTRALIS (Serville). A single specimen was secured in the vicinity of Philadelphia in 1908. The insect is probably present in sand areas along the Delaware River and possibly in low sandy spots throughout south-eastern Pennsylvania. Usually, in such environment only, it is quite abundant and frequently encountered. It appears adult early in July.

TRACHYRHACHIS KIOWA FUSCIFRONS (Stål). Probably local, not abundant and only at lower elevations in southwestern Pennsylvania. An eastern limit is Washington in this State (Fox and Osterman⁴). Prefers low grass in open areas of

³ Recorded from Lehigh Gap, as *Trimicrotropis citrina* by Kelm in 1902 and as *Spharagemon saxatile* by Fox in 1914.

⁴ ENT. NEWS 48: 199, July, 1937.

poorer soil. Probably appears adult early in the Summer.

TRIMEROTROPIS CITRINA Scudder. This widespread southern species probably invades a very limited portion of the lowlands of southeastern Pennsylvania, a northeastern limit being Harrisburg, Pennsylvania. Prefers bare soil in waste fields, along roads, etc. Appears adult in July.

TRIMEROTROPIS MARITIMA MARITIMA Harris. Preferring the loose sand of upper sea beaches this insect invades the interior only short distances in local areas of similar character. It also works up bay shores and is known up the Delaware River as far as Washington Park, Delair and Burlington, New Jersey; Philadelphia Neck, Pennsylvania⁵, and Chesapeake Bay at least as far as Chesapeake Beach, Maryland⁵. This latter material is usually atypic in coloration, more tinged with brown and having the caudal tibiae weakly to definitely pink. It appears adult early in July.

T. MARITIMA INTERIOR E. M. Walker. Occurs in areas of loose sand on the shores of the Great Lakes and in Pennsylvania is known only from Presque Isle, where it has been found abundant in August by E. S. Thomas. Probably appears adult in early July.

CIRCOTETTIX VERRUCULLATUS (Kirby). A northern insect found on bare rock outcrops and rock slides in the boreal portions of the mountains of northern Pennsylvania, southern limits being the Delaware Water Gap, Mount Carmel and Mahanoy City⁶. It appears adult in mid-July.

CYRTACANTHACRINAE.

Since *Schistocerca damnifica damnifica* (Saussure) occurs north in New Jersey to Manasquan, Medford and Westville (on the Delaware River), it should be found in southeastern Pennsylvania. Scudder has, however, alone recorded a specimen from this State without definite locality, taken many years ago by Schaum. It prefers dry open woodlands, appears adult

⁵ Recorded as *citrina* by Rehn and Hebard in 1916, examination of this material enables me to correct these errors.

⁶ At this locality found by H. Fox on nearly bare mine debris composed of rock fragments in a shallow valley between the ridges.

late in the Summer but is present adult until late the following Spring. It is occasional and rather sporadic in appearance.

SCHISTOCERCA AMERICANA AMERICANA (Drury). Possibly only a migrant in Pennsylvania. It becomes restless in the late fall, then frequently flying far north of its normal range. Such individuals are sometimes taken in or about Philadelphia and Harrisburg and have been captured as far north as Massachusetts. Generally distributed but prefers the dry open woodlands and high grass in fields. Its normal northern limit possibly runs across Maryland. Appears adult late in summer and is present to the south throughout the winter in this condition.

S. ALUTACEA (Harris). Though Tinicum Island is the only Pennsylvania record, the species may be present locally throughout the lowlands of Pennsylvania. It prefers rank herbage about bogs or near woods and also occurs in open woodland. It appears adult in July.

HESPEROTETTIX VIRIDIS BREVIPENNIS (Thomas). Sylmar, Chester County, VIII, 3, 1937, (H. R. Roberts; undergrowth in scrub pines). First Pennsylvania record. Probably very local. Occurs north to Wellesley, Massachusetts. Appears adult in early July.

MELANOPLUS GRACILIS (Bruner). This species occurs locally probably throughout all but the northern portions of western and central Pennsylvania. It has been recorded from Bloomsburg and I have specimens from Ligonier. It prefers grasses growing in damp places and bogs and appears adult early in July.

M. VIRIDIPES EURYCERCUS Hebard. This eastern race of a mid-western species is probably present locally throughout the mountains and western portions of Pennsylvania. I have studied material from Moosic Lake, Derrick City, Ligonier and Puketa Creek, the first three being southeastern limits of distribution. The insect occurs in colonies, sometimes in large numbers, in the richer undergrowth of open woodlands and appears adult in June.

As *Melanoplus similis* Morse is known both north and south of Pennsylvania it is certain to be found in the hills and mountains of the State. It is a very local inhabitant of richer

woodland undergrowth, but considerable colonies are sometimes found. It appears adult in early June.

As *Melanoplus hubbelli* Hebard, a species of similar habitat but more sluggish in action, is known north to the Cactoctin Mountains in western Maryland near the Pennsylvania line and from Ohio localities, it is certain to be found in the southern mountains of this State and also in the southwestern section. It appears adult in early June.

M. RUSTICUS OBOVATIPENNIS Blatchley. This is a northern and northeastern race of a south-central species. It occurs locally in colonies in the forest undergrowth of southwestern Pennsylvania at the lower elevations. I have material from Pittsburgh. It appears adult late in August.

M. DELAWARE Hebard. Scarce and very local on poor soil in open woodland undergrowth of hills in southeastern Pennsylvania, as yet recorded (as *tribulus*) only from Pink Hill in Delaware County, one of the serpentine outcrops of this region. A species occurring from the mountains of Georgia to those of southern New York and therefore present also at least in the eastern portions of the Pennsylvania mountains. Appears adult in June.

Another species of woodland undergrowth, *Melanoplus decoratus* Morse, should be sought though its distribution is undoubtedly much less extensive and does not reach as far north. It also appears adult in June.

M. SCUDDERI SCUDDERI (Uhler). Often abundant in weedy open areas⁷ and occurs also in open woodlands throughout the lowlands of Pennsylvania and present, though there scarcer, in the mountain valleys. Appears adult early in August.

M. MANCUS (Smith). An abundant but local species of the woodland undergrowth of the Canadian Zone in the more eastern mountains of Pennsylvania, known west to Buffalo Gap near Harbleton and Buena Vista Springs. Appears adult in late June.

M. ISLANDICUS Blatchley. Similarly present in the mountains of southwestern Pennsylvania but as yet known from few

⁷ Contrary to Fox, this is not a sylvan species though occurring often along woodland borders or under scattered trees.

localities, northeast to Mechanicsville in Clarion County and east to Chestnut Ridge in Westmoreland County. Appears adult probably in late June.

M. WALSHII Scudder. A more occasional but more widespread species of the forest undergrowth in the mountains of southwestern Pennsylvania in the Transition Zone. Known north only as far as Chestnut Ridge in Westmoreland County and northeast to Buffalo Flat in Union County. Appears adult in mid-July.

M. PUNCTULATUS PUNCTULATUS (Scudder). Probably present throughout Pennsylvania but exceedingly local. Arboreal and easily overlooked as it is a sluggish insect. Apparently prefers conifers and particularly pine trees. I have found many, but never without much search even after locating a colony, resting motionless in the sunshine on the trunks or lower branches of young pines. Appears adult late in August. Though colonies are often large, they are rarely found.

M. BIVITTATUS (Say). Common and generally distributed in the open throughout Pennsylvania. Prefers weed tangles, rich grasses and thick marsh vegetation. Appears adult in June.

M. DIFFERENTIALIS (Thomas). Appeared around Philadelphia about 1896, probably introduced from the West. Now abundant in waste weedy spots around the city and in marsh vegetation along the Delaware River in southeastern Pennsylvania. Appears adult in late July.

M. DAWSONI (Scudder). Rare and local as far as known and present only in the Canadian Zone of the mountains of northern Pennsylvania at Tobyhanna, a southeastern limit. Prefers boreal undergrowth of open forest areas. Appears adult in late June.

M. CONFUSUS Scudder. Probably present throughout Pennsylvania. Prefers sweet vernal and blue grass in open or gravelly or sandy drier areas. Appears adult in early June and has almost disappeared by mid-July. Often very local, rarely abundant.

M. FEMUR-RUBRUM FEMUR-RUBRUM (DeGeer). Generally distributed and very common throughout Pennsylvania. Pres-

ent in all grasses and weeds in the open. Appears adult in late June but not abundantly until late July.

M. BOREALIS JUNIUS (Dodge). Usually scarce and local in grasses of woodlands and bogs of the Canadian Zone in the mountains of northern Pennsylvania; material is before me from Moosic Lake. Prefers boreal grasses in damp open areas. Appears adult in mid-June.

M. FASCIATUS (F. Walker). Present and occasional in boreal woodland undergrowth, particularly low huckleberry bushes, throughout the Pennsylvania mountains, much more local and confined to the forested hills in the vicinity of Philadelphia. Appears adult in mid-June.

M. MEXICANUS MEXICANUS (Saussure). Present throughout Pennsylvania and sometimes very abundant in the open, particularly in weedy areas. Appears adult in early June but most abundant in summer, and a second brood reaches maturity early in August (Fox in litt.).

M. KEELERI LURIDUS (Dodge). Present throughout Pennsylvania, but probably local and not usually abundant. Prefers herbage along woodland borders or in open woods. Appears adult in July.

APPALACHIA HEBARDI Rehn and Rehn. Very local in sweet fern and other undergrowth of open forest or scrub in the mountains of Pennsylvania. Known north to Moosic Lake. Though it may be locally moderately numerous this is one of the rarer species. Appears adult in early July.

ZUBOVSKYA GLACIALIS VARIEGATA (Scudder). Local and confined to boreal forest undergrowth throughout the mountains of Pennsylvania. Thamnophilous and should be sought on hazel and alder bushes and on the lower branches and trunks of trees. A sluggish insect, difficult to locate, not frequently encountered and therefore not common in collections though sometimes present in large colonies. Appears adult in mid-July.

PAROXYA CLAVULIGER (Serville). Confined to the proximity of water in the lowlands of eastern Pennsylvania. Inhabits high marsh and swamp herbage. Appears adult in early July.

(To be continued.)

**Biological Notes on *Pseudolucanus placidus* Say,
Platycerus quercus Weber and *Ceruchus piceus*
Weber (Lucanidae--Coleoptera).**

By CLARENCE H. HOFFMANN, MORRISTOWN, New Jersey.

All of the rearings reported upon in this paper were completed in salve boxes supplied with relatively small particles of decaying wood which were moistened with a few drops of water about every other day. These boxes were kept in a basement room with a temperature of approximately 23°C.

I am grateful to E. A. Chapin for the identification of the Lucanidae, to D. G. Hall for the identification of *Theresia monohammi* Tns., and to D. J. Pletsch, A. C. Hodson, and Chi Liu for donating larval collections of *C. piceus*.

PSEUDOLUCANUS PLACIDUS Say.—Apparently very little has been written concerning this large species of Lucanid. Meek (1901), who treated statistically some variations in this species, concluded that variation was greater in the males than females and that there was no dimorphism in length of bodies, mandibles, or tibiae. Blatchley (1910) states that this beetle is common from May 1 to June 20 in Indiana, and that it is abundant in season along the beach of Lake Michigan. Girault (1913) collected a nearly grown grub under the surface of the ground at the base of a stump at Blacksburg, Virginia, on July 10, 1902. This grub was confined and formed the prepupa about August 1, pupated on August 3, and became an adult on October 6. The adult was not fed and died on October 21.

On June 3, 1933, the writer removed about 40 *P. placidus* grubs from a decayed oak log and the roots of two oak stumps. Most of the grubs were in the subterranean roots of the old stumps, which, at this time, were very dry and hard. The majority of these grubs appeared to be practically full-grown and 7 of the 16 isolated in salve boxes completed their metamorphosis within 3 months after collection. Four grubs, on the other hand, lived in captivity for over three years, dying before pupation. Pupation of the other grubs occurred about the middle of August and adults issued up to the middle of Sep-

tember. The larvae became less active about six days prior to prepupation. The mean length of the prepupal stage for 10 individuals was 5.5 days, range 4 to 7 days; while the mean length of the pupal period for 7 individuals was 29.6 days, range 29 to 30 days. Longevity records kept for 6 individuals show that they lived 156, 260, 297, 299, 336, and 489 days respectively. One pair of reared beetles isolated on September 23, 1933 were observed mating on May 10, 1934. Although the female lived 489 days, she did not deposit any eggs on or near the provided wood.

PLATYCERUS QUERCUS Weber.—According to Riley (1870), Mr. E. J. Ayres of Villa Ridge, Illinois, observed these beetles injuring many young pear trees by completely eating out the ends of the new shoots and of the buds just before they burst. This author also mentions that the larvae feed in dead oak logs and stumps, and intimates that the species overwinters as an adult. Blatchley (1910) records that *P. quercus* occurs in Indiana from March 25 to October 29, adult emergence occurring the latter part of March and mating about May 1.

On March 23, 1933, I took a larva of this species in the firm part of a fallen decayed hickory branch near Baldwin, Kansas. After isolation, the larva formed a cell within a small piece of this wood and did not begin to feed until May 28. Another larva collected in an old log at the same place began feeding on May 3. Pupation of the former occurred on August 28, and the adult emerged on September 8. On May 6, 1933, I collected 3 grubs of this species from an old log, possibly elm, near Taylors Falls, Minnesota. They were not feeding at the time of collection. One of the larvae survived laboratory conditions, pupated on August 3, and the adult emerged on August 16. The two reared adults were kept alive until October 1 at which time they were killed and pinned.

CERUCHUS PICEUS Weber.—Felt (1906) states that the larvae of this species have been recorded from old beech stumps, decaying chestnut, willow, and birch. He records taking it abundantly in rotting black cherry. In Indiana, *C. piceus* occurs in and about decaying beech, oak, and other logs from April 10 to October 25 (Blatchley, 1910).

This species was most difficult to rear in salve boxes, and, although I had an abundance of material, only one larva was reared to maturity. On April 8, 1933, A. C. Hodson collected about 80 grubs from a small section of a decayed elm log, which was partially submerged, near Victoria, Carver County, Minnesota. Both small and large larvae were represented in this collection, the smaller ones being about 7 mm. long. D. J. Pletsch collected 4 large larvae from an old Norway pine log at Itasca Park, Minnesota on May 29, 1933. One of these became a prepupa on July 23, pupated July 26, and emerged as an adult on August 11. Chi Liu removed 33 grubs and one adult from an old log in Anoka County, Minnesota on April 14, 1934. On May 29 of the same year, I collected both larvae and adults from a decayed birch stump at Itasca State Park, Minnesota.

THERESIA MONOHAMMI Tns. PARASITIC ON *CERUCHUS PICEUS*.—A number of the large *C. piceus* grubs collected by Dr. Hodson on April 8, 1933, were parasitized by *T. monohammi*. As this dipterous larva approached maturity, the beetle larva became less active than usual, certain portions of the cuticula turned deep blue or black, and some of the abdominal segments became swollen. The parasitic larvae, which when mature were approximately 12 mm. long and 4 mm. wide, left their hosts during the latter part of April and all pupated within two days afterward. It was observed that only one *T. monohammi* larva completed its development within each grub of *C. piceus*. The dark brown puparia formed in the wood debris were about 12 mm. long and 4 mm. wide. Of the 6 individuals reared to maturity, 4 required 14 days in this stage while the other 2 required 15 days. Adult emergence occurred between May 5 and May 11, 1933.

LITERATURE.

BLATCHLEY, W. S. 1910. An illustrated descriptive catalogue of the Coleoptera or beetles (exclusive of the Rhynchoptera) known to occur in Indiana, pp. 906-908.

FELT, E. P. 1906. Insects affecting park and woodland trees. N. Y. State Museum Memoir 8:492.

GIRAULT, A. A. 1913. Fragments on North American insects IV. Ent. News 24:195.

MEEK, E. B. 1901. Some variations in *Lucanus placidus*, statistically examined. Science 13:375.

RILEY, C. V. 1870. A new pear-tree insect. American Entomologist and Botanist 2:212, fig. 129.

The Occurrence of Two European Nitidulid Beetles in Wisconsin.

During two seasons of collecting at Madison, Wisconsin, the following European Nitidulidae were taken by the author:

BRACHYPTEROLUS PULICARIUS (L.). This insect has been reported from various New England localities. Hatch¹ gives a bibliography of the American literature. The following Wisconsin localities may be added: Madison, June 4, 1934, 3 specimens of flowers of *Smilacina racemosa*, June 15-27, 1935, 3 specimens; Devil's Lake State Park, May 25, 1935, 6 specimens sweeping, 2 on flowers of *Prunus virginiana*; Cloverleaf Lakes, Shawano County, June 15, 1935, 1 specimen.

NITIDULA CARNARIA (Schall.). Abh. Schrift. Nat. Ges. Halle I, 1783, p. 257. This species resembles a small *N. rufipes*, but with disc of elytra marked with two pairs of yellow spots, the anterior pair at basal third, widely separated, slightly elongate longitudinally; posterior pair at apical third, more approximate, rather transverse, larger. In some specimens there is a humeral pale area nearly contiguous to the anterior spot. The elytral maculation distinguishes this species at once from the other *Nitidula* of our fauna. The specimens before me are 2.4-3 mm. long.

At Madison two specimens of this necrophile were taken at carrion, May 28 and 30, 1934, and the following spring a score of specimens were taken at similar habitats April 29 to June. Six specimens have also been received from J. E. Blum, taken at Oakland, California, April, 1934. This is indicative of a wide distribution and possible long establishment of this species in our fauna.

H. R. DODGE, University of Minnesota.

¹ Hatch, M. H., 1928. Jour. New York Ent. Soc., 36: 35-36.

A New Species of *Phyllophaga* (Coleoptera, Scarabaeidae) from Kentucky.*

By PAUL O. RITCHER, Kentucky Agricultural Experiment Station, Lexington, Kentucky.

The total number of species of *Phyllophaga* taken in Kentucky has been increased to twenty-five as a result of collections made by the writer the past two years. The list is composed of *Phyllophaga anxia* (Lec.), *arkansana* (Schffr.), *bipartita* (Horn), *crenulata* (Froehl.), *delata* (Horn), *ephilida* (Say), *fervida* (Fab.), *fraterna* (Harris), *fusca* (Froehl.), *futilis* (LeConte), *glaberrima* (Blanch.), *hirticula* (Knoch), *hirtiventris* (Horn), *hornii* (Sm.), *ilicis* (Knoch), *implicita* (Horn), *micans* (Knoch), *praeternissa* (Horn), *profunda* (Blanch.), *prunina* (Lec.), *quercus* (Knoch), *rugosa* (Melsh.), *tristis* (Fab.), *vehemens* (Horn) and one species which appears to be undescribed. The new species is named after the state in which it occurs.

Phyllophaga kentuckiana, n. sp.

This species belongs in Horn's Group IX. It resembles *P. fraterna* and *P. forsteri* in many respects but is apparently quite distinct.

Length 16-20 mm. General form oblong, slightly dilated posteriorly. Medium to dark brown in color with slightly darker head and pronotum. Surface moderately shining.

Clypeus rather deeply emarginate; margin reflexed; surface coarsely, closely punctate. Head closely punctate, the punctation slightly coarser than that of clypeus.

Pronotum widest at base; sides subangulate at middle, anteriorly straight and convergent; posteriorly vaguely subsinuate; side margins feebly crenate; surface moderately shining, coarsely, sparsely punctate; punctures rather unevenly distributed. Each pronotal puncture bears a short recumbent yellow hair; hairs in some specimens longer and more prominent at sides.

Elytra: Sutural costae moderately strong, rather wide, sparsely rugose-punctate; discal costae somewhat vague; submarginal costae narrow, obsolete on basal half. Elytral surface shining; finely, irregularly, not closely punctate.

Surface of mesosterum finely, closely punctate; a rather sparse vestiture of yellowish hair.

* The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

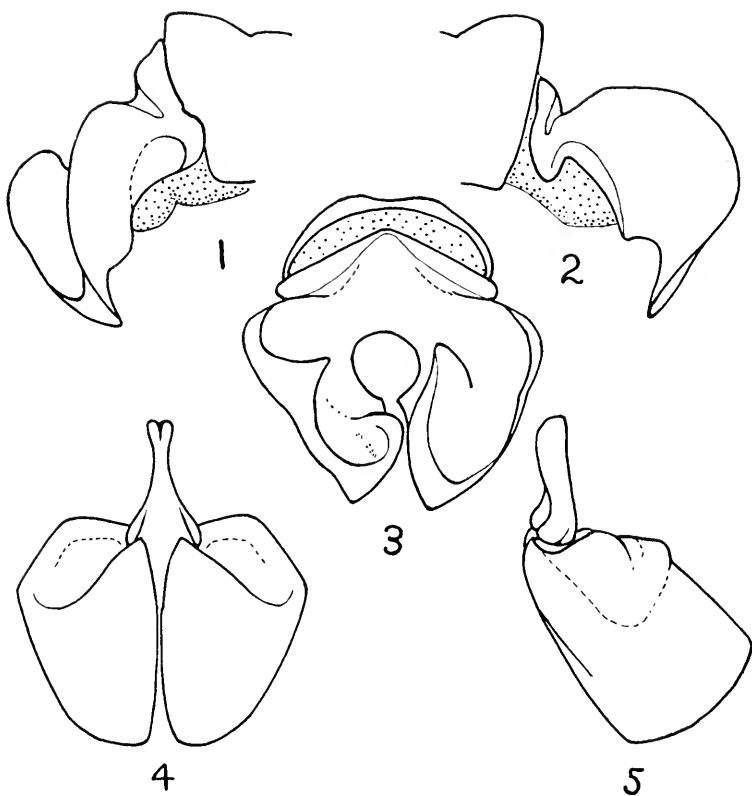


Fig. 1—Upper left—Left male clasper. Fig. 2—Upper right—Right male clasper. Fig. 3—Center—Hind view of the male claspers. Fig. 4—Lower left—Ventral view of female genitalia. Fig. 5—Lower right—Side view of female genitalia.

Abdomen with surface finely, rather sparsely punctate, with short, fine, yellowish hairs. Pygidium rather broad, convex. Surface rather finely and sparsely punctate.

Tooth of claw median; long, nearly right angled in both sexes.

♂: Antenna 10-segmented; club slightly longer than stem. Upper spur of hind tibia lanceolate elliptical, slightly decurved, obtuse. Lower spur fixed, two-thirds length of upper, acute. Abdomen with longitudinal flattened or depressed area; penultimate segment with an extensive, finely roughened slightly

elevated, arcuate ridge more pronounced to sides; terminal segment with a median, slightly roughened depression. Genitalia well developed, superficially resembles those of *P. rugosa*; quite distinct from those of *P. fraterna* and *P. forsteri*. May be distinguished from *P. fraterna* in that posterior angle of right male clasper is acute and curved inward with tendency to form a ridge on inner face of right clasper. No deep notch in right clasper as in *P. forsteri*.

♀: Antenna 10-segmented; antennal club slightly shorter than funiculus. Upper spur of hind tibia as in male; lower, three-fourths length of upper, broad, obtuse. Pubic process intermediate between that of *P. fraterna* and *P. forsteri*; larger and thicker than pubic process of *P. forsteri*, with notch at distal end.

Holotype.—Male; Lexington, KENTUCKY, May 26, 1936, feeding on red oak.

Allotype.—Female; Lexington, Kentucky, May 11, 1936, feeding on bur oak.

Paratypes.—8 males and 10 females. Two males and four females, Lexington, Kentucky, May 21, 1936. Two males and four females, Cynthiana, Kentucky, June 2, 1920. Three males and two females, Winchester, Kentucky, May 24, 1905. One male, near Mammoth Cave, July 23, 1894.

Holotype and allotype deposited in National Museum. Paratypes in writer's collection and collection of Kentucky Agricultural Experiment Station.

Food plants.—Taken on bur, red and pin oak, walnut, and elderberry.

Some Field Equipment.

By H. ELLIOTT McCLURE, Ames, Iowa.

Several years ago I had a bee in my bonnet to go to the tropics and collect insects. For months I planned and studied what I thought I would need for such an expedition. Either I did not know where to look or the literature on specific equipment for field work is scattered and not usually catalogued. I had considerable difficulty finding helpful hints and even finding men who could tell me what to and what not to take. The tropical trip faded, but I continued to build up

equipment which I thought would sustain investigation in a locality away from drugstores and museums.

During May 1936, on the spur of the moment, I decided to go to Churchill, Manitoba and collect tundra forms. In three days I was packed and on the road with Mr. A. C. Twomey, ornithologist. My equipment worked so well that I feel I should pass on at least a list of it to anyone else considering a similar trip.

In this instance we were to travel by automobile and by rail so that weight was not a prime factor. Further, we were to live in a bunk car or cabin and would not have to prepare to live in a tent. When fully packed I had two hand or suitcase trunks, two wooden boxes 20" x 20" x 10", two small wooden boxes, one large canvass bag, and one rollup of blankets. The weight was approximately 300 pounds, and the equipment had to last at least eight weeks.

One trunk was for clothes, while the other I called my collecting trunk. Into it I had built shelves and drawers to hold all of the minute and varied collecting and preserving accoutrements of an entomologist. This material included five gross of vials, four of which were filled with alcohol before being packed. Ethyl acetate and cellophane were taken along and many killing bottles were made out of dry vials, so that individual insects from different plants, etc., could be killed and carried with the least amount of space. Larger killing bottles were made with calcium cyanide. An extra gallon of alcohol was included and my guess was so close that I had only $\frac{1}{2}$ pint left over when I packed to return. During the last week I lacked sufficient insect pins. I did not take along a triangle punch and needed one. Of the following list every thing was used, but the set for inflating larvae:

5 gross 2 dram short vials	Several scissors
1000 insect pins, sizes 00-7 (needed more)	Several dissecting needles
1000 common pins	Millimeter rule
1 gallon alcohol	2 crow quill pens
1 lb. ethyl acetate	2 fine camel hair brushes
$\frac{1}{2}$ lb. cellophane	4 Schmidt boxes (needed more)

½ lb. calcium cyanide	Sheet cork
Pinning block	5 wide mouth bottles
5000 labels	Triangle punch (not taken but needed)
Reading glass	½ lb. white arsenic
Pocket lens	Several slides
Larva inflation set (not used)	Balsam
Several tweezers	Xylol
Several scalpels	

For actual collecting I had one collapsible sweep net with two canvas sweeping bags and one butterfly net. The ability to change nets quickly was a great help, for I would sweep in one minute and chase butterflies the next. For aquatic insects I used a long handled aquatic net, with a spare bag for it also. All of these bags I had previously dyed a leaf green, as that is apparently the least obnoxious color to most insects. For insects of the soil surface and debris I used my soil surface sampler described in *Ecology*, October, 1935. Altho I claimed too much accuracy for this apparatus in this article, it does serve the purpose of giving fairly accurate collections of soil surface fauna rapidly and I am continuing to use it. Three collapsible light traps lighted by coal miner's carbide lamps were used, but these failed to function in the North, because it was hardly dark during June and July and in the early morning hours the temperature was too low for insect flight. They had worked excellently in Illinois. Also three screen bait traps were included, but these too were not successful, apparently because the high north wind dispersed the odor of the attractant too rapidly. Only in protected spots in the black spruce-tamarack forest did these work at all. For the lights I took 10 pounds of carbide and for the bait traps three cheap perfumes, molasses and honey. The soil surface samples were collected in six cloth bags and then taken to the bunk car for study. Insects from the sweepings were put into one pint jars in the field and later separated from the leaves, etc. Twenty-four pint mason jars were taken.

Every worker has his own methods of keeping records, but for uniformity and space I use the hundred page ledgers available in most ten cent stores. Sheets of typing paper were

folded and cut into eight pieces each and records were written on these in the field and placed in each pint jar with each collection. Later the records were copied into ledgers under proper headings. I took eight of these. Several small pocket note books were included, but not used. I took along three eversharp pencils with plenty of extra leads. Much fishing failed to rescue one pencil from the bottom of a crystal clear lake. For reference Comstock's *An Introduction to Entomology* and a collection of keys for larvae were used and, altho Ward and Whipple's *Fresh Water Biology* was not included, it was needed.

For records of weather conditions several thermometers were used and broken. I borrowed and insured a hygrograph thermograph, and sling psychrometer, so that accurate and continuous records of the temperature and humidity in one location were obtained. Additional paper, ink, and points were carried for these. I should like to have had an atometer and rain gauge also, but these were not readily available when I left.

Additional odds and ends that were found to be useful were:

1 lb. Plaster Paris	1 pack fine cardboard (for triangles)
1 ream typing paper	1 ball cord
1 bottle blue black writing ink	Hammer
1 bottle red writing ink	1 pair pliers
1 bottle India ink	6 small tin cans
Several pipettes	2 small funnels
Several candles	Hand axe
1 metal tape measure	Hunting knife
Animal cage	Pocket knife
Numerous thumb tacks, clasps, etc.	Compass
1 package cotton	Field glasses
2 tubes glue	Several metal pill boxes
Water tight match case	1 roll wire
Several gummed labels, address, etc.	Folding drinking cup
1 sq. ft. copper screen	Several screen top lids for jars
1 sq. ft. sand paper	Gasoline lantern
1 pack index cards	Flashlight and 12 extra batteries
Many rubber bands	

The animal cage was made by soldering copper screen into the top of a bread box and proved to be very handy. Mine housed snakes, frogs, birds, and lemmings during the trip.

My photographic equipment was cheap, but effective. The camera was an Eastman Kodak taking 116 film or 2½" x 4¼" pictures. With it I carried a K³ color filter, a portrait lens reducing the focal distance to 18 inches, and another portrait lens reducing the focal distance to 7 inches. The last an optometrist ground for me. I also had with me two tripods, the lighter of which I carried at all times. I used 30 packs of verichrome negatives and altho I did not attempt any developing and printing I did have a little developing fluid and fixative with me. Mr. Twomey carried a photometer which was indispensable to us. All of this equipment except the tripods fits into a metal watertight container which I keep on hand in case that I might be canoeing or in some other situation where the negatives and camera might become wet.

Naturally anyone going out into the open will carry a first aid kit, and this too is something that varies with the user's needs. I have a small scout kit which I carry in my collecting box at all times. It is fortified with other medicines left at camp. Besides the kit, mine usually includes bicarbonate of soda, extra gauze and tape, extra bandaids, iodine, mercuriochrome, cold reliefs, vaseline, laxative, etc.

As food was available in Churchill, we did little or no cooking, but boarded out. Nevertheless, for tea, washing, etc., a gasoline stove and an ordinary camp cooking set was much used. This would have to be augmented for anyone leaving civilization entirely.

Now to the much worried about and never understood problem of clothes. What you will need varies with each locality and wherever possible you should contact someone in that locality, or who has been there, to find just what you want. Fortunately Mr. Twomey having had previous experience with the North could direct me. Altho there were three or four decidedly warm days at Churchill, the weather was not dependable and we had to go out prepared for rapid drops in temperature if the wind shifted from south to north. Natur-

ally, being from the South we were more susceptible to these changes and the way I bundled got many a laugh out of the natives. If you are susceptible to mosquitoes and black flies, then it is necessary that you have clothes of close and heavy enough weave to resist their attacks. Mosquitoes will work at the seams of a pair of breeches with a diligence and fixity of purpose that is highly commendable. They even bit me on the toughened palms of my hands. Mosquito netting and a mosquito bar are essential. The netting should be black, for after wearing a head net for days the eyes are strained by any other color. I took a yard of black veiling and sewed it together into a cone. Inside of this I sewed the wire rib of a nail keg. In wearing this, I pulled the whole over my felt hat and tucked the bottom ends inside of my jacket, so that the wire ring rested on my shoulders. The brim of the hat and the ring thus held the netting away from the back of my neck and my long nose. The nature of the country makes expensive, high grade boots a necessity and I was told that, if I spent less than \$25.00 for a pair I would come back barefooted. I wore out two pairs of leather boots and one pair of rubber hip boots in eight weeks. The tundra is made up of areas of rocks and gravel interspersed between soggy water soaked muskeg and pools of water. I waterproofed the leather about every two days but constant walking in the water and out onto rocks softened and rapidly wore thru the soles. I should suggest that an expensive pair of rubber boots, either knee or hip length, with a laced and fitting shoe, would be the most satisfactory foot wear for the tundra.

The clothes that I took and actually needed are listed below; everything else was wasted weight and space:

2 pair whipcord breeches	Mosquito bar (necessity)
2 wool underwear	Mosquito repellent
3 pair wool socks	Hat
2 wool shirts	Gloves (preferably leather)
1 leather sheepskin coat (or canvas parka)	12 handkerchiefs
1 suede jacket	12 towels
1 pair shorts and shirt	6 wash cloths
2 cotton work shirts	4 wool blankets

2 pair leather boots	1 cotton blanket
Neats foot oil	1 small mattress (or sleeping bag)
Waterproofing material	Soap, shaving kit, toothpaste,
1 pair rubber hip boots	Needles, thread, thimble,
Black mosquito netting (necessity)	buttons
2 flannel pajamas	

I carried no gun, and altho I worked several miles from the town and polar bears were in the vicinity, I saw no animals more dangerous than a Hudsonian red squirrel or seal. Mr. Twomey carried only a light shot gun for birds and a year or so before he had encountered a female polar bear with a cub, but escaped by backing away slowly after she had calmly stood on her hind legs and observed him.

The equipment as I have listed here served me well during my eight weeks at Churchill and I was not handicapped by lack of anything, but plankton nets. As it was, I collected nearly 50,000 specimens of all or nearly all of the orders of insects represented in the region and of many of the other arthropod groups.

Reduced Rates and Tours to Europe

On account of the Seventh International Entomological Congress at Berlin, August 15 to 20, 1938.

Special reduced steamship rates will be in effect for those booking under the committee's arrangements.

The following tour will be organized, if enough book, for those wishing to tour Europe before or after the Congress or both. For announcement of the Congress see ENTOMOLOGICAL NEWS, October, 1937, page 242.

Sailing June 25, six day motorcoach tour through Ireland, one week motorcoach tour through England, nine days in London and northeastern England (Scotland optional) Norwegian fjords and glaciers, Oslo three to five days, Copenhagen, North Central Germany. After the Congress: Breslau, Krakau, Budapest, Vienna, the Danube, four days at an Austrian Alpine Lake, Munich, Switzerland (Rigi, Lake Lucerne, Pilatus, Jungfrau), Paris. Sailing from Cherbourg September 18.

If you or your friends have any interest in the tour, send in your name and you will be kept informed. No general announcement will be mailed to the membership list.

*Joint Committee of Entomological Society of America
and American Association of Economic Entomologists.*

A. R. SHADLE, University of Buffalo, Chairman.
R. W. LEIBY, Cornell University.

The Type Species of the Genus *Lampides* Hübner, (Lepidoptera: Lycaenidae).

BY LEIGH E. CHADWICK, Harvard University,
Cambridge, Massachusetts.

In 1873, A. R. Grote (see tabulation below) published a supposed new genus and species of Theclinae. This name, *Callicista ocellifera* Grote, now rests in the synonymy of *Strymon columella* Fabr., and is of no particular interest here. However, Grote followed his formal descriptions with a few remarks in which he compared his species with some other members of the family, and concluded his article with the statement that "the European *L. Boeticus* may be considered the type of *Lampides*."

This statement is of some consequence, since, so far as it has been possible to determine, it constitutes the first valid fixation of the type of the Hübnerian genus, and has been overlooked by subsequent writers. Modern students have followed Scudder's selection of *L. zethus* Hbn. (= *Papilio celeno* Cram.) as the type of this genus. This course has involved the erection of a new name, *Cosmolyce* Toxopeus, for *boeticus* Linn., and the placing, by some students, of *Jamides* Hbn., type *Papilio bochus* Stoll, as a synonym of *Lampides* Hbn. For convenience, the bibliographical facts may be summarized as follows:

LAMPIDES Hübner

Hübner, [1819] Verz. bekannt. Schmett. (5): 70

Id., 1823. Zuträge z. Exot. Schmett. 2: 11

Grote, 1873, Bull. Buffalo Soc. Nat. Sci. 1: 179

specifies *L. boeticus* Linn., 1767, as type

Scudder, 1875, Proc. Amer. Acad. Arts Sci. Boston 10: 199 regards *boeticus* Linn. as the type of *Polyommatus* Latreille, and therefore specifies as the type of *Lampides* Hbn. *L. zethus* Hbn. (= *Papilio celeno* Cram.) under the name *aelianus* Fabr.

Kirby, 1896, in Allen's Nat. Libr. Handbook Lepid. 1 Butt. 2:82 independently selects *L. boeticus* Linn. as the type of *Lampides* Hbn.

Toxopeus, 1927, Tijdschr. Ent. 70: 268 *nota* proposes the new name *Cosmolyce* for the reception of *L. boeticus* Linn., Tox. (= *L. boeticus* Linn.)

- Hemming, 1933, *Entomologist* 66: 224 recognizes Scudder's designation of the type of *Lampides* and accepts *Cosmolyce* Toxopeus, at the same time inadvertently offering the new name *Lampidella* for the same purpose
- id. , *ibid.* p. 276
sinks *Lampidella* Hemming as a synonym of *Cosmolyce* Toxopeus
- id. , 1937, *Hübner*, Vol. II: 215 cf. for dating of Hübner references cited

It has been realized for some time that the type of *Polyommatus* Latreille is not *boeticus* Linn., as Scudder thought, but *Polyommatus argus* Fabr., *Latr. nec Fabr.* 1804 (= *Papilio icarus* Rott., 1775). Cf. Hemming, 1934, *Gener. Names Hol. Butt.* 1: 109 no. 277. Furthermore, *boeticus* Linn. is the fifth of the eight species and one MS name listed under *Lampides* in the *Verzeichniss*, and also the species of that genus chosen by Hübner for comparison with *L. balliston* in the *Zuträge*. Consequently, nothing stands in the way of accepting Grote's designation of *boeticus* Linn. as the type of *Lampides* Hbn. *Cosmolyce* Toxopeus must therefor fall as a synonym of *Lampides* Hbn.

This leaves two possible courses in respect to *celeno* Cram. and its congeners. *Jamides* Hbn., [1819], type *Papilio bochus* Stoll, 1782, is available for use by those who regard *celeno* Cram. and *bochus* Stoll as congeneric; in any case it must be separated from *Lampides* Hbn. Students who feel that *bochus* Stoll is generically distinct from *celeno* Cram. and its allies will be under the necessity of erecting a new genus to receive these species.

Rare Butterflies Captured by Dr. Avinoff (Lepid.).

The mysterious female of the rarest species of butterfly (*Closyne pantoni*) known to the island of Jamaica, a butterfly never before netted by a scientist, has been captured by Dr. Andrey Avinoff, director of Carnegie Museum, Pittsburgh, Pennsylvania, in the strange rocky section of Jamaica known as the Cockpit Country. Dr. Avinoff has 18 of the rare butterflies, including three females, and 10 specimens of *Papilio homerus*, the largest swallowtail butterfly in the western hemisphere. ANNA JANE PHILLIPS in the *Pittsburgh Post-Gazette*, July 21, 1937.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within () follows; then the pagination follows the colon :

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

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

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. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Abbott, C. E.—Photographing insects. [19] 32: 155. Carpenter, F. M., et al.—Insects and arachnids from Canadian amber. Collembola by Folsom; Homoptera by Essig; Hymenoptera by Kinsey and Brues; Diptera by Boesel; Arachnida by Ewing. [Univ. Toronto Studies] No. 40: 7-62, ill. Carpenter & Collins.—Notes on insects collected in N. W. Greenland by the Oxford Univ. Land Exped. of 1934-35, with description of a n. sp. of Rhamphomyia (Dipt.). [75] 20: 401-409, ill. (*). Goldschmidt, R.—Cynips & Lymantria. [90] 71: 508-514. Imms, A. D.—Some reflections on recent developments in entomology. [107] C: 1: 57-66. Schneider, H.—Insektenplagen II. [17] 54: 525-528. Secastopulo, D. G.—Methylated spirit as a relaxing agent. [21] 49: 113. A preservative fluid for metallic pupae. [21] 49: 113-114. Sparrow, F. K.—Some Chytridiaceae inhabitants of submerged insect exuviae. [Proc. Amer. Phil. Soc.] 78: 23-61, ill. Wehrli, E.—Über alte und neue genera, subgenera, species and subspecies. [17] 54: 502-503, cont. Williams, C. B.—The use of logarithms in the interpretation of certain entomological problems. [35] 24: 404-414.

ANATOMY, PHYSIOLOGY, ETC.—Alpatov, W.—On some quantitative regularities in the growth of the silk gland in *Antheraea pernyi*. [Zoologitsheskij Jour.] 16: 574-578. (in Russian with English summary). Anon.—Observations on the larval antennae of the crickets. [Ent. &

Pathol., Hangchow] 5: 457-458. **Barth, R.**—Bau und funktion der Flügeldrüsen einiger Mikrolepidopteren. [94] 150: 1-37, ill. **Bodenstein, D.**—Beintransplantationen an Lepidopterenraupen IV. Zur Analyse experimentell erzeugter Bein-Mehrfachbildungen. [87] 136: 745-785, ill. **Boyd, W. C.**—Cross-reactivity of various hemocyanins with special reference to the blood proteins of the black widow spider. [92] 73: 181-183. **Brocher, F.**—Un physiologiste des insectes. By. A. Pictet. [41] 16: 749-757, ill. **Brown, A. W. A.**—A note on the utilisation of Polysaccharides by a grasshopper. [22] 28: 333-336. **Carpentier, F.**—Sur le tube digestif des Tridasctyloides. [33] 77: 283-291, ill. **Crew & Auerbach.**—“Spheroidal”: A mutant in *Drosophila funebris* affecting egg, size and shape, and fecundity. [Pro. Roy. Soc. Edinburgh] 57: 255-268, ill. **Edney, E. B.**—A study of spontaneous locomotor activity in *Locusta migratoria migratorioides* by the actograph method. [22] 28: 243-278, ill. **Epure, E.**—Observations sur le corps gras des larves de *Simulium*. [Arch. Zool. Exp. & Gen.] 79: 17-23, ill. **Fiedler, H.**—Die wichtigsten schadlichen Erdruppen der Gattung *Agrotis* (Lep., Noct.). Ein Beitrag zur Biologie, Morphologie und praktischen systematischen Erkennbarkeit der Larven und Imagines von *Agrotis segetum*, *A. exclamatoris*, *A. vestigialis* und *A. tritici*. [11] 1936: 113-178, ill. **Gabler, H.**—Beitrag zur kenntnis des eies, der eiblage und des larven von *Calcoris biclavatus*. [34] 119: 299-302, ill. **Heuser, R.**—Die ursache der verschiedenen puppenfarben bei *Papilio machaon*. [Mitt. Munchner Ent. Ges.] 27: 52-56. **Hilton, W. A.**—Nervous system & sense organs. XLIV. Thysanoptera. [13] 29: 71. **Ilse, D.**—New observations on responses to colours in egg-laying butterflies. [31] 140: 544-545, ill. **Ishmaer, A.**—The morphology and postembryonic growth of the silk-secreting gland of *Antherea pernyi*, (in Russian with English summary). [Zoologitscheskij Jour.] 16: 239-246. **Jackson, D. I.**—Host-selection in *Pimpla examinatrix*. [107] (A) 12: 81-91, ill. **James, H. C.**—Sex ratios and the status of the male in *Pseudococcinae* (Cocc.). [22] 28: 429-461. **Kassianoff, L.**—Etude morphologique et biologique de la famille des Cimicidae. [54] 15: 385-408, ill. **Knipling & Rainwater.**—Species and incidence of dipterous larvae concerned in wound myiasis [Jour. Parasit.] 23: 451-455. **Lawrence, R. F.**—A stridulating organ in harvest-spiders. [75] 20: 364-369, ill. **Lesperon, L.**—Recherches cytologiques et experimentales sur la secretion de la soie et sur certains mecanismes excre-

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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 for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, *Columbia* or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator; Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba." offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material. Edwin I. Guedet, P. O. Box 305, Napa, California.

Wanted for cash or exchange any pamphlets dealing with the American Hesperidae. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Mca. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

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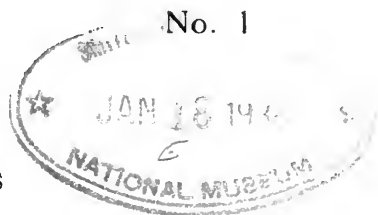
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VOL. XLIX.

JANUARY, 1938

No. 1

Further Observations on the Nesting Habits of *Cerceris nigrescens* Smith (Hymenoptera: Sphecidae).

By KARL V. KROMBEIN, Buffalo, N. Y.

The following notes on *Cerceris nigrescens* Smith, made in September 1936 in Forest Lawn Cemetery, Buffalo are a continuation of my observations of this species during 1934.¹ Mr. Henry Dietrich of Cornell University has been kind enough to determine the weevils.

Cerceris no. 2. Entrance of burrow open and surrounded by a mound of pellets of earth about three-eighths of an inch in height and an inch and one half in diameter. Burrow ran down at an angle of 85° from the horizontal to the one and one half inch level and then at an angle of 45° to the three inch level. The burrow ended at this depth and contained no weevils.

Cerceris no. 3. Entrance of burrow open and surrounded by a cone of pellets three sixteenths of an inch high and one inch in diameter. Burrow descended for one inch vertically and opened into a cell three quarters of an inch long at an angle of 45°. The cell contained three *Sitona hispidula* Fabr., the clover-root curculio, and the wasp continued to bring in more weevils after I excavated the burrow.

Cerceris no. 4. Entrance of burrow plugged with earth for an eighth of an inch from the surface and without a cone of pellets. The burrow (including the cell) extended to a depth of an inch and one half at an angle of 85° from the horizontal and contained two *Sitona hispidula*.

Cerceris no. 5. Entrance open and not surrounded by a mound of pellets. Burrow descended for half an inch at an angle of 85° from the horizontal, then at an angle of 45° for

¹Krombein, Karl V. Biological Notes on Some Solitary Wasps. (Hymenoptera: Sphecidae). Ent. News XLVII: 93-99, 1936.

three-quarters of an inch and then back at a right angle for another inch. Two cells ending at the three inch level, at a 45° angle to the horizontal and at right angles to each other were connected with the main burrow by short passages. One cell was completely stocked and held twenty-five *Gymnectron antirrhini* Payk. and a tiny wasp larva while the other cell contained two weevils of the same species.

Cerckeris no. 6. Wasp captured while flying with a *Gymnectron* species (?).

Cerckeris no. 7. Wasp captured while flying with a *Sitona hispidula*.

Cerckeris no.'s 8-10. Burrow entrances open and two of them surrounded by a cone of pellets. General form of burrow as in no. 3 but no weevils were found in any of the nests.

The shape of the burrow appears to be quite constant and is the same as that figured by the Peckhams² for *Cerckeris nigrescens*. The only exception was the *Cerckeris* no. 5 where the burrow had one extra angulation. The cone of earth around the entrance to the burrow is lacking as often as it is present. There is no correlation here with the species of prey stocked since burrows 4 and 5 lacked a cone but contained different weevils. Certainly those burrows having the cone resemble the entrance to an ant's nest very much. Probably this is not the effect of a studied mimicry on the wasp's part but rather an indication that some of the *Cerckeris* are a bit lazier.

Ordinarily the entrance to the burrow is not closed while the wasp is absent but one burrow (no. 4) had an earthen plug at the entrance. It is certainly a lack of foresight on *Cerckeris* part leave the entrance open since she is much troubled by *Senotainia trilineata* V. d. W., the Miltogrammine inquiline, which follows her around and is apparently the cause of the wasp's wariness in entering her burrow. I have seen *Senotainia*, tired of shadowing a *Cerckeris*, give up the chase and wait for the wasp at her burrow. As soon as the wasp reappeared the fly again took up the chase.

² Peckham, G. W. and E. G. On the Instincts and Habits of the Solitary Wasps. Wisconsin Geol. and Nat. Hist. Surv. Bull. 2: Pl. VIII, Fig. 6, 1898.

The weevil is carried well toward the wasp's head during flight. The Peckhams state that the prey is held in the mandibles but I have never been able to get close enough to a flying wasp to verify this. The weevil is held by the mandibles alone when the wasp is on the ground.

I have recorded four species of weevils—*Sitona hispidula*, *Gymnetron antirrhini*, *Gymnetron* species and *Hyperodes delumbis* as prey of *nigrescens* but apparently an individual wasp uses only one of these species in all her provisioning. Mr. John G. Franclemont has taken one of these wasps at Chafee, New York (September 13, 1935) carrying a *Sitona hispidula*. In all probability *nigrescens* stocks her nests with this clover-root curculio over a large portion of its range and must be an important secondary factor in the control of the beetle since at least a dozen weevils would be necessary to bring one wasp larva to maturity.

In my previous paper I indicated that *nigrescens* is a colonial species. This contention was borne out by my observations this year. After two years the wasps were still nesting in the identical area and the population had not increased appreciably. A spirit of toleration pervades the colony and there is no stealing of prey from the rightful owners such as has been recorded for various species of *Bembix* which also live in communities.

An Annotated List of The Butterflies of Nebraska, with the Description of a New Species. (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

As no list of Nebraska butterflies has been published for more than 40 years (H. G. Barber's list in the 1893 Proceedings of the Nebraska Academy of Science) and as many additional species have since been taken in the state, and more definite records are at hand in the case of others, there appears to be ample justification for a list at this time.

The writer has collected butterflies in Nebraska for 28 years, keeping careful field notes during the active season and com-

piling them at the end of each season. Others who have collected in the state during this time and the result of whose collecting has contributed to the data contained herein, are:

Dr. Robt. H. Wolcott, who greatly assisted the writer at all times, and who but for his death in 1934 would have joined in the authorship of this list; Frank H. Marshall, Frank H. Shoemaker, Dr. R. W. Dawson, C. E. Mickel, and L. M. Gates.

Earlier collectors who have added material of their collecting to the collection of the University of Nebraska are: Prof. Lawrence Bruner, Merritt Cary, and J. C. Crawford.

Professor Myron H. Swenk, head of the Department of Entomology, University of Nebraska, generously granted access to the University collection as well as to the library of the department, making possible examination and study of a large number of specimens collected in the state.

The present list includes 159 species. Although this is a rather large number of species to record from one state I feel confident that many more species are to be found in Nebraska, and that when the state has been more fully covered a number of species which have not hitherto been credited to the state will be added to the list.

This rather extensive butterfly fauna is to be accounted for by a variety of causes: 1). Geographical location, being midway between the East and West, and also between the North and South. 2). Extensive area. Nebraska covers some 400 miles east and west, and 200 miles north and south. 3). Range of altitudes, varying from less than 1000 feet along the Missouri river to approximately 5000 feet in Banner county adjacent to the Wyoming line. 4). Diversity in the character of country, there being woodland, prairie, sandhills, plains, pine woodland and rocky canyons. 5). Proximity of the Rocky Mountains, accounting for the presence of mountain forms in the western part, as gaps in mountains permit these forms to find their way through.

Only such species are included in the list as have been collected within the state by the writer or by others where the specimens have actually been examined by him.

The classification followed is that of Barnes & Benjamin's Check List of 1926.

Where not otherwise noted the records refer to captures by the writer.

Hesperia pahaska n. sp.

On the high plains of the canyon region in Sioux County, Nebr., there flies a skipper which has passed under various names but which differs from all the named forms. An examination of the genitalia indicates that it is distinct. I propose for it the name *pahaska*, the name the Sioux Indians bestowed upon Col. Wm. F. Cody (Buffalo Bill), who killed Chief Yellow Hand in single combat in War Bonnet Canyon, upon the rim of which this skipper flies. "Pahaska" in the Sioux language means "White Chief".

Male, upper side: Primaries, a somewhat faded or washed-out-looking fulvous, broad dark border on outer margin not very clearly defined; fulvous apical spots within the border rather pale; stigma curved and fairly heavy, scales beneath stigma shading it and making it appear heavier than it really is. Secondaries, fuscous with a single pale fulvous spot toward base, and an outer curved row of similar pale fulvous spots. Fringes dirty white. Under side: Primaries paler than above, inner margin very pale; apical spots of upper side reproduced, but in color they are a dirty white. Secondaries, ground color an uncertain shade of yellowish brown, the inner margin, however, broadly yellow; the spot in basal area larger than on upper surface, and somewhat bifid; above this, near costa, a linear light spot; outer row of spots consists of 6 irregular shaped spots fairly separate, the one nearest inner margin projecting inwardly. All spots faintly silvered. Expanse 36 mm.

Female, pattern similar to male but fulvous area greatly restricted; apical spots of primaries whitish. Fringes dirty white. Under side similar to that of the male. Expanse 40 mm.

The above is a description of the δ holotype and the ♀ allotype, selected from a series of 7 males and 6 females as being representative examples. The entire series is from the canyon region of Sioux County near the town of Harrison, NEBRASKA.

δ *Holotype* July 15, 1917. ♀ *Allotype* July 19, 1917, both in the collection of the writer. 6 δ *paratypes*, June 22, 24,

1911. July 17, 18, 19, 22, 1917. 5 ♀ *paratypes*, June 27, 1911. July 16, 19, 19, 22, 1917.

This species is nearest *viridis* Edw. Compared with that species it is duller, more sordid or washed-out-looking, with the spots paler and consequently more contrasting. The fringes also are lighter, and the male stigma is heavier and shaded beneath, as stated in the description. On the under side the primaries are less reddish than in *viridis*, the secondaries darker, and the spot nearest inner margin projects inwardly, whereas in *viridis* this spot lies nearer the outer margin than the spot next to it.

R. C. Williams, who made a slide of the genitalia in 1923, wrote that while the maculation is like *viridis*, the male genitalia is different from that species, and added: "it seems to me you either have a good species or a valid form to describe."

1. P. PAPILIO PHILENOR L. Rare. Has been taken at Omaha, Lincoln and Roca. Larvae have been found on Dutchman's pipe vine (*Aristolochia siphon*) in June and in August, and reared to maturity, the butterflies emerging in July, October and in May of the year following pupation.

2. P. AJAX L. (ASTERIUS Cram.). Apparently found over the entire state. Common at Omaha and Lincoln. First brood May and June; second brood from the middle of July to first part of September.

P. AJAX form CURVIFASCIA Skin. A number of overwintering chrysalids, produced by larvae found on parsley at Omaha, gave forth imagoes of this form, while others gave forth imagoes of the typical form.

P. AJAX form AMPLIATA Men. Out of a large number of *ajax* larvae reared at Omaha there was obtained 1 male and 1 female of *ampliata*.

P. AJAX ab. ALUNATA Skin. & Aar. One specimen of this aberration in the Nebraska University collection. Taken in Squaw Canyon, Sioux County, July, 1892.

3. P. BAIRDII Edw. Four specimens in the University collection, all collected in Sioux County. July, 1892, June, 1900; July 29, 1913; August 15, 1913.

P. BAIRDII form *BRUCEI* Edw. Found in the western part of the state, where it appears to be more common than the typical form. Sioux County July, 1892 (Univ. coll.); Haigler Aug. 19, 1909 (Gable); Colfer Aug. 18, 1912 (Shoemaker); Wauneta, July 27, 1923 (Leussler).

4. *P. NITRA* Edw. Rare. One male Bull canyon, Wild Cat Mtns., near Harrisburg, Banner County, June 2, 1919 (Leussler).

5. *P. INDRA* Reak. Rare. One specimen from W. Monroe Canyon, Sioux County, May 31, 1900 (Univ. coll.); 1 from Bull Canyon, Harrisburg, Banner County, June 2, 1919 (Leussler).

6. *P. CRESPHONTES* Cram. Not uncommon in the eastern part of the state and has been taken as far west as Kearney. First brood latter part of May through June; second brood August and September. Larvae in numbers can be found at Omaha on prickly ash in September.

7. *P. GLAUCUS* L. Black females are found commonly in the eastern part of the state during May and June, and again during July and August. Observed and collected at Omaha every year.

P. GLAUCUS form *TURNUS* L. The commonest *Papilio* in the eastern part of the state. First brood early May; second about the middle of July. Some individuals of the early brood closely resemble race *canadensis* R. & J., in having the yellow submarginal spots on under side of primaries united into a band and in being considerably smaller than individuals of the later brood.

8. *P. MULTICAUDATA* Kirby. Abundant in the western part of the state, especially in Sioux County where it is the common *Papilio*. Specimens of both sexes taken there in the latter part of June were already more or less worn, suggesting that the species makes its appearance in late May or early June. Specimens also collected at Valentine June 9, 1914, and one was taken a few miles south of Omaha May 1, 1910, by Dr. Wolcott. Apparently double brooded as the University collection contains a specimen taken in Sioux County July 20, 1892.

9. *P. TROILUS* L. A single specimen taken near Omaha April 27, 1913; it had the appearance of having travelled a long distance, as its wings were badly mutilated although the colors were fresh.

10. *P. PALAMEDES* Dru. Rarely visits Nebraska. One individual observed at Omaha (Leussler); one taken in Dodge County by the late E. A. Dodge and now in the writer's collection. Barber's list credits it also to Lincoln.

11. *P. MARCELLUS* Cram. form *TELAMONIDES* F. & F. Rare. One specimen, near Omaha, April 3, 1910.

P. MARCELLUS form aest. *LECONTEI* R. & J. Rare. Observed occasionally at Omaha during late June and July (Leussler) and at Lincoln (Wolcott). One specimen in University collection bearing Rulo locality label, no date. Rulo is in the extreme southeastern corner of the state, and as papaw, the food plant, is known to occur in that part of the state it is likely that this butterfly is not uncommon thereabouts.

12. *PARNASSIUS SMINTHEUS* Dblly & Hew., race *SAYII* Edw. Common in the northwestern part of the state. Long series have been collected on the ridges and canyon slopes in Sioux County, about 8 miles northwest of the town of Harrison. Much variation in the number and size of red spots is noted. Most of the males have a submarginal row of black crescent-shaped spots on secondaries, heavy and distinct in some, and but faintly indicated in others. In some specimens the red spots are replaced by spots of an orange tint, varying in degree from slight to very pronounced.

13. *NEOPHASIA MENAPIA* (F. & F.). Found in the canyons of Sioux County, where, on the pine-covered slopes it is reported to be common. I have specimens taken there August 14, 1911 (F. H. Shoemaker) and August 18, 1912 (R. W. Dawson).

14. *APPIAS ILAIRE* (Godt.) race *NEUMOEGENII* (Skin.). A single tattered specimen, taken at Omaha, August 19, 1909, following ten days of steady southeast wind; clearly a straggler. It is a male and has the stiff brush-like clusters of hair attached to the abdominal claspers, leaving no doubt as to identification.

15. *ASCIA SISYMBRII* (Bdv.). Apparently found only in the western part of the state, and not common there. 2 specimens, Sioux County, 1900 (Wolcott).

A. SISYMBRII ab. ♀ *FLAVA* (Edw.). One specimen of this yellowish female, Monroe Canyon, Sioux County, June 5, 1919 (Leussler).

16. *A. PROTODICE* (Bdv. & Lec.). Common over the entire state, though less so than *rapae*. In the eastern part of the state it is on the wing from May till October.

A. PROTODICE gen. vern. *VERNALIS* (Edw.). Less common, but specimens of this form, small in size, lightly marked on upper surface, and with the veins on under side of secondaries heavily fuscous, can be taken at Omaha and Lincoln in late March and April. *Protodice*, taken late in October often shows considerable darkening of veins on under side of secondaries but otherwise is more like the typical form.

17. *A. RAPAE* (L.). The spring form, the males of which are sometimes almost immaculate, is fairly common in the eastern part of the state, and probably in other parts as well. April and May.

A. RAPAE gen. aest. *YREKA* (Reak.). Exceedingly common; found everywhere and at all times during the summer and fall.

18. *NATHALIS IOLE* Bdv. Very plentiful, sometimes actually swarming at Omaha, and apparently just as common all over the state, for I have taken it at many points in every quarter of the state. Two broods at least, first early July, second early September, continuing on the wing until cold weather. In some females the ground color of secondaries is pure yellow while in others it is decidedly orange.

(To be continued)

A List of Dragonflies taken during the Summer of 1936 in Western United States. (Odonata).

BY CARSTEN AHRENS, McKeesport High School,
McKeesport, Pennsylvania.

During the summer of 1936, the writer had the good fortune to be selected as a student in the Yosemite National Park

School of Field Natural History which is conducted in California by the Department of the Interior. On the trip west by automobile, collecting was attempted wherever climatic and topographical conditions were favorable. The trip to and from California was hastily made; there was little time allowed for collecting. Most of the insects taken were netted from vicinities close to the highways, or actually captured along the road.

A total of seven weeks was spent in Yosemite National Park where a preliminary check-list of the dragonflies of the area was made. During these weeks, 38 species were collected in Yosemite, and since the dismissal of school, this list and specimens have been accepted by the officials of the museum there. Five species of the dragonflies collected in Utah are new records for the state. They are: *Anax zwalsinghami* McLachlan, *Brechmorhoga mendax* Hagen, *Hyponcura lugens* Hagen, *Ischnura demorsa* Hagen, *Ischnura damula* Calvert.

I wish to express my appreciation to Mrs. L. K. Gloyd of the University of Michigan Museum, Ann Arbor, Michigan, for her cheerful and expert help in identifying species; to Prof. Frederick M. Gaige who permitted me to make use of the laboratory and specimens of this museum; to Mark Leslie for his skillful assistance in collecting; and to Claudeous Brown with whom I corresponded regarding the specimens collected in Utah. The arrangement of species used by Needham has been followed in this paper.

ANISOPTERA.

1. *TANYPTERYX HAGENI* Selys. Two males taken along Snow Creek, 7000 feet*, in Y. N. P.** July 21. One female in the same vicinity, August 4. The insects have the same habits which the author noticed in *Tachopteryx thoreyi* Hagen, in Cades Cove, Tenn. The dragonfly will flatten itself against the surface of a rock or tree from which it will make sudden sallies after passing insects, and then return to the favorite perch.

2. *PROGOMPHUS BOREALIS* McLachlan. 9 males and 1 female collected along a little, rocky stream near Washington,

*The altitude is given when it is considered significant.

**Y. N. P., Yosemite National Park.

Utah, August 14. The insects made short flights, alighting frequently on rocks protruding from the water or upon the sandy margin of the stream.

3. *HAGENIUS BREVISTYLUS* Selys. 2 males and 1 female, near Lebanon, Missouri, August 21.

4. *OPHIOGOMPHUS BISON* Selys. A female acquired where Meadowbrook is crossed by the Pohono Trail, Y. N. P. (6000) June 30.

5. *ERPETOGOMPHUS DESIGNATUS* Hagen. Near Lebanon, Missouri on August 21, a male was captured with a male *Hagenius brevistylus*. The *H. brevistylus* had struck and seized the *designatus* with such force that both were carried into the water. Both were dipped from the river an instant after they struck the surface.

6. *F. COMPOSITUS* Hagen. Two males on August 13 and 14; one near Glendale, Arizona, the other near Washington, Utah.

7. *GOMPHUS EXTERNUS* Hagen. One male near Prophetstown, Illinois, June 9.

8. *G. AMNICOLA* Wash. One male near Prophetstown, Illinois, June 9.

9. *G. VASTUS* Walsh. One male near Prophetstown, Illinois, June 9.

10. *G. GRASILINELLUS* Walsh. One male near Prophetstown, Illinois, June 9.

11. *DROMOGOMPHUS SPOILIATUS* Hagen. A female near Clinton, Oklahoma, August 19.

12. *OCTOGOMPHUS SPECULARIS* Hagen. A male where Pohono Trail crosses Meadowbrook, June 30. 6000 ft.

13. *ANAX JUNIUS* Drury. Observed frequently through the west. Six specimens taken in the valley at the foot of El Capitan, Y. N. P., 6000 ft.

14. *A. WALSLINGHAMI* McLachlan. A male swept from the air above a stream near Washington, Utah on August 8. A new record for Utah.

15. *AESCHINA CALIFORNICA* Calvert. 4 males taken near

Franklin, Idaho on June 15; a female near Great Salt Lake, Utah, June 16.

16. *A. MULTICOLOR* Hagen. Observed and collected this insect frequently in valleys in Y. N. P. that were not higher than 5000 ft. 2 males near Ensenada, Baja California, August 12; a female near Laguna, N. Mexico, August 18.

17. *A. WALKERI* Kennedy. 4 males taken June 28 in Y. N. P. at 4000, 5000 and 6000 feet.

18. *A. PALMATA* Hagen. 3 males, along road twenty miles south of Bryce Canyon, Utah, on August 14.

19. *A. INTERRUPTA NEVADENSIS* Walker. A male, Dog Lake, Y. N. P., 9000 ft., July 22; a male found on snowbank on Shepherd Crest, Y. N. P., 11,000 ft., August 1.

20. *A. VERTICALIS* Hagen. A male, Dog Lake, Y. N. P., 9000 ft., July 22; a male, on White Mountain, Y. N. P., 11,000 ft., July 23.

CORDULEGASTER DORSALIS Hagen. 5 males, along Acherson Creek, Y. N. P. (5000) on June 28; 5 males on Indian Creek, Y. N. P., 6000 ft., July 17. The insects flew close to the water and explored every indentation of the shoreline. They were flying with *A. walkeri* Kennedy whose presence they constantly disputed.

22. *SOMATOCHLORA SEMICIRCULARIS* Selys. Numerous in the high mountain bogs and meadows of Y. N. P. at altitudes of 8-11,000 feet.

23. *CORDULIA SHURTFLEFFI* Scudder. Common in Y. N. P. and frequently found flying with *S. semicircularis* Selys, although often at lower altitudes.

24. *PERITHEMIS DOMITIA* Drury. Common about a small artificial lake near Clinton, Oklahoma, August 19.

25. *LIBELLULA LUCTUOSA* Burmeister. Numerous about Clinton, Oklahoma, August 19, where it was flying with *Perithemis*.

26. *L. SATURATA* Uhler. Observed and captured frequently west and south of Utah, though never above 7000 feet.

27. *L. PULCHELLA* Drury. Common through west, below 7000 feet.

28. *L. QUADRIMACULATA* Linne. Frequently observed and collected west and south of the Black Hills, South Dakota. In Y. N. P. often taken up to 10,000 feet.

29. *L. NODISTICTA* Hagen. Common about the western end of Mono Lake, California, on August 1 and 4, 6000 ft., 2 males and 1 female, Wowona Meadows, Y. N. P., 4000 ft., July 17.

30. *L. COMPOSITUS* Hagen. 3 males and 5 females, south of Great Salt Lake, Utah, about roadside ditches. One male has well-developed nodal spots.

31. *PLATHEMIS LYDIA* Drury. Observed at lower altitudes across the country. Few were the reed-edged pools unaccompanied by these "white-tails".

32. *P. SUBORNATA* Hagen. 3 males and 4 females, on the Great Salt Lake Desert, Utah, June 16.

33. *SYMPETRUM CORRUPTUM* Hagen. Apparently the most widely distributed Anisopteron in the West. It seemed to flourish in any habitat and at any altitude. It was collected along the ocean in Baja California, along the Colorado River in the Grand Canyon, in the midst of the Great Salt Desert of Utah, among the forests of Idaho, and a lifeless specimen was found on the snow of the Conness Glacier in Y. N. P. at an altitude of 12,000 feet. It was taken over standing water and along swift glacier-fed stream, over deserts and around mountain tops. It was first on wing in the morning and the first on wing after a rain.

34. *S. ILLOTUM* Hagen. A male, Yosemite Valley, 4000 ft., June 28.

35. *S. PALLIPES* Hagen. 4 males and 1 female, Yosemite Valley, July 1, 13, and August 4.

36. *S. DECISUM* Hagen. 5 pair, Wells, Nevada, June 16, where they were emerging in countless numbers. Common in swampy meadows in Yosemite Valley late in June.

37. *S. SEMICINCTUM* Say. A male, Mather, California June 28, and a female in Yosemite Valley, August 4.

38. *S. COSTIFERUM* Hagen, 3 males and a female taken in a swampy region of the west shore of Mono Lake, California, 6000 ft., August 1, 4.

39. *S. DANAE* Sulzer. A series of these insects was taken with *S. costiferum* Hagen on the west shore of Mono Lake, California on August 1 and 4.

40. *LEUCORRHINIA HUDSONICA* Selys. 2 males and 4 females, Y. N. P. during late June and early August.

41. *L. INTACTA* Hagen. 2 males, Franklin, Idaho, June 15; 4 males, Mather, California, June 28.

42. *L. GLACIALIS* Hagen. A series of these insects taken on July 11 and 28 in Y. N. P.

43. *PACHYDIPLAX LONGIPENNIS* Burmesiter. A male, near Ensenada, Baja, California on August 12.

44. *MESOTHEMIS SIMPLICICOLLIS* Say. 2 females taken south of the Great Salt Lake, Utah on June 16; a female at Glendale, Arizona, August 13.

45. *BRECHMORHOGA MENDAX* Hagen. 2 males taken along a rocky stream near Washington, Utah on August 14. A new record for Utah.

46. *PALTOHEMIS LINEATIPES* Karsch. A male captured along Bright Angel Creek in the Grand Canyon on August 16.

47. *PANTALA HYMENEAE* Say. Observed and collected frequently through the West, often at high altitudes. Secured a specimen at 11,000 feet on the snow of Conness Glacier, July 23.

48. *P. FLAVESCENS* Fabricius. 2 males, Lebonon, Missouri, August 21.

49. *TRAMEA LACERATA* Hagen. 1 male, Lebonon, Missouri, August 21.

50. *T. ONUSTA* Hagen. 3 males, near Ensenada, Baja California on August 12.

ZYGOPTERA.

51. *HETAERINA AMERICANA* Fabricius. Collected in Mojave Desert, California; Grand Canyon, Arizona; Albuquerque, N. Mex.; and Bryce Canyon, Utah on August 13, 16, 18, and 20.

52. *LESTES CONGENER* Hagen. Taken in Yosemite Valley, Mono Lake, Laguna, N. Mex., and Bryce Canyon, Utah on July 2, August 1, 18.

53. *LESTES FORCIPATUS* Rambur. A series secured in Yosemite Valley during July.

54. *L. DISJUNCTUS* Selys. 2 females at Bryce Canyon, Utah, August 14; common in Kaibab Forest, Arizona, August 15; 1 female at Clinton, Oklahoma, August 19.

55. *L. UNCATUS* Firby. Common through west. Series secured in Yosemite during July; at Franklin, Idaho, June 15; and at Wells, Nevada, June 16.

56. *HYPONEURA LUGENS* Hagen. 3 females taken along a stream near Washington, Utah. A new record for Utah.

57. *ARGIA AGRIOIDES* Calvert. 1 female taken in the Mojave Desert, California, on August 13; 1 male at Washington, Utah, August 14; 2 males near Laguna, N. Mex., August 18.

58. *A. APICALIS* Say. A pair, Prophetstown, Illinois, June 9; a pair at Weatherford, Oklahoma, August 20.

59. *A. MOESTA* Hagen. 2 males, Prophetstown, Illinois, June 9; 1 female, Grand Canyon, August 16; 5 males and 1 female, Clarence, Oklahoma, August 20.

60. *A. SEDULA* Hagen. 1 female, Clarence, Oklahoma, August 20; 5 males Lebanon, Missouri, August 21.

61. *A. VIVIDA* Hagen. Common in Yosemite up to 6000 feet during July; 2 males near Great Salt Lake, Utah, June 16; 5 males and 4 females, Grand Canyon, Arizona, August 16.

62. *AMPHIAGRION ABBREVIATUM* Selys. 2 males and 1 female at Wells, Nevada, June 16; a series at Yosemite during July; 3 males at Bryce Canyon, Utah, August 14.

63. *TELEBASIS SALVA* Hagen. Very common near Ensenada Baja California, August 12.

64. *ENALLAGMA BOREALE* Selys. Series at Franklin, Idaho, June 15; 4 males and 1 female, Bryce Canyon Utah, August 14.

65. *E. CLAUSUM* Morse. Common along roadside through Great Salt Desert, Utah, June 16.

66. *E. CYATHIGERUM* Charpentier. Series in Y. N. P. during July; a male near Laguna, N. Mex., August 18.

67. *E. EXSULANS* Hagen. 2 pairs taken near Prophetstown, Illinois on June 9.
68. *E. CARUNCULATUM* Morse. Specimens taken frequently through western United States and Baja California.
69. *E. CIVILE* Hagen. Common through west.
70. *E. PRAEPARVUM* Hagen. 4 males at Albuquerque, N. Mex., August 18; 4 males at Laguna, N. Mex., August 18.
71. *E. ANNA* Williamson. Series taken just south of Great Salt Lake, Utah, June 16; 1 male at Bryce Canyon, Utah, August 14.
72. *ISCHNURA DENTICOLLIS* Burmeister. Very common through western United States and Baja California.
73. *I. DEMORSA* Hagen. 1 male and 2 females at Bryce Canyon, Utah, August 14; 1 male and 2 females at Laguna, N. Mex., August 18. A new record for Utah.
74. *I. PERPARVA* Selys. Common through west.
75. *I. CERVULA* Selys. Common through western United States and Baja California.
76. *I. DAMULA* Calvert. 1 female, Bryce Canyon, Utah, August 14; 6 females, Laguna, N. Mex., August 18. A new record for Utah.

Two New Species of Helmidæ from a Warm Spring in Montana. (Coleoptera).

By MELVILLE H. HATCH, University of Washington,
Seattle, Washington.

Recently, Dr. C. J. D. Brown of the Department of Zoology, Montana State College sent me a vial containing two new species of helmid beetles which are described below. The beetles were collected by Dr. Brown on December 6, 1936 in a spring with a temperature of about 22° C. throughout the year, located at the mouth of Bridger Canyon, near Bozeman, Gallatin County, MONTANA.

***Heterelmis browni* n. sp. (figure 1)**

Length 2 mm.; piceous, the antennae, elytra, tibiae and tarsi paler; pronotum quadrate, about five-sixths as broad as long, sides bisinuate, anterior angles prominent and acute, posterior

angles slightly acute; disc of pronotum uniformly alutaceous, set with fine hairs, with an elevated, slightly sinuate carina extending from base to apex on either side at a distance from either lateral margin of about one-fifth the total width of the pronotum; the surface of the pronotum undulating with an especially prominent longitudinally oval impression on the middle line just in front of the middle and other less prominent impressions at about the anterior third along the lateral margins and at about basal third just within the lateral carinae and elsewhere; elytra uniformly smooth, shining, set with fine hairs and with about ten longitudinal series of punctures the outer two of which are invisible in dorsal view, the second interval carinate in basal fourth, the fifth interval carinate in about basal three fifths, the seventh interval strongly carinate nearly to apex.

Type and fourteen paratypes in collection of author.

Distinguished from the other nearctic species of *Heterelmis* by the sculpture of the pronotum, which is neither smooth as in *nitidula* LeC. and *latiuscula* LeC. or marked by a transverse impression between the lateral carinae as in *glabra* Horn and *vulnerata* LeC. Moreover, the pronotum is said to be broader than long in *glabra* and scarcely longer than broad in *vulnerata*.

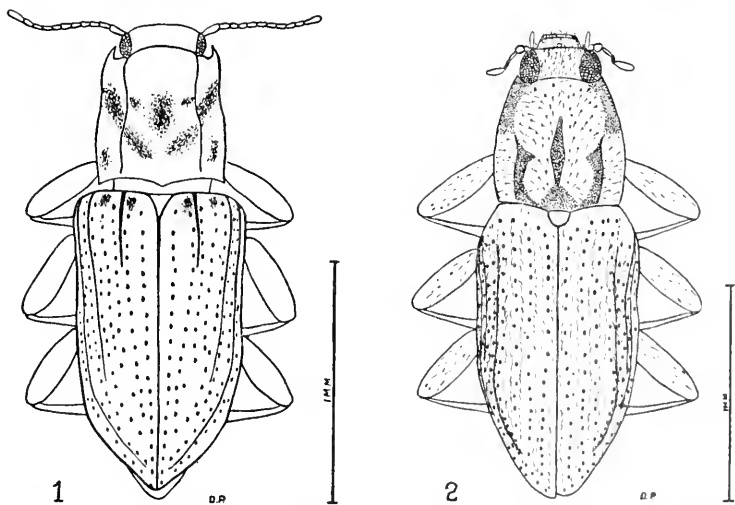


Fig. 1. *Heterelmis brozeni* n. sp. Fig. 2. *Macronychus thermae* n. sp.

Macronychus thermae n. sp. (figure 2)

Length 2 mm.; piceous, the antennae, legs, elytra, and apical portions of the abdomen paler; antennae short, eight-segmented, the funicle composed of a basal long and four very short segments, the last segment of the antenna forming a well marked club; pronotum widest at about basal fourth where it is nearly as wide as long, apex about seven eighths as wide as the base, the sides somewhat arcuate; anterior angles of pronotum slightly prominent and acute, the posterior angles nearly rectangular; pronotal disc smooth, shining, sparsely coarsely punctate and pubescent, with an opaque longitudinal median impression occupying about or somewhat more than its median half, the region of the anterior angles opaque; the lateral carinae of the pronotum distinct, sinuate, occupying basal three fifths of pronotum, bordering an opaque impressed area on their median side; the median basal portion of the pronotum impressed, this impression more or less confluent with the median and lateral opaque impressions; elytra with about nine longitudinal series of punctures, coarse at base, finer behind the middle, nearly obsolete towards apex; elytral intervals each set with a series of semierect setae, the fourth, sixth, and seventh intervals carinate, carinae crenulate on top, the fourth interval carinate from about basal sixth to beyond apical fourth, the sixth interval carinate to beyond middle, the seventh interval carinate to beyond apical fourth, the carinae of the sixth and seventh intervals confluent for about basal seventh; the surface of the elytra laterad to the fourth interval sericeous except for a smooth humeral space; apex of elytra serrulate.

Type and fourteen paratypes in collection of author.

This species may be distinguished from the other described nearctic species of *Macronychus* by means of the following table.

KEY TO NEARCTIC SPECIES OF *Macronychus* Müll.

A. Elytra with fourth, sixth, and seventh intervals carinate, the sixth more briefly so, the carinae crenulate on top; pronotum with a median longitudinal impression.

B. Lateral carinae of pronotum nearly entire; elytra without lateral sericeous space; length 2.5 mm.; Calif.....
parvulus Horn*

BB. Lateral carinae of pronotum confined to basal three fifths; elytra sericeous laterad to the fourth interval; antennae eight-segmented; length 2 mm.; Mont.....
thermae n. sp

*Taken from description by Horn, Trans. Am. Ent. Soc. III, 1870, p. 41.

AA. Elytra with the seventh interval alone carinate, and it very prominently so, the carina crenulate on top; elytra strongly sericeous laterad to the seventh interval; pronotum without median impression, the lateral carinae vague and confined to the basal half; antennae seven-segmented; length 3-3.5 mm.; Quebec (*Chagnon*), Connecticut (*Britton*), and District of Columbia (*Ulke*) to Michigan (*Hatch*) and Iowa (*Wickham*) *glabratus* Say

The figures were drawn by Miss Dorothea Pemberton, a student at the University of Washington employed by the National Youth Administration with funds appropriated by the United States Government.

Four New Coleoptera (Elateridae and Buprestidae).

By JOSEF N. KNOLL,

The Ohio State University, Columbus, Ohio.

Conoderus browni n. sp.

♂—Form robust, rufocastaneous on both surfaces with a somewhat indistinct irregular dark transverse area at base and another on apical third of elytra, apical one extending along suture.

Head convex; front broadly rounded; surface densely punctured; punctures separated by less than their own diameters; antennae extending one joint beyond hind angles of pronotum, scape stout, second joint slightly longer than wide, third joint longer than second, fourth joint longer than second and third taken together, fifth joint shorter than fourth, joints five to eleven of about equal length, joints four to ten slightly serrate.

Pronotum longer than wide, wider at base than in front, widest back of middle, hind angles produced, acute; disk convex, prehumeral carinae single, sinuate, divergent from lateral margin; surface densely punctured with one type of puncture which becomes smaller at base and sides. Scutellum round, finely punctured.

Elytra a little over two times as long as wide, gradually narrowing posteriorly to rounded apices; disk with strongly impressed striae, punctures small and confluent, interspaces convex, very finely punctured.

Beneath finely densely punctured. Fourth tarsal segment broadly lamellate beneath.

Length 7.6 mm.; width 2.1 mm.

Described from a series of specimens collected at Brownsville, TEXAS, from May 10 to June 6, 1935 by the author.

Holotype male, May 22, and *paratypes* in writer's collection, *paratypes* in Canadian National Collection, U. S. National Museum and Ohio State University Collection.

According to Van Dyke's key¹ this species would run to *C. varians* Seinh., but can be distinguished by the coarser punctures of the pronotum and the smaller size.

Variation. The indistinct dark color pattern unites the two dark areas of the elytra by extending the entire length of the suture in some specimens. Other specimens show signs of a similar median area on pronotum.

I take pleasure in naming this species after Mr. W. J. Brown who has done extensive work with the Elateridae.

***Limonium flavomarginatus* n. sp.**

♂. Resembling a small specimen of *L. griseus* Beauv. in size, form, color and general appearance. Above dark brown, head, pronotum and elytra with exception of sutures margined with dark yellow, beneath in most part dark brown margined with dark yellow, legs same color as the margins; clothed with moderately long fulvous pubescence.

Head with front slightly concave near front margin; front margin broadly rounded, no indication of an emargination; surface densely punctured, punctures separated by less than their own diameters; eyes small, finely granulate; antennae reaching to just beyond hind angles of pronotum when laid along side margin, second and third joints short, of equal length, joints four to ten longer, serrate, eleventh joint elongate.

Pronotum slightly longer than wide, narrower in front than at base, widest back of middle; sides broadly rounded anteriorly, sinuate near base; disk convex, slightly depressed in front of scutellum, prehumeral carinae single, distinct; surface densely punctate, punctures separated by a distance less than their own diameters. Scutellum round, granulate.

Elytra less than three times as long as wide, gradually narrowed posteriorly to rounded apices; disk with striae impressed, punctures large, separated by about their own diameter, interspaces finely punctured, not rugose.

Beneath finely densely punctured; propleurae with punctures contiguous; prosternal sutures distinctly sulcate in front.

Length 9.7 mm.; width 2.5 mm.

¹E. C. Van Dyke, Proc. Cal. Acad. Sci., Vol. 20, No. 9, pp. 291-465, 1932.

♀. Differs from the male by antennae not reaching hind angles of pronotum; length 11.1 mm.

Holotype male and *allotype* collected at Rock Bridge, OHIO, June 14, 1936, by the writer, in the collection of the author.

According to Van Dyke's key¹ this species would run to *L. plebejus* Say. It can be distinguished by the fine punctures of the head and pronotum.

Paratyndaris tucsoni n. sp.

♂. Form robust, cylindrical, piceous with violaceous lustre, a small triangular red spot on lateral margin of each elytron, just in front of middle and another like area opposite it near suture, clothed above and below with recumbent white pubescence.

Head convex, no sign of median depression, eyes small, finely granulate; surface finely punctured, densely pubescent; antennae short, not reaching middle of pronotum when laid along side margin, serrate from the seventh joint.

Pronotum slightly broader than long, widest in middle, wider at base than at apex; sides broadly rounded; lateral margin entire; anterior margin broadly rounded; basal margin slightly sinuate; disk convex, void of median depression; surface densely coarsely punctured at sides, transversely asperate in middle, pubescence concealing punctures at sides, pubescence of central area so short that it appears denuded. Scutellum round, glabrous.

Elytra wider than widest part of pronotum; sides constricted back of humeral angles, subparallel back of middle, then rounded to apices; apices with three teeth along margin and three above; lateral margins serrate from middle; disk convex, umbone prominent; surface irregularly striate, punctures of striae much larger than those of interspaces.

Abdomen beneath finely punctured, the vestiture concealing most of the sculpture, second segment at middle of posterior margin with a small rounded plate extending over the third segment, nearly one half of its width; plate granulate, last abdominal segment terminating in an acute spine. Tarsi slender, claws simple, not toothed, but slightly swollen at bases.

Length 6 mm.; width 2.2 mm.

♀. Differs from the male by the ventral abdominal plate being much smaller.

Described from one pair collected at TUCSON, ARIZONA, August 13, 1936, by the author. *Holotype* and *allotype* in writer's collection.

According to the key² this species comes next to *P. anomalis* Knull. It can be separated from this species by the arrangement of the red markings of the elytra, which are not united. Superficially it resembles *P. acaciae* Knull, but it can be separated by the serrate seventh antennal joint, lack of a median depression on pronotum and having two red dots on each elytron.

***Paratyndaris quadrinotata* n. sp.**

♂. Form robust, cylindrical, piceous above and below, an irregular red area along side margin of each elytron in front of middle, another like round area opposite this near suture, clothed above and below with recumbent white pubescence.

Head convex, no sign of median depression, eyes small, finely granulate; surface coarsely punctured, densely pubescent; antennae short, not extending to middle of pronotum when laid along side margin, serrate from the sixth joint.

Pronotum wider than long, widest in front of middle, wider at base than at apex; sides constricted in front, then broadly rounded to base; lateral margin entire; anterior margin broadly rounded; basal margin slightly sinuate; disk convex, void of median depression, surface densely coarsely asperate. Scutellum round, glabrous.

Elytra slightly narrower than pronotum; sides constricted back of humeral angles, subparallel to back of middle, broadly rounded to apices; apices with three teeth along margin and three above; lateral margins serrate from middle; disk convex, umbone prominent; surface irregularly strigate, punctures of striae much larger than those of interspaces.

Abdomen beneath finely punctured, vestiture concealing most of the sculpture, second segment at middle of posterior margin with a small rounded plate extending over the third segment one-third of its width, plate granulate, last abdominal segment terminating in an obtuse spine. Tarsi slender, claws simple, not toothed, but slightly swollen at bases.

Length: 5.9 mm.; width 2.2 mm.

♀ differs from the male by the ventral abdominal plate being slightly swollen.

Described from a small series collected at TUCSON, ARIZONA, from July 27 to August 15, 1936, by the writer. *Type* labeled August 15, *allotype* and *paratypes* in author's collection.

According to the key² this species would come next to *P. coursetiae* Fishr. The extra spot on the elytron will serve to distinguish it.

² J. N. Knull, Ann. Ent. Soc. Am., Vol. 30, No. 2, pp. 252-257, 1937.

New List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Psyche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Ciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Entomologische Zeitschrift. Frankfurt-M.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
27. Bollettino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janeiro. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chilena de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Comparée. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie, Leningrad, USSR.
73. Mem. Instituto Butantan, Sao Paulo, Brazil.
74. Sbornik entomolog. národního musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungsmechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern. Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Científica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten über morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biología Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memorias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Kcilin and Hindle. London.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, part, part, &c., the later within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—**Bodenheimer, F. S.**—Population problems of social insects. [Biol. Revs., Cambridge] 12:393-430, ill. **Borgmeier, T.**—Insectos atacando chocolate no Rio de Janeiro. [107] 7:530. **Claassen, P. W.**—Obituary by E. F. Phillips. [12] 30: 807-808, ill. **Gazulla, P.**—Coletores de insectos. [44] 40: 13-19. **Metcalf, Z. P.**—Methods of preserving and studying genitalia. [12] 30: 805. **Porter, C. E.**—Galeria de Naturalistas de Chile. XLV.—El R. P. Felix Jaffuel. [44] 40: 154-159, ill. Galeria de Naturalistas de Chile. XLVI.—El Prof. Carlos Silva F. [44] 40: 203-206, ill. Notas breves de entomologia agricola. [44] 40: 426-429, ill. **Smith & Kelley.**—The sixth annual insect population summary of Kansas covering the year 1936. [103] 10: 113-132, ill. **Weiss, H. B.**—The Vermin Killer: 1775 model. [6] 45: 403-407. **Wheeler, G.**—An entomological dictatorship. [21] 49: 123-124. **Zalessky, G.**—Ancestors of some groups of the present day insects. [31] 140: 847-848, ill.

ANATOMY, PHYSIOLOGY, ETC.—**Bhalia & Keilin.**—On a new case of parasitism of a snail (*Vertigo ugenessi*) by a Dipterous larvae. [116] 29: 399-407, ill. **Borquin, F.**—Metamorfosis de *Stenoptilia insperata* (Lep. Pterophoridae). [107] 7: 426-428, ill. (S). **Campbell, R. E.**—Temperature & moisture preferences of wireworms. [84] 18: 479-489, ill. **Claus, A.**—Einige physiologische über *Sigara lugubris* (Hemiptera). [34] 120; no. 3 4: 40-44. **Cousin.**

G.—Les arrêts du développement chez *Lucilia ampullacea* et remarques sur la diapause (Dipt: Muscidae). [25] 42: 218-221. **Dallas, E. D.**—Apuntes sobre teratologia entomologica. [44] 40: 340-342, ill. **Ford, E. B.**—Problems of heredity in the Lepidoptera. [Biol. Revs., Cambridge] 12: 461-503. **George-Grieve, E.**—Studies on the biology of the damselfly, *Ischnura verticalis*, with notes on certain parasites. [70] 17: 121-153, ill. The muscles of the head stomodeum of an Odonate nymph, *Ischnura verticalis*. [4] 69: 211-218, ill. **Goldschmidt, R.**—Spontaneous chromatin rearrangements in *Drosophila*. [31] 140: 767. **Kassianoff, L.**—Etude morphologique et biologique de la famille des Cimicides. [54] 15: 193-217, ill. **Lindquist, A. W.**—Myiasis in wild animals in southwestern Texas. [12] 30: 735-740, ill. **Sharif, M.**—On the internal anatomy of the larva of the rat-flea *Nosopsyllus fasciatus*. [Phil. Trans. R. Soc. London] B, 227: 465-538, ill. **Snodgrass, R. E.**—The male genitalia of Orthopteroid insects. [Smithson. Misc. Coll.] 96, no. 5: 1-107, ill. **deVailly, J.**—Des causes de la conformation et de la constitution des ailes des papillons, *Rhopaloceres* en particulier. [Amateur Papillons] 8: 268-275.

ARACHNIDA AND MYRIOPODA—**Canals, J.**—Observaciones biologicas en Aracnidos del orden Opiliones. [44] 40: 61-63. **Fox, I.**—The Nearctic spiders of the family Heteropodidae. [91] 27: 461-474, ill. (*). **Jacot, A. P.**—Journal of North-American Mossmites. [6] 45: 353-375, ill. (*). **Kaston, B. J.**—The black widow spider in New England. [Bull. N. Engl. Mus. Nat. Hist.] no. 85: 3-11, ill. **Kurata, T. B.**—The spiders of Mer Bleue near Ottawa. [Can. Field Nat.] 51: 114-115. **de Mello-Leitao, C.**—Etude sur les Arachnides de Papudo et Constitucion (Chili), recueillis par le Prof. Dr. Carlos E. Porter. [44] 40: 112-129, ill. (k*). **Schulze, P.**—*Anocentor columbianus*, n. gen., n. sp. (Ixod.). [34] 120: 24-27, ill.

THE SMALLER ORDERS OF INSECTS—**Brown, I. M.**—On some Collembola from Iceland & Greenland. [75] 20: 514-520. **Hood, J. D.**—Studies in Neotropical Thysanoptera. V. [107] 7: 486-530, ill. (*). **Ide, F. P.**—Descriptions of eastern N. A. spp. of Baetina Mayflies with particular reference to the nymphal stages. [4] 69: 219-231, ill. (*). **Montgomery, B. E.**—Records of Indiana dragonflies, IX, 1935-1936. [Proc. Ind. Acad. Sci.] 46: 203-210. **Navas, L.**—Insectos Neuropteros de Chile poco conocidos. [44]

40: 179-181, ill. **Thompson, G. B.**—The Esthiopterinae (Mallophaga) parasitic on Pelecaniformes. [75] 20: 539-543, ill.

ORTHOPTERA—**Cousin, G.**—Elevage et biologie de quelques Gryllides. [Rev. Ent., Franc.] 4: 157-162, ill. **Dearolf, K.**—The dwellers in the dark. [Frontiers, Phila.] 2: 44-46, ill. **Hincks, W. D.**—On polymorphism in male Diplatys Macrocephalus (Dermaptera: Pygidicranidae). [8] 73: 247-250, ill. **Snodgrass, R. E.**—see under Anatomy.

HEMIPTERA—**Ball, E. D.**—Some new N. A. Membracidae. [91] 27: 479-482. **Drake & Harris.**—Notes on some American Halobatinae (Gerridae). [105] 7: 357-362, ill. (S*). **Ferris, G. F.**—On nomenclatorial and other problems in the systematics of the Coccoidea. [75] 20: 525-530. **Hambleton, E. J.**—A proposito de um artigo do Dr. Monte sobre Tingitidae. [107] 7: 532-533, (S). **Oman, P. W.**—The Cinerosus Group of the gen. Laevicephalus (Cicadellidae). [91] 27: 474-479, ill., (*). **Sim, R. J.**—New Jersey lace bug notes. [6] 45: 4081.

LEPIDOPTERA—**Bryk & Eisner.**—A Reply to the Critical Review of the Treatment of the American Species of Parnassius in the "Tierreich" by J. McDunnough in the Canadian Entomologist. [Parnassiana] 5: 3-7, (*). **Davis & Dorst.**—Noctuidae collected by light trap in central Utah. [Proc. Utah Acad. Sci. A. & L.] 14: 179-194. **Ford, E. B.**—see under Anatomy. **Gerasimov, A. M.**—Beitrag zur Psychiden auf Grund der erforschung des Raupen [34] 120: 7-17, ill. **Grimshawe, F. M.**—The Black Witch [Erebus odora (Noct.)]. [Nat. Mag.] 30: 337-338, ill. **Hayward, K. K.**—List of the Argentine spp. of Pholisora (Hesperiidae), with descriptions of two n. spp. [44] 40: 274-278, ill. **Klots, A. B.**—Some notes on Colias and Brenthis (Pieridae & Nymphalidae). [6] 45: 311-333, (*). **Knowlton & Allen.**—Notes on some Utah Lepidoptera. [Proc. Utah Acad. Sci. A. & L.] 14: 155-158. **May, E.**—Lepidoptera from Ceara, Brazil. [44] 40: 111. **Meyrick, E.**—Exotic Microlepidoptera. 5. pt. 5, pp. 129-160, (*). **Richards, A. G.**—Notes on some tropical Noctuids in N. A. [4] 69: 218-219. **Silva, F. S.**—La polilla de palto (Arctopoda maculosa). [44] 40: 220-223, ill. **Sim, R. J.**—Note on giant swallowtail butterfly in New Jersey. [6] 45: 402. **Ureta R., E.**—Lepidopteros de Chile. [44] 40: 343-380, ill. (*). **Ureta**

R., R.—Segunda nota adicional a la lista de Ropaloceros de la provincia de Coquimbo. [44] 40: 108-110.

DIPTERA—**Alexander, C. P.**—Undescribed spp. of *Bra-chypremna* & *Tanypremna* (Tipulidae). [44] 40: 298-305. ill. (Sk*). **Bequaert, J.**—*Triceratomyia*, a new South American gen. of Pangoiinae (Tabanidae). [105] 7: 350-353. ill. **Borgmeier, T.**—A descoberta da biologia de *Stylogaster* (Conopidae). [107] 7: 533. (S). **Bromley, S. W.**—The gen. *Stenopogon* in the U. S. of A. (Asilidae). [6] 45: 291-309, ill. (k*). New & little known Diptera, with notes on the taxonomy of the Diptera. [Proc. Utah Acad. Sci. A. & L.] 14: 99-109, ill. (k*). **Curran, C. H.**—The generic status of *Lagarus Philippi* (Stratiomyiidae). [44] 40: 281-282. Three new neotropical Diptera. [44] 40: 331-335. **Czerny, L.**—Ergänzungen zu meiner Monographie der Helomyziden. [56] 16: 137-142. **Edwards, F. W.**—Bombyliidae from Chile & western Argentine. [44] 40: 31-41, ill. (*). **Epure, E.**—Observations sur le corps gras des larves de *Simulium* (Diptera). [Arch. Zool. Exp. Gen.] 79: 17-23, ill. **Fisher, E.**—New N. A. Fungus Gnats (Mycetophilidae). [6] 45: 387-401, ill. (k). **Fraga, G., A.**—El genero *Dasyapha* de la subfamilia *Silviinae* (Tabanidae). [44] 40: 246-251, ill. (k). **Gonzalez, R. R.**—Acerca de los progresos en el estudio de la *Dermatobia cyaniventris*. [44] 40: 54-56. **Hardy, D. E.**—New Bibionidae from Nearctic America. [Proc. Utah Acad. Sci. A. & L.] 14: 193-213, ill. **Hennig, W.**—Beitrage zur Systematik der Richardiiden. [107] 7: 484-485 (S*). **Horsfall, W. R.**—Mosquitoes of southeastern Arkansas. [12] 30: 743-748. **Knowlton & Harmston.**—Utah Diptera. [Proc. Utah Acad. Sci. A. & L.] 14: 141-149. **Rempel, J. G.**—A n. sp. of *Anatopynia* from Colombia (Chironomidae). [105] 7: 413-416, ill. **Ronna, A.**—Novos dados sobre os habitos de *Melaltoncha ronnai* (Phoridae), endoparasita de *Apis mellifica*. [105] 7: 409-413. **Stuardo, O. C.**—Nemestrinoides nuevos Chilenos y anotaciones sobre dos especies conocidas. [44] 40: 169-178, ill.

COLEOPTERA—**Bierig, A.**—Algunos nuevos Estafilinidos cubanos [115] 11: 273-283, ill. (*). **Bleasdel, G. G.**—The Rhynchophora of Iowa. [Iowa St. Coll. Journ. Sci.] 11: 405-445. **Bondar, G.**—Notas entomologicas de Bahia (1). [107] 7: 475-483, ill. (S*). **Bosq, J. M.**—Copula de los Scarabaeidae de distintos generos. [44] 40: 26-28, ill. **Bruch, C.**—Metamorfosis y etologia de dos Hispidos. [Rev.

Mus. La Plata] 1: 31-44, ill. (S). Notas etologicas acerca del "Tuco-Tuco" (*Ctenomys talarum*) y nomina de arthropodos que viven en sus habitaculos. [Not. Mus. La Plata] 2: 81-87, ill. (S). Breves notas sobre ectoparasitos de roedores (Staphylinidae). [44] 40: 92-95, ill. Genero y especies nuevos de un estafilinido mirmecofilo (*Aleocharinae*). [105] 7: 353-356, ill. **Camargo, F. C.**—Notas taxonomicas e biologicas sobre alguns *Coccinellideos* do gen. *Neocalvia*, predadores de larvas do genero *Psyllobora*. [105] 7: 362-377, ill. (Sk). **Cros, A.**—Description de la larve primaire d'un Meloe du Mexique recueillie par L. Dignet. [Rev. Ent. Franc.] 4: 192-199, ill. **Denier, P.**—Description de *Pienoseus Gajardoi*, n. sp. de Chile (Meloidea). [44] 40: 288-290, ill. **Fall, H. C.**—The N. A. spp. of *Nemadus*, with descriptions of n. spp. (Silphidae). [6] 45: 335-340. **Fiedler, C.**—Bestimmungstabelle der sudamerikanischen Arten der Gattung *Rhyssomatus* (Curculion. Cryptorhynchid.). [Ent. Nachricht.] 11: 67-90, ill. **Fisher, W. S.**—A new Cerambycid beetle from Chile. [44] 40: 324-326, ill. **Hambleton, E. J.**—Uma nova especie de *Gasterocercodes*, broca do algodoeiro no Brasil (Curcul.). [105] 7: 345-350, ill. **Krauss, N. L. H.**—A study of the gen. *Glyptoscelis* in America north of Mexico (Chrysomelidae). [67] 7: 21-32, ill. (k*). **Mendes, L. O. T.**—Note sobre *Neoterius (Dolichobostrychus) vitis* (Bostrychidae). [107] 7: 531, (S). **Olave O., L. E.**—Revision de los Buprestidos Chilenos. II. Pt.—Gen. *Cylindrophora*. [44] 40: 239-246, ill. (*). **Orellana O., B.**—Revision de los Elateridos Chilenos. [44] 40: 57-60. **Reed, E. P.**—Sobre Buprestidos chilenos. [44] 40: 434-435. **Ruiz P., F.**—Los *Ceroglossus* de Chile (Carabidae). [44] 40: 381-425, ill. (k). **Sloop, K. D.**—A revision of the N. A. Buprestid beetles belonging to the gen. *Melanophila*. [67] 7: 1-20, ill. (k*). **Voss, E.**—Beschreibung neue bekannt gewordener Attelabinen aus der neotropischen Region (Curculionidae). [107] 7: 472-474, ill. (k).

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A New Butterfly Record for the United States*

A battered female specimen of one of the blue colored *Anaeas* was taken by H. Glazbrook on July 30, 1935, at the Kenedy Ranch, Kenedy County, Texas, and sent to the writer for determination. It turned out to be *Anaeas phithyusa* Felder. The battered condition of this specimen indicates that it had probably traveled a great distance. It is very unlikely that this Southern Mexican and Central American species will become established within the borders of the United States.

The writer believes that butterfly visitors should be placed on our check lists provided the fact that they are only known as visitors is clearly indicated.

This specimen is in the collection of H. Glazbrook of Sarita, Texas.

WILLIAM D. FIELD, Colorado Springs, Colorado.

The one hundred and fiftieth anniversary of the birth of THOMAS SAY was observed by the Academy of Natural Sciences of Philadelphia on July 27, 1937, when S. Davis Wilson, mayor of Philadelphia, made the commemorative address. *Science*, July 30, 1937, p. 97.

ENTOMOLOGICAL NEWS for December, 1937, was mailed at the Philadelphia Post Office, December 29, 1937.

* Contribution from the Penrose Museum of Rhopalocera, Colorado Springs, Colorado.

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 for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, *Samia*, Columbia or hybrid with *S. Cecropia*, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and philenor, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material. Edwin I. Guedet, P. O. Box 305, Napa, California.

Wanted for cash or exchange any pamphlets dealing with the American Hesperiidæ. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Mea. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

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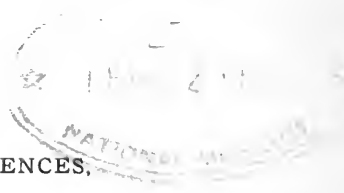
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Stated Meetings of The American Entomological Society will be held at 8.00 P. M., in 1938, on the fourth Thursday of each month excepting June, July, August, November and December, and on the third Thursday of November and December.

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ENTOMOLOGICAL NEWS

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No. 2

A Method of Rearing *Hexagenia* Nymphs (Ephemera).

By HERMAN T. SPIETH.

The College of the City of New York.

No one has ever succeeded in rearing mayflies of the genera *Hexagenia*, *Ephemera*, or their relatives through an entire life cycle. Wiebe, 1926, has described the first three larval stages of *Hexagenia bilineata* Say. In view of later taxonomic work that has been done on *Hexagenia*, it seems probable that this is a misidentification and that Wiebe was dealing with *Hexagenia occulta* Walker. Neave, in 1932, incubated the eggs of *Hexagenia occulta* and then from a statistical study of nymphs collected from Lake Winnipeg decided that the complete life history, with limited exceptions, took two years. Ide, 1935, reared the first 11, the 13th, and the last 8 instars of *Ephemera simulans* Walker, but missed the intervening stages. Many other workers have hazarded guesses as to the length of the life cycles of these burrowing forms, but they have not had sufficient evidence to establish their statements.

There seems to be fairly general agreement on the following points: (1) that the eggs of the burrowing species can be obtained by stripping and can be readily incubated; (2) that the later stages, up to and including the emergence of the subimago, can be successfully handled under experimental conditions; (3) that the rate of incubation of the egg, the development of the nymph, and consequently the length of the life cycle are dependent mainly upon the external temperature. Thus the main difficulty seems to be that no one has devised a suitable method of handling the nymphs during the younger and intermediate stages, at the same time keeping them in a habitat similar to their normal environment. The methods recorded in the following pages seem to offer a solution to this difficulty.

At Lake Wawasee, Indiana, *Hexagenia occulta* usually emerges in great numbers at various times during the month of July. These swarms appeared in 1927 on July 3, 6, 13, 18, and 27th. Scattered specimens were collected during the last week of June and the first week of August. The subimagoes appear in the early evening, at which time they are positively phototropic and collect in great numbers around electric lights along the shore. The next day they can be found on the under sides of leaves, in tall grass, cat tails, and other forms of vegetation. Often they are located several hundred yards from the shore of the lake.

During the afternoon, the subimaginal skin is cast. Just at dusk the imagoes appear for the nuptial flight. The males first collect in groups, usually near the shore, and engage in the nuptial dance. By the time the majority of the females have joined them, it is almost dark and they are all concentrated near the shore. After mating in the air, the females fly out over the lake and drop two cylindrical packets of eggs.

On July 3, 1927, specimens in copula were collected from a swarm and the females stripped of their eggs. The packets of eggs were dropped into quart jars which were about half full of water. Upon touching the water, the egg packets immediately dissolved and the individual eggs fell to the bottom. The eggs apparently are coated with a sticky substance that hardens in a short time, for after a few minutes they can be removed only by force. Four such cultures were collected. Two of the jars were partially immersed in a small stream, in a completely shaded location. The others were kept in the building that served as a laboratory, where the temperature was much higher. In the latter cultures, the nymphs emerged after 15 days and in the former they emerged after 20 days.

The newly hatched nymphs were observed to be negatively phototropic, and since they belonged to a species whose nymphs burrow they were assumed to be positively thigmotropic. Several cake pans 4" x 4" x 8" were procured and filled about half full of mud from the bottom of a small stream. This mud was similar to that of the lake shore, but was taken from

a locality where no females had been observed to oviposit, nor had any individuals been seen mating in this vicinity. The mud was carefully gone over to remove any large organisms, especially predaceous ones. Two days after the nymphs emerged, they were placed in the pans and kept in a cool place for 12 hours. At the end of this period the pans were immersed in a gently flowing stream. Thus the nymphs were in a habitat similar to their normal one, and yet in order to escape they must leave the mud and swim over the edge of the pan. This they did not do.

From time to time, the pans were taken from the water and a sample of the mud removed. This was put into a white enameled pan with a small amount of water and carefully searched for nymphs. Because of the small size of the nymphs, this was difficult at first, but within a few weeks they had reached such a size as to be easily located (see chart).

At the end of August a large washtub was partially filled with mud and all of the cultures added to it. The tub was then placed in an unused pond of the State Fish Hatchery at Lake Wawasee. This pond was supplied with fresh water by a natural spring and an inlet from a lake. On returning to Lake Wawasee on October 15, 1927, it was found that there were a great many nymphs in the tub. They had grown enormously during the intervening period (see chart). It was impossible to see the culture again until June of 1928. At that time there were no nymphs in the tub. Whether they had emerged, migrated, died, or had been killed by predators, it is impossible to say.

The average length of the newly hatched individuals was approximately 0.9 mm., whereas full grown nymphs vary from 18 to 27 mm. for males, and from 20 to 30 mm. for females. An inspection of the table shows that the specimens in the cultures grew rapidly, but that within a group of the same age a great amount of disparity in size was soon observable. Furthermore, within three months some of the individuals were half grown. It seems difficult to conceive that these specimens would not have ordinarily emerged the following summer. In

point of fact, there seems to be no reason why a species in the northern part of its range might not take two years to mature, while in the southern part of its range one year would be sufficient.

The following table gives a fair picture of the rate of growth of the specimens in the cultures. Unfortunately the number of specimens collected was not large.

Age-days from hatching to preserving	Number Specimens	Average Length	Minimum Length	Maximum Length
10	3	1.5	1.5	1.5
14	2	1.75	1.5	2.0
16	11	2.61	2.25	3.0
21	2	2.8	2.25	3.75
26	1	3.75	3.75	3.75
28	3	3.2	2.5	4.0
30	2	3.5	3.0	4.0
33	7	4.8	4.5	5.5
88	16	11.3	7.5	16.0

SUMMARY.

(1) A method has been presented for rearing the nymphs of burrowing mayflies. The method seems entirely feasible provided the investigator has facilities where he can watch his cultures over a period of time.

(2) In view of the fact that the rate of development is mainly dependent upon temperature, there seems to be no reason why the length of the life cycle should not vary in different parts of the range within which the group is found.

BIBLIOGRAPHY

- IDE, F. P. 1935 Post embryonic development of Ephemeroptera (Mayflies): External characters only. Canadian Journal of Research. 12: 433-478.
- WIEBE, A. H. 1926 The first three larval stages of *Hexagenia bilineata* Say. Ohio Journal of Science, 26 (5): 267-274, 1 plate.
- NEAVE, FERRIS 1932 A study of the Mayflies (*Hexagenia*) of Lake Winnipeg. Cont. Canad. Biology and Fish., being studies from the Biol. Stations of Canada, 7 (Ser. A), General No. 12: 177-201.

Where and When to find the Orthoptera of Pennsylvania, With Notes on the Species Which In Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

(Continued from Vol. XLVIII, Page 280)

TETTIGONIIDAE.

PHANEROPTERINAE.

SCUDDERIA SEPTENTRIONALIS (Serville). Present through the mountains and probably in the more boreal spots locally in the lowlands of Pennsylvania. A southeastern limit is Town Bank, New Jersey. Sylvan, living in trees and bushes. One of the least often seen Katydids. Probably most active at night if not strictly nocturnal, as is the case with most species of this subfamily. Females are very rare in collections. Appears adult in mid-July.

S. PISTILLATA Brunner. A boreal bush-dwelling species, preferring bushes in pastures or open areas in northern swamps and forests. Peculiar to the mountains of Pennsylvania and there quite generally distributed but usually in small numbers. Appears adult in early August.

S. CURVICAUDA CURVICAUDA (DeGeer). Probably present throughout Pennsylvania in dry fields and woodlands where it is often found low in oak trees or on oak sprouts⁸. Appears adult in early July.

S. TEXENSIS Saussure and Pictet. Present throughout Pennsylvania through local and scarce in the more boreal mountainous sections. Prefers tall weeds and grasses in moist or wet spots, swamps and marshes, where it is often abundant. Appears adult in early July.

S. FURCATA FURCATA Brunner. The most generally distributed and common species of the genus throughout Pennsylvania. Found in tall herbage and in bushes and trees of both dry and wet areas. Appears adult in early August.

S. FASCIATA Beutenmüller. Long considered a mere color phase of *furcata*, I am now satisfied that *fasciata* represents

⁸ This insect is often confused with *texensis* and the majority of records from marshes are probably based on material of that species.

a valid species. Present probably throughout northern Pennsylvania and in boreal spots in the southeastern section. Local and little known. I have material from Chestnut Hill and North Mountain. Prefers hemlock and other northern conifers. Appears adult in August.

AMBLYCORYPHA OBLONGIFOLIA (DeGeer). Found throughout Pennsylvania but probably scarce in the more boreal northern and mountainous portions of the State. Often numerous in rank weeds and vines particularly in moist areas at the forest edges. Appears adult in July.

A. FLORIDANA CARINATA Rehn and Hebard. Much like *oblongifolia* in choice of habitat but not a race as was originally explained⁹. Known only from along the Delaware River in southeastern Pennsylvania. Appears adult in mid-July.

A. ROTUNDIFOLIA Scudder. Confined to the mountains and northern portions of Pennsylvania where it is probably often quite numerous. Prefers undergrowth particularly of open deciduous woodlands. Appears adult early in July.

Although *A. uhleri* Stål is scarce in the Pine Barrens of New Jersey north to Whittings, it has been reported east to Cinnaminson (VIII, 13, 1920, (Brindley), 1 ♂ (given as "Riverton" by Fox); Woodbury, VIII, 4, 1921, (H. Fox), 1 ♂, and Lucaston, IX, 7, 1908, 1 ♂, recorded by Rehn and Hebard. Thus it may well occur in the undergrowth on the banks of the Delaware in southeastern Pennsylvania. It appears adult in July.

MICROCENTRUM RHOMBIFOLIUM (Saussure). Probably limited to the lowlands of southeastern and southwestern Pennsylvania. A northern record is Brownsburg and I have material from Kutztown and Harrisburg. Aboreal, sometimes present in bushes or in forest undergrowth. Appears adult in late July.

PSEUDOPHYLLINAE.

PTEROPHYLLA CAMELLIFOLIA (Fabricius). Present throughout Pennsylvania except in the most boreal areas in the northern mountains. In some sections decidedly local. Lives in decidu-

⁹ Though so assigned by Blatchley in 1920.

ous treetops and is never seen near the ground until after Fall storms or when females are ovipositing in the bark of trees. Though large colonies are often heard and the mountain forests are full of these, individuals are extremely difficult to capture unless a colony can be located in an area of low trees. They are then best secured with the aid of an electric torch and a long pole, or by shaking saplings vigorously, as they fall to the ground and can not fly. The song is much the loudest of any katydid of this region. Adults appear late in July.

COPIPHORINAE.

NEOCONOCEPHALUS RETUSUS (Scudder). Confined to the lowlands of eastern (and probably southwestern) Pennsylvania but there moderately numerous and sometimes very abundant. Widely distributed in open grassland. Is sometimes to be heard singing on sunny afternoons late in the Fall but is normally much more active at night. Appears adult in mid-August.

N. PALUSTRIS (Blatchley). Known only from the swamps along the Delaware River in southeastern Pennsylvania. Prefers grasses growing within such swamps and much less often found in marshes. Very local and not frequently located but sometimes the colonies are very large. Northern limits are New Brunswick and Trenton, New Jersey and Cornwells, Pennsylvania. Appears adult in early August.

As *N. caudellianus* Davis has been taken at Palmyra and Cinnaminson (Riverton) by Fox it will undoubtedly be found on the opposite side of the Delaware River in Pennsylvania. Prefers denser clumps of weeds and grasses in open. Usually scarce and elusive. Appears adult in mid-July.

N. ROBUSTUS CREPITANS (Scudder) intergrading with *robustus robustus* (Scudder). Present in southeastern Pennsylvania only, in the marshes along the Delaware River north to Trenton, New Jersey. In high marsh vegetation and also in nearby upland grasses. Local and moderately numerous. Appears adult in mid-July.

N. ENSIGER (Harris). Present in the boreal and mountain areas and probably all of eastern Pennsylvania, with Philadelphia and Paxtang southeastern limits. Widely distributed

in open. Prefers dry upland pastures and cultivated fields. Reaches maturity in early July.

Since *N. lyristes* (Rehn and Hebard) is widespread in the salt marshes of the Atlantic Coast and also occurs in the bogs of Ohio, it should be sought in the bogs and marshes of southern Pennsylvania. In favorable environment the species is often locally abundant. Appears adult in mid-July.

N. EXILISCANORUS (Davis). Present in southeastern Pennsylvania locally in high weedy growth bordering marshes. When located a colony is often found to be of large size. Appears adult in late July.

CONOCEPHALINAE.

ORCHELIMUM AGILE (DeGeer). Probably confined to the lowlands of southeastern Pennsylvania. Inhabits the tall vegetation of fresh-water and tidal marshes and bogs. Northern limits are West Creek and Florence, New Jersey, and Cornwells and Collegeville, Pennsylvania. Appears adult in early August.

As *O. glaberrimum* (Burmeister) is known in New Jersey from a number of localities near the Delaware River north as far as Burlington and Talleyville, Delaware (Fox in litt.) it is sure to be found in the bogs and wet meadows along the southeastern margin of Pennsylvania. It appears adult in mid-July.

O. VULGARE Harris. Common throughout Pennsylvania in the open, particularly in tall weeds. Appears adult in mid-July.

O. GLADIATOR Bruner. A boreal species which occurs throughout Pennsylvania but probably is very local in the southern lowlands. Southern limits are Winslow Junction, New Jersey; between Wilmington and New Castle, Delaware, and I have material from Pittsburgh, Pennsylvania. From this State the only other material before me is from localities in the southeastern portion. It frequents wet grassy areas and bogs and is usually present locally in colonies. It appears adult early in July.

As *O. silvaticum* McNeill¹⁰, a mid-western species, occurs in Ohio east to Tuscarora, Guernsey and Monroe Counties (E. R. Thomas), it will probably be found in the lowlands of extreme southwestern Pennsylvania. In this region it prefers the undergrowth along forest borders and in open woodlands. It appears adult in July.

O. PULCHELLUM Davis¹¹. Present only in southeastern Pennsylvania. Local but often very abundant, confined to high swamp and marsh vegetation. Northern limits are Red Bank, South River and Trenton, New Jersey; Cornwells and Chestnut Hill, Pennsylvania. Appears adult early in August.

O. MINOR Bruner. Arboreal and peculiar to pine trees. Known north to Yaphank on Long Island, New York; Helmetta, New Jersey, and White Deer [Hebard Cln.] and Bloomsburg [Davis Cln.], Pennsylvania. Probably has a wide but discontinuous distribution through xeric sandy areas with pines over the southern half of the State. A difficult insect both to locate and to capture. Appears adult early in August.

O. CONCINNUM CONCINNUM Scudder. Present locally in the marshes and marshy meadows of the Delaware Valley in southeastern Pennsylvania north to Morrisville, reaching this area from the sea coast where it is very abundant locally in the salt marshes. May reappear in bogs in southwestern Pennsylvania as it is present in such environment in Ohio. Becomes adult in mid-July.

As *O. concinnum delicatum* Bruner is known east to Ash-
tabula County, Ohio (E. R. Thomas) along the shore of Lake Erie, its distribution there is probably extended narrowly along the northwestern margin of Pennsylvania. It is a western race of the species, the intrusions of which eastward are surprising. "Only in swales bordering sand dunes" (E. R. Thomas for Ohio, in litt.). Appears adult in mid-July.

The presence of *O. nigripes* Scudder, a mid-western species, in Ashtabula and Columbiana Counties, Ohio (E. R. Thomas),

¹⁰ The synonymy of *Orchclimum calcaratum* Rehn and Hebard 1915 was established by the author in 1934.

¹¹ Incorrectly placed as a synonym of *laticauda* Redtenbacher by Rehn and Hebard in 1915.

indicates that it will certainly be found in the lowlands of western Pennsylvania. Usually present in great numbers in vegetation bordering water, it appears adult in late July.

As *O. volantum* McNeill, long supposed to occur only in the upper Mississippi Valley, has been taken on the Delaware River in New Jersey from Delanco to Repaupo, it is certain to be found at least along that river in southeastern Pennsylvania and may have a wide distribution in suitable environment throughout the lowlands of the entire State. Essentially aquatic and fairly frequent on spatterdock, *Nymphaea advena*, which grows in water, difficulty of approach probably is the reason for the great gaps in its known distribution. Appears adult in mid-July.

O. SUPERBUM Rehn and Hebard. Present along the margins of the Delaware River and in adjacent wet meadows in southeastern Pennsylvania, material from Boothwyn alone is before me. On the New Jersey side it is known north to Charleston. Inhabits the rank vegetation of wet meadows, bogs and sloughs, appearing adult in late June.

CONOCEPHALUS FASCIATUS FASCIATUS (DeGeer). Present and often locally numerous throughout Pennsylvania, in open in grasses. Appears adult early in July.

C. BREVIPENNIS (Scudder). Present throughout Pennsylvania, moderately abundant and local, in open but preferring a somewhat shaded environment. Appears adult early in August.

C. NEMORALIS (Scudder). Probably present throughout Pennsylvania except in the eastern lowlands. Known east to the Hudson Palisades, New Jersey; Harrisburg, Pennsylvania, and Washington, D. C. Sylvan and very local but when present usually in moderate numbers in woodland grasses. Appears adult in early August.

C. STRICTUS (Scudder). Occurs in southeastern and undoubtedly in western Pennsylvania. Northern limits are Van Cortlandt Park (H. Fox) and Staten Island, New York; Alpine and Oradell, New Jersey, Tullytown and Harrisburg, Pennsylvania, and Ashtabula County, Ohio (E. S. Thomas). In grasses (*Andropogon*) on dry poor soil or sandy areas. Appears adult in early August.

(To be continued)

The Interpretation of the Term *Subspecies* and the Status of Names applied to Lower Categories in Lepidoptera.

By WILLIAM HOVANITZ, University of California, Berkeley.

A lack of uniformity in the literature of entomology concerning the usage of polynomials and concerning the interpretation of the term¹ *subspecies* promises even greater confusion in the future unless authors can come to an agreement. This is especially true in the taxonomy of Lepidoptera where authors seem to be working each under his own code. There seems to be no excuse for disagreement so long as we abide by existing rules² and, therefore, this paper has been written to show how this lack of uniformity is affected by the following two statements derived from the code:

I. No zoological category recognized in the rules is therein defined. That is, *family*, *subfamily*, *species*, *subspecies*, and other categories are not defined.

II. Only two classes of names in the lower categories are recognized: the *binominal* and the *trinominal* applied under the rules of binary nomenclature. (Ref. "Article 2. The scientific designation of animals is uninominal for subgenera and all higher groups, binominal for species, and trinominal for subspecies.").

From these two statements it follows that:

(a.) The subspecies is the only category of lower rank than the species and its name exists only as a trinomial.

(b.) Names proposed as polynomials (larger than trinomials) are unavailable under the code. They do not apply under the Law of Priority (Article 25.) until they are repropounded as a *bi-* or *trinomial* name and they date thence from the time of reproposal, not from that of the original appearance.

¹ The reader should note that only the *term* subspecies is referred to; no reference is made nor implied that a biological entity or category is to be interpreted.

² The International Rules of Zoological Nomenclature. Reprinted: Proc. Biol. Soc. Wash. 39:75-104, 1926.

(c.) Names proposed as bi- or trinomials are unaffected as to availability by reason of their having been originally described as of a biological category not generally considered of taxonomic³ significance.

EXAMPLES OF PRACTICAL ASPECTS OF THE PROBLEM.

1. A white female of an American pierid butterfly was described as *Eurymus alexandra edwardsii* form *hatui* B. & B. The name *hatui* is quadrinomial and hence is unavailable.

2. A nymphalid butterfly (*Euphydryas editha* (Bdv.)) was described as having come from the northern part of California. Another population of this species occurs to the south near San Diego and an aberrancy (*E. editha* ab. *fieldi* Gunder, 1924.) was named as of this population. Later, it was found that this population was subspecifically distinct and another name (*E. editha* r. *wrighti* Gunder, 1929.) was applied to it. According to the above principles, we see that the latter name (*wrighti*) must be placed as a synonym of the former (*fieldi*), *fieldi* having become the subspecific name.

3. The name *interligata* Cabeau (described in trinomial form) has been applied to six different species of *Argynnis* as an aberrancy name. Although I could not refer to the original description (Rev. Mens. Soc. Ent. Namur. 1919:49; and 1922:46), assuming that my information is correct, all these names except the first are homonyms in the genus *Argynnis*. The first, which merely designates an aberrancy, will necessarily have to be placed as a synonym of the earliest named subspecies from which the aberrancy came.

4. Verity (Journ. Linn. Soc. Lond. 32: 149-152, 1913) has found that the name *adippe* Linn. as now used in the genus *Argynnis* for a European butterfly was originally applied to an abnormal form of another species in the same genus (*niobe* Linn.) in the binomial form. The former, therefore, falls as a synonym of the latter. What name is available for the former entity, I could not ascertain from the literature at hand, but I here append a summary which I have drawn from Verity

³ *Taxonomy* refers to a phylogenetic arrangement of organisms while *nomenclature* refers to the mechanics of the arrangement. The reader should clearly distinguish the two.

(Ent. Rec., London, 42: 149-152, 1930) and which may be of help to some future worker:

Argynnis niobe niobe Linnaeus

Papilio niobe Linn., 1758, Syst. Nat. Ed. 10: 481

Papilio cydippe Linn., 1761, Fauna Suecica 2:

Papilio adippe Linn., 1767, Syst. Nat. Ed. 12:786

Argynnis

Papilio phryra Bergstrasser, ?

Papilio adippe Rottembourg, 1775, Der Naturforscher, ?

Papilio adippe Esper, 1777, ?

Papilio syrix Borkhausen, 1788, Eur. Schmett. 1:37 ?

Argynnis esperi Verity, 1913, Journ. Linn. Soc. Lond. 32:175

And the names *adippe* and *cydippe* by many authors as well as innumerable other names applied to this category.

5. Though the following example is similar to one above, it is given because of its importance to a bulky work recently published, namely, Warren's "Monograph of the Genus *Erebia* Dalmon", Brit. Mus., London, 1936. In this work, the first species is *Erebia ligea* Linn.; the second subspecies other than *ligea* is given as *carthusianorum* Fruhst., 1909; under this are many quadrinomials. One of the latter, *subcaeca* Schultz, 1908 (according to Warren originally proposed as *Erebia ligea* ab. *subcaeca* Schultz; a trinomial) is older than *carthusianorum* and must supersede it in usage for the subspecific name. Other names must either yet attain bi- or trinomial standing or become synonyms if available. It is obvious that if *subcaeca* were not used it would have to stand as a synonym of a name younger than itself!

Notes on Hippoboscidae: 11. Additional Notes on *Pseudolynchia*. (Diptera.)

By J. BEQUAERT, Department of Tropical Medicine, Harvard University Medical School, Boston, Mass.

I have dealt on two previous occasions (1926 and 1935) with the problem of distinguishing species in the genus *Pseudolynchia*. This is of more than taxonomic importance, first because one of the species is a common ectoparasite of domestic pigeons and secondly because that species is the intermediate host and carrier of an important blood parasite of the pigeon.

In my latest attempt I separated four species in a key, but I recognized that one of them was doubtfully distinct. Much additional material has been seen meanwhile. While most of it fitted readily in my proposed scheme, some proved extremely troublesome. This was particularly the case for a series of four specimens recently received from Mr. G. A. H. Bedford.

There is never any difficulty in separating *P. brunnea* by the characters given in my key. The remaining three species I recognized (*maura*, *canariensis* and *rufipes*) are often perplexing. A renewed and most careful study has failed to disclose any characters beyond those used in my key (1935). These are all slight and of degree only, consequently difficult to appreciate. Some of the specimens seen bridge over the differences which I pointed out between *maura* and *canariensis*, so that I am forced to the conclusion that these two, at any rate, are not specifically distinct. Unfortunately, this will entail the displacement of the well-known *P. maura* (Bigot) by the older name *P. canariensis* (Macquart). Provisionally I retain *P. rufipes* (Macquart) as distinct, recognizing for the present three species in the genus.

1. PSEUDOLYNCHIA BRUNNEA (Latreille).—I have seen additional specimens from MINNESOTA, off a nighthawk, and from OHIO, off *Antrostomus carolinensis* (Gmelin).

2. PSEUDOLYNCHIA CANARIENSIS (Macquart).—Synonyms: *Olfersia canariensis* Macquart, 1840; *Olfersia garzettæ* Rondani, 1879; *Olfersia maura* Bigot, 1885; *Olfersia lividicolor*, Bigot, 1885; *Olfersia capensis* Bigot, 1885; *Olfersia exornata* Speiser, 1900; *Lynchia simillima* Speiser, 1904.

Additional Localities: FRANCE: Ushant (or Ouessant), off *Streptopelia t. turtur* (Linnaeus) (sent by G. A. H. Bedford).—CANARY ISLANDS: Sa. Cruz de Teneriffe, off domestic pigeon.—NORTHERN RHODESIA: Mazabuka, off red-footed kestrel, *Erythropus amurensis* Radde (P. LeRoux). SOUTHERN RHODESIA: Salisbury, off *Clamator* (or *Oxylophus*) *cafer* (Lichtenstein) (A. Cuthbertson); Kezi, off a (wild?) dove (A. Cuthbertson).—TRANSVAAL: Onderstepoort, off domestic pigeon (G. A. H. Bedford).—PHILIPPINE ISLANDS: Sibuyan

Id., off *Streptopelia dussumieri* (Temminck); San Juan del Monte, Rizal Province, Luzon, off pigeon (C. S. Banks); Manila, Luzon, off pigeon (C. S. Banks). All locality and hosts records previously (1926 and 1935) published by me for *P. maura*, *P. lividicolor* and *P. canariensis* should be referred to *P. canariensis*.

The wing length seems to vary much in this species, the extremes measured being 5.5 mm. and 7.5 mm. Specimens from domestic pigeons average longer wings than those from most wild hosts. I have seen specimens which bridge the gap, and one of these, with a wing length of only 6 mm., came from a domestic pigeon in the Transvaal. The variation of the relative length of the hind legs seems to follow the same rule. Neither appears to provide a reliable standard for separating *maura* from *canariensis*. In a series of eight specimens from the Philippines, from pigeon, the wing measures from 5.8 to 6.5 mm.; and it is 5.5 mm. in the fly from the turtle dove in France. Nevertheless it seems remarkable that the wing of flies found on domestic pigeons is usually so much longer. Might it not be that *P. canariensis* is actually in the process of developing a long-winged race, or incipient species, indirectly under the influence of the domestication of one of its original wild hosts?

Since I can no longer regard *maura* as specifically distinct from *canariensis*, I feel no further compunction in relegating to the synonymy of the same species *garzettae*, *lividicolor*, *capensis*, *exornata* and *simillima*. *P. canariensis* is nowadays almost cosmopolitan; yet I believe that its original home was the Old World tropics and subtropics, and that it was introduced into the New World by man with domestic pigeons.

3. PSEUDOLYNCHIA RUFIPES (Macquart).—Additional Locality: TRANSVAAL: Onderstepoort, off *Centropus burchelli* Swainson (G. A. H. Bedford).

This species seems to differ constantly from *P. canariensis* in the slightly wider and more parallel-sided frons, the somewhat longer postvertex (antero-posteriorly), the shape of the fronto-clypeus (with a narrow and long base), the relatively

shorter and broader humeral angles and the narrower scutellum; the wing is always short. I have as yet seen no specimens that would seem to be transitional to *canariensis*. Moreover, it appears to be restricted to Africa, being originally described from the island of Reunion. Although it is found on a variety of birds, it has not yet been taken on wild or domestic pigeons.

BIBLIOGRAPHY.

BEQUAERT, J. 1926. Notes on Hippoboscidae. 1. *Lynchia* Weyenbergh and *Lynchia* Speiser are not congeneric. (*Psyche*, XXXII, 1925, pp. 265-277).

1935. Notes on Hippoboscidae. 9. A further study of *Pseudolynchia*. (*Rev. Zool. Bot. Afric.* XXVII, pp. 395-399).

Odonata at Winter Park, Florida.

By E. M. DAVIS and J. A. FLUNO, Rollins College,
Winter Park.

Following is an annotated list of species collected since October 1934, within 15 miles of Winter Park. The Wekiwa River, referred to below, is 12 miles northwest of Winter Park. Most of the species listed have been checked with specimens at the Museum of Comparative Zoology, Cambridge, Massachusetts, if there seemed to be any question about them.

GOMPHOIDES [PROGOMPHUS] OBSCURA (Rambur). Found always on sandy shores of local lakes, fairly common. Apr. to Aug.

GOMPHOIDES WILLIAMSONI Gloyd. Abundant on the Wekiwa R., locally common in Winter Park. June to Sept. One male has been compared with one of Mrs. Gloyd's paratypes and with her description by Dr. P. P. Calvert, who is responsible for this identification.

HAGENIUS BREVISTYLUS Selys. Scarce. Wekiwa R. Much larger than northern specimens, length av. 84 mm.; f. wing, av. 56 mm. June to Nov.

DROMOGOMPHUS SPINOSUS Selys. Three specimens from Wekiwa R., one from Winter Park. June to Sept.

GOMPHUS CAVILLARIS Needham. Common, Feb. to May. Identification (1 ♂) confirmed by Dr. P. P. Calvert.

G. DILATATUS Rambur. Common on Wekiwa R. Mar. and Apr.

G. MINUTUS Rambur. Common. Feb. to May.

G. PALLIDUS Rambur. Occasionally seen, two specimens collected. April.

G. PLAGIATUS Selys. Scarce. July to Sept.

GOMPHAESCHINA ANTILOPE (Hagen). Scarce. Taken in Jan., Mar., and June.

CORYPHAESCHINA INGENS (Rambur). Abundant. Mar. to Aug.

TRIACANTHAGYNA TRIFIDA (Rambur). Very common in 1934, occasional since. Oct. to Jan.

GYNACANTHA NERVOSA Rambur. Scarce in 1934, common to abundant in autumn since. Aug. to May.

NASIAESCHINA PENTACANTHA (Rambur). Scarce. Apr. to July.

EPIAESCHNA HEROS (Fab.). One specimen collected, Mar. from Wekiwa R. Probably not as rare as this one record would indicate.

ANAX JUNIUS (Drury). Found throughout the year, common in summer.

A. LONGIPES Hagen. Fairly common, Mar. to Sept.

MACROMIA TAENIOLATA Rambur. Taken on Wekiwa R. and in Winter Park. Fairly common, June to Nov.

DIDYMOPSIS TRANSVERSA (Say). Common in spring. Mar.

EPICORDULIA REGINA Selys. Abundant over lakes and rivers. Mar. to July.

TETRAGONEURIA SEMIAQUEA (Burm.). Uncommon, but found on Wekiwa R. and near water in other places. Jan. and Feb.

T. STELLA Williamson. Rare. Nov. and Mar.

SOMATOCHLORA FILOSA (Hagen). One specimen from Rock Springs, Orange Co. Sept. 1936.

LIBELLULA AURIPENNIS Burmeister. Common. Feb. to Sept. One record for Dec.

L. AXILLENA Westwood. Common some years, not others. There are some specimens which may be a cross between *axillena* and *incesta*.

L. DEPLANATA Rambur. Common in early spring. Jan. to Mar.

L. INCESTA Hagen. Fairly common. June to Sept.

L. JESSEANA Williamson. Abundant in 1935, none seen in 1934 or 1933; none seen in 1936. Males are easily recognized at sight by the deep blue head, thorax, and abdomen, and orange wings. Ordinarily they fly four to six feet in the air over the edges of ponds. April to Sept.

L. VIBRANS Fabricius. Wekiwa R. April to June.

ORTHEMIS FERRUGINEA (Fabricius). Found each year at a small lake at Apopka, and one has been taken at a lake in

Orlando. Males are easily recognized by peculiar red violet color. Oct. and Nov.

CELITHEMIS AMANDA (Hagen). Common. June to Aug.

C. BERTHA Williamson. Abundant. Mar. to Dec.

C. EPONINA (Drury). Abundant. Mar. to Dec.

C. FASCIATA Kirby. Rare. June to Aug.

C. ORNATA (Rambur). Abundant. Mar. to June.

PERITHEMIS SEMINOLE Calvert. Abundant. Apr. to Nov.

ERYTHRODIPLAX MINUSCULA (Rambur). Found all the year, abundant in warm weather.

PACHIDYPLAX LONGIPENNIS (Burmeister). Found all the year, abundant in warm weather.

BRACHYMESIA GRAVIDA (Calvert). Abundant around lakes in Winter Park. Apr. to Nov.

ERYTHEMIS SIMPLICICOLLIS (Say). Abundant around lakes. Mar. to Oct.

TRAMEA CAROLINA (Linn.). Dark area of hind wing varies from the typical as illustrated by Needham¹ to slightly less than the dark area in *T. onusta*. Found all the year, abundant in warm weather.

PANTALA FLAVESCENS (Fabricius). Fairly common at various times, Apr. to Dec.

P. HYMENEAE (Say). Two specimens collected. July 1935.

AGRION DIMIDIATUM (Burmeister). Abundant on Wekiwa R., and found in most other suitable places. Mar. to Nov.

A. MACULATUM Beauvais. Much scarcer than *A. dimidiatum*. Apr. to Aug.

HETAERINA TITIA (Drury). Males are found on the Wekiwa R. every month of the year, and are abundant during the summer. Females are seldom seen. In the males the color of the wings is very variable, and our series is evenly graded from minimum to maximum coloration as follows:—front wing, red extends one cell beyond quadrilateral, barely reaches R plus M, and leaves most of the posterior row of cells uncolored. Brown at tip barely visible. Hind wing, brown extends distally somewhat less than red of front wing; it stops just anterior to the subcosta, and very definitely at Cu2; wing barely tipped with brown.

Maximum coloration, front wing; red extends half way to nodus, to the subcosta, and to the hind margin of the wing. Brown extends to the costa and almost to the nodus. Wing tipped with brown as far back as the stigma. Hind wing completely brown.

¹ NEEDHAM and HEYWOOD, Handbook of Dragonflies of North America, 1929, p. 253.

All these specimens come from a stretch of river not exceeding four miles in length.

LESTES FORCIPATUS Rambur. All species of *Lestes* have been scarce since 1934, but some years they are abundant in appropriate places. April.

L. VIGILAX Hagen. See *L. forcipatus*. April.

L. VIDUA Hagen. See *L. forcipatus*. April.

ARGIA BIPUNCTULATA (Hagen). One specimen, Sept. 1936.

A. FUMIPENNIS (Burmeister). Found all the year, abundant in warm weather.

A. SEDULA (Hagen). Abundant on the Wekiwa R. all the year.

ISCHNURA KELLIKOTTI Williamson. Common in April 1935. Apr. to Dec.

I. POSITA (Hagen). Occurs all the year, usually very common.

I. RAMBURI Selys. Occurs all the year, usually abundant.

ANOMALAGRION HASTATUM (Say). Sometimes abundant in any suitable place, but in 1935 it was rare. Jan. to Nov.

ENALLAGMA CARDENIUM Selys. Abundant all the year when weather is warm.

E. CONCISUM Williamson. Uncommon. Brilliant red and black in life. April.

E. DOUBLEDAYI Selys. Locally abundant. Apr. to Nov.

E. LAURENTI Calvert. Locally common. Oct. and Nov.

E. PALLIDUM Root. Uncommon. Apr. and Aug.

E. SULCATUM Williamson. Locally common. Apr.

E. SIGNATUM (Hagen). Found all the year, abundant in warm weather.

E. VESPERUM Calvert. One male collected Feb. 1937. Seminole Co.

E. WEEWA? Byers. One specimen from the Wekiwa R. is probably this species. March 1935.

TELEBASIS SALVA Hagen. Several caught on Wekiwa R. in spring of 1934. Common in many places in 1935. None seen 1936. Apr. and Nov.

ROBERT E. SNODGRASS, senior entomologist of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, has been elected one of the twelve honorary fellows of the Royal Entomological Society of London.—*Science*, Dec. 10, 1937.

New North American Histeridae (Coleoptera).

By EDWARD S. ROSS, University of California, Berkeley.

***Terapus arizonensis* new species.**

Rufo-ferrugineous, shining. Head very closely coarsely punctate, somewhat depressed in a median line from vertex to clypeus; labrum glabrous, transverse, truncate, edge piceous strongly flexed outward; front acutely margined, carinae interrupted medially, minutely setiferous.

Pronotum one-half wider than long, sides very broadly arcuate; disc sharply convex medially, strongly closely punctate throughout, punctures separated by half their diameter; lateral lobes more finely unevenly punctured, anterior lobe with apical angle truncate, bearing numerous short recurved setae, strongly reflexed, limiting a shallow glabrous depression. Elytra slightly broader than long, densely punctate throughout, except medially along suture, where the surface becomes impunctate and smooth; humeri prominent, bicarinate, inner carina subentire, abbreviated slightly at base and apex, outer carina short, extending from basal margin to apical two-thirds; epipleurae with a distinct, broad, shallow, depressed area in basal third, limited on the inner side by outer humeral carina and exteriorly by a strongly arcuate stria which nearly unites with the latter at the base; apical angles more closely punctate, setaceous.

Propygidium transverse, closely, but not strongly, punctate at base, gradually becoming finer and sparser approaching apex; transverse carinae strong, narrowly interrupted medially, almost impunctate immediately above and below. Pygidium weakly, subobsoletely punctate at base, becoming glabrous apically.

Prosternum very densely, coarsely punctate throughout, bistriate, striae sinuate, strongest at base. Metasternum moderately punctate at base, becoming finer and sparser towards apex; median longitudinal line entire, fine.

Hind femora stout, very closely, strongly punctate on convex outer face, each puncture bearing a short, squamiform, recumbent seta; dorsal surface with a short, distinct carina in basal third. Hind tibiae strongly dilated in basal fourth, deeply concave on inner face, outer face strongly convex, surface similar to that of femora. Length 2.25 mm.; width 2mm.

Holotype (No. 4524 Mus. Calif. Acad. Sci. Ent.) collected by the writer at Patagonia, ARIZONA, alt. 4000 feet, July 8, 1936. The specimen was taken in flight a day after the first heavy summer rain, consequently no record of the host ant

could be obtained; undoubtedly it occurs in the nests of *Phidole* as do other species of *Terapus*.

This species is nearest *muizechi* Mars. and *nigritus* Hntn., but differs from both in its almost complete lack of vestiture, lighter color, almost obsolete pygidial punctuation, and in the form and surface of the hind tibiae. From *infernalis* Fall, it is distinct in many features most notable of which being its much lighter color, stouter legs, and more strongly convex and coarsely punctate outer face of the hind tibiae; in *infernalis* the outer face is very feebly convex and only minutely sparsely punctate.

***Hetaerius wagneri* new species.**

Broadly quadrate-oval, robust; dark reddish-brown, shining; surface very finely punctulate, devoid of vestiture except along lateral margins of pronotum. Head finely alutaceous, sparsely punctate; marginal carinae strong, abruptly arched in front, reverting to apical angles of clypeus; labrum large, concave, smooth glabrous.

Pronotum twice as wide as long, sides gradually convergent; disc moderately convex, obsoletely punctate baso-medially gradually becoming stronger approaching apex, basal margin with a fine but distinct stria strongest in medial third; anterior lateral area broad, strongly, unevenly, longitudinally rugulose; bulla broad, deeply rugoso-punctate; outer marginal sulci of both lobes densely setigerous, setae stout, short, pointed, color same as that of sclerites; oblique sulci deep in basal third, becoming weaker towards apex, abruptly curved inward and joining frontal margin. Elytra one-third wider than long, surface very finely alutaceous, sparsely, finely punctate, strongly convex, epipleurae finely bistriate; striae widely separated, outer humeral strongly cariniform at base, forming a deep groove on inner side, joining inner humeral at base and again at apical three-fourth, inner humeral entire, strong, dorsal at base becoming ventral at apex, the three dorsals entire, cariniform at base, less so approaching apex, basal subhumeral angles with a few short closely set setae.

Propygidium dull, finely alutaceous throughout, very minutely, sparsely punctate, naked. Pygidium convex, surface similar to latter at basal third, becoming smooth and glabrous towards apex.

Prosternum flat, lobe very coarsely punctulate, less so towards base, strongly alutaceous; prosternal striae cariniform,

broadly divergent behind coxae, more feebly divergent before, tips sharply convergent but not meeting. Meso-metasterna anteriorly very deeply depressed, only feebly transversely convex within depression; sternites smooth shining, microscopically punctate. Length 2.75 mm., Width 2.25 mm.

Holotype (No. 4525 Mus. Calif. Acad. Sci. Ent.) collected at Bass Lake, Madera County, CALIFORNIA, on April 1, 1934, by Mr. R. S. Wagner, for whom this species is named as a slight token of gratitude.

This species is allied to *whecleri* Mann from which it is readily separated by its large size, darker color, total absence of dorsal pubescence, and by the form and sculpture of the pronotum. In *whecleri* the pronotum is less convex, the oblique sulci are not curved inward apically but are straight and the basal marginal stria is absent. The meso-metasternal depression in this species is more prominent than that of any other species of the genus.

In Martin's key to the species of *Hetaerius* (Ent. News XXXIII, 1922, pp. 292-293) this species runs to *dictrichi* Mart., from which it is at once distinguished by its much larger size, darker color, strongly rugulose anterior lateral pronotal lobe and more robust convex form; *dictrichi* is elongate with more nearly parallel sides. No record of the host ant accompanies the type.

***Plegaderas setulosus* new species.**

Very broadly oblong oval, feebly convex; color ferruginous; surface punctate, each puncture bearing a short distinct erect scale-like seta. Head finely sparsely punctate.

Pronotum short, one-third wider at base than long; sides feebly sinuate, slightly convergent cephalad, broadly arcuate from just before middle to apical angles; lateral sulci deep, broad, entire; lateral margins broad, feebly convex, punctures coarse, shallow, elongate, separated by half their diameters; outer marginal striae strong; transverse sulcus deep, dividing the pronotum into two nearly equal regions; anterior region strongly evenly convex, punctuation similar to that of head; posterior region more feebly convex, punctures fine and sparse anteriorly, becoming somewhat larger and closer laterally and basally, punctures along basal margin very broad and shallow decreasing slightly in diameter medially. Elytra

one-fourth wider than long, sides strongly evenly arcuate; surface evenly convex, uniformly punctate, punctures broad, shallow, decreasing in depth posteriorly, interspaces less than width of punctures; whole surface presenting a finely, unevenly roughened appearance, somewhat less so along suture; oblique basal striae traceable only by faint indistinct impressions; punctures of inflexed portions nearly confluent.

Pygidium deeply closely punctate, more finely so at apex. Prosternal grooves wide, deep; anterior lobe one-fourth longer than wide, punctures broad, shallow; posterior lobe as wide as long, square, equal in width to posterior portion of anterior lobe. Metasternal plate evenly cribrately punctate. Length 1.2 mm; width .85 mm.

Holotype, deposited in the Canadian National Collection, collected at Hosmer, BRITISH COLUMBIA, on June 7, 1936, by Mr. Hugh B. Leech, to whom I am grateful for the privilege of describing this species.

This species represents a rather isolated development for the genus and cannot be closely compared with any other species of this fauna. It is especially distinctive in the prominence of the setae arising from each puncture of the dorsal and ventral surfaces. Indeed setae arising from punctures is a characteristic feature of *Plegaderas*, but in no other species do they even approach those of *setulosus* in degree of prominence. In the other species the setae are minute and can only be seen under high magnification and special conditions of light. The setae in *setulosus* are scale-like, apically truncate and decreasing in width towards their bases, tending to curl outward. The curious sculpture of the elytra is also without parallel in the genus.

The type was collected in the gallery of an ants nest, *Formica* sp., located in the heart of a rotting Douglas Fir log. This fact suggests a myrmecophilous habit in spite of the fact that all other members of the genus occur under the bark of trees in early stages of decay and have never been reported to occur with ants. Perhaps the specimen was carried into the nest by one of the ants.

ENTOMOLOGY AT THE CONVOCATION WEEK MEETINGS,
DECEMBER 27, 1937, TO JANUARY 1, 1938.

Our annual summary of the entomological items of the programs of the American Association for the Advancement of Science and Associated Societies held at Indianapolis, Indiana, follows:

The number of papers bearing on insects, including those in symposia and non-duplicating demonstrations, were:

*Entomological Society of America	48
*American Association of Economic Entomologists	103
American Society of Zoologists	21
American Society of Parasitologists	1
*Ecological Society of America	3
*Genetics Society of America	22
Limnological Society of America	1
*American Society of Plant Physiologists	2
*Phi Sigma	4
Potato Association of America	1
*American Nature Study Society	1
Total.....	207

These papers were distributed in subject as follows:

	i	Genetics	23
*General Entomology ..	10	Evolution	1
*Entomological Instruc-		*Taxonomy	6
tion	10	*Parasites and Diseases	
*Cytology	14	of Insects	8
*Embryology and Life		*Plant Diseases and In-	
History	10	sects	5
*Anatomy and Morph-		*Symbionts of Insects ..	1
ology	9	General Economic En-	
Physiology	29	tomology	11
Ecology	8	Insecticides	33
*Behaviour	5	Apiculture	11
Geographical Distribu-		Arthropods Affecting	
tion	3	Man	2

Do. do. other Ani- mals	2	Thysanoptera	3
Do. do. Cereals and Field Crops	8	Coleoptera	15
*Do. do. Truck Crops..	14	(excluding Japanese Beetle)	
Do. do. Households ...	3	Japanese Beetle	1
Do. do. Fruit and Fruit Trees	3	*Hymenoptera	19
Do. do. Forest and Shade Trees	5	(excluding Honey Bee)	
		*Honey Bee	12
		Trichoptera	1
		*Lepidoptera	19
ii.		(excluding the three following)	
Acarina	3	Codling Moth	4
Orthoptera	15	Oriental Fruit Moth...	1
Isoptera	3	*Corn Borer	4
*Odonata	2	Diptera	15
Homoptera	8	(excluding <i>Drosophila</i>)	
Heteroptera	6	* <i>Drosophi'a</i>	19
Anoplura	1	*Zoraptera	1

Many of these figures are duplications, both between sections i and ii and also within sections. Increase in numbers of papers over the corresponding figures for 1936-1937 are starred (*). Decreases are not indicated. The total number of papers (207) is slightly above that for 1936-1937 (206) and below that for 1935-1936 (239).

Both entomological societies met in the Lincoln Hotel. The Entomological Society was presided over by Prof. O. A. Johanssen, Cornell University; the Secretary was Prof. C. E. Mickel, University of Minnesota. The annual address was given by Mr. P. J. Parrott, New York State Agriculture Department on "Loafing in Africa" at the combined Entomologists' dinner, December 29, at 6.30 P. M.

The President of the Economic Entomologists was Dr. F. C. Bishopp of the United States Department of Agriculture and the Secretary Prof. E. N. Cory, University of Maryland. A joint symposium of the two societies and the American Phytopathological Society on the Relationships between Insects and Plant Diseases was held on December 28. Entomologists were also represented in the symposium of the Limnological Society on Hydrobiology on December 31.

ELSIE LINCOLN.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the later within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—Back, E. A.—Two types of mothproofing solutions. [10] 39: 269-272, ill. **Cooke, B. H.**—Nomenclature run wild. [21] 49: 134. **Fantham, Harold Benjamin.**—Obituary by H. A. U. Munro. [4] 69: 255-256. **Fenyés, Adalbert.**—Obituary by H. C. Fall. [55] 13: 145-147, ill. **Kennedy, J. S.**—Phase transformation in locusts in the field. [31] 140: 889-890, ill. **Lange, W. H.**—An annotated list of the insects, mostly Coleoptera, associated with Jeffrey pine, in Lassen National Forest, California. [55] 13: 172-175. **Malaise, R.**—A new insect-trap. [28] 58: 148-160, ill. **Romm, H. J.**—The insect predators of Purslane. [39] 20: 43-47; 51-61. **Lord Rothschild.** Obituary by H. J. Turner. [21] 49: 149-150. **de la Torre-Bueno, J. R.**—On keys and dichotomies. [19] 32: 210-212. Arizona insect localities. [19] 32: 187-194. **Urich, Frederick William.**—Obituary by A. Busck. [10] 39: 192-193. **Wheeler, Wm. Morton.**—Obituary with a list of his published writings by C. T. Brues. [5] 44: 61-96, ill. Obituary by Barber, Wade & Morrison. [10] 39: 191-192, ill. **White, Gershom Franklin.**—In Memoriam; obituary by Bishopp & Burnside. [10] 39: 184-188, ill.

ANATOMY, PHYSIOLOGY, ETC.—**Arrow, G. J.**—Dimorphism in the males of Stag-beetles (Coleo.: Lucan.). [36] 86: 239-246, ill. **Bourdon, J.**—Recherches experimentales sur la regeneration chez un coleoptere. [78] 71: 466-

499, ill. **Castelnuovo, G.**—Ricerche sulla spermatogenesi del *Bacillus rossi* (Orthopt., Phasmid.). [Arch. Zool. Ital. Turin] 24: 113-128, ill. **Cockayne, E. A.**—Insect teratology. Reduplication of legs in Coleoptera, Diptera, and Hymenoptera. [36] 86: 191-200, ill. **Cowley, J.**—Tibial and femoral combs, and a trochanteral brush, in the Odonata. [107] A. 12: 123-125, ill. **Das, G. M.**—The musculature of the mouthparts of insect larvae. [53] 80: 39-80, ill. **Elson, J. A.**—see under Hemiptera. **Frazer, F. C.**—A note on the persistence of the primary antenodal nervures in the order Odonata. [107] A. 12: 101-107, ill. **Grandi, G.**—Morfologia ed etiologia comparati di Insetti a regime specializzato. XII. *Macrosiagon ferrugineum flabellatum* (Coleo.). [Bull. 1st. Ent. R. Univ. Bologna] 9: 33-64, ill. **Ionesco, M. A.**—La Chaetotaxie des stades larvaires chez le genre *Eosentomon* (Protura). [28] 58: 101-105, ill. **James, H. C.**—The effect of delayed fertilization on the sex ratio of a species of insect in which the female is the heterogametic sex *Ephestia kuhniella*, Lepid., Phycit.). [107] A. 12: 92-98. **Komp, W. H. W.**—see under Diptera. **Kuhn & Piepho.**—Ueber hormonale Wirkungen bei der Verpupung der schmetterlinge. [Nachricht. Ges. Wissen. Göttingen; Nachr. Biol.] 2: 141-154, ill. **de Lerma, B.**—Osservazioni sul sistema endocrino degli Insetti (corpora allata e corpi faringei). [Arch. Zool. Ital., Turin] 24: 339-368, ill. **Manunta, C.**—Sulle variazioni della proporzione dei due costituenti del secret serico, fibroina e sericina, durante lo sviluppo delle ghiandole in varie razze di *Bombyx mori*. [Arch. Zool. Ital., Turin] 24: 311-338. Il contenuto inacido urico durante lo sviluppo embrionale della uova di bachi da seta (*Bombyx mori*). [Arch. Zool. Ital., Turin] 24: 369-383. La distribuzione dei carotenoidi nel bozzolo di varie razze pure di *Bombyx mori* e di loro incroci. [Arch. Zool. Ital., Turin] 24: 385-401. **Millot & Fontaine.**—Etude physiologique sur les Orthopteres. 1. La teneur en eau du Criquet Pelerin adulte. [Bull. Soc. Hist. Nat. Afriq. Nord] 28: 412-418. **Patterson, M. T.**—The cellular structure of the digestive tract of the beetle, *Pasalus cornutus*. [7] 30: 619-640, ill. **Paulian, R.**—A study of polymorphism in *Forficula auricularia* (Dermaptera). [7] 30: 558-562, ill. **Pollister, P. F.**—The structure and development of the wax glands of *Pseudococcus maritimus* (Hemipt., Cocc.). [53] 80: 127-152, ill. **Saito, S.**—On the development of the Tusser, *Antheraea pernyi* (Lepidop-

tera), with special reference to the comparative embryology of insects. [Journ. Fac. Agr. Hokkaido Imp. Univ.] 40: 35-109, ill. **Storey & Nichols.**—Defaecation by a Jassid species. [107] a, 12: 149-150, ill. **Tirelli, M.**—Osservazioni ed esperienze sulla muta crisalidale e imaginale del *Bombyx mori*. [Arch. Zool. Ital., Turin] 24: 47-89, ill. **Varley, G. C.**—The life-history of some Trypetid flies, with descriptions of the early stages (Diptera). [107] A, 12: 109-122, ill.

ARACHNIDA AND MYRIOPODA.—**Blaisdell, F. E.**—Note on the dispersion of Pseudoscorpions. [55] 13:158. **Braendegaard, J.**—Spiders from southeast Greenland. [Meddel. om Gronland] 108, no. 4, 15 pp., ill. (*). **Chamberlin, R. V.**—Change of name. [55] 13: 170. **Ewing, H. E.**—A new Eriophyid mite from lemon trees (Eriophy.). [10] 39: 193-194, ill. **Fox, I.**—A new Cheyletid mite parasitic on the Carolina jumping mouse, *Zapus hudsonius americanus*. [10] 39: 227-230, ill. **Larson, C. L.**—see under Hymenoptera. **Pomerancev, B. I.**—Adaptations parasitiques des tiques Ixodoidea (Acarina) [Russ. with French summ.] [Bull. Acad. Sci. Un. Rep. Soviet Soc., Cl. Sci.] Ser. Biol., 1937: 1423-1435, ill. **Redikorzev, V.**—Die erste neotropische Roncusart. [28] 58: 146-147, ill.

THE SMALLER ORDERS OF INSECTS.—**Back, E. A.**—Silverfish. [U. S. D. A. Leaflet] No. 149, 4 pp., ill. **Frazer, F. C.**—(see under Anatomy). **Gurney, A. B.**—A n. sp. of *Panorpa* from Utah, with notes on other Nearctic spp. (Mecoptera). [10] 39: 222-227, ill. **Lestage, J. A.**—Contribution a l'etude des Ephemeropteres. XIV.—Quelques cas de pontes aberrantes. [33] 77: 332-336. **Mosely, M. E.**—Mexican Hydroptilidae (Trichoptera). [36] 86: 151-190, ill. (*). **Moulton, D.**—Further notes on Hawaiian thrips with descriptions of n. spp. [37] 9: 409-414. **Sakimura, K.**—A survey of host ranges of thrips in and around Hawaiian pineapple fields. [37] 9: 415-427. **Sweetman, H. L.**—A n. sp. of *Machilinus* (Thysanura: Machil.). [10] 39: 214-216, ill.

ORTHOPTERA.—**Back, E. A.**—The increasing importance of the cockroach, *Supella supellectilium*, as a pest in the U. S. [10] 39: 205-213, ill. **Gurney, A. B.**—Synopsis of the Grylloblattidae with the descr. of a n. sp. from Oregon. [55] 13: 159-170, ill. (k*). **Paulian, R.**—see under Anatomy.

HEMIPTERA—**Back, E. A.**—Bedbugs. [U. S. D. A. Leaflet] No. 146, 8 pp., ill. **Ball, E. D.**—Some new Fulgoridae from the western U. S. [19] 32: 171-183. **Barber, H. G.**—A n. sp. of *Triatoma* from Arizona (Reduvi.). [10] 39: 86-87. **Barber, H. G.**—Descrip. of six n. sp. of *Blissus* (Lygae.). [10] 39: 81-86. **Bromley, S. W.**—*Alydus* on carrion (Corisc.). [19] 32: 213. **Caldwell, J. S.**—Some North American relatives of *Aphalara calthae* (Cherm.). [7] 30: 563-571, ill. (*). **Elson, J. A.**—A comparative study of Hemiptera. [7] 30: 579-597, ill. **Ferris, G. F.**—Contributions to the knowledge of the Coccoidea, VI. [Microent.] 2: 103-122, ill. **Hungerford, H. B.**—A new *Notonecta* from Mexico. [55] 13: 180-182, ill. **Knoll & Auten.**—Some *Erythroneura* of the maculata Group from Decatur, Georgia (Cicadell.). [7] 30: 572-578, ill. (*). **McKenzie, H. L.**—Generic characteristics of Aonidiella, and a descr. of a n. sp. from Australia (Diaspid.). [55] 13: 176-180, ill. (k). **Rau, G. J.**—Two apparently undescribed mealybugs (*Pseudococc.*) from N. Y. state. [19] 32: 195-201, ill. **Suehiro, A.**—New records of mealybugs in Hawaii. [37] 9: 429-430. **Swezey, O. H.**—A n. sp. of *Dictyophorodelphax* from the Island of Lanai (Homoptera). [37] 9: 431-432, (k). **Usinger, R. L.**—A new name for *Nysius monticola* Kirkaldy (Lygae.). [37] 9: 443. A n. sp. of *Koanoa* from the Hawaiian Islands (Mir.). [37] 9: 437-439.

LEPIDOPTERA—**Balduf, W. V.**—Bionomic notes on the common bagworm, *Thyridopteryx ephemeraeformis* (Psychidae) and its insect enemies (Hym., Lep.). [10] 39: 169-184. **Brower, A. E.**—Description of a n. sp. & new race of *Catocala* (Noctu.). [19] 32: 184-186. **Carpenter, G. D. H.**—Lizards as enemies of butterflies. [10] A, 12: 157-161, ill. **Field, W. D.**—A new seasonal form of *Coenonympha ampelos* (Satyr.). [4] 69: 249-250. **Grant, K. J.**—An historical study of the migrations of *Celerio lineata lineata* & *C. lineata livornica* (Sphingidae). [36] 86: 345-357, ill. **Hovanitz, W.**—Concerning the *Plebejus icarioides* Rasenkreis (Lycaen.). [55] 13: 184-189, (*). **Morisset & Guathier.**—Observations sur les mœurs de *Samia cecropia* (Saturni.). [98] 64: 293-295. **Williams, C. B.**—The migrations of day-flying moths of the genus *Urania* in tropical America. [107] A, 12: 141-147, ill.

DIPTERA—**Alexander, C. P.**—N. spp. of crane-flies from S. Am. Pt. VIII. (Tipul.). [7] 30: 598-617. **Cushing**

& Hall.—Some morphological differences between the screwworm fly *Cochliomyia americana* and other closely allied or similar spp. in North America (Calliphor.). [10] 39: 195-200, ill. (k). **Enderlein, G.**—Dipterologica. IV. [Sitzungs. Gesell. Naturf. Freunde Berlin] 1936: 431-444, ill. **Gjullin, C. M.**—The female genitalia of the *Aedes* mosquitoes of the Pacific coast states. [10] 39: 252-266, ill. (k). **Komp, W. H. W.**—The nomenclature of the thoracic sclerites in the Culicidae, and their setae. [10] 39: 241-252, ill. **Martin, C. H.**—Notes on collecting Diptera [19] 32: 212-213. **Montschadsky, A. S.**—Die Evolution der Larven und Ihre Beziehung zu der Evolution der Imagines der familie Culicidae [Russ. with Germ. summ.]. [Bull. Acad. Sci. Un. Rep. Sov. Soc., Cl. Sci.] Ser. Biol., 1937: 1329-1351, ill. **Rempel, J. G.**—Notes on the genus *Chasmatonotus* with descriptions of three n. spp. (Chironom.) [4] 69: 250-255, ill. (k). **Rozenboom, L. E.**—The egg of *Anopheles pseudopunctipennis* in Panama (Culic.). [Journ. Parasitol.] 23: 538-539, ill. **Rubzow, I. A.**—Zur Evolution der Kriebelmücken (Simuliidae), [Russ. with Germ. summ.]. [Bull. Acad. Sci. Un. Rep. Soviet. Soc.] Ser. Biol., 1937: 1289-1323, ill. **Shields & Miles.**—The occurrence of *Orthopodomyia alba* in Alabama (Culic.). [10] 39: 237. **Timon-David, J.**—Recherches sur le peuplement des hautes montagnes. Dipteres de la vallee de Chamonix et du massif du Mont Blanc. [Ann. Faculte Sci. Marseille] 10: 7-54, ill. **Varley, G. C.**—see under Anatomy. **Walton, W. R.**—Attraction of *Euxesta notata* (Ortal.) to roasted coffee. [10] 39: 201.

COLEOPTERA.—**Abbott, C. E.**—The necrophilous habit in Coleoptera. [19] 32: 202-204. **Arrow, G. J.**—see under Anatomy. **Asterlund, J. F.**—The larva of *Chalcodermus collaris* with a key to related spp. (Rhyncophora). [10] 39: 216-222, ill. **Blake, D. H.**—Ten n. spp. of West Indian Chrysomelidae. [10] 39: 67-78, ill. **Buchanan, L. L.**—A n. sp. of *Ceutorhynchus* from N. Amer. (Curculion.). [19] 32: 205-207. **Cazier, M. A.**—A n. sp. of *Valgus* and a new generic record from Mexico (Scarab.). [55] 13: 190-192, (k). **Nunnemacher, F. W.**—Studies among the Coccinellidae, No. 8. [55] 13: 182-183, (S*). **Saylor, L. W.**—The beetles of the subfamily Chasmatopterinae in the new world (Scarab.). [91] 27: 531-535, ill. (k*). Synopsis of the beetles of the Chilean genus *Phytholaema* (Scarabaeidae: Melolonthinae). [50] 85: 1-11, ill., (k*). **Van Dyke, E. C.**—*Eudiagogus pulcher* (Rhyncophora). [55] 13:170.

HYMENOPTERA.—Ainslie, C. N.—A correction. [4] 69:255. **Bequaert, J.**—The nest & prey of *Chlorion* (*Ammobia*) *caliginosum* (Sphec.). [19] 32: 186. **Bischoff, H.**—Beitrage zur Lebensgeschichte der *Pseudogonalos hahni*. [Sitzungs. Gesell. Naturf. Freunde Berlin] 1936: 51-63, ill. **Cockerell, T. D. A.**—Bees from San Miguel Island, California. [55] 13: 148-157, (k*). **Compere, H.**—The spp. of *Aenasius*, Encyrtid parasite of Mealybugs. [37] 9: 383-404, ill. (Sk*). **Donisthorpe, H.**—Generic names, etc., of the British Formicidae. [21] 49: 131-132; 143-145. **Gahan, A. B.**—Two new Chalcidoid egg parasites (*Euloph.* & *Mymar.*). [10] 39: 266-269. **Gobeil, A. R.**—Notes sur *Phylotoma nemorata* (Tenthredin.). [98] 64: 229-233. **Goetsch, W.**—Ameisen Staaten. [Jahresber. Schlesischen Ges. vaterl. Cult.] 109, no. 1, 35 pp., ill. **Grandi, G.**—Contributi alla conoscenza degli Imenotteri Aculeati, XVI. [Boll. Ist. Ent. R. Univ. Bologna] 9: 253-346, ill. **Hase, A.**—Ueber das Leben der staatenbildenden wesp *Polybia atra* [Sitzungs. Gesell. Naturf. Freunde Berlin] 1936: 1-51, ill. **Hopping, G. R.**—Sawfly biologies. No. 2. *Hemichroa crocea*. [4] 69: 243-249, ill. **Howard, L. O.**—Resume and conclusions to Paul Marchal's extended paper on the *Trichogrammas* (Chalcid.). [7] 30: 551-557. **Larson, C. L.**—The tick parasite *Ixodiphagus texanus* (Encyrt.) in nymphs and larvae of *Haemaphysalus leporis-palustris* in Minnesota. [Journ. Parasitol.] 23: 496-498. **Linsley, E. G.**—The effect of stylopization on *Andrena porterae*. [55] 13: 157-158. **Micheli, L.**—Note biologiche e morfologiche sugli Imenotteri (VIII). [Att. Soc. Ital. Sci. Nat. Mus. Civ. Stor. Nat. Milan] 76: 280-290, ill.



A GLOSSARY OF ENTOMOLOGY Smith's 'An Explanation of Terms Used in Entomology'. Completely revised and rewritten by J. R. DE LA TORRE-BUENO, F.R.E.S. Published by Brooklyn Entomological Society, Brooklyn, N. Y. Printed by the Science Press Printing Co., Lancaster, Penna., 1937. Pp. ix, 336, 9 plates. \$5.00, postage, extra.—Prof. John B. Smith's (*not* An) 'Explanation of Terms Used in Entomology' was published in 1906 and consisted of vii + 154 pages and 4 plates. Both volumes have the same page size: 9 x 5 $\frac{7}{8}$ inches, the earlier with a page form 6 $\frac{1}{2}$ x 4 inches and 47 or 48 lines to the page, the later 7 x 4 $\frac{1}{2}$ inches and 50 or 51 lines. The type of the former is much smaller (7 point) than that of the

latter (10 point), so that the edition of 1937 is much easier reading. An announcement in the *Bulletin of the Brooklyn Entomological Society for April, 1937*, page 90, says: "The original Explanation of Terms Used in Entomology contained some 4300 terms. Our new revision will contain nearly 12,000 definitions; and since in many cases, numerous terms with slightly different spellings have the same definition, there will be listed nearly 10,000 terms."

We take these numbers as given, having made no attempt to verify them. They will indicate the fullness of the 1937 version. Most, if not all, of the terms of 1906 are reproduced in 1937, often with the definitions unchanged, and there are of course many additions, drawn, as the 1937 introduction states, from other sciences than entomology in its more limited sense, and with special mention of medical entomology. Very nearly the traditional length of a human generation separates the two editions; those mentioned as taking part in the preparation of the later are all different from those who prepared the earlier. In the body of that of 1906 only rarely is the author of a term given, with the exception of Comstock for venational names. In 1937 authors' names appear much more frequently and one of the valuable qualities of this edition is its inclusion of the often bizarre terms of MacGillivray. Plates I, II and III of the first edition are reproduced here as I, II and IX, as witness the spellings in Pl. II, fig. 11, and illustrate six orders of insects. The new plates III-VIII contain old friends and add but one to the number of orders represented, to our regret. The plate of 1906 illustrating nomenclature of colors has been discontinued. Useful new features are lists of Latin abbreviations and of arbitrary signs and symbols, an alphabetical register of signs and symbols and a two-page bibliography of titles of rather unequal value, to which *Tillyard's Biology of Dragonflies* might well have been added. *Smith's Glossary* has been long out of print. *Torre-Bueno's Glossary* worthily fills the gap and is a necessity to all entomologists.—P. 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 for Cash or Exchange.—North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—Heliconia from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and philenor, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

Wanted for cash or exchange any pamphlets dealing with the American Hesperiidæ. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Meg. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

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ENTOMOLOGICAL NEWS

MARCH, 1938

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Stated Meetings of The American Entomological Society will be held at 8.00 P. M., in 1938, on the fourth Thursday of each month excepting June, July, August, November and December, and on the third Thursday of November and December.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the "News" will furnish reprints of articles, without covers, over and above the twenty-five given free at the following rates: One or two pages, twenty-five copies, 35 cents; three or four pages, twenty-five copies, 70 cents; five to eight pages, twenty-five copies, \$1.40; nine to twelve pages, twenty-five copies, \$2.00; each half-tone plate, twenty-five copies, 30 cents; each plate of line cuts, twenty-five copies, 25 cents; greater numbers of copies will be at the corresponding multiples of these rates. Printed covers for 50 copies, \$4.00 or more, according to number of pages bound.

ENTOMOLOGICAL NEWS

VOL. XLIX.

MARCH, 1938

No. 3

Two *Philosamia cynthia* Pupae in one Cocoon (Lepid.: Saturniidae).

By C. BROOKE WORTH, Dept. of Biology, Swarthmore College,
Swarthmore, Pennsylvania.

I found an unusual cocoon of *Philosamia cynthia*, which contained two pupae, in a vacant lot in the heart of Philadelphia, Pennsylvania, sometime in February, 1937.

So compactly was the cocoon spun that I did not suspect at first that it was anything more than a large "normal" one, probably containing a female pupa. But I was led to suspect something unusual when, on weighing it, I found that its total weight was 7 grams. In a study of weight loss in cocoons of this species (during the course of their slight hibernating metabolism), I had found that male *cynthia* cocoons average 3 grams in weight, and female cocoons average 4 grams. To find a cocoon weighing exactly the same as the sum of the average of both sexes was certainly suggestive of something unusual, especially as the largest female I had found to date weighed only slightly over 5 grams.

External examination of the cocoon did not reveal any great abnormality. There was a clearly defined exit where the cocoon was suspended by its strap. However, I could detect a slightly looser texture in the weaving at the side opposite to the strap.

For the rest, the external aspect of the cocoon gave no evidence whatsoever of its double occupancy; in cross-section it was perfectly circular, with no detectable indentation at any point.

On cutting the cocoon open, I found two pupae, each one oriented with its head toward one of the suggested outlets of the cocoon. The inner wall of the structure was perfectly smooth. There was no trace of a septum between the pupae. The wall of the cocoon was not thicker than normal.

The pupae were male and female. The male occupied the lower position. Examination of these two pupae revealed that they were both of normal size, and each seemed vigorous and healthy. The male, however, was markedly compressed.

This condition indicates that the female was the first to pupate, accomplishing this sufficiently in advance of the male to have hardened into the normal inflexible contour while the male was still soft.

It is likely, I think, that this cocoon would have yielded two normal moths, no matter in which order they hatched; even if the male had matured first, there appeared to be room for him to squeeze past the female and come out of his own "front door." The specimen seemed of sufficient interest, however, to preserve, and it is now in alcohol, in the possession of the Department of Entomology of the Academy of Natural Sciences of Philadelphia.

I do not believe that there was any sexual "design" in the two caterpillars' spinning a joint cocoon. They were more than likely brother and sister, though this would not, of course, exclude the possibility of their future mating. It is more likely, however, that the cocoon was the result of accident. The two caterpillars, of the same age, on the same tree (which was, incidentally, only a small sapling), felt the urge to spin simultaneously and happened to choose the same site for their spinning.

Gene Stratton-Porter records in her "Moths of the Limberlost" the finding of two cecropia cocoons (*Samia cecropia*), spun side by side so as to be slightly interwoven. Remarkable as it may seem, these cocoons contained male and female individuals respectively, and the imagines emerged *simultaneously*, as proved by the excellent photographs which she took.

One is almost forced to regard this occurrence as a provision for the mating of individuals, though it is hard to credit caterpillars with such a profound degree of instinctive foresight. And now my *cynthia* cocoon adds a jot of evidence to such a hypothesis, if, indeed, there is any one sufficiently credulous to be interested in such speculations.

Notes on some North American Mydaidae (Diptera)

By MAURICE T. JAMES, Colorado State College, Fort Collins.

Recently, I sent a small collection of Mydaidae to Dr. J. Bequaert for determination, and, after making identifications, pointing out a new species, and making some observations on the collection, he asked me to publish the results. I am greatly indebted to him for his generosity.

***Nomoneura micheneri*, new species.**

♂. Head black in ground color, clothed with dense, white, semi-appressed pile on the occipital orbits, the face, and to each side of the antennae, and with similar, but less dense and more erect, pile on the upper part of the front and on the vertex; this pile is somewhat longer than the combined length of the first and second antennal segments. Antennae black, except the bulbous fifth segment, which is orange-yellow; the first segment twice as long and thick as the second, clothed sparsely with long black and pale hairs mixed; third segment, slender, cylindrical, almost half the length of the entire antenna; the fourth segment approximately the length of the second; the fifth expanded bulblike, its greatest width being preapical; the antennae elbowed at the apex of the third segment. Proboscis black, slender, extending approximately to the apex of the antennae.

Thorax black, shining, with dense conspicuous, white pile which covers the humeri and the following areas on the dorsum: the lateral margins, the anterior margin, except the median third, and a partial stripe on each side, extending backward almost to the suture and just outside the median third; this pile is appressed, except that on the humeri, which is semi-appressed; a similar area of semi-appressed pile occurs below each wing base, and there is a small tuft of it at the base of the scutellum. Posterior calli somewhat elevated. Halteres black. Legs black, the knees and tarsi brownish. Wings hyaline; the first posterior cell closed.

Abdomen black ventrally on the first six segments; the first and second entirely black, the third to sixth inclusively reddish dorsally, their lateral margins and narrow apices, however, black; genitalia mostly reddish. First segment with a considerable amount of rather long semi-appressed whitish pile; the second segment with a basal tuft of appressed whitish pile on each side; the remaining segments with inconspicuous black appressed pile on the disc and with conspicuous silvery tufts

at the posterior corners. Length, 10 mm.

♀. Similar to the male, but the pile is much shorter and sparser, the dense covering of the head being especially reduced; on the abdomen the segments beyond the first are practically devoid of pile dorsally. The pile of the thoracic dorsum is similar to that of the male, but more reduced in area. Tibiae and genitalia brownish, the latter with four spines on each side. Antennae broken off at end of second segment.

Holotype ♂, *allotype* ♀, on one pin, taken in copulation, seven miles south of White Water, Riverside County, California, April 13, 1935 (C. D. Michener).

Of the species included in Johnson's key to *Leptomydas*, three evidently belong to *Nomoneura*, as defined by Curran in his "North American Diptera." These three, *hirta* Coq., *concinna* Coq., and *venosa* Loew, together with *micheneri*, are the representatives of this genus in the United States. *Micheneri* has a longer proboscis than the other species, and the coloration of the abdomen is quite different; the abdomen of *venosa* ♀ is entirely pale, while those of *venosa* ♂, *hirta*, and *concinna*, are banded with black and yellow.

PHYLLOMYDAS BRUSEI Johnson. ♂, foothills west of La Porte, Larimer Co., Colorado, July 22, 1935 (M. T. James). On sage brush. This specimen was compared with the type by Dr. Bequaert, who informs me that it has been recorded only from the type locality, Galveston, Texas.

I have the following records for other Mydidae, all determined by Dr. Bequaert.

MYDAS MACULIVENTRIS Westw. Miami, Florida, Aug. 6, 1934 (Frank N. Young).

M. MACULIVENTRIS var. *INCISUS* Macq. Miami, Florida, Aug. 9, 1934 (Young); Coconut Grove, Fla., June 18, 1934.

OPOMYDAS CARBONIFER O. S. Lloyd, Jefferson County, Florida, Aug. 9, 1935 (G. Fairchild).

NOMONEURA VENOSA Loew. Globe, Arizona (Duncan); Roggen, Colorado, Sept. 8, 1933 (M. T. James); between Trinidad and La Junta, Colorado, Aug. 8, 1933 (H. G. Rodeck, M. T. James). The latter specimen was taken, in rather good condition, from the radiator of our car.

Notes on Western Conifer Aphids (Homoptera: Aphididae).¹

By G. F. KNOWLTON and CLYDE F. SMITH.

The following report adds to the known distribution of several conifer aphids, two species and a sub-species being described as new².

CINARA BREVISPINOSA (G. and P.). On *Pinus contorta* twig bark at Boise, Idaho, July 16, 1936 (T. O. Thatcher).

C. CURVIPES (Patch). On Engelman spruce at Pingree Park, Colorado, August 21, 1935 (G. F. Knowlton).

C. FERRISI (Swain). On *Pinus albicaulis*, Moose Green, near Karsts' Ranch, Montana, July 8, 1936 (Thatcher).

C. GLEHNA (Essig). On *Picea pungens* twig bark at Salt Lake City, Utah, June 12, 1935 (Knowlton).

C. HOTTESI (G. and P.). On twig bark of *Picea engelmannii* at Pingree Park, Colorado, August 21, 1935 (Knowlton: M. A. Palmer).

C. MEDISPINOSA (G. and P.). On young twig bark of *Pinus contorta* at Boise, Idaho, July 6, 1936 (Thatcher), and Beaver Creek, Logan Canyon, Utah, July 25, 1837 (C. F. Smith: C. K. Smith).

C. MURRAYANAE (G. and P.). On twig bark of *Pinus contorta* at Boise, Idaho, July 6, 1936; and Mountain View Peak, Rogerson, Idaho, May 12, 1936 (Thatcher).

C. OCCIDENTALIS (Davidson). On twig bark of *Abies lasiocarpa*, Minidoka National Forest, Idaho, May 31, 1935 (Thatcher).

C. PINI (L.). On *Pinus sylvestris*, Campus, Utah State Agricultural College, Logan, Utah, July 26, 1937 (Smith: C. J. Davis).

C. PONDEROSAE (Williams). On *Pinus ponderosa* twig bark west of Meaw Meadows, Idaho, June 13, 1936 (Thatcher); Yellowstone National Park, Wyoming, July 18, 1936 (Knowlton); Gallatin Valley, Montana, July 14, 1936 (Knowl-

¹ Contribution from the Department of Entomology, Utah Agricultural Experiment Station. Authorized by the Director.

² The writers are indebted to Professor M. A. Palmer for her opinion concerning various species herein recorded.

ton); and Nederland, Colorado, August 23, 1935 (Knowlton).

C. SIBIRICAE (G. and P.). On *Juniperus sibirica* at Pingree Park, Colorado, August 21, 1935 (Knowlton).

***Cinara thatcheri* n. sp.³**

Alate vivipara.—Size 4mm. long and 1.75 wide through eyes; ocular tubercles present; antennae 1.61 long; antennal III, 0.57 to 0.6 mm. long with 3 to 6 sensoria; IV, 0.25 to 0.28, with 1 to 3 sensoria; V, 0.3 to 0.33, with 1 secondary sensorium; VI, 0.153 to 0.16 + 0.047 to 0.05; last three segments of acute rostrum measuring 0.21 to 0.22, 0.28 to 0.3, and terminal segment 0.11; hind tibiae 2.83 to 2; hind tarsi 0.395; cornicles 0.3 to 0.46 across longest part of base; dusky patches occur on the two dorsal segments preceding the cauda; small, dusky spots partly surround spiracles and occur on other dorsal segments.

Apterous vivipara.—Size 4.5 mm. long 2.4 wide through abdomen and 0.78 through eyes; antennae 1.6 to 1.65 mm. long; antennal III, 0.53 to 0.634, without sensoria; IV, 0.25, with 1 sensorium; V, 0.285 to 0.32 with 1 secondary sensorium; VI, 0.146 to 0.155 + 0.047 to 0.05; penultimate segment of rostrum 0.29 to 0.3 mm. long; rostrum reaching nearly to end of abdomen; hind tibiae 2.6 to 2.83 hind tarsi 0.36 to 0.39; cornicle 0.4 mm. across base longest way.

Collections.—On *Pinus ponderosa* at White Bird Summit, IDAHO, June 13, 1936 (T. O. Thatcher).

Taxonomy.—Professor M. A. Palmer called the writers' attention to the fact that the sub-terminal segment of the rostrum in *Cinara thatcheri* is noticeably longer than is the case in its near relative, *Cinara schwarzi* (Wilson), in which it is 0.2 to 0.23 mm. long; also antennal V always is longer than IV.

C. TAXIFOLIAE (Swain). On twig bark of *Pseudotsuga taxifolia* at Antelope Flat, near Ashton, Idaho, July 18 and 27, 1936 (Thatcher).

***Cinara utahensis* n. sp.**

Apterous vivipara:—Color brownish-black, shiny; body 4.5 to 4.72 mm. long and bearing hairs 0.06 to 0.07 mm. long on abdomen; vertex hairs 0.10 to 0.12; hairs on antennal III, 0.04 to 0.06; antennae 2.2 to 2.3 mm. long; antennal III, 0.78 to 1.04 mm. long and bearing 1 to 3 sensoria; IV, 0.28 to 0.35 bearing 1 to 2 sensoria; V, 0.37 to 0.45 with 1 sensorium;

³Types of new species are deposited in the U. S. National Museum. Paratypes in the G. F. Knowlton and C. F. Smith collections.

VI, 0.125 to 0.14 + 0.065 to 0.10 mm.; rostrum attaining cornicles; rostral IV + V, 0.33 to 0.37; hind tibiae 3.76 to 4.6 mm. long and bearing pointed hairs 0.096 to 0.117 mm. long; first joint of hind tarsi 0.06 to 0.08 mm. on the outer side, 0.16 on inner side; second joint 0.34 to 0.37; cornicles 0.53 to 0.61 mm. across base.

Alate vivipara.—Antennal III, bearing 9 to 12 sensoria; antennal IV, 2 to 3 sensoria; hairs on vertex 0.08 to 0.09;

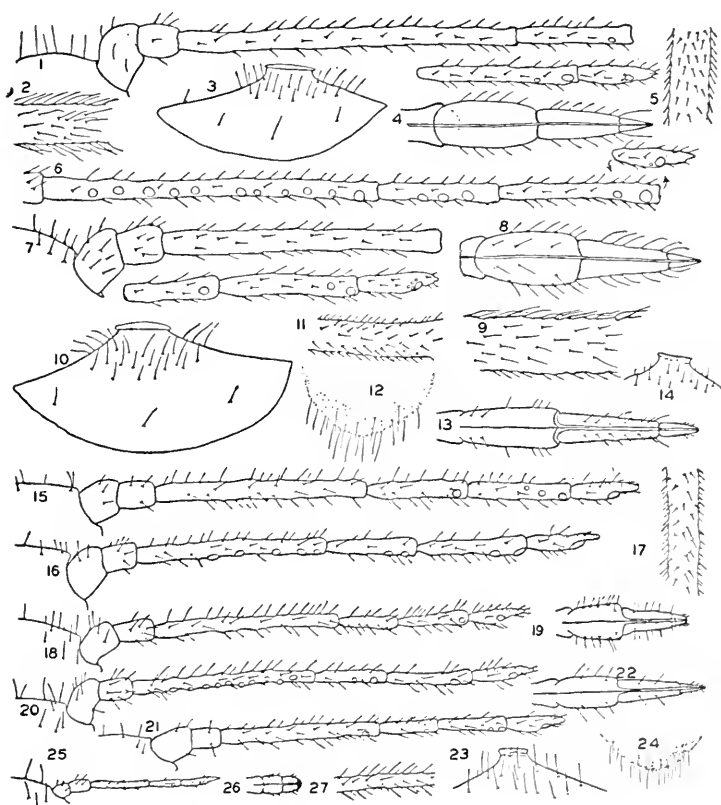


Fig. 1. *Cinara utahensis* n. sp. Aptera, 1-4; alate 5-6. *C. utahensis zoolathridi* n. subsp. Aptera, 7-10. *C. thatcheri* n. sp. Aptera, 11-15; alate, 16-17. *C. taxifoliae* (Swain). Aptera 18-19; alate, 20. *C. brevispinosa* (G. and P.). Aptera, 21-24. *Essigella fusca* G. and P. Aptera, 25-27.

hairs on hind tibiae 0.045 to 0.047; other characters as in apterous vivipara.

Taxonomy.—This species differs from *C. coloradensis* (G. and P.) in diameter of cornicles being greater; tibial hairs longer and less rigid, these being longer than one-half the diameter of the hind tibiae; and in having a secondary sensorium on antennal I'. *C. utahensis* differs from *C. curvipes* (Patch) in having fewer sensoria on apterous antennal III, and averaging more secondary sensoria on antennals IV and V; in tibial hairs being longer (more than half the diameter of the joint) and pointed; hind tarsi being more than 0.1 of hind tibiae. This species runs to *C. cdulis* (Wilson) in Gillette and Palmer's key (Ann. Ent. Soc. Amer. 24: 844) from which it differs in angle of hairs on hind tibiae being less than 45 degrees; and in being a larger species.

Collections.—On *Abies lasiocarpa* in Smithfield Canyon, UTAH, July 18, 1937 (W. P. Nye: C. J. Davis).

***Cinara utahensis* zoolathridi n. subsp.**

Apterous vivipara.—Body reddish-brown, 3.7 to 5.4 mm. long; antennae 2 to 2.5 mm. long; antennal III, 0.8 to 0.92 mm. long and bearing 0 to 2 sensoria on distal half; IV, 0.29 to 0.35 mm. with 1 to 2 sensoria near distal end; V, 0.41 mm., bearing 1 to 2 secondary sensorium near distal end; VI, 0.15 to 0.16 + 0.063 to 0.082; rostrum lance-like, usually surpassing cornicles; rostral IV + V, 0.34 to 0.38 mm.; hind tibiae curved, 4 to 5 mm. long, bearing numerous thin hairs 0.062 to 0.086 mm. long; first joint of hind tarsi 0.09 on the inner side and 0.19 on the outer side; second joint 0.39; cornicles 0.35 to 0.42 mm. in diameter across base.

Collections.—On spruce trees in nursery, Portland, OREGON, 1934 (C. Chamberlin).

Taxonomy.—This sub-species differs from *C. utahensis* n. sp. in having slightly shorter hairs on vertex; hairs on antennae being less spine-like; and in having thicker antennae and hind tarsi. From *C. curvipes* (Patch) it differs in base of VI being shorter; wider base of cornicles; and hairs on hind tibiae being longer, thinner and less blunt.

SCHIZOLACHNUS PINI-RADIATAE (Davidson). On needles of *Pinus ponderosa* in Dixie National Forest, Utah, August

10, 1936 (Knowlton: C. F. Smith).

ESSIGELLA FUSCA G. and P. On *Pinus* needles at Heron Creek, Wyoming, July 18, 1936 (Knowlton); and Pingree Park, Colorado, August 19, 1936 (Knowlton).

**Description of and Notes on the Early Stages of
Hyloicus canadensis Bdv. (Lepidoptera: Sphingidae).**

By WALTER J. CLAYTON, Lincoln, Maine.

The following descriptions were made of larvae from eggs laid by three female moths taken at Lincoln, Maine, by myself. The first was taken at 1 A. M. on June 30, 1937, at a street light. She laid a few eggs that night and a total of 110. The larvae emerged on July 5th. The second moth laid only 19 eggs and the third 118. This last female seemed less vigorous than the others and many of the larvae from her batch of eggs did not survive moulting.

The newly-hatched caterpillars ate most of their eggshells after emerging. Those of the first brood grew to maturity and stopped eating 21 days after hatching, and on July 26th began to roam around, considerable moisture exuding from the first three or four segments. The larvae from the eggs of the second and third females went through their development in exactly the same length of time.

The larvae from the first mentioned brood had a large number of the red-colored examples in it, and the second and third lots were inclined to be rather dark, merging into reddish brown markings, but, like the others, lost most of the dark color in the last stage.

The caterpillars were quite frail and had difficulty in passing the first moult in which many died, but those which survived had little trouble in passing the other moults. It was necessary, however, to rear the larvae singly.

The larvae from the first brood were, on the whole, a brighter sort of reddish-rust color and were much brighter than the caterpillars of the other two broods. In the end, though, the caterpillars of all three broods were much alike in color with white back, green sides and reddish shades showing faintly in some.

When they stopped feeding, the caterpillars were placed in a box of dirt to which a cover was fastened with nails. This cover had a hole cut in the top of it, through which the larvae were dropped when they were ready to pupate. The interior of the box was dark and most of the caterpillars pupated under and among leaves scattered on top of the soil. A few burrowed into the earth one or two inches. They walked around the box sometimes for two or three days before becoming quiet. Few caterpillars were lost during this period. After three or four days some had shed the larval skin, but others were a week in doing this.

The moths are on the wing from the last week in June and some have been taken as late as the first week in August. A total of seven was taken this year. Although several years of collecting in Lincoln has yielded from three to seven moths annually, no female has been taken until this year, and no larva has ever been found in the wild state.

Egg. The eggs were pale green, much like that of *H. chersis* Hbn., but only about half as large. They hatched five days after deposition.

Larva. The larvae, at hatching, were $7/32$ of an inch in length, very pale yellow to almost white, the caudal horn light, (turning dark in about 15 minutes) straight and held very erect. The caterpillars were given black ash (*Fraxinus nigra* Marsh) and low bush blueberry (*Vaccinium* sp.). They would not touch the blueberry, but after considerable wandering attached themselves to the veins on the underside of the leaves of the ash and soon began to reach out at right angles, first eating only the surface, then a hole through the leaf. The larvae, when a little older, ate a hole and then continued it to the edge of the leaf.

First moult. The first moult occurred five days after hatching. The larvae were $9/32$ of an inch in length and up to now very transparent. By holding up to the light and with an ordinary reading glass, pellets of food could be seen passing down to the stomach. A very pale subdorsal stripe on both sides ran from the fourth segment to the caudal horn. Seven pale oblique stripes on the sides came out of the subdorsal stripes and a pink spot was situated above the oblique and below the subdorsal. These became more conspicuous before the next moult.

Second moult. This occurred 5 days later, and the caterpillars were $\frac{3}{4}$ of an inch or slightly more in length. Considerable changes took place now and before the next moult. About half of the lot looked much like *H. chersis* in some ways, the rest were decked out in rust-red, reddish brown, and some were nearly chocolate brown. They varied considerably in brightness and in amount of color, but all were much whiter than *H. chersis* on the back. The first three segments were pale green dotted with white granulations, the remainder of the body beneath and half-way up the sides was pale green with white dots like *H. chersis*. The head was triangular, considerably notched at apex, and green with yellow vertical stripes. The caudal horn was reddish or brown at tip and somewhat curved. It was darker basally and in some larvae the last two segments were rusty, brownish, or reddish. Some had oblong reddish spots above the subdorsal stripe. Most of the rust or reddish markings were edged with very pale yellow. The terminal segment was much dotted with raised black spots. The spiracles were rose, edged with pale yellow. The colors became brighter as the caterpillars neared the next moult. Two larvae were very dark green, like the greenest type of *H. chersis*.

Third moult. Five days after the preceding moult this one occurred. The larvae were $1\frac{3}{4}$ inches in length, and were little changed in color although some were brighter than in the preceding instar, and a number had lost most of the reddish markings. Most, however, were the green, white-backed type and were largest from about the middle of the body to the caudal end, and tapered from the middle to the small head. The head was not as much notched as in the preceding instar, and the caudal horn, while it had previously shown a tendency to droop, was now pointing nearly straight out behind.

Full-grown larva. The full grown larvae may be described as follows: Length $2\frac{1}{2}$ - $2\frac{3}{4}$ inches; the first three segments, the under parts and the lower part of the sides were all light green dotted with white granulations. The head was deep green with pale yellow vertical stripes on the sides, triangular, and somewhat notched at the apex. The legs were the same as in *H. chersis*. The upper part of the body was nearly white. The seven oblique stripes were slightly yellow at the lower end, becoming whiter than the dorsum at the upper, and were edged above with sharply contrasting dark green. The obliques crossed one segment and two-thirds or more of the next, and some larvae showed some of the washed-out reddish color of the second instar. The caudal horn was green, tipped with reddish or

brown, curved and heavily spiked with black spines located mostly in front and in back. The last segment was green dotted with raised, black granulations. The spiracles were rose-red edged with pale yellow.

In this stage the following should distinguish it from *H. chersis*: much like *H. chersis* but smaller ($2\frac{1}{2}$ - $2\frac{3}{4}$ inches as against $3\frac{1}{2}$ -4 inches in length for *H. chersis* and less than half the diameter). The caudal horn is grass green, never bluish or yellowish as in *H. chersis*. While there was considerable variation in colors, all the larvae were very white on the dorsum, never bluish or yellow, and the terminal plates had raised black dots (granulations). It should be clearly understood, moreover, that while the larva of *H. canadensis* has been compared with that of *H. chersis*, the two are not to be confused in their red phases. That of *H. chersis* is dull red all over, while that of *H. canadensis* is of spots and blotches of a different shade of red. The latter species also present an almost unlimited degree of variation in the extent and arrangement of spotting, and, if any segments are entirely red, it is only the last three or four with the remainder of the dorsum white as in all the spotted varieties.

Pupa. The pupae are $1\frac{13}{32}$ inches long, $\frac{3}{8}$ of an inch in diameter, and are dark brown. A short tongue case is present, humped up in the middle, and touching at the slightly enlarged tip. The pupa is difficult to separate with certainty from that of *H. luscitosa* Clem., and is the same size and color.

Descriptions of some North American Micropezidae (Diptera).

By EZRA T. CRESSON, Jr., Philadelphia, Pennsylvania.

The following species were encountered while working on a revision of the Nearctic species of this family.

Micropeza abnormis new species.

Similar to the European *M. corrigiolata* (Linn.) differing most noticeably in having the antennae pale in both sexes, in the form of the claspers and in the color of the ovipositor.

♂, ♀. Black as follows: Head except face, bucca, lateral and posterior-oral margins; antennae; thorax except areas around coxae; tarsi; abdomen except male genital segments, claspers and first segment of ovipositor. Pale genitalic segments of male with median dark spot. Basal segment of ovipositor reddish to yellowish. Coxae, femora and tibiae pale except a disto-median and apical flexor spots on femora, and

apices of tibiae. Palpi and wing veins dark. Arista white; halteres pale.

Thorax and abdomen more or less cinerous but never densely so. Otherwise surfaces more or less shining; the face with usual silvery reflection.

Head relatively stout, almost as high as long (as 27:30); the postorbital swelling about .3 length of head. One notopleural bristle; no pectoral pile or pile on posterior surface of hind femur. Marginal setae on tergites and sternites not conspicuous but discernable in the female sex.

Claspers situated distad close to genital segments, small, scarcely as long as length of tergite V, turgid, their apices rather knob-like, curving mesad hood-like; their cephalic surface sparingly black pilose. Second vein almost straight in entering costa; third costal section .25 length of ultimate of vein IV; first posterior cell closed or nearly closed in margin.

Length: 4-4.5 mm.

Type.—Male; Baboquivari Mountains, ARIZONA, (R. H. Beamer; July 19, 1932), [Kans. Univ. Colln.]. *Paratypes*.—5 ♂, 4 ♀; with same data.

***Micropeza compar* new species.**

Structurally similar to *Micropeza turcana* Townsend (1892); but paler in color, and antennae of the male yellow.

♂. Pale species, with black to ferruginous as follows: Ocellar spot, broad lateral margins of vertex attenuated to foramen, median line on mesofrons, small foveal spot; four antesutural lines, the lateral one abbreviated cephalad but extending postsuturally, a paler median postsutural line extending onto scutellum, broad pleural band and metanotum. Tergites more or less brownish except at margins, the usual sinistral black spot on genital segment distinct. Arista black. Femora with more or less distinct disto-median extensor spot and their apices dark; apices of tibiae and all tarsi, black.

Head robust about 1.5 longer than high; pectoral and hind femoral pile very sparse; claspers large, broad, easily attaining base of abdomen, with apical fingers comparatively but slightly curved.

♀. Similar to the male but darker; antennae showing some infuscation but never intensely black and the third always pale at inferior margin; dark markings somewhat more extensive and the tergites showing very narrow pale margins; ovipositor segment dark basally.

Length: ♂, ♀ exclusive of ovipositor, 6 mm.

Type:—Male; Huachuca Mountains, ARIZONA, July 8, 1932,

(R. H. Beamer). [Kans. Univ. Colln.]. *Paratypes*.—1 ♂ ; 2 ♀ ; topotypical. 3 ♀ , Chiricahua Mountains, July 8, 1932; and 1 ♀ , Santa Rita Mountains, Arizona, July 7, 1932; (all R. H. Beamer).

***Micropeza atra* new species.**

Although the male of this species is unknown, I suspect, from the general habitus of this female that we have a species of the *turcana* group, and I further suspect that the male will prove to have the genitalic development of this group and that the claspers will be short of the *lineata* type.

I would hesitate to erect a new species on the female sex, but here we find one that is so distinct in having the thorax entirely black and more densely pollinose than is usual with the other species of this group. I cannot consider it a dark variety of *setaventris* because of its lacking the characteristic sternal setae of that species; and I do not think it can be an extreme, dark form of the *turcana* assemblage. It should not be confused with either *abnormis* here described or *nitida* Hennig, both belonging to other species groups.

Black, including antennae and arista, the former of which however may be brownish. Yellow to tawny are: the face, oral margin, mouthparts, prosternum, all coxae, halteres, very narrow apices of tergites. Fore femur black, pale basally; mid and hind femora tawny, darker basally and at extreme apices; tibiae and tarsi black. Wing veins brownish.

Head mostly shining to polished, with the usual cinereous postocellar area and the silvery facial reflections. Mesonotum rather densely cinereous, but not opaque, becoming shining towards humeri; pleura somewhat niveous. Scutellum and notopleura similar to mesonotum. Abdomen sparsely brown pollinose. Ovipositor polished.

Head robust about 1.5 as long as high. One notopleural bristle. Sternites narrow, inconspicuously setose laterally; ovipositor segment about as long as the abdomen. Third costal section about .5 as long as the ultimate of vein IV; first posterior cell open.

Length, 5 mm. excl. ovipositor.

Type.—Female: Flagstaff, Coconino County, ARIZONA. June 7, (H. S. Barber), [U. S. N. M., no. 27059].

***Micropeza setaventris* new species.**

Similar to *M. turcana* Townsend (1892) but postorbital

region and occiput black as are also the entire mesonotum and lower portion of pleura.

♂, Mostly black with following pale yellow to reddish: frontal orbits above; narrow area around ocelli; face, oral margin, notopleural stripe, supra-alar margin of mesonotum, pectal margin of sternopleura and halteres; more or less of abdomen beyond tergite II and claspers; coxae and legs except tarsi. Apical flexor spot on femora and apices of tibiae are dark.

Head robust, about 1.5 as long as high; claspers short, not nearly attaining base of abdomen, very strongly setose apically; hind femora with some flexose pile on posterior surface.

♀. Similar to the male but darker, the pale markings being reduced; abdomen except narrow margins of tergites, black; sternites with lateral margins bearing long setae which are longer than width of sternite, interspersed with smaller setae.

Length, ♂, ♀ exclusive of ovipositor, 2.7 to 4 mm.

Type.—Male; Fort Duchesne, Uintah County, УТАН, June 28, 1937, (G. F. Knowlton), [A.N.S.P. no. 6536].

Paratypes.—1 ♀ topotypical, with same data. 9 ♂, 11 ♀; Hooper, Weber County, July 15, 1937 (D. E. Hardy). 1 ♂; Huntsville, Weber County, July 10, 1937 (G. F. Knowlton). 1 ♂, 3 ♀; Smithfield, Cache County, July 11, 1937 (Smith & Harmston). 1 ♀; Richmond, Cache County, July 2, 1937, (G. F. Knowlton). 1 ♂; Bingham Canyon, Box Elder County, July 15, (Knowlton & Harmston), all in Utah.

***Micropeza texana* new species.**

Very similar to *M. producta* Walker (1849) but distinct in its trivittate mesonotum.

♂. Yellow to ferrugineous including palpi. Black to brown are: vertex and upper half of postorbital region and occiput except narrowly around ocelli, a narrow line including outer verticals, frons, foveae and antennae (arista pale but not niveous); a median antesutural and two postsutural stripes on mesonotum, the median one continuous narrowly caudad, the others continued broadly cephalad of the suture and attenuated caudad, scutellum except pale apex; pleural line including propleural scale and continuous with the black metanotum; a pectoral line; abdominal tergites except narrow margins; two spots on male genital segment; distomedian and apical rings on femora; broad apices of tibiae and all tarsi. Halteres dark in part.

More or less shining species but mesonotum and particularly

the pleura are distinctly cinereous, almost obscuring the ground color pattern; abdomen as usual somewhat grayish and subopaque. Venation rather dark.

Head slender and elongate, about twice as long as high (as 30:15); two notopleurals. Tergites II and IV slightly longer than V and VI. Claspers of male similar to those of *producta* but the fingers more slender; styli also similar to those of *producta* but the longer lateral prong is more slender and thorn-like. Second vein rather abruptly curving into the costa, apportioning the third costal section to about .3 of ultimate of vein IV. First posterior cell closed and petiolate.

Length, 4 mm.

Type.—Male; Corpus Cristi, Nueces County, TEXAS, (F. C. Pratt; April 13, 1906), [U.S.N.M., no. 27061]. *Paratype*.—1 ♂; topotypical with same data.

Taeniptera brunneipes new species.

Similar to *Calobata antennaepes* Say, 1823, but darker. Third antennal segment black; the usual disto-medial dark ring of mid and hind femora broader extending almost to base of these members; the mid and hind metatarsus almost as dark as the distal segments.

Type.—Male; Broad Creek, near Washington, DISTRICT OF COLUMBIA, May 19, 1922, (E. G. Vanatta; from Bald Eagle's nest), [A.N.S.P., no. 6288].

Paratypes.—1 ♂, 1 ♀; topotypical with same data. 1 ♂, 2 ♀; Swarthmore, Delaware County, PENNSYLVANIA, June 18, 1905, June 10, 1906, July 4, 1907, (E. T. Cresson, Jr.).

An Annotated List of The Butterflies of Nebraska (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

(Continued from page 9.)

19. *EUCHLOE AUSONIDES* (Bdv.) race *COLORADENSIS* (Hy. Edw.). Apparently confined to the western part of the state, where it flies on the pine-clad slopes. Sioux County, May 27 and July 10, 1900 (Wolcott) and June 5, 1919 (Leussler). The form found here is identical with that found in the Front Range, Rocky Mountains, Colorado. It differs from the Pacific Coast form in the smaller size, and more slender discal black spots of primaries.

20. *ZEGRIS OLYMPIA* (Edw.) race *ROSA* (Edw.). Rare. One specimen, Omaha, May 4, 1926, 1 from Omaha, May 24,

1929, and 1 from Plattsmouth, May 13, 1936. All 3 specimens are race *rosa*, distinguished by the very lightly marked apices in contrast with the more heavily marked apices noted in a long series from the sand dunes at Millers, Indiana. The late E. A. Dodge also reported collecting a specimen in Dodge County.

21. *ANTHOCARIS MEDEA* (Hbn.). I have seen no individuals actually on the wing in Nebraska. However, Dr. Wolcott found a specimen in a small collection of local butterflies made at Crete, which was said to have been captured there by the owner of the collection. Prof. Lawrence Bruner also reported having taken specimens near Omaha years ago.

22. *CATOPSILIA SENNAE* (L.). Typical *sennae* is rare in Nebraska. One specimen, near Omaha, September 19, 1914, closely resembles Texas specimens in the peculiar shade of yellow, flushed on secondaries with orange, and with the margins heavily edged with brown.

C. SENNAE form *EUBULE* (L.). Fairly abundant as a rule in the eastern part of the state. August and September. Omaha, Lincoln, Roca, Papillion and Kearney.

C. SENNAE form ♀ *PALLIDA* (Ckll.). Rare. One specimen, very pale creamy-white with heavy brown margins, taken in copula with a male of *eubule*, Plattsmouth, August 12, 1931. Another, pale greenish yellow with heavy brown margins, Omaha, September 29, 1933.

23. *C. AGARITHE* (Bdv.). One male, taken at Glencoe, Dodge County, by the late E. A. Dodge in the summer of 1876, and now in the writer's collection. Undoubtedly a straggler.

24. *C. PHILEA* (Joh.). One male, taken at Plattsmouth, August 12, 1931. Wings somewhat frayed, suggesting long flight. No doubt a straggler.

25. *AMYNTHIA MAERULA* (F.). One female taken at Omaha, September 20, 1921 (Leussler). This is not *clorinde* (Godt.) nor *maerula* (Hbn.). It agrees perfectly in size and shape with the figure of *maerula* (F.) in Seitz. It is a pale, dirty yellowish-white, quite different from the ground color of *clorinde* and it lacks the orange splash on the primaries of the

latter. The brown spot on primaries is identical with that in Seitz's figure, and the spot on secondaries is pale orange, circled with brown, not brown surrounded by orange as in *clorinde*. The under side is decidedly more green than *clorinde*, and the median spots are white bordered with reddish, altogether different from those of *clorinde*. It fits perfectly the description of the female *maerula* (F.) as set forth in the text in Seitz. The wings are somewhat frayed showing long flight. This species is not listed in Barnes and Benjamin's check list, and has not, so far as I am aware, been recorded from north of the Mexican border.

26. *KRICOGONIA LYSIDE* (Godt.). Another straggler. One battered specimen, taken at Roca, May 10, 1911.

27. *ZERENE CAESONIA* (Stoll). Fairly common in the eastern part of the state. The first brood in June, the second, in August and September. Has also been taken near Harrison, in the northwestern part of the state. The species is quite variable in the amount of orange flushing on secondaries and in the width and form of the black border on secondaries.

Z. CAESONIA gen. auctum. *ROSA* (M'Neill). Some splendid examples of this form found in September and October. Not all the individuals of the fall brood have the under side of secondaries pink, but most of the females have more or less. In some the under side of secondaries is solidly pink. Apparently form *rosa* is confined to the female sex, for although common among the females of the fall brood I have seen no males which I could refer to this form. The males of the fall brood which correspond to the female *rosa* in their tendency toward pink under side apparently are form *rosea* (Roeder). The pink on the under side of the males is confined, besides the laving at apex of primaries, to two streaks radiating from the base of secondaries, a series of irregular shaped small spots forming a band parallel to outer margin of secondaries, a similar series on primaries not quite reaching the inner margin. The edge of both wings is also narrowly margined with pink. On the upper side the black border of hind wings is replaced by narrow streaks which are broadened at the end of veins, forming an inverted T. A percentage of females of the fall

brood also possess all of these characters.

Z. CAESONIA ab. IMMACULSECUNDA Gunder. Two females, Omaha, October 3, 1928. One male, Omaha, September 29, 1933, has slight vestiges of marginal border, thus approaching *immaculsecunda*.

28. EURYMUS EURYTHEME (Bdv.). Common over entire state. The spring form of this species in the eastern part of the state is what has been known as *kecwaydin*, occasional specimens approaching *ariadne* in the restricted amount of orange on primaries. On the other hand many show almost as much orange as *amphidusa*, and intergrades of every degree are found. Albinic females (ab. *alba* Stkr.) also are found in the early generation.

E. EURYTHEME form AMPHIDUSA (Bdv.). One of our commonest butterflies. Wherever there is a clover or alfalfa field swarms of this butterfly will be found. June to October. Albinic females (ab. *alba* Stkr.) are now much more common than formerly. During August and September individuals of both sexes in which the ground color is pure yellow (ab. *flava* Stkr.) are not uncommon.

E. EURYTHEME form ERIPHYLE (Edw.). Found in the western part of the state. Specimens from Banner and Sioux Counties.

29. E. PHILODICE (Godt.). Fairly common in the eastern part of the state, though less so than the preceding species, and also less common than formerly. Albinic females (*alba* Stkr.) are occasionally found but are rather rare. Orange tinted individuals (ab. *hybrida* Stkr. = *luteitincta* Wolcott) are also found. The latter have been taken at Omaha, April 10, 1910; June 19 and 26, 1910; Blair, September 19, 1920.

E. PHILODICE gen. vern. ANTHYALE (Hbn.). Small, extremely narrow-bordered individuals have been taken at Omaha, Cedar Bluffs and Harrisburg.

30. E. ALEXANDRA (Edw.). This handsome species is found in the western part of the state. I have taken it in abundance in the vicinity of Harrison.

E. ALEXANDRA race EDWARDSII (Edw.). Rare. One specimen, Warbonnet Canyon, June 24, 1901. (Merritt Cary); 1, Monroe Canyon, August 18, 1912; 1, June 16, 1929.

31. EUREMA MEXICANA (Bdv.). Found in fair numbers throughout the state in late September and early October; occasionally also in June. Has been taken at Omaha, Lincoln, Roca, Meadow, Fremont and Harrison.

32. E. NICIPPE (Cram.). Rare. Single individuals have been taken at Omaha, Lincoln, Roca, Cedar Bluffs and McCook.

33. E. LISA (Bdv. and Lec.). Common over the greater part of the state. Apparently two broods, July to October. Occasional females are found which are very pale, almost white (form ♀ alba Stkr.). These albinic females I have found only in the fall.

34. DANAUS MENIPPE (Hbn.). Common over the entire state, particularly so in late summer and fall, although it makes its appearance as early as April and May. One dwarfed specimen of ab. *fumosus* (Hlst.) was taken at Omaha, July 8, 1910.

(To be continued.)

OBITUARY

DR. GEORGE HENRY FALKINER NUTTALL, emeritus professor of biology at the University of Cambridge and lately director of the Molteno Institute for Research in Parasitology, died on November 16, at the age of seventy-five years (*Science*, December 24, 1937, p. 581.)

Among his well-known publications are: On the rôle of insects, arachnids and myriapods as carriers in the spread of bacterial and parasitic diseases of man and animals (John Hopkins Hospital Reports VIII, 1899), Studies in relation to Malaria: The structure and biology of Anopheles (Journal of Hygiene, i-iii, 1901-03) with A. E. Shipley, The part played by *Musca domestica* and allied (non-biting) flies in the spread of infective diseases (Rept. to Local Gov't. Board of Public Health, &c., London n. s. no. 16, 1909) with F. B. Jepson, and Ticks, a monograph of the Ixodoidea, parts I and II, with Cecil Warburton, Cambridge, England, 1908, 1911. Many of his papers in this field appeared in *Parasitology*, a journal which he founded in 1908 and of which he was editor for twenty-five years.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the later within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—Barnes, H. F.—Recent advances in Science. Entomology. [Sci. Progr.] 32: 542-547. Betrem, J. G.—Modern Entomologisch Onderzoek. [Handel. Zev. Nederland.—Indisch Natuurw. Cong. Gehouden Batavia van 23-26 Oct. 1935] p. 539-549. Carpenter, J.—Daily fluctuations in insect populations in the prairie forest ecotone of No. Amer. [C. R. XII Congr. Internat. Zool.] 2: 969-980, ill. Cowley, J.—Quantitative methods of local entomofaunistic survey. [9] 71: 8-12. Hayward, K. J.—Further records of insect migration in the Argentine republic. [9] 71: 6-7. Hincks, W. D.—A plea for better citation of synonymy. [8] 74: 13-14. d'Orchymont, A.—Changements de noms de genres. L' "Opinion" 11. [33] 77: 423-432. Schneider, H.—Fangreisen in Uruguay. La Sierra de las Animas. [17] 55: 97-102; 109-112; 128-131, ill.

ANATOMY, PHYSIOLOGY, ETC.—Albertson, G. W.—A morphological study and comparison of the mouth parts of some Hymenoptera. [Contrib. Biol. Lab. Catholic Univ. Am.] 1921: 5-59, ill. Anon.—Chromosomes of Pyrgomorphiinae. [Cur. Sci.] 6: 307. Anon.—The occurrence of v-shaped centrioles in the spermatocytes of some neuropteran insects. [Cur. Sci.] 6: 307. Becker, E.—Eine gut analysierbare pigmentablagerung in liesegangschen ringen bei insekten. [Forsch. und Fortsch.] 14: 9-11, ill. Claus, A.—Vergleichendphysiologische Untersuchungen zur Okologie

der Wasserwanzen mit besonderer Berichtigung der Brackwasserwanze. [89] (All. Zool.) 58: 365-432, ill. **Barth, R.**—Herkunft, Wirkung und Eigenschaften des weiblichen sexual duftstoffen einige Pyraliden. [89] (All. Zool.) 58: 297-329, ill. **v. Frankenberg, G.**—Die erste Füllung der Tracheen bei *Culex* und *Corethra*. [89] (All. Zool.) 58: 175-180, ill. **Ghidini, G. M.**—Le ghiandole della seta del *Bombyx mori* nel periodo maturativo e postmaturativo. [Bull. Zool., Italy] 8: 193-209. **Grandi, G.**—Morfologia ed etologia comparate di Insetti a regime specializzato. XII. *Macrosiagon ferrugineum flabellatum*. [Boll. Ist. Ent. Bologna] 9: 33-64, ill. **Guibe, J.**—Etude de l'aile chez *Apterina pedestris* (*Sphaerocer.*). [Bull. Soc. Z. France] 61: 266-273, ill. **Guye, C. E.**—Sur le bruit que produit un essaim d'insectes bourdonnants. [Arch. Sci. Phys. Nat.] 142: 53-70, ill. **Hebredey, K. F.**—Beitrag zum Bau des Subelytralraumes und zur Atmung der Coleopteren. [46] 33: 667-734, ill. **Henke, K.**—Versuch einer vergleichenden morphologie des flugelmusters der Saturniden auf entwicklungs-physiologischer grundlage. [Nova Acta Leopoldina.] 4 (18): 137 pp., ill. **Hilton, W. A.**—Nervous System and Sense Organs. LXV.—Isoptera. LXVI.—Mallophaga. LXVII.—Anoplura. LXVIII.—Corrodentia. LXIX.—Embiidina. [13] 29: 88-99, ill. **Janda, V.**—Beitrage zur Kenntnis des Umfarbungsprozesses bei "*Chrysopa vulgaris*" (*Neuropt.*). [C. R. XII Congr. Internat. Zool.] 2: 1463-1471. **Johnson, M. W.**—A study of the nucleoli of certain insects and the crayfish. [Journ. Morph.] 62: 113-139, ill. **Kangas, E.**—Ein Fall von anomaler Fuhlerbildung bei *Comber connata* (Hymen., Tenthredin.) [Ann. Ent. Fenn.] 3: 150-153, ill. **Krey, J.**—Untersuchungen zur Okologie und Physiologie der Trichopterenlarven. II. Teil. Über die Bedeutung der Wasser stoffionkonzentration für die Physiologie von Trichopterenlarven verschiedener ökologischer Valenz. [89] All. Zool.) 58: 201-224, ill. **Langner, E.**—Untersuchungen an Tegument und Epidermis bei Diplopoden. (Mit Beiträgen zu Sehorganen und Hautdrüsen). [89] Abt. (Anat.) 63: 483-541, ill. **Lengerken, H. V.**—Studien über die Lebensbedingungen der Silphini (Coleo.). [46] 33: 654-666, ill. **Lison, L.**—L'appareil pulsatile du tube de malpighi chez *Tenebrio molitor*. [Soc. Roy. Zool. Belgique] 67: 41-49, ill. 1936. **Mahdihassan, S.**—Die Struktur des Stocklacks und der Bau der Lackzelle. [46] 33: 527-554, ill. **de Mello-Leitao, C.**—see under Arachnida. **Millot, J.**—Le sens du gout chez les Araignées. Metamerisation et

musculature abdominale chez les Araneomorphes. [Bull. Soc. Z. France] 61: 27-38; 181-204, ill. **Mosebach-Pukowski, E.**—Über die Raupengesellschaften von *Vanessa io* und *V. urticae*. [46] 33: 338-380, ill. **Muschamp, P. A. H.**—Gynandromorphism in Diptera [21] 50:2. **Naumann, F.**—Zur Reduktion der Saugrüssels bei Lepidopteren und deren Beziehung zur Fluegelreduktion. [89] (Syst.) 70: 381-420, ill. **Park, T.**—A note on the size & composition of old *Tribolium confusum* populations. [90] 72: 24-33. **Poll, M.**—Note sur les tubes de Malpighi des larves de *Tenthredinoides*. [33] 77: 433-442, ill. **Rietschel, P.**—Bau und Funktion des Wehrstachels der Staatenbildenden Bienen und Wespen. [46] 33: 313-357, ill. **Scott, A. C.**—Paedogenesis in the Coleoptera. [46] 33: 633-653, ill. **Sen, Sirsir.**—On the mechanism of feeding in blood-sucking Acari, and its relationship with that of blood-sucking Diptera. [C. R. XII Congr. Internat. Zool.] 3:1584-1587, ill. **Sioli, H.**—Thermotaxis und Perzeption von Warmestrahlen bei der Bettwanze (*Cimex lectularius*). [89] (All. Zool.) 58: 284-296, ill. **Smith, S. G.**—Cytology of spruce sawfly and its control in eastern Canada. [31] 141:121. **Spotkov, E. M.**—The centriole in the parthenogenetic and fertilized eggs of *Habrobracon juglandis*. [Journ. Morph.] 62: 49-89, ill. **Stage, Gjullin & Yates.**—Flight range and longevity of flood-water mosquitoes in the lower Columbia River valley. [12] 30: 940-945, ill. **Svajkovskij, I.**—Aerodynamische eigentümlichkeiten der insekten. [Comptes Rendus Acad. Sci. U. S. S. R.] 17: 77-80, ill. **Tiensuu, L.**—Anomalous Mayfly Individuals (Ephemera). [Ann. Ent. Fenn.] 3: 217-223, ill. **Vandel, A.**—L'évolution de la parthogenese naturelle. [C. R. XII Congr. Internat. Zool.] 1: 51-64. **Verhoeff, K. W.**—Die Perioden der Hautungs Zeit bei den Chilognathen. [46] 33: 438-444.

ARACHNIDA AND MYRIOPODA.—**Clark, A. H.**—On some Onychophores from the W. Indies & Cent. Amer. [50] 85: 1-3, (*). **da Fonseca, F.**—Remarks on the tick *Spelaerhynchus latus*. [C. R. XII Congr. Internat. Zool.] 3: 1580-1583. Occurrence of a new subsp. of *Ixodes ricinus* in the state of S. Paulo, Brazil. [C. R. XII Congr. Internat. Zool.] 3: 1588-1592, ill. "*Ixodes amarali*," n. sp. [C. R. XII Congr. Internat. Zool.] 3: 1593-1596, ill., (S). N. gen. & spp. of Acari Laelaptidae from Brazilian rodents. [C. R. XII Internat. Congr. Internat. Zool.] 3: 1597-1615, ill. **Gerhardt & Kastner.**—Ordnung der Arachnida: Araneae

Echte spinnen webspinnen. [Kukenthal & Krumbach Handb. Zool.] 3, 2 (2): 394-496, ill. **Holm, A.**—Notes on the spider fauna of East Greenland. [83] 29 (B12) 1-2. **Jacot, A. P.**—Some new western N. Carolina moss-mites. [10] 40: 10-15. **Lundblad, O.**—Fünfte mitteilung uber neue wassermilben aus Santa Catharina in Sudbrasilien. [34] 120: 280-293. **de Mello-Leitao, C.**—La distribution des Arachnides et son importance pour la zoogeographie Sud-Americaine. [C. R. XII Congr. Internat. Zool.] 2: 1209-1216, ill. Distribution et Phylogenie des Faucheurs Sud-Americaines. [C. R. XII Congr. Internat. Zool.] 2: 1217-1228, ill. **Schulze, P.**—Durch Raummangel bedingte Hemmungserscheinungen an einzelnen Korperteilen in der Ruhenymphe der Ixodiden und das Auftreten entsprechender Bildungen als Art- und Gattungsmerkmal. [46] 33: 445-495, ill. **Verhoeff, K. W.**—Ungewöhnliche Diplopodenhautungen und ihre phylogenetisch Bedeutung. [46] 33: 290-296.

THE SMALLER ORDERS OF INSECTS.—**Batthasar, V.**—Arthropleidae eine neue familie der Ephemeropteren. [34] 120: 204-230, ill. (*). **Blair, K. G.**—Mayflies: A consideration of anglers' & entomologists' claims to a popular name. [8] 74: 17-19. **Cowley, J.**—The penis of Chlorocyphidae (Odonata) as a group character. [36] 86: 1-18, ill. **Hilton, W. A.**—Campodea from Mexico. [13] 4: 100-104, ill. **Keler, S.**—Über einige neue und interessantere Mallophagen des Deutschen Entomologischen Instituts in Berlin-Dahlem. [109] 4: 312-324, ill. **Needham, J. G.**—The nymph of *Pseudoleon superbus* (Odonata: Libellulidae). [13] 4: 107-109, ill. **Priesner, H.**—Thysanopterologica V: Zwei neue Phlaeothripiden. [109] 4: 347-350 (S). **Scholzel, G.**—Die embryologie der Anopluren und Mallophagen. [Zeitschr. Parasitenk.] 9: 730-770, ill. **Thompson, G. B.**—A brief survey of the spp. of Mallophaga described from (3) Procellariiformes and (4) Pelecaniformes. [75] 1: 23-25. **Wagner, J.**—Aphaniptera aus Sud-Peru sowie bemerkungen über die fam. Stephanocircidae. [Zeitschr. Parasitenk.] 9: 698-716, ill. (*). **Werneck, F. L.**—Algumas especies e sub-species novas de Anoplura. [111] 32: 391-410, ill.

ORTHOPTERA.—**Lizer y Trelles, C. A.**—Memoria de la Comision Central de Investigaciones sobre la Langosta. [Rep. Argentina Min. Agric. La Nacion] 1937: 126 pp., ill. **Rehn, J. W. H.**—A new species of *Tonkinacris* from Szechuan (Acrid.). [1] 63: 427-430.

HEMIPTERA.—**DeLong & Caldwell.**—Check list of the Cicadellidae of America, North of Mexico. [Ohio State University]. 93pp. **Ferris, G. F.**—Contributions to the knowledge of the Coccoidea VI. [Microentomology] 2: 103-122, ill. **Hase, A.**—Besonders sinnfällige unterschiede zwischen bettwanze und schwalbenwanze. [34] 120: 271-273, ill. **Oman, P. W.**—A contribution to the classification of S. Amer. Agallian leafhoppers. [Ann. Carnegie Mus.] 25: 351-460, ill. (k*).

LEPIDOPTERA.—**d'Almeida, R. F.**—Notes synonymiques sur les Lepidopteres Americains. [Lambillionea] 1937: 251-257. **Clarke, J. F. G.**—A n. sp. of *Azenia* from California (Noctu.). [38] 36: 65-67, ill. **Comstock & Dammers.**—Notes on the early stages of three California moths. [38] 36: 68-78, ill. **Fischer, C.**—*Erebia manto* (Pyrrha) et ses principales variations. [L'Amateur Papillons] 8: 276-280. **Fletcher, T. B.**—Sur quelques insectes qui emigrent. [L'Amateur Papillons] 8: 283-288. **Forbes, W. T. M.**—Butterfly Geography. [Proc. R. Canad. Inst.] (3a), 2: 5pp. **Gerasimov, A.**—Bestimmungstabelle der Familie von Schmetterlingsraupen. [60] 98: 281-300, ill. **Hasebroek, K.**—Zum Problem der historischen Rassenbildung bei den Schmetterlingen unter Mitwirkung der "Vererbung erworbener Eigenschaften." (V. e. E.). [17] 55: 117-123; 133-136, ill. **Mosebach-Pukowski.**—see under Anatomy. **Richards, A. G.**—On naming "Aberrations" of Lepidoptera. [Ward's Ent. Bull.] 5: No. 3. **Schauss, Wm.**—N. spp. of moths of the family Notodontidae in the U. S. Nat. Mus. [50] 84: 563-584, (S). **Sick, H.**—Zur kenntnis der systematik der Uraniidae, unter Berücksichtigung der tympanalorgane. [34] 120: 273-280, ill. 1. Beitrag zur Kenntnis der Uraniidae [17] 55: 103, (S*). **Wailly, J.**—Des causes de la conformation et de la constitution des ailes des papillons, Rhopaloceres en particulier. [L'Amateur Papillons] 8: 288-291. (Cont.)

DIPTERA.—**Barrett, W. L.**—Natural dispersion of *Cochliomyia americana*. [12] 30: 873-876. **Cerqueira & Antunes.**—*Haemagogus tropicalis*, a n. sp. from Para, Brazil (Culic.). [10] 40: 1-9, ill. **da Costa Lima, A.**—Chave das especies de Culicoides da regio neotropical. [111] 32: 411-422, ill. (*K). **da Fonseca, F.**—*Flebotomus limai*, n. sp. [C. R. XII Congr. Internat. Zool.] 2: 1497-1498, ill. (S). **Hennig, W.**—Übersicht über die Arten der Neriiden und

uber die Zoogeographie dieser Acalyptraten-Gruppe. [60] 98: 241-280, (k*). **Krober, O.**—Ein Beitrag zur Kenntnis der Omphraliden (Scenopiniden). [60] 98: 211-231, ill., (k*). **Lacour, P.**—Etude biologique de la race rurale de *Culex pipiens*. [Arvernia Biol. Clermont] Faw. 19: 119, ill. **de Meijere, J. C. H.**—Die Larven der Agromyzinen. Dritter Nachtrag. [101] 1937: 167-243. ill. **Morisset & Beaulne.**—see under Hymenoptera. **Prado, A.**—On Sabethoides intermedius & Megarhinus bambusicola, two spp. of mosquitoes breeding in bamboos. [C. R. XII Congr. Internat. Zool.] 2: 1509-1513, ill. (S). **Thienemann, A.**—Chironomiden aus Lappland. III. Beschreibung neuer Metamorphosen, mit einer Bestimmungstabelle der bisher bekannten Metriocnemuslarven und -puppen. [60] 98: 165-185, ll. **Townsend, C. H. T.**—Manual of Myiology. Pt. 5, 232pp.

COLEOPTERA.—**Arrow, G. J.**—Coleopterorum Catalogus. Pars 156. Scarabaeidae: Dynastinae. 124pp. **Banninger, M.**—Über sudamerikanische Taenio-lobus-Arten (Carab.). [2] 33: 320-322. **von Bloeker, J. C.**—The status of *Phyllophaga cribrosa* (Scarab.). [38] 36: 83-88. **Cazier, M. A.**—A revision of the Pachydemini of North America (Scarabae.). [13] 29: 73-87, ill. (k*). **von Dalla Torre & van Emden.**—Coleopterorum Catalogus. Pars 153. Curculionidae: Brachyderinae II. 133-196. **Fisher, W. S.**—A new anobiid beetle from Alaska. [91] 28: 26-27. **Guignot, F.**—Contribution a l'etude des Laccophilinae (Dytisc.). [25] 42: 137-143, ill. (k*). **Hinton, H. E.**—On the Psephenidae collected by Dr. Fritz Plaumann in Brazil. [107] B, 6: 9-13, ill. (*). **Kleine, R.**—1. Nachtrag zum Cat. Col. Jung-Schenkling Pars 89 Brenthididae 2. ed. [2] 33: 316-320. **Kuntzen, H.**—Ueber *Arrhenodes minutus*, eine literatur und zitationsstudie ueber einen nordamerikanischen Brenthiden. [Mitt. Zool. Mus. Berl.] 22: 190-197. **Lesne, P.**—Notes rectificatives et synonymiques sur certain Bostrychides. [25] 42: 238-239 (*). **Lotte, F.**—Buprestide nouveau de l'Amerique meridionale. [33] 77: 420-422, ill. **Mequignon, A.**—Observations sur quelques noms de genre. II. Synonymies proposees par Embrick Strand. [25] 42: 276-279. **d'Orchymont, A.**—Contribution a l'etude des Palpicornia, X. [33] 77: 457-475, (S). (see under General). **Paulian P.**—Les larves des Staphylinidae Cavernicoles. [Arch. Zool. Exp. gen.] 79: 381-407, ill. **Pic, M.**—Coleopterorum Catalogus. Pars 155. Dasytidae: Dasytinae.

130 pp. **Schenkling & Marshall**.—Coleopterorum Catalogus Pars 154. Curculionidae: Rhadinosominae, Trachodinae Raymondionyminae 1-4; 1-6. **Scott, A. C.**—(see under Anatomy). **Ting, P. C.**—A n. sp. of *Dyslobus* with notes on vestigial hind wings & genitalic characters in the Otiorynchid weevils. [38] 36: 79-82, ill. **Uham, E.**—Übersicht über die ersten Gattungen der Uroplatini (Chrysomel.). [2] 33: 336-337, (Sk*). Amerikanische Hispinen aus dem Zool. Mus. Univ. Berlin. Subf. Amplipalpini. [Mitt. Zool. Mus. Berlin] 22: 198-213, ill. (S*). **Voss, E.**—Über Arten und Gattungen der Unterfamilien Belinae, Rhynchitinae und Attelabinae (Curculion.). [60] 98: 199-209, ill., (S*). **Verhoeff, K. W.**—Zur biologie der *Scutigera coleoptrata* und über die jüngeren larvenstadien. [94] 150: 262-282, ill.

HYMENOPTERA.—**Bequaert, J.**—The American *Polistes* with prepectal suture. Their structural characters, distribution and variation. [30] 3: 171-205, ill. (k*). **Cole, A. C.**—Suggestions concerning taxonomic nomenclature of the hymenopterous family Formicidae and descriptions of three new ants. [Amer. Midl. Nat.] 19: 236-241, ill. **Donohoe, H. C.**—Nests of leaf-cutting bees in dried figs. [10] 40: 15-16. **Eidmann, H.**—Biologie und wirtschaftliche Bedeutung der Blattschneiderameise "*Atta sexdens*." [C. R. XII Congr. Internat. Zool.] 3: 2295-2335, ill. (S). **Filho, O. M.**—Contribuicao ao conhecimento dos insectos que vivem em figos do Brasil. Uma nova especie de *Eupistrina* (Agaon.). [111] 32: 460-468, ill. **Goetsch, W.**—Die entstehung der "soldaten" im Ameisenstaat. [88] 25: 803-808, ill. **Mitchell, T. B.**—A revision of the genus *Megachile* in the nearctic region. Part 8. Taxonomy of the subgenus *Chelostomoides*, addenda and index (*Megachil.*). [1] 63: 381-426. **Morisset & Beaulne**.—Insectes parasites recoltes dans nos elevages au cours de l'annee 1936-37. [98] 65: 42-44. **Peck, O.**—The male genitalia in the Hymenoptera, especially the family Ichneumonidae. II. Taxonomy of the ichneumonid genitalia. [Can. Jour. Res.] 15: 253-274. **Ross, H. H.**—The nearctic species of *Pikonema*, a gen. of spruce sawflies (Tenthredin.). [10] 40: 17-20, ill. (k). **Weyrauch, W.**—Zur Systematik und Biologie der Kuckuckswespen *Pseudovespa Pseudovespula* und *Pseudopolistes*. [89] (Syst.) 70: 243-289, ill.

SPECIAL NOTICES.—Die Palearktischen *Colletes*-arten.—J. Noskiewicz. Prace Nauk. Wydaw. Towarz. Nauko We Lwowie. 529 pp., ill.

GENETICS AND THE ORIGIN OF SPECIES. By THEODOSIUS DOBZHANSKY, Professor of Genetics, California Institute of Technology. Columbia University Press, New York, N. Y. pp. xvi + 364. 22 illus. \$3.60.

This volume presents an astonishingly lucid account of those facts and theories of modern genetics that bear upon the mechanism of organic evolution. Gene mutations and the genetically and cytologically verifiable rearrangements occurring in the structure of the chromosomes are shown to supply the raw material for evolution. The study of these changes together with the study of the effects of geographical isolation and of natural selection appears to bring us much closer than we have ever been before to an understanding of the way in which evolution has come about. The statement frequently heard a few years ago, that genetics deals only with the inheritance of abnormalities occurring in laboratory animals can no longer be successfully defended. Much of the present volume deals with the genetical analysis of differences between various species and races of insects as they are found in nature, combined with careful studies of the geographical distribution of the forms involved. One cannot consider the facts here so clearly presented without feeling that genetics is making a real contribution to our understanding of the problem of race and of species formation. At present the degree of difference recognizable in the structure of the chromosomes is not always correlated with the degree of differentiation in the systematic rank of the forms in question, nor can chromosome morphology or chromosome number be always so correlated. Nevertheless there is also so much information of a positive nature that there is at present a greatly improved outlook for the hope that "the tracing of phylogenetic relationships is to become at long last an exact procedure instead of the expression of the opinion of the particular investigator." To those interested in phylogenetic and in systematic studies this book will be of especial interest. Systematists have developed some fairly definite ideas regarding the evolution of races and species and regarding the rôle of isolation in effecting evolutionary differentiation. These ideas, which they have developed, often through a kind of intuitive understanding of their observations, are extensively confirmed and augmented by the rigorous analytic methods of genetics, albeit expressed in a different terminology and based largely on a different type of evidence. In addition, genetical theories offer a good explanation of the evolution of non-adaptive racial and specific characteristics, of those features so

much used for diagnostic purposes in taxonomy but which have always been inexplicable on the basis of natural selection and which have always been an embarrassment to all good Darwinians.—R. G. SCHMIEDER.

SOURCE BOOK OF BIOLOGICAL TERMS. By AXEL L. MELANDER. The College of the City of New York, 160 pp. 8vo. 1937. \$1.10.—This book well covers the ground suggested by its title. The author, introducing this book says: "One of the disciplines of the study of Biology is the acquaintance of a technical vocabulary. Each term incorrectly used becomes responsible for an ever widening circle of faulty repetition. The language of Biology seems strange to beginning students because most of the terms used are of Greek or Latin extraction but when such words are given a meaning the student realizes that nomenclature is a help and not a hindrance to his study." An idea of the ground covered in this book can be gained from a perusal of the table of its contents. Here we find chapters on biological nomenclature, the romance of taxonomic names, classical sources for names, evolution of word meanings; how words originate, their phylogeny, homologies and how they change in passing from one language to another; words of uncertain and mistaken derivations; how some words are derived from ancient customs, biological beliefs, divinations and early anatomical conceptions; words based on unnatural history, on color and terms relating to education. Further we have chapters on accentuation, pronunciation of taxonomic terms, mispronunciations, suffices, prefixes, plurals, the Greek alphabet, derivations of biological terms and lastly one on some pertinent definitions. All this we have in sixty-one pages. In part two of ninety-five pages is an alphabetical list of many components of biological vocabulary.—E. T. CRESSON, Jr.

PROCEDURE IN TAXONOMY. By EDWARD T. SCHENK and JOHN H. McMASTERS. Stanford University Press. 72 pages, 8 vo. Publication date, February 26, 1936. Price \$2.00.—This book was prepared to supply the student as well as the professional systematist with the principles of taxonomy. The contents are grouped into chapters on systematic categories, types, descriptions of new species, specific names, synonyms, storage of type material, Latin names and abbreviations; with an appendix giving the rules and opinions of the International Commission on Zoological Nomenclature. The title "Procedure in Taxonomy", however, gives rather an erroneous im-

pression of what one would expect. One might say that Procedure in Paleontological Taxonomy would have been a better title, as palaeontology is its background, and many of the illustrations, forms and references savor of this science. However, judging from the poorly constructed descriptions and revisions one finds in the great mass of the literature of today, many students and authors of zoology will find very profitable reading in this little book. A commendable feature is the index to the rules and opinions of the zoological commission. This alone enhances its value to zoological taxonomists. The writer of this notice does not concur in many of the recommendations, and there are many to which others will take exception; but on the whole these are of rather minor importance as compared with the general commendations.—E. T. CRESSON, Jr.

THE MALE GENITALIA OF ORTHOPTEROID INSECTS. By R. E. SNODGRASS. Smithsonian Miscellaneous Publications, Vol. 96, No. 5. Pp. 1-107, 42 figs. Washington, September 25, 1937.—The Introduction, of 11 pages, begins: "The order Orthoptera . . . includes at least the Mantoidea, Blattoidea, Tettigonioidea and Acridioidea. The group unity of these forms is attested in the structure of the male reproductive system by the compounding of the so-called accessory genital glands that appear, in the adult condition, to arise from the inner end of the ductus ejaculatorius, but which in their development are outgrowths of the mesodermal coelomic ampullae into which the vasa deferentia discharge. Closely associated with the true Orthoptera by the same feature of the male genitalia are the Termitidae, Embiidae, Grylloblattidae, Phasmatidae and probably the Zorotypidae. On the other hand, the Plecoptera and the Dermaptera would appear to be distinct orders having no close relationship with the Orthoptera, since in each of these groups the male reproductive system is specialized in its own way, and shows none of the features characteristic of the orthopteroid insects." Following this is a summary of the development of the male gonads, based largely on Nelson's work on *Melanophus*, of the male genital ducts and of the external genitalia. Then nine sections are devoted to the Isoptera, Embioptera, Zoraptera, Grylloblattoidea, Phasmatoidae, Mantoidea, Blattoidea, Tettigonioidea and Acridioidea respectively, those on the Blattoidea (22 pp.) and the Tettigonioidea (38 pp.) being the most extensive. In each section the previous literature is summarized and original observations and illustrations by the author are added.—P. 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—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

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ENTOMOLOGICAL NEWS

APRIL, 1938



Vol. XLIX

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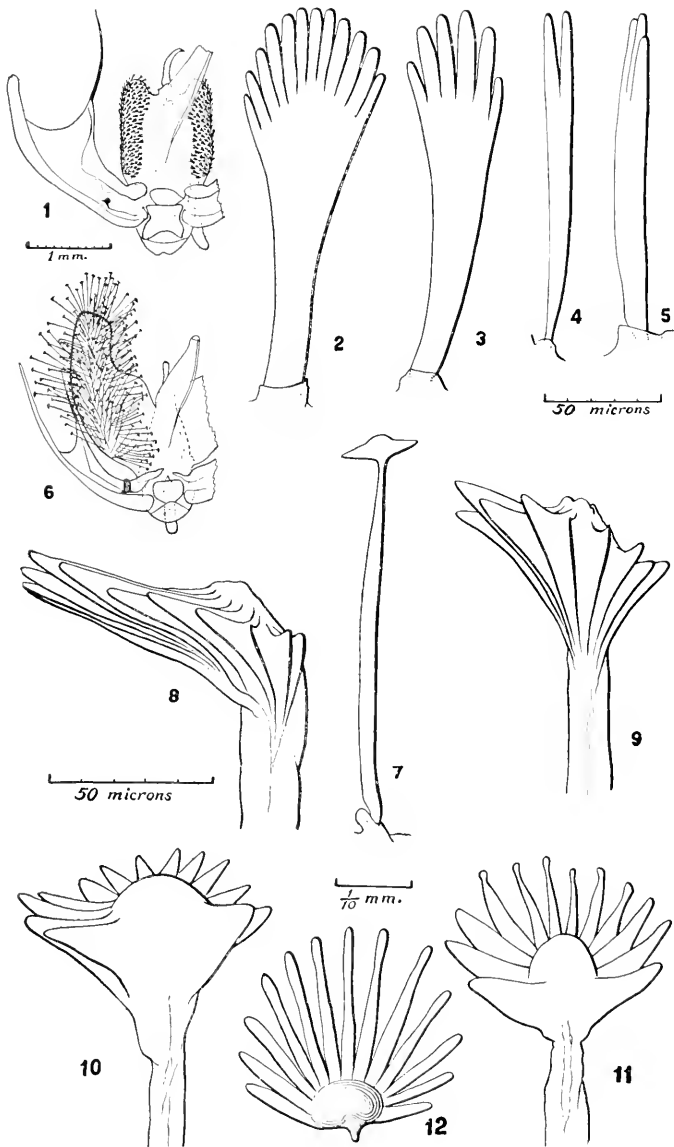
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SETAE OF MALE GENITALIA OF AMYNA - RICHARDS.

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No. 4

The Remarkable Setae on the Male Genitalia of the North American Species of the Genus *Amyna*. (Lepidoptera: Noctuidae).

By A. GLENN RICHARDS, Jr., Biology Department, College of
the City of New York.

(Plate I.)

The modified setae with which this paper is largely concerned are confined to the lateral lobes of the tegumen.¹ These lobes (figs. 1 and 6) arise from the entire lateral surface of the tegumen (ninth abdominal tergite) and extend from the base of the uncus (tenth abdominal tergite) to the ventral edge of the tegumen at the point of its articulation with the vinculum (coxosternal arc of ninth abdominal segment) and its appendage, the harpe. In *Amyna octo* they are relatively narrow (fig. 1) but in *A. bullula* they are greatly developed processes and appreciably larger than the harpes (fig. 6).²

The setae on the lateral lobes of the tegumen of *Amyna octo* are about 160-180 in number on each side but are so crowded and overlapping that a more accurate counting cannot be made readily. In shape they vary from nearly simple, albeit somewhat swollen and distally flattened forms (not illustrated), through apically bifurcated forms (fig. 4) to ones with numerous finger-like processes up to fourteen in number (figs. 2 and 3). In size these fimbriated setae vary in length from about 140-160 μ from the setal socket to the distal end of the longest fimbriae; in breadth they vary from about 3-16 μ at the socket to from about 7-60 μ at the broadest point near the apex, the breadth being correlated with the number of fimbriae on the seta. The individual fimbriae vary considerably, being from about 3-8 μ broad at the broadest point and about 15-40

¹ Many normal simple setae, long or short, are found on the harpes, especially on the apical part of sacculus, and on the uncus.

² A formal description of the general structure of the male genitalia is given near the end of this paper.

mu long. These fimbriated setae have the processes all in a single row (plane) across the apical end of the distally flattened seta (fig. 5). On the whole these forms are found scattered about on the lobes of the tegumen but there is a noticeable tendency for the ones with the fewer prongs to occur along the outer margin and the many-pronged ones to occur away from the margin.³

The setae on the lateral lobes of the tegumen of *Amyna bullula* can be counted with considerable accuracy due to the greater area concerned and to the distinctive apical modifications (except that a few setae are broken off from all mounts). The number present on each of four lobes (both sides of two specimens) varies from about 185 to 200—only slightly more than on the smaller lobes of *A. octo*. In size they are rather constant. They average slightly more than one-half a millimeter in overall length, about 14mu in breadth at the base, about 22mu in breadth at the greatest diameter at the center of the 'stalk', and then seem to contract to about 8mu just before the apical structure.⁴ The apical structure has a maximum width of about 90mu across the longest flanges; the apical dome is about 20-30mu broad and 7-9mu high⁴; the flanges are in a graded series of lengths varying from about 15-50mu. In shape these setae seem to be fairly constant. They appear in profile as distinctly mushroom-shaped when viewed from 'front or rear' (fig. 7), or with varying degrees of asymmetry when viewed from the side or some other angle (figs. 8 and 9). These setae are made up of a long swollen basal stalk which seems to decrease in diameter distally⁴, and which is crowned with an elaborate apical structure (figs. 7-12). This apical structure is composed of a central dome-like area of rather thin chitin which is usually quite rounded but sometimes somewhat

³ Compare Pierce, 1914, figure of setae on ovipositor of female of *Theria rupicaprararia*, and Ferris, 1934, fig. 2N (seta from coccid).

⁴ The chitinous walls of the setae are more or less delicate in this area and frequently have a wrinkled appearance which may possibly indicate shrinkage or partial collapse either in drying or during the process of preparing the macerated mount from the dried specimens. The tendency of some flanges to appear thicker at their tips, and the variation and tendency towards ribbing of the apical dome may also possibly be due to such shrinkage.

wrinkled or angulate⁴, and from which there radiate out on three sides from 12-14 triangular blunt-tipped flanges (figs. 8-12). Viewed 'from the side', the tip of one of these remarkable setae appears as a dome with long triangular flanges extending to one side and shorter flanges extending towards the observer (fig. 8). Viewed from more or less 'in front or rear' the setae seem to have varying degrees of asymmetry depending on the angle from which they are viewed (fig. 9). Viewed from a right angle to what I have called the 'side view' the setae may appear to be perfectly symmetrical (figs. 10-12). In other words, they are bilaterally symmetrical but not radially symmetrical. No perfect view straight down onto the tip of one of these setae was obtained but figure 12 approaches such rather closely and shows the relative lengths of the flanges more accurately than any of the other figures.

One naturally wonders what function these strange setae of *Amyna bullula* may have. Being a part of the male genital armature it is not unreasonable to assume some connection with copulation. They do not have the general external characteristics of scent-producing or scent-carrying setae (see papers by Eltringham and Snodgrass), and being so extravagant in structure one would like to think them more than mere tactile receptors. But with no knowledge of the nature of the cytoplasmic contents of the setae and no knowledge of the type of innervation it would be unwise to guess. Unfortunately, aside from its rarity, *Amyna bullula* is a rather small moth and the lobes bearing these setae are normally retracted into the end of the abdomen except during the act of copulation. It would seem no simple matter to study the function of these setae even if ample living material were available.

Only two species of the genus *Amyna* Guenée are found in North America north of Mexico.⁵ *A. octo* Guenée is of almost

⁵ The genus *Amyna* Guenée is listed at present in the subfamily Erasitriinae (Acontiinae), following Hampson (1910), but would seem better placed in the subfamily Acronyctinae (Apatelinae) despite the moderately well developed vein M_2 in the hind wing — or at least the two North American species seem acronyctine. I have already pointed out elsewhere that the North American species of *Amyna* have an unique development in the thoracic tympanum, and in that paper suggested that the genus might better be considered as an acronyctine (Richards, 1933).

cosmopolitan distribution. It is fairly common in the southern states and extends northward along the Atlantic coast to New Jersey. *A. bullula* Grote is a rare species recorded from Georgia to Texas and southward into Central America. The specimens of both species used in this study were collected by the author at light at Athens, Georgia, August to October, 1926-1929.

The male genitalia of *Amyna octo* and *bullula* (figs. 1 and 6) are symmetrical; uncus of moderate length, pointed and bearing a few simple setae; anal tube rather long and with a weak narrow subscaphium; tegumen with highly developed lobes⁶ arising from the entire lateral margin and bearing specially modified setae (see above); vinculum narrow and rounded or slightly excavated at tip; juxta large; transtillae short and broad; harpes conspicuously divided into two parts: 1) a long sacculus which projects beyond the rest of the appendage and which is clothed, especially near the tip, with many long simple setae, and 2) an anterior margin (cucullus) terminating in a long simple seta; these two sclerotized parts of the harpe are connected by a rather broad area of membrane, near the basal part of which is located the small clasper; aedoeagus with spined vesica.

I have slides of the genitalia of representative species of the majority of the North American genera of Noctuidae, and so

Incidentally, certain North American species, placed in the *Erastrinae* by Hampson (1910), have already been moved to the *Acronyctinae*. His "*Amyna teratophora* H.-S.", "*Bryocodia lepidula* Grt.", and "*Bryocodia avirida* Sm." have all been placed in the acronyctine genus *Agriopodes* Hampson by Barnes and McDunnough (1917). I feel inclined to suggest for *Amyna octo* Guenée and *A. bullula* Grote a position somewhere in the neighborhood of *Cerma* Hübner or *Agriopodes* Hampson, although I realize the uncertainty of much of the generic grouping in the *Acronyctinae* and even of the separation of what I have called the *Erastrini* (Richards, 1933).

⁶ These lobes are probably to be considered the peniculus of Pierce (1909), although in no other genus known to the present author do they arise from the entire lateral margin of the tegumen. Usually the peniculus arises from the ventral portion of the tegumen but in some noctuids (e. g. *Enargia decolor* Walker) a lobe, perhaps to be called a peniculus although it does not bear a dense tuft of setae, arises from the dorsal part of the tegumen. The situation is further complicated by the uncertainty as to the homology of the peniculus (a term used principally in the Noctuidae) with the outgrowths of the tegumen in other Lepidoptera, namely the socius and gnathos.

far as I know no other genus of American Noctuidae possesses such highly modified setae, either of these or of any other type. Certain groups do have heavy vestiture on moderate enlargements of the tegumen (peniculus of Pierce, 1909) but this vestiture in all other species of Noctuidae known to me and in all the species figured by Pierce (1909) consists of many long simple setae. 'Hair pencils' are frequently found on various parts of the body of Lepidoptera but the setae in such tufts are of relatively simple structure (see Eltringham, 1915-1933). Distally spatulate setae (clavate scales of Pierce, 1914) are found on various parts of the male genitalia of a number of species of Lepidoptera (Pierce, 1914; Richards 1936). Setae similar to those described herein for *Amyna octo* are found on certain coccids (Ferris, 1934) and on the ovipositor of the female of the geometrid moth *Theria rupicapraria* (Pierce, 1914). Nowhere have I seen reference to setae resembling the type found on the male genitalia of *Amyna bullula*.

REFERENCES CITED.

- BARNES, WM. & McDUNNOUGH, J. 1917 Checklist of the Lepidoptera of Boreal America. 392 pp. Herald Press, Decatur, Illinois [See page 64].
- ELTRINGHAM, H. 1915 Further observations on the structure of the scent organs in certain male danaine butterflies. Trans. Ent. Soc. London, pp. 152-176. 10 plates.
- ID. 1925 On the abdominal brushes in certain male noctuid moths. Trans. Ent. Soc. London, pp. 1-5. 1 plate.
- ID. 1927 On the brush organs in the noctuid moth *Laphygma frugiperda*, Sm. & Ab. Trans. Ent. Soc. London, pp. 143-146. 1 plate.
- ID. 1933 The senses of insects. 126 pp. Methuen & Co., London.
- FERRIS, G. F. 1934 Setae. Can. Ent., 66: 145-150. 2 figs.
- HAMPSON, G. F. 1910 Catalogue of the Lepidoptera Phalaenae in the British Museum. Vol. 10. 829 pp. 26 plates. London. [See pages 459, 460, 468, 474, 476 and 477].
- PIERCE, F. N. 1909 The genitalia of the group Noctuidae of the Lepidoptera of the British Isles. 88 pp. 32 plates. A. W. Duncan, Liverpool.
- ID. 1914 The genitalia of the group Geometridae of the Lepidoptera of the British Isles. 88 pp. 48 plates. Northern Publ. Co., Ltd., Liverpool.
- RICHARDS, A. G., Jr. 1933 Comparative skeletal morphology

of the noctuid tympanum. Ent. Americana, N. S., 13: 1-84. 20 plates. [See pages 24 and 25 and figure 123].

Id. 1936 A generic synopsis of the *Phoberia-Melicpotis-Drasteria-Boryza* series of Erebinæ (Lepidoptera, Noctuidæ). Rev. d. Ent., 6: 338-374. 16 figs. [See figure 7].

SNODGRASS, R. E. 1926 The morphology of insects sense organs and the sensory nervous system. Smithsonian Misc. Coll., 77: 1-80. 32 figs.

EXPLANATION OF PLATE I.

All drawings made by the author with a compound microscope and with the aid of a camera lucida. Dimensions indicated by scales drawn from a stage micrometer with the aid of a camera lucida and with the same lenses that were used in making the drawings.

Fig. 1. Small scale drawing of the male genitalia of *Amyna octo* Guenée showing the lateral lobes of the tegumen and the position of the modified setae thereon. Harpe omitted from one side.

Figs. 2-5. Enlarged drawings of single setae from the lateral lobes of the tegumen of *A. octo*. Figure 5 is a drawing of a view at almost a right angle from the views shown in figures 2-4. All four drawings at same magnification (scale drawn below figs. 4-5).

Fig. 6. Small scale drawing of the male genitalia of *Amyna bullula* Grote showing the lateral lobe of the tegumen and the position of the modified setae thereon. Setae not sketched individually with the camera lucida and so only approximately correct both as to number and position. Harpe and lobe of tegumen omitted from one side. Drawn at same magnification as figure 1.

Fig. 7. Enlarged outline drawing of a single seta from the lateral lobe of the tegumen of *A. bullula*. Scale of magnification drawn below.

Fig. 8. Greatly enlarged drawing of 'side view' of the apical structure of a setae from the lobe of the tegumen of *A. bullula*. Scale of magnification drawn below.

Fig. 9. Greatly enlarged drawing of a diagonal view of the apical structure of another seta from the lobe of the tegumen of *A. bullula*. Magnification same as figure 8.

Fig. 10. Same, but looking slightly down on the apical structure and from the 'rear side'. Magnification same as figure 8.

Fig. 11. Same, but looking down on the apical structure from a greater angle.

Fig. 12. Same, but looking almost directly down on the apical structure.

Where and When to find the Orthoptera of Pennsylvania, With Notes on the Species Which In Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

(Continued from page 39.)

CONOCEPHALUS NIGROPLEURUM (Bruner). May be present locally throughout the northwest portion of the State, but is known only from Milton, Pennsylvania, a southeastern limit. Ithaca, New York is a northeastern limit. Inhabits grasses and sedges in humid spots. Appears adult in early July.

C. ATTENUATUS (Scudder). A central western species probably present locally throughout Pennsylvania excepting all high areas in the mountains and the northeastern portion of the State. Eastern limits are Ithaca, New York; Sussex and Rancocas, New Jersey, and New Castle, Delaware. I have material from Cornwells and Harrisburg, Pennsylvania. Local but abundant when found in tall vegetation near water. Appears adult in early August.

C. SALTANS (Scudder). Should be present locally throughout the lowlands of all but northern Pennsylvania. Yet known only from Fern Hill in Chester County. Found in grasses on dry poor soil or sandy areas. Appears adult in early August.

DECTICINAE.

ATLANTICUS TESTACEUS (Scudder). Present but very local, occasionally probably moderately numerous, throughout Pennsylvania. In dead leaves and undergrowth of scattered deciduous forests, particularly of oak. Appears adult in early June.

A. DAVISI Rehn and Hebard. Present throughout the mountains of Pennsylvania. Local but often numerous. In similar environment. Appears adult in early June.

A. AMERICANUS AMERICANUS (Saussure). A more austral species than the preceding, probably very locally distributed in the eastern lowlands and eastern mountains of Pennsylvania and has as yet been taken only at Pink Hill in Delaware County in open woods on a serpentine outcrop. Appears adult early in July.

GRYLLACRIDIDAE.

GRYLLACRINAE.

CAMPTONOTUS CAROLINENSIS (Gerstaecker). Probably confined to the lowlands of southeastern Pennsylvania, a specimen from Dresher constituting a northern limit. Local and very seldom seen in shrubbery and vine tangles. A comparatively rare nocturnal insect. Appears adult early in August.

RHAPHIDOPHORINAE.

The introduced *Tachycinus asynamorus* Adelung will probably be found in greenhouses and cellars in Pennsylvania, as it is now widely distributed and established in such artificial environment in the United States.

HADENOECUS PUTEANUS Scudder. Generally distributed in the South Mountain hills and the mountains of Pennsylvania as far north as Allentown and Center County (material before me) and east and south to Allentown, near Reading (material before me) and Rockville. Widespread southward through the Appalachian Mountains. Lives in rock piles, holes in the ground, wells and caves. Appears adult in mid-July.

CEUTHOPHILUS BREVIPES Scudder. A widespread and common boreal species present through all of Pennsylvania except the eastern lowlands. Spruce Cabin Falls and Blue Ridge Summit are southeastern limits. Six records from the State. Adults are present in the Spring, but majority here taken in August.

C. GRACILIPES GRACILIPES (Haldeman). An Appalachian species occurring throughout the forests and caves of the mountains of Pennsylvania and absent from the eastern and north-western lowlands. Very common. Eleven records from State. Lehigh Gap and Blue Ridge Summit are southeastern limits. Adults appear late in May, many here taken in August.

C. MERIDIONALIS Scudder. A relatively scarcer mid-western species known in the East only from eight localities in the lowlands of the eastern portion of Pennsylvania, northern limits being Dark Hollow, Lebanon and Harrisburg. Prefers low moist forests. Adults appear early in Summer and are most numerous in the Fall.

C. PALLIDIPES E. M. Walker. A common boreal and Appalachian species, probably occurring throughout Pennsylvania. Prefers mixed and deciduous forests. Fifteen records for the State with Whitemarsh a southeastern limit. Adults appear early in Summer and are most numerous in the Fall.

C. LATENS Scudder. A moderately common species present throughout the deciduous forests of southern Pennsylvania except at high elevations and occurring up the Susquehanna River to Orangeville. Six records from State. Adults appear in early June, are more numerous in the Summer and some survive to late Fall.

C. MACULATUS (Harris). A relatively scarcer boreal species possibly present in all but southwestern Pennsylvania. Material is before me from Hess Cave near Reading. Previously doubtfully recorded only from Chestnut Hill and Rockville. Present adult through the year, the majority in July and August.

C. UHLERI Scudder. An exceedingly common south-central and Appalachian species, present only in southeastern Pennsylvania, northwestern limits being Lehigh Gap and Rockville. Known from nine localities, the majority about Philadelphia. Appears adult in June but the majority present in late Fall.

C. LAPIDICOLA (Burmeister). A south Appalachian woodland species present in the lowlands of southeastern Pennsylvania north to Monocacy, Lebanon and Dauphin. Relative'y scarce but was found at Whitemarsh in very great numbers. Twelve localities for State. Present adult throughout the year, the majority from June to August.

C. DIVERGENS Scudder. Known from southeastern Pennsylvania this common species probably also occurs at low elevations in the intervening territory. Very generally distributed but particularly fond of forests in mesic environment. Eight records for the State. Appears adult in early June, the majority in July and August.

C. NIGRICANS Scudder. All of Pennsylvania included in its distribution but not yet recorded from the northwestern section. A moderately common insect generally present in forests. Nineteen records from the State. Adults present throughout the year, majority probably from June to December.

GRYLLIDAE.

GRYLLINAE.

GRYLLULUS ASSIMILIS (Fabricius). Present throughout Pennsylvania and often very abundant particularly in grassland. Broods appear adult the middle of May, in the Summer and in the Fall.

G. DOMESTICUS (Linnaeus). Introduced and now established. Material before me from Philadelphia, West Philadelphia and Upper Darby. Rarely seen but sometimes very numerous when found. Possibly adult throughout the year.

MIOGRYLLUS VERTICALIS (Serville). Probably present through southern Pennsylvania but very local and not abundant. Lives in fields and moist spots in burrows, under the grasses, boards, etc., and so is comparatively rarely seen. Probably feeds at night more than during the day. Appears adult in late May. I have material from Philadelphia, Villanova and near Lancaster.

NEMOBIINAE.

NEMOBIUS FASCIATUS FASCIATUS (DeGeer). Everywhere except in heavy forests in Pennsylvania. Extremely abundant. Appears adult in early July.

N. FASCIATUS TINNULUS Fulton. Local, usually in large colonies in forest undergrowth. I have material from North as far as Stroudsburg and Diamond Valley in Huntingdon County. Represents rather an environmental development than the usual concept of a race. Appears adult in early August.

N. MACULATUS Blatchley. Local but usually in large colonies in forest undergrowth. Probably absent from boreal portions of Pennsylvania and as yet known only from Cornwells, Chestnut Hill and Camphill in Dauphin County. Appears adult in early August.

N. CUBENSIS PALUSTRIS Blatchley. Should be found in sphagnum bogs very locally in Pennsylvania, but is only represented by material from Tinicum Island, Villanova and Stroudsburg. Usually numerous when found but both difficult to locate and to capture. Appears adult in mid-August.

N. BRUNERI Hebard. Confined to extreme southeastern

Pennsylvania where at Cornwells one large colony was located among dead leaves on the sandy shore of the Delaware River. Cornwells is a northeastern limit. Appears adult in early August.

N. CAROLINUS CAROLINUS Scudder. Probably throughout Pennsylvania in dead leaves and undergrowth along fence rows and woodlands and also in open woods. Appears adult early in July.

OECANTHINAE.

OECANTHUS EXCLAMATIONIS Davis. Probably throughout Pennsylvania except in the most boreal areas. Rarely seen and apparently more definitely arboreal than any of the other species of the genus. Prefers oaks, maples and other deciduous trees. Can be considered one of the scarcer crickets. Appears adult in late July.

OE. ANGUSTIPENNIS Fitch. Probably generally distributed through Pennsylvania but may be absent from the more boreal portions. Prefers shrubbery and is often present locally in very large colonies. Appears adult in mid-August, greatest abundance in late Fall.

OE. NIVEUS (DeGeer). Much the same distribution but usually decidedly less abundant and often found singly. Prefers vines, apple trees and bushes. Appears adult in mid-July.

OE. NIGRICORNIS QUADRIPUNCTATUS Beutenmuller. Very abundant and generally distributed in weeds in open throughout Pennsylvania. Rather an adaptation to certain types of vegetation; limited to a definite area of distribution which however is largely coincident with that of *nigricornis nigricornis*. Appears adult in mid-July.

OE. NIGRICORNIS NIGRICORNIS F. Walker. Locally abundant in raspberry vines (typical), shrubs and tall herbs in open throughout Pennsylvania. Appears adult in early August. A decidedly atypic condition is very abundant in the high weeds of the marshes along the Delaware River in southeastern Pennsylvania.

OE. PINI Beutenmuller. Arboreal, inhabiting only pine trees in dry sandy areas (Pitch Pine and Scrub Pine, *Pinus rigida*

and *Pinus virginiana*). Possibly present in such areas throughout all but the most boreal portions of Pennsylvania, but the only valid record is Bloomsburg¹². Northern limits are Gloucester, Massachusetts; Windham, Connecticut; Karner, New York, and Columbiana and Erie Counties, Ohio (E. S. Thomas), while a southern limit is Raleigh, North Carolina. Though rare in collections, individuals are sometimes to be found in large scattered colonies. Appears adult in late July.

OE. LATIPENNIS Riley. Present in the lowlands of southern Pennsylvania; northern limits are the vicinity of Philadelphia and Allegheny County. Occasional in deciduous woodlands, on oaks, but also on shrubs and vines. Appears adult in mid-August.

NEOXABEA BIPUNCTATA (DeGeer). Probably absent from the boreal portions of Pennsylvania, this insect should be sought in all other sections. Known from a number of localities in the southeastern area and Jeannette in Allegheny County. Scarce, secretive and very local, often found singly. Prefers vine tangles in openings of woodlands and along forest borders. Appears adult in early August.

TRIGONIDIINAE.

ANAXIPHA EXIGUA (Say). Known north as far as Morrisville and Chestnut Hill in southeastern Pennsylvania, but the species is probably present throughout the lowlands of the State. Local but often moderately abundant when located. Prefers high weeds, grasses and bushes in wet areas and near water. Appears adult in late July.

PHYLLOPALPUS PULCHELLUS Uhler. I have material only from Tinicum Island and the species may be limited to southeastern Pennsylvania. It is decidedly scarce there and very local, in high weedy growth along ditch borders in Delaware River marshes. Appears adult in late July (July 25, 1937, H. R. Roberts).

¹² The atypic condition of *nigricornis nigricornis* discussed above has been incorrectly recorded as *pinii* from Delaware County (based on material from Tinicum Island which Rehn and Hebard collected) by Blatchley in 1920.

E NEOPTERINAE.

HAPITHUS AGITATOR AGITATOR Uhler. Probably limited to southeastern Pennsylvania, where it occurs very locally in moderate numbers in the tall weedy growth of the Delaware River shores and marshes. I have it from Cornwells and Tinicum Island, but it is known up the river as far as Burlington, New Jersey. Should be sought also in shrubbery in damp woodland environment. Appears adult in early August.

OROCHARIS SALTATOR Uhler. Possibly limited to southeastern Pennsylvania. There present but very rarely seen in shrubbery and vines particularly near woodlands. Decidedly a rare species in this State. I have material from Cornwells, Philadelphia and Chestnut Hill. Appears adult early in August.

GRYLLOTALPINAE.

GRYLLOTALPA HEXADACTYLA Perty. Lives in burrows in the moist earth along streams or around ponds. Nocturnal and largely subterranean. Local and rarely seen. Probably occurs throughout Pennsylvania, but known only from a number of localities about Philadelphia and Harrisburg (north to Newport). Present adult from early Spring to late Fall.

TRIDACTYLINAE.

TRIDACTYLUS APICIALIS Say. Probably throughout Pennsylvania except in the most boreal areas but there local, usually very scarce and rarely abundant. Prefers bare sand areas near water where it burrows but is on the surface much of the time. Known only from Harrisburg, V, 24, 1909, (Kirk and Champlain) and New Cumberland, V, 15, 1909, (Fox in litt.). Appears adult in September and so persists through the Winter and the following Spring.

T. MINUTUS Scudder. Present only in the warmer portions of Pennsylvania, Chestnut Hill and Port Treverton (material examined) are northern limits. Extremely local but when found usually in great numbers. Lives on bare sand areas near water. Period of adult appearance the same as for *apicalis*.

(To be continued.)

Two Unusual Collecting Records for Pennsylvania (Coleoptera: Scarabaeidae).

On November 6, 1937, while gunning in an open woods near Broomall in Delaware County, I found a nest of a white-footed mouse, beneath a piece of tin on the ground. In scratching around in the nest I found one specimen of *Aphodius leptotarsis* Br. To my knowledge the group of *Aphodius* (*Platyderides* Br.) to which this species belongs has heretofore been

strictly western, not being found east of the Mississippi River. Mr. W. J. Brown has kindly examined the specimen for me and writes that this is the only specimen he has seen except the two types, which were found in North West Territories and Riley County, Kansas.

Six specimens of *Ochodaeus musculus* (Say) were taken by the writer on June 19, 1937, in a heavy deciduous forest on the grounds of the Westtown School near West Chester. These specimens were collected along with *Odontacus liebecki* Wallis by scratching away the surface of the leaf mold. This genus has not been recorded in Pennsylvania before, being southern and western in its distribution.—MARK ROBINSON, 1533 So. 56 St., Philadelphia, Pennsylvania.

The Mating of *Ephestia kuehniella* Zeller and its Results.¹

By JOSEPH L. WILLIAMS, University of Pennsylvania and
Lincoln University, Pennsylvania.

(Plates II and III.)

INTRODUCTION.

The contents of this paper grew out of a desire to verify, in other Lepidoptera, Arnold Pictet's observations of double copulation in *Lasiocampa quercus*. The following is a translated quotation from his observations: Normally the *Lasiocampa quercus* male copulates two successive times with the same female, once by placing himself on her left, then, after being detached from her and after being slightly distant from her for about twenty minutes, a second time by placing himself on her right. In both cases, the penetration of the penis was verified.

His conclusions are as follows:

- (1). Only copulation on the left has the power of fertilizing.
- (2). Copulation on the right has no other purpose except causing the laying of the eggs fertilized by the union on the left.
- (3). The beginning of the laying immediately follows the union on the right. When this has been experimentally suppressed by the removal of the male, the female waits five or six

¹ A Thesis in Zoology presented to the Faculty of the Graduate School of the University of Pennsylvania in partial fulfillment of the requirements for the degree of Master of Arts.

days before beginning the act of laying; however, the eggs are fertilized.

(4). A male which has fertilized a first female can copulate with a second, but no longer has the power of fertilizing her, because he copulates with the second only on the right, and because only the union on the left has the power of fertilizing. The female lays immediately, but her eggs, it is agreed, are not fertilized.

(5). In the case where a second virgin male comes to pair with a female having already received a visit of a first male, during the interruption of egg laying, it is demonstrated that in spite of his virginity, this second male does not fertilize the mass of eggs remaining to be deposited because he only causes the emitting of the eggs fertilized by the first male. Moreover, in this case, the second male does not unite on the left, (coitus through which fertilization took place by the first), but only the right, (coitus which forces the laying). The habit of the species being to practise coitus twice, he copulates a second time, again on the right, which has for the purpose of forcing a third supplementary laying which is not fertilized.

(6). An anatomical study of the constitution of the female reproductive organs makes it obvious that the first coitus, on the left, (fertilization), would be made by the vaginal orifice which is situated to the left of the end of the abdomen, and that the second coitus, to the right, (acceleration of the egg-laying), would take place through the egg-laying orifice, situated on the right on the preceding, and whose sphincter it would dilate. In the case where the union to the right did not take place, (the beginning of the egg-laying being retarded), it is the time of waiting which, because of muscular relaxation, seems to take the place of the effect of the second coitus.

I observed sulphur butterflies in the field but was unable to see the details of the copulatory act. I caged a number of them but they did not copulate in captivity. I raised cabbage butterflies from larvae, but for some reason that particular group did not copulate.

One morning while out in the field I came upon a male and female *Telca polyphemus* lying on the ground together. The penis, at the time I came upon them, was thrust into the bursal opening of the female. I carefully caged the pair and later they broke apart. I brought them home to see if they would copulate again, but no further copulation took place. Later that night, I separated the male from the female and found the

next morning a great number of eggs in the female's cage. I placed the male back with the female but they did not copulate. Later that afternoon, the male died.

The second night, the female laid the greatest number of her eggs; and on the third night she laid a few. By this time, the abdomen which was at first enlarged, had become more slender than the thorax. The eggs were stuck neatly to the wire cage and two days after her last laying she died. Every egg hatched and I was able to raise twenty-six pupae out of this lot, by feeding the larvae on red oak leaves. Although I did not observe these moths from the beginning of copulation, the presence of the penis in the bursal opening suggests a fertilization copulation. Therefore *polyphemus* female does not need a separate copulation to make her lay. Since the first laying took place late that night, hours after I captured the moths, it would seem that waiting was the necessary stimulus for the dilation of the vaginal sphincter.

Later, in the summer of 1936, I took a genetics course, at the University of Pennsylvania under Dr. P. W. Whiting. He uses the wasp, *Habrobracon juglandis*, which is parasitic upon the larva of the moth *Ephestia kuehniella* Zeller. Whenever I would go to the stock boxes to get caterpillars, I would see moths fastened together. I began to study them, since there was a wealth of material available. I have observed hundreds of these moths copulating, and the penis was always found in the bursal opening. The vagina opens into a chitinous ovipositor, but I have never seen the penis in its opening. I have observed females lay fertilized eggs after a copulation only in the bursal opening, and females to lay with dead males hanging to them. Whenever the dead male was fastened to a female, the penis was in the opening of the bursa. I have seen dead females fastened to males and the penis was in the opening of the bursa. I have observed virgin females to lay unfertilized eggs, although the number was small. These observations suggest that the purpose of the bursal copulation is fertilization of the female and cause her to lay a great number of eggs; however, she can lay without copulating with the male, but the number of eggs laid is small.

I dissected a great number of these moths, (more than three hundred), and it was from my dissections that I learned the nature of some of the female organs before and after copulation.

MATING.

When a female is ready to mate, she lies quietly with her abdomen curved upward. The wings are spread apart a little and she keeps this position until mating occurs. If she be disturbed, she will crawl around just as any other female that is not ready to mate. Soon she becomes quiet again, spreads the wings and curves the abdomen upward, waiting for a male.

After mating the female lies quietly for a while, after which she begins to lay her eggs. Active egg-laying continues for about a day, after which she lies quietly, curves her abdomen upward with the wings spread, waiting to mate the second time. After this mating she lies quietly for a while as before, then begins to lay her eggs for another day. I have watched females mate three times. They will mate with the same male or any other male that comes to them.

A male that is ready to mate crawls around vibrating the wings. If he meets a female that is ready to mate, he turns the hind end of his abdomen to the hind end of the female's abdomen, and with the aid of his claspers, the penis is thrust into the bursal opening. The mating period varies from three to five hours. I have seen exceptional cases where the pair stayed together for more than twelve hours. Sometimes the pair is unable to break apart. In such cases the female lays her eggs with the male hanging to her. Under such conditions, one of the pair lives and the other dies. If the female lives, she is, of course, unable to mate with another male. On the average, males do not mate more than twice and after this they die. They live longer if they do not mate. I have been able to keep these moths alive for more than ten days by feeding them sugar or honey water; but their vitality seems to lessen with age. I have tried mating old males that had previously mated with females seeking to mate, but had very little success; greater success was obtained when young males were used.

(To be continued.)

Descriptions of New Melanic Forms (Lepidoptera: Geometridae, Noctuidae and Arctiidae).

By J. G. FRANCLEMONT, Ithaca, New York.

During the past three or four years of collecting numerous melanic forms of various species of moths have been caught, and since some of them have proved to be new, it seems fitting at this time to describe them. I believe that I am justified in doing so on three counts: the moths are very distinct in coloration, melanism is an inheritable characteristic, and numerous people before me have described similar forms of other species—some thinking they represented good species and others realizing that they were merely forms.

GEOMETRIDAE.

VENUSIA COMPTARIA form. nov. **palumbes**.

The fore and hind wings a uniform dark pearly gray, crossed by a blackish median line, all other lines obsolete, a few white streaks on the veins, especially the cubital and anal veins. Thorax and abdomen darker than the wings.

Holotype: ♀, Ithaca, NEW YORK, May 8, 1936 (J. G. Franclemont), [in Coll. Franclemont].

The uniformity in color will serve to distinguish this dark form from the normal form which is very pale and contrastily marked.

PHIGALIA TITEA form. nov. **deplorans**.

The fore and hind wings a uniform powdery black, the fore wings with the post-medial, median and antemedial lines faintly discernible, the subterminal line white but quite faint; the hind wings with a very faint postmedial line, not evident in some specimens. The thorax concolorous with the wings; abdomen darker contrasting with the wings and thorax.

Holotype: ♂, Ithaca, NEW YORK, April 26, 1935 (J. G. Franclemont), [in Coll. Franclemont]. *Paratypes*: 3 ♂ ♂, Ithaca, N. Y., April 27, 1935, May 1, 1937, March 22, 1938, (J. G. Franclemont), [in Coll. Franclemont].

This form may be readily distinguished from the typical form by its powdery black coloring and almost obsolete lines, the coloring of the normal form being pale whitish gray with very conspicuous black lines.

VITRINELLA PAMPINARIA form. nov. **stygia**.

The fore and hind wings deep grayish black, the ante- and postmedial lines black, but not conspicuous, a dark median shade on the fore wings, both fore and hind wings with a white subterminal line. The thorax and abdomen concolorous with the wings.

Holotype: ♂, Ithaca, NEW YORK, Aug. 13, 1937 (J. G. Franclemont), [in Coll. Franclemont].

This form differs from the normal form in its almost uniform black color, that of the normal being gray.

NOCTUIDAE.

CATOCALA CEROGAMA form. nov. **ruperti**.

Head black with the bases of the antennae white; thorax black with the collar and tegulae edged with white, the posterior tuft white, the legs with the femora, tibiae and tarsi black on their outer side and white on their inner side. Fore wings shining black with a slight brownish cast in some lights, the subterminal line white, the most conspicuous feature of the fore wings, the postmedial line evident, of intenser black, edged on the outer side by a pale shade, antemedial line indistinct, subreniform pale contrasting with the ground color, reniform very faintly indicated, the fringe black. Hind wings black, paler at base, crossed by a single median yellow band, somewhat reduced compared with that of normal *cerogama*, especially the last third which tends to become obsolete in some specimens, the fringe white. Underside of fore wings black crossed by cream colored postmedial and antemedial bands, underside of hind wings black with the median band and base cream colored tinted with yellow.

Holotype: ♂, Ithaca, NEW YORK, Aug. 20, 1937 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♀, Ithaca, N. Y., Aug. 16, 1937 (J. G. Franclemont), [in Coll. Franclemont]. *Paratypes*: 16 ♂, 21 ♀, Ithaca, N. Y., July 4 to Sept. 12, 1935 to 1937, (J. G. Franclemont, H. I. Scudder), [in Coll. Franclemont, Lemmer, Rupert and Cornell Univ.]. 4 ♂, 1 ♀; Sardinia, N. Y., Aug. 18 to 30, 1937 (L. R. Rupert), [in Coll. Rupert].

This very conspicuous form can be readily separated from the normal form of *cerogama* by its totally black forewings and by the usual reduction of the yellow band of the hind wings.

I consider this form the showiest *Catocala* we have about

Ithaca, and I look on its gradual increase from year to year with interest. I take great pleasure in naming this form for my friend, Mr. Laurence R. Rupert, who shared with me the pleasure of catching the first specimens.

CATOCALA MESKEI form. nov. **krombeini**.

Head black, bases of the antennae white; thorax black dusted with white, tegulae whitish in central portion, appearing as if margined with black; abdomen grayish brown with a blackish cast. Fore wings powdery black, the margin pale with the veins black in this area, subterminal line white, very conspicuous the postmedial line traceable towards the costal margin, other lines obsolete, the subreniform pale connecting with a whitish patch before the reniform which is barely evident, fringe pale; hindwings as in normal *meskei*. Underside of fore wings black, base pale, and antemedial triangular patch of white and a postmedial band of white narrowing toward inner margin; underside of hindwings flushed with red, a black medium band and a broad black marginal band, fringe white.

Holotype: ♀, Ithaca, NEW YORK, July 23, 1937 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♂, Ithaca, N. Y., Aug. 5, 1937 (J. G. Franclemont), [in Coll. Franclemont.] *Paratypes*: All Ithaca, N. Y., 1 ♀, July 19, 1937, 1 ♀, July 23, 1937, 1 ♀, July 31, 1937 (J. G. Franclemont), [all in Coll. Franclemont].

Typical *C. meskei* is not considered a common species and it was a surprise to find it at Ithaca this past summer, but more of a surprise was the melanic form. At first I thought it might be nothing more than aberrant *C. briseis*. It differs from typical *meskei* in the black fore wings and may be distinguished from *briseis* by the narrower and more pointed fore wings and the lack of the buff shade between the white subterminal line and the black postmedial line.

This form is named for my friend Mr. Karl V. Krombein, the companion on many collecting excursions.

CATOCALA PARTA form. nov. **forbesi**.

Head and palpi black, bases of the antennae white; thorax brownish gray with the collar and tegulae edged with black; abdomen brownish black. Fore wings intense black with a few brownish shades, subterminal line white, postmedial line intenser black, made evident by a pale shade on its outer side, white at inner margin, antemedial line blackish buff, white at

inner margin, subreniform pale with a black center, reniform traceable, fringe pale; hind wings as in normal *parta*, fringe white; underside of forewings black, with the base white and the two cross bands white; underside of hind wings flushed with red, crossed by a median black band and a wide, black, marginal band.

Holotype: ♀, Sardinia, NEW YORK, Aug. 7, 1934 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♂, Sardinia, N. Y., Aug. 28, 1937 (L. R. Rupert), [in Coll. Franclemont]. *Paratypes*: Sardinia, N. Y., 1 ♂, July 30, 1934, 1 ♀, Aug. 27, 1937 (L. R. Rupert), [in Coll. Rupert].

This very striking form may be distinguished from the normal form of *parta*, which is soft gray with a few brownish tints, by the almost uniform black coloring of the forewing; the black transverse streak running from the upper angle of the fore wing to the base, so conspicuous in normal *parta*, is completely obscured by the black ground color in this form.

I take pleasure in naming this form for Dr. W. T. M. Forbes, who has done much to "aid and abet" my interest in the Lepidoptera.

CATOCALA NEOGAMA form. nov. **mildredae**.

Head whitish gray, bases of the antennae black, thorax whitish gray, collar and tegulae edged with black, posterior tuft white; abdomen brownish black. Fore wings shining black with bluish or greenish reflections in some lights, brownish shades before the intense black postmedial line, antemedial line intense black becoming white at inner margin, subreniform pale, reniform warm brown, fringe dark; hind wings predominately black, the remaining yellow confined to two spots in the middle of the wings, one on the inner side and the other on the outer side of the median black band; the amount of yellow on the hind wings no doubt will vary with the individual specimens as it does in *cerogama*; fringe buff. Underside of fore wings black, yellow at base and crossed by antemedial and postmedial yellow bands; underside of hind wings black, base yellow and crossed by a yellow median band.

Holotype: ♀, Ithaca, NEW YORK, Aug. 25, 1937 (J. G. Franclemont), [in Coll. Franclemont].

This very handsome moth is a great contrast to the somber colored normal form of *neogama*; its black forewing with the glowing reflections of green and blue will serve to differentiate

it immediately from the normal form with its gray forewings. The amount of black on the hind wings, as noted in the above description, will probably vary from specimen to specimen.

I am pleased to name this beautiful form for my Mother.

ACRONICTA VINNULA form. nov. **percolens**.

Forewings deep olive green, black lines and dashes as in normal *vinnula*, the black postmedial line followed by a series of white lunules, a conspicuous feature of the wing; hind wings blackish gray. Thorax concolorous with the wings, collar and tegulae tipped with white; abdomen smoky gray.

Holotype: ♂, Ithaca, NEW YORK, July 5, 1937 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♀ Ithaca, N. Y., June 7, 1936 (J. G. Franclemont), [in Coll. Franclemont]. *Paratypes*: All Ithaca, N. Y., 1 ♂, June 2, 1933, 1 ♂, Aug. 5, 1937, 3 ♀, June 7, and Aug. 18, 1937 (J. G. Franclemont), [in Coll. Franclemont].

This pretty little form may be easily recognized by its intense olive color in comparison with the pale whitish gray color of the normal form.

ACRONICTA FRAGILIS form. nov. **atrior**.

Fore wings intense black with a white postmedial line, most noticeable in the females, the males tend to have almost uniform black forewings; hind wings dusky with a darker border. Thorax black; abdomen smoky gray with the basal tuft black.

Holotype: ♂, Ithaca, NEW YORK, May 25, 1936 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♀, Ithaca, N. Y., June 3, 1936 (J. G. Franclemont), [in Coll. Franclemont]. *Paratypes*: All Ithaca, N. Y. 1936, 1 ♂ 1 ♀, June 9, 1 ♂, June 12, (J. G. Franclemont), [in Coll. Franclemont].

The intense black forewings of this form distinguish it from the normal gray form of the species. This black form is much commoner than the normal form at Ithaca.

ACRONICTA SUPERANS form. nov. **superba**.

Fore wings blackish gray, with deep black shades and ordinary lines visible, the two whitish areas so conspicuous in normal *superans* reduced to dusky blackish shaded areas; hind wings blackish gray, paler at bases. Thorax yellowish gray dusted with black, collar edged with black, tegulae black with a few whitish flecks.

Holotype: ♂, Ithaca, N. Y., May 18, 1936 (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♀, Sardinia, N. Y., June 20, 1934 (J. G. Franclemont), [in Coll. Franclemont].

This form has the forewings almost uniform in darkness of color in contrast to the variegated fore wings of the normal form.

ACRONICTA MORULA form. nov. **columboides**.

Fore wings a deep smoky gray, soft and somewhat olive in hue, with brownish shades, the ordinary lines and dashes as in normal *morula*, an indication of a subterminal row of pale dots and the postmedial line followed by a series of pale lunules; hind wings blackish gray. Thorax concolorous with fore wings, central portion brown; abdomen smoky gray.

Holotype: ♂, Chaffee, NEW YORK, May 14, 1934 [Bred], (J. G. Franclemont), [in Coll. Franclemont]. *Allotype*: ♀, Ithaca, N. Y., July 19, 1937 (J. G. Franclemont), [in Coll. Franclemont]. *Paratypes*: all New York, Crystal Lake, Cattaraugus County, 1 ♂, July 19, 1932; Sardinia, 1 ♂, June 20, 1934; Chaffee, 1 ♂, June 23, 1934; Ithaca, ♂, June 3, 1936, 3 ♂, 3 ♀, July 7, to 22, 1937, (J. G. Franclemont), [all in Coll. Franclemont].

This form will be readily recognized by its dark coloring as compared with the pale whitish gray coloring of the normal form.

ACRONICTA DISTANS form. nov. **scintillans**.

Fore wings shining gray black with a slight tendency to appear powdery, a series of subterminal whitish spots, ordinary lines and spots present of intenser black than the ground color; hind wings blackish gray, paler at base, females with hind wings all black. Thorax black contrasting somewhat, but not noticeably with the fore wings; abdomen dark luteous black.

Holotype: ♂, Crystal Lake, Cattaraugus County, NEW YORK, Aug. 2, 1933 (J. G. Franclemont), [in Coll. Franclemont] *Allotype*: ♀, Chaffee, N. Y., Aug. 3, 1934 (J. G. Franclemont), [in Coll. Franclemont] *Paratypes*: Chaffee, N. Y., 2 ♂, July 17, and 31, 1934; Crystal Lake, Catt. Co., N. Y., 1 ♀, July 28, 1933; Ithaca, N. Y., 1 ♂, May 12, 1936, 1 ♀, July 22 and 1 ♂, Aug 5, 1937 (J. G. Franclemont), [in Coll. Franclemont].

The deep shining black color of the fore wings will readily aid in distinguishing this form from the normal gray form. It is not as common as the dark form of *impleta*, but appears to be more widely distributed.

ARCTIIDAE.

HAPLOA CONFUSA form. nov. *suffusca*.

Forewings with the ground color dark fuscous, the ordinary markings of the species not contrasting to any great degree with the ground color, but nevertheless evident because of the relatively darker color; hind wings pale fuscous, lighter at base; thorax fuscous, tegulate white; abdomen dusky with a dark dorsal stripe.

Holotype: ♂, Allegany State Park, NEW YORK, July 16, 1936 (E. Greenspan), [in Coll. Franclemont].

The deep fuscous color of the fore wings will immediately separate this form from the normal form which has the ground color of the primaries white; the lack of strong contrast between ground color and markings is also a distinguishing characteristic when compared with the normal form which has the black markings in sharp contrast with the white ground color.

A South African Onthophagus Found in United States (Coleoptera: Scarabaeidae)*

Specimens of an unusual *Onthophagus* collected by Professor P. W. Fattig near Vidalia and Lyons, Georgia, have been determined as *Onthophagus depressus* Har., a South African species, by Dr. G. J. Arrow of the British Museum. Dr. Arrow, in commenting upon the species states that the same species has been described from Australia under the name *Onthophagus carteri* by Blackburn. Professor Fattig first collected the species at light at Vidalia, Georgia, May 4, 1937. A few more were found August 11 and on August 30, 1937 about three hundred specimens were taken in cow dung at two localities,—three miles southwest of Vidalia and two and one-half miles west of Lyons. These localities are about seventy-five miles inland west of Savannah, Georgia. How and when this African species was introduced into the United States is unknown at present.

* Technical Contribution No. 57 from South Carolina Experiment Station.

O. depressus Har., is uniformly black, broadly oval, evenly convex, 6 to 9 mm., in length, 3 to 5 mm., in width, and shows only slight sexual differences. Clypeus with two teeth as in *Canthon lacvis*. Surface of head and clypeus with close transversely elongate granules. Thorax closely coarsely annularly punctate, each puncture bearing a very short coarse yellowish hair and having a more or less noticeable granule immediately in front of the hair. Elytral punctures similar but in rows, those of the fine shallow striae similarly annular but without the hair and granule. In size and color, *O. depressus* Har., is nearest our common *O. hecate* Panz.—O. L. CARTWRIGHT, South Carolina Experiment Station, Clemson, South Carolina.

Some Interesting Butterfly Records for South Florida.

The following records of butterflies taken in or around Miami, Florida, seem to be new or of some interest:

Anteos macrula macrula (Fabricus). A single damaged specimen of this tropical American species was taken by the author on July 8, 1935. Another specimen taken at Miami is in the possession of Mrs. C. N. Grimshawe. It is apparently only an occasional immigrant from the Antilles to judge from the badly beaten condition of the specimens I have seen.

Kricogonia lyside (Godart). Several specimens of this rather rare species were taken by the author during June, 1937. The first specimen was taken at Miami, June 13, 1937, and about a dozen others were taken on Virginia Key in Biscayne Bay between June 15 and 17. The latter specimens were all taken feeding on the flowers of black mangrove trees along the beach. From the fresh condition of most of the specimens, I should say that the species breeds in Florida.

Hypolimnas misippus (Linneus). A male of this butterfly was taken during April, 1934, in a grove at Miami. This insect seems to have been very infrequently taken in the New World.

The specimens mentioned above, with the exception of the specimen taken by Mrs. Grimshawe, are now in the collection of the Museum of Comparative Zoology, Harvard College.—FRANK N. YOUNG, Department of Biology, University of Florida.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

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GENERAL.—Dymond, J. R.—External parasites of bats. [4] 70: 20-21. Knaus, Warren.—Obituary by G. A. Dean. [103] 11: 1-3. Weiss, H. B.—The criminal prosecution of insects. [6] 45: 241-258.

ANATOMY, PHYSIOLOGY, ETC.—Asana & Makino.—The occurrence of v-shaped centrioles in the spermatocytes of some Neuropteran insects. [Ann. Zool. Japonenses] 16: 175-180, ill. Beadle, Anderson & Maxwell.—A comparison of the diffusible substances concerned with eye color in *Drosophila*, *Ephestia* and *Habrobracon*. [Proc. Nat. Acad. Sci.] 24: 80-85. Dreyer, W. A.—Seasonal weight and total water content of the mound-building ant, *Formica exsectoides*. [84] 19: 38-49. DuBois, A. M.—La détermination de l'ébauche embryonnaire chez *Sialis lutaria*. [Rev. Suisse Zool.] 45: 1-92, ill. Freney, M. R.—Studies on the chemotropic behaviour of sheep blowflies. [Comm. Australia Coun. Sci. & Ind. Res.] Pamph. No. 74: 24pp., ill. Goldschmidt, R.—see under Special. Grell, K. G.—Der Darmtraktus von *Panorpa communis* und seine Anhangs bei Larve und Imago. (Ein Beitrag zur Anatomie und Histologie der Mecopteren). [89] Abt. Anat.: 64: 1-86, ill. Harries, F. H.—Some effects of temperature on the development and oviposition of *Microbracon hebetor*. [43] 37: 165-171. Hoffmann, R. W.—Der insektenschlaf als reflektorische immobilisation. [88] 25: 359-366, ill. Hood, C. W.—The anatomy of the digestive system of

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SPECIAL NOTICES.—**Goldschmidt, R.**—Physiological Genetics. McGraw-Hill Book Co., N. Y., 1938, viii + 375 pp., ill. **Theobald, N.**—Les insectes fossiles des terrains oligocenes de France. Nancy, G. Thomas, 1937. 437 pp., 29 pls. **Vogelsanger, Th.**—Aus dem entomologischen Tagebuch von Dr. Med. F. Ris. [Mitteilungen der Naturforschenden Gesellschaft Schaffhausen] 13 (7): 159-203. This first installment concerns Lepidoptera almost exclusively.

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—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—*Heliconia* from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

Wanted for cash or exchange any pamphlets dealing with the American Hesperidae. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Meg. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

Wanted—Collectors desiring *Argynnis diana*, *Amblyscirtes carolina* & *textor*, *Rhabdoides cellus*, *Callosamia angulifera*; Catocalae and other North Carolina lepidoptera, write R. M. McKenzie, Gastonia, N. C.

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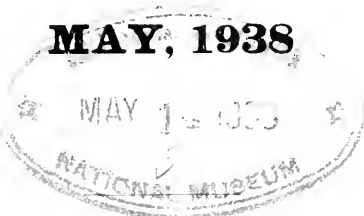
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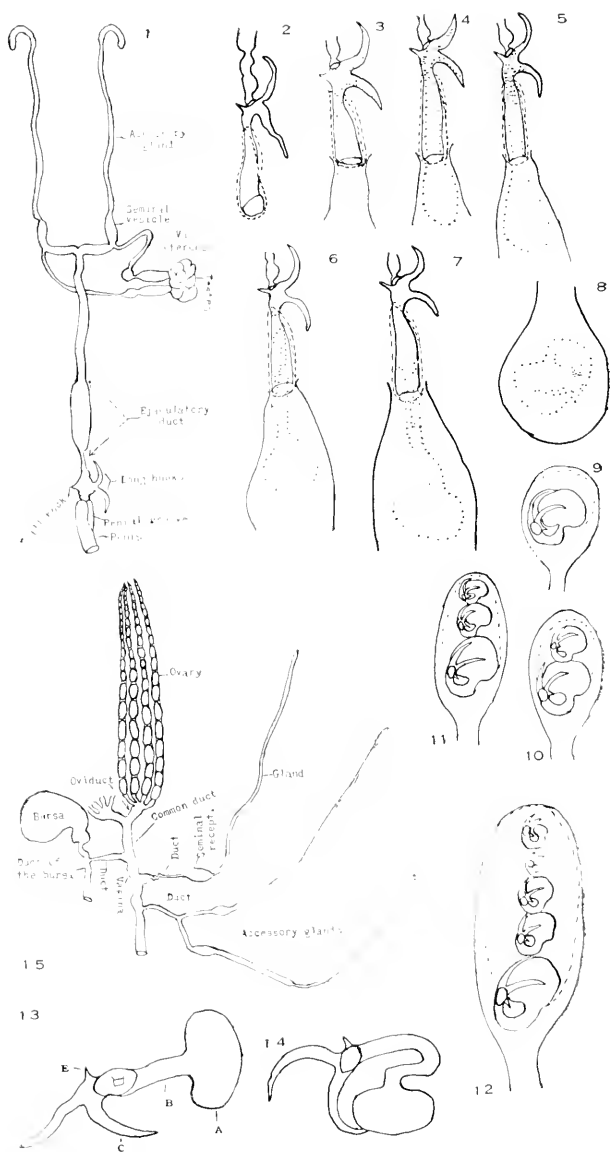
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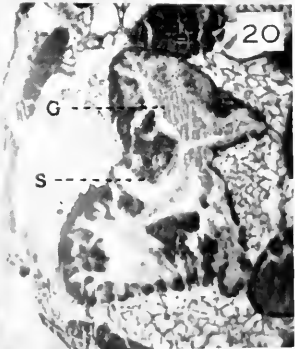
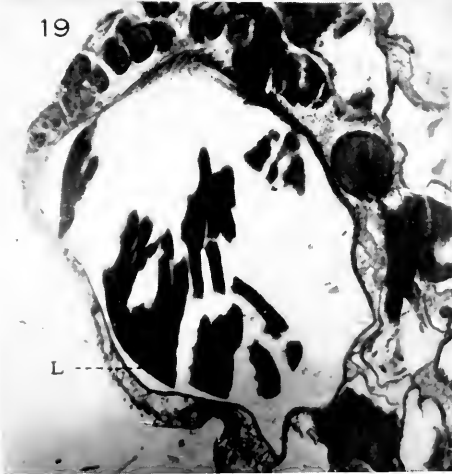
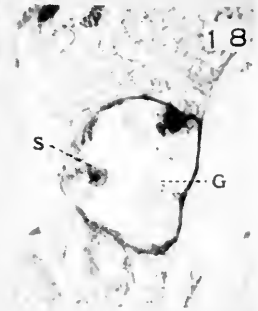
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EPHESTIA KUEHNIELLA—WILLIAMS.



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The Mating of *Ephestia kuehniella* Zeller and its Results.

By JOSEPH L. WILLIAMS, University of Pennsylvania and
Lincoln University, Pennsylvania.

(Plates II and III.)

(Continued from page 107.)

INTERNAL CHANGES IN THE BURSA.

When a female emerges from the pupa, and is immediately killed, her bursa is transparent and appears empty. If a virgin female be allowed to live for a few days, her bursa becomes somewhat thicker. A granular cheesy material has formed at the closed end. (Plate III, Figs. 18 and 20). Chitinous teeth are formed in the lower part of the bursa just above the duct leading to the vagina. (Plate III, Fig. 16.).

If a virgin female be allowed to mate, and the bursa be examined a short while after mating, one sac of sperms will be found in the lower part of this organ, (Plate II, Fig. 9). The sac of sperms seems to be held firmly by the bursal teeth in the lower part of the organ, (Plate III, Fig. 17). There is a gelatinous substance at the top, (Plate III, Fig. 19.). at about the same position as the granular cheesy material in the virgin bursa. This gelatinous substance and the muscle fibers of the bursa are stained by borax carmine, but the sperm sac does not take the stain. Eosin, however, will stain the sperm sac. This staining property suggests that the sperm sac is of chitin. If a female that has mated once be allowed to live until indicating readiness to mate again, and the bursa be examined, the sperm sac does not appear as large as it does after mating. This suggests that the sperms have been used.

If a female be allowed to mate twice, and her bursa be examined a little while after, two sperm sacs will be found in this organ, (Plate II, Fig. 10.). The last sac, which is the filled

one, will be at the bottom or hind end, surrounded by the chitinous teeth of the bursa. The first sac which now appears to be empty, is above the filled sac. The gelatinous substance which stains red with borax carmine is above the empty sac.

If a female be allowed to mate three times, three sacs will be found upon examining the bursa, (Plate II, Fig. 11.). The filled and largest sac will be found below surrounded by the chitinous teeth of the bursa. The next larger sac will be found in the center of the bursa, and the smallest sac will be found at the top. Between the smallest sac and the upper bursal wall, is the gelatinous substance that stains red with borax carmine.

I have not observed a fourth mated bursa, nor have I ever found a female from moth stock boxes, with four sperm sacs in the bursa. I have observed, however, females from stock boxes with five sacs in the bursa, but never more than five, (Plate II, Fig. 12.). The filled sac is always at the bottom and the smallest one at the top. On top of the smallest sac is the gelatinous substance that stains red with borax carmine. Females under observations have mated three times. Each sperm sac found in the bursa indicates a mating. Females from the stock boxes whose bursae contain five sperm sacs must have mated five times. Females with one or two sperm sacs are rather numerous in the stock boxes. Females with three sacs are less numerous, while those with five sacs are still fewer. This seems to indicate that three matings are the average in the life of *Ephestia kuehniella*.

DESCRIPTION OF SPERM SAC.

The sperm sac is a bag with a somewhat cylindrical chitinous neck. The end of the neck is bifurcated forming two hooks. A little above the bifurcated neck is an opening for the entrance of sperms, from the male. On the opposite side of the sperm aperture is a smaller hook, (Plate II, Figs. 13 and 14). If a mating couple be killed and the bursa be examined, the penis will be found in the bursal neck. The bag of the sperm sac will be surrounded by the bursal teeth, (Plate II, Fig. 3.). The neck of the sperm sac passes down through the penis. The opening just above the bifurcated neck fits closely against the

terminal opening of the ejaculatory duct of the male, being held in position by all the hooks of the sperm sac, fitting tightly into all the hooks at the root of the penis. The sperms are forced from the ejaculatory duct, through this opening, into the neck of the sperm sac, through which the sperms enter the bag.

FUNCTION OF THE BURSA AND SPERM SAC FORMATION.

The bursa secretes layers of a cheesy, granular substance that remains granular, (Plate III, Figs. 18 and 20.), as long as the female is virgin. When the female mates, a secretion flows into the bursa (from the male?), that may react with the cheesy granular material, for the latter now becomes gelatinous and arranged in layers, (Plate III, Fig. 19). Previously mated females whose bursal cavities contain more than one sac, have the empty sacs and part of the newly-formed filled sac embedded in this secretion.

The sperm sac is formed by a secretion hardened in the penial region which serves as a mould. A small hollow hook and two longer ones at the penial base mould the small hook and two longer hooks of the sperm sac, (Plate II, Fig. 3.). The aperture in the neck of the sac is formed by the entrance of sperms and accessory gland secretion breaking through a thin membraneous region of the sac held firmly against the opening of the ejaculatory duct, by the insertion of the sac hooks into the hollow hooks at the penial base. As sperms and accessory gland secretion flow into the neck, in order to accommodate this mass, the body of the sperm sac is formed under pressure and distended into the bursal cavity, (Plate II, Fig. 3.).

The secretion responsible for the sperm sac formation may be male, female, or both. According to Norris (1932), the sperm sacs or "spermatophores", of *Plodia*, are formed from secretions of the unpaired glands of the male system.

Their formation according to Norris is as follows:

I. The secretion of the lower unpaired gland [of the male] flows into the bursal cavity and hardens into a gelatinous mass.

II. The secretion of the second unpaired gland flows into the ductus ejaculatorius and viscia where it hardens from with-

out inwards and is consequently moulded to the form of the duct.

III. The secretion of the upper unpaired gland flows into the ductus, pushing before it the still soft core of the previous secretion and causing the tip of the latter to bulge out of the mouth of the vesica into the bursal cavity.

IV. The bulging tip is further distended by the entrance of the sperm, and the body of the spermatophore is formed.

V. The secretion of the accessory gland flows into the spermatophore and mixes with the sperm.

VI. The neck of the spermatophore is drawn out of the ductus ejaculatorious and bent up inside of the sac.

When the body of the sperm sac is full, muscular contraction of the bursal muscles upon it, aided by the chitinous teeth located in that region, and the repeated pushing of the ovipositor, guided by the penial groove, against the hollow hooks of the base of the penis, may cause the loosening and release of the sperm sac hooks inserted in them, (Plate II, Figs. 3-8.). When the sac is completely in the bursa, the male releases the female by removing his claspers from her. Contraction of the bursal muscles upon the body of the sperm sac forces sperm from it, through the bursal duct and vagina into the seminal receptacle, (Plate II, Fig. 15.).

THE SPERM PATH THROUGH THE FEMALE ORGANS.

Four females were taken from the stock boxes, killed, and their reproductive organs dissected from their bodies. The bursa, bursal duct, vagina, seminal receptacle and its duct, were separated, stained with borax carmine, dehydrated, cleared and embedded in paraffin. The parts of each female were kept separate. Sections were made six microns thick, stained with Delafield's hematoxylin and counter-stained with eosin.

In one female, sperms were found in the lower bursa, seminal duct, vagina and seminal receptacle. In another, sperms were found in the bursa, but in no other part. In the other two, remains of sperm sacs were found in the bursa but no sperms. I dissected the reproductive organs from a female known to be virgin, and treated the parts the same as above. I found no sperms or remains of sperm sacs.

The results suggest that there is a time just before laying, when sperms move from the bursa to the seminal receptacle. When the seminal receptacle is filled with sperms, the sperm sac in the bursa is partly emptied or emptied at once. If the sperm sac in the bursa is partly emptied, there may be enough sperms left in the sac to fill the seminal receptacle again. If the seminal receptacle's capacity is the same as that of the sperm sac, the sac may be emptied during the sperm transfer. When the seminal receptacle and sperm sac are empty, the empty sac is small enough to be released from the chitinous teeth in the lower bursa, and it is forced, or floated, up toward the top. When this condition exists the female is ready for another mating.

SUMMARY.

The contents of this paper grew out of a desire to verify Arnold Pictet's observations of Double Copulation in *Lasio-campa quercus*. Observations of *Telca polyphemus* and *Ephesia kuchniella* fail to furnish this verification. In hundreds of moths of the latter species, the penis was found in the bursal opening only. The same female may pair from one to five times, each pairing results in the formation of a sperm sac (spermatophore of Norris 1932). A maximum of five sacs was found in the bursa of a single female. The mode of formation of these sacs within the penis of the male, when it is thrust into the bursal duct, is described. The contents of each sperm sac are emptied before the next following copulation. The sperm passes from the sperm sac in the bursa to the seminal duct, to the vagina, and then to the seminal receptacle.

The writer is indebted to Dr. P. P. Calvert for suggesting the problem and for his direction during its progress. He is also grateful to Dr. P. W. Whiting for generous supplies of moths during the course of the investigation.

REFERENCES.

- NORRIS, M. S. 1932. Contributions towards the Study of Insect Fertility—The structure and operation of the reproductive organs of the genera *Ephesia* and *Plodia* (Lepidoptera, Phycitidae) Proc. Zool. Soc. London, 1932, pp. 595-611, 5 pls.
- PETERSEN, W. 1900. Beiträge Zur Morphologie der Lepi-

dopteren. Mem. Ac. St. Petersburg. (8) IX, no. 6, 144 pp. 4 pls.

PICTET, A. 1931 a. Sur le double accouplement et la double ponte de *Lasiocampa quercus* L. (Lépidoptères) *Rev. suisse Zool.*, Geneve, 38, pp. 373-375.

Id., 1931 b. Recherches experimentales sur le double accouplement et la double ponte de *Lasiocampa quercus* (Lépidoptères) et sur les consequences génétiques qui en resultent. *Rev. suisse Zool.*, Geneve, 38, pp. 449-467.

EXPLANATION OF PLATES.

PLATE II.

Fig. 1: The Male Reproductive Organs.

Figs. 2-8: Diagrams (based on preparations mounted as slides) to Show the Formation and Movement of Sperm Sacs from the Male to the Bursa; 2—Penis showing the two long pockets, small pocket, and the opening of the ejaculatory duct; 3—Sperm sac being formed with the bag slightly distended into the bursa; 4—The sperm sac being pulled away from the opening of the ejaculatory duct; 5—The opening in the neck is in the middle region of the penis; 6 and 7—Sperm sac is nearly in the bursa; 8—Sperm sac in the bursa. Dotted line shows sperm sac, broken line shows the hard chitin of the penis. Figs. 9-12: Sperm Sacs in the Bursa; 9—One sperm sac in the bursa; 10—Two sperm sacs in the bursa; 11—Three sperm sacs in the bursa; 12—Five sperm sacs in the bursa. Figs. 13, 14: Two Views of the Sperm Sacs removed from the Bursa; A—Bag of sperm sac; B—Neck of sperm sac; C—Long hook of sperm sac; D—Opening in the neck for the entrance of sperms and accessory gland secretion during its formation; E—Small hook of the sperm sac.

Fig. 15: The Female Reproductive Organs:

PLATE III.

Figs. 16-20: Cross Sections at Different Levels of the Virgin's and Mated Female's Bursae:

16—Cross section of lower virgin bursa, showing the circular muscle fibers M and chitinous teeth T; 17—A bursal cross section of a mated female showing sperm sac P between the chitinous teeth of the bursa, also a cross section of sperm sac neck N; 18—Cross section near the closed end of a virgin bursa showing layers of granular cheesy material G and secretion cells S.; 19—A bursal cross section of a mated female, showing the gelatinous secretion L in layers; 20—Cross section of the virgin bursa, showing layers of granular cheesy material G and secretion cells S.

**The Bees of the Genera *Chelostomopsis*, *Formicapis*,
Robertsonella and *Prochelostoma*.
(Hymen.: Megachilidae).**

By CHARLES D. MICHENER, University of California,
Berkeley.

Although not closely related to one another, the four genera of Osmiinae considered in this paper all have the general aspect of *Chelostoma*, being small, black, and finely punctured. Each is represented by a single species, restricted to North America.

CHELOSTOMOPSIS Cockerell.

Chelostomopsis Cockerell. 1925, Proc. Calif. Acad. Sci. (4) 14: 205.

Raphidostoma Cockerell, 1936, Pan-Pac. Ent., 12: 133. (n. syn.).

Black; head rather large; maxillary palpi four-segmented, longer than last two segments of labial palpi together; second segment of labial palpus a little over twice as long as first, third segment much narrower basally than apically; glossa nearly twice as long as facial line; prepectal carina absent; notauli linear; metanotum and base of propodeum nearly horizontal; first recurrent vein beyond first transverse cubital; base of first tergite smooth and polished, slightly concave, and bounded by a very weak carina; abdomen of male with only six exposed tergites.

The genotype and only species is *C. rubifloris* (Ckll.). *Chelostoma australis* Ckll. (*Chelostomopsis* Cockerell, 1925) and *C. lutzi* Ckll. are both to be placed in *Ashmeadiella*.

CHELOSTOMOPSIS RUBIFLORIS (Cockerell).

rubifloris Cockerell, 1898, Can. Ent., 30:50 (*Chelynia*).

edwardsii Cockerell, 1916, Entomologist, 49:157 (*Chelostoma rubifloris* subsp.) (n. syn.).

ceanothi Cockerell, 1936, Pan-Pac. Ent., 12:134 (*Raphidostoma*) (n. syn.).

♀: Mandibles longer than eye, weakly bidentate at apex; labrum of about the same length, truncate at apex; clypeus broad and low, with long, slender, dorso-ventrally flattened, median process; inner orbits diverging below; cheek broader than eye seen from side; head finely and closely punctate;

thorax finely and closely punctate; propodeum with a basal rugoso-striate band, below which is a polished, impunctate area; abdomen more finely and sparsely punctate than scutum, with distinct apical bands of pubescence on first four tergites. Length $5\frac{1}{2}$ to 9 mm.

♂: Mandibles bidentate, of normal size; labrum not enlarged; inner orbits converging below for lower portions; clypeus densely white hairy; structure of thorax and punctuation similar to female; apex of abdomen turned under; margin of sixth tergite produced and rounded medially, broadened into rounded angles laterally; profile of sixth tergite strongly convex basally, concave apically; process of coxopodite elongate, straight, flat, club shaped, with few short hairs; parameres slender, acutely pointed, their apical halves not united; abdominal bands very weak. Length $4\frac{1}{2}$ to 7 mm.

Raphidostoma ceanothi, the type of which is in the collection of the California Academy of Sciences, is the male of *C. rubifloris*. Since females from any one locality present all extremes in size, the name *edwardsii* (type in the British Museum), must be regarded as synonym.

This species is distributed through the Pacific states, mostly in mountain and foothill regions. Type locality: Seattle, WASHINGTON. The holotype is in the collection of the United States National Museum.

CALIFORNIA: Eagle Rock Hills, Los Angeles County, April 14, 1933, on *Rhamnus crocea*; Tetley Park, San Bernardino Mountains, May 16, 1936, on *Nemophila*; Crystal Lake, San Gabriel Mountains, July 7, 1934, on *Verbena prostrata*; Altadena, June 1, 1935, on *Lotus*; Eagle Rock, April 7, 1936, on *Salvia mellifera*; Mt. Diablo, April 26, 1937, on *Phacelia* (all Michener, collector); Cajon Pass, April 13, 1936 (G. E. & R. M. Bohart); Cobb Mountain, Lake County, May 7, 1936 (R. M. Bohart); Carrville, Trinity County, 2400 to 2500 feet, May 15, 1934 (G. E. Bohart); Santa Cruz County, 1500 feet, June 8, 1917 (W. M. Giffard); Fairfax, Marin County, April 12, 1921 (C. L. Fox); Yorkville, Mendocino County, May 1, 1924 (E. P. VanDuzee); Coffee Camp, Tulare County, June 11, 1925, on *Lotus glaber* (Timberlake); Swartout Valley, June 3, 1925, on *Phacelia californica* (Timberlake); Crestline, San Bernardino Mountains, May 23, 1936, in *Lotus davidsonii* (Timberlake); Mill Creek, San Bernardino Mountains, May 30, 1936, on *Phacelia brachyloba* (Timberlake); The Gavilan,

March 19, 1936, on *Rhus trilobata* (Timberlake); Valley of the Falls, San Bernardino Mountains, May 25, 1935, on *Phacelia davidsonii* (Timberlake); Sequoia Lake, June 12, 1925, on *Horkelia* (Timberlake).

OREGON: Corvallis, April 12, 1936 (G. Ferguson).

FORMICAPIS Sladen.

Formicapis Sladen, 1916, Can. Ent., 48:271.

Formicapis Cockerell, 1922, Can. Ent., 54:144.

Black, head large; maxillary palpi four-segmented, longer than last two segments of labial palpi together; first segment of labial palpus two thirds as long as second, third segment much narrower at base than at apex; tongue shorter than facial line; prepectal carina absent; notauli linear; metanotum and base of propodeum slightly slanting posteriorly; first recurrent vein nearly interstitial with first transverse cubital; base of first tergite with a short medial sulcus, anterior face of tergite impunctate though dull, in contrast to dorsum, not bounded by a carina; abdomen of male with seven exposed tergites and six exposed sternites.

FORMICAPIS CLYPEATA Sladen.

clypeata Sladen, 1916, Can. Ent., 48:271.

neomexicana Cockerell, 1922 (nec 1904) Can. Ent., 54:144 (misidentification).

♀: Mandibles broad, with large apical tooth, slightly smaller subapical tooth, followed by long edge bearing one or two low teeth; labrum broad basally, tapering to a narrowly rounded apex, and margined with a fringe of yellowish hairs; cheek nearly twice as broad as eye seen from side; clypeus low and broad, with a median snout-like process; clypeus and median part of supraclypeal area sparsely punctate and shiny; thorax and rest of head more closely punctate, duller; abdomen somewhat more finely and sparsely punctate than thorax; tergites with weak apical bands of white hair. Length 6 to 8 mm.

♂: Similar to female but mandibles and clypeus of normal size and shape; labrum shorter and hardly fringed; flagellum brown beneath; seventh tergite four lobed, median lobes rather close together and exceeding the others in length. Length 6½ mm.

Although this species has been called *Formicapis neomexicana* (Ckll.), the type of *Chelostoma neomexicana* Ckll. proves to be an *Ashmeadiella*, thus validating Sladen's specific name.

This species occurs in central Alaska and south to eastern

British Columbia and to Manitoba, and through the Rocky Mountains to Colorado. Type locality: Banff, ALBERTA. The holotype is in the Canadian National Collection at Ottawa.

COLORADO: Pingree Park, Larimer County, August 22, 1935 (Michener). SASKATCHEWAN: Malfort, July 20, 1916 (Sladen, Can. Nat. Coll.) ALBERTA: Nordegg, July 25 and 27, 1936 (E. H. Strickland); Beaverlodge, June 14 and 25, 1931 (E. H. Strickland and O. Peck). BRITISH COLUMBIA: Field, July 1, 1906 (G. Brown, Acad. Nat. Sci. Phil.) ALASKA: Fairbanks, June 30, 1921 (J. M. Aldrich, U. S. N. M.)

ROBERTSONELLA Titus.

Robertsonella Titus, 1904, Jour. N. Y. Ent. Soc., 12:22.

Small, black; maxillary palpi four-segmented, shorter than last two segments of labial palpi; first segment of labial palpus a little less than two thirds as long as second, third segment narrower at base than at apex; glossa a little longer than facial line; prepectal carina absent; notauli linear; metanotum and base of propodeum slanting posteriorly; first recurrent vein beyond first transverse cubital; base of first tergite with a median sulcus and no carina; abdomen of male with seven exposed tergites and six exposed sternites.

ROBERTSONELLA SIMPLEX (Cresson).

simplex Cresson, 1864, Proc. Ent. Soc. Phil., 2:384 (*Heriades*).

gleasoni Titus, 1904, Jour. N. Y. Ent. Soc., 12:23 (n. syn.).

♀: Mandibles short and broad, tridentate; clypeus with anterior margin produced, truncate, the truncation over twice as long as distance from end of truncation to lateral angle of clypeus; inner orbits converging below; cheek a little wider than eye, seen from side; head very finely punctate, clypeus closely so; scutum more coarsely and less closely punctate than vertex; mesepisternum only slightly more coarsely punctate than scutum; punctures of abdominal tergites separated by about their diameters or less; apical margins of abdominal tergites with inconspicuous apical bands of pubescence. Length $6\frac{1}{2}$ to 7 mm.

♂: Similar to female; mandibles bidentate; pubescence of clypeus and lower sides of face very short and dense, of even length; seventh tergite rounded posteriorly. Length 5 to 7 mm.

This species is found from Massachusetts to North Carolina and west at least to Illinois. Type locality: MASSACHUSETTS.

The type is in the collection of the Academy of Natural Sciences of Philadelphia, and is not an *Alcidamea* as has previously been supposed. Specimens from Grand Tower, Illinois, the type locality of *R. gleasoni*, the holotype of which is in the collection of the United States National Museum, show somewhat finer punctation on the first two abdominal tergites than in the more eastern specimens, thus approaching the subspecies *crataegina*. This species appears to be quite rare.

MARYLAND: Cabin John, May 18, 1915, on *Ranunculus* (A. H. Potting, U. S. N. M.). NORTH CAROLINA: Raleigh, May 8, 1924, May 2, 1928, April 30, 1932, all on *Rubus* (T. B. Mitchell).

ROBERTSONELLA SIMPLEX CRATAEGINA (Cockerell).

crataegina Cockerell, 1909, Ann. & Mag. Nat. Hist., (8) 4:28.

crataegina Michener, 1936, Am. Mus. Nov., 875:16.

This form is so close to typical *simplex* that it seems unwise to regard it as a full species. It may be distinguished from *simplex* by the somewhat finer punctures of scutum, greater contrast between them and those of mesepisternum, and by finer punctures of tergites, which are separated by more than their diameters.

This subspecies is found in Texas. Type locality: Fedor, Lee County, Texas. Type in the Cockerell collection at Boulder, Colorado. An additional locality is Paris, Texas, April 10, 1904 (F. C. Bishopp, U. S. N. M.).

PROCHELOSTOMA Robertson.

Prochelostoma Robertson, 1903, Trans. Am. Ent. Soc., 29: 167 & 171.

Prochelostoma Titus, 1904, Jour. N. Y. Ent. Soc., 12:24.

Small, black; maxillary palpi four-segmented, shorter than last two segments of labial palpi together; second segment of labial palpus about three times as long as first; third segment narrower basally than apically; glossa a little longer than facial line; prepectal carina absent; notauli linear; thorax elongate, metanotum and base of propodeum horizontal; first recurrent vein beyond first transverse cubital; first tergite with a sulcus at base, and no carina; male with seven exposed tergites.

This genus is close to *Chelostoma*, perhaps a subgenus or a

synonym of it, being distinguished primarily by the shape of the third segment of the labial palpus. The genitalia are similar to those of *Chelostoma*. The process of the coxopodite is nearly straight, and the parameres are broad through pointed apically, and contiguous throughout their length.

PROCHELOSTOMA PHILADELPHI (Robertson).

philadelphii Robertson, 1891, Trans. Am. Ent. Soc., 18:64 (*Heriades*).

philadelphia Robertson, 1900, Trans. Acad. Sci. St. Louis, 10:52 (*Chelostoma*).

philadelphii Robertson, 1903, Trans. Am. Ent. Soc., 29:171.

♀: Mandibles long, bidentate, the apical tooth largest; labrum long, truncate apically; clypeus low, apical margin straight; inner orbits slightly converging below; cheeks as wide as eye seen from side; punctation rather fine and not close, that of mesepisternum coarser and sparser than that of head and rest of thorax; dorsal area of propodeum coarsely rugosostriate; abdomen without hair bands. Length 7 mm.

♂: Similar to female; labrum and mandibles of normal size; mandibles bidentate; cheek somewhat narrower than eye seen from side; seventh tergite with a pair of rather slender, pointed, median teeth, and sharp lateral angles (about right angles). Length 5 to 6 mm.

This species occurs from New York to Georgia and west to Michigan and Illinois. Type locality: ILLINOIS. The type is no doubt in the collection of Charles Robertson, which is still in Carlinville, Illinois.

GEORGIA: Thompson Mills, April, 1910 (H. A. Allard). NORTH CAROLINA: Wilmington (J. T. Riley); Bryson, May 24, 1923, on *Philadelphus* (T. B. Mitchell); Raleigh, May, 1928 (Mitchell collection). VIRGINIA: Washington Country Club, Arlington County, on *Philadelphus* (P. H. Timberlake, J. C. Bridwell). DISTRICT OF COLUMBIA: Washington, June 1, 1907 (Wm. Palmer, U. S. N. M.). MARYLAND: Hyattsville, May 21, 1915, on *Philadelphus coronarius* (A. H. Pottinger). INDIANA: Anderson, June 18, 1913 (M. D. Ellis). OHIO: Columbus, May 24 and 28, 1902 (J. C. Bridwell, U. S. N. M.) PENNSYLVANIA: Harrisburg, May 24, 1908 (P. R. Myers, U. S. N. M.) NEW YORK: Ithaca, June 10, 1914. (U. S. N. M.). MICHIGAN: Ann Arbor, June 10, 1936 (G. Steyskal, Bohart collection).

The Occurrence of *Nemobius sparsalsus* Fulton in Southern New Jersey. (Orthoptera: Gryllidae).

By HENRY FOX, Department of Biology, University College, New York University.

Fulton¹ in 1930 described *Nemobius sparsalsus* from material taken in salt marshes near Wilmington, North Carolina, and Hebard² simultaneously recorded it from four other localities, indicating its probable general occurrence southward along the coast from the type locality to southern Florida and thence west to, at least, Galveston, Texas. So far as recorded, the species is an inhabitant of salt marshes in association with grasses of the genus *Spartina*.

Observations during the past season (1937) have shown that this interesting cricket is not uncommon in restricted areas along the landward margins of the salt marshes in Cape May County, New Jersey. So far it is definitely known only from the two localities listed below, but future search will doubtless reveal its presence in suitable situations throughout the entire County, and perhaps also in the remaining maritime sections of southern New Jersey. By this discovery the known range of the species is extended fully 400 miles north of the type locality, which hitherto has been a northern limit record.

Definite records of the species in southern coastal New Jersey are as follows:

Ocean View, N. J., September 3-4, 1937, 10 ♂, 9 ♀.

Clermont, N. J., September 14, 1937, 10 ♂, 14 ♀.

In addition to the preceding, I found 5 males and 1 female of the same species in an unlabelled lot of *Nemobius*, which was collected mostly at Ocean View, in the early autumn of, I believe, 1931, and preserved in formalin for future study.

Sample specimens from the series of 1937 were submitted to Dr. Fulton, who kindly verified and confirmed my determination of them as the present species.

Fulton, in commenting upon the habitat of *N. sparsalsus* as observed at the type locality, described it as occurring only in

¹ Ent. News XLI: 38-42.

² *Ibid*: 42-43.

the thick growth of marsh grass, *Spartina stricta*, which is one of the dominants in the salt marshes of the North Carolina Coast, forming a zone bordering the brackish sounds. He describes this grass as growing about a foot high in a black silty mud partly or entirely submerged at high tide and states that the crickets live about the crowns of the grass and on the ground where they presumably need to be constantly alert to avoid the fiddler crabs which overrun the place³.

So far as my observations extend, the habitat of *N. sparsalus* in the Cape May section is a very narrow tract, rarely more than a few yards wide, which coincides essentially with the upper limit of daily high tide. The latter forms the boundary between what botanists term the tension zone, lying between dry land and the salt marsh, and those daily flooded portions of the marsh in which fully saline conditions are represented and where the bulk of the vegetation consists of the tough cord grass, *Spartina alterniflora*.⁴ The cricket, however, was not found in ground occupied by this grass, as originally reported by Fulton in North Carolina, but within the adjacent borders of tracts carpeted with a dense matted growth, about a foot high, formed of the two wiry-stemmed grasses, *Spartina patens* and *Distichlis spicata*, the former predominating. These

³In a recent letter Fulton informs me that, since he published on this species, he has collected it at the original locality but once and on that occasion found it only in a very narrow zone of *Juncus roemerianus* at the upper limit of high tide, the *Spartina stricta* being flooded at the time. He mentions Dr. B. W. Wells, of the Botanical Department of North Carolina State College, as stating that this *Juncus* in North Carolina forms a zone between *Spartina stricta* and *S. patens*. This is not true of salt marshes in southern New Jersey, where *J. roemerianus* is absent and the zone of *S. patens* immediately adjoins the areas occupied by *S. stricta* (= *S. alterniflora*).

⁴I am indebted to Dr. John Milton Fogg, Jr., of the Botanical Department of the University of Pennsylvania, for the information that this is the currently accepted name among botanists of the grass which in most of the past publications on the salt marshes and their biota was designated *S. stricta*, though I had previously read a statement to the same effect in certain of the more recent reports of the New Jersey Mosquito Extermination Commission. From the latter source I understand that true *S. stricta* is an Old World form, now recognized as specifically distinct from its relative on this side of the Atlantic. In Stone's Flora of Southern New Jersey, our plant is termed *S. glabra*, with *alterniflora* listed as a variety. Dr. Fogg informs me that the local plant is variety *pilosa*, typical *alterniflora* being of more northern range.

grasses belong to the tension zone previously referred to, where they occupy ground which, while low and permanently moist, is sufficiently elevated above the general surface of the marsh to escape flooding except during more or less widely separated intervals of exceptionally high water.

It may conduce to a clearer understanding of the observed haunts of this species in Cape May County to point out that they mark the lowest limit of growth of the so-called "salt hay" of the region, which is extensively harvested in the late summer and fall, the earliest cutting of the hay being coincident with the appearance of the adult cricket. This hay is composed in the main of the two wiry-stemmed grasses previously mentioned, *Spartina patens* and *Distichlis spicata*, and a rush, *Juncus gerardi*, which intermingles with and largely replaces the former on the somewhat higher and firmer sections of the tension zone adjoining the mainland. Cutting of the salt hay ceases abruptly along the line where the tension zone meets the regularly flooded part of the salt marsh dominated by *Spartina alterniflora*. The latter is too coarse a grass for an acceptable component of the hay and moreover grows in ground too soft to support the horses and wagons used to haul the hay.

In its undisturbed haunts *N. sparsalsus* is an extremely difficult insect to capture. The crickets are extremely active and, when rooted out of their shelter in the thick grass, leap rapidly about over the surface for a second or two and then dive down into the tangled wiry mass of stems and leaves and are almost instantly lost to view. Once they have disappeared in this manner, it is next to impossible to force them to expose themselves a second time. Under these circumstances it was found impractical to capture the insects by holding the open net on the surface of the grass and herding them into it, as was done by Fulton in securing his original series. Instead, they were mostly secured by quickly striking the palm of the hand down upon them as they started to hide in the grass, thereby preventing them from penetrating further and thus making it possible to hold them in place long enough to be extricated by

the fingers. Less frequently individuals were captured by a quick stroke of the net while leaping over the surface. The former method, however, was the more successful, although it often meant damaged specimens.

Collecting the species was much facilitated after harvesting of the salt hay crop had removed a large part of the tangled mass of grass in which the crickets hide. Thereafter the only shelter left for them was scattered wisps of partially cured hay remaining on the ground after the removal of the bulk of the crop. By trampling upon such patches, the insects hiding beneath were much more readily induced to expose themselves than in the uncut grass and were then frequently captured before they succeeded in regaining shelter beneath some other stray wisp of hay.

One of the stations at Ocean View in which *N. sparsalsus* was found is noteworthy because of its virtual isolation from the usual habitat of the species, which, as was previously stated, is located in the tension zone of the salt marsh adjacent to the mainland. The station in question is a small tract, scarcely $\frac{1}{4}$ acre in extent, isolated in the salt marsh about $\frac{1}{8}$ mile from the nearest part of the mainland. Although surrounded on all sides by regularly flooded salt marsh dominated by *Spartina alterniflora*, this tract rises sufficiently above the general level of the marsh to escape daily flooding by the tide, and, in apparent correlation with this fact, the ground supports, and indeed is buried from sight beneath, an extremely dense growth of mostly *Spartina patens*. On the highest part of this tract occurs a small thicket of the shrub, *Iva frutescens* growing up through the grass. *N. sparsalsus* was scarce in this particular station and was only observed in a very narrow tract of the *Spartina patens* lying between the thicket of *Iva frutescens* and the nearest part of the area occupied by *S. alterniflora*.

From Fulton's published account of the habitat of the species in North Carolina, I had supposed that *N. sparsalsus*, if it occurred in New Jersey, would most likely be found in areas of the salt marsh dominated by *Spartina alterniflora*.

The ground where this grass grows is perpetually wet and is formed of a black silty mud, like that mentioned by Fulton. In places where the ground at high tide is covered with more than a few inches of water, as on the shores of the sounds and the banks of the numerous tidal creeks, which tortuously meander over the marsh, this grass reaches its greatest size, growing to a height of 4 to 8 feet, and thus forming a decidedly reedy growth. Elsewhere, over the nearly level, better drained, general surface of the marsh, on which the water at high tide normally averages less than 2 inches deep, the same grass grows only from about a foot to knee-high, thus giving the landscape the general appearance of a meadow rather than a marsh⁵. This shorter grass forms a much closer stand than the tall variety and, because of this fact, as also on account of the better drainage, the ground occupied by it, although wet, is ordinarily sufficiently firm to be likened to a turf. On the other hand, the ground occupied by the reedy type is a quite soft, oozy mud, largely bare in the relatively wide interspaces between the crowns of the plants. Such surroundings form the favored haunts of the fiddler crabs which abound there, whereas they are much less numerous in the denser growth formed by the short variety of the grass.

Although the type of environment last described would seem to correspond closely with the habitat of *N. sparsalsus* as described by Fulton, all my efforts to find it,—or, for that matter, other species of cricket—, in similar surroundings in New Jersey have been fruitless. This remark applies to areas dominated by all forms of *Spartina alterniflora* irrespective of the height attained by the plants or the density of the growth formed by them.

In the special type of grassland formation in which *N. sparsalsus* has been found in Cape May County, fully mature fiddler crabs appear to be scarce, the compact, matted growth making it difficult for them to move about readily. However, the section of the same formation which adjoins the area occupied by *Spar-*

⁵It is probable that much of this condition has resulted from the digging of innumerable drainage ditches which accommodate much of the water which would otherwise overflow the general surface.

tina alterniflora affords shelter to large numbers of young fiddlers, of about the same size as the *Nemobius*, and so like the latter in tint and superficial aspect that I frequently caught them by mistake while hunting for the crickets. So far as I observed, there were no indications that these young fiddlers ever disturb the *Nemobius*, except perhaps as a result of mere mechanical contact.

Wherever *N. sparsalsus* occurred, I found it associated with much greater numbers of *N. fasciatus socius*⁶. The latter in general, however, appeared to prefer slightly dryer ground, being most numerous in those sections of the *Spartina patens* where that grass intermingles with and is largely replaced by *Juncus gerardi*.

Nemobius cubensis was also a rather regular associate, but occurred in much smaller numbers than *N. fasciatus socius*.

Although *N. sparsalsus* was present in limited areas in fairly considerable numbers, it seems to be rather local or erratic in its distribution in the section of Cape May County where it was discovered. Although the time available precluded extensive search, on more than one occasion I looked for it in vain in several places along the margins of the salt marshes near Ocean View where, to all appearances, ground and vegetational conditions were identical with those in other stations where the species was found without difficulty.

Where To Collect Insects?

By H. ELLIOTT McCLURE, Iowa State College, Ames, Iowa.

When students in entomology at the University of Illinois formed a collector's club, the first question discussed was where to collect insects. This may best be answered by stating that they may be found everywhere and all the time, but certain groups are restricted to definite habitats and many interesting forms may be found in unusual places.

The accompanying outline is an attempt to list the habitats usual and unusual in which insects and their relatives may be

⁶ Reference confirmed by B. B. Fulton on the basis of examples sent him.

collected and something of the groups available in them. It may serve to call to mind other places for collecting and other groups to take.

As a general rule, collecting should be done at night as well as during the day, for many soil and soil surface forms are on the foliage at night. Mesic situations heavily overgrown generally yield better collecting than drier or upland habitats.

A. Indoors.

1. Dwellings: bedbugs, roaches, fleas, clothes moths, etc. Basements: Spiders, house centipedes, silverfish, psocids, midges, box elder bugs, squash bugs, camel crickets, crickets, etc.

2. Greenhouses: Mites, mealy bugs, scales, white fly, sow bugs, millipeds, psocids, leaf tyers, Collembola, midges, thrips, psychodids, etc.

3. Mushroom beds: Mites, Collembola, fungus gnats, staphylinids, etc.

4. Barns: Flies, hibernating insects in straw and under boards, flea larvae, etc.

5. On stock and pets: Lice, ticks, fleas, mites, sheep ticks, bot flies, warbles, etc.

6. Warehouses: Weevils and moths in candies, fruits and tobaccos, flies, spiders, etc.

7. Museums: Dermestids, psocids, etc.

8. Grain bins: Stored grain insects.

9. Jails and Gymnasiums: Lice, bedbugs, etc.

B. Outdoors.

1. Aquatic.

a. Streams.

Riffles: Plecoptera, Heptagenia, longtoed water beetles, Corydalis, Hydropsyche, Similium, tipulids, etc.

Pools: Hexagenia, hydrophilids, dytiscids, chironomids, water striders, gyrenids, Odonata, etc.

Banks: Haliplids, toad bugs, Collembola, spiders, Plecoptera, etc.

b. Temporary pools: Trichoptera, dytiscids, hydrophilids, corixids, notonectids, Eubranchipus, amphipods, ostracods, copepods, isopods, etc.

c. Lakes and ponds: Chironomids, beetles, Hexagenia, Trichoptera, etc.

d. Oceans.

Tide rack: Dermaptera, ephydriids, beetles, crustaceans, etc.

Open water: Water striders, beetles, etc.

Marine mammals: Lice, parasites, etc.

2. Swampy situations.

a. Rush swamps: Tabanids, tipulids, belastomatids, aquatic Hemiptera, aquatic Coleoptera, etc.

b. Lowlands: Tabanids, tipulids, fly larvae, beetles, mosquitoes, etc.

c. Bogs: Staphylinids, spiders, wide variety of beetles, parasites, psocids, etc.

3. Terrestrial.

a. Subterranean: Cave crickets, cave insects, etc.

b. Bare Ground and banks: Digger wasps and their parasites, Bembidion, cicindellids, heterocerids, carabids, etc.

c. Cliffs: Mud daubers and their parasites, flies, solitary bees, etc.

d. Sand: Cicindellids, trap door spiders, myrmeleonids, white grasshoppers, etc.

e. Prairie.

Soil: White grubs, ants, Dermaptera, elaterids, millipeds, mites, etc.

Soil surface: Chinch bugs, other Hemiptera, spiders, minute beetles, Collembola, mites, etc.

Plants, especially when in bloom: Vast numbers of forms including thrips, flies, beetles, locustids, moth larvae, mantids, mordellids, rhipiphorids and other rare beetles, Hymenoptera, etc.

f. Gardens.

Soil: Mole crickets, elaterids, Diabrotica, tenebrionids, moth pupae and larvae, etc.

Plants: Moths, butterflies, cutworms, beetles, hornworms, bees, wasps, aphids, etc.

g. Field Crops: Seed chalcids, ear worms, weevils, meloids, chrysopids, hemerobiids, spiders, etc.

h. Pasture: Locustids, mantids, meloids, piesmids, Orius, spiders, mites, Collembola, etc.

i. Orchards.

Soil: Cicadids, white grubs, elaterids, tenebrionids, etc.

Soil surface: Silphid larvae, ants, carabids and larvae, teleophorid larvae, Collembola, pseudoscorpions, mites, etc.

Weeds: Abound with insects including chrysopids, Tetraroepes, flies, wasps, butterflies, Hemiptera, ants, etc.

Trees: Scales, loopers, coccinellids, aphids, tingids, etc.

Bloom visited by numerous flies, wasps, moths, beetles, etc.
Fallen fruit visited by bees, flies, butterflies, beetles, etc.

j. Forest.

Deciduous.

Soil: Ants, elaterids, bibionids, cicadas, mites, etc.

Soil surface: Collembola, mites, spiders, pseudoscorpions, beetles, thrips, fly larvae, beetle larvae, Hemiptera, fulgorids, staphylinids, tingids, ants, etc.

Herbs: Leafhoppers, flies, Hemiptera, chrysomelids, Mecoptera, psocids, minute beetles, ants, etc.

Shrubs: Chrysomelids, moth larvae, spiders, tingids, fulgorids, Mecoptera, membracids, chermids, gall insects, minute beetles, ants, etc.

Trees: Spiders, pentatomids, weevils, cerambycids, moth larvae, phasmids, psocids, membracids, tettigoniids, gall insects, etc.

Evergreen.

Soil: Ants, tenebrionids, Dermaptera, etc.

Herbs and Shrubs: About the same as the deciduous forest.

Trees: Scale insects, bud worms, loopers, tenthredinids, scolytids, etc.

4. Trees.

a. Living: Borers in stems and trunks, leaf eaters, galls, etc. Eggs and cocoons on bark.

b. Dead: Under Bark: Histerids, aradids, borers, tipulids, staphylinids, centipedes, mites, Collembola, etc.

In Trunk: Passalids, elaterids, ants, termites, beetle larvae, centipedes, Collembola, insects differ with the degrees of decay, etc.

In Stumps: Termites, cucujids, ants, etc.

5. Fungi: Mycetophilids, drosophilids, staphylinids, fungus beetles, Collembola, fly larvae, mites, etc.

C. Miscellaneous Situations.

1. Hanging leaves in winter time: Moth cocoons and larvae, spiders, pentatomids, etc.

2. Galls: Trypetids, cecidomyids, cynipids, chalcids, ichneumonids, ants, mordellids, minute beetles, etc.

3. Manure: Scarabeids, drosophilids, flies, other beetles, muscoids, silphids, staphylinids, butterflies, mites, Collembola, etc. Different kinds and different ages of manure have different insects visiting it.

4. Flowers: Meloids, cantharids, dolichopodids, mordellids, ptiliids, other minute beetles, thrips, triangulin larvae, geometrids, rhipiphorids, enicocephalids, syrphids, psocids, phymatids, etc.

5. Cacti: Hemiptera, tettigoniids, moth larvae, etc.
 6. Cattails or rushes: Moth larvae, parasites, hibernating insects.
 7. Stalks of weeds: Moth larvae, Hymenoptera, beetle larvae, etc.
 8. Birds: Mallophaga, fleas, mites, etc.
 9. Birds' nests: Staphylinids, mites, mallophaga, spiders, fly larvae, hibernating insects, scavenger insects, etc.
 10. Garbage: Flies, stratiomyids, beetles, butterflies, etc.
 11. Dead animals: Silphids, staphylinids, histerids, scarabaeids, dermestids, sarcophagids, etc. Varies with the age of the corpse.
 12. Freshly killed or live wild animals: Fleas, lice, platyp-sillids, mites, etc.
 13. In the air: Sciarids, chironomids, aphids, staphylinids, minute beetles, minute Hymenoptera, coccids, spiders, muscoid flies, etc.
 14. Ant and termite nests: Pselaphids, staphylinids, histerids, flies, scydmaenids, silphids, other termitophiles, etc.
 15. Under stones: Ants, carabids, larvae, Myriemoma, Embioptera, Grylloblatta, centipedes, millipeds, etc.
 16. Old paper wasp nests: Roaches, spiders, mites, etc.
 17. Honey bee and Bumble bee nest: Moths, chrysidids, volucella larvae, etc.
 18. Mouse runs and nests: Fleas, lice, Collembola, carrion beetles, etc.
 19. Crotches or stumps filled with water: Rat-tailed maggots, other larvae, fungus beetles, etc.
 20. Oil pools: Fly larvae, etc.
 21. Traps: Bait traps: Wasps, moths, beetles, flies, etc.
- Light traps: Moths, tipulids, Plecoptera, Trichoptera, cicadellids, numerous Hymenoptera, numerous beetles, phasmids, numerous Hemiptera, etc.
- Bands on trees, tarpaper, corrugated paper, gunnysacks or other material: Roaches, psismids, curculionids, trogositids, spiders, cerambycids, moth larvae, mites, centipedes, millipeds, Collembola, etc.

Rearing insects yields you the adults of any immature forms that you are successful in feeding and keeping alive.

It is not necessary to cease collecting with the advent of cold weather, as insects are almost as abundant in the winter as in the summer. Following are some suggestions as to where to collect in the winter:

Sweeping plants yields spiders,	In soil surface debris.
Plecoptera, chermids, beetles, and others.	Among grass roots.
Under stones.	Along fence rows.
Dead leaves hanging on trees and shrubs.	In birds' nests.
In old stalks of plants.	In wasps' nests.
In logs and stumps.	On and under bark of living trees.
In aquatic situations.	In mouse runs and burrows.
Under bridges and ledges—	On domestic animals.
for Plecoptera mainly.	On freshly killed game.
In old buildings.	Indoors.
	Under dead animals.

Supella supellectilium (Orthoptera, Blattidae) in Pennsylvania.

In a recent paper Mr. E. A. Back, of the United States Department of Agriculture (Proc. Entom. Soc. Wash., XXXIX, pp. 205-213, figs. 1 and 2, pls. 18 and 19, 1937) has called attention to the spread of the circumtropical cockroach *Supella supellectilium* (Serville) over a considerable portion of the United States. The most northern of the records cited by him are in the Mississippi Valley and the southern Great Lakes region, i. e. Kansas City, Missouri; [Lincoln,] Nebraska; Urbana and Chicago, Illinois; Indianapolis, Indiana. No records from north of Atlanta and Savannah, Georgia are given for the Southeastern or Atlantic States.

Some weeks ago my colleague Mr. E. T. Cresson, Jr., brought to me a male individual of this species taken in his home at Swarthmore, Delaware County, Pennsylvania, February 8, 1938. This is apparently the first noted occurrence of the species anywhere near the coast north of Savannah.

The interior marginal records given by Back can also be amplified by the following ones drawn from material in the Hebard Collection at the Academy of Natural Sciences of Philadelphia: Fort Leavenworth, Kansas; V, 19, 1935; (T. C. Lawrence); 2 ♂, 1 ♀: Springfield, Illinois; XII, 17, 1935, in hotel; 1 ♂.

Back has overlooked the fact that *Supella supellectilium* recently has been recorded from the southwestern United States, i. e. Tucson, Arizona, by Hebard (Trans. Amer. Entom. Soc., LXI, p. 273, 1935). The material on which this record was based includes both sexes, and the species doubtless is there well established.—JAMES A. G. REHN.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—Bishopp, F. C.—Entomology in relation to conservation. [12] 31: 1-11. Czyzewski, J. A.—Zygmunt Mokrzejcki, a prominent Polish entomologist. [Polski Pismo Ent.] 14-15: 1-80, ill. Davis, W. T.—Natural history records from the meetings of the Staten Island Nature Club. [Proc. Staten Isl. Inst. A. & S.] 8: 19-57. Granovsky, A. A.—Insects in relation to diseases of truck crops. [12] 31: 11-19. Haldeman, S. S.—Some Historical material relating to by H. B. Weiss. [6] 46: 45-48. Innes, Walter Francis—Obituary. [Bull. Soc. R. Ent. Egypt] 21: 173-174, ill. Keen, F. P.—Insect enemies of western forests [U. S. D. A. Misc. Publ.] no. 273: 209 pp., ill. Keler, S.—Zur Nomenklatur einiger Mallophagen-genera. [Polski Pismo Ent.] 14-15: 313-323. Kunkel, L. O.—Insects in relation to disease of fruit trees and small fruits. [12] 31: 20-23. Leach, J. G.—Insects in relation to diseases of shade and forest trees. [12] 31: 23-24. Minkiewicz, R.—Les lois de la sexualisation des couleurs chez les insectes. [Polski Pismo Ent.] 14-15: 144-214, ill. Murillo, L. M.—Sentido de una lucha biologica. [Rev. Acad. Colombiana] 1: 376-410, ill. Nuttall, G. H. F.—Obituary. [4] 70: 40. Poos, F. W.—Insects in relation to diseases of cereal and forage crops. [12] 31: 24-39. Riley, N. D.—Entomo-museology. [31] 141: 348-349. Tillyard, R. J.—Obituary by A. D. Imms. [12] 31: 135-136. Weiss, H. B.—Some historical material relating to Prof. S. S. Haldeman. [6] 46: 45-48.

ANATOMY, PHYSIOLOGY, ETC.—**Brauns, A.**—Die "Pflöckchen" der Anthomyiden (Diptera). [3+] 121: 137-149, ill. **Busnell, R. G.**—Influence du régime alimentaire sur la biochimie et la biologie du *Leptinotarsa decemlineata* a l'état d'insecte parfait: Action du *Solanum demissum* et des hybrides de cette plante. [C. R. Acad. Sci.] 206: 694-696. **Chauvin, R.**—Anatomie et histologie du tube digestif de *Schistocerca gregaria* (Orth: Acrididae). [Bull. Soc. Hist. Nat. Afr. Nord] 28: 488-499. **Craig & Clark**—The pH concentration and buffer value of the blood of larvae of *Pieris rapae* & *Heliothis obsoleta*. [12] 31: 51-54, ill. **Dorman, Hale & Hoskins.**—The laboratory rearing of flesh flies and the relation between temperature, diet and egg production. [12] 31: 44-51. **Evans, A. C.**—Studies in the distribution of nitrogen in insects. I. In the castes of the wasp *Vespula germanica*. [107] A, 13: 25-29. **Hilton, W. A.**—Nervous system & sense organs. LXX.—Euplexoptera. LXXI.—Ephemera. [13] 30: 26-29; 30-35, ill. **Lawrence, R. F.**—The odoriferous glands of some So. African harvest spiders. [Trans. R. Soc. S. Africa] 25: 333-342, ill. **Levereault, P.**—The morphology of the Carolina mantis (Orthoptera). [Univ. Kans. Sci. Bull.] 24: 205-259, ill. **Maloeuf, S. N. R.**—The physiology of arthropodan development with special reference to the insects. [Bull. Soc. R. Ent. Egypt] 21: 88-152, ill. **Misra, A. B.**—A study of the chromosomes of two Japanese spp. of spittle insects belonging to the family Cercopidae (Homoptera). [Journ. Fac. Sci. Hokkaido Imp. Univ.] 5: 255-264, ill. **Querci, O.**—Influence de l'ozone sur les insectes. [Lambilliona] 38: 61-64. **Richins, C. A.**—The metamorphosis of the digestive tract of *Aedes dorsalis* (Dipt.: Culicidae). [7] 31: 74-87, ill. **Schaefer, P. E.**—The embryology of the central nervous system of *Phormia regina* (Dipt.: Calliphor). [7] 31: 92-111, ill. **Schulze, P.**—Über rein glabellare Karapaxbildungen bei Milben und über die Umgestaltung der Vorderkörpers der Ixodidea als Folge der Gnathosomaentstehung. [46] 34: 135-149, ill. **Stella, E.**—Ricerche citologiche sui nenti e sui riproduttori delle termiti italiane (*Calotermes flavicollis* e *Reticulitermes lucifugus*). [Att. R. Acad. Naz. Lincei, Rome] 7; fasc. 1: 3-30, ill. **St. Quentin, D.**—Die Tibialleiste der Odonaten. [34] 121: 225-239, ill. **van Schreven, A. C.**—Über die sogenannten Tracheenlungen von *Grvllus domesticus*. [34] 121: 263-264. **Wilder & Smith.**—The Malpighian tubules in the adult *Melanotus com-*

munis (Coleop: Elateridae). [7] 31: 61-67, ill. **Yeager, J. F.**—A modified Wright's blood-staining procedure for smears of heat-fixed insect blood. [7] 31: 9-14.

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Barnes and Benjamin List of Diurnal Lepidoptera, both out of print.

The announcement is to the effect that a new "Check List of the Macrolepidoptera of Canada and the United States of America" is now in print.

This is to be issued as Volume One of a new series of "Memoirs" of the So. Calif. Academy of Sciences. It will be printed on a durable offset book paper which will take ink without running or blotting. The page size of the work will be 7 by 10 inches, which will insure wide margins around the type material.

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Dr. McDunnough has brought this list down to the end of 1937, incorporating all of the species added to the literature since the publication of the earlier list, and thoroughly revising the material to conform to them many excellent revisions of the various groups that have been issued by specialists. His own eminent standing as a systematist insures a work that will be indispensable to all who operate in the field of North American Lepidoptera.

Further details regarding the above may be obtained by writing Dr. John A. Comstock, Treas., So. Calif. Academy of Sciences, c/o Los Angeles Museum, Exposition Park, Los Angeles, Calif.—JOHN A. COMSTOCK.

A Substitute Name for *Dicellura* (Rehn and Hebard)

(Orthoptera: Tettigoniidae.)

In 1915 in the Transactions of the American Entomological Society (XLI, pp. 158, 161, 169) we proposed the name *Dicellura* for a subgenus of the tettigoniid genus *Conocephalus*. An examination of generic name indices then available failed to show prior use of the name. However, it has recently been called to our attention that Halliday in 1865 (Journ. Linn. Soc. London, Zoology, VIII, p. 162) first used the name *Dicellura* for a new genus of Thysanura. To replace our preoccupied *Dicellura* we here propose *Dicellurina*, with the same genotypic species, i. e. *Conocephalus allardi* [*Xiphidion allardi*] (Caudell).—JAMES A. G. REHN and MORGAN HEBARD.

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—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstern, Department of Entomology, Cornell University, Ithaca, New York.

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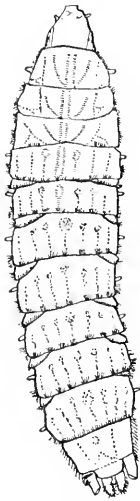


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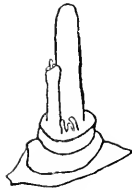


Fig. 2.



Fig. 3.



Fig. 4.

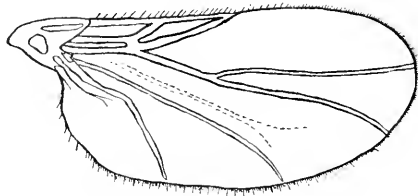


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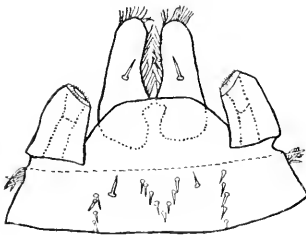


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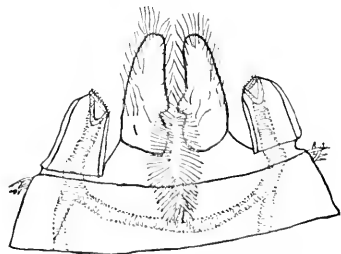


Fig. 7.

SCATOPSE (RHEGMOCLEMA) SIMILIS N. SP.—BEEKEY

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The Immature and Adult Stages of a New Species of Scatopse from Maine. (Diptera: Scatopsidae).

By CYRUS E. BEEKEY.

(Plate IV.)

Some flies which differ from previously described species but closely resembling *S. subnitens* Verrall (= *nigra* (Mg.) Edw.) an European species, were submitted to me by Dr. O. A. Johannsen of Cornell University. The larvae and pupae were found beneath the loose bark of spruce logs, which were floating in the Penobscot River, in the vicinity of saw mills, at Orono, Maine, in October. They occurred just above the water line where they were kept moist by the capillary action.

Scatopse (Rhegmoclema) similis n. sp.

Larva. Head capsule strongly sclerotized, flattened dorso-ventrally, truncate, slightly longer than wide; surface generally smooth on top but laterally sculptured. Eyes absent. Antennae small, slender, with papillae-like blade or spike on the second segment (fig. 2). Labrum with groups of fine spines projecting from its under surface; premandibles with five distinct teeth, the fourth and fifth being finer and longer than the first three. Mandibles with four teeth in one plane, and one more proximad directed toward the others. The "leaf-like structure" found in some other species was not observed in *S. similis* but in its place were several long, stout bristles. Besides these there is a fringe of bristles extending about the distal third of the mandible on the dorso-lateral side. The maxilla is similar to that of other species, the distal lobes with blunt teeth.

Body composed of twelve segments, each of which, except the eleventh, more than twice as broad as long (fig. 1); dorsal side more strongly sclerotized than the ventral. First thoracic segment bears a lateral spiracle; first six abdominal segments are of uniform width; first abdominal segment apparently overlapping the third thoracic as well as the second abdominal, and somewhat bi-convex with reference to its anterior and pos-

terior margins. Each abdominal segment with a pair of lateral spiracles, except the eighth and ninth; those on the eighth abdominal segment project caudally, stout, and heavily sclerotized; ninth tergite projecting over the bases of stout caudal papillae (fig. 6).

The dorsal setae pattern of *S. similis* is quite characteristic (fig. 1). There is a median longitudinal row of bristles on all segments except eleven and twelve. This row is double on segments one to four inclusive and partly so on the fifth and sixth. On the thoracic segments there are two more rows of setae on each half; those next to the median row diverging anteriorly. The next row on the first two segments is almost parallel to the median row. It is joined by short, slightly curved, transverse rows. On the third segment the lateral longitudinal row also diverges from the posterior to the anterior margin. On segments four to ten inclusive, in addition to the median row, there are three rows in each dorsal half of a segment. Often the third row is considerably broken. These rows are nearly parallel with the median row. On the fourth segment the rows next to the median seem to have at their anterior ends small loops. These, although less regular, are found in a similar position on segments five to nine inclusive. On the sixth segment and those following, the median row of setae appears to have a small, more or less circular area of setae at the anterior end. The setae on the eleventh segment (fig. 6) roughly represent the letter "W" with the outer arms pointing anteriorly. The setae on this segment are longer and stronger than those previously described. On segments four to ten inclusive, there is, on the posterior border of each segment, a broken line of hairs connecting the posterior ends of the longitudinal row of bristles. This row is incomplete on the third segment. Segments five to ten inclusive also appear to have an anterior fold on the lateral margins of each segment. This is also lined with hairs slightly longer than the setae. Laterally, each segment except the first and last two, have two tufts of hairs, one anterior just in front of the spiracles, the other posterior. The first segment has the anterior lateral border margined with hairs and the eleventh segment has the entire lateral border thus margined, but with considerably longer hair. The setae, under very high magnification, appear like the teeth of a comb as there are often five or six very close together in a straight line. These are found especially on the median row, and on the lateral rows of the first four segments. Groups of fewer setae, of this type, are scattered without pattern on the ventral surface. The tubercles

of the posterior spiracles are stouter, and more heavily sclerotized than the caudal appendages. They are nearly parallel with them and bear only a few very tiny hairs, differing in this respect from some other described species, in which, the hairs are longer. In the larva of *S. atrata* described by Malloch in 1917 the spiracular tubercles appear on the dorsal side near the anterior border of the 12th segment. The caudal appendages in the latter species also appear on the dorsal side but near the posterior border of the 12th segment and diverge rather sharply. In the larva of *S. similis* the caudal appendages are slightly tapering, and covered at their tips and on their interior margins by very long hair. On the ventral surface the posterior spiracular tubercles clearly show the trachea entering them (fig. 7). There is a "V" shaped area on the eleventh and twelfth sternites which is bordered by a wide diffuse line of long hair. These hairs guard the anal opening. In other species this line is more regular. Length of full grown larva about 4.0 mm.

The pupa of *S. similis* is very similar to those of other members of the genus *Scatopse*, except in the structure of the prothoracic spiracular organs. The pupa forms within the last larval skin, and through this, one can observe on the ventral side, the sheaths for the appendages. On the dorsal side, however, projecting through the larval skin, in the third segment along the anterior margin, a pair of long "horn-like" processes break through. These are the prothoracic respiratory organs. In *S. subnitens* and also in *S. atrata* each of these organs bifurcates into equal parts about the middle of their length. The *S. similis* pupa as seen from some angles seems to have a straight unbranched organ, but, by turning it, one may notice a small branch near the middle containing a few tracheal openings (fig. 3). The remainder of the organ at its tip and on the distal half is closely covered by the spiracular openings, which appear as the ends of tiny tubes. Six pairs of lateral pupal respiratory processes are found which pierce the larval skin in the same line as the last abdominal pair. The pupal organs are longer than those of the larva.

♂ ♀. The adult of *S. similis* closely resembles that of *S. subnitens* Verr. except in a slight difference of wing structure. The wings of *S. subnitens* are described as being milky white. In *S. similis* they are transparent hyaline. The cubital veins more closely approach the wing margin in *S. similis* than in *S. subnitens*.

Length 2 mm. Head and body black, the latter glistening,

legs yellow to dark brown. Facets of eyes interspersed with short brown hairs. Antennae ten-segmented, slightly longer than the height of the head; distal segment is as long as the three adjacent segments; each segment bearing several bristles in addition to numerous fine hairs; the second segment longer than the first or third but of the same width as the remainder of the segments. Scutellum, black, with numerous yellow hair. Mesonotum very dark brown, glistening, with only a few hairs. Abdomen long and narrow, closely covered with a gray pubescence; slightly depressed dorsoventrally.

The male is easily distinguished by a somewhat pointed tergite at the tip of the abdomen. Beneath the claspers the last sternite projects in a rounded point (fig. 4). The female has light colored, haired lobes as in other species.

Wing (fig. 5) transparent hyaline; first three veins very heavy and black, ending at about the middle of the costal margin, the other veins very light in color; prefurca of median vein about one-half the length of either branch; first branch ends at the apex; both branches at first parallel but diverge rather sharply near the wing margin; first cubital vein extends beyond the half of the wing, where it suddenly bends toward the wing margin, but not quite attaining it; second cubital vein thick and strongly sinuous, having an arc of a small circle at its middle; second cubital vein, like the first, not quite reaching the wing margin and stopping abruptly very close to it; anal vein reduced. A pair of spurious veins appears between the media and cubitus, and after being closely parallel to the middle of the wing, diverge at an angle of about thirty degrees. Costal margin with stout bristles on the first two-thirds, beyond which point they gradually become finer, but interspersed with a few longer hairs beyond the point where the second branch of the media reaches the margin. Halteres very dark brown, almost black.

The adult *S. similis* most closely resembles *S. atrata* and *S. pygmaca* of the species previously described for North America, differing in the relative length of the prefurca. The prefurca in *S. atrata* is two-thirds of the length of the posterior branch of the median fork, in *S. similis* it is slightly less than half the length of the posterior fork, in *S. pygmaca* it is about one-fourth of the length of the posterior branch of the fork.

This is the unnamed species referred to by Johannsen in Aquatic Diptera, Part I, (Memoir 164, Cornell University Experiment Station, 1934, page 49).

Where and When to find the Orthoptera of Pennsylvania, with Notes on the Species Which in Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

(Continued from page 103.)

The following exotic species have been brought to Pennsylvania but can almost certainly not become established in this climate.

DERMAPTERA.

EUBORELLIA ANNULIPES (Lucas). Philadelphia, 1 ♂.

PROLABIA ARACHIDIS (Yersin). Dead in skin of bat in Philadelphia museum, 1 ♂, 2 juv.

ORTHOPTERA.

BLATTIDAE.

NEOBLATTELLA FRATERCULA (Saussure and Pictet). On ship at Philadelphia from Honduras, 1 ♂.

N. DETERSA (F. Walker). On ship at Philadelphia from Jamaica, 2 ♂, 5 ♀.

NYCTIBORA LAEVIGATA (Beauvois). On wharf at Philadelphia, 1 ♀. Harrisburg, 1 ♀.

EURYCOTIS DIMIDIATA (Bolivar). Berwick, 1 ♂.

NEOSTYLOPYGA RHOMBIFOLIA (Stoll). In package of tobacco from Sumatra at Reading, 1 ♀.

PANCHLORA CUBENSIS Saussure. In fruit at Philadelphia, 3 ♀.

LEUCOPHAEA MADERAE (Fabricius). In logwood on ship at Philadelphia from Jamaica, 1 large juv.

NAUPIHOETA CINEREA Olivier. In onion leaves on ship at Philadelphia from Rhodesian cargo, 1 ♂, 2 ♀.

BLABERUS DISCOIDALIS Serville. In logwood on ship at Philadelphia from Jamaica, 1 ♂, 3 ♀.

The following species, not known from New Jersey or Pennsylvania, probably do not occur in the latter State but in distribution approach it relatively closely.

ACRIDIDAE.

SCHISTOCERCA OBSCURA (Fabricius). Dover, Delaware; Chestertown and Druid Hill Park in Baltimore, Maryland. In high rich vegetation in humid areas. Most adults in Fall.

PARATYLOTROPIDIA BEUTENMULLERI Morse. In southern valleys of Appalachian Mountains. Probably in thicket undergrowth. Adult probably in early Summer.

MELANOPLUS ACROPHILUS PACHYCERUS Hebard. Giles County, Virginia at 4000 feet. Probably in richer open forest undergrowth. Adult probably in early July.

PAROXYA HOOSIERI Blatchley. Lake and Portage Counties, Ohio (E. S. Thomas). In bogs. Adult in mid-July.

TETTIGONIIDAE.

MONTEZUMINA MODESTA (Bruhner). Wingina, Virginia. In bushes and forest undergrowth. Adult probably in mid-July.

ATLANTICUS AMERICANUS HESPERUS Hebard. Berne Township in Fairfield County, Ohio (E. S. Thomas). In woodland undergrowth. Adult in early July.

GRYLLIDAE.

NEMOBIUS GRISEUS GRISEUS E. M. Walker. North Haven, Connecticut, and Lucas County, Ohio (E. S. Thomas). In sandy areas in open. Adult in mid-August.

N. CONFUSUS Blatchley. Plummers Island and Cabin John Run, Maryland. In bogs and swamps. Adult in mid-August.

CYRTOXIPHA COLUMBIANA Caudell. Washington, D. C. In the lower foliage of deciduous trees. Probably adult in early August.

The following species reach to or beyond New Jersey on the Atlantic Coast but in this latitude are not known, and the great majority certainly do not occur, inland as far as Pennsylvania.

DERMAPTERA.

PSALIDAE.

ANISOLABIS MARITIMA (Géné). Sea beaches from Maine to Florida. Adult at all seasons in the South.

ORTHOPTERA.

BLATTIDAE.

PARCOBLATTA FULVESCENS (Saussure and Zehntner). Coastal margin of Pine Barrens north to Lakehurst. Adult in mid-June.

P. CAUDELLI Hebard. Coastal margin of Pine Barrens north to Wading River on Long Island, New York. Adult in mid-June.

P. LATA (Brunner). Ocean View, VII, 24 and VIII, 10, 1937, (H. Fox; taken in molasses jar trap set in woods) 3 ♀ 2 juv., [A.N.S.P. and Hebard Cln.]. A first record for New Jersey and a northern limit point.

ACRIDIDAE.

TETTIGIDEA ACUTA Morse. Salt marshes north to Morgan. Adult in Spring, Summer and Fall.

Although there is a recorded male of *Tettigidea prorsa* Scudder labelled Beach Haven, New Jersey in the Academy collection, it is apparent that some mistake in labelling may have occurred. The correct limit of known northeastern distribution may well be Fayetteville, North Carolina.

MERMIRIA INTERTEXTA Scudder. Bog areas and margins of tidal marshes north to Ocean City and Belleplain in southern New Jersey. Adult early in August.

ORPHULELLA OLIVACEA Morse. Salt marshes generally, north to New Haven, Connecticut. Adult in late June.

CLINOCEPHALUS ELEGANS Morse. Margins of salt marshes and bogs near coast north to Ravenswood on Long Island, New York. Adult in mid-July.

PARDALOPHORA PHOENICOPTERA (Burmeister). Sandy waste fields toward coast throughout New Jersey, north to Fort Wadsworth on Staten Island, New York. Adult in early June.

SPHARAGEMON SAXATILE Morse. On bare rock ledges southwest to Great Notch, Newfoundland and Ogdensburg in northeastern New Jersey. Adult in early July.

MELANOPLUS IMPUDICUS Scudder. Pine Barrens north to Selden on Long Island, New York. Berlin, New Jersey is the

eastern limit nearest Pennsylvania. Adult in early June.

M. STONEI Rehn. Even more local in Pine Barrens north to Lakehurst. Berlin is the eastern limit nearest Pennsylvania. Adult in late June.

DENDROTETTIX QUERCUS Packard. A unique relict or introduced. Present in northern Pine Barrens of New Jersey and north to Yaphank on Long Island, New York. On oaks, not infrequently defoliating these trees. Adult in mid-July.

PAROXYA ATLANTICA ATLANTICA Scudder. Edges of marshes on coast and in swamps and bogs of Pine Barrens north to Jamesburg and Lakehurst. Medford and Lindenwold are eastern limits nearest Pennsylvania. Adult in late June.

TETTIGONIIDAE.

MICROCENTRUM RETINERVE (Burmeister). In deciduous trees. North only to Manumuskin in southern New Jersey. Adult in mid-August.

NEOCONOCEPHALUS TRIOPS (Linnaeus). Through undergrowth. North only to Green Creek in extreme southern New Jersey. Adult in late August, so surviving and reappearing in early Spring in the South.

N. ROBUSTUS ROBUSTUS (Scudder). Sea beaches north to Cape Cod, Massachusetts. Adult in late July.

N. NEBRASCENSIS (Bruner). Ocean View. Otherwise known only from the middle west. Adult taken early in August.

ORCHELIMUM FIDICINIUM Rehn and Hebard. Salt marshes north to Rockaway on Long Island, New York and on Delaware Bay to Hancock's Bridge. Adult in mid-July.

O. MILITARE Rehn and Hebard. Speedwell, one very small male. Extremely rare so far north. Tall grasses in damp spots in pine woods and along borders of marshes and lakes. Adult taken in late August.

CONOCEPHALUS STICTOMERUS Rehn and Hebard. Fresh water marshes in southern New Jersey north only to Cedar Springs. Adult in early August.

C. AGIALUS Rehn and Hebard. Northern limit Cape May (series secured last Fall by H. Fox). On damp soil in *Spartina patens*. Adult probably in early August.

C. NIGROPLEUROIDES (Fox). Salt marsh tidal flats north to Staten Island, New York, in *Spartina stricta* and *Spartina patens*. Adult in late July.

C. SPARTINAE (Fox). Salt marshes north to Old Orchard, Maine, in *Panicularia fluitans* and *Spartina patens*. Adult in late July.

GRYLLIDAE.

ANUROGRYLLUS MUTICUS (DeGeer). Coastal southern New Jersey north only to Ocean View. Adults present early in June.

NEMOBIUS CUBENSIS CUBENSIS Saussure. Coastal in marshes north to Staten Island, New York. Swainton and Cold Spring only New Jersey localities.

FALCICULA HEBARDI Rehn. Known only from Reega. A northern limit in the Pine Barrens. Adults taken in late July.

CYCLOPTILUM BIDENS Hebard. Coastal north to East Marion, Long Island, New York. Lakehurst, Margate City and Reega are the only New Jersey records. Adult in mid-August.

GRYLLOTALPA GRYLLOTALPA (Linnaeus). Introduced and established; in great numbers in nursery at Rutherford.

It will be noted how very much E. S. Thomas has helped me in defining limits of distribution. Through an unfortunate error the initials E. R. instead of E. S. Thomas were given on page 37. Under *Scudderia fasciata*, moreover, on page 33, I should have remarked that the specific status of that insect had been observed by E. S. Thomas from Ohio material and that he had communicated to me his findings.

**Notes on the Synonymy and Distribution of some
North American Bees of the Genus *Bombomelecta*
(Hymenoptera).**

By E. GORTON LINSLEY, University of California, Berkeley.

The bees of the genus *Bombomelecta*, although occasionally captured in numbers, are generally rather rare in collections. Little is known of the distribution or hosts of most of the species, and in several cases, sexual dimorphism has resulted in the giving of different specific names to the two sexes of a single species. The following notes and synonymy are based primarily on a study of the members of the genus in the collections of the Academy of Natural Sciences of Philadelphia, the California Academy of Sciences, and the Canadian National collection.

BOMBOMELECTA FULVIDA (Cresson). This form has been variously treated by different authors as a distinct species or as a variety of *B. pacifica* Cresson or *B. thoracica* Cresson. The male genitalia indicate that its relationships are with *pacifica*, but the lobes of the stipites have a more slender, conical, apical process than in the latter type. At present our knowledge of the habits and distribution of the two forms is insufficient to indicate whether this difference is of specific or subspecific importance. *B. fulvida* has been recorded from Nevada (type locality), Colorado, Arizona, New Mexico, and British Columbia. Additional records are as follows: CALIFORNIA: Truckee, June 13-15 (Van Duzee, C. A. S.), West Walker River, Mono Co., 7200 ft. (N. W. Frazier), Hackamore, Modoc Co., May 6 (Linsley); OREGON: Warner Mts., Lake Co., June 19 (Van Dyke, C. A. S.), Blitzen Valley, Harney Co., April 19 (S. G. Jewett), Stein Mts., Harney Co., June 25 (W. J. Chamberlin, C. A. S.), Melhorn's Mill, Baker Co., June 17 (W. J. Chamberlin, C. A. S.), Wild Horse Canyon, Steens Mts., July 5 (Scullen, C. A. S.), Meachim, June 23 (J. F. Bock, C. A. S.), Elgin, June 20, (A. L. Lovett, C. A. S.); BRITISH COLUMBIA: Penticton, April 25-30 (E. R. Buckell, Can.), Chilcotin, May 14 (Buckell, Can.), Salmon Arm, April 25, (T. Wilson, Can.), Vernon, May 25 (W. B. Anderson, Can.); ALBERTA: Medicine Hat, April 21 (Sladen, Can.); UTAH: Mt. Carmel, near Zion Canyon, May 23, (Van

Dyke, C. A. S.): TEXAS: Davis Mts., July-August (Poling), Texas A. & M. College Insectary (C. A. S.)

BOMBOMELECTA LARREAE Cockerell.

Bombomelecta larreae Cockerell, 1900, Can. Ent. 32:51, ♀.

Bombomelecta azygos Viereck, 1903, Trans. Am. Ent. Soc. 29: 181, ♂, n. syn.

An examination of the type of *B. azygos* Viereck reveals the fact that it is the male of *B. larreae* Ckll. The two sexes are quite similar, but the male lacks the dense patch of golden hairs on the upper frons as well as the abdominal fasciae which are sometimes present in the female. The species has been previously known from New Mexico (*larreae*) and Nevada (*azygos*). In California, a series of both sexes was recently taken near the junction of Deep Creek and the Mojave River, Mojave Desert, San Bernardino Co., on April 26 (Linsley) and May 5 (Timberlake and Linsley), at flowers of *Eriodictyon trichocalyx*. Other records from the same State are: Borego Valley, San Diego County, May (H. S. Gentry, in coll. G. E. and R. M. Bohart); Wildrose Canyon, Panamint Mts., Inyo County, 3500 ft., May 28, on *Prosopis* (C. D. Michener); 5 mi. S. of Olancho, Inyo Co., May 19 (C. D. Michener); and Mountain Springs, Argus Mts., Inyo Co., 5000 ft., May 22, on *Stenotopsis linearifolia* and *Stanleya pinnata* (C. D. Michener).

BOMBOMELECTA EDWARDSI (Cresson).

Melecta edwardsi Cresson, 1878, Trans. Am. Ent. Soc. 7:92, ♂

Bombomelecta zygus Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀

A study of the type of *B. zygus* Viereck confirms the suggestion of Dr. Cockerell¹ that it is the female of *B. edwardsi* Cresson. The two sexes have been taken together on numerous occasions at Antioch, Contra Costa Co., Calif.

BOMBOMELECTA PACIFICA Cresson. British Columbia records in the Canadian National Collection are as follows: Vernon (E. P. Venable), Penticton, April 10-15 (E. R. Buckell), Salmon Arm, April 25 (T. Wilson).

BOMBOMELECTA SEPARATA MACULATA Viereck. This race has been previously recorded from Utah, California, and

¹Cockerell, T. D. A., 1925, Pan-Pac. Ent. 1:180.

Oregon. Material in the Canadian National Collection from British Columbia is as follows: Victoria, April 29 (R. C. Treherne), and Royal Oak, May 5 (R. C. Treherne).

Bibliographical and Synonymical Catalogue of Bombomelecta.
Genus BOMBOMELECTA Patton.

Bombomelecta Patton, 1879, Bull. U. S. Geol. Surv. 5:370. Cresson, 1887, Trans. Am. Ent. Soc. (suppl.) 128. Fox, 1893, Ent. News 4:144. Ashmead, 1899, Trans. Am. Ent. Soc. 26:66. Fowler, 1901, Univ. Calif. Exp. Sta. 2:326. Cockerell and Atkins, 1902, Ann. Mag. Nat. Hist. (7) 10:46. Cockerell, 1910, Ann. Mag. Nat. Hist. (8) 5:27. Cockerell, 1928, Univ. Colo. Studies 16:104.

Orthotype: *Melceta thoracica* Cresson.

ALFREDI Cockerell, 1895, Psyche (suppl.) 11, ♂. Cockerell, 1898, Bull. Lab. Den. Univ. 11:61, ♂. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♂. N. Mex.

ARIZONICA Cockerell, 1902, Can. Ent. 34:267, ♀. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. Ariz.

CALLURA Cockerell, 1926, Pan-Pac. Ent. 3:58, ♂. Calif.

EDWARDSI Cresson, 1878, Trans. Am. Ent. Soc. 7:92, ♂, *Melceta*. Fowler, 1901, Univ. Calif. Exp. Sta. 2:326. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♂. Cockerell, 1925, Pan-Pac. Ent. 1:180, ♂ ♀. Calif.

zygos Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀.

FULVIDA Cresson, 1878, Trans. Am. Ent. Soc. 7:204, ♀. *Melceta pacifica* var. Cockerell, 1895, Psyche (suppl.) 11. *Melceta thoracica* var. Cockerell, 1898, Bull. Lab. Den. Univ. 11:61, *M. thoracica* var. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. Cockerell, 1908, Ann. Mag. Hist. (8) 2:331, *M. pacifica* var. Viereck, 1906, Can. Ent. 38:278, ♀. Cockerell, 1908, Ann. Mag. Hist. (8) 2:331, *M. pacifica* var. Cockerell, 1928, Univ. Colo. Studies 16:104. Calif. Nev., Ore., B. C., Alta., Utah, Colo., Ariz., Tex., N. Mex.

JOHNSONI Cockerell, 1905, Ent. News 16:270, ♂. Cockerell, 1928, Univ. Colo. Studies 16:104. Colo.

LARREAE Cockerell, 1900, Can. Ent. 32:361, ♀. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. N. Mex., Nev., Calif.

azygos Viereck, 1903, Trans. Am. Ent. Soc. 29:181, ♂.

MACULATA Viereck, 1903, Trans. Am. Ent. Soc. 29:181, ♀, *B. separata* var. Viereck, 1906, Can. Ent. 38:278, ♀, *B. separata* var. Cockerell, 1916, Pomona Journ. Ent. Zool. 8:61. Utah, Calif., Ore., B. C.

PACIFICA Cresson, 1878, Trans. Am. Ent. Soc. 7:91, ♂, *Melecta*. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀ ♂. Viereck, 1906, Can. Ent. 38:278, ♀ ♂. Swenk, 1907, Ent. News 18:298. Cockerell, 1928, Univ. Colo. Studies 16:104. Calif., Nev., Colo., Nebr., B. C.

SEMIFULVA Cockerell, 1921, Ann. Mag. Nat. Hist. (9) 7:212, ♂. Cockerell, 1928, Univ. Colo. Studies 16:104. Colo.

SEPARATA Cresson, 1878, Trans. Am. Ent. Soc. 7:204, ♀, *Melecta*. Fowler, 1901, Univ. Calif. Exp. Sta. 2:326. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. Nev., Calif.

THORACICA Cresson, 1875, Wheeler Exp. 1:726, ♀, *Melecta*. Patton, 1879, Bull. U. S. Geol. Surv. 5:370. Ashmead, 1890, Bull. Colo. Biol. Assn. 1:30. Fowler, 1901, Univ. Calif. Exp. Sta. 2:326. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. Nev., Calif., Tex., Colo.

Some Dragonflies from the Florida Keys (Odonata).

By C. FRANCIS BYERS, University of Florida, Gainesville.

During the past year the writer has received two small collections of dragonflies from some of the islands or "keys" off the southern tip of peninsular Florida.

One of these collections, made by Mr. Frank N. Young on Virginia Key near Miami (Dade County, Florida), contained a male specimen of *Trapezostigma binotata* (Rambur)* captured June 18, 1937. Mr. Young reports that this specimen was taken flying against the wind along a canal and that capture was difficult due to the height and speed at which the dragonfly was flying. He also states that other representatives of the species were seen but not captured.

The other collection received was made by Mr. Jack C. Russell on Key West and the Dry Tortugas from July 2 to August 12, 1936.

The Dry Tortugas, southernmost part of the United States, consists of a group of small low lying keys located 65 miles from Key West and 125 miles west-southwest from Cape Sable,

* Syn. ad. *Tramea insularis* Hagen. The generic name *Tramea* Hagen, 1861, must be replaced by *Trapezostigma* Hagen, 1849, according to Mr. J. Cowley. (Nomenclature of Odonata: Three Generic Names of Hagen. The Entomologist, 68:283-284, December, 1935). Hagen's species *insularis* is a synonym of Rambur's *binotata*.

at the entrance to the Gulf of Mexico. The nearest mainland is Cape Sable; the island of Cuba at its nearest point is 90 miles distant; the coast of Yucatan is 350 miles to the southwest and 750 miles to the westward is the coast of Mexico.

Mr. Russell collected dragonflies on the following keys of the Tortugas group: Garden Key, the largest of the group on which Fort Jefferson is located; Loggerhead Key, the location of the lighthouse and the Marine Biological Laboratory of the Carnegie Institute of Washington; Bush Key and Sand Key.

Because of its interest to students of dragonfly distribution and to biologists concerned with the fauna of the Dry Tortugas, I append a complete list of Mr. Russell's dragonfly collection; the notes following the species are his.

CORYPHAESCHNA INGENS (Rambur). 1 ♀. Loggerhead Key, August 3, 10 P. M. Party cloudy with showers. Perched on limbs of bushes.

C. VIRENS (Rambur). 1 ♀. Bush Key, August 2, 6:30 P. M. Fair. Caught flying around a brackish water pool.

TRICANTHAGYNA TRIFIDA (Rambur). 1 ♀. Loggerhead Key, August 3, 10 P. M. Partly cloudy with showers. Perched on limbs of bushes.

ANAX AMAZILI (Burmeister). 1 ♀. Garden Key, July 2. Fair. 1 ♂. Garden Key, July 16. At rest at night.

A. JUNIUS (Drury). 1 ♀. Loggerhead Key, July 30, 8:30 P. M. Windy and partly cloudy. Perched on limbs of bushes. 1 ♂; 2 ♀. Loggerhead Key, August 3, 10:00 P. M. Partly cloudy with showers. Perched on limbs of bushes.

CELITHEMIS EPONINA (Drury). 1 ♀. Garden Key, July 7.

ORTHEMIS FERRUGINEA (Fabricius). 3 ♀. Key West August 8-9, Mid-day. Fair. Flying around a fish pool.

ERYTHRODIPLAX BERENICE NAEVA (Hagen). 1 ♂. Garden Key, July 23. Windy and partly fair. Hanging around a slightly brackish pond—an enclosed place in the moat. 3 ♂; 1 ♀. Key West, August 7-8. Fair. Open grassy field. 1 ♂; 6 ♀. Key West, August 10. Hot and fair. Around brackish water.

E. UMBRATA (Linne). 2 ♀ (heterochromatic). Garden

Key, July 26. Flying after a storm. 1 ♂ ; 1 ♀ (homochromatic). Bush Key, July 27. Windy.

— *PACHYDIPLAX LONGIPENNIS* (Burneister). 1 ♂. Garden Key, July 26. Flying after a storm.

— *LEPTHEMIS VESICULOSA* (Fabricius). 1 ♂. Loggerhead Key, July 30. Fair. 1 ♂. Key West, August 9. Mid-day. Fair. Around fish pool. 2 ♂. Key West, August 10. Hot and Fair. Around brackish water flats.

— *MACRODIPLAX BALTEATA* (Hagen). 1 ♂ ; 1 ♀. Key West, August 10. Hot and Fair. Around brackish water flats.

— *TRAPEZOSTIGMA CAROLINA* (Linne). (See foot note, page 163). 3 ♀. Garden Key, July 7.

— *PANATALA FLAVESCENS* (Fabricius). 1 ♀. Garden Key, July 7. 1 ♀. Loggerhead Key, July 24. Fair. 2 ♂ ; 1 ♀. Garden Key, July 30. Early morning after a hard blow and rain.

— *P. HYMENAEA* (Say). 2 ♀. Garden Key, July 7. 1 ♀. Garden Key, July 30. Early morning after a hard blow and rain.

— *ISCHNURA RAMBURII* (Selys). 1 ♀. Sand Key, July 14. 2 ♂ ; 2 ♀. Bush Key, July 18. Fair. 2 ♂ ; 2 ♀. Bush Key, August 2. Fair. Flying around brackish water pool. 2 ♂ ; 3 ♀. Loggerhead Key, August 3. Hot and fair. Caught by sweeping in grassy field.

— *ANOMALAGRION HASTATUM* (Say). 2 ♀. Loggerhead Key, July 30. 1 ♂ ; 1 ♀. Garden Key, August 2. Fair. Flying in Ft. Jefferson. 1 ♂ ; 2 ♀. Key West, August 12. Hot and fair. Open grassy fields.

Coryphaeschma virens, *Anax amazili* and *Trapezostigma bi-notata* are worthy of special note because either they are new additions to the Florida list of dragonflies or they substantiate literature records made so long ago as to be traditional. Also, it is of interest to point out the prevalence of the larger stronger flying dragonflies on the Dry Tortugas and the paucity of the damselfly fauna.

Five New Genera of Fossil Oestromuscaria. (Diptera).

By CHARLES H. T. TOWNSEND, S. Paulo, Brazil.

ADIPTERITES gen. nov.

Genotype, *Dipterites obovatus* Heer, *Urwelt Schweiz*, fig. 323 (1865). Maggot. Upper Miocene of Oeningen, Baden.

Length, 24 mm; width, 18 mm. Oval, showing 13 segments, venter of second to twelfth but especially second to tenth segments furnished with heavy armature and chitinized in what appear like segmental plates, dorsum unarmed. Evidently culebrebrid or hypodermatid stock, but unlike any form hitherto known.

COCKERELLITHA gen. nov.

Genotype, *Glossina osborni* Cockerell, *Nature*, April, 128 (1909). Fly. Miocene of Florissant, Colorado.

Length of body, 10-1/3 mm; wing, 7 mm. M2 not so strongly curved before R6 as in *Paloestrus* and the living glossinid genera, M3 axis at right angle to M2, being the opposite extreme in venation from *Lithoglossina* erected below.

LITHOGLOSSINA gen. nov.

Genotype, *Glossina armatipes* Cockerell, *Pr. Biol. Soc. Wash.*, XXX, 19 (1917). Male fly. Miocene of Florissant, Colorado.

Length of abdomen, 6½ mm; wing, 7½ mm; hind femur, 4 mm; hind tibia, 3 mm. M3 strongly sinuate, its axis at 45° to M2. Hind femora and tibiae armed with row of strong bristles, hind metatarsi bearing 2 stout longitudinally striate spines. Quite in contrast to other glossinid genera, which show hind legs only faintly bristled and M3 only faintly sinuate.

ELECTROTACHINA gen. nov.

Genotype, *E. smithii* sp. nov. For new genus Muscidae aff. *Tachina* sp. F. Smith, *Quart. Jn. Sc.*, V, 184, pl. 18, fig. 5 (1868). Fly Lower Oligocene of Baltic amber.

Length of body, 8 mm; wing, 7 mm. Body not stout. Wings much longer than abdomen, 5R apparently narrowly open or closed, M3 apparently nearer R6. Legs moderate length. Abdomen apparently ovate and rather deep. Probably exoristid or tachinid stock.

VINCULOMUSCA gen. nov.

Genotype, *Musca vinculata* Scudder, *Bull. U. S. G. G. Sur.*

Terr., III, 758 (1877); Tert. Ins. No. Am., 554, pl. 5, fig. 77 (1890). Maggot. White River. Eocene of Chagrin Valley, Colorado.

Length, 17 mm; width, $4\frac{1}{2}$ mm. Stout subcylindric, venter with broad transverse micro spine bands best marked on fourth to ninth segments. Apparently exoristid or tachinid stock.

Notes on the Distribution of *Vermileo* in the United States and Mexico with a Description of a New Species. (Diptera: Rhagionidae).

By DONALD DELEON, Berkeley, California.

The genus *Vermileo*, or worm-lions as they are commonly called, includes a group of true flies of very remarkable habits. It seems, however, that both the latin name and the commonly used translated equivalent are misleading, for in habits they are not lion-like insects that feed on "worms" but "worms" or better maggots with the habit of preying on small arthropods that fall into their pits in the sand or dust. Their mode of life is quite similar to that of *Myrmelcon* which, as the name indicates, includes a group of predatory insects feeding chiefly on ants.

Wheeler¹ gives an account of the habits and distribution of all the known species of this genus and in addition a detailed study of the morphology of that common species of the Sierra Nevada Mountains, *V. comstocki* Wh. It was believed by Wheeler that this species was a mountain form and found only at elevations above 4000 feet. In April 1934 the writer reared specimens of this species from material collected in February in the Coast Range at Pinnacles National Monument at an elevation of about 1600 feet. The Pinnacles National Monument is near Hollister, California. On December 22, 1936, Ranger Powell of this monument sent in about a dozen more larvae from this locality. Three of these larvae pupated and transformed between February 2 and March 1, 1937.

¹Wheeler, W. M. Demons of the dust. W. W. Norton, New York, 1930.

V. opacus (Coq.) which is treated by Leonard² as a species distinct from *comstocki* and by Wheeler, in the work cited above, as but tentatively distinct was collected in the larval stage in numbers at Zion National Park, Utah in March 1934. Specimens reared from this lot were compared with the two specimens in the Academy of Natural Sciences, Philadelphia by Mr. Cresson who determined them as *V. opacus*. This species, which hitherto has been known only from a specimen collected near Carson City, Nevada and from two specimens from Alamogordo, New Mexico, was found to be very common in parts of the Southwest. In addition to the Utah locality, adults have been reared from larvae collected in Mesa Verde National Park, Colorado and Bandelier National Monument, New Mexico. Larvae that were most probably this species were collected at Colorado National Monument, Colorado and near Glendale, Utah. None has been collected in Arizona though they have been searched for from Grand Canyon in the north to the Chiricahua Mountains in the south.

V. opacus is easily distinguished from *comstocki* by its lighter color and its highly polished mesonotum with its three dark brown, sclerotized stripes.

During a trip to Mexico in 1936, *Vermilco* larvae were collected on January 25 at La Gruta near the pyramids of San Juan Teotihuacan at an elevation of about 8000 feet; on February 4 near the village of Palo Blanco, Go. at an elevation of about 2200 feet and on the same day at the same elevation two miles north of the town of Chiapanzingo, Guerrero. Both of these towns are on the highway to Acapulco. The last lot of larvae was collected on February 5 just south of the divide on the road between Mexico D. F. and Cuernavaca, Mor. at an elevation of about 9500 feet.

Of the several dozen larvae which were brought back alive to Berkeley only two have so far been reared to adults. Both of these larvae were from the lot collected February 5. At the time of collection these larvae were of all sizes but most of

² Leonard, M. D. A revision of the dipterous family Rhagionidae in the United States and Canada. Amer. Ent. Soc. Mem. 7. Philadelphia, 1930.

them were about 16 mm in length. Many of the larger larvae were taken from pits no larger than pits from which larvae half their size were taken. The largest larvae, four of which pupated between April 13 and 23, 1936, did not increase in size before pupation. One of these pupae transformed between April 24 and 25. The remaining three pupae died. One more adult, a male, emerged between March 5 and July 2, 1937. The date of pupation for this specimen is not known.

At the time of writing this note (November 10, 1937), there are four larvae still alive. Three of these are from the lot collected from La Gruta and one from the lot collected near Palo Blanco.

The larvae have been fed chiefly on vestigial-winged *Drosophila* adults but they also accepted termite nymphs and adults, ants, and even *Lucilia* larvae. The ability of the larvae to go without food or moisture is rather remarkable. Although between April 26 and November 20, 1936 none of the larvae was fed, there was only a slight mortality. In fact mortality seemed to be greater during the period when they were regularly fed than when they were not fed. Another record of a long fast is that of a larva from Pinnacles National Monument which was not fed during the period between June 1934 and January 25, 1935 but which was apparently healthy when fed on the later date. Signs of cannibalism were observed in only one box where the larvae were rather perhaps too closely crowded. In attempts to secure pupation, the sand containing the larvae was heavily misted with water several times but the moistening of the sand apparently had no effect in hastening their development.

The two adults that were reared appear to be a new species. They are strikingly distinct from either of the two species in the United States and do not fit the description for *Arthrostylum* described by Williston from Mexico³. Williston in *Biologia Centrali-Americana*⁴ lists his species as a synonym of Walker's *Phencus tibialis* which was described from Jamaica.

³ Williston, S. W. Kans. Uni. Quart. Vol. 4, p. 109. 1895. (*A fascipennis* n. sp.).

⁴ Diptera Vol. 1, p. 264 of supplement. 1886-1901.

As pointed out by Wheeler (op. cit.), Williston's description of *fascipennis* does not fit the description for *tibialis*. His species is more closely allied to the new species described below.

Vermileo willetti n. sp.

Malc.—Length, 8 mm with abdomen bent downward. If straightened out the length would be about 8.5 mm. Head: Front and face both grey-pollinose; eyes dichoptic, black, bare rather finely granular, inner margin of compound eyes along front nearly parallel up to vertex, ocelli set on a distinct prominence which is narrowed and shining behind and below, lateral ocelli closer to inner margin of compound eyes than the width of the anterior ocellus; antennae with first joint yellow, twice the length of the second which is slightly darker than the first, basal part of the third joint same color as the second, remainder of third joint and style dark brown, nearly black, the style becoming darker towards its extremity; occiput flat, same color as front and face, rather sparsely covered with slender, yellowish-brown bristles; mouthparts light yellow.

Thorax: Somewhat opaque; mesonotum brownish-yellow with three black, longitudinal stripes somewhat confluent posteriorly, the middle stripe undivided, extending to the anterior margin, the lateral stripes extending slightly more than three-fourths of the way to the anterior margin, area between stripes grey-pollinose; scutellum yellowish-brown, metanotum similar but with median part dark brown, this brown part wider posteriorly than anteriorly; meso- and sternopleura dark brown; basal part of pteropleura dark brown, remainder of pleura yellow-brown; pleura for the most part slightly pollinose.

Abdomen: Slender, narrowest at segments 4 and 5, shining, yellowish brown with caudal half of segments 2 to 6 black, segment 7 entirely black, the remaining segment and appendages opaque brown, segment 1 black along crescent-shaped posteriorly bent transverse ridge, segment 2 with rounded boss near dorsal caudal margin, segment 3 with less strongly pronounced boss in the same relative position.

Wings: Hyaline with infumated band extending from C at union of Sc with C more narrowly across wing to and along Cu_2 to wing margin; all of cells C_2 and Sc infumated but not as strongly as transverse band; tip of wing infumated in region of R_{2+3} and R_4 and R_5 ; cell M_1 acute at base, cell M_3 open; knobs of halteres and distal half of stem nearly black.

Legs: Fore-legs yellow, last four segments of tarsi dark, 1st tarsal segment intermediate in color; a single spur present at

distal end of tibia; mesothoracic legs similar to fore-legs but darker in color and two spurs at end of tibia; metathoracic legs much longer than others and darker, tibia nearly black except for extreme proximal end of which is yellowish, two spurs at distal end of tibia.

Described from one specimen reared from larva collected February 5, 1936 along the highway about halfway between Mexico D. F. and Cuernavaca, Morelos. Emerged between March 5 and July 2, 1937.

Female.—Length 7 mm, the abdomen is bent down rather strongly; if straightened out the length would be at least 8 mm; similar to male but more robust and coloration uniformly lighter; inner margin of compound eyes along front more distinctly divergent towards the apex, lateral ocelli scarcely more distant from inner margin of compound eyes than the width of the anterior ocellus; mesothorax with longitudinal stripes wider, sides parallel and no tendency towards posterior confluency, lateral stripes lighter in color than median stripe; metanotum without darker median area; abdomen robust, dark yellow-brown, segments scarcely lighter anteriorly; hind tarsi and distal end of tibiae yellow; infumation of wings similar to but not as pronounced as in male.

Described from one female collected as larva same date and locality as male but which emerged between April 24 and 25, 1936. The tip of the right wing is broken.

Type: Male; both type and allotype are being retained in the author's collection under the collection number 680.

Named after C. R. Willette of Yosemite National Park who first found the pits of this species.

This species seems to be allied to *V. fascipennis* (Will.) but differs from it by the front and face being grey-pollinose whereas the front of *fascipennis* is brown and the face opaque yellow; by the first two joints of the antennae being yellow, while in *fascipennis* they both are partly black; by the pleura being yellow-brown instead of black; and by the abdomen having five transverse yellowish bands instead of being reddish and without any bands.

Acknowledgements are made to Mr. E. T. Cresson Jr., who kindly compared the material sent to him with the specimens in the Academy of Natural Sciences and to Dr. Nathan Banks who compared the male of the species described above with *V. tibialis* and *V. tibialis* var. *dozoi* Wh. in the Museum of Comparative Zoology at Harvard.

List of Titles of Publications Referred to by Numbers
in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Psyche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Sciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Entomologische Zeitschrift. Frankfurt-M.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
27. Bollettino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janeiro. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chilena de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Comparée. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národního musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungsmechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Científica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten über morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memórias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biología Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memorias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

- GENERAL.**—Burr, M.—Beelzebub. [21] 50: 27-28.
 Chapin, E. A.—Collecting insects on Island of Jamaica. [Expl. & Field Work Smiths. Inst.] 1937: 73-76, ill. Dallas, E. D.—Dr. Eduardo Ladislao Holmberg, una pagina de la historia de la Sociedad Entomologica Argentina. [104] 9: 135-137. Dow, R.—The Scudder drawings. [Bull. N. Eng. Mus. Nat. Hist.] 87: 12-13, ill. Eustis, G. D.—Obituary. By F. M. Jones. [Bull. N. Eng. Mus. Nat. Hist.] 87: 14-15. Fletcher, T. B.—More about Names. [21] 50: Suppl., (9)-(12). Glaser, R. W.—A method for the sterile culture of houseflies. [Journ. Parasit.] 24: 177-179. Hansen, H. J.—Obituary by K. L. Henriksen. [102] 20: 29-31, ill. Hardy & Milne.—Aerial drift of insects. [31] 141: 602-603. Henriksen, K. L.—Insects collected in the fifth Thule expedition. [Rep. Fifth Thule Exp. Copenhagen] Zool. II. 34pp., map. Hora, S. L.—Animal ecology of torrential streams. [Current Sci.] 7: 437-439. Janse, A. J. T.—Demonstration on the importance of the study of genitalia in lepidoptera for classification purpose. [S. Afri. Biol. Soc.] Pamp. 9: 26-27. Kusnezov, N. J.—The arctic fauna of Eurasia and its origin; a study based mainly on Lepidoptera (Russian, English summary.) [Trav. Inst. Zool. Acad. Sci USSR] 5: 1-85. Lagloire & Gauthier.—Le guide de l'amateur d'insectes. [98] 65: 78-86; 103-124, ill. (k.). Lizer y Trelles, C. A.—La obra entomologica de Don Carlos Bruch. [104] 9: 13-21. McDonald, M.—A study of drouth recovery and

seasonal succession in a pond (preliminary study). [Proc. Iowa Acad. Sci.] 43: 373-382, ill. **Murray, J. A.**—Technique for paraffin section of formol-fixed insect material. 57:15. **d'Orchymont, A.**—En marge de l' "Opinion" 11. Des termes "binaire," "uninominal" et "binominal." [33] 78: 37-47. **Patch, E. M.**—Without benefit of insects. [19] 33: 1-9. **de Peyerimhoff, P.**—Diffusion spontance dans l'Afrique du Nord du *Rhizobius Lophantae* (Coccinell.). [Bull. Soc. Hist. Nat. de l'Afrique du Nord] 28: 481-482. **Ridgway, T. L.**—Scientific Illustration. Stanford University Press. 173pp., ill. **Wheeler W. M.**—Obituary by C. Bruch. [104] 9: 27-29, ill.

ANATOMY, PHYSIOLOGY, ETC.—**Aubertot, M.**—Sur les membranes péritrophiques des insectes. [Arch. de Zool. Exp. et gen.] 79: 49-57, ill. **Bodine & Bell.**—The effect of ultracentrifuging on the respiratory activity of developing and blocked embryonic cells. [Proc. Iowa Acad. Sci.] 43: 391-392. **Bodine & Boell.**—Respiratory activity of grasshopper embryo as contrasted with intact egg. [Proc. Iowa Acad. Sci.] 43: 392-393. **Burdick, H. C.**—Effects of exposure to low temperatures on developmental time of embryos of the grasshopper, *Melanoplus differentialis*. [Proc. Iowa Acad. Sci.] 43: 398-399. **Cody & Gray**—The changes in the central nervous system during the life history of the beetle, *Passalus cornutus*. [Journ. Morph.] 62: 503-521, ill. **Crampton, G. C.**—The structures called parameres in male insects. [19] 33: 16-24, ill. **Daniels, M. I.**—A cytological study of the gregarine parasites of *Tenebrio molitor*, using the ultra-centrifuge. [53] 80: 293-320, ill. **Dumitrosco, M.**—Les glandes séricigènes tubulaires de *Thecidium tepidariorum*. [Arch. de Zool. Exp. et gen.] 79: 58-68, ill. **Eloff & Bosazz.**—Penetration of ultra-violet rays through chitin. [31] 141: 608. **Evans, T. C.**—Effects of roentgen rays on development and respiration of grasshopper embryos. [Proc. Iowa Acad. Sci.] 43: 391. **Fiedler, H.**—Muskelmanik des Raupen-Abdominalfusses. (Lep.). [Mitt. Deutsch. Ent. Ges.] 8:76-78, ill. **Frappa, M. C.**—Recherches sur l'action de la température et de l'humidité sur le comportement du criquet migrateur (*Locusta migratoria capito*) a Madagascar. [Rev. de Path. Veg. et d'ent Agr. de France] 25: 46-58. **von Gebhardt, A.**—Anatomische Studien über die Geschlechtsorgane der Carabiden (Col.). [45] 27: 98-110, ill. **Grandjean, F.**—Observations sur les Bdelles (Acarions). [24] 107: 1-21. **Hahn, J.**—

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It is planned by the writer to finish his work on this edition and publish it as soon as possible but the actual date is problematical as there is a great deal of work that must be finished before the Directory can be completed.

EST. OF SAMUEL E. CASSINO.

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ENTOMOLOGICAL NEWS

JULY, 1938

Vol. XLIX

No. 7

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VOL. XLIX.

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Variant Elytral Markings of *Epilachna varivestis* Muls. (Coleoptera: Coccinellidae).

By B. J. LANDIS and HORATIO C. MASON, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Unlike the elytral spots in many species of predacious coccinellids, these spots in *Epilachna varivestis* Muls. are relatively constant in number and size. Each elytron normally has eight spots or dots of varying size arranged in three rows as follows: Three small sub-basal spots in a broken row, the median spot less basal than the other two; three in a transverse subparallel row just before the middle, usually larger than the sub-basal; and two near the apex (Chittenden, '20) (fig. A).

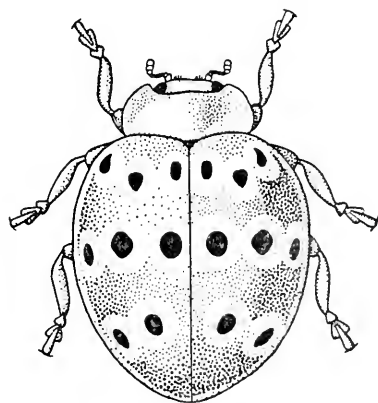


Figure A.—Adult of *Epilachna varivestis* Muls., showing normal number and size of spots.

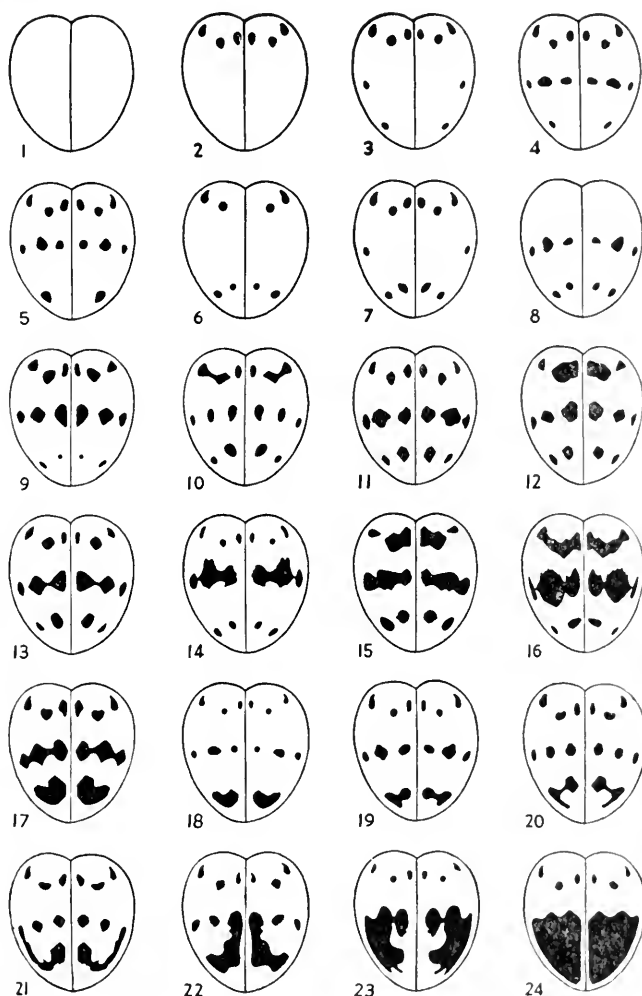
Among several thousands of beetles handled in hibernation and life-history studies in Ohio and the Federal District of Mexico, the authors occasionally found beetles with odd markings. Beetles having variant markings occurring on each

elytron were saved and the several types are here figured and discussed briefly. To clarify the discussion, each of the eight elytral spots has been given a number, beginning with the outside spot on the sub-basal row and proceeding to the elytral suture, and continuing in the same direction, from outside to inside, for the intermediate row and then the apical row of spots (Johnson, '10).

Certain differences were noted between the variant beetles from Mexico and Ohio. In the Mexican beetles there was a tendency for the normal spotting to be altered by the dropping of spots, whereas in Ohio beetles the abnormalities were caused entirely by the confluence of spots. One mature albino beetle (fig. 1) was found at Columbus, Ohio, in which the eyes, elytra, and other body parts were concolorous with the normal ground color.

In the beetles from Mexico spot 8 was lost most commonly (figs. 2 to 5), although the entire intermediate row also (spots 4, 5, and 6) was absent in two individuals (figs. 2 and 6). In one beetle spots 1, 2, and 3 (fig. 8), and in another spots 4, 5, 6, 7, and 8 (fig. 2), were lacking. The confluence of spots 7 and 8 was common (figs. 18 and 19), and in one individual spots 4, 5, 6, 7, and 8 were confluent (fig. 23). Two beetles with spotting identical with that shown in Figure 23 were found in a small field of beans near Mexico City on the same day. The confluence of spots 4, 5, and 6 (figs. 14 and 17) was not common.

In the beetles from Ohio spots 5 and 6 coalesced most commonly (fig. 13), and several individuals having this type of confluence occur in samples of 1,000 to 2,000 beetles. In one beetle spots 4, 5, and 6 coalesced (fig. 15), and this type of confluence was observed also in a beetle from Birmingham, Ala. In the Birmingham beetle spots 1, 2, and 3 also coalesced (fig. 16). Confluence of spots 2 and 3 is more common among Ohio beetles (figs. 12 and 15) than confluence of spots 1 and 2 (fig. 10). Fusion of spots 7 and 8 occurred in four beetles (figs. 20, 21, 22, and 24) but did not form an arcuate fascia as in Mexican beetles. Interesting types of confluence are illustrated



Figures 1 to 24, inclusive, showing deviation from the normal elytral spotting in adults of *Epilachna varivestis* Muls. Figures 2, 3, 4, 5, 6, 7, 8, 14, 17, 18, 19, and 23 represent beetles from the Federal District of Mexico; Figures 1, 9, 10, 11, 12, 13, 15, 20, 21, 22, and 24, from Columbus, Ohio, and Figure 16, from Birmingham, Alabama.

in Figure 21, where spots 4, 7, and 8 fuse, and in Figure 22, where spots 6, 7, and 8 coalesce. The greatest confluence of

spots was observed in three beetles found in a collection of approximately 5,000 beetles from Letart Falls, Ohio. In these beetles spots 4, 5, 6, 7, and 8 coalesced to form a large triangular fascia (fig. 24). An egg mass was obtained from one of these beetles, and of two individuals reaching the adult stage one had the same elytral spot confluence as the parent female.

LITERATURE CITED.

CHITTENDEN, F. H. 1920. The Bean Ladybird. U. S. Dept. Agr. Bull. 843, 24 p., illus.

JOHNSON, ROSWELL, H. 1910. Determinate evolution in the color-pattern of the Lady-Beetles. Pub. 122, Carnegie Inst. Wash., 104 pp., illus.

Corrections and Additions to a recent Catalog of the Tiphidae, (Hymenoptera).¹

By KARL V. KROMBEIN, 22 Meadow View Place,
Buffalo, New York

Since the publication of Dalla Torre's *Catalogus Hymenopterorum* in the last decade of the nineteenth century a large number of new species and genera have been described particularly in the groups which are of importance in the biological control of noxious insects. Consequently the appearance of a new catalog of the Hymenoptera should be most welcome to workers in this order. Inasmuch as I have just recently compiled a card catalog of the family which comprises the first part of this new *Catalogus* I feel it necessary to call attention to certain omissions and corrections which may serve to make the catalog more useful to systematists.

OMISSIONS.

Unquestionably the most serious fault has been in not citing the species which were originally described as species of *Tiphia* and later transferred to other genera outside the family as understood by Hedicke. Such omissions, if continued in the other parts of this new catalog, will lead to the eventual creation of a number of homonyms since the dilettante systematist,

¹ Hedicke, H. *Hymenopterorum Catalogus*, Pars I, Tiphidae, 32 pp. 1936. (publ. W. Junk).

interested only in seeing his own name after a species, will merely check over the names in the Catalogus to determine whether the name he wishes to propose has been used before rather than to dig through all the early literature to compile his own catalog. To obviate the cause of such confusion it is sincerely hoped that successive parts of the Catalogus will cite these transferred species as an appendix to each genus as I have done here in the Appendix to this critique.

The following species which belong in the Tiphidae as comprehended by Hedicke have been omitted from his catalog:

TIPHIA BREVILINEATA Allen and Jaynes. Proc. U. S. N. M., LXXVI: 70, 1930. ♀

T. FORTISTRIOLATA Cameron. Invert. Pacif., I: 170, 1907. ♂.

PARATIPHIA CANALICULATA Cameron. Biol. Centr.-Amer., Hym., II: 237, no. 6, 1893. ♀ (*Epomidiopteran*).

Dalla Torre, Cat. Hym., VIII: 143, 1897. (*Epomidiopteran*)
Cameron, Invert. Pacif., I: 105, 1905. (*Paratiphia*)

EPOMIDIOPTERON HETEROSPILUM Cameron. Timahri, Journ. Roy. Agr. & Comm. Soc. Brit. Guiana, (3) II: 417, 1912. ♀

CORRECTIONS.

Scoliphia Banks should be placed as a synonym of *Epomidiopteran* de Romand². *S. spilota* Banks is doubtfully distinct from *Epomidiopteran julii* de Romand.

TIPHIA CANALICULATA Cameron, 1902 has priority over *T. himalayensis* Cameron, 1904 and the species should appear under the former name rather than the latter.

T. UNICOLOR Lepeletier, 1845 has priority over *T. polita* Costa, 1858 and the species should appear under the former name rather than the latter.

Inasmuch as a varietal name has no status in nomenclature it is not necessary to use *Tiphia notopolita* var. *alleni* Roberts for *T. notopolita* var. *intermedia* Allen and Jaynes.

T. DENTICULA Cameron is mis-spelled and appears in the

²Bridwell (Proc. Hawaii. Ent. Soc., IV: 119, 1919) is the authority for this synonymy.

catalog as *T. denticulata*.

T. MINUTOPUNCTATA Allen and Jaynes should follow *T. minuta* van der Linden.

EPOMIDIOPTERON 12-MACULATA (Cameron) is placed under *Paratiphia* as *deccmmaculatus* and should be transferred to *Epomidiopteron* with the original orthography.

Some papers issued as parts of a serial publication have been cited incorrectly. For example in the reference listed under *Tiphia inornata* Say, we find the following citation—"Bradley, List Ins. N. York p. 922, 1928." To facilitate reference to this work it should have been cited as follows: Bradley [in Leonard], List Ins. New York, Cornell Univ. Agr. Expt. Sta., Memoir 101, p. 922, 1928.

In my opinion *Tiphia reticulata* Malloch is the name which should be used for the species Hedicke lists as *T. intermedia* Roberts. *T. intermedia* was proposed by Malloch as a new variety of *punctata* Robertson (preoccupied by *T. punctata* Smith) preceding by two pages *T. reticulata* which was described as a new species. Inasmuch as a varietal name has no standing in nomenclature and although *intermedia* Mall. has page priority over *reticulata* Mall., the latter should be used. Roberts, recognizing that *punctata* Robertson was preoccupied, raised *intermedia* Mall. to specific rank and proposed the variety *exitalis* for the variety *intermedia*. Allen after studying Malloch's type material concluded that *intermedia exitalis* and *reticulata* were conspecific. As I understand it the synonymy is as follows:

TIPHIA RETICULATA Malloch. Ill. Nat. Hist. Surv. Bull., XIII: 23, 1918. ♀

Tiphia punctata Robertson. Trans. Amer. Ent. Soc., XXVII: 196, 1901. ♂ (*nec T. punctata* Smith, 1873).

Tiphia intermedia Roberts. Can. Ent., LXII: 189, 1930.

VAR. *INTERMEDIA* Malloch. Ill. Nat. Hist. Surv. Bull., XIII: 21, 1918. ♀

Tiphia intermedia var. *exitalis* Roberts. Can. Ent., LXII: 189, 1930.

Two homonyms have been overlooked by Hedicke so I here-

by propose the following new names:

Tiphia turneri³, *nom. nov.*, for *Tiphia pedestris* Gerstaecker, 1857 (*nec Tiphia pedestris* Fabricius, 1775).

Tiphia palmi⁴, *nom. nov.*, for *Tiphia rufipes* F. Smith, 1855 (*nec Tiphia rufipes* Latreille, 1797).

In conclusion I might add that I am not in agreement with Hedicke's limitation of the family Tiphidae to the six genera which he has included. Nothing is to be gained by erecting a separate family for every few genera in the Scoliid Hymenoptera and the Myziniinae certainly are very closely related to the Tiphinae proper, as are also the Brachycistinae. However, this is a point which must be settled to his own satisfaction by each worker in the field.

APPENDIX.

The following species which were omitted by Hedicke were described originally as species of *Tiphia* and were relegated later to other genera.

TIPHIA ABDOMINALIS Panzer. Fauna Ins. German., Heft 53: T. 5, 1798. To Sphecidae.

T. ANNULATA Fabricius. Ent. Syst., p. 225, no. 7, 1793. To Scoliidae.

**T. BIPUNCTATA* Perty. Delect. anim. artic. Brasil., p. 139, T. 27, f. 12, 1833. To Anthoboscidae (?).

T. BREVICORNIS Panzer. Fauna Ins. German., Heft 53: T. 6, 1798. To Apoidea.

T. CAROLINIANA Panzer. Krit. Revis., II: T. 1, f. a-c, 1806. To Myziniinae in Tiphidae.

T. CENOPTERA Panzer. Fauna Ins. German., Heft 81: T. 14, 1801. To Bethyilidae.

T. CILIATA Fabricius. Mant. Ins., p. 279, no. 7, 1787. To Scoliidae.

**T. CINGULATA* Klug. In Weber & Mohr, Beitr. z. Naturk., II: 185, no. 3, 1810.

³For Mr. Rowland E. Turner in recognition of his studies in the aculeate Hymenoptera.

⁴For Professor Chas. E. Palm of the Cornell University Department of Entomology.

* Original not seen.

- T. COLLARIS Fabricius. Syst. Ent., p. 354, no. 7, 1775. To Scoliidae.
- T. CRASSICORNIS Fabricius. Mant. Ins., p. 278, no. 2, 1787. To Sphecidae.
- T. DORSATA Fabricius. Mant. Ins., p. 279, no. 11, 1787. To Scoliidae.
- T. EPHIPIUM Fabricius. Syst. Ent., p. 353, no. 4, 1775. To Myzininae in Tiphidae.
- T. FLAVIPES Fabricius. Ent. Syst., p. 224, no. 3, 1793. To Sphecidae.
- T. GROSSA Fabricius. Syst. Piez., p. 232, no. 4, 1805. To Scoliidae.
- T. HAEMORRHOIDALIS Fabricius. Syst. Ent., p. 353, no. 3, 1775. To Sphecidae.
- T. HEMIPTERA Fabricius. Supplem. Ent. Syst., p. 254, no. 1-2, 1798. To Bethyidae.
- T. HISTRIONICA Fabricius. Mant. Ins., p. 279, no. 4, 1787. ?
- T. INTERRUPTA Say. Narr. Exped. St. Peter's Riv., p. 322, no. 2, 1824. To Myzininae in Tiphidae.
- T. MACULATA Fabricius. Ent. Syst., p. 224, no. 4, 1793. To Myzininae in Tiphidae.
- *T. MARGINATA Klug. *In* Weber & Mohr, Beitr. z. Naturk., II: 184, no. 2, 1810. ?
- T. MIXTA Fabricius. Supplem. Ent. Syst., p. 254, no. 10-11, 1798. ?
- T. NIGRA Fabricius. Ent. Syst., p. 225, no. 9, 1793. To Scoliidae.
- T. OBSCURA Fabricius. Syst. Piez., p. 233, no. 8, 1805. To Myzininae in Tiphidae.
- T. QUINQUECINCTA Fabricius. Syst. Ent., p. 353, no. 2, 1775. To Myzininae in Tiphidae.
- T. RADULA Fabricius. Syst. Ent., p. 354, no. 5, 1775. To Scoliidae.
- T. RUFICORNIS Fabricius. Mant. Ins., p. 279, no. 12, 1787. ?
- T. RUFIVENTRIS Panzer. Fauna Ins. German., Heft 53; T. 4, 1798. To Sphecidae.
- T. SERENA Fabricius. Ent. Syst., p. 224, no. 4, 1793. To

Myzininae in Tiphidae.

T. THORACICA Fabricius. Supplem. Ent. Syst., p. 254, no. 15-16, 1798. To Scoliidae.

T. TRICINCTA Fabricius. Syst. Ent., p. 354, no. 6, 1775. To Scoliidae.

T. TRIFASCIATA Fabricius. Ent. Syst., p. 226, no. 14, 1793. To Scoliidae.

T. TRIPUNCTATA Rossi. Fauna Etrusca., II: 69, no. 831, T. 6. f. 10, 1790. To Myzininae in Tiphidae.

T. VARIEGATA Fabricius. Mant. Ins., p. 179, no. 6, 1787. To Sphecidae.

New Species of Pacific Coast Coleoptera. (Cleridae, Pyrochroidae, Chrysomelidae).

By EDWIN C. VAN DYKE,

University of California, Berkeley, California.

FAMILY CLERIDAE.

Bostrichoclerus, new genus.

Large, elongate, very finely and sparsely pilose. Head large; eyes large, transverse, coarsely granular, feebly emarginate in front, and very prominent; antennae long, eleven segmented, scape robust, segments 2-5 about twice as long as broad, feebly clavate and quite glabrous, a few stiff hairs only being evident, segments 6-10 moderately serrate, eleventh fusiform, the free angles of 6-8 densely clothed with fine silky pile and the three following segments completely clothed; a prominent horn, laterally compressed and bifid at apex, arising from in front of each eye and just within the insertion of the antennae giving the latter the appearance of arising from their bases; mandibles robust; maxillary palpi four segmented, labial palpi three segmented, the terminal segments of both sets securiform, that of the labial palpi the larger, and almost an equilateral triangle. Prothorax robust, somewhat longer than broad, broadly constricted at sides in front of middle and narrowed posteriorly, basal margin a complete and well defined bead; coxal cavities rounded and narrowly opened behind. Elytra almost three times as long as prothorax, two and a half times as long as broad, rather finely, densely and irregularly punctured and without striae except for fine sutural striae close to the suture and extending from about the middle almost to the apex. Anterior

coxae conical, very narrowly separated, trochantine not visible; middle coxae feebly conical, well separated and with evident trochantine; hind coxae transverse. Abdomen with five free ventral segments. Legs long and moderately slender; tibiae with short terminal spurs; tarsal segments all well developed, flattened dorsally, 1-4 broad yet longer than broad, with the usual membranous appendages and densely papillose beneath, the fifth with sides somewhat papillose; claws simple.

Genotype: *Bostrichoclerus bicornus*, new species.

This rather remarkable genus belongs in the tribe Tillini and because of its coarsely granular eyes, somewhere near *Cymatodera*. It, however, does not look at all like any species of the latter genus but at first sight rather like a large species of the genus *Polycaon* of the family Bostrichidae, also because of its size and general appearance somewhat suggests *Natalis* which is structurally quite removed. Its distinctive peculiarities are the prominent frontal horns, the type of antennae and the elytra without discal striae.

Bostrichoclerus bicornus, new species.

Rather large, dark brown and somewhat shining. Head flattened in front, rather densely punctured above, smooth and sparsely punctured anteriorly, with a faint medial, longitudinal impression on front and sparsely pilose. Prothorax about a sixth longer than broad, base lobed at middle and sinuate each side, apex broadly arcuate and overhanging, disk irregularly punctured, more closely and deeply so in front and with short, reclinate hair arising from the punctures and a few, long erect hairs widely scattered about, and broadly and feebly impressed at middle. Scutellum semicircular, densely punctured, rugose and concave. Elytra moderately convex, with pronounced though well rounded humeri, sides almost parallel and disk somewhat dull as the result of the dense punctuation and fine rugoseness. Beneath somewhat shining, rather closely punctured anteriorly and sparsely behind. Legs with apices of tibiae beneath and undersurfaces of the tarsal segments from 1-4 densely clothed with short, silky, orange pile. Length 20 mm (with head flexed), breadth 6.5 mm.

Holotype (No. 4682 Mus. C. A. S. Ent.), a unique from Palm Cañon, Angel de la Guardia Is., Gulf of California, collected May 3, 1921, by J. C. Chamberlin, from beneath bark.

This insect is one of our largest clerids and like nothing else

in our fauna.

Enoclerus inyoensis, new species.

Small, black, with fulvous tibiae, antennae in great part and palpi rufous, and the elytra varicolored, the color pattern being as follows: the anterior half a reddish orange except for an hour-glass-shaped, sutural, black marking, broadest in front about the scutellum and a blackish line along the lateral margin in front of the median gray bar; the posterior portion densely clothed with gray pile upon a light background except for a broad, black transverse bar at the posterior third which bisects the gray patch, which may or may not be broken at the suture, and which has the pile covering it short, closely appressed and unicolorous with it. Head with front rather finely, closely punctured at sides, with a smooth, blunt ridge at center, and covered with long gray pile. Prothorax cuneate, narrowed behind, with a narrow transverse impression near base and a shallow, broader impression somewhat back of the apex, the surface finely, rather closely punctured and with gray pile at base, sides and to a slight degree in the center, elsewhere with long, black hair which extends somewhat onto the head. Elytra rather finely, closely punctured, finely rugose, and provided with scattered, erect, black setae in addition to the pubescence mentioned before. Beneath rather shining, sparsely, finely punctured and with short, scattered gray pile. Length 5-6 mm., breadth 1.75-2.25 mm.

Holotype (No. 4683 Mus. C. A. S. Ent.) and three *paratypes* from the Panamint Mts., Inyo Co., CALIFORNIA, collected as follows: three including type, May 29, 1937, the fourth June 18, 1937, and two by D. Little, and one each by J. W. Johnson and myself. All were beaten from pinyon pine, *Pinus monophylla* Voss.

This attractive little clerid is of about the same size as *lecontei* (*nigriventris*) (Lec.) and *humeralis* Schf., and resembles them also in having the elytra marked with a median transverse gray band and gray apex. It is less narrow and elongate than either, has a large reddish orange humeral patch, lacking in *lecontei* and much more extensive than in *humeralis*, has the gray, median bar broad and evenly arcuate, whereas it is narrow and zig-zag in *lecontei* and much vaguer in *humeralis*, and the black bar sharply defined with even margins while

it has irregular boundaries in *lecontei* and is but poorly defined in *humeralis*. In addition the tibiae are fulvous or rufus in *inyoensis* and black in the other species.

FAMILY PYROCHROIDAE.

Ischalia (Eupleurida) californica, new species.

Orange yellow except for the antennal segments 3-9 which are black and a large black, median elytral vitta which extends from near the base to near the apex, being about one half the width of the disk in the basal two thirds and expanded apically in the form of a transverse bar clear to the lateral margins. Head flattened in front with a small tubercle between the anterior margins of the eyes. Prothorax about one fourth broader than long, sides carinate and feebly arcuate posteriorly, more evidently rounded and convergent in front, hind angles slightly projecting posteriorly; disk bigibbous in front, with a pronounced median carina behind which extends posteriorly beyond basal border, with large transverse impressions on either side of carina and a finely pubescent surface. Scutellum tubercular. Elytra over twice as long as broad, with the sutural and lateral margins carinate as in *costata* and *vancouverensis* but with the lateral discal carinae broadly expanded throughout their course, the disk between finely, densely punctured inwardly towards suture and more coarsely and distantly punctured outwardly towards lateral carinae. Beneath unicolorated orange and finely punctured and pubescent as in the other American species. Length 5-6.5 mm., breadth 2-2.5 mm.

Holotype (No. 4684 Mus. C. A. S. Ent.) and numerous designated *paratypes* from a large series of specimens collected near Weott, Humboldt Co., CALIFORNIA, July 13, 1929. I have also collected it near Arcata, Humboldt, Co., Calif.

This species I have been considering for some time as but a subspecies of *vancouverensis* but a more careful study has shown me that it is quite distinct. It differs from *vancouverensis* in the color pattern, in having the posterior prothoracic angles not divergent as they are in the latter, in the type of punctuation of the disk of the elytra and in the uniformly broad lateral carinae of the elytra. It has the antennal segments 3-9 a sooty black whereas they are merely fuscous or piceous in *vancouverensis*; the discal black markings of the elytra not expanded until the posterior third, then reaching

fully to the lateral margins whereas in the other the expansion is from the middle to near the apex and only reaches the lateral carinae at the sides; and the abdomen is orange in *californica* while black in *vancouverensis*. In the latter the discal elytral punctuation between the lateral carinae is uniformly coarse and somewhat reticulate while quite fine and dense towards the suture and coarser near the lateral carinae in *californica*. The lateral carinae in *californica* are uniformly wide until near their apices, in *vancouverensis* and also in *costata* they are considerably narrower as well as more depressed from about the middle.

In a recent paper Dr. Blair¹ has resurrected *Euplecurida* Le Conte, for the American species chiefly on account of their being wingless and lacking a small supplementary humeral carina which is evident in all known Old World species. I prefer, however, to consider *Euplecurida* as but a subgenus of *Ischalia*, not deeming the divergent characters of sufficient importance, especially when one considers the very numerous points of resemblance, also the fact that one oriental species, the Japanese, *I. patagiata* Lewis, has the wings incompletely developed. I have always found our two Pacific Coast species about fungous growth on old decaying logs. At one time I split open a small hollow log of tanbark oak, *Lithocarpus densiflora* (H. and A.), and found the entire cavity lined with white mycelium upon which numerous larvae and adults of *californica* were feeding.

Key for the separation of the American species of Ischalia

1. Head black, elytra black except for median portion of lateral carinae, middle part of side margin and apices which are yellow; lateral carinae gradually narrowed from base to apex;
 - Alleghany Mts. *costa*
 - Head orange 2
2. Abdomen black and elytra with broad black median vitta extending from base of elytra to middle where suddenly dilated to lateral carinae; lateral carinae of elytra narrowed from about the middle to apex; West Br.

¹ Notes on the Coleopterous Genus *Ischalia* Pascoe, ect., by K. G. Blair, Ent. Mo. Mag., 3d Ser., Vol. VI (1920), pp. 133-135.

Col., West Wash. *vancouverensis*
 Abdomen orange, the broad black elytral vitta extending
 from base to posterior third where suddenly dilated
 to lateral margins; lateral carinae of equal breadth from
 base to posterior third, then narrower; Humbolt Co.,
 Calif. *californica*

FAMILY CHRYSOMELIDAE.

GLYPTOSCELIS ILLUSTRIS *aridis* new subspecies.

Somewhat similar to the typical *illustris* but differing by being proportionally shorter and broader and much more densely pilose, hence less brilliant. In typical *illustris* the proportions are: for the prothorax, length .3 to breadth .35; and for the elytra, length .75 to breadth .45; while in *aridis*, the proportions are: for the prothorax, length .27 to breadth .37; and for the elytra, length .7 to breadth .5. The anterior margin of *illustris* as seen from the side is much more oblique than in *aridis*; the white pile in *illustris* is condensed along sides of both prothorax and elytra and along elytral suture and in more or less vague, interrupted vittae on elytral disk with a larger patch at sides near the middle, while in *aridis* it is denser and more uniformly disposed; and the sparse golden brown hairs of *illustris* are scattered over the more or less denuded coppery surface of both pronotum and elytra while the light brown pile of *aridis* is most evident near the apex of the pronotum and about the humeri and posteriorly at the sides of the elytra. The impression about the scutellum also appears to be deeper in *illustris* than in *aridis*.

Holotype male, *allotype* female (Nos. 4685-4686, Mus. C.A.S. and five paratypes, the holotype, allotype and one paratype collected June 15, 1937, on the Westgard Pass Plateau, Inyo Mts., Inyo Co., CALIFORNIA, the first two by myself, the third which is now in the collection of B. E. White by one of my students; two other specimens collected May 27, 1937, by myself and June 7, 1937, by L. D. Phillips from the same locality and the remaining two specimens collected by Albert Koebele, in May 1891, in the Argus Mts. of Inyo Co., Calif. There are no doubt several other Argus Mt. specimens collected by Albert Koebele in the U. S. National Museum Collection. All the Inyo Mt. specimens and presumably also the Argus Mt. specimens were beaten from pinyon pine, *Pinus monophylla* Voss.

The typical *illustrus* of the Sierra Nevada Mts. is generally to be found on the ponderosa pine, *Pinus ponderosa* Lawson.

This interesting subspecies of the desert ranges of south-eastern California when placed near typical specimens of *illustris* stands out very distinctly because of its greater piloseness, in fact looks very much like some of the other and more uniformly pilose species. Other species of the genus *Glyptoscelis* which, by the way, has been recently reviewed², that are to be found in its territory are *scquoiae* Blasid. on juniper and in Owens Valley, *alternata* Cr. on a species of wild vetch, *Glycyrrhiza lepidota* (Nutt.) and on other annuals.

An Improved Method of Bleaching Insect Specimens

By BRYANT E. REES, Stanford University, California.

Various methods of bleaching melanic insect specimens for morphological study have been suggested, but all of them have the defect of requiring an excessive lapse of time between the beginning and end of the process. Soaking in Eau de Labarraque (hypochlorite of soda) or in Eau de Javelle (hypochlorite of potash), or boiling in hydrogen peroxide are some of the methods that have been advocated. An improved method is described by Blackwelder in his paper on the Morphology of the Coleopterous Family Staphylinidae (Smithsonian Miscellaneous Collections, Vol. 94, No. 13, 1936.) He employed the procedure of boiling the insects for a few minutes in KOH and then placing them in a 3% solution of hydrogen peroxide to which has been added a small amount of ammonia (about one drop per cc. of peroxide). By this method two to six hours are required to bleach dark sclerites and the treatment has the great advantage of leaving the edges and the sutures darker than the rest.

This method as described by Blackwelder gives excellent results, but the time involved is still excessive; and so, beginning

² A study of the Genus *Glyptoscelis* Le Conte in America North of Mexico, by N. L. H. Krauss, Univ. Calif. Publ. in Entom., Vol. 7, No. 2, pp. 21-39, 9 fig. (1937).

with this method, the present author has attempted to shorten the time required for its application. The method was varied in several ways and controls were obtained for the various types of specimens or parts of specimens. A beetle of the genus *Harpalus* was used as a test standard. Stronger hydrogen peroxide was employed, the 20% solution which is obtainable at drugstores being used.

Specimens or parts of specimens of light pigmentation, but yet dark enough to justify some bleaching, are boiled for 4 or 5 minutes in 10% KOH or less time if necessary to avoid the breaking down of tissues. These are then transferred directly to a vial containing about 5 cc. of 20% hydrogen peroxide to which has been added 13 to 16 drops of ammonia and allowed to stand with frequent shakings. (Do not stopper vial.) Fifteen to thirty minutes are required for bleaching. If more time is desired for less pigmented parts or for slower and better control, smaller amounts of ammonia should be used. Three to five drops of ammonia to 5 cc. of peroxide result in a slower bleaching time of one to one-and-a-half hours. The ratio of 13 to 16 drops of ammonia to 5 cc. of hydrogen peroxide is found most satisfactory and is used throughout the whole method unless otherwise specified. Also the small amount of KOH carried over with the parts of the specimens seems to better insure the bleaching.

For a more rapid bleaching of any part or for more heavily pigmented parts the method may be hastened by boiling the pieces for 5 minutes in 10% KOH, transferring the parts directly to the peroxide and ammonia solution for about one minute, and then transferring them back to *boiling* KOH. Rapid bleaching occurs in the KOH and should be closely watched. The parts or specimens are again placed in the peroxide and left from one to three minutes or until the desired degree of discoloration is reached. If necessary this may be repeated. The reaction is stopped by washing the parts in alcohol. The procedure may be completed in 10 to 15 minutes.

Even more rapid bleaching or the bleaching of very heavily

pigmented parts or specimens as *Harpalus* or *Elcodes* may be obtained by boiling them in KOH for 5 minutes and then transferring them to a casserole containing approximately 15 to 20 cc. of clear, boiling KOH. (Used KOH may be poured off and new added to the casserole containing the specimen and heated to boiling.) To this is added about 3 cc. of 20% hydrogen peroxide and approximately 8 drops of ammonia. This is allowed to boil. It should be closely watched as the time required is shortened to from 30 seconds to a few minutes depending on the specimens or parts of specimens. When the desired stage of bleaching is reached the reaction can be stopped by transferring to alcohol. This procedure gives very satisfactory results with whole specimens, and the speed may be controlled by the amount of peroxide added to the boiling KOH. If punctures are made in the membranes of all insects the bleaching is more uniform for specimens still containing muscles. By this procedure *Elcodes*, one of the most refractory insects that can be suggested because of the thickness of its derm and heavy pigmentation, was easily bleached to a workable condition in 15 minutes.

Vernon Lyman Kellogg

A resolution adopted by the Division of Biology and Agriculture of the National Research Council, published in *Science* for June 3, 1938, contains the following: Vernon Lyman Kellogg was born in Emporia, Kansas, December 1, 1867. After a long and distressing illness he finally put aside the heavy burden at Hartford, Connecticut, August 8, 1937. He attended the University of Kansas where he graduated in 1889. Here he became assistant professor of entomology in 1890; he was called to Leland Stanford University in 1894 as assistant professor. He became active in the formation and administration of the National Research Council, in which he was chairman of the Division of Biology and Agriculture. Later he became secretary of the Council until ill health forced him to retire in 1932. The Division here records its heartfelt appreciation of his services in the Division and in the wider circle of the Council as a whole.

Notes on some Dragonflies (Odonata) from Admiralty Island, Alaska.

By LEONORA K. GLOYD,

Among the recent additions to the Williamson Collection of Odonata in the Museum of Zoology of the University of Michigan, are some dragonflies from Admiralty Island, Alaska, collected by R. R. Sheppard during the summer of 1933. They are of interest largely because no specimens from this island are recorded in the literature and because three of the species, *Sympetrum danae* (Sulzer), *Somatochlora semicircularis* (Selys) and *Aeshna interrupta interrupta* Walker, have not been previously reported from Alaska.

Admiralty Island (57° to 58° 30' latitude and 133° 50' to 135° longitude) is about 110 miles long and 30 miles wide, and lies a little south of Juneau between the mainland and a group of seaward islands. The topography is rough with mountains rising rather abruptly from the coast to elevations of 2,000 to 4,000 feet.* According to Mr. Sheppard practically the whole island is heavily timbered, chiefly with spruce and hemlock but with some yellow cedar. It has numerous lakes two to four miles in length, many streams and beautiful meadows near the coast and in the mountain basins.

Mr. Sheppard collected insects from June 22 to August 29, but no dragonflies were taken until July 15. His field records, from which the following habitat notes are taken, show that representatives of this group were obtained from four general locations in the vicinity of Mole Harbor and Mole River:

(1) A meadow near the mouth of Mole River. "The meadows are densely green with various grasses, cinquefoil and a smaller element of skunk cabbage, deer cabbage, daisies, and many shorter plants. In some places the grass is very high, five feet or more, in other places where the cinquefoil is dominant, the herbage is six inches or less high." July 26, weather clear with hot sunshine, temperature 62°F. at 9:00 A. M..

*A detailed account is given by Charles W. Wright in "A reconnaissance of Admiralty Island," 1906, U. S. Geol. Surv. Bull. 287, pp. 138-161, map.

66° at 3:00 P. M. August 16, rain. August 19 (on flats near shore), rain most of day except from 11-11:30 A. M. August 21, rain in morning, cloudy in afternoon.

(2) Alexander, Beaver and Hasselberg lakes. These are "wooded lakes bordered with alders, blueberries, ferns, devil's club, sphagnum, grasses, herbs, and other vegetation." Lake Alexander was visited on June 26 but no dragonflies were collected. On July 15, a clear day with bright sunshine, all three lakes were visited and the only species taken was *Enallagma cyathigerum* (Charp.). The temperature at 8:00 A. M. was 62°F.

(3) Swamps and meadows on the trail from Mole Harbor to a mountain basin south of the harbor, elevation about 1500 feet. August 25, weather clear and warm after slight fog in morning.

(4) A mountain basin with ponds of melted snow, elevation about 3000 feet. The meadows were "covered with heather, deer cabbage, grasses, sedges, lupine, asters, and other plants." August 26, weather clear and warm.

List of Species.

LEUCORRHINIA HUDSONICA (Selys). August 25, 2 ♂ ; August 26, 2 ♂ 1 ♀ .

SYMPETRUM DANAE (Sulzer). August 21, 1 ♂ .

SOMATOCHLORA ALBICINCTA (Burmeister). August 25, 1 ♂ ; August 26, 1 ♂ .

SOMATOCHLORA SEMICIRCULARIS (Selys). August 25, 1 ♂ .

AESHNA EREMITA Scudder. August 19, 1 ♀ .

AESHNA INTERRUPTA INTERRUPTA Walker. August 19, 1 ♂ .

AESHNA JUNCEA (Linné). August 21, 2 ♀ ; August 25, 1 ♂ .

AESHNA PALMATA Hagen. July 26, 1 ♂ ; August 16, 7 ♂ ; August 19, 1 ♀ ; August 21, 5 ♂ .

ENALLAGMA BOREALE Selys. July 26, 1 ♂ ; August 16, 1 ♂ 1 ♀ ; August 19, 1 ♂ ; August 25, 1 ♂ . The black areas of the thorax and abdomen show a tendency to be broader and more extensive than those of specimens from more southern localities.

ENALLAGMA CYATHIGERUM (Charpentier). July 15, 8 ♂. In this series the dark areas are more extensive than usual for this species. On the thorax the mid-dorsal black stripe covers half of the mesepisternum, the humeral is almost as wide as the pale antehumeral, a black line is present on the second lateral suture, and the metinfraepisternum is outlined in black. On the abdomen the dorsal black areas are slightly enlarged on segments 1 and 2 and conspicuously increased on 3 to 7 covering approximately the apical $\frac{1}{3}$ of segment 3, $\frac{1}{2}$ of 4, $\frac{2}{3}$ of 5, $\frac{4}{5}$ of 6, and all of 7 except for a narrow basal ring. In addition to the more extensive color pattern, segment 1 has a lateral oblique black stripe extending across the basal angle and slightly longer than half the segment; segment 2 has a sublateral black or dark brown bar of varying extent which does not touch either the base or apex of the segment but in some specimens is narrowly joined to the apical black area; and segments 8 and 9 which are usually entirely blue have large irregular dorso-lateral patches of black. The basal area of all three pairs of coxae is also black.

LESTES DISJUNCTUS Selys. August 16, 1 ♂ 1 ♀; August 25, 1 ♂; August 26, 3 ♂ 1 ♀. These specimens are small and very dark with a noticeable metallic green lustre, quite different in appearance from the larger and paler brown and yellow *disjunctus* from the southern part of the United States.

A preliminary study of the *disjunctus* material in the Williamson Collection indicates that a gradual but definite increase in size, and decrease in the extent and intensity of coloration, takes place from north to south and from high to low altitudes. The genital characters, however, remain constant throughout the entire population. In view of this color variation and the marked similarity in abdominal appendages and genitalia between this species and the bright metallic green *Lestes sponsa* Hansem of Europe, the metallic lustre of the dark northern specimens of *disjunctus* is especially interesting. A more thorough investigation is necessary to determine the exact nature of this relationship.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Ja.

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

This list gives references of the current or last year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL. — Anon. — Association between nematodes and insects. [Nature] 141: 755. Anon.—Insecten in Sawarienoten. [58] 10, No. 219: 12-14. (S). Barton, C.—How it feels to be bitten by a black widow [spider]. [Nat. Hist., N. Y.] 48: 43-44. Burks, Ross & Frison.—An economical, portable light for collecting nocturnal insects. [12] 31: 316-318, ill. Burr, M.—The notorious case of Lady Glanville. [21] 50: 41-42. Carpenter, Roman & Collin.—Notes on insects collected in W. Greenland by the Oxford Univ. Greenland Expedition, 1936. [75] 1: 529-553, (*). Cockerell, T. D. A.—San Miguel Island, California. [Scient. Month.] 46: 180-187, ill. Cooke, B. H.—Nomenclature: a plea for common sense. [21] 50, Suppl.: (16). Ewing, H. E. The speed of insects in flight. [68] 87: 414-415. García-Díaz, J.—An ecological study of the fresh water insects of Puerto Rico. [J. of Agr. Univ. Puerto Rico] 22: 43-97, ill. Marcovitch, S.—The entomologist and human health. [Sci. Month.] 1938, June: 526-528. Martini, E.—Zur Frage der biologischen Arten. [110] 5: 33-43. Martynov, A. V.—Obituary by F. M. Carpenter. [5] 45: 80-83, ill. Obituary by T. D. A. Cockerell [68] 87: 292. Meyrick, E.—Obituary by T. B. Fletcher. [21] 50: 49-51, ill. Nuttall, George H. F.—Obituary by R. Matheson. [Journ. Parasit.] 24: 180-183, ill. Obituary by H. B. Ward. [68] 87: 337. Urquhart, F. A.—The insect collection of the Royal Ontario Museum of

Zoology. [4] 70: 67-70. **Wightman, A. J.**—The International Code of Zoological Nomenclature. [21] 50, Suppl.: (15)-(16). **Williams, H. B.**—Generic nomenclature. [21] 50, Suppl.: (13)-(15).

ANATOMY, PHYSIOLOGY, ETC.—**Arndt & Viets.**—Die biologischen (parasitologischen) beziehungen zwischen Arachnoideen und Spongien. [Zeit. f. Parasitenkunde] 10: 67-93. **Aubertot, M.**—Sur les membranes peritrophiques des insectes. [Arch. Zool. Exp. Gen.] 79, N. & Rev.: 49-57, ill. **Baerg, W. J.**—The poisons of scorpions and spiders, their effect and treatment. [Nat. Hist. N. Y.] 1938: 42-51, ill. **Bodenstein, D.**—Untersuchungen zum Metamorphoseproblem 1. — Kombinierte schnurings-und Transplantation-experimente an Drosophila. [87] 137: 474-505, ill. **Breakey & Olcott.**—The non-toxicity of gossypol to certain insects. [68] 87: 87. **Burns, R. K.**—Hormonal control of sex differentiation. [90] 72: 207-227, ill. **Cartwright, K. St. G.**—see under Hymenoptera. **Cochrane, F.**—An histological analysis of eye pigment development in *Drosophila pseudo-obscura* [Pro. R. S. Edinburgh] 57: 385-399, ill. **Corey, H. I.**—Heteropycnotic elements of Orthopterous chromosomes. [Arch. Biol. Paris] 49: 159-174, ill. **Dumitresco, M.**—Les glandes sericigenes tubulaires de *Theridium tepidaraorum*. [Arch. Zool. Exp. Gen.] 79, N. & Rev.: 58-68, ill. **Emerson, A. E.**—Termite nests—a study of the phylogeny of behavior. [Ecol. Monogr.] 8: 247-284, ill. **Fraenkel & Pringle.**—Halteres of flies as gyroscopic organs of equilibrium. [31] 141: 919-920, ill. **Geitler, L.**—Über den Bau des Huhkerns mit besonderer Berücksichtigung der Heteropteren und Dipteren. [97] 58: 152-179, ill. **Goldschmidt, R.**—Intersexuality and development [90] 72: 228-242. **Gough, H. C.**—Toxicity of mercury vapour to insects. [31] 141: 922-923. **Hase, A.**—Zur hygienischen bedeutung der parasitären haus-und vogelwanzen sowie über wanzenspopulationen und wanzenkreuzgen. [Zeit. f. Parasitenkunde] 10: 1-30. **Heidermanns, H.**—Der Exkretstoffwechsel der wirbellosen Tiere. [88] 17: 263-267. **Helwig, E. R.**—The frequency of reciprocal translocations in irradiated germ cells of *Circotettix verruculatus* (Orth.). [Arch. Biol. Paris] 49: 143-158, ill. **Hopf, H. S.**—Investigations in the nutrition of the Ash-bark beetle, *Hylesinus fraxini*. [35] 25: 390-405. **Janisch, E.**—Eine neue Pilzkrankheit bei Nonnenraupen. [110] 5: 1-20, ill. **Kalo, M.**—

The diurnal activity of the strawberry weevil, *Anthonomus bisignifer*, with a note on the ecological meaning of the solar radiant energy. [Sci. Rep. Tohoku Imp. Univ. Japan] (4), 12: 511-530, ill. **Kettisch, J.**—Zur Kenntnis der Morphologie und Ökologie der Larve von *Cricotopus trifasciatus* (Dipt.: Chironom.). [56] 16: 193-204, ill. **Korschelt, E.**—Cuticularsehne und Bindegewebssehne. [94] 150: 494-526, ill. (insects p. 498-503). **Krause, G.**—Einzelbeobachtungen und typische gesamtbilder der Entwicklung von Blastoderm und Keimanlage im ei der Gewächtschauschreche *Tachycines asynamorus*. [46] 34: 1-78, ill. **Kuhn & Piepho.**—Die Reaktionen der Hypodermis und der Versonschen Drüsen auf das Verpuppungshormon bei *Ephestia kuhniella*. [97] 58: 12-51, ill. **Larsen, O.**—Untersuchungen über den geschlechtsapparat der Aquatilen wanzen. [Opuscula Ent.] 1, (Suppl.): 388 pp., ill. **Leach & Granovsky.**—Nitrogen in the nutrition of termites. [68] 87: 66-67. **Mast, S. O.**—Factors involved in the process of orientation in lower organisms in light. [Biol. Rev. Camb. Philosop. Soc.] 13: 186-224. (Insects p. 209-217, ill.) **Menner, E.**—Studien über die Bewegung von *Artemia salina* und *Branchipus stagnalis*. [34] 122: 4-65, ill. **Patterson, J. T.**—Aberrant forms in *Dropsophila* and sex differentiation. [90] 72: 193-206, ill. **Pflugfelder, O.**—Untersuchungen über die histologischen Veränderungen und das Kernwachstum der *Corpora allata* von Termiten. [94] 150: 451-467, ill. **Plagge, E.**—Weitere Untersuchungen über das Verpuppungshormon bei Schmetterlingen. [97] 58: 1-12, ill. **Pu, Chih-Lung.**—A comparative study of musculature of male genitalia in several species of Orthoptera. [Lingnan Sci. J.] 17: 21-31, ill. **Querci, O.**—Influence of reflected radiations on insects. [21] 50: 42-43. **Ribbans, C. R.**—Cytology of metamorphosis in the Culicidae. [31] 141: 920. **Schlottke, E.**—Die Hautung der Spinnenlungen und die dabei zu Beobachtende Grossenänderung der Zellkerne. [46] 34: 207-220, ill. **Schrader, K.**—Untersuchungen über die Normalentwicklung des Gehirns und Gehirntransplantationen bei der Mehlmotte *Ephestia kuhniella* nebst einigen Bemerkungen über das *Corpora allatum*. [97] 58: 52-90, ill. **Slifer, E. H.**—The formation and structure of a special water-absorbing area in the membranes covering the grasshopper egg. [53] 80: 437-457, ill. **Stossberg, M.**—Die Zellorgane bei Entwicklung der Flugelschuppen von *Ephestia kuhniella*. [46]

34: 173-206, ill. **Watson, G. I.**—The jump of fleas. [31] 141: 923. **Woodhill, A. R.**—Salinity tolerance and pH range of *Culex fatigans*. [31] 141: 920. **Yonge, C. M.**—Recent work on the digestion of cellulose and chitin by invertebrates. [Sci. Progress] 32: 638-647. **Zirngiebl, L.**—Über weitere Missbildungen bei Blattwespen. [56] 16: 220-223, ill.

ARACHNIDA AND MYRIOPODA.—**Arndt & Viets.**—Die biologischen (parasitologischen) Beziehungen zwischen Arachnoideen und Spongien. [Zeitschr. Parasitenk.] 10: 67-93, ill. **Baerg, W. J.**—see under Anatomy. **Fox, I.**—Notes on North American spiders of the families Gnaphosidae, Anyphaenidae, and Clubionidae. [Iowa State Coll. J. Sci.] 12: 227-243, ill. (*). **Jacot, A. P.**—New moss-mites, chiefly mid-western, Ill. [Amer. Midland Nat.] 19: 647-657, ill. **Jenks, G. E.**—The birth of a baby black widow and its enemy, a small parasitic fly. [Nat. Hist. N. Y.] 1938: 52-57, ill. **Kaston, B. J.**—Family names in the order Araneae. [Amer. Midland Nat.] 19: 638-646. **Verhoeff, K. W.**—Über Diplopoden des Zoologische Museums in München. [89] Abt. Syst., 71: 1-54, ill. (k*). **Wells, F. L.**—“Shutting” in *Argiope aurantia*. [5] 45: 62-71, ill.

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MOSAICS AND OTHER ANOMALIES AMONG ANTS. By WILLIAM MORTON WHEELER. Pp. 95, 2 pls. + 18 figs. Harvard University Press, Cambridge, Mass. \$2.00—The manuscript for this handsome volume was completed by Professor Wheeler just a few days before his death. In it there are revealed again the brilliant analytical mind and the exhaustive detailed knowledge of ants that were Wheeler's. The occasion for this book was the discovery by Dr. Neal Albert Weber, a student of Professor Wheeler's, of two colonies of ants containing large numbers of anomalous individuals. One of these colonies, that of a large Cryptocerine, containing 4000 gynandromorphs has not yet been studied. The other colony, that of a fungus-growing (Attine) ant, *Acromyrmex octospinosus* Reich, forms the principal subject of the present volume.

In Part I (pp 3-18), the distribution, habits and normal castes of *Acromyrmex* are carefully described and new observations are recorded on fungus gardens in artificial nests. Part II (pp 18-34), is given to a detailed description of the entire personnel of the *A. octospinosus* colony taken in Trinidad, consisting of about 8000 normal individuals including 175 females, 660 males and the rest workers of the three castes, minor media and major. In addition there were 164 anomalous individuals. Of these, 106 were females and workers, belonging to three different "mutations." There were also 10 gynandromorphs (male-female mosaics), 46 gynergates (female-worker mosaics) and 1 diploergate (major and media worker mosaic), all believed to be the progeny of one of the mutant females. In the gynandromorphs the female component is confined to a portion of the head while the body is that of a normal male, except in one specimen which had abnormal genitalia. In the other types of mosaics it is again found that one of the components is nearly always limited to a portion of the head.

Part III (pp 35-65) considers the origin of the new types of mosaics and also of those mosaics which have already appeared in the literature, including mosaics with a soldier component (dinergatandromorphs and dinergatogynes) and those having an ergatogyne and a male component (ergatogynandromorphs). As regards the determination of the sexes, it is well established for ants as for honey-bees that the males develop parthenogenetically, while the females develop from fertilized eggs. In honey-bees it is known that the female castes (worker and queen) are determined by differential feeding of the larvae (trophogenic determination). As regards the determination of the castes in ants, Emery always maintained that it was also trophogenic, while others, such as Forel, have favored the idea

that the castes are already determined in the egg and that there is a genetic difference between the castes (blastogenic determination). Wheeler states that he himself was for a long time "on the fence" in this controversy, until his studies on these mosaics won him over to the blastogenic side. The evidence he presents for this theory is based on careful comparative studies of the morphology of all the normal castes in many different groups of ants, on anomalies, including the parasitogenic ones, on the nursing and feeding behavior within ant nests and, finally, on mosaics. As to mosaics, Wheeler points out that true sex mosaics (gynandromorphs) admittedly contain two sorts of genetically different tissues making up respectively the male and the female components of the mosaic. If this is true, then caste mosaics must also be made up of two sorts of tissues which are genetically different. In a gynergate, for example, both female and worker tissues must be present. And since mosaics between the subcastes also exist (diploergates), these subcastes too must be genetically different. And so Wheeler has concluded that all the castes and sub-castes have a blastogenic origin. However, in spite of the clear and exhaustive presentation of these data on mosaics and of all other available evidence, one still feels, in the end, that additional evidence, especially evidence of an experimental nature will be necessary to really demonstrate that determination is blastogenic. (In this connection attention is called to P. W. Whiting's review and discussion of Wheeler's book in the *Journal of Heredity*, 29: 189-193, May, 1938, in which alternative explanations of ant mosaics are proposed). Other valuable features of Professor Wheeler's book are: the taxonomic notes on the species (Appendix A); the revision of the known non-mosaic anomalies, both the parasitogenic and the non-parasitogenic, which gives the history and synonymy of the often confusing terminology of these forms (Appendix B); and finally, the bibliography on castes and anomalies.

R. G. SCHMIEDER.

RECENT ADVANCES IN ENTOMOLOGY by A. D. IMMS, Reader in Entomology, University of Cambridge. Second Edition. With 94 illustrations; Philadelphia P. Blakiston's Son & Co. Inc. 1937 x + 431 pp. \$5.00. The first edition of this work appeared in 1931, occupied viii + 374 pages and was reviewed by Prof. Cockerell in the *News* for July of that year. The number of chapters, their titles and most of the subdivisions in the new edition are the same as those in its predecessor. Some subjects whose inclusion might have been expected, as insect physiology, insects and climate, general morphology, insects

and plant viruses, have been omitted because they "have already formed the subjects of recent books or monographs." Much revision has been made in those chapters dealing with head segmentation, genitalia, musculature, homologies of appendages, hormones in metamorphosis, paleontology, response to visual stimuli, stimulatory organs, biological races and biological control. Prof. Cockerell's remark concerning the first edition applies, of course, to this second: "He [Dr. Inms] has chosen the most significant lines of advance, and has recorded an astonishing number of observations and discoveries, often in fields which were hardly explored until very recently." One can not read this "astonishing number" without being impressed by the fact that the conclusions reached by different investigators of the same topic, whether it be morphological, physiological, paleontological or ecological, are in many cases still so divergent as to require much more study, observation and experimentation before agreement is attained. This condition of entomology—not peculiar to it—makes this book particularly valuable to all dealing with this science, and should serve as a warning to avoid dogmatism on disputed subjects.

P. P. CALVERT.

Rocky Mountain Conference of Entomologists

The fourteenth Rocky Mountain Conference of Entomologists will be held at the University of Wyoming summer camp, Centennial, Wyoming, August 14-19, 1938. As in the past the arrangement will be such that members of the family can be comfortably cared for at the Camp and enjoy an outing while the meetings are under way. The University of Wyoming summer camp is located in the Medicine Bow National Forest about 40 miles west of Laramie, Wyo., and 100 miles north and west of Fort Collins, Colo., at an elevation of approximately 9500 ft. The Camp consists of a large recreation and dining hall, two lecture and laboratory buildings and a number of cabins equipped to accommodate three persons in each cabin. All meals and bedding will be furnished at a reasonable cost at the Camp. The Medicine Bow Mountain area is noted for its rugged scenery and good trout fishing. The nearby streams, lakes and mountain meadows furnish excellent high altitude insect collecting. Reservations should be made with the Secretary well in advance. Detailed information in regard to the final arrangements will be sent to those indicating they are interested in attending. Let us have your topics for discussion at an early date.

GEO. M. LIST, Sec., Colorado State College, Fort Collins, Colorado.

EXCHANGES

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Hemileuca maia in Flight (Lepid.: Saturniidae).

By ALEX K. WYATT, Chicago, Illinois.

An outstanding incident in a collecting experience covering over forty years of active work, was recalled in going over some notes of former years. Sunday, October 16, 1921, was one of those wonderful autumn days that make one feel good to be alive and able to enjoy the beauty and carefree spirit of the great out-doors. Temperature recorded for the day ranged from fifty-six degrees at 9:00 A. M. to sixty-five at noon and seventy-three at 5:00 P. M. and it was warmer in the sunshine. To take advantage of the day, I took the family on a scouting trip for new collecting grounds, to the south and southeast of the city. Friend Emil Beer joined us. We drove south some thirty miles to Lincoln Highway, then east through Dyer, Indiana, to Schererville, Indiana, which we reached about noon. Here we turned north, planning to stop at our old stamping grounds at Hessville, Indiana, to investigate collecting possibilities in the vicinity.

Just out of Schererville, we ran into them; *Hemileuca maia* by the hundreds, flying across the fields in every direction as far as one could see. We stopped by the roadside at once, unlimbered the nets and went to work. After capturing a few specimens, I surrendered my net to the older daughter, age eleven, and was kept busy caring for the moths as she and her younger sister, age six, brought them to me. The younger girl picked the moths from the tall grasses and shrubbery with her fingers and as may be imagined, these were mostly females. I can still visualize the youngster, coming toward me with a moth in her fingers and five or six males following, hovering closely around her hand and forearm. For a period of about two hours from noon until two o'clock the moths were flying

in great numbers. They flew high as a rule, thirty to fifty feet up and seemed to have business in the next county, but in the field where we were, many flew low enough to be captured, doubtless attracted by the females just emerging there. It was extremely interesting to see how madly the males sought the females; they literally fought each other in their eagerness. In one instance, we saw a tumbling ball of eight or ten moths with a dozen or more on the wing nearby, and upon investigation, found two females in the center of the ball. Copulation is effected almost instantaneously if there is no interference, whereupon the attraction for other males soon ceases. Looking across the field it was easy to spot the females by observing the males hovering about them. After two o'clock, flight practically ceased, the moths became scattered and many males were found at rest.

There was no great variation among over one hundred and forty specimens which we captured on that occasion, except in the width of the white band, which was narrow and almost entirely absent in some specimens and fully a quarter-inch wide in others. I took one unusual specimen, a male, in which the fringe of the primaries was white instead of the customary black color. We also found several egg masses, banded around twigs of willow. Records from eastern states usually give oak as the food plant of *Hemileuca maia*. Here, we never find the larva on oak, though it is plentiful in the vicinity, and willow is definitely the preferred food plant.

Never before, nor since, have we seen such a flight and the experience will remain vivid in our memories for many and many a day, and the nice little series of *Hemileuca maia* in our collections, will serve to refresh that memory.

An Annotated List of The Butterflies of Nebraska (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

(Continued from page 80.)

35. *D. BERENICE* (Cram.) race *strigosa* (Bates). Rare. One each from the following localities: Roca, May 10, 1911 (Leussler); McCook, June 20, 1913; Lincoln, August 10, 1913 (R. W. Dawson); West Point (no date); Mitchell August 19, 1916 (C. E. Mickel).

36. *ENODIA PORTLANDIA* (Fabr.). Not rare in the state but rather local. Colonies usually found at the edge of timber near a stream. Two broods, first in June, second in August. Has been taken as far west as Oconto.

37. *MEGISTO CYMELA* (Cram.). Common; single brooded, appearing late in June. Apparently found over the entire state. Specimens from Omaha, Lincoln, Rulo, Oxford and Harrison.

38. *SATYRODES EURYDICE* (Joh.). A few were taken by me in the canyons near Harrison, Sioux County on July 1, 1911. E. A. Dodge reported it as being quite common in the low lands near Fremont in the 80's.

S. EURYDICE race *FUMOSUS* Leussler. This dark giant race has thus far been found in but one locality, a spring-fed marsh near Omaha, where formerly it was abundant. Unfortunately, the marsh was drained and otherwise disturbed some years ago, since which time none of the butterflies have been found.

39. *COENONYMPHA INORNATA* Edw. Found so far only in the vicinity of lakes in the sand hill region of Cherry County. A series of 6 specimens collected there June 4 to 7, 1914, and 2 on June 10, 1929. These are race *benjamini* McDunnough.

40. *C. OCHRACEA* Edw. Taken abundantly near Harrison on numerous occasions in June. Has also been taken at Emmett in June, 1900, (Wolcott).

41. *NEOMINOIS RIDINGSI* (Edw.). Fairly swarmed on the high plains near Harrison, June 16 to 30, 1911. It is clearly double brooded, for fresh specimens in abundance were found

in the same locality on August 17 of the same year. It is quite variable, some specimens, especially of the later brood, resembling *dionysus* Scud. in size, and in having the eye spots larger, ground color at base lighter, and sharper dentation of the medium band of the secondaries. In June, 1933, a number were taken at Kimball.

42. *CERCYONIS ALOPE* race *OLYMPUS* (Edw.). Common; very variable; the form most commonly found in the state is Edwards' *olympus*, but some specimens found in and around Omaha are very similar to eastern *nephele*. Others have the yellow band so well developed as to approach somewhat closely typical *alope*, and there are intergrades of every degree. I have seen no typical *alope* in the state but it would not be surprising if it were found in the southeastern part. It is recorded from Nebraska City in a list published by Albert Cassel in 1894, and also included in H. G. Barber's list.

43. *C. MEADII* (Edw.). This handsome species is common at Harrison and Harrisburg throughout August. No doubt its habitat extends also to other localities, though at present no further records are at hand.

44. *C. OETUS* (Bdv.). Specimens collected in Squaw Canyon, July 20, 1892, and along Prairie Dog Creek July 2, 1901, are in the University collection. Both localities are in Sioux County near the town of Harrison.

45. *OENEIS UHLERI* (Reak.) race *VARUNA* (Edw.). Common on the high plains of Sioux County in May and early June. Extremely variable in the depth of ground color, number of ocelli and distinctness of band on under side of secondaries. Some specimens, on characters, would have to be referred to typical *uhleri*.

46. *COLAENIS JULIA* (Fabr.). Included in this list on the strength of a single specimen taken by Mrs. W. B. Graham in her garden at Omaha in September, 1908, and now in the writer's collection. The specimen is somewhat rubbed but the colors are fresh, and it is not tattered as if it had traveled a long distance. This suggests the possibility of its introduction

as larva or chrysalis. The dark band on forewing, extending from costa to outer margin, is complete and the apex of this wing also is well marked with fuscous. It apparently does not belong to the race *nudcola* Stichel.

47. *DIONE VANILLAE* (L.). Rare. A number of larvae (60 or 70) found feeding on passion vine at Omaha by F. H. Marshall, and some of them reared to maturity. A nice fresh individual observed at Lincoln, July 28, 1912 (R. W. Dawson), One specimen collected at Omaha, July 5, 1924; another October 15, 1928; and one at Plattsmouth, July 23, 1936 (Leussler).

48. *EUPTOIETA CLAUDIA* (Cram.). Common everywhere in the state; on the wing in every month from May to October, but fresh specimens are most numerous in July and September, indicating at least two broods.

49. *ARGYNNIS IDALIA* (Dru.). Common, especially in the eastern part of the state. Can be found from the middle of June till the middle of September, although there is but one brood.

50. *A. CYBELE* (Fabr.). The common *Argynnis* in the eastern part, but extending over the entire state; single brooded, its season being about the same as the foregoing. Specimens from the western part of the state are smaller, and have less heavy shading in the basal area.

51. *A. APHRODITE* (Fabr.). The typical form is rare, but has been taken at Omaha (Marshall), West Point (Univ. coll.), Oconto (Leussler), Bazile Mills (Shoemaker). Towards the west it grades into race *cypris*.

A. APHRODITE race *ALCESTIS* (Edw.). Rare, excepting in the northeastern part of the state. Two specimens from Omaha (Leussler), 4 from Lincoln, and a series from Bazile Mills (Shoemaker).

A. APHRODITE race *CYPRIS* (Edw.). This small red race is rather common in the canyons of Sioux County, long series having been taken there at various times. Like most *Argynnis* it is variable, and intergrades towards typical *aphrodite* are not uncommon.

52. *A. HESPERIS* (Edw.). Rare. There are in the University collection 4 specimens taken in Sioux County by Merritt Cary in July, 1901.

53. *A. NEVADENSIS* Edw. race *MEADII* (Edw.). Rare. A few fresh specimens were taken in Monroe and Warbonnet canyons, Sioux County in June, 1911. Other specimens in the University collection, from the same locality bear date labels July 1892.

54. *A. EDWARDSII* (Reak.). This was the commonest Argynnid in Sioux County in June, 1911, and altogether more than 50 specimens were taken, (Leussler). Others were taken at Mitchell, June 26, 1913 (Gates).

55. *A. PLATINA* (Skin.). A few specimens were taken in Sioux County June 27, 1911; also some in earlier years.

56. *A. HALCYONE* (Edw.). Taken in fair numbers in June, 1911. Abundant in the same locality in July, 1917, on alfalfa. Variable in the depth of ground color of basal area on under side of secondaries.

57. *BRENTHIS MYRINA* (Cram.). Found in many parts of the state in moist meadows. In the eastern part of the state there is found a race very considerably larger than those from other sections, measuring in the case of males 20 to 21 mm. from center of thorax to apex of wing, and 30 mm. in the case of females. To this race Dr. Holland has given the name *nebraskensis*. A male is figured in the revised Butterfly Book.

58. *B. BELLONA* (Fabr.). Apparently found only in the northeastern part of the state where it is not common. Three specimens were taken at Crystal Lake near Dakota City, May 14, 1910, (A. W. Lindsey), and Dodge reported taking a few specimens around orchards in Dodge County.

59. *EUPHYDRYAS BERNADETTA* (Leussler). Very abundant along the canyon rims in Sioux County in late May and early June. Easily captured when feeding on flowers. It is a race of *amicia* and is probably the most easterly representative of that species.

60. *MELITAEA ACASTUS* (Edw.). Specimens have been taken

near Harrison, Sioux County, but it apparently is rare, for I have seen but 2 specimens from there, 1 taken July 21, 1901, by Merritt Cary, and at present in my collection.

61. *M. POLA* (Bdv.). Far more common in Sioux County than the preceding species. I have taken many specimens there in June, 1911, 1917 and 1919. It, no doubt, inhabits other localities in western Nebraska.

62. *PHYCIODES ISMERIA* (Bdv. and Lec.). Found over the entire state, and at times very abundant; at least two broods, possibly three. Larvae feed on small wild sun-flower and are easily reared. The type, a beautiful melanic form, described by Cary and named *nigra* by him is in the University collection. It was collected in Sioux County, June 10, 1901.

63. *P. NYCTEIS* (Dbldy & Hew.). Common at Omaha and Lincoln. I have not found it very far west in the state. Two broods, June and August.

64. *P. VESTA* Edw. form *AESTIVA* (Edw.). A single specimen, Omaha, July 14, 1912.

65. *P. GORGONE* (Hbn.) A single male, Fremont, May 30, 1921.

P. GORGONE form *HIEMALIS* (Edw.). A fine fresh female, near Omaha, October 16, 1920.

66. *P. THAROS* (Dru.). Very common everywhere in the state. Middle of June till freezing weather. Subject to more or less variation.

P. THAROS form vern. *MARCIA* (Edw.). Common over the entire state, but less so than the summer form. May, and a few late in the fall.

67. *P. BATESI* (Reak.). This seems to be the common *Phyciodes* in the Sioux County canyons, where I have taken it in numbers, several years, in the month of June. Specimens match up well with specimens from Aylmer, Quebec, received from Dr. McDunnough.

68. *P. PICTA* (Edw.). Apparently rare in the state, only 2 having been taken of which I have actual knowledge; June 30, 1913 (L. M. Gates); Wauneta, June 21, 1933 (Leussler).

May be more abundant than we think, for on June 22, 1933, it was found in considerable numbers at Ft. Morgan, Colo., not more than 90 miles from the Nebraska line.

69. *ANTHANASSA TEXANA* (Edw.). Occasional. 1 specimen on each of the following dates: March 27, 1910 (F. H. Shoemaker); September 14, 1911; July 7, 1914; September 26, 1914; October 15, 1928; 4 specimens September 18, 1928; and 2 on September 22, 1928 (Leussler), all at Omaha. Apparently making an effort to establish itself.

70. *CHLOSZYNE LACINIA* (Gey.) *ADJUTRIX* Scudder. One fresh specimen, Omaha, October 15, 1920, captured on flowers of marigold in a city garden. Possibly introduced as larva or chrysalis.

71. *POLYGONIA INTERROGATIONIS* (Fabr.). Common; extends over the entire state but is most abundant in the eastern part.

P. INTERROGATIONIS form *FABRICII* (Lint.). Most of the individuals of the fall brood belong to this form. As a rule, more abundant than the summer brood.

72. *P. COMMA* (Harris). Common; September till freezing weather, when it hibernates and flies again in the spring. Specimens from Omaha, Lincoln, Roca, Cedar Bluffs.

P. COMMA form *DRYAS* (Edw.). Not nearly as common as the preceding. June and July. Specimens from Omaha and Lincoln.

73. *P. SATYRUS* (Edw.). Taken only in the canyon region of Sioux County as far as known. Several were taken there in Sow Belly Canyon in June, 1911.

74. *P. ZEPHYRUS* (Edw.). This species also has been recorded only from the canyons in Sioux County, where it was quite abundant in the latter part of June, 1911.

75. *P. PROGNE* (Cram.). Although I have taken this species only in the canyons of Sioux County, where it was common in late June, 1911, it has been recorded by W. L. Carpenter from Ft. Niobrara, at Valentine, and from Nemaha County by W. E. Taylor, according to Barber's List.

(To be continued.)

Ichneumon Hibernation in The Northeastern United States. (Hymenoptera, Ichneumonidae).

By HENRY K. TOWNES, Jr., Dept. of Zoology,
Syracuse University.

The genus *Ichneumon* (in the broad sense) is represented in the Northeast by over two hundred species. They are rather large ichneumonids with a short ovipositor and an abdomen that is not compressed. The genus is also known in this country under the name *Amblyteles*.

In November of 1935, Mr. R. H. McCauley, Jr., and one or two other students at Cornell University called my attention to the occurrence of large numbers of female *Ichneumon* in rotten logs in the valley of Six Mile Creek at Ithaca, N. Y. A few days later, two hours spent digging into rotten logs at the reported locality produced about ninety specimens representing six species. Since then searches in the vicinity of Ithaca, N. Y.; South Hadley, Mass. (M. C. Townes); Syracuse, N. Y. (H. K. and M. C. Townes); and Buena Vista, Pa. (R. H. McCauley, Jr.); have resulted in the finding of several hundred specimens representing about twenty-five species of *Ichneumon*. Those species that have been determined are *Ichneumon ultimus*, *centrator*, *cincticornis*, *leucaniae*, *scelestus*, *funestus*, *canadensis*, *fuscifrons*, *heterocampae*, *devinctor*, *confirmatus*, *maius* (?), and *rubicundus*. The species are listed in order according to their abundance.

The species found hibernating are not closely related. Those reported above belong to the groups known as *Spilichneumon*, *Cratichneumon*, *Stenichneumon*, *Pseudamblyteles*, *Chasmodes* (?), *Barichneumon*, and *Ichneumon* in the strict sense. The last named group is represented by the largest number of species. The species that hibernate are those of which the males and females are on the wing in September and October. They mate in the fall, the males die, and the females hibernate and emerge in the spring to oviposit. In central New York, most of the females are probably in hibernating quarters about November 1 and remain there until about April 25, after which

they may be seen flying and crawling about on warm days. Not all of these species common in the fall have yet been found hibernating, neither have some of those that can be collected in early spring as adults (females). The first generation males of *Ichneumon* appear in the spring about May 25, and it is certain that females collected in early May passed the winter as adults.

Searching for hibernating *Ichneumon* is often an unproductive task, as the standards used in their choice of hibernating quarters are very exacting and difficult to learn. A great deal of time may be spent pulling off bark and digging into logs without finding a single specimen. When a specimen is found, however, there are usually many others in the same log or stump, and other suitable places in the neighborhood are likely to be productive. Wood of exactly the right moisture content and stage of decay seems to be necessary, but there are apparently other factors that influence the choice. Perhaps a gregarious instinct induces so many individuals to choose the same log.

The various species are found in different types of places. *Ichneumon centrator*, *scelestus*, *devinctor*, and sometimes *cincticornis* are found just beneath the loose bark of large logs in which there is a layer of soft debris between the bark and the sounder wood. These species occur singly, each in a small space that has been cleared out. *Ichneumon ultimus*, *leucaniae*, *funestus*, *canadensis*, and *heterocampae* are found in rotten logs and stumps in the empty tunnels of beetle larvae or carpenter ants, usually two to four inches from the surface and always in groups. The groups number from about three to twenty individuals and often contain several species. *I. cincticornis* occurs also in logs and stumps, but is usually nearer the surface than the above species and often singly. Two specimens of *I. confirmatus* were taken from a punky log covered with a heavy coat of moss and were rather near the surface. *I. fuscifrons* and *maius* (?) were also taken from rotten logs or stumps. Several specimens of *I. ultimus* were found by Mr. Victor Tiship deep down in grass tussocks and a single

specimen of *rubicundus* was collected from under a stone by Dr. Henry Diterich. The only other ichneumonid found hibernating was a female *Orthocentrus* in a stump.

It is noteworthy that the black species occur under bark, while the red and black ones (except *devinctor*) are found deeper in rotten logs. It seems, also, that those hibernating deeper in logs have, on the whole, a shorter and stouter build. The probable reason for this is that the stouter species (usually red and black) habitually crawl under leaves and other debris in search of hosts, while the more slender species do not have these semi-burrowing habits. With the approach of cold weather, it is natural that the species with the stronger inclination and better equipment for burrowing should push deeper into the decaying wood.

Seyrig, in an interesting paper on the hibernation of female ichneumonids in Europe, (*Ann. Soc. ent. France.* (1923) 1924 92: 354-362) reports the occurrence of sixty-two species found hibernating. Most of these belong to *Ichneumon* in the broad sense, but twenty are Phaeogenini, four Cryptinae, and one *Pimpla*. His rather extended observations agree with mine. He finds ichneumonids hibernating under moss and in grass tufts, as well as under bark, each type of locality protecting a different set of species. Probably after searches in a variety of places, a large number of our own ichneumonids of the subfamily Ichneumoninae will be found to hibernate as adults.

**Coccidula suturalis synonymy. (Coleop.:
Coccinelidae.)**

By H. R. DODGE, Ohio State University.

In the summer of 1937 the writer collected a series of a *Coccidula* species by sweeping in a marshy swale at Itasca Park, Minnesota. The specimens agreed very well with Horn's description and figure of the western *occidentalis*. An attempt to discover their relationship to the eastern *suturalis* Weise revealed the following facts.

Weise (*Ann. Ent. Soc. Belg.* 39: 132) described *suturalis*

in March, 1895, considering it to be a variety of *lepida*.

Horn (Trans. Amer. Ent. Soc. 22: 114) described *occidentalis* from Wyoming and Vancouver in May, 1895.

Reitter, 1897, (Wien. Ent. Zeit. 16: 127) described *Coccidula suturalis* N. Sp. from Irkutsk, Siberia.

Weise, 1898, (Arch. Naturges. 64: 238) states that *occidentalis* is a synonym of *suturalis* Weise.

Casey, 1899, (Journ. New York Ent. Soc. 7: 163) states the synonymy upon the authority of Weise and records *suturalis* from Ohio.

Leng, 1920, (Catalogue of the Coleop. of America N. of Mexico) lists both *suturalis* and *occidentalis* as good species.

Korschevsky, 1931, (Coleop. Catalogus: Coccinellidae) considers *suturalis* Weise an aberration of *lepida*, and *suturalis* Reitter and *occidentalis* good species.

Specimens in the Wenzel collection at the Ohio State University, under the name *C. occidentalis*, are represented from New Jersey and Edmonton, Alberta. The eastern and western specimens are conspecific, and the Minnesota specimens are similar to them. This points to a continuous distribution of the species from Vancouver Island to New Jersey, and bears out Weise's statement of synonymy, which had been disregarded or overlooked by Leng and Korschevsky.

The correct name of the species in question is, therefore, *Coccidula suturalis* Weise, this name having priority over *C. occidentalis* Horn. *Coccidula suturalis* Reitter nec. Weise I shall designate as ***Coccidula reitteri*** new name.

In both of his articles Weise expresses the belief that *suturalis* is merely a variety of *lepida*. Frost, 1920, (Can. Ent. 52:231) records the species from Orono, Maine, and notes a color variation of the abdominal sternites towards the *lepida* type. However, a complete intergradation of coloration is not recorded. I favor retention of specific rank for *suturalis* upon this point, plus the facts that *suturalis* and *lepida* apparently have never been found in association, and *suturalis* has a much wider distribution.

Notes on Florida Odonata.

By E. M. DAVIS, Rollins College, Winter Park, Florida.

During the past four years (1934-1937) I have collected dragonflies at various places in the southern half of Florida and it has frequently happened that interesting species have been found.

On Merritt's Island, east of Titusville, and at the southern end of Mosquito Lagoon, one of the commonest dragonflies in the fall is *Macrodiplex baltcata*. I do not know its status earlier in the year but in October and November it has been abundant. It is found in the brackish marsh area where *Erythrodiplax berenice* is also abundant. *Macrodiplex* is watchful and quick, perching on the tops of weeds and bushes, and sufficiently numerous so that a good number can be caught in a short time. I have found this same dragonfly in large numbers in April about 10 miles after leaving Royal Palm Park on the road to Flamingo, and it was abundant until within about 10 miles of the settlement, which is at the southern tip of the mainland of Florida. It is also found in April on the upper Keys.

Sympetrum corruptum occurs sparingly on Merritt's Island in the brackish marsh area; I have caught two and seen several others.

Brachymesia gravida is an abundant species around lakes or canals in many places in the southern half of Florida, where it is found during all the warmer months. I have found it wherever *Macrodiplex* occurs and in many other places as well; it is one of the most common dragonflies in southern Florida.

Lepthemis vesiculosa was found around some small pools on Lower Matecumbe Key in April, 1937. In the field it looks very much like a large *Erythemis simplicicollis*. They rested on rocks, grasses, or bushes, and while watchful were not fast or high fliers, and kept close to their small pools, in which the females were laying by dipping the abdomen quickly into the water. They were not easily frightened, even when we missed

them with the net, and should be rated easy to catch. While in a boat, following the water lanes through the small mangrove keys off of Upper Matecumbe Key, I passed close by two of these and they were so indifferent to us that only the absence of my net prevented their certain capture.

A great contrast to *L. vesiculosa* is the smaller and much more active *Orthemis ferruginca*. Pugnacious, alert, and fast, they keep close to the edges of large ponds, but at the small pools on the Keys flew anywhere over the water and not far above it. When old, the pruinosity of the males makes them a most striking and peculiar red-violet, but when young the abdomen is brilliant red. To see them racing over a small pool, fighting everything in their way, is a great sight for anyone who appreciates dragonflies, and for each one caught many are missed. The brown females laid their eggs with quick dips of the abdomen while the male stayed a foot or so above. It has often been suggested that in nature females are frequently dull-colored compared with males, because it affords them protection from predators. In the case of *Orthemis* on this occasion on the Keys, two of us collected around several pools for over an hour, and later (and too late!) it was discovered that while we had taken males and females of several species, we had caught *only* the brilliant males of *Orthemis*!

Tramea onusta was also on the Keys in April. Several pairs were seen and some singles and pairs were caught. They were free flying, going over land or water, and keeping well up in the air. I have caught one other of this species not far from the St. Johns River about 20 miles west of Melbourne. All species of this genus except *T. carolina* are apparently scarce in southern Florida.

Of the damselflies, *Enallagma durum* was found at some small shallow waterholes in open woods near the St. Johns River about 20 miles east of Winter Park. This was in March and April 1937, and they were common at that time and place.

At one of these water holes I found some pale-blue and black damselflies which could not be identified at sight and to my surprise turned out to be both males and females of *E. pollu-*

tum. This is one of the most abundant species in Florida, but all except these have always been the usual brown and black.

The scarcity of damselflies between Royal Palm Park and Cape Sable, and also on the Upper Keys, has been very noticeable. Except for a glimpse of one blue and black *Enallagma* I have seen nothing but *Ischnura ramburii* and these are uncommon.

A List of Dragonflies (Odonata) taken in Southern Alaska.

By CARSTEN AHRENS, The McKeesport High School,
McKeesport, Pa.

For 41 days of last summer, July 1—August 10, 1937, the writer collected dragonflies in southern Alaska. It was his misfortune to visit this United States possession during the coldest and wettest summer that that territory has experienced in twenty years. The temperature never rose above 60° F. With the exception of three days, rain fell almost constantly throughout the trip. Collecting was frequently discouraging. For instance, during the five days spent at Ketchikan, the first Alaskan port of call on the way north from Seattle, rain rarely ceased to fall; only five specimens, stiffened with cold, were taken, and those were "picked" from the vegetation that grows jungle-like in that humid region.

A total of 426 specimens, representing 20 species were taken. 6 are included here for the first time in any list of Alaskan Odonata: *Aeschna interrupta lineata* Walker, *Sympetrum decisum* Hagen, *Leucorrhinia proxima* Calvert, *Leucorrhinia borealis* Hagen, *Lestes dryas* Kirby (*uncatus* Kirby), and *Agrion resolutum* Hagen (genus *Coenagrion* of Needham and Hayward).

Mrs. L. K. Gloyd of the University Museum of Ann Arbor, Michigan, checked the identifications. Her invaluable help has made possible the following list.

1. *AESCHNA SITCHENSIS* Hagen 1 ♂ 2 ♀. Juneau, 8/5-8/6 (1 ♂ 1 ♀; Matanuska Valley 7/19 (1 ♀). Found these specimens in boggy meadows.

2. *AE. PALMATA* Hagen 19 ♂ 5 ♀. Juneau, 7/11 (2 ♂), 8/5-8/6 (9 ♀ 4 ♀); Matanuska Valley 7/19 (2 ♂), 7/20 (6 ♂ 1 ♀). These insects were taken about lakes, especially Auk Lake, near Juneau.

3. *AE. INTERRUPTA INTERRUPTA* Walker 1 ♂, Ketchikan, 7/8. Picked this dragonfly while he was at rest on a gaudily painted totem pole in the city's park.

4. *AE. INTERRUPTA LINEATA* Walker 5 ♂ 11 ♀. Chitina, 7/28 (1 ♀); Matanuska Valley, 7/19/21, (5 ♂ 10 ♀). This aeschnid was flushed frequently as it rested on the new gravel roads in the Matanuska Valley.

5. *AE. EREMITA* Scudder 24 ♂ 5 ♀. Anchorage, 7/22 (1 ♀); Chitina, 7/27 (1 ♂); Gulkana, 7/27 (4 ♂ 2 ♀); Matanuska Valley, 7/19-7/20 (19 ♂ 2 ♀). Common about the edges of lakes which they patrolled with surprising regularity.

6. *AE. JUNCEA* Linn. 38 ♂ 11 ♀. Anchorage, 7/17 (1 ♂); Gulkana, 7/27 (7 ♂ 1 ♀); Juneau, 7/11 (7 ♂ 1 ♀), 8/5-8/6 (9 ♂ 4 ♀); Ketchikan, 7/8 (1 ♂); Matanuska Valley, 7/19-7/21 (8 ♂ 2 ♀); Seward, 7/16 (4 ♂ 2 ♀); Valdez, 7/24 (1 ♂ 1 ♀). The commonest Anisopteron collected. It was taken in the vicinity of every place visited and about habitats that differed greatly from each other. At Seward it was the only species observed. At Juneau the females were ovipositing in floating logs in an old gravel pit.

7. *SOMATOCHLORA ALBICINCTA* (Burm.) 7 ♂ 1 ♂. Anchorage, 7/22 (1 ♀); Juneau, 7/11 (1 ♂); Palmer, 7/20 (6 ♂). Easily captured for they slowly fly a few inches above the surface of the lake while they investigate every twist of the shore line.

8. *S. SEMICIRCULARIS* (Selys) 9 ♂ 1 ♀ Juneau, 7/11 (8 ♂ 1 ♀), 8/5 (1 ♂). The males were captured in a boggy meadow just below the Mendenhall Glacier. The females were ovipositing in puddles which the rain had left in an oats field.

9. *CORDULIA SHURTLEFFI* Scudder 13 ♂ 1 ♀. Anchorage, 7/22 (8 ♂); Gulkana, 7/27 (2 ♂); Juneau, 7/11 (1 ♂); Matanuska Valley, 7/21-7/29 (2 ♂ 1 ♀). This species was taken along clear streams, lakes, and over muskeg.

10. *LIBELLULA QUADRIMACULATA* Linn. 4 ♂, Juneau, 7/11. These males were taken over a gravel pit which is situated on the very edge of the milky glacier silt-filled Mendenhall River. The water in the pit was clear.

11. *SYMPTEUM DECISUM* Hagen 13 ♂ 7 ♀. Chitina, 7/28. Teneral were emerging in large numbers at 10:30 A. M., in a densely reeded area on the edge of Willow Creek.

12. *S. DANAE* Sulzer 6 ♂ 5 ♀. Juneau, 8/5-8/6. Specimens were captured at low tide over the sedge flats near the ocean.

13. *LEUCORRHINIA HUDSONICA* Selys 6 ♂ 11 ♀. Chitina, 7/28 (1 ♀); Gulkana, 7/27 (1 ♀); Juneau, 7/11 (5 ♂ 6 ♂), Gold Cr. 7/12 (1 ♀); Ketchikan, (near Fawn L. & L. Ketchi-

kan) 7/5 (1 ♂ 2 ♀). All of the dragonflies of this species were collected on foliage near lakes with the exception of one female which was taken high in the mountains along swift Gold Creek, four miles from the ocean.

14. *L. PROXIMA* Calvert 5 ♂ 1 ♀, Anchorage, 7/22. These insects were taken at rest on the margin of a small lake three miles north of the town of Anchorage.

15. *L. BOREALIS* Hagen 1 ♂ 1 ♀. Anchorage, 7/17 (1 ♂); Gulkana, 7/27 (1 ♀). Mrs. L. K. Gloyd writes, "The 8th segment does not have the large red spot but nevertheless I believe it to be *borealis* and not *pectoralis*. Seg. 7 is proportionately longer and the vulvar lamina wider near the apex than in *pectoralis* ♀.

16. *LESTES DISJUNCTUS* Selys 45 ♂ 13 ♀. Anchorage, 7/23 (2 ♂), Taken in the rain by sweeping in a swampy tide flat. Gulkana, 7/27 (8 ♂ 1 ♀), Collected about a reedy lake along highway between Gulkana and Gakona. Juneau, 8/6 (3 ♂ 1 ♀), Found in boggy meadow just below Mendenhall Glacier. Matanuska Valley, 7/19 (2 ♂ 1 ♀ tenerals), 7/20 (30 ♂ 10 ♀), Drove out many from shelter in the rain-drenched weeds of a railroad embankment above a stagnant ditch.

17. *LESTES DRYAS* Kirby (*uncatus* Kirby) 13 ♂ 10 ♀, Chitina, 7/28. Numerous in swamps near roadside where many pairs were flying in tandem.

18. *AGRIÓN RESOLUTUM* Hagen (genus *Cocnagrion* of Needham and Hayward's Handbook) 39 ♂ 7 ♀. Anchorage, 7/17 (15 ♂ 3 ♀); Gulkana, 7/27 (7 ♂ 1 ♀); Matanuska Valley, 7/19-7/21 (17 ♂ 3 ♀). Found in reedy areas where fresh water was seeping into tidal flats and about small, shallow lakes.

19. *ENALLAGMA BOREALE* Selys 17 ♂ 10 ♀. Gulkana, 7/27 (6 ♂ 5 ♀); Juneau, 7/11 (2 ♀), 8/5-8/6 (4 ♂ 1 ♀); Juneau, Awk Lake, 7/11 (1 ♂); Matanuska Valley, 7/17-7/21 (6 ♂ 2 ♀).

20. *E. CYATHIGERUM* (Charp.) 38 ♂ 20 ♀. Juneau, 7/11 (6 ♂ 4 ♀), 8/6 (1 ♂ 1 ♀); Juneau, Awk Lake, 7/11 (11 ♂ 3 ♀); Matanuska Valley, 7/19-7/21 (20 ♂ 12 ♀). These *Enallagmas* were numerous about lakes and clear streams in the company of *boreale*.

A New *Acmaeodera* (Coleoptera: Buprestidae).

By JOSEF N. KNULL, The Ohio State University,
Columbus, Ohio.

***Acmaeodera vulturei* n. sp.**

♀.—Size and form of *A. varipilis* Van.D., ventral surface, head and pronotum bronze with bluish cast, elytra dark blue, each elytron with four irregular transverse spots, one back of base, another in front of middle and two back of middle, posterior two more or less connected.

Head convex, a well marked carina on vertex; surface coarsely punctured, pubescence long; antennae serrate from the fifth joint, second and third joints of equal length, together shorter than scape, fourth joint longer than third, joints five to eleven decreasing in length.

Pronotum wider than long, widest in front of base, wider at base than at apex; sides broadly rounded in front, more acutely rounded posteriorly; anterior margin sinuate, median lobe broadly rounded; basal margin truncate; disk convex, a slight trace of median depression, a lateral depression on each side at base; surface coarsely punctured, punctures separated by much less than their own diameters in middle, reticulate at sides, pubescence long.

Elytra wide as widest part of pronotum, sides constricted back of base, broadly rounded posteriorly to rounded apices; margins serrate from middle; disk convex, umbone prominent; surface coarsely punctured, punctures of interspaces very fine, a recumbent hair arising from each fine puncture.

Abdomen beneath densely coarsely punctured, a short recumbent hair arising from each puncture; last ventral segment without subapical modification; front margin of prosternum straight, sides not reaching front angles.

Length 6.5 mm.; width 2 mm.

Holotype collected in Vulture Mountains near Wickenburg, ARIZONA, June 16, 1937, by D. J. and J. N. Knull; *paratype* labeled Elizabeth Lake, CALIFORNIA, July 10, both in collection of writer.

Variations.—The female paratype has the markings of the elytra broken up into elongate yellow areas.

This species belongs to the *Truncata* group according to Fall* and would come near *A. vanduzeei* Van D. Dr. Van Dyke has kindly compared a specimen with his type and found the two forms to be different.

* H. C. Fall, Jour. N. Y. Ent. Soc., viii, pp. 1-37, 1899.

Egg-Laying Among the Argynnids. (Lepid.: Nymphalidae).

By DR. EUGENE MURRAY-AARON, Field Museum, Chicago.

Nearly a half century ago, the late Dr. Henry Skinner and I published an Annotated List of the Butterflies of the Philadelphia District (Can. Ent. Vol. 27, p. 130 et seq.) in which we described several new varietal forms and also took occasion to reply to a characteristicly caustic critique that not long before had appeared in Scudder's Butterflies of the Eastern United States and Canada. In that, Mr. Scudder had written of the egg-laying vagaries of *Argynnis (Dryas) cybele* (Vol. 1, p. 560) as follows:

"The eggs are laid upon the leaves and stalks of the food plant and not, as stated by H. Skinner, dropped from a distance upon the herbage. * * * The butterfly has been seen to deposit its eggs in the ordinary manner and such a wide departure from the common rule must be disbelieved in until it has been seen repeated. If Mr. Skinner had seen the act more than once he would have said so. * * * Still it would be less surprising in this butterfly than in some others, as the caterpillar leaves its food plant on hatching and does not seek it until spring."

I, knowing Mr. Scudder well, even intimately, valuing him as a kind friend and adviser, several times his guest as he was mine knew him also as a very positive critic and therefore favored a more positive reply than my good-humored fellow author insisted on our making. As a consequence we were contented to quote our friend George Howard Parker, then Instructor in Zoology at Harvard, now Professor Emeritus thereof, and my brother S. Frank Aaron, stating that we authors had observed the same action on the part of *myrina* and *bellona* and that I believed I had observed the same some years before (1875 to '79) in the Smoky Mountains of Tennessee, on the part of *diana*.

To this Mr. Scudder made no reply at the time and my notes of those years show that I wrote him regarding the matter, with further testimony, without result. At that time I stressed

the argument not unnaturally based on his own hint as to feeding habits of *cybele* larvae, as stated in his last sentence above quoted.

It was no surprise to me to get no reply as I had had a printed controversy with him regarding the food of *Lycacna* (*Everes*) *comyntas* some years earlier—sixty-one years ago, to be exact—regarding which my friend Wm. H. Edwards had come to my rescue, without acknowledgement from Mr. Scudder. He, one of the most tireless and usually among the most exact of all naturalists of his day, did not take kindly to being corrected, even by the then high priest of the Rhopalocera, my valued friend Edwards.

All of this comes back to mind now, while engaged in the never ending puzzles that the Argynnids afford, in taxonomic work on the Strecker Collection at the Field Museum. This continually drives me to my own card catalog, started in 1873 and still in active growth, in which I have just come across several records regarding this vagarious proceeding on the part of some Argynnids. From them I find that I have since twice observed *diana* thus behaving, have noted the same of *idalia*, here in our Skokie meadows north of us, and have such repeated notes of *cybele* and *bellona* as well.

What can our many western collectors tell us on this subject? Comstock, Gunder, Grinnell and others should be able to testify.

The First Occurrence of *Sphinx franckii* Neum. in Pennsylvania. (Lepid.: Sphingidae).

On July 12, 1938, my parents, Mr. and Mrs. George S. Worth, caught a perfect specimen of *Sphinx franckii* Neum. at a light in one of the rooms of their home at Wayne, Pennsylvania. The time was about ten-thirty in the evening. The next day they gave it to me, and I presented it to the Academy of Natural Sciences of Philadelphia. The identification was made at once by Mr. John W. Cadbury, 3rd, of the Academy's Department of Entomology. This species of moth is very rare throughout its range, and the present record, according to Mr. Cadbury, is the first instance of its capture in Pennsylvania. C. BROOKE WORTH, Department of Zoology, Swarthmore College, Swarthmore, Pennsylvania.

An Outbreak of *Synnoma lynosyrana* Walsingham (Tortricidae, Lepidoptera).

On August 12, 1937, the writer inspected an outbreak of lepidopterous larvae feeding on rabbitbrush (*Chrysothamnus* sp.) in Beaverhead County, Montana. The caterpillars, which were tying the foliage into compact clumps and producing a witches-broom effect, were found on a rangeland area 3-4 miles long and ½ mile wide. Ranchers in the affected area were concerned about the possible spread of the pest to economic crop plants.

Adults were reared and sent to C. F. W. Muesebeck, Division of Insect Identification, Bureau of Entomology and Plant Quarantine. Through the kindness of Mr. Muesebeck and Mr. C. Heinrich, the adults were determined as *Synnoma lynosyrana* Wlsm. The following distribution data were furnished by Mr. Heinrich:

California: Sheep Rock (Siskiyou Co.), San Bernadino Co.
New Mexico: Springer, Koehler, Fort Wingate.

Colorado: Pike's Peak, (several specimens—no definite locality).

Arizona: Williams, Verde Valley, Douglas.

Montana: Jefferson Co., Beaverhead Co.

The type locality for the insect is the Mount Shasta region of California." (1879).

Specimens from the earlier Montana outbreak have been found (Jefferson Co., 1924). Larval specimens are deposited in the U. S. National Museum collection, and in the entomological collection of Montana State College, Bozeman, Montana.

Mr. Heinrich indicates *Chrysothamnus* as the only known food plant for this insect; the confirmation of this by the occurrence of an additional outbreak on the same host plant suggests that the tortricid may be restricted in its feeding to this rangeland shrub.

D. J. PLETSCH, Montana State College, Bozeman, Montana.

An Old Joke about Bees.

The following appeared in the London *Times* of April 21, 1838:

Some time since a person in the neighbourhood of Keswick, having several hives of bees to dispose of, and being desirous to attract purchasers, caused a placard to be printed announcing the sale, with the following extraordinary headlines:—"Extensive sale of live stock, comprising not less than one hundred and forty thousand head, with an unlimited right of pasturage!"

This joke has survived for a hundred years. I first heard it in New Mexico, where it was quoted to me as original.—
T. D. A. COCKERELL.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or preceding year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—Bailey, S. F.—Bells in memory of W. E. Hinds. [55] 14:96. Barber, G. W.—A study of the elliptical golden rod gall caused by *Gnorimoschema gallaesolidaginis*. [6] 46: 155-178, ill. Bonnell & Bruzas.—A method of collecting Amphizoa (Coleo.). [55] 14:112. Crosby, C. R.—Obituary by S. C. Bishop. [Festschr. 60. Geburtst. Strand] 4: 561-562, ill. Hatch, M. H.—Theophrastus of Eresos as an economic entomologist. [6] 46: 223-227. Jobling, B.—The cardboard cell method for the mounting of insects and their parts. [107] A, 13: 55-57, ill. Monte, O.—Manual do Colecionador de Insetos. [Chacras e Quintaes, Suppl., Mar. 1938] 49 pp. Pyenson, L.—The problems of applied entomology in Pernambuco, Brazil. [105] 8: 237-254, ill. Snodgrass, R. E.—Evolution of the Annelida, Onychophora, and Arthropoda. [Smiths. Miscel. Coll.] 97, no. 6: 159 pp. Warren, B. C. S.—The International Code of Zoological Nomenclature. [9] 7: 133-139. Wilson, George Ringo.—Obituary by H. M. Armitage. Wusthoff, W.—Ueber die Praparation kleiner kafer. [2] 34: 62-66.

ANATOMY, PHYSIOLOGY, ETC.—Cooper, B.—The internal anatomy of *Corioxenos antestiae* (Strepsiptera). [107] A, 13: 31-54, ill. Fraser, F. C.—A note of the fallaciousness of the theory of pretracheation in the venation of Odonata. [107] A, 13: 60-70, ill. Harukawa & Tokunaga.—Studies on the life history & bionomics of *Phyllotreta vittata* (Coleo.). [Mem. Coll. Agr. Kyoto Imp. Univ.] No.

44 (Ent. Ser. 5); 1-48, ill. **James, H. C.**—The effect of the humidity of the environment on sex ratios from over-aged ova of *Pseudococcus citri* (Hemipt., Coccid.). [107] A, 13: 73-79. **Jannone, G.**—Aspetti bio-morfologici e somatometrici dei problema delle fasi nel *Daciostaurus maroccanus* in Italia e fuori, con particolare alla provincia Napoli (Orth. Acrid.). [Boll. R. Lab. Ent. Agr. Portici] 1: 261-329, ill. **Kaszab, Z.**—See under Coleoptera. **Otter, G. W.**—On the morphology of the larvae of three spp. of Cecidomyiidae from knapweed (*Centaurea*) flowers. [36] 87: 39-68, ill. **Paoli, G.**—Osservazioni sulla morfologia dell' estremo adome della femmina dei Ditteri Bombiliidi. [Redia] 23: 1-4, ill. Recherche sulla morfologia e anatomica del capo delle larve dei Ditteri Bombiliidi. [Redia] 23: 5-16, ill. Osservazioni su alcune particolarità di struttura e funzione dell' apparato genitale femminile dei *Dociostaurus maroccanus* (Orth: Acrid.). [Redia] 23: 17-26, ill. Studi sulle cavallette di foggia (*Dociostaurus*, Orth., Acrid.), e sui loro oofagi (Ditteri Bombiliidi e Coleotteri Meloidi) ed Acari ectofagi (Eritreidi e Trombidiidi). [Redia] 23: 27-202, ill. **Querci, O.**—Effets des radiations reflechies sur les insectes. [Lambillonea] 28: 105-107. **Russo, G.**—V. Contributo alla conoscenza dei Coleotteri Scolitidi. Fleotribo: *Phleotribus scarabaeoides*. [Boll. R. Lab. Ent. Agr. Portici] 1: 3-261, ill. **Usinger, R. L.**—Dorsal abdominal scent glands in nymphs of Lygaeidae. [55] 14:83. **Whelan, D. B.**—Blood pulsations in *Euxoa detersa* (Noctuid.) [103] 11:109. **Woodruff, L. C.**—Observation on roach reproduction (Orth: Blatt.). [103] 11: 94-96, ill.

ARACHNIDA AND MYRIOPODA.—**Jacot, A. P.**—More Box-mites of the Northeastern United States. [6] 46: 109-145, ill. (k*). **Kaston, B. J.**—See under Small Orders, etc. **Keifer, H. H.**—Eriophyid Studies (Acarina). [Bull. Dept. Agr., St. Calif.] 27: 181-206, ill. (*). **Paoli, G.**—See under Anatomy. **Pratt & Hatch.**—The food of the black widow spider on Whidby I., Wash. [6] 46: 191-193. **Snodgrass, R. E.**—See under General.

THE SMALLER ORDERS OF INSECTS.—**Banks, N.**—Two n. gen. of Myrmeleconidae. [10] 40: 125-129, ill. New Chrysopidae & spp. new to the U. S. (Neuroptera. [54] 70: 118-122. (k). **Da Costa Lima, A.**—Uma variedade de "*Rhopalopsyllus bohlsi*" (Siphonaptera: Pulicidae). [Rev. Med-Cirurg. Brasil] 45: no. 2, Aug. 1937 [3-6]. ill.

(*). *Uma nova pulga do Mexico e nota sobre Hormopsyla* (Siphonaptera: Ischnopsyllidae). [Rev. Med.-Cirurg. Brasil] 46: [3-9], 46: no. 2, Feb. 1938, [3-9], ill. (*). **Emerson, A. E.**—Termite nests—a study of the phylogeny of behaviour. [Ecol. Monogr.] 8: 274-284, ill. **Fraser, F. C.**—Additions to the family Amphipterygidae (Odonata) [107] B, 7: 137-143, ill. **Hanson, J. F.**—Studies on the Plecoptera of North America, I. [19] 33: 79-83, ill. (k*). **Hood, J. D.**—New Thysanoptera from Florida & North Carolina. [105] 8: 348-420. **James, H. G.**—Notes on some arctic Collembola. [4] 70: 151-154, ill. **Kaston, B. J.**—Mantispidae parasitic on spider egg sacs. [6] 46: 147-151, ill. **Lestage, J. A.**—Contribution a l'etude des Ephemeropteres, XVI.—Recherches critiques sur le complexe ametropo-metretopodidien. [33] 78: 156-162, ill. **Ling, Shao-wen.**—A few new caddis flies in the collection of the California Academy of Sciences. [55] 14: 59-69. **McCauley & Flint.**—Outwitting the termites in Illinois. [Ill. Nat. Hist. Surv.] Circ. 30; 19 pp., ill. **Ross, H. H.**—Descriptions of new N. A. Trichoptera. [10] 40: 117-124, ill. **Silvestri, F.**—Primo contributo alla conoscenza dei Protura dei Brasile e di Costa Rica. [Liv. Jub. Prof. Travassos] 1938: pp. 441-445, ill. (*). Due novi generi deserticoli di Lepismatidae (Thysanura). [Boll. R. Lab. Ent. Agr. Portici] 1: 340-353, ill. Contribuzione alla conoscenza dei Projapygidae (Diplura). [23] 30: 41-74, ill. (S*). **Simon, F.**—Goniodes centrocerci, a new Mallophagau from grouse. [103] 11: 104-108, ill. **Walker & Ricker.**—Notes on the Odonata from the vicinity of Cultus Lake, B. C. [4] 70: 144-151.

ORTHOPTERA.—**Da Costa Lima, A.**—Uma nova especie do genera *Tanusiella* (Pseudophyllidae). [Liv. Jub. Prof. Travassos] pp. 137-138, ill. **Hatch, M. H.**—Note on the Blattariae or Cockroaches of western Washington. [55] 14: 120. **Paoli, G.**—See under Anatomy. **Rehn, J. A. G.**—A revision of the Neotropical Euthymiae (Acrid.: Cyrtacanth.). [Proc. Acad. Nat. Sci. Phila.] 90: 41-102, ill. (k*). A new procryptic Phasmid from Cuba. [Proc. Acad. Nat. Sci. Phila.] 90: 103-107, ill. **Rehn & Hebard.**—N. gen. & spp. of West Indian Acrididae, with notes on previously known spp. [1] 64: 201-226, ill. **Urquhart, F. A.**—A n. sp. of *Nemobius* from Ontario. [4] 70: 101-102, ill.

HEMIPTERA.—**Beamer, R. H.**—Some n. spp. of Leafhoppers (Cicadell.). [103] 11: 77-84, ill. **Drake, C. J.**—Mexican Tingitidae. [55] 14: 70-72. (*). **Drake & Harris.**

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On the Designation of Genotypes by Fabricius.

In the NEWS for May, 1937, pages 130-134, was published an article by Mr. René Malaise, of the Swedish Museum of Natural History at Stockholm, entitled "Fabricius as the First Designator and Original Inventor of Genotypes." Of this Mr. W. L. McAtee, of the Biological Survey, U. S. Department of Agriculture, made an adverse criticism in the NEWS for October, 1937, page 230. Mr. Malaise has replied to Mr. McAtee in a paper "On the designation of genotypes by Fabricius. A response to McAtee," in *Entomologist Tidskrift*, Stockholm, Häft 3-4, 1938, pages 99-106, with facsimiles of four different pages from Fabricius's books, 1792, 1804 and of one page from Latreille's "Tables des Genres" of 1810. This paper originally prepared for publication in the NEWS, had to be withdrawn, much to our regret. Mr. Malaise kindly writes "Free copies will be sent to all who apply for one as long as the supply lasts. The *Entom Tidskrift*, 1938, 3-4 will probably not be distributed before the 18. XII. 1938." Mr. Malaise may be addressed at Naturhistoriska Riksmuseum, Entomologiska Avdelningen, Stockholm 50, Sweden. His paper is in English.

OBITUARY

Science for July 22, 1938, said: Professor FERNANDO NEVERMANN, since 1909 [*sic*] professor of entomology at the National Agricultural School at San Jose, Costa Rica, was recently accidentally killed while searching for ants that had been damaging banana plants.

We are indebted to Prof. Anastasio Alfaro of San José for a clipping from the *Diario de Costa Rica* of July 5, 1938, giving details of this sad event, which we translate and abstract as follows:

Don Fernando Nevermann has lived for the past twenty years in our country and the Centro Nacional de Agricultura has benefited for some little time past from his valuable services with very satisfactory results, as Prof. Rafael A. Chavarria, Director of the establishment has assured us. A Cuban col-

league of Prof. Nevermann's arrived in Costa Rica to study certain material and the two gentlemen arranged to make a survey of the zone on the "Old Line" on which Prof. Nevermann had a farm. On Thursday evening [June 30] they set out to examine the surroundings and investigate certain species which are abroad only in the darkness. To see their way they carried two small lights. In the house a son of Prof. Nevermann remained asleep. Nearby was a farm where lived a young man named Scott, very fond of hunting who, a short time before gave chase to a lion [puma]. He went to hunt this same night. The two entomologists kept their lamps lighted almost all the time. At a moment when they met to examine an anthill, Scott approached at some distance, mistook the lights for the eyes of an animal and, without waiting to be sure, fired two shots. At once a deep cry of pain arose from the two scientists wounded by the discharges. Scott ran up and the sorrowful spectacle of the tragedy met his eyes. Prof. Nevermann was seriously wounded, his companion also but less gravely. With great exertions on the part of Scott and of Prof. Nevermann's friend, the three returned to the house and arrangements were made to proceed to the hospital at Port Limon, where the two wounded men arrived the same night. The physicians exerted themselves to the utmost, but complications supervened and Prof. Nevermann died Sunday morning [July 3]. In accordance with the wishes of his relatives, his body was brought to the capital, where the funeral was held, and interred in the presence of a numerous company, the professors and students of the Centro Nacional de Agricultura and members of the German colony.

Prof. Nevermann had contributed papers on Coleoptera to *Entomologische Blätter* of Berlin (Eine neue *Statira* aus Costa Rica, 1926; Zwei neue *Colydiiden* aus C. R., 1930; Beobachtungen über die Lebensweise einiger Lamellicornier und einer Chrysomeliden, 1933; Berichtigung zum Cucujidenkatalog, 1936) and to *Entomologische Rundschau*, Stuttgart (Winke zur Unterhaltung, und Präparation der Käfersammlung in den Tropen 1935), while his principal work appears to be his Beitrag zur Kenntniss der *Telephanus* (Cucujidae) in the *Stettiner Entomologische Zeitung*, 1931, 1932, embracing 119 pages and 8 plates. He collected insects of various orders in Costa Rica. He was 56 years of age at the time of his death.

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.

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Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American Cephidae. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

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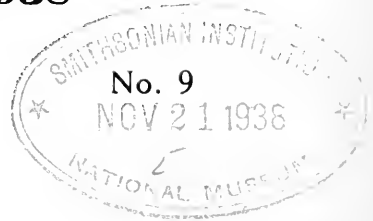
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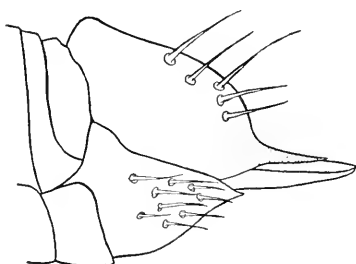
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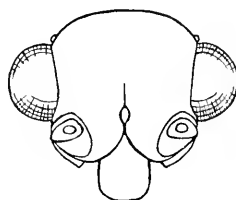
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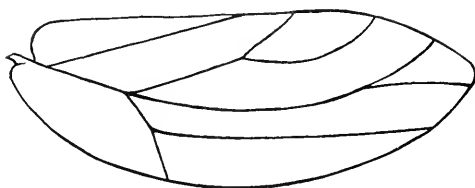
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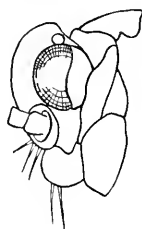
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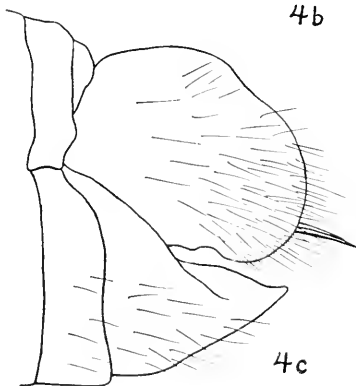
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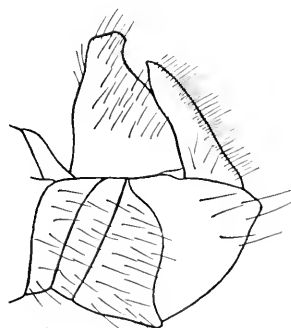
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PSYLLA NANA 1, TRIOZA SHEPHERDIAE 2, T. CHLORA 3,
LEVIDEA LINEATA 4 - 4D.—TUTHILL

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Some New North American Psyllidae (Homoptera).

By L. D. TUTHILL, Department of Zoology and Entomology,
Iowa State College, Ames, Iowa.

(Plate V.)

The writer has been working on a critical review of North American Psyllidae for the past two years. Some of the new forms encountered are described in this paper. The material is from the U. S. National Museum, the University of Kansas, and the author's collection. The writer would like to obtain as much North American material as is available and will gladly determine material in this group for the privilege of studying it.

***Arytaina hirsuta* n. sp.**

Similar to *A. pubescens* in size and pubescence but reddish in color, wings reddish brown, genitalia quite distinct. Length to tip of folded wings, 2.00-2.25 mm.

Color: General body color, including legs, red. Head and thoracic dorsum with prominent white pubescence. Disc of vertex white, except medial line and two foveae black; antennae black at tip. Thoracic dorsum white, heavily marked with black and red; scutum definitely striped. Forewings reddish fumate, darker toward apex. Veins red.

Structure: Head deflexed, slightly broader than thorax. Discal foveae and medial suture of vertex very prominent. Postero-lateral portions of vertex, which bear ocelli, prominently raised. Genal cones quite sharp, pubescent. Antennae about one and one-half times as long as width of head. Thorax heavily pubescent, granular. Forewings twice as long as broad, coriaceous; pterostigma short and broad.

Genitalia: Male proctiger longer than forceps, narrow in lateral view; forceps longer than in *pubescens*, strongly curved inward, tapering to apices which bear small black hooks, the postero-medial margin with very heavy golden pubescence. Female genital segment short, constricted midway and very narrow to apex; dorsal valve slightly longer than ventral.

Holotype, male, *allotype*, female, two male and fourteen female paratypes, Lapine, OREGON, July 2, 1935, P. W. Oman; other paratypes as follows: one male, Klamath, Ore., July 1, 1935, one female, Bend, Ore., July 2, 1935, P. W. Oman; one female, Lapine, Ore., July 2, 1935 and one female, Reno, NEVADA, June 26, 1935, R. H. Beamer.

Holotype, allotype and paratypes in U. S. National Museum. Paratypes in Snow Collection, University of Kansas, and author's collection.

***Psylla nana* n. sp.**

(Plate V, Fig. 1.)

Resembling *Psylla minuta* but the forewings definitely maculate, the vertex and thoracic dorsum not pubescent and the genal cones much smaller. Length to tip of folded wings, 2.00-2.25 mm.

Color: General body color, including legs, dirty white, with orange markings. Vertex white with margins, median line and discal foveae orange; genal cones white; antennal segments dark on apices, last two segments black. Thoracic dorsum with a median orange line, a pair of broader orange stripes on each side of scutum. Forewings more or less fumate in basal half; membrane whitish with somewhat irregular brown maculae as illustrated; veins white.

Structure: Head of median size, vertex bulging forward between antennae, with medial suture and discal foveae prominent. Genal cones small, short, blunt, somewhat pubescent. Antennae about twice as long as width of head. Thorax relatively flat. Forewings two and one-third times as long as broad, broadly rounded; pterostigma very short.

Genitalia: Male genitalia quite large. Proctiger slightly longer than forceps, tapering from rather broad base, apex bent posteriorly at right angles. Forceps fairly broad in lateral view, curved forward and then posteriorly near apices, apices black. Female genital segment shorter than rest of abdomen, dorsal valve straight on dorsal side; ventral valve evenly curved up to apex, slightly exceeded by dorsal valve.

Holotype, male, *allotype*, female, and one male paratype, Santa Rita Mts., ARIZONA, July 17, 1932, R. H. Beamer; two male and four female paratypes, Patagonia, Ariz., June 24, 1933, P. W. Oman.

Holotype, allotype and paratype in Snow Entomological Collection, University of Kansas; paratypes in U. S. National Museum and author's collection.

Trioza shepherdiae n. sp.

(Plate V, Fig. 2.)

This typically triozone species does not resemble very closely any of the known North American members of this genus. Length to tip of folded wings, 2.50 mm.

Color: General color of head, thoracic dorsum and legs light testaceous to fulvous. Vertex light except discal foveae; genal cones, eyes, distal half of antennae dark. Prescutum with a pair of brown stripes halfway back. Scutum with two inverted V-shaped, brown marks. Wing membranes slightly fumate; veins brown. Abdomen brown to black.

Structure: Head and thoracic dorsum coarsely granular. Head of medium size, narrower than thorax. Vertex decidedly emarginate in front, with very prominent discal foveae, postero-lateral angles, which bear ocelli, raised. Genal cones short, about one-half as long as vertex, conical, almost parallel to plane of vertex. Antennae about one and one-half times as long as width of head. Pronotum depressed. Prescutum strongly arched. Forewings two and one-half times as long as wide, membrane rather thick, slightly rugose, venation typical. Hind wings more rugose than forewings. Legs of medium length, hind tibiae with one spine outside, two inside.

Genitalia: Male genital segment small. Proctiger as long as forceps, almost right-triangular in lateral view, posterior lobe of medium length. Forceps slender, irregularly narrowed to sharp apices, with medium pubescence. Female genital segment short, dorsal valve decidedly longer than ventral, terminating in a heavy, black, up-curved hook, usually exceeded by partially extended ovipositor sheath.

Holotype, female, *allotype*, male, 45 female and 9 male paratypes, Lake City, COLORADO, June 29, 1937, L. D. Tuthill; 26 female and 5 male paratypes were collected by R. H. Beamer at the same time. Holotype, allotype and paratypes in author's collection, paratypes in Snow Entomological Collection, University of Kansas, and U. S. National Museum.

This species was taken on *Shepherdia canadensis* (L.) Nutt. growing in a dense stand beneath aspen.

Trioza chlora n. sp.

(Plate V, Fig. 3.)

In Crawford's key this species runs to *albifrons*. It is, however, quite unlike the latter species. The genal cones are less acute, less divergent and are directed downward; the wings are very slender and acute at apex. Length to tip of folded wings, 3.25-3.50 mm.

Color: General color white to yellow except eyes and apical two-thirds of antennae black. Thoracic dorsum and vertex deeper yellow to orange. Wings hyaline.

Structure: Head medium in size, post-ocular occipital region very large giving the eyes the appearance of projecting forward. Vertex evenly excavated, rather deeply emarginate in front, extending forward over front ocellus. Genal cones vertical, about as long as vertex, rather acute. Antennae twice as long as width of head. Thorax strongly arched. Forewings almost three times as long as broad, sharply angled. Venation typical triozone.

Genitalia: Male genitalia small. Proctiger broad at base, tapered to slightly produced apex, bearing a black spine at base on either side. Forceps slightly shorter than proctiger, broad in lateral view, anterior margin almost straight, posterior margin slightly curved, apex roundly truncate and slightly produced anteriorly; apical margin brown. Female genital segment shorter than rest of abdomen, basal portion subglobular, apex a short, brown styloform elongation; dorsal valve slightly longer than ventral.

Holotype, male, Pearce, ARIZONA, Aug. 23, 1935, R. H. Beamer; *allotype*, female, Huachuca Mts., Ariz., Aug. 22, 1935, R. H. Beamer. Types in Snow Entomological Collection, University of Kansas.

RHINOPSYLLA SCHWARZI Riley

This species which has been known heretofore only from two males is represented in the Snow Collection by two females. They are similar to the males except that the fore femora are not enlarged, this apparently being a secondary sexual character.

The female genital segment is short, the dorsal valve narrowly hood-shaped, overhanging the ventral valve, the latter scarcely produced, slit at apex.

Allotype, female, Ponce de Leon, FLORIDA, July 13, 1934, R. H. Beamer, and *parallotype*, same data, in the Snow Entomological Collection, University of Kansas.

LEVIDEA n. gen.

Head small, much narrower than thorax, deflexed; vertex smooth, perpendicular, slightly rounded, median suture lacking or at least not apparent except just above front ocellus; genae somewhat swollen below antennae, almost touching; clypeus large and globose, visible from front; antennae moderate in length, longer than width of head. Thorax moderately arched; episternum of pronotum produced laterally around posterior of eye. Wings triozine in venation and shape, pointed at apex, somewhat thickened and maculate. Legs rather short, apex of hind tibia with two spines inside, one outside.

Genotype, *Levidea lineata*, n. sp.

Levidea lineata n. sp.

(Plate V, Figs. 4, 4a, 4b, 4c, 4d.)

Length to tip of folded wings, 3.00-3.50 mm.

Color: General body color, including legs, stramineous. Vertex and genae light, antennae darker. Eyes dark. Two brown lines extending across prescutum, sometimes incomplete, continuing on scutum as a diverging pair of lines. Membrane of forewings with small brown spots, very thick at anal margin to sparse on costal margin, the veins unspotted except at marginal cells, thus giving general appearance of stripes.

Structure: Head very small, strongly deflexed; vertex slightly swollen in appearance, perfectly smooth except for two very small foveae near the occipital margin and remnant of medial suture above front ocellus. Genae slightly swollen. Clypeus very large, visible from front or side. Antennae twice as long as width of head. Thorax moderately arched, the episternum of the pronotum developed out and around the occiput. Forewings slightly more than twice as long as wide, without pterostigma or cubital petiole, marginal cells about equal.

Genitalia: Male genitalia large, proctiger triangular in outline, broad at base, slightly longer than forceps which are simple, tapering from base to acute apices, quite strongly arched, apices touching, pubescent on posterior margins. Female genital segment large with rather dense, silky pubescence; dorsal valve very large, hood-shaped, ventral valve smaller, sharply pointed.

Holotype, female, *allotype*, male, 9 female and 4 male paratypes, Mustang Mt., ARIZONA, June 12 and 20, 1933, P. W. Oman; 3 female and 1 male paratypes, Mustang Mt., Ariz., June 12, 1933, R. H. Beamer. Holotype, allotype and paratypes in U. S. National Museum. Paratypes in Snow Entomological Collection, University of Kansas and in author's collection.

Mr. Oman says that this unique species apparently lives upon "wild rubber," *Parthenium incanum*.

EXPLANATION OF PLATE V.

- Fig. 1. *Psylla nana*, forewing.
 Fig. 2. *Trioza shepherdiae*, ♀ genitalia.
 Fig. 3. *Trioza chlora*, ♀ genitalia.
 Fig. 4. *Levidea lineata*, front view of head.
 Fig. 4a. *Levidea lineata*, lateral view of head.
 Fig. 4b. *Levidea lineata*, forewing.
 Fig. 4c. *Levidea lineata*, ♀ genitalia.
 Fig. 4d. *Levidea lineata*, ♂ genitalia.

A Bibliography of Keys for the Identification of Immature Insects. Part I. Diptera*.

By WM. P. HAYES, University of Illinois.

Nowhere in entomological literature are bibliographies available to assist in locating works containing keys or tables for the identification of immature insects. The work of Banks listing the keys for adult insects has been of great value to persons looking for keys to adults and it should be brought up to date. We have no such work treating the immature stages. A few institutions throughout the United States are now offering some work in the taxonomy of immature insects. Having been engaged in teaching such a course for twelve years, the writer has accumulated a rather comprehensive bibliography of papers which contain such keys. Mimeographed copies listing the available works in the various orders have been of much use to students and requests for copies from workers throughout the country are frequently received. It is hoped to supplement this work in the near future with bibli-

* Contribution No. 195 from the entomological laboratories of the University of Illinois.

ographies of the other important orders.

"It looks like a muscid larva but we will have to rear it to the adult stage to be sure." This, or some such phrase, is on the lips of almost everyone engaged in the determination of insects for the public. Taxonomic works of the sort here listed are attempts to alleviate this lack of information. It is granted that the field of taxonomy of immature insects is in an immature stage, nevertheless in a number of the orders keys are available to help us recognize at least the more common species.

Among the Diptera, the aquatic forms are perhaps the best known in their developmental stages as is evidenced by the numerous keys to such groups as the Culicidae and Chironomidae and the recent (1934, 1935 and 1937) works of Johannsen. The important work of Malloch (1917) is the most comprehensive work treating of the Orthorrhapha. The Cyclorrhapha have been keyed, mostly, only in connection with those species causing myiasis or affecting the health of man.

The following list is offered as an aid to those who wish to identify larvae and pupae of Diptera. It is not complete and the writer would welcome additional citations.

GENERAL KEYS.

ALEXANDER, C. P. 1930. Observations on the dipterous family Tanyderidae, *Proc. Linn. Soc. N. S. Wales*, 55: 221-230. (Larval key to families of Orthorrhapha, pp. 225-228.)

BALACHOWSY, A. and L. MESNIL. 1935. [Key to brachycerous larvae attacking grains and cereals.] In: *Les insectes nuisibles aux plantes cultivées etc.* Busson, Paris, Vol. I, 1137 pp. (Key to genera and species, pp. 913-923.)

BANKS, N. 1912. The structure of certain dipterous larvae with particular reference to those in human foods. *U. S. D. A. Bur. Ent., Tech. Bull.* 22, pp. 1-44. (Key to some families and genera, p. 15.)

BELING, TH. 1882. Beitrag zur metamorphoses zwei-flügeliger Insecten aus den Familien Tabanidae, Leptidae, Asilidae, Empidae, Dolichopodidae und Syrphidae. *Arch. Naturg.*, 44: 187-240. (Larval key to genera of these families pp. 236-240.)

BRAUER, F. 1883. Die zweiflügler des kaiserlichen Museums zu Wien III. Systematische Studien auf Grundlage der Dipternlarven, etc. *K. Akad. Wiss.* (Vienna), *Math.-Naturze.*

Vol. 47, pp. 1-100. (Larval key to families of Orthorrhapha, pp. 17-19; key to genera of Oestridae pp. 36-38; good bibliography of earlier references to larvae.)

BRUES, C. T. and A. L. MELANDER. 1932. Classification of Insects. *Bull. Mus. Comp. Anat.* Harvard. Vol. 73, 672 pp. (Larval key to principal families, pp. 352-368; pupae of principal families, pp. 370-376.)

BUTOVITSCH, V. von, and W. LEHNER. 1933. Bestimmungstabelle der wichtigsten in märkischen Kiefernwaldboden vorkommenden Insektenlarven. J. Springer Co., Berlin, 16 pp. (Keys to families of larvae inhabiting pine forest soil, p. 5.)

FELT, E. P. 1917. [Key to American insect galls.] *N. Y. State Mus., Bull.* 200.

FROST, S. W. 1924. A study of the leaf-mining Diptera of North America. *Cornell Agr. Exp. Sta., Memoir* 78, pp. 1-228. (Key to the more common leaf-mining Diptera based on the type of mine, pp. 19-20; larval key to families, p. 29; larval key to Agromyzidae, pp. 37-38.)

GREENE, C. T. 1918. [Table of common fly larvae.] In: Mimeographed Proceedings of the Class to Study Entomology of Disease, Hygiene and Sanitation. Lecture 15. Sept. 9, 1918, p. 217. Washington, D. C.

Id. 1921. Table to separate larvae (maggots). In: Sanitary Entomology by W. D. Pierce. Badger Pub. Co., Boston, 518 pp. (Larval key to house fly and related species, pp. 142-144.)

GRÜNBERG, K. 1910. Diptera, Zweiflüger. In: *Brauer, Süßwasserfauna Deutschlands*, Heft 2 A, 312 pp. Fisher, Jena. (Larval key to aquatic families, pp. 13-15; Culicidae, p. 80; Stratiomyidae, p. 113.)

HALIDAY, A. H. 1857. List of Genera of British Diptera, the earlier stages of which are more or less perfectly known, etc. *Nat. Hist. Rev.*, IV, p. 177. (A list with family characters of larvae.)

HART, C. A. 1895. Entomology of the Illinois River, Diptera. In *Bull. Ill. State Lab. Nat. Hist.* Vol. 4 (art 6) pp. 184-270. (Key to families of larvae and pupae of aquatic Diptera, pp. 186-189.)

HEGNER, R., R. M. ROOT and D. L. AUGUSTINE. 1929. Animal Parasitology, Century Biological Series, Century Co., N. Y., 731 pp. (Larval key to genera of some common muscoid flies, pp. 584-585.)

HENDEL, F. 1928. Zweiflüger oder Diptera II. Allgemeiner Teil. In: *Die Tierwelt Deutschlands*, Part II, pp. 1-135, Fischer, Jena. (Larval key to families, pp. 113-131; key to

principal forms of pupae, pp. 111-112.)

HERING, M. 1935-1937. Die Blatt-Minen Mittel-und Nord-Europas. Bestimmungs-Tabellen aller von Insekten-larven der verschiedenen Ordnungen erzeugten Minen, Lief. I-VI, pp. 1-112. Gustav Feller, Neubrandenburg; (Lieferung VI not yet published). (Arranged alphabetically by food plants.)

ISAACS, I. M. 1923. Key to the identification of the dipterous families and certain subgroups . . . relating to myiasis. In: Herms, Medical and Veterinary Entomology, Macmillan Co., N. Y. (Larval key p. 315 includes some Trypetidae, Oestridae, Anthomyiidae, Muscidae, Sarcophagidae, and Drosophilidae.)

JOHANNSEN, O. A. 1903. Aquatic nematoceros Diptera. Aquatic Insects in New York State. *New York State Mus., Bull.* 68, pp. 328-441. (Key to families of larvae and pupae and some keys to species, pp. 329-332.)

Id. 1934. Aquatic Diptera, Part I. Nematocera, exclusive of Chironomidae and Ceratopogonidae. *Cornell Univ. Agr. Exp. Sta., Mem.* 164, pp. 1-71, 24 pl. (Many keys to this group.)

Id. 1935. Aquatic Diptera, Part II. Orthorrhapha, Brachycera and Cyclorrhapha. *Cornell Univ. Agr. Exp. Sta., Mem.* 177, pp. 1-62. (Many keys to this group. For Part III see Chironomidae.)

KARNY, H. H. 1934. Biologie der Wasserinsekten. Fritz Wagner, Wien, 311 pp. (Key to families, pp. 187-190.)

LAMPERT, K. 1910. Das Leben der Binnengewässer. Leipzig, 1910. 856 pp. (Larval key to genera of Aquatic Diptera, p. 166.)

MALLOCH, J. R. 1915. Some additional records of Chironomidae for Illinois and notes on other Illinois Diptera. *Bull. Ill. State Lab. Nat. Hist.*, Vol. II, pp. 304-363. (Key to some Ill. pupae of Bombyliidae, Mydidae, Asilidae and Therevidae, pp. 325-327.)

Id. 1927. A preliminary classification of Diptera, exclusive of puparia, based upon larval and pupal characters, with key to imagos in certain families. Part I. *Bull. Ill. State Lab. Nat. Hist.*, 12: 161-407. (Many keys to larvae and pupae. Best American work.)

NEEDHAM, J. G. 1918. Key to North American aquatic dipterous larvae. In: Ward and Whipple, Fresh Water Biology, John Wiley and Sons, N. Y., 1111 pp. (Prepared by O. A. Johannsen.) (Key to families and genera, pp. 943-946.)

NEEDHAM, J. G., S. W. FROST and B. H. TOTTELL. 1928. Leaf mining insects. Williams and Wilkins Co., Baltimore, Md., 295 pp. (Key to dipterous mines, p. 239; key to *Agro-*

myza, p. 249; *Phytomyza*, p. 261.)

PATTON, W. W. 1922. Notes on the myiasis-producing Diptera of man and animals. *Bull. Ent. Res.*, 12:239-261. (Key to larvae, p. 258.)

RILEY, W. A. and O. A. JOHANNSEN. 1932. Medical entomology. 476 pp. McGraw, Hill and Co., N. Y. (Larval key to families and some genera of aquatic diptera, pp. 194-195; larval key to bots, Oestridae, pp. 309-310; key to three instars of myiasis producing larvae, in part after S. M. Tao. p. 309-376.)

SEGUY, E. 1926. Diptera (Brachyceres). In: *Fauna de France*. Vol. 13, pp. 1-308. (Larval key to families, p. 14, a translation into French of Brauer's key.)

SHARP, D. 1909. [Key to families of Brachycera and also Platypezidae, Pipunculidae and Syrphidae.] In: *Verral, British Flies*, Vol. 5. Gurney and Jackson, London. (This is a translation of Brauer's key. Key to families only.)

TAO, S. M. 1927. A comparative study of the early larval stages of some common flies. *Amer. Jour. Hyg.*, 7:735-761. (Keys to first and second instars. This key is reproduced and a third instar key appended in Riley and Johannsen, 1932.)

KEYS TO SPECIAL GROUPS.

TIPULOIDEA.

ALEXANDER, C. P., and J. T. LLOYD. 1914. The biology of the North American crane-flies. (Tipulidae, Diptera I. The genus *Eriocera* Macquart.) *Journ. Ent. and Zool.* (Pomona) 6:12-23. (Key to larvae, p. 19; key to pupae, p. 20.)

ALEXANDER, C. P. 1914. Biology of the North American crane-flies. (Tipulidae, Diptera.) II. *Liogma nodicornis*, Osten Sacken. *Jour. Ent. and Zool.* (Pomona) 6:105-118. (Key to larvae of *Cylindrotomini*, pp. 109-110, and key to larvae and pupae of the genus *Liogma*, pp. 110-111.)

Id. 1915. The biology of the North American crane-flies. (Tipulidae, Diptera.) IV. *Journ. Ent. and Zool.* (Pomona) 7:141-158. (Key to larvae and pupae of the tribe *Hexatomini*, p. 148.)

Id. 1920. The crane-flies of New York, Part II. *Cornell Univ. Agr. Exp. Sta. Memoir* 38, pp. 695-1133. (Key to larvae and pupae of the superfamily Tipuloidea, including Tipulidae, Anisopidae (Rhyphididae), Tanyderidae and Ptychopteridae.)

Id. 1930. Observations on the dipterous family Tanyderidae. *Proc. Linn. Soc. N. S. Wales*, 55:221-230. (Key to pupae of related families, p. 228.)

BELING, T. 1878. Zweiter Beitrag zur Naturgeschichte (Metamorphose) verschiedener Arten aus der Familie der Tipuliden. *Verhand. d. k. k. Zool. Bot. Ges. Wien*, 28: 21-56. (Larval key to species of *Pachyrhnia*, p. 44.)

Id. 1886. Dritter Beitrag zur Naturgeschichte (Metamorphose) verschieden Arten aus der Familie der Tipuliden. *Verhand. d. k. k. Zool. Bot. Ges. Wien*, 36: 171-214. (Larval key to various genera, pp. 203-206; species of *Tipula*, pp. 206-213.)

LENZ, F. 1919. Die Metamorphose der Cylindrotomiden. *Archiv. Naturges.* Vol. 85, (Heft 6, Abt. A.), pp. 113-146. (Larval key to genera, pp. 129-130.)

ROGERS, J. S. 1933. Contribution toward a knowledge of the natural history and immature stages of the crane-flies. The genus *Polymera* Weidemann. *Occasional Papers Mus. Zool. Univ. Mich.* No. 268, pp. 1-13. (Larval and pupal key to two species of this genus, p. 11.)

See also the keys of Malloch, 1917; Grünberg, 1910; Hart, 1895; and Johannsen, 1934; cited under general keys.

BLEPHEROCERIDAE.

BEZZI, M. 1912. Blefaroceridi Italianii con descrizione di una nova forma e di due specie esotiche. *Bol. Soc. Ent. Ital.*, 44: 3-114. (Larval key, p. 76.)

MANNHEIMS, B. J. 1935. Beiträge zur Biologie und Morphologie der Blepharoceriden (Dipt.) *Zool. Forschungen*, Band 2. Universitätsverlag von Robt. Noske, Leipzig, 115 pp., 69 figs. (Keys to larva and pupae occurring in the Alps, p. 80.)

(To be continued)

New Records of Odonata for Southeastern Pennsylvania.

During the past three summers, I have done little collecting of these insects but obtained the following noteworthy additions to the local fauna at Cheyney, Delaware County, Pennsylvania. In 1936 at or very close to Smithson's Pond, *Lestes curinus* (Say), a male, and *Nehalennia irene* Hagen, both sexes, were met on July 25, and a male of *Somatochlora tenebrosa* (Say) on September 1. On May 30, 1937, I took a male *Cordulegaster diastatops* Selys and on August 1, 1938, a male *Cordulegaster erroneus* Hagen, the last two not at the pond.—PHILIP P. CALVERT.

Some Insects Accepted by the American Chameleon, *Anolis carolinensis* Voigt.

By H. ELLIOTT McCLURE, Ames, Iowa.

During the past fifteen years eight American chameleons, *Anolis carolinensis* Voigt., have been kept in captivity for varying lengths of time, up to five years, and observed. They were purchased at fairs and circuses and freed in cages large enough to give them sufficient exercise. Green plants in the cages helped make the conditions more natural.

The animals will capture a wide variety of insects. They never attack a dead insect, but must capture it alive. Large field crickets, *Gryllus pennsylvanicus* Burm., greater in girth than the chameleon, can be eaten and the prey is gulped into the throat, where it remains distending the neck until it is predigested and passes into the stomach. In capturing its prey, the chameleon tenses its body, points its nose toward the insect, and gathers its hindlegs for the jump. As the insect walks closer, the lizard opens its mouth, sticks the tip of its tongue out, and bobs its head up and down as if aiming carefully. If the insect draws near and stops, the lizard will not strike, but remains motionless until the insect moves again. Then the strike is made. When very hungry it will jump eight or ten inches upon the insect, and very seldom misses.

Moths, flies, and other large insects are generally eaten head first and the wings scraped off by rubbing the head on some object, as a bird cleans its bill on a limb. Foreign objects gotten into the mouth can not be spit out, but are either scraped away or swallowed. Grass and sticks are sometimes swallowed because of this. Occasionally foreign matter is scraped from the side of the mouth by a hind foot.

The following groups of insects have been accepted regularly by the lizards:

Diptera; Muscidae, Sarcophagidae, Bombyliidae, Tabanidae, Syrphidae, Asilidae, Stratiomyiidae, Tachinidae and most other families.

Orthoptera; Tettigoniidae, Gryllidae and small Locustidae.
Neuroptera; Myrmelionidae, Hemerobiidae and Chrysopidae.
Odonata; Small Zygoptera.

Hemiptera; Miridae and very few others.

Hymenoptera; Tenthredinidae and small Ichneumonoidea.

Lepidoptera; butterflies such as, *Grapta interrogationis* (Fabr.), *Vanessa atalanta* (Linne), *Pyramcis cardui* Linne, and others; and moths such as, *Heliothis obsoleta* Fabr., *Carpocapsa pomonella* Linne, *Cirphis unipunctata* (Haworth), *Hemerocampa leucostigma* Smith and Abbott and many others including all available small moths.

The American chameleon discerns fine differences in its prey. For example, one chameleon had remained unfed for a week and was very hungry, so a box elder bug, *Leptocoris trivittatus* Say, was freed in the cage. Quickly the chameleon leaped across the enclosure to seize the victim, but hesitated, eyed the bug by turning its head to one side and, with almost a look of disgust, slowly climbed up a flower-stalk, allowing the bug to walk away. It is doubted that this lizard ever encountered a box elder bug before, but it refused to attempt to eat it. Size was not the deciding factor in the chameleon's decision, for it attacked horse flies or moths one-fourth to one-half its own size with alacrity.

At another time, this same lizard attempted to eat a red-legged grasshopper, *Melanoplus femur-rubrum* De Geer, and after a vicious struggle, during which the grasshopper kicked the lizard violently about the face, it succeeded in killing and eating it. The chameleon could never be induced to attack another grasshopper of any size after that. The lizards delight in crickets, but shun cockroaches. A wasp or bee is left to its own activities while a bee fly or a small ichneumon is snapped up. When a honey bee was released in the cage of a chameleon, it refused to eat the insect, but kept close watch upon its clumsy flight and avoided it. The bee was removed and a drone fly, *Eristalis tenax* Linne, released in the cage. It was immediately taken by the lizard. If numerous flies, such as blue-bottle flies, are released in the cage, the chameleon will

eat its fill, sometimes as many as ten or fifteen, and then, because the remaining flies disturb it by walking over it and getting their feet in its eyes, the lizard will systematically catch and crush each fly, and then scrape it from its mouth. In this way it relieves itself of the torment.

All of these instances show a fairly accurate degree of discernment. As the lizard always hesitates before it strikes, it has time to observe the prey and classify it as to its delectability, therefore mimicry and protective coloration in the insects seem to be of little value in protecting them from its attack.

Three New Geophiloid Chilopods.

By RALPH V. CHAMBERLIN

The types of the new species described below are at present in the author's collection.

***Gosphilus auximus* sp. nov.**

This yellowish form has the usual conspicuously flattened body. Head broad, with basal plate equally broad and somewhat narrowed caudad. The antennae flattened and attenuate distally, contiguous at base. Prehensors concealed from above; the claws short, rather stout, when closed falling much short of anterior border of head; chitinous lines sharply defined and complete.

Spiracles small, circular. Ventral pores in a transversely elongate area. Last ventral plate wide as usual. Each coxa bearing about eight small, inconspicuous pores, about half of which are covered by the last ventral plate. Anal legs of male conspicuously and clavately thickened. Pairs of legs, 149.

Length, about 65 mm.

Holotype: Male, Edinburg, TEXAS, Oct. 16, 1936, (S. Mulaik).

This form seems readily distinguishable from *G. laticeps* in having typically 149 as against 81 pairs of legs.

LEPTODAMPIUS gen. nov.

The claw of the prehensors narrow and thin at base where excavated above as in *Agathotus*. It differs from the latter genus, however, in having the claw article of the prehensors with a conspicuous chitinous antero-mesal corner or tooth, as

well as in having the last ventral plate narrow instead of very broad, etc.

Genotype, *L. lamprus*, sp. nov.

Leptodampius lamprus sp. nov.

Pale yellow throughout. Cephalic plate short, with the frontal suture present. Antennae not distally attenuate. Prebasal plate not exposed. Basal plate slightly widened cephalad. Claws of prehensors when closed nearly attaining anterior margin of head; smooth, slender to abruptly wider but short basal portion which bears a chitinous angle or tooth at its antero-mesal corner. Chitinous lines not present.

Spiracles rather small, circular, the first not enlarged and those of posterior region scarcely reduced. First legs shorter and more slender than the second. And legs but little thicker and longer than the preceding pair. Last ventral plate moderate in breadth, narrowed caudad; corresponding tergite broad. Last coxae bearing about 15 small pores ventrally and laterally. Anal pores present. Pairs of legs, 63.

Length, about 37 mm.

Holotype: female, Boyer, OREGON, (J. A. Macnab).

Brachygeophilus leionyx sp. nov.

Color yellow throughout. Cephalic plate relatively broad, smooth and shining without sulci and with no definite frontal suture. Prebasal plate not exposed. Basal plate short, broad and trapeziform. Claws of prehensors when closed not attaining front margin of head, smooth, neither these nor other articles bearing denticles. Chitinous lines present, fine, incomplete anteriorly.

Spiracles circular, the first not larger than those immediately following, the others gradually decreasing caudad. Last ventral plate broad, trapeziform, the sides converging caudad, the caudal margin straight. Each of the last coxae bearing about 18 small pores, of which one is somewhat larger and stands by itself in a more caudal position; the others along and under border of ventral plate, and especially along dorsal plate and at anterior end. First legs decidedly shorter and more slender than the second pair. Anal legs in female much exceeding the penult in thickness and length, the claw long and smooth. Pairs of legs, 63.

Length, about 26 mm.

Holotype: female, and 1 *paratype* female, Boyer, OREGON, (J. A. Macnab.)

The Concentration of *Heliothis obsoleta* Moths at Food. (Lepidoptera: Noctuidae).

By G. W. BARBER, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

Certain unusual and destructive infestations of the corn-ear worm, *Heliothis obsoleta* (F.), seem to result from concentrations of moths for feeding. Moths are attracted to plants in blossom; and if corn is not available at the time, the moths deposit eggs on these same plants. When not in blossom, the moths are attracted to these plants little if at all.

The first observed site of such a concentration was a 100-acre soybean field of the variety O-Too-Tan in Washington County, Georgia. During the third week of September, 1933, the plants of this field were in blossom, and on September 19 a tremendous population of *Heliothis obsoleta* was observed. Many times as many moths were present than had ever been noted by the author in a like area before; as one walked through the bean field moths arose in tremendous numbers. Later, these moths laid many eggs on the plants, certainly enough to result in the destruction of the crop had the eggs all hatched and had even a part of the larvae survived. At this time, in the vicinity of this field, very few *H. obsoleta* moths were found elsewhere, and practically no moths were to be found in fields of soybeans which were older and which bore less profuse bloom, although such plants were suitable as larval food.

It seemed probable that moths had migrated to this field to feed on the blossoms. Not only were the blossoms of other plants relatively scarce because of dry, warm weather, but the millions of blossoms in this field seemed to have had an attraction somewhat in proportion to the mass of bloom present.

These moths remained over a period of at least 2 weeks in the bean field, hiding among the plants during the hours of daylight. Possibly because corn was then unavailable, all having ripened, they laid eggs on the plants on which they had fed and among which they rested.

The second observed instance of concentration of these

moths for feeding was in Estill, South Carolina, where, in the first week of June, 1934, moths were very abundant in a late-planted flax field of about 25 acres, which was at the height of blossoming. Moths had apparently concentrated in this field from some distance because of the abundant food supply. Many eggs were laid on the flax plants, and the resulting larvae did considerable damage.

In this instance, corn ranging from a foot to 18 inches in height occurred in the vicinity, and would normally have attracted moths for oviposition. After remaining in the flax field for a week or 10 days, hiding among the plants during hours of daylight, the moths disappeared between June 14th and 18th; they were very abundant on the former date, while few remained on the latter date. Possibly they had migrated to corn fields in the vicinity.

During the first week in June, when moths became very abundant in the flax field described, they were absent or very scarce in earlier-planted flax fields which at that time bore fewer blossoms, although plenty of green bolls suitable as larval food were present. A generation of *H. obsoleta* had occurred in the flax fields during May, and the larvae had attacked, in particular, an earlier-planted field of 50 acres which adjoined the late-planted field. During the first week in June, adults emerged from the May brood of larvae in the larger field, but all those emerging in this earlier-planted field migrated to the late-planted field where blossoms were much more abundant. Moths emerging in other early-planted flax fields in the vicinity also migrated to the blossoming field. Few eggs were laid in any of the early-planted fields during the first week of June, and few moths hid in these early-planted fields. Available larval food, green bolls, seemed to have had little influence on oviposition. It seemed probable that the moths were attracted to the late-planted flax fields for food, and that they laid eggs somewhat incidentally. The mass of blossoms in a field at the height of blooming attracted many moths, while fewer blossoms in older fields attracted few.

These observations and many others seem to show (1) that

moths congregate in fields with an abundance of blossoms for feeding; (2) that it is possible that this food attracts moths in numbers and from distances somewhat proportionate to the mass of bloom; (3) that the moths may lay eggs on such plants, notwithstanding the fact that these may not be preferred or usual food plants; (4) that unusually severe injury to such plants by larvae may be traced to their attractiveness as feeding locations for the moths; (5) that large concentrations of moths have been observed only at times when corn was not available in attractive stages of growth, namely, early in the spring and during the fall.

A Note on Synonymy in Spiders (Araneae: Salticidae and Argiopidae).

B. J. KASTON, New Haven, Connecticut

In 1932, Banks proposed a new name, *Allepeira*, for the genus known as *Hentzia* McCook 1894. He called attention to the fact that the name *Hentzia* had already been used by Marx for a spider belonging to the genus *Wala*. The publication containing Marx's generic name is a little known pamphlet by L. O. Howard, "*A list of the invertebrate fauna of South Carolina*," being Chapter XI of "*Resources of South Carolina*," published at Charleston, July 19, 1883. On page 1 appears the following statement: "With regard to the order Arancina (spiders) I have been enabled, through the kindness of Mr. George Marx, of Washington, to present not only a list of the described species, but to add to it a large number of undescribed species, indicated by Mr. Marx's manuscript names."

This list of spiders' names (pages 21 to 26 inclusive) contains, in addition to the many manuscript names, which being *nomina nuda* have no standing, three generic names associated with previously described species. One of these is *Hentzia*, to which Banks has already called attention (Marx listed *Hentzia palmarum* (Hentz) on p. 26). Since Keyserling's *Wala* was not established until 1884 and has for its type his *albovittata*,

which is the same as Hentz's *Epiblemum palmarum*, *Wala* becomes a synonym of *Hentzia* Marx. On page 22 appears *Ocrepeira ectypa* (Walck.); but Walckenaer's *Epeira ectypa* belongs in the genus *Wixia* O. P.-Cambridge 1882, of which accordingly *Ocrepeira* becomes a synonym. The third generic name with which we are concerned also appears on p. 22, and in association with two species: *Acanthepeira stellata* (Hentz) and *verrucosa* (Hentz). In 1888, *Epeira verrucosa* Hentz was shown by McCook to be the same as *E. arenata* Walck., and was made the type of a new genus, *Verrucosa*, (in the same manner as did Marx, by simply associating the new name with the already described species). The species *E. stellata* Hentz being the same as the one for which McCook in 1894 established the genus *Marxia*, it follows that the latter name becomes a synonym of *Acanthepeira* Marx.

Some question may arise as to whether Howard rather than Marx should be cited as authority. However, I think it is clear from an interpretation of Article 21 of the International Rules of Nomenclature¹ that the names should be credited to Marx. It is indeed unfortunate that Marx did not continue to use the names he had proposed. Since they were omitted from his catalogue of American spiders, and from the subsequent catalogues of Banks and of Petrunkevitch, their synonyms, instead, have come to be well known.

Notes on the Eggpods of *Appalachia hebardii* and *Dendrotettix quercus* (Orthoptera: Acrididae; Cyrtacanthacridinae).

By JOHN W. H. REHN, Philadelphia, Pennsylvania.

While engaged in some local field work this summer it has been possible to obtain live material of both *Appalachia hebardii* and *Dendrotettix quercus*, the Post-Oak Locust. As there is no published information on the biology of either of these in-

¹"The author of a scientific name is that person who first publishes the name in connection with an indication, a definition, or a description, unless it is clear from the contents of the publication that some other person is responsible for said name and its indication, definition or description." (Italics mine.)

teresting grasshoppers we have attempted to secure some data along these lines.

At the present time I have been able to obtain eggpods of both of these rather rare or, at least, exceedingly local grasshoppers and we believe that a brief description of these eggpods would be of some interest.

The pods of *Dendrotettix quercus* vary, in transverse section, from subquadrate to more or less rectangulate, the eggs being placed in an almost vertical position. The greatest length of the four pods examined varies from 4 to 6 mm. while the width remains relatively constant at about 4 mm. The number of eggs contained in these varies from six to eleven or twelve, all more or less vertical although usually inclined to some degree. The eggs of a pod may all be inclined in the same direction or they may be tilted in various directions, there appearing to be no regular pattern. The eggs, which are buckthorn brown, are about 5 mm. long and in lateral view are more or less elliptical. The eggs are surrounded and covered by a chestnut brown mucous matter which holds the mass together. In some of the pods before me this mucous material appears relatively transparent, while in others it is decidedly opaque.

While only one pod of *Appalachia hebaridi* has been obtained its appearance is so unusual that it is noteworthy, yet at the same time it is my firm belief that the eggpod is perfectly normal. The whole mass is a subcircular disk with a diameter of about 9 mm. and a height of 3.5-4 mm. The eggs are directed obliquely and diagonally upward through the mass which contains approximately ten eggs. These eggs are more or less fusiform and are buckthorn brown. The mucous mass that surrounds the eggs is light sudan brown and quite frothy, having a very strong resemblance to the material found in a mantid oötheca.

It is my hope that I may be able to continue the work started on these forms and that some knowledge of their life history may be obtained.

A Breeding Record for the Red-barred Sulphur (*Callidryas philea* Linn.) from Indiana (Lepid.: Pieridae).

During the last week of August, 1936, I was fly-fishing on Little Blue River in Union Township, Shelby County, Indiana, across the highway from Pitt's Playground. On a branch of the legume, wild senna, *Cassia marilandica*, which was bending over the water, I saw a golden-colored larva about fifty millimeters in length. The golden color was most conspicuous but there were some fine black lines running dorso-ventrally on the lateral surface of several segments. I carried the larva home on the branch for further observation. In the next few days it ate some small holes in the leaves and then formed a chrysalis. A short time later the adult emerged and was identified as *Callidryas philea*.

Seitz (1924) used the name of *Catopsilia philea* for this lepidopteron and states that it has been observed as a migrant in Illinois and that it is abundant from Texas to southern Brazil.

Holland (1931) points out that little is yet known of the early stages of this insect. He mentions that it occurs in Texas and has been found in Illinois as a straggler. It is abundant in Mexico, Central America, and southward.

Mrs. Kite (1934) says that this butterfly appeared at the Lake Taneycomo Region in the Missouri Ozarks on September 20, 1928 and also in October 1929.

LITERATURE CITED.

HOLLAND, W. J. 1931. The Butterfly Book, p. 289. Doubleday, Doran and Company, Inc., Garden City, New York.

KITE, MRS. R. B. 1934. Entomological News 45:36-39.

SEITZ, ADALBERT 1924. The Macrolepidoptera of the World. vol. 5, p. 86. Alfred Kernan Verlag, Stuttgart.

ROBERT H. COOPER, Ball State Teachers College, Muncie, Indiana.

Flashing of Fireflies

Flashing is the result of a rise and fall in the osmotic pressure of the photogenic cells. This phenomenon is under spontaneous cerebral control in the normal animal but can be imitated by injection of hypertonic solutions or by partial asphyxiation, thus producing a continuous glow.

MALOEUF in Annals, Entom. Soc. America, Sept., 1938.

Biological Abstracts.

In the NEWS for June, 1935, page 168, we made a plea for support adequate to insure the continuance of *Biological Abstracts* and we pointed out why the *Abstracts* are of such transcending importance to the investigator and the teacher in Biology. The struggle to secure that support has continued. It has seemed to those now in charge of the *Abstracts* that not only should subscriptions to each complete yearly volume continue to be sought, but also that provision be made for supplying to those who desire them parts of each volume at, of course, reduced rates. For the year 1939 five such parts are projected:

I. General Biology to include General Biology, Biography-History, Bibliography, Evolution, Cytology, Genetics, Biometry and Ecology; price \$4.00.

II. Experimental Animal Biology to include Animal Physiology, Nutrition, Pharmacology, Pathology, Anatomy, Embryology and Animal Production; price \$9.00.

III. Microbiology and Parasitology to include Immunology, Bacteriology, Viruses, Parasitology, Protozoology and Helminthology; price \$5.00.

IV. Plant Sciences to include Phytopathology, Plant Physiology, Plant Anatomy, Palaeobotany, Systematic Botany, Agronomy, Horticulture, Forestry, Pharmacognosy and Pharmaceutical Botany; price \$6.00.

V. Animal Sciences to include Palaeozoology, Parasitology, Protozoology, Helminthology, Systematic Zoology and Economic Entomology; price \$6.00.

The sum of the prices of the five parts is \$30.00, but subscribers to the complete volume will receive it for \$25.00.

The great advantages of *Biological Extracts* are still with the complete volume. The entomological part-subscriber will doubtless take Part V; so doing he will lose, at least, abstracts of many valuable articles on insect physiology and embryology included in Part II, on insect evolution, genetics and ecology for which he must look in Part I. A different grouping into parts may be devised for his needs. How far additional groupings may be desirable we do not pretend to know, but convinced as we now are and as we were in 1935 of the absolute necessity and prime importance of abstracts, the only satisfactory solution appears to us to be the complete volume. The expense to the individual may seem high, but it should have the first claim on his professional budget.

PHILIP P. CALVERT.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or preceding year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of *Entomological News* for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the *Entomological News* are not listed.

GENERAL.—Barnes, H. F.—Recent advances in Entomology. [Sci. Progr.] 33:117-123. Fullaway, D. T.—Orchid insects. [37] 10:43-49. Gould & Deay.—Notes on bionomics of roaches inhabiting homes. [Proc. Indiana Acad. Sci.] 47:281-284. Huang, S. M. Yekfa.—An abridged taxonomic catalogue of insects infesting stored grains and grain products. [Science, Sci. Soc., China] 22:165-179. Huxley, J.—Clines: an auxiliary taxonomic principle. [31] 143:219-220. Isely, F. B.—Survival value of Acridian protective coloration. [84] 19:370-389, ill. Knowlton, G. F.—Lizards in insect control. [43] 38:235-236. Malaise, R.—On the designation of genotypes by Fabricius. A response to McAtee. [28] 1938:99-106. Tarshis, M. S.—Surgical maggots in modern medicine. [76] 1938:252-257. Weiss, H. B.—Thomas Martyn's "English Entomologist." [6] 46:321-325. Paper from wasp's nests. [6] 46:244.

ANATOMY, PHYSIOLOGY, ETC.—Babers, F. H.—A septicemia of the southern army worm caused by *Bacillus cereus*. [7] 31:371-3. Bergmann, W.—The composition of ether extractives from the exuviae of the silkworm, *Bombyx mori*. [7] 31:315-321. Bradley & Arbuthnot.—The relation of the host physiology to development of the Braconid parasite, *Chelonus annulipes*. [7] 31:350-365, ill. Bushnell, R. J.—The relation of nutritional levels to the growth of populations of *Tribolium confusum*. I.—Growth of larval, pupal

and adult populations in cornmeal and cornmeal supplemented with yeast. [7] 31: 345-351, ill. **Emden, F. van.**—See under Coleoptera. **Evans, J. W.**—The morphology of the head of Homoptera. [Pap. & Proc. R. Soc. Tasmania] 1937: 1-20, ill. **Flanders, S. E.**—Cocoon formation in endoparasitic Chalcidoids. [7] 31: 167-180, ill. **Forbes, J.**—Anatomy and histology of the worker of *Camponotus herculeaneus pennsylvanicus* (Hym., Formicid.). [7] 31: 181-195, ill. **Frolova, S. L.**—Development of the giant salivary gland nuclei of *Drosophila*. [31] 141: 1014-1015, ill. **Gates, F. R.**—The structure of the chromosome. [J. R. Micro. Soc.] 58: 97-111. **Glancy & Howland.**—Transplantation of mutant and wild type bristle-bearing tissues in *Drosophila melanogaster*. [92] 75: 99-105, ill. **Goldschmidt, R.**—A note concerning the adaptation of geographic races of *Lymantria dispar* to the seasonal cycle in Japan. [90] 72: 385-386. **Haskins & Enzmann.**—See under Hymenoptera. **Haug, G. W.**—Mass egg production by the Coccinellid *Hippodamia convergens*. [7] 31: 366-369, ill. **Kowalczyk, A. A.**—A report on the intestinal protozoa of the larvae of the Japanese beetle. [Trans. Amer. Micr. Soc.] 57: 229-244, ill. **Maloef, N. S. R.**—The basis of the rhythmic flashing of the firefly. [7] 31: 374-380, ill. **Mattingly, H. E.**—The morphology of the alimentary tract of the blister beetle, *Epicauta pennsylvanica* (Coleo.: Meloid). [43] 38: 250-263, ill. **Pelton, J. F.**—The alimentary canal of the Aphid *Prociphilus tessalata*. [43] 38: 164-169, ill. **Quayle, H. J.**—The development of resistance to hydrocyanic gas in certain scale insects. [Hilgardia] 11: 183-210, ill. **Slack, H. D.**—Chromosome numbers in Cimex. [31] 142: 358. **Stiles, K. A.**—Intermediate-winged Aphids and the time-of-determination theory. [92] 74: 430-460, ill. **Trager & Subbarow.**—The chemical nature of growth factors by mosquito larvae. [92] 75: 75-84. **Vachon, M.**—Recherches anatomiques et biologiques sur la reproduction et la developpement des Pseudoscorpions. [3] (9 1: 1-207, ill. **Williams, I. W.**—The comparative morphology of the mouthparts of the order Coleoptera treated from the standpoint of phylogeny. [6] 46: 245-289, ill. **Woodworth, C. E.**—The reaction of wireworms to arsenicals. [47] 57: 229-238.

ARACHNIDA AND MYRIOPODA.—Ewing, H. E.—A key to the gen. of chiggers (mite larvae of the subfamily Trombiculinae) with descriptions of n. gen. & spp. [91] 28: 288-295. **Herman, C. M.**—Occurrence of larval and

nymphal stages of the rabbit tick, *Haemaphysalis leporis-palustris*, on wild birds from Cape Cod. [19] 33: 133-134. **Hilton, W. A.**—A new Symphylan from near Death Valley. [13] 30: 68-69, ill. **Jacot, A. P.**—More primitive moss-mites from North Carolina, III. [J. Elisha Mitchell Sci. Soc.] 54: 127-137, ill. (*). **Larson & Green.**—See under Hymenoptera. **de Mello-Leitao, C.**—Algunas Aranas nuevas. [Rev. Mus. Lat Plata] 1, Zool.: 89-118, ill. (S*). **de Mello-Leitao, C.**—Consideracoes sobre os Phalangodoidea com descricao de novas formas. [15] 10: 135-145, ill. **Remy, P.**—Die Eurauropodidae (Myriapoda: Paurapoda) des Naturhistorischens Museum zu Wien. [Verh. Zool.-Bot. Ges. Wien] 86-87: 1-34, ill. (k). **Verhoeff, K. W.**—Über einige Amerikanische Myriapoden. [34] 122: 269-284, ill. (k*). Über einige Chilopoden des Zoologischen Museum in Munchen. [34] 123: 123-130. (S*).

THE SMALLER ORDERS OF INSECTS.—**Banks, N.**—Antillean Ascalaphidae. [J. Dept. Agr. Univ. Puerto Rico] 22: 177-180, ill. (k*). **Cowley & Gloyd.**—Redescription of the types of *Protonneura tenuis* and a study of variation in this species. [114] no. 378, 18 pp., ill. **Hilton, W. A.**—Nervous system & sense organs, LXXV.—Trichoptera. [13] 30: 70. **Kennedy, C. H.**—*Palaemnema picicaudata*, *P. abbreviata*, & *P. brucei*, new dragonflies from Ecuador, with notes on other *Palaemnemas* (Odonata: Platystictidae). [7] 31: 249-266. **Klingstedt, H.**—A taxonomical study of the gen. *Cyrnus* including the description of a n. sp. with some remarks on the principles of taxonomy. [Act. Soc. Faun. & Flor. Fenn.] 60: 573-598, ill. **Lestage, J. A.**—Contribution à l'étude des Éphéméroptères, XVII.—La dispersion holarctique éphéméroptérienne. [33] 78: 246-249. **Milne & Milne.**—The Aretopsychidae of continental America north of Mexico (Trichoptera). [19] 33: 97-110, ill., (k). **Ricker, W. E.**—A new stonefly from Baffin Land (Plecoptera: Capniidae). [4] 70: 173-174, ill. **Sakimura, K.**—Thysanoptera of Kauai with notes on the incidence of yellow spot on wild host plants. [37] 10: 167-173, ill. **Schmidt, E.**—Check-list of Odonata of Oceania. [7] 31: 322-344.

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Stated Meetings of The American Entomological Society will be held at 8.00 P. M., in 1938, on the fourth Thursday of each month excepting June, July, August, November and December, and on the third Thursday of November and December.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

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Descriptions of some new forms of *Pseudolucanus capreolus*. (Coleoptera: Lucanidae).

By BERNARD BENESH, North Chicago, Illinois.

PSEUDOLUCANUS CAPREOLUS (L.).

1764. *Scarabacus capreolus* L., Museum Ludovicae Ulricaе, p. 32.

A recent examination of some preserved specimens of our common stag beetle, *Pseudolucanus capreolus* (L.), disclosed two examples which are worthy of record. Taken in company with 120 others having typical mandibular characters, on my annual trips in 1935 and 1936 to Deer Lodge, Morgan County, Tennessee, they were believed, at the moment of discovery, to be a hitherto undescribed form or perhaps a new species. To settle this question to my satisfaction, the specimens were sent to Dr. E. A. Chapin, Curator of Insects, U. S. National Museum, for inspection, who, on returning the two examples, submitted additional material for reference from the National Collection, recommending their description. I am under deep obligation to Dr. Chapin, for the kindly loan of the material in the National Collection, and thank him heartily for the opportunity to figure and describe the possible variations which we may encounter in our stag beetles.

All the examples, that is, the two males in my own cabinet and four males from the National Collection, are of intermediate size, ranging from 19.75 to 23.5 millimeters. In comparison with a magnificent male of 39 mm., the six forms appear to be mere dwarfs. They differ to a great extent in mandibular dentition; the typical male is designated as Form *A*, and there is even an edentate phase, which is, however, not the smallest individual as could be surmised, but compares favorably as to size with the other multidentate forms, which, it appears, are relatively uncommon in occurrence.

As is well known, the constant form of this species is equipped with symmetrical mandibles, esplanate dorsally, armed internally with a single obtuse, slightly subdorsal tooth, the position of which varies from the apical third to the middle of the mandible. In the specimens before me, these subdorsal teeth are not so well developed, being represented by a simple conical denticle, or, in one instance entirely lacking. For convenience, the subdorsal tooth is called *upper*, and the additional teeth noted, *lower*; they vary in size and position, as indicated in the subjoined descriptions.

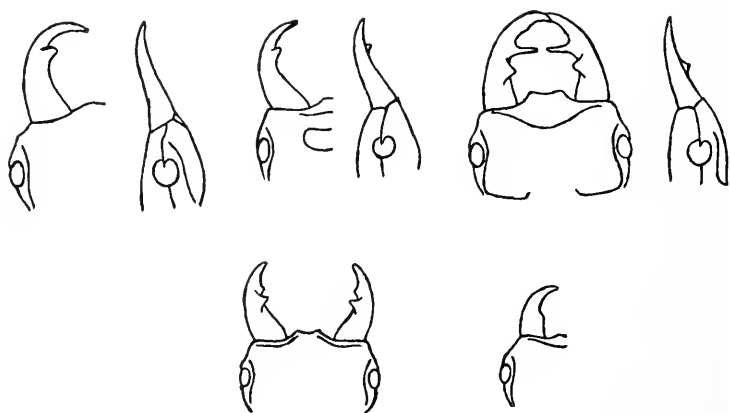


Fig. 1

Fig. 2
Fig. 4Fig. 3
Fig. 5

Forms of *Pseudolucanus capreolus* (L.). Fig. 1, Form A, typical; 2, *nigricephalus* ab. nov.; 3, Form C; 4, Form D; 5, Form *muticus* (Thunberg.).

FORM A. FIG. 1.

Typical male of the largest development in my possession, purposely selected for illustration, measures 39 mm. with mandibles. Dark chestnut, shining. Mandibles strongly incurved, esplanate dorsally, with a distinct subdorsal (*upper*) tooth, not visible when viewed from the side (fig. 1).

No(rthern) ILL(INOIS). 22-VI-30. Collected by B. Benesh, near Libertyville, in a deciduous forest with beeches predominating, at dusk. Accession No. 649.

PSEUDOLUCANUS CAPREOLUS nigricephalus ab. nov. FIG. 2.

A distinct new form, readily distinguishable by its coloration and nearly erect mandibular subdorsal tooth, readily seen when viewed laterally; 34 mm. long, highly polished, shining. Head and pronotum entirely black, the latter becoming gradually lighter in shade towards the base, where it matches the dark chocolate-brown elytra. Head nearly destitute of the semi-circular occipital carinae present in Form *A*, sloping gently from the vertex to front, with a frontal, transverse kidney-shaped depression, between and on line with the eyes. Mandibles not so strongly curved at apex as in the preceding form, more cylindrical, with the subdorsal tooth more elevated, and exposed to view from the side (fig. 2). Venter and legs distinctly concolorous (dark chestnut).

Type: 1 ♂ No (rthern) ILL(INOIS). 10-VI-28. Taken at Beach (now Dunes Park) by the writer and in his collection No. 653. Another example of this distinct aberrant is preserved in the collection of Mr. J. W. Angell, New York, which I have had the privilege to examine during my brief visit to that metropolis in 1932.

FORM C. FIG. 3.

Multidentate, cherry-red, 23.25 mm. long. Mandibles symmetrical, uniformly curved from base to apex, cylindrical, more coarsely punctuate than in the preceding two forms. Subdorsal (upper) tooth indicated by a conical denticle and, anterior to this, a lateral (slightly lower) acute prong pointing at a right angle inwards (fig. 3). Legs reddish-yellow.

Type: 1 ♂, Deer Lodge, TENNESSEE, June 1936. B. Benesh, collector and in his collection No. 4346.

FORM D. FIG. 4.

Multidentate, dark chocolate-brown (possibly discolored in the preserving fluid), 22.5 mm. long. Mandibles symmetrical, with the upper tooth present as a conical tubercle which is bigger than the lower and feebly indicated anterior tooth (fig. 4). Legs obscurely reddish.

Type: 1 ♂, Deer Lodge, TENNESSEE, June 1935. B. Benesh, collector and in his cabinet No. 4347.

FORM E.

Similar to preceding form, 23.5 mm. long. Both the acute lower and the blunt upper tooth are present, one above the

other, as very feebly developed protuberances.

Type: 1 ♂, Mt. Airy, P(ENNSYLVANIA). Coll. P. Laurent, Geo. M. Greene collection, U. S. N. M.

FORM F.

Each mandible has the acute lower tooth as a small denticle; basally from this tooth a second not so well developed; blunt upper tooth lacking on both mandibles. Length 20 mm.

Type: 1 ♂, Nashville, TENN(ESSEE), 11-23, Osborn. Wickham Collection 1933, U. S. N. M.

FORM G.

Left mandible with an acute lower tooth moderately well developed, the right mandible with the acute lower tooth developed only as a small denticle, the normal blunt upper tooth lacking on both. 19.75 mm. long.

Type: 1 ♂, Gipsy Moth Lab., July 8, 1910. At arc lights. Wilmington, MASS(ACHUSETTS). 1910. U. S. N. M.

PSEUDOLUCANUS CAPREOLUS form MUTICUS (Thunb.). FIG. 5.

Edentate form, to which Thunberg¹ applied the name *muticus*, 23 mm. long, fig. 5. Mandibles nearly straight for two-thirds their length, thence gently curved to apex; broad to about the middle, suddenly tapered to a point; no trace of either tooth on either mandible.

1 ♂, Plummers Island, M(ARYLAND). 1. 7. 19. Schwarz and Barber Collection. U. S. N. M. Several others, not as yet pinned, from Deer Lodge, Tenn., in the writer's possession.

It is interesting to note that, out of the five multidentate specimens, three are from the State of Tennessee. In some quarters, especially continental Europe, these would be considered as "Uebergänge," "Brücken" or "Geographische Rassen." However, this interpretation is unacceptable, in view of the two specimens taken at some distance from Tennessee, i. e., in Massachusetts and Pennsylvania. These specimens lend support to my statement² that certain forms, thus far described as subspecies or regional races, will, at some time, be taken throughout the range of a species and lead us to deny to these so-called subspecies or geographical races the status bestowed upon them.

¹ THUNBERG, C. P. *Lucani Monographia*, Mem. Soc. Nat., Moscow, I. p. 198 (1806).

² BENESH, B. Some notes on Boreal American Dorcinae. *Trans. Amer. Ent. Soc.* LXIII, p. 14 (1937).

An Annotated List of The Butterflies of Nebraska (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

(Continued from page 218)

76. *AGLAIS J. ALBUM* (Bdv. and Lec.). A dozen specimens taken in War Bonnet and Monroe canyons, Sioux County in July, 1917, and many more seen. One pupa found on black birch July 20, which gave forth its butterfly July 24.

77. *A. MILBERTI* (Godt.). Not rare in Sioux County in late June. Has not been recorded from other parts of the state.

78. *A. ANTIOPA* (L.). Found wherever elm or willow grows; two broods, latter half of June and middle of August, the latter hibernating.

79. *CYNTHIA ATALANTA* (L.). Very common over the entire state; at least two broods, for it is on the wing from April to October.

80. *C. VIRGINIENSIS* (Dru.). Found everywhere in the state. Common in most years but rare in others. Flies from May to October.

81. *C. CARDUI* (L.). Found everywhere in the state, and usually common; several broods.

82. *JUNONIA COENIA* Hbn. Fairly common, at least in the eastern part of the state; two broods, June and August.

83. *BASILARCHIA ARTHEMIS* (Dru.) race *ASTYANAX* (Fabr.). Common in the eastern part of the state. Two broods, June and August. Specimens of forms *viridis*, *inornata*, and *purpuratus* have been taken at Omaha.

84. *B. WEIDEMEYERII* (Edw.). Very abundant in the canyons of Sioux County in June; also 1 specimen Belmont, May 13, 1890 (Coll. Univ. Nebr.). Just where in the state this species replaces the preceding is not, at present, known.

85. *B. ARCHIPPUS* (Cram.). Common. Has been taken in all parts of the state; two broods, June and August. Specimens with the median black line on secondaries obsolescent, ab. *lanthanis* Cook and Watson, are occasionally found.

86. *CELTIPHAGA CELTIS* (Bdv. and Lec.). Fairly common; typical in the eastern part of the state, but undergoing a change as we go westward. Sioux County specimens are extremely large, and the majority of them have two ocelli on primaries; they vary in ground color from pale grey and dark grey to a decided red-fulvous. This race is nearest to the form which Holland figures as *montis* (Edw.) but which, according to my

understanding is not true *montis*. Specimens from the central part of the state are intermediate.

C. *CELTIS* ab. *INORNATA* (Wolc.). An extremely interesting aberrant individual was taken near Ashland June 14, 1913 (Wolcott) in which the median band of white spots on forewing is wanting, and the markings on upper side of hind wings are obliterated, giving the insect a strange appearance. This ab. was described and figured in Ent. News, March, 1916, by Dr. Wolcott. Type, now in the writers' collection.

87. C. *CLYTON* (Bdv. and Lec.). Found at Omaha and vicinity where it is quite plentiful. Single brooded, but butterflies emerge over an extended period. The earliest emerging ones are mostly *clyton clyton*, while the later ones are mostly form *proserpina* (Scud.). From one laying of eggs there was produced every gradation from *clyton clyton* to *clyton proserpina*.

88. *ANAEA ANDRIA* (Scud.). Common at Lincoln, Meadow and Oconto; less so at Omaha. Has also been at Cedar Bluffs and Mitchell (Dawson). Flies in October, hibernates and flies again in the spring.

89. *LIBYTHEA BACHMANI* (Kirt.). Not common. Occasionally met with at Omaha and Lincoln, and has been taken at Kearney (Black) and Mitchell (Dawson). On October 20, 1916, Dawson observed a great number at Mitchell, apparently migrating.

90. *STRYMON MELINUS* (Hbn.). Fairly common as a rule. Has been taken in every month from May to October, and clear across the state from Omaha to Harrison.

91. *S. ACADICA* (Edw.). This also has been taken in the eastern, middle and western part of the state. Common at Harrison and Oconto. Flies in July.

92. *S. TITUS* (Fabr.). This also is restricted to certain localities, but has been found entirely across the state. Flies in July and is fond of the flowers of butterfly weed (*Asclepias tuberosa*).

93. *S. EDWARDSII* (Saund.). Found, so far, only at Omaha, where it was extremely rare until July, 1929, when it appeared in large numbers in one locality having a growth of young scrub oak and butterfly weed, and it has been found there in abundance every year since.

94. *S. CALANUS* (Hbn.). Found in restricted localities in various parts of the state. In these localities it is sometimes found in numbers. Omaha, Lincoln, Rulo and Bazile Mills. Middle of June to middle of July.

95. *S. LIPAROPS* (Bdv. and Lec.) race *STRIGOSA* (Harr.). Rare. Specimens from Sioux County; also 1 from West Point. (Coll. Univ. Nebr.); 1 from Bazile Mill's June 17, 1918 (Shoemaker) and 1 from Wauneta June 21, 1933.

96. *MITOURA SIVA* (Edw.). A single specimen on cedar, in Bull Canyon, Banner County, June 2, 1919. As the slopes of this canyon abound in cedars, *siva* may be expected to be established here, but the day I visited this region was most unfavorable for collecting — cloudy, with temperature near freezing.

97. *INCISALIA HENRICI* (G. & R.). Found in numbers in a draw or ravine near Omaha, April 17, 18, 24, and May 8, 1915. In the following year a single specimen was found in the same locality but none have been found since although diligently searched for year after year.

98. *I. ERYPHON* (Bdv.). Common in Sioux County in late May and early June. With respect to the band on under side of forewings, as well as other characters, the Sioux County form appears to be intermediate between eastern *niphon* and western *eryphon* but most of the specimens are closer to the latter.

99. *FENISECA TARQUINIUS* (Fabr.). Rare. Several specimens taken in various localities in and about Omaha; also one specimen at Lincoln. One full grown larva found at Omaha, July 26, 1913, among a colony of woolly plant lice reared to imago August 4.

100. *LYCAENA DIONE* (Scud.). Common. Found everywhere in the state where bitter dock grows. Single brooded. Latter part of June.

101. *L. THOE* (Guer.). Common. Extends at least as far west as Kearney and Oconto. Frequents moist area where knot weed grows. Double brooded, June and August. The species shows a tendency toward fusion of spots, to examples of which Gunder has given the name tr. f. *revutti*.

102. *L. HELLOIDES* (Bdv.). Not found in the eastern part of the state but quite common in Cherry County and further west. At least two broods: first early June, second after the middle of July.

103. *L. HYPOPILAEAS* (Bdv.). Rare. Present at Omaha in fair numbers, in a meadow well sprinkled with white clover, in the years 1915 and 1916, since which time, however, it has been met with only once or twice.

104. *L. RUBIDUS* (Behr) race *sirius* (Edw.). Common in the western part of the state. Taken in large numbers at Harrison the latter half of June, 1917, on lupine. Spotting on

under side of hind wing is variable, very distinct in some specimens and only faintly indicated in others.

105. *LEPTOTES MARINA* (Reak.). Although apparently a long ways from home, fresh specimens of this species have been taken both at Omaha and Lincoln. Omaha June 25, 1914; September 3, 7, 16, 17, October 7, 1916; Lincoln October 7, 1918.

106. *BREPHIDIUM EXILIS* (Bdv.). Another California species which occasionally makes its appearance in Nebraska. 1 specimen, Lincoln August 10, 1901 (J. C. Crawford); 1, Lincoln, July 11, 1920 (R. W. Dawson); 1, Plattsmouth, September 16, 1931 (Leussler).

107. *HEMIARGUS ISOLA* (Reak.). Not uncommon and found everywhere in the state. On the wing from May to October; most numerous in September.

108. *EVERES COMYNTAS* (Godt.). Exceedingly common in the eastern half of the state; quite variable, the males of the summer brood having a much broader black border than those of the earlier brood.

E. COMYNTAS race *HERII* (Grin.). Sioux County specimens match well with specimens from Arizona.

109. *PLEBEJUS MELISSA* (Edw.). Extremely common in the western part of the state but growing less so as we go eastward, until at Lincoln it is very rare, and at Omaha I have taken but a single specimen (September 14, 1918), the only one seen in 28 years collecting there. Double brooded June and August.

110. *P. ICARIOIDES* race *LYCEA* (Edw.). Extremely common in Sioux County where long series have been collected in June and July. Quite variable in size, shade of blue and width of black border. The under side is more constant. Not recorded from elsewhere in the state.

111. *P. SHASTA* (Edw.). race *MINNEHAHA* (Scud.). Apparently rare. 1 male and 1 female, Sioux County, June 21, 1890. (Coll. Univ. Nebr.); 1 male, Sioux County, June 21, 1911 and several of both sexes same locality July 14, 1917 (Leussler).

112. *P. ACMON* (West and Hew.). Specimens from the following localities: Clear Lake, Cherry County; Harrisburg, Banner County; Harrison, Sioux County. Double brooded. June and August. These should perhaps be referred to *lupini* (Bdv.). The dark marginal border is broad and not clearly defined, and the orange band on secondaries is composed of more or less separated spots rather than a continuous band,

113. PHAEDROTES PIASUS (Bdv.). race *daunia* (Edw.). Found in Sioux County, in June, but not very common.

114. GLAUCOPSYCHE LYGDAMUS (Dblly.) race *ORO* (Scud.). The range of this species in the state is restricted to the extreme western part. Dr. Wolcott and I found it abundant near Harrisburg, May 30, 1919 and have also taken it in Sioux County in June.

115. LYCAENOPSIS PSEUDARGIOLUS (Bdv. and Lec.). The spring form of this species is one of the earliest butterflies, appearing about the middle of April; fairly common in eastern part of the state. Very rarely a specimen is met with approaching form *marginata* (Edw.).

L. PSEUDARGIOLUS gen. aest. NEGLECTA (Edw.). This summer form is more abundant than the spring form; often found in large numbers in June and July and again in August. There is considerable variation in size of individuals of the summer brood.

116. EPARGYREUS TITYRUS (Fabr.). Common everywhere in the state; On the wing from May to October. Larvae on wistaria, locust and rose acacia.

117. THORYBES PYLADES (Scud.). Rather common in open spaces in or near woods, in June and July. Found from the eastern to the western state boundary.

118. T. DAUNUS (Cram.). Less common than the preceding though as widely distributed. Has been taken as early as May 8, and as late as September 5, and in every month between.

119. PYRGUS SCRIPTURA (Bdv.). Rare. A single specimen, Prairie Dog Creek, near Harrison, Sioux County, June 29, 1911 (Wolcott).

120. P. TESSELLATA (Scud.). One of our very common skippers; on the wing everywhere from May till late in October.

121. PHOLISORA CATULLUS (Fabr.). Very common everywhere; and, like the preceding species, on the wing from May to October.

122. P. HAYHURSTII (Edw.). Not nearly as common as *catullus* and far more local. Specimens from Omaha, Cedar Bluffs and Roca. Two broods, latter part of May and Middle of July.

123. ERYNNIS BRIZO (Bdv. and Lec.). Rare. A few specimens taken at Omaha and Weeping Water. Earliest capture April 23, latest May 15.

124. E. PERSIUS (Scud.). Common. Two broods; first

very end of April, second middle of August. Individuals of the later brood average larger than those of the earlier brood. Specimens from various points in eastern half of state.

E. PERSIUS race AFRANIUS (Lint.). Fairly common in Sioux County late in May and early June. Small race, hoary gray on upper surface, with distinct light fulvous spots on hind wings.

E. PERSIUS race LUCILIUS (Scud. and Burg.). Rare. Occasional specimens taken at Omaha match up well with specimens from Great Notch, N. J.

125. E. MARTIALIS (Scud.). Fairly common in one piece of native prairie land on the outskirts of Omaha, the latter half of July; also found, though far less common, in the first half of May. Specimens also from the sand hills near Halsey. Apparently very local.

126. E. JUVENALIS (Fabr.). Common and distribution general. Double brooded; the first brood, latter part of April and early part of May being by far the more numerous.

127. E. HORATIUS (Scud. and Burg.). Less common than *persius* and *juvenalis*. Early May and again in late summer. Omaha, Cedar Bluffs and Nebraska City.

128. E. FUNERALIS (Scud. and Burg.). Rare. 1 specimen, Cedar Bluffs, May 30, 1913 (Wolcott) and 1, Fremont, May 30, 1921 (Leussler).

129. ANCLOXYPHA NUMITOR (Fabr.). Very common in grasses around small streams; appears about June 1 and is present then throughout the summer. Omaha, Roca, Valley.

130. OARISMA GARITA (Reak.). Quite common near Harrison in late June. Frequents moist grassy spots and is probably to be found elsewhere in the western part of the state also. Specimens are somewhat larger than those from Colorado and Arizona.

131. CHAEREPHON RHESUS (Edw.). A single specimen taken in Sioux County by Merritt Cary in May, and now in the Collection of the University of Nebraska.

132. C. SIMIUS (Edw.). Fairly common in Sioux County where a number of specimens were taken in the latter part of June, 1911, and a larger number in July, 1917. It has a curious habit of settling deep down on the flower heads of white thistle with wings folded tightly back, in which position it greatly resembles the tuft of the flower and is easy to approach.

133. HESPERIA UNCAS (Edw.). Not uncommon in the western part of the state. I have taken it at Valentine, Benkleman and Harrison. Flies in June and July.

(To be continued)

The Egg-laying and Early Stages of the Robber Fly, *Erax aestuans*. (Diptera: Asilidae).

By EDWARD G. REINHARD, University of Scranton.

During August, 1932, while vacationing at Winthrop Harbor in northeastern Illinois, I became interested in observing the egg-laying habits of a common robber fly, later determined by Mr. C. T. Greene of the U. S. Bureau of Entomology as *Erax aestuans* L. These flies attracted attention because of their curious partiality for the fruiting spikes of the self-heal, *Brunella vulgaris*, a very common plant in the vicinity, which they used as shelters for their eggs. Since the behavior of the Asilidae has been a neglected field of study in American entomology the following observations, though scanty, seem worthy of record.

I first noticed females engaged in oviposition on August 8th and saw the flies *in copula* on the same day. There is no reason to suppose, however, that this was the very beginning of the mating season, since eggs were collected on August 9th from which the larvae had already hatched. Thereafter, for a period of ten days, whenever the weather was clear and warm, females could be found in abundance probing with their ovipositors the dried heads of *Brunella* or rarely of some other plant. When the capsules were examined after a fly had been at work they usually showed a clutch of eggs deposited on top of the seeds.

On the day following my initial observation it rained, and this proved a fortunate occurrence for it taught me a simple method for finding the eggs. When the fruiting spikes of *Brunella* are moistened the individual capsules stand out at right angles to the main stem and their lips open widely so that one can easily see what is within. Instead of prying each capsule apart to find the one containing *Erax* eggs, as must be done when the spikes are dry, it is only necessary to dip the spikes in water for a moment. Then, thanks to hygroscopic unfolding movements, the capsules gape open and reveal their contents to a quick glance of inspection.

By this method quite a number of egg masses were found in spikes collected purely at random. It also demonstrated what a haven these seed pods were for various small arthropods seeking seclusion. Spiders, mites, a sleeping little wasp, cocoons of *Chrysope*, and pupae of microlepidoptera were some of the occupants that found shelter there.

A single capsule of *Brunella* may contain as many as ninety eggs of *Erax aestuans*, although the average number of eggs per cluster amounted to about forty. When the flies oviposited in *Achillea*, *Rudbeckia*, or *Verbascum* heads, as occasionally happened, the available space limited the eggs to a single one per crevice, or to small clusters of four to ten.

The eggs of this species of robber fly measures approximately 0.8 mm. x 0.25 mm. The shell is rather tough, does not lose its shape after the embryo has hatched, and bears a fine granular network, presumably the imprint of the chorion-secreting cells.

Eight freshly-laid egg masses, totalling 440 eggs, were placed in gelatine capsules and kept under observation to determine the incubation period. Hatching began on the seventh to ninth day after laying and continued for each cluster over a period of three or four days. Movement could be detected within the egg two days before hatching. The larva is doubled up within the shell, head touching tail. By a forward thrust of its hooked head the larva ruptures the shell, then slides in and out the opening to enlarge it, and finally squeezes through head first and crawls away.

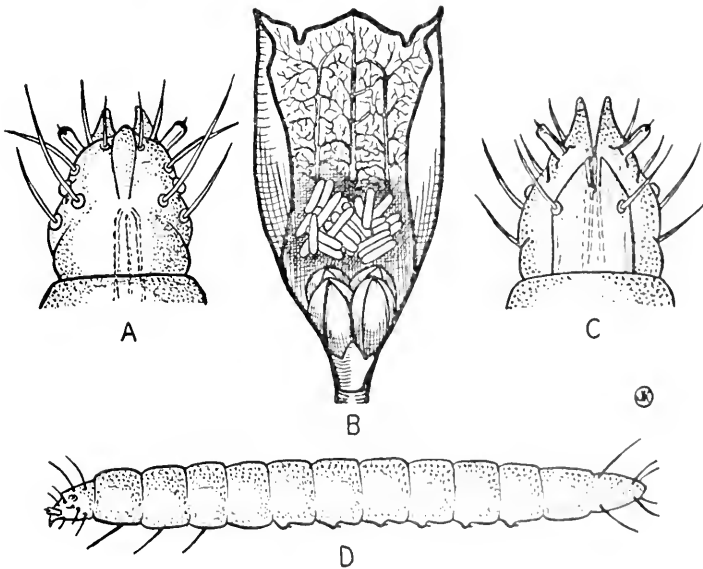
The young larva can cling with its posterior extremity and when crawling leaves a moist trail. Apparently it excretes from the anal region a fluid that assists the larva in holding on to objects over which it creeps.

Several newly-hatched larvae were placed on *Brunella* spikes to determine how they would descend to earth. All simply fell off when they eventually reached an extremity. Larvae put on the surface of a can of loose earth penetrated to the bottom, but a batch of newly hatched larvae placed on the hard packed soil outdoors failed to penetrate and were found the next day

still alive but lying where they had been placed.

On the assumption that *Erax* larvae are predaceous on white grubs, as several writers have stated, I tried to feed my maggots by providing them with small *Lachnosterna* grubs. Not one attached itself to the grubs; instead the maggots died but the grubs survived. An attempt to feed them on ant larvae also proved unsuccessful. Much digging in the vicinity of the robber fly nesting sites failed to produce asilid larvae, and, vacation days having come to an end, I was forced to leave Winthrop Harbor without carrying the life history of *Erax aestuans* any farther. Later, I had an opportunity to read D. Melin's thorough work "Biology of the Swedish Asilids" (Zoologiska Bidrag fran Uppsala, 8:1-317, 1923) and learned there that despite common belief asilid larvae are not carnivorous as a rule but feed on vegetable substances of a solid nature.

The chief structural features of the first larval instar of *Erax aestuans* are illustrated in the accompanying figures.



Eggs and first instar larva of *Erax aestuans* L. A. Dorsal view of head of larva, X 150. B. Capsule of *Brunella vulgaris* opened to show eggs lying in cavity above the seeds, X 7. C. Ventral view of head of larva, X 150. D. Lateral view of larva, X 40.

Notes on Utah Plecoptera and Trichoptera¹.

By G. F. KNOWLTON and F. C. HARMSTON².

Stone flies and caddis flies form an important source of fish food in most western lakes and streams. Incomplete knowledge of the species present and their distribution in Utah led to the following report.³

PLECOPTERA—STONEFLIES.

- ACRONEURIA PACIFICA* Banks. Brigham Canyon, June 18, 1937; Duchesne; Logan; Mantua; Roosevelt, March 21, 1937; Sevier; Trout Creek (E. Gardner). Also at Lamezella Canyon, New Mexico (H. B. Stafford) and Yellowstone National Park, Wyoming.
- ALLOPERLA COLORADENSIS* (Bks.). Big Cottonwood Canyon, June 15, 1937; Logan.
- CAPNIA COLUMBIANA* Clsn. Logan, March and May, 1937; Logan Canyon, April, 1937.
- C. ELONGATA* Clsn. Logan Canyon, April 14, 1937.
- C. NANA* Clsn. Northern Utah.
- DICTYOPTERYGELLA KNOWLTONI* Frison. Logan, June 23, 1929.
- EUCAPNOPSIS BREVICAUDA* Clsn. Big Cottonwood Canyon, April 24, 1937; Brigham Canyon; Logan Canyon.
- ISOPERLA FULVA* Clsn. Blacksmith Fork Canyon, May 4, 1937; Logan Canyon (C. F. Smith); Ogden Canyon; Weber Canyon.
- I. PETERSONI* Clsn. Logan, October 5, 1937; Logan Canyon (D. E. Hardy).
- LEUCTRA BRADLEYI* Clsn. Provo Canyon, April 10, 1917.
- NEMOURA CALIFORNICA* Clsn. Roosevelt, June 16, 1935.
- N. CINCTIPES* Banks. Brigham Canyon, May 1, 1937; Logan; Salt Lake City; Sunset; Wellsville.
- N. GLABRA* Clsn. Brigham Canyon, March 29, 1937; City Creek Canyon; Logan Canyon; Mantua; Morgan; Salt Lake City.
- N. LOBATA* Frison. Logan and Logan Canyon, October, 1937 (L. L. Hansen).
- PERLODES AMERICANA* (Klap.). Logan Canyon, April 20, 1937.

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

²Associate entomologist and research assistant, respectively.

³The writers are indebted to Drs. T. H. Frison and H. H. Ross for the identification of most of the material recorded. Unless otherwise indicated, collections were made in Utah and by one or both of the writers.

- PERLOMYIA UTAHENSIS* N. & C. Brigham Canyon, April 24, 1937.
- PTERONARCELLA BADIA* Hag. Blacksmith Fork Canyon, July 9, 1937; Fruitland, September 17, 1936; Logan, (W. P. Nye); Strawberry Valley, May 2, 1935; Whiterocks.
- PTERONARCYS CALIFORNICA* Newport. Big Cottonwood Canyon, June 27, 1937; Blacksmith Fork Canyon; Logan (R. E. Nye); Ouray; Salt Lake City; Sevier; Springville; Uinta Mountains.
- P. PRINCEPS* Banks. Logan, July 23, 1929; Trout Creek (J. A. Rowe & W. L. Thomas).
- SIALIS CORNUTA* Ross. Fruitland, March 30, 1937; Red Creek.
- TAENIOPTERYX NIGRIPENNIS* Bks. Blacksmith Fork Canyon, May 4, 1937; Brigham Canyon; City Creek Canyon; Farmington; Mantua; Ogden; Weber Canyon.
- T. OCCIDENTALIS* Bks. Logan Canyon, March 14, 1937.
- TRICHOPTERA—CADDIS FLIES.
- AGAPETUS DEBILIS* Ross. Logan Canyon, August 29, 1937 (W. P. Nye).
- ARCTOPSYCHE GRANDIS* Banks. Logan, May 30, 1937; Spanish Fork, July 9, 1937 (Knowlton-H. E. Dorst). Also at Riverdale, Idaho, July 17, 1937 (C. F. Smith-Harmston).
- ASYNARCHUS CENTRALIS* (Bks.). Logan Canyon, August 1, 1937 (Smith-Harmston).
- BRACHYCENTRUS ASPILUS* Ross. Logan, August 8, 1937; Logan Canyon, July 25, 1937.
- B. OCCIDENTALIS* Bks. Blacksmith Fork Canyon, May 4, 1937; Logan, May 1, 1937; Logan Canyon, May 8, 1937 (Nye).
- CHEUMATOPSYCHE COMPYLA* Ross. Currant Creek, June 30, 1937.
- C. PETTITI* Bks. Logan Canyon, July 25, 1937; Wellsville, May 1, 1937.
- CHIMARRIA UTAHENSIS* Ross. Gandy, September 26, 1936 (C. J. Sorenson).
- DISCOSMOECUS ATRIPES* (Hagen). Logan, September 13, 1936.
- D. UNICOLOR* Bks. Logan, August 28, 1937.
- DOLOPHILUS GABRIELLA* Bks. Logan, September 28, 1937.
- GLOSSOSOMA ALASCENSE* Bks. Mantua, May 1, 1937.
- G. VERDONA* Ross. Big Cottonwood Canyon, April 24, 1937; Kaneshville, May 15, 1937; Logan Canyon, April 20, 1937.
- GLYPHOSYCHE ORMIAE* Ross. Logan, November 3, 1934 (C. F. Smith); Smithfield, October 20, 1936 (H. F. Thornley).
- G. SUBBOREALIS* Bks. Logan, October 3, 1933 (T. O. Thatcher).

- HESPEROPHYLAX CONSIMILIS Bks. Northern Utah, 1937.
- H. MAGNUS Bks. Logan, August 14, 1937 (K.-Nye); Manila, August 11, 1937; Monticello, September 4, 1937.
- H. OCCIDENTALIS Bks. Brigham, April 24, 1937; Logan, September 6, 1937 (K.-Nye); Ogden Canyon, June 21, 1937 (K.-Smith).
- HYDROPSYCHE CALIFORNICUS Bks. Logan Canyon, October 5, 1937 (D. E. Hardy).
- H. COCKERELLI Bks. Blacksmith Fork Canyon, June 20, 1937 (Smith-Harmston); Ogden, August 18, 1937; Weber Canyon, June 10, 1937 (C. J. Davis).
- H. OCCIDENTALIS Bks. Logan, August 14, 1937; Ogden Canyon, June 21, 1937 (K.-Hardy); Spanish Fork, July 19, 1937 (K.-Dorst); Weber Canyon, August 18, 1937.
- H. OSLARI Bks. Logan, August 16, 1937; Logan Canyon, July 25, 1937.
- LEPIDOSTOMA KNOWLTONI Ross. Clinton, June 21, 1936.
- L. PLUVIALIS (Milne). Logan, July 29, 1937; Logan Canyon, July 4, 1937 (Smith-Harmston).
- L. UNICOLOR Bks. Logan, August 9, 1937.
- LIMNAPHILUS EXTERNUS Hagen. Logan, August 20, 1937; Strawberry Valley, August 10, 1933 (E. W. Anthon).
- L. PRODUCTUS Hagen. Logan, August 14, 1937 (K.-Nye); Spanish Fork, August 17, 1937.
- L. TALOGA Ross. Indian Writings, San Rafael, September 11, 1937 (W. P. Nye).
- L. THORUS Ross. Blue Creek, August 28, 1934 (Smith).
- MACRONEMA ZEBRATUM Hagen. Roosevelt, August 14, 1937.
- OECETIS INCONSPICUA (Walker). Daniel's Canyon, June 30, 1937; Delta, August 18, 1937.
- OLIGOPHLEBODES MINUTA Bks. Brigham Canyon, June 27, 1937 (G. F. & M. W. Knowlton); Currant Creek, June, 1937; Smithfield, July 11, 1937 (Smith & Harmston).
- PHILOPTAMUS AEQUALIS Bks. Logan, July 5, 1937 (G. F. & M. W. Knowlton).
- RHYACOPHILA BASALIS Bks. Logan Canyon, July 4, 1937 (Smith-Harmston).
- R. VERRULA Milne. Logan, October 2, 1937 (R. E. Nye).
- TRIAENODES TARDA Milne. Logan, August 29, 1937.

Migration of Monarch Butterflies (Lepid.: Danaidae).

By CHARLES A. EVANS, M.D., Department of Bacteriology,
University of Minnesota, Minneapolis.

In his monograph on the "Migration of Butterflies," Williams¹ devotes an entire chapter to the Monarch (*Danaida plexippus*). By collecting and correlating records from all over the country, he shows that this species, which breeds from the Gulf States north to Hudson's Bay, congregates in large numbers to migrate southward in the fall. Records from Florida and California show that at least in these two states it spends the winter, as vast numbers have been seen clinging to pine trees at this season. In late February or early March, they disappear from these locations and begin to move northward as the milkweed comes out. The return trip is inconspicuous as the butterflies go singly or in small groups instead of in the spectacular masses which are seen in the fall.

Williams was able to find only three records of migrating monarchs in Wisconsin. All three were observations in late August or early September, two in 1868 at Madison and Racine, and one in 1900 at Milwaukee. In September, 1935, I observed a migration of monarch butterflies near Grafton, Wisconsin, about 20 miles north of Milwaukee. On September 4, while seated about 30 yards from the shore of Lake Michigan, I counted 200 drifting between myself and the lake in 10 minutes and 20 seconds. All were going southward, moving in a persistent but not hurried manner and stopping occasionally on some tree or flower. They did not venture out over the lake. For at least a quarter of a mile back from the lake, they were equally numerous. I was unable to investigate beyond this distance. However, calculating on the basis of the 200 butterflies counted, it can be estimated that they were passing southward at the rate of approximately 17,000 an hour in the quarter mile strip observed. This movement continued at the same rate all day and had been going on for several days before September 4th. On the following days the number of passing monarchs decreased rapidly until on September 9th none were seen on a brief visit to the same place. On September 10th

only one of these butterflies was seen and that was frantically trying to find a way through a wire fence which blocked its way to the south. It was watched several minutes flying against the fence repeatedly, trying to find a way through. The persistence of this butterfly in attempting to go southward, although any other direction would have been much easier, is interesting. Williams states that the first purpose of this monograph is "to establish by force of evidence the reality and especially the wilful nature of the unidirectional flights" of butterflies. Wilful is defined as "governed by the will without regard to reason." Certainly this butterfly presented a clear-cut example of the wilful nature of an unidirectional flight.

REFERENCE.

WILLIAMS, C. B. Migration of Butterflies, Oliver and Boyd, Edinburgh, 1930.

An Unusual Nesting Site of *Polistes rubiginosus* Lept. (Hymenoptera: Vespidae).

By HAROLD I. O'BYRNE, Urbana, Illinois.

Rau has on several occasions (1929a, '29b, '31) described the nesting sites of *Polistes rubiginosus* Lept. as being in dark, inaccessible places within walls of buildings or in hollow trees. Nesting places seen by me have likewise been in the dark—usually in hollow trees, with entrances through holes or cracks. An exception in this respect was a nest which I observed near the south end of Reelfoot Lake, Tennessee, on April 17, 1938. This nest was in the open, attached to a branch of a small shrub about one foot above the ground. It had been newly started and consisted of only six or seven cells, including some unfinished ones. Several wasps were clinging to it—there may have been as many as eight, but the exact number was not determined because some took flight as I approached. These wasps evidently had hibernated, since it was too early in the season for a new brood to have matured.

Of the spring behavior of *P. rubiginosus*, Rau says (1929a, '30) that the females return from their place of hibernation to the old nesting site, but he has not described the resumption of nesting activity in the spring. However, the behavior of *P. annularis* Linn. at this season is of interest in this connection: At Clifton Terrace, Illinois, on April 24, 1914, Rau (1918, pp. 287-8) observed a number of queens of *annularis* clustered on the nests of the preceding year; but there were also a few nests in process of construction, on each of which from one to four queens were seen. This suggests that collaboration by more than one female in building the nests may take place in the spring. The nest of *P. rubiginosus* at Reelfoot Lake likewise seemed to be the result of cooperation by several females. Although Wheeler (1928, pp. 73 and 101) states that in temperate regions nests of *Polistes* are founded by a single fecundated female while in the tropics they may be founded by a fecundated female with several workers who are her sisters, the foregoing observations by Rau on *P. annularis* and by myself on *P. rubiginosus* suggest that the condition that prevails in the tropics has not been entirely lost in temperate regions.

It is not surprising that the spring behavior of *rubiginosus* should resemble that of *annularis* in this respect; but the selection of an exposed site instead of a dark, protected place by the wasps founding this single *rubiginosus* colony at Reelfoot Lake is a noteworthy departure from the usual nesting behavior of this species.

REFERENCES.

- RAU, PHIL, 1918. Wasp Studies Afield. Princeton, 472 pp.
Id., 1929a. At the end of the season with *Polistes rubiginosus*. Ent. News, xl, pp. 7-13.
Id., 1929b. The habitat and dissemination of four species of *Polistes* wasps. Ecology, x, pp. 191-200.
Id., 1930. The behavior of hibernating *Polistes* wasps. Ann. Ent. Soc. Amer., xxiii, pp. 461-6.
Id., 1931. The nests and nesting sites of four species of *Polistes* wasps. Bull. Brooklyn Ent. Soc., xxvi, pp. 111-8.
WHEELER, W. M., 1928. The Social Insects. New York, 378 pp.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, JR.

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

This list gives references of the current or preceding year unless otherwise noted. All 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. 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) at the end of the title of the paper.

The figures within brackets [] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within () follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Bedard, W. D.—An annotated list of the insect fauna of Douglas fir (*Pseudotsuga mucronata*) in the northern Rocky Mt. region. [4] 70: 188-197. **Carpenter, Snyder, Alexander, James, Hull.**—Fossil insects from the Creede formation, Colorado. Pt. 1. Introduction, Neuroptera, Isoptera and Diptera. [5] 45: 105-119, ill. [**Frison, T. H.**]—Entomologists Don't Rate. [12] 31: 635-636. **Gilliatt, Frederick C.**—Obituary by A. Kelsall [4] 70: 197-198. **Hyslop, J. A.**—Giving meaning to the terms, brood and generation. [12] 31: 557-559. **Lagloire, P.**—Le guide de l'amateur d'insectes [98] 65: 240-252, ill. **Laing, J.**—Host-finding by insect parasites. I. Observation on the finding of hosts of *Alysia manducator*, *Mormoniella vitripennis* and *Trichogramma evanescens*. [Jour. Anim. Ecol.] 6: 298-317, ill. **Lameere, A.**—Precis de Zoologie. Caracteres fondamentaux des Arthropodes, les Arachnomorphes, les Crustacés. Les Myriapodes caractères fondamentaux des insectes. Les insectes inférieurs. [U. Bruxelles Inst. Zool.] 3, 1933: 212-531, ill.; 4, 1935: 468 pp., ill. **Mendes, L. O. T.**—Lista dos inimigos naturais de *Dysdercus* spp., observados no Est. de Sao Paulo. [105] 9: 215-217. **Meyrick, Edward.**—Obituary by A. Busck. [10] 40: 177-179, ill. **Palmer, E. L.**—Some common fresh-water insects [Nat. Mag.] 31: 477-484, ill. **Pyenson, L.**—The problems of applied entomology in Pernambuco, Brazil. Pt. 2.—A survey of some of the pests of the crops of Pernambuco [105] 9: 16-31. **Rodeck, H. G.**

—Type specimens of fossils in the University of Colorado Museum. [Univ. Col. Studies] 25: 281-299. **Salt, G.**—Experimental studies in insect parasitism, VI.—Host suitability. [22] 29: 223-246, ill. **Severin, Guillaume.**—Obituary by A. Lameere. [33] 78: 313-314, ill. **Smart, J.**—Notes on the insect fauna of the bromeliad, *Brocchinia micrantha*, of British Guiana. [8] 74: 198-200, ill. **Smith, R. C.**—Some Phases of entomological writing from the viewpoint of the reader. [12] 31: 563-565. **Stanley & Smallman.**—A method of determining the mean speed of movement of insects in a mass of flour. [Can. Jour. Res.] 16, Sec. D: 221-224, ill. **Whitehead, F. E.**—A proposed national contest for entomology students. [12] 31: 566-568.

ANATOMY, PHYSIOLOGY, ETC.—**Andre, M.**—Elevages de volailles decimes par le *Tyroglyphus farinae*. (Acariens). [Bull. Soc. Zool. France] 62: 366-367. **Brauns, A.**—Dieflugelrueckbildung bei der Strandfliege *Conioscinella brachyptera* (Dipt.: Chloropid.) und die Beziehungen zur Ausbildung der Flugelsinnes Kuppeln. [34] 123: 281-295, ill. **Butler, C. G.**—On the ecology of *Aleurodes brassicae* (Hemiptera). [36] 87: 291-311, ill. **Evans, A. C.**—Physiological relationships between insects and their host plants. I.—The effect of the chemical composition of the plant on reproduction and production of winged forms in *Brevicoryne brassicae* (Aphid., Hemipt.). [35] 25: 558-572. **Farstad, C. W.**—Thelyotokous parthenogenesis in *Cephus cinctus* (Hymen.: Cephidae). [4] 70: 206-207. **Grandjean, M. F.**—*Otodectes cynotis* et les pretendues trachees des Acaridiae. [Bull. Soc. Zool. France] 62: 280-290, ill. **Hopkins, G. H. E.**—Function of the "gills" in mosquito larvae. [31] 142: 482. **Kozhanchikov, I. W.**—The peculiarities of gaseous metabolism in insect tissues. [Comptes. Rend. Acad. Sci. U. S. R. R.] 19: 759-761. Physiological conditions of cold-hardiness in insects. [22] 29: 253-262, ill. **McGregor, S. E.**—Environmental factors and size variations in honeybee appendages. [12] 31: 570-573, ill. **Milne, M. J.**—Case-building in Trichoptera, as an inherited response to oxygen deficiency. [4] 70: 177-180. **Patay, R.**—Anatomie, histologie et physiologie des tubes de Malpighi du Doryphore (*Leptinotarsa decemlineata* (Chrysomel.)). [Bull. Soc. Zool. France] 62: 174-186, ill. **Patterson, N. F.**—On the external morphology of South African specimens of *Micromalthus* (Coleo.) [36] 87: 287-290, ill. **Poisson & Pesson.**—L'appareil circulatoire d' *Icerya purchasi* (Coccid.,

Monophlebinae). [Bull. Soc. Zool. France] 62: 431-435, ill. **Pringle, J. A.**—Observations on certain wood-boring Coleoptera occurring in South Africa (Lyctidae & Bostrychidae). [36] 87: 247-270, ill. **Pringle, J. W. S.**—Proprioception in insects. I. A new type of mechanical receptor from the palps of the cockroach. II. The action of the companion sensilla on the legs. [Jour. Exp. Biol.] 15: 101-113, ill.; 114-131, ill. **Quadri, M. A.**—The life-history & growth of the cockroach *Blatta orientalis*. [22] 29: 263-276, ill. **Salt, G.**—The egg-parasite of *Sialis lutaria*; a study of the influence of the host upon a dimorphic parasite. [116] 29: 539-553. **Wilson, F.**—Some experiments on the influence of environment upon the forms of *Aphis chloris* (Hemipt.). [36] 87: 165-180, ill.

ARACHNIDA AND MYRIOPODA.—**Cameron, D.**—The northern fowl mite (*Liponyssus sylviarum*). Investigations at MacDonald College, Que., with a summary of previous work. [Can. Jour. Res.] 16: 230-254, ill. **Chamberlin, J. C.**—New and little-known false scorpions from the Pacific and elsewhere (Chelonethida). [75] 2, 11th Series: p. 259-285, ill. (k*). **Ewing, H. E.**—North American mites of the subfam. Myobiinae. [10] 40: 180-197, ill. (k*). **Grandjean, F.**—Sur quelques caracteres des Acaridiae libres. [Bull. Soc. Zool. France] 62: 388-398, ill. **Jacot, A. P.**—Thomas Say's free-living mites rediscovered. [5] 45: 121-132, ill. (*). **Michelbacher, A. E.**—The biology of the garden centipede *Scutigera immaculata*. [Hilgardia] 11: 55-148. **Sellnick, M.**—Eine neue Milbengattung aus Süd- und Mittelamerika. [109] 5: 184-185.

THE SMALLER ORDERS OF INSECTS.—**Babcock & Ewing.**—A n. gen. & sp. of Anoplura from the peccary. [10] 40: 197-201, ill. **Banks, N.**—A n. gen. of Perlidae (Plecoptera). [5] 45: 136-137, ill. **Clay, T.**—The names of some Mallophagan genera. [9] 71: 206-207. **Despax, R.**—Structure de l'organe copulateur male dans le genre *Isopteryx* Pict. (*Chloroperla* Newm.) (Plecopt.). [25] 43: 135-136. **Folsom & Mills.**—Contribution to the knowledge of the genus *Sminthurides*. (Collembola). [Bull. Mus. Comp. Zool.] 82: 231-274, ill. **Hood, J. D.**—Nine new Thysanoptera from North America. [Amer. Midl. Nat.] 20: 354-367. Studies in Neotropical Thysanoptera, VII. [105] 9: 218-247, ill. (*). **Lestage, J. A.**—Contribution a l'etude des Ephemeropteres. XXI.—Notes critiques sur l'assimilation

des Polymitarceys aux Ephoron et sur les Polymitarceys palearctiques. [33] 78: 381-394. **Snyder, T. E.**—See under General. **Spieth, H. T.**—Studies on the biology of the Ephemeroptera. I.—Coloration and its relation to seasonal emergence. [4] 70: 210-218. **Ulmer, G.**—Chilenische Ephemeropteren, hauptsächlich aus dem Deutschen Entomologischen Institut Berlin-Dahlem. [109] 5: 85-108, ill.

ORTHOPTERA.—**Chesler, J.**—Observations on the biology of some South African Acrididae. [36] 87: 313-351, ill. **Chopard, L.**—Description d'un Gryllide nouveau du Bresil. [25] 43: 159-160, ill. **Lawrence, T. C.**—A report on *Supella supellectulium* [sic] (Blatt.). [103] 11: 123. **Mayer, K.**—See under Diptera. **Quadri, M. A.**—See under Anatomy. **Toleda Piza, S. de.**—Novos Phasmidas do Brasil e da Argentina. [105] 9: 1-11, ill.

HEMIPTERA.—**Burham, J. C.**—A contribution to a list of the Aphididae of the maritime provinces of Canada [4] 70: 180-188. **Butler, C. G.**—See under Anatomy. **Drake & Harris.**—Concerning *Velia boliviana*. [105] 9: 97-98, ill. **Hungerford, H. B.**—Some new Graptocorixa from Mexico and other notes. [103] 11: 134-141, ill. **Lindsay, D. R.**—N. spp. of *Norvellina* (Cicadell.). [103] 11: 113-123. **de Long, D. W.**—Biological studies on the leafhopper *Empoasca fabae* as a bean pest. [U. S. D. A.] Tech. Bull. 618: 1-60, ill. **Strickland, E. H.**—The Chermidae of Alberta. [4] 70: 200-206.

LEPIDOPTERA.—**Biedermann, R.**—Formes nouvelles des genres *Papilio* et *Prepona*. [25] 43: 141-142, (S). **Clarke & Benjamin.**—A study of some N. A. moths allied to the Thyatirid genus *Bombycia*. [38] 37: 55-73, ill. (k*). **Clark & Clark.**—Notes on Virginia butterflies. [95] 51: 177-182. **Comstock & Dammers.**—Notes on the life history of a Noctuid moth. [38] 37: 78-79, ill. **Dethier, V. G.**—The larva and chrysalis of *Ancyloxypha numitor* (Hesper.). [38] 37: 74-77, ill. **Dos Passos, C. F.**—A new race of *Euphydryas chalcedona* from Arizona (Nymph.). [4] 70: 199-200, ill. **Field, W. D.**—New forms & subspp. of North American Libytheidae and Lycaenidae. [103] 11: 124-133. **Hall, A.**—On the types of *Adelpha* (Nymphal) in the collection of the British Museum. [9] 71: 184-187; 208-211; 232-235, (S*). **Mell, R.**—Beitrag zur Fauna simica. XVII. —Inventur und oekologisches Material zu einer Biologie

der sudchinesischen Lepidopteren. [11] 1938: 197-345, ill. **Nicholson, C.**—Curious behaviour of *Danaus chrysippus*. [9] 71: 161.

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SPECIAL NOTICES.—**Dipteres Dolichopodidae.**—L. O. Parent. [Faune de France] 35: 720 pp., ill. (K). **Revision of the Bombyliidae of Southern Africa.** By A. J. Hesse. [Ann. South African Mus.] 34: 1053 pp., ill. (K*).

BULLETIN OF THE CHEYENNE MOUNTAIN MUSEUM, being a catalogue of the original descriptions of the Rhopalocera from north of the Mexican border: Vol. 1, part 1, the Hesperioidea, by Ernest L. Bell, Colorado Springs, Colorado. 35 pages, price 50 cents.

This is the first of a series, others of which are announced as in process of publication. It lists 222 species and 41 races or forms, and is a valuable contribution to our knowledge of the skippers. The number of these insects discovered and named has increased with the years. Skinner's Synonymic Catalog of 1898 listed 182 species and 18 forms, Dyars' Catalog, of 1902, 195 species and 18 forms, the Lindsey, Bell and Williams' Denison University Bulletin of 1931 listed 215 species and 34 forms. The total number however is something less than 10 percent of the Hesperids flying in all the Americas. The nomenclature is the last word in this group, the generic names adopted being those that have strict priority in the literature, and the newer ones that have replaced those that have fallen through previous use elsewhere. All of the references listed, have, to my personal knowledge, been checked by Mr. Bell. The synonymy contains the insects that have been missidentified by authors, so that it may be expected that any figure in the books available to the student may be considered to represent the species unless found corrected in Bell's work. The latter will be found indispensable to all workers interested in the American Hesperioidea. ROSWELL C. WILLIAMS, JR.

THE GENUS SEPTOBASIDIUM. By JOHN N. COUCH. 480 pages, frontispiece, 60 text figures, 114 plates. The University of North Carolina Press. \$5.00. Here is a book which, unfortunately, will be reviewed chiefly in purely botanical journals and filed on the botanical shelves in libraries and thus is likely to remain unknown to entomologists unless they come upon it accidentally. But it contains so much of entomological interest that it deserves review in entomological journals and would not be out of place in any entomological library. The reviewer, as a student of the scale insects, has long known that there are some species which are very intimately associated with certain fungi. But not being familiar with the literature of the fungi he was quite unaware of the fact that there is a botanist who is especially interested in this association. It has come, therefore, as a very pleasant surprise to learn that there is such a person and to receive for review an entire volume devoted to the genus *Septobasidium*, to which all the fungus species in question are referred. The pleasure is all the greater, in that the volume is extremely well printed and extremely well illustrated. The extraordinary symbiosis of insect, fungus and host

plant is considered in detail in connection with the fungus, *Septobasidium burtii* Lloyd, which occurs in association with *Diaspidiotus* (= *Aspidiotus*) *osborni* (Newell and Cockerell) on various species of oaks in our southeastern states. In addition a very considerable amount of information obtained from other species associated with other scales on other hosts is added. The story of these relationships is too long even to be abstracted here and the interested student must refer to the book. Dr. Couch points out that all the species of the fungi that he has studied cause damage to their host trees, but that this damage is due "not to the fungus directly but to the combination of fungus and scale insects." The nature of the damage is reviewed and control methods are suggested. A review of the geographical distribution of the host trees and host insects—the latter including two aphids—is presented. The identifications of the scale insects associated with the fungi in North America are by Harold Morrison, but unfortunately in the case of most of the foreign species—which constitute a very large part of the total—the scales are unidentified. The author remarks that "From the results so far obtained it appears that the greater number of species of *Septobasidium* are not limited to an association with one species of scale insect but may be associated with several." A few errors in scale insect names may be noted. *Cerococcus* is mis-spelled as *Cerecoccus* and this generic name is erroneously applied to the species properly to be called *Mycetococcus ehrhorni*. The generic name *Chionaspis* is employed for the species *biclavis* which for more than forty years has been referred to *Howardia*. *Odonaspis* is mis-spelled as *Odanaspis*. Other errors in the list of scales are due merely to the chaotic state of scale insect taxonomy. In the section dealing with the taxonomy of the fungi nearly 175 species, from all parts of the world are listed. That these constitute but a small part of the species which probably exist is emphasized by the author, who points out that except for southeastern United States, no region in the world has been carefully combed for them. A bit of cooperation from those of us who collect scale insects seems to be called for.—
G. F. FERRIS.

Erratum. ENTOMOLOGICAL NEWS, vol. xlix, page 262, line 30, for *Biological Extracts*, read *Biological Abstracts*.

Doings of Societies.

The fourteenth annual Rocky Mountain Conference of Entomologists was held at the University of Wyoming summer camp, Centennial, Wyoming, August 14 to 19, 1938. A total of 73, representing 11 states and the District of Columbia, attended. The following are those directly interested in entomology:

Jas. I. Hambleton, F. M. Wadley, Washington, D. C.; Don. B. Whelan, Nebr.; Vasco M. Tanner, Geo. I. Reeves, Utah; Robert Hawkins, Byrne Thrailkill, Wm. B. Owen, C. H. Gilbert, Herbert J. Stoles, Jr., Margaret Greenwald, A. W. Woodrow, Eugene C. Holst, A. P. Sturtevant, Wyoming; Maurice T. James, Bob Potts, C. R. Jones, C. P. Gillette, Theodore R. Hupper, Fred H. Kropf, John L. Hoerner, Theodore R. Robb, Lorin Anderson, Ed Beals, Gordon Mickle, Fred Biederman, Fred R. Lewis, N. D. Wygant, L. G. Davis, Geo. M. List, Ralph J. Gilmore, Miriam A. Palmer, Colorado; Harwood B. Dryer, Richard Lewis Post, New York; R. L. Parker, E. G. Kelly, Roger C. Smith, Kansas; L. H. Shropshire, Wm. P. Hayes, Illinois; Joseph F. Reinhardt, Minnesota; C. L. Farrar, Wisconsin; Paul Knight, Maryland; Ephraim Hixson, Oklahoma.

The following is a list of the more formal subjects discussed:

APICULTURE—The General Research Program of the Intermountain Bee Laboratory, U. S. Bureau of Entomology and Plant Quarantine, Laramie, Wyo., A. W. Woodrow; Resistance of Strains of Bees to American Foul Brood, A. P. Sturtevant; Queen Supersedure, C. L. Farrar.

COLEOPTERA—The Striped Cucumber Beetle on Squash and Melons, J. L. Hoerner; The Wheat White Grub, *Phyllophila lanceolata*, E. G. Kelly.

HEMIPTERA—Results in the Control of the Squash Bug, J. L. Horner.

HOMOPTERA—Summer Temperatures and the Tomato Psyllid, *Paratrioza cockerelli* (Sulc), Geo. M. List; Aphid Studies with a Report on Several New Species, Miriam A. Palmer.

LEPIDOPTERA—An Outbreak of the Walnut Datana, 1935-38, Ephraim Hixson; The Celery Stalkworm, *Nomophila noctuella*, Roger C. Smith; Biology and Control of the Strawberry Leaf-roller, *Ancyliis comptana* Froel, R. L. Parker.

ORTHOPTERA—Grasshopper Control Studies; Roger C. Smith; Symposium, The 1938 Grasshopper Program, C. L. Corkins. Discussed by T. R. Robb, Gordon Mickle, Ed Beals,

Fred R. Lewis, Fred Biederman, Fred H. Kropf, T. R. Hupper, Robert Hawkins.

GENERAL—Symposium, The Building of Insect Collections Representative of the Inter-mountain Region; Leaders: Robert Potts, Vasco M. Tanner, Maurice T. James, Don B. Whelan, Roger C. Smith; Preserving Insect Specimens and Preparing Material for Display, R. L. Post; The Castor Bean in Relation to Insects, Roger C. Smith; Effect of Fumigation on Tomato Fruit, C. R. Jones; Insect Control on Truck Crops in Northern Illinois, L. H. Shropshire; Insect Problems in Wyoming, Margaret Greenwald; Some Work of the Nebraska Station, Don B. Whelan; Statistical Methods in Entomology, F. M. Wadley; Bacteriological Work at the Intermountain Bee Laboratory, Herbert J. Stoles, Jr.; Some Problems Being Studied at the Forest Insect Laboratory of the U. S. Bureau of Entomology and Plant Quarantine, N. D. Wygant; Insect Photography for Class Room Use, Paul Knight.

It was voted to attempt to make discussions of forest and shade tree pests a main part of the program in 1939, and if practical to arrange for trips into the surrounding national forests to study the forest insect research programs.

The officers elected for 1939 were C. P. Gillette, Chairman; Vasco M. Tanner, Vice-Chairman; George M. List, Secretary, and C. R. Jones, Treasurer. **GEORGE M. LIST**, Secretary, Rocky Mountain Conference of Entomologists.

Dr. Eugene Murray-Aaron Convalescing.

It may interest those who remember Dr. Eugene Murray-Aaron as a lepidopterist, who began writing for entomological journals in 1874, to realize from our October number that he is still actively interested and busy at work in the Field Museum, in Chicago. Just now he is convalescing in a hospital from a broken leg due to the speed fever of a careless autoist, and the 86-year bones are successfully knitting together.

He is working on a catalog of the North American Rhopalocera, after the pattern of, and to supplement that of, Skinner, forty years ago, but to be supplied with tables, keys, line and photo illustrations to aid the student in specific identification. His friends will hope his rather unusual physical resiliency may stay with him as long as his mental energy requires.

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(* indicates new genera, species, names, etc.)

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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—Chrysalids of *Papilio ajax* and *philenor*, cocoons of *Rothschildia orizaba* and *zorilla*. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted—Specimens of North American **Cephidae**. Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

Wanted for cash or exchange any pamphlets dealing with the American Hesperiidæ. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Meg. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

Wanted—Cantharidæ of the United States, esp. those of the genus *Cantharis*. Will exchange named beetles of Oregon. K. M. Fender, 930 S. Davis St., McMinnville, Oregon.

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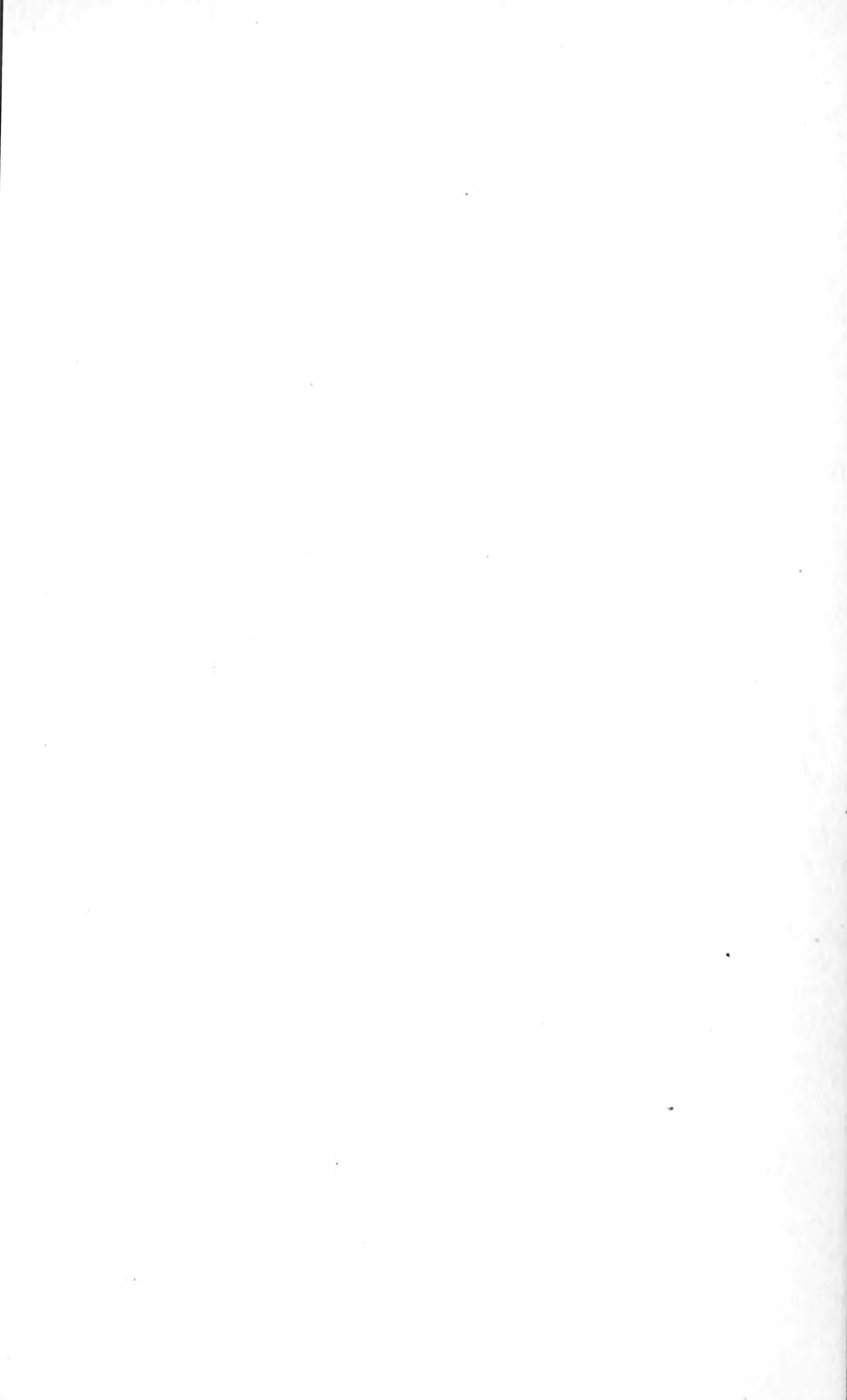
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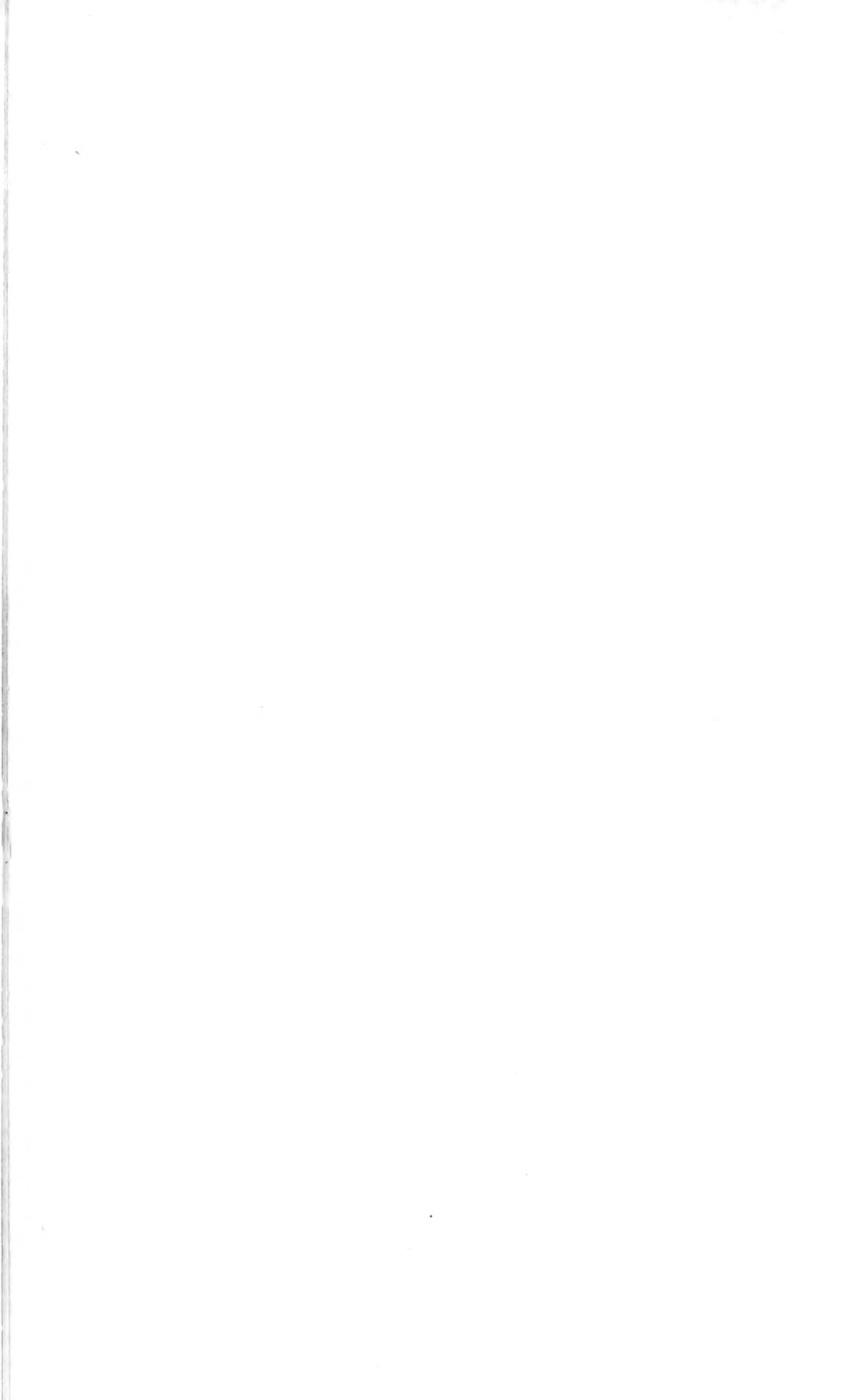
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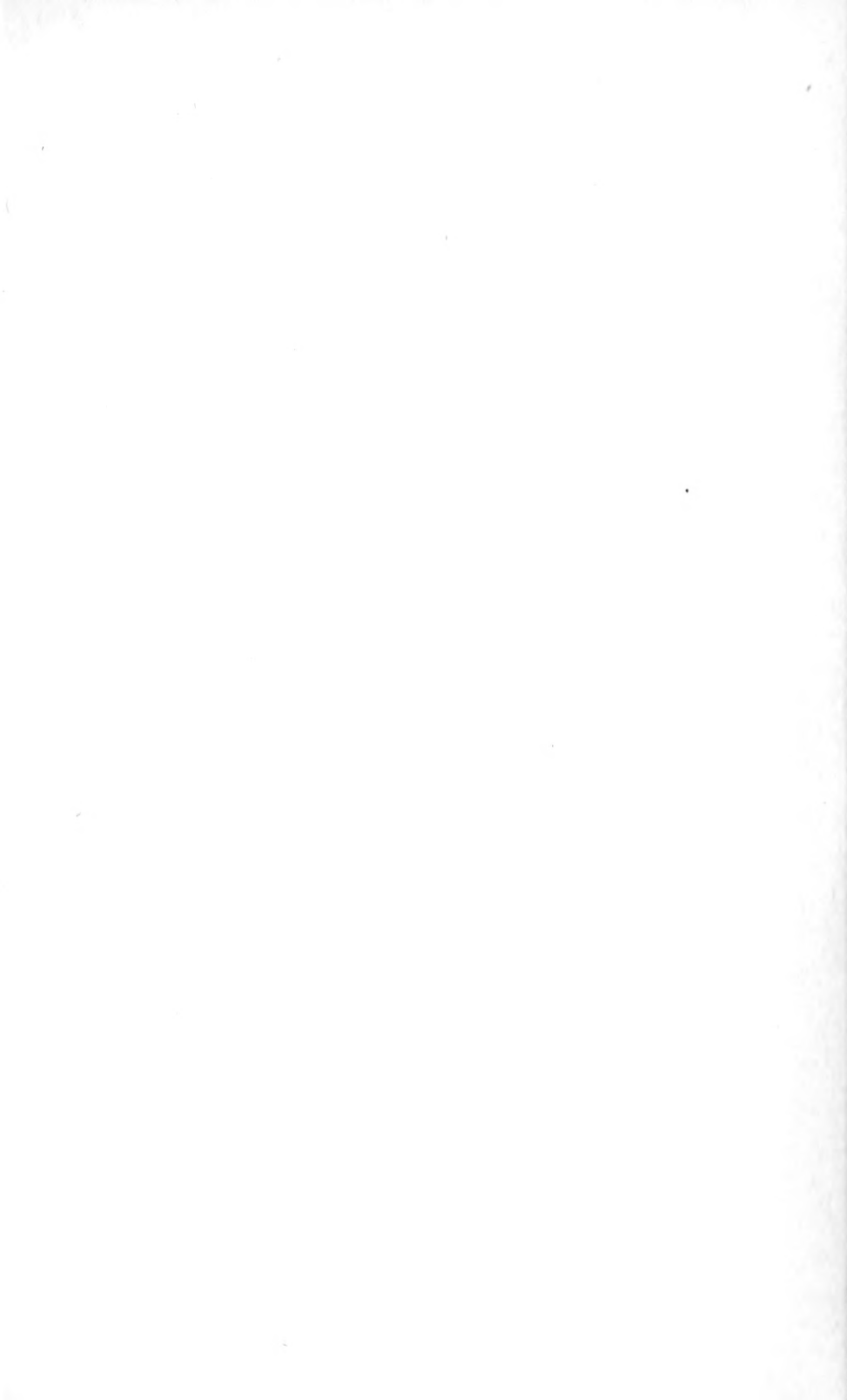
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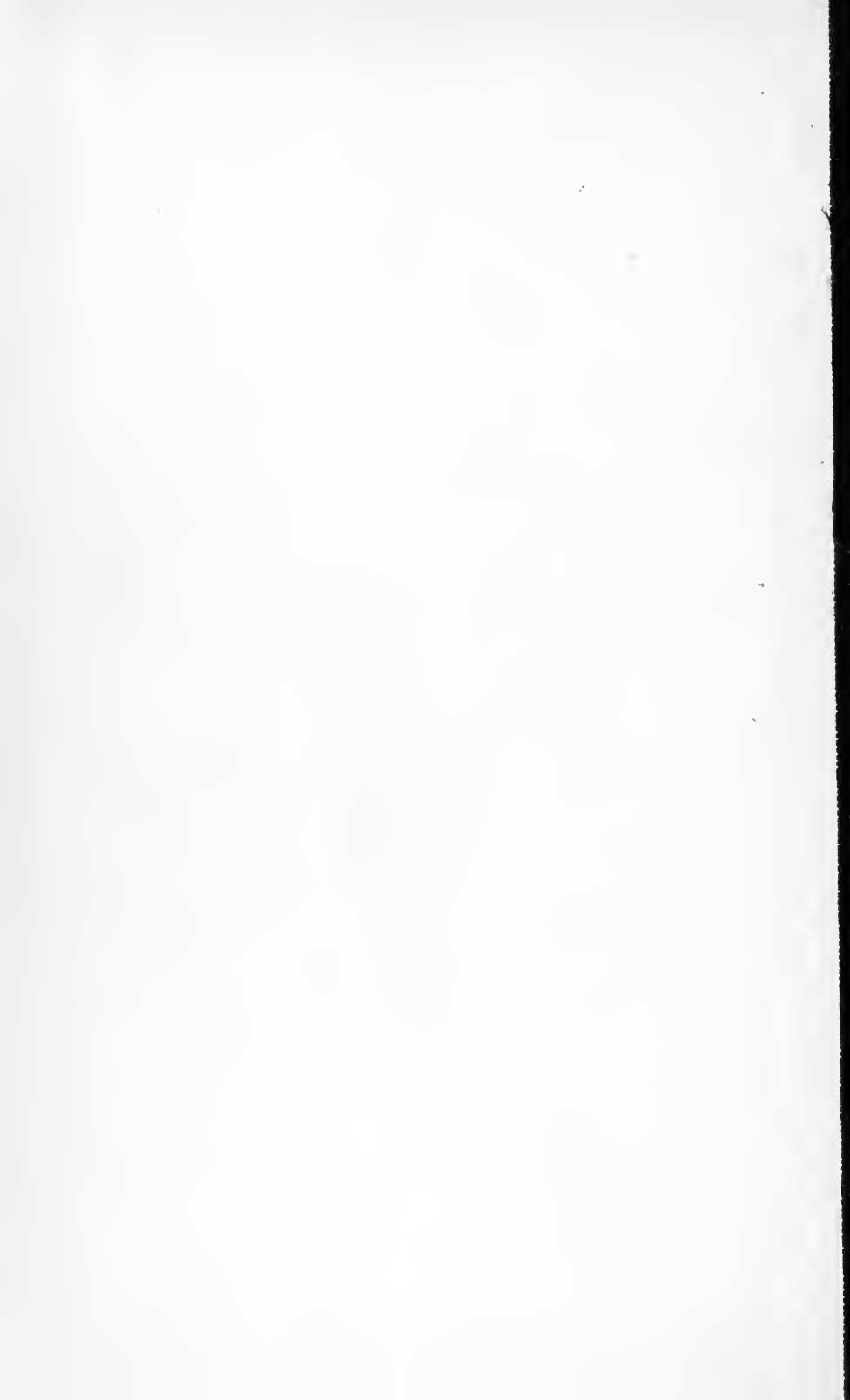
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