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ENTOMOLOGICAL NEWS

VOLUME XLI, 1930



FERDINAND HEINRICH HERMAN STRECKER
1836-1901



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JANUARY, 1930

ENTOMOLOGICAL NEWS

Vol. XLI

No. 1



FERDINAND HEINRICH HERMAN STRECKER
1836-1901

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TO CONTRIBUTORS. All contributions will be considered and passed upon at our earliest convenience and, as far as may be, will be published according to date of reception. The receipt of all papers will be acknowledged. Owing to the limited size of each number of the News, articles longer than six printed pages will be published in two or more installments, unless the author be willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

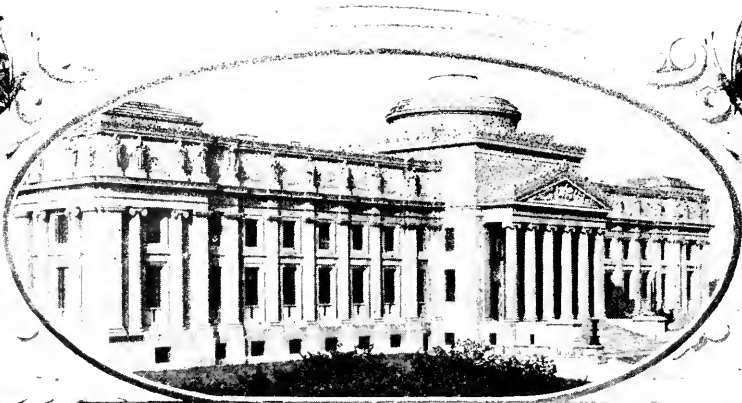
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Stated Meetings of The American Entomological Society will be held at 7.30 o'clock P. M., on the fourth Thursday of each month, excepting June, July, August, November and December, and on the third Thursday of November and December.

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 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.



BROOKLYN MUSEUM, BROOKLYN, N.Y.



GEO. P. ENGELHARDT

ENTOMOLOGICAL NEWS

VOL. XLI.

JANUARY, 1930

No. 1

North American Institutions featuring Lepidoptera.

X. The Brooklyn Museum, Brooklyn, New York.

By J. D. GUNDER, Pasadena, California.

(Plate I.)

Not long ago I asked Mr. George P. Eglehardt of Brooklyn, N. Y., our American authority on the family Aegeriidae (clear-wing moths), to give me some recent news about himself and also about the Museum with which he has been connected for so many years. This letter in reply will be of interest to Mr. Eglehardt's many good friends.

Nov. 19, 1929.

DEAR FRIEND GUNDER:

Am sorry for the unavoidable delay in answering your letter of late date. It just happens to be a very busy time for me at the Museum.

Pending the completion of several tasks now in hand, I expect to retire from active service sometime this winter. This will terminate a continuous service of twenty-seven years with the Brooklyn Museum, but by no means will it conclude my personal interest in all matters pertaining to zoology and biology. On the contrary, I have been looking forward to the time when, relieved from the executive responsibilities as Curator of the Department of Natural Science, I may indulge more freely in serious research and particularly in such biological problems as call for study and investigation in the field.

Heretofore my duties at the Museum have left untouched hardly any subject connected with the natural and applied sciences. Consequently I have acquired a little knowledge about many things, but I do not claim to know a great deal about any one thing. Be that as it may, in retrospect I can visualize activities which will always remain a satisfaction and a joy. There

have been opportunities for travel and exploration on this continent, in the West Indies and in Central America, but above all I appreciate contacts with so many people, professional and novice, old and young, and the subsequent wide circle of enduring friendships in this country and abroad.

The Brooklyn Museum, a public institution under charter of the City of New York, established in 1898 for the promotion of cultural interests, including fine arts, decorative arts, ethnology and natural sciences, for sometime has felt the difficulty, shared by all museums, of providing adequately for the development of so many departments. A recent action terminating research work in the natural sciences, left this department in the possession of notable study collections bereft of their significance and, without provision for their safety and upkeep, subject to deterioration or possible destruction. The approval of a recommendation for the transfer of research collections perishable in nature to institutions best equipped for their care and development has been a source of much satisfaction to me.

The transfer of all our study collections of insects to the U. S. National Museum of Washington, D. C., supervised by Dr. Wm. Schaus and Mr. H. S. Barber, was completed during the summer. Included are the well known pioneer collections of lepidoptera of O. Neumoegen, E. L. Graef, George Hulst and others obtained by purchase or gift, as well as the very extensive collections in all orders secured on Museum expeditions by Jacob Doll¹, Chas. Schaeffer and the writer. About 1400 types are represented. Not included in this transfer are selections from all orders fully providing for purposes of exhibition and all materials pertaining to a so-called local collection with particular emphasis on the fauna of Long Island, but in general representative of New York state.

Temporarily excluded also has been the family Aegeriidae, with numerous types, to facilitate my revision now in course of preparation. Combined with my own and only personal collection, comprising some 3,000 specimens, there will be lacking only

¹ Mr. Doll passed away on Feb. 10, 1929, at the ripe old age of eighty-two years. See Englehardt's "Chapters from the long life of a Butterfly Collector" in the *Brooklyn Museum Quarterly*, October, 1925.

two or three of the 110 species so far listed for North America, while twenty or thirty more will be added as new.

The transfer of such important collections to another institution naturally has caused much discussion, favorable and otherwise. In the rapid growth of museums in this country there has been too much duplication of research collections and consequently a scattering of types, often inadequately and inaccessible housed. It is the consensus of opinion that this condition should be adjusted through centralization, particularly of the types. The appeal is made to institutions and individuals alike.

The Brooklyn Entomological Society² is the second oldest association of its kind in the country and has enjoyed the hospitality and the cooperation of the Brooklyn Museum, as headquarters and regular meeting place, since 1912. With an average attendance of twenty out of fifty active members, the meetings are still full of zest and interest and the affairs of the Society are progressing favorably. The official organs of the Society, the *Bulletin* and *Entomologica Americana*, are now entering their twenty-fifth and tenth volumes, respectively. The following gentlemen have been serving as officers since 1920: *President*, William T. Davis; *Secretary*, Ernest L. Bell; *Treasurer*, Geo. P. Englehardt; *Editor*, since 1919, J. R. de la Torre-Bueno.

I hope this hurried résumé will be of assistance to you and I wish I had more time to go into detail.

Sincerely yours,

GEO. P. ENGLEHARDT, Curator, Department of Natural Sciences.

***Agrilus fisheriana* new name (Coleop.: Buprestidae).**

Mr. W. S. Fisher has called my attention to the fact that Dr. Obenberger had used the name *Agrilus fisheri* in Philip. Jour. Sci., vol. 25, no. 5, 1924, p. 591. I therefore propose the name *fisheriana* instead of *fisheri* for the species described by me in Ent. News, vol. 40, p. 271, 1929.—J. N. KNULL, Bureau of Plant Industry, Harrisburg, Pennsylvania.

²For an interesting and comprehensive history of the Society, see Ann. Ent. Soc. Am., pp. 392-400, no. 2, vol. XXII, Sept., 1929. This is an article by Mr. Englehardt entitled, "The Brooklyn and New York Entomological Societies, past and present".

An European Plant-bug (*Adelphocoris lineolatus* Goeze) found in Iowa (Hemip.: Miridae).*

By HARRY H. KNIGHT, Ames, Iowa.

While conducting a field trip with a class in general entomology, June 18, 1929, at Ames, Iowa, the writer took in his collecting net the first specimen of *Adelphocoris lineolatus* Goeze known from the United States. This species was previously known from North America, but only from Cape Breton Island when the writer recorded it in 1922 (Can. Ent., liii, p. 287). It was indeed a great surprise to look into my collecting net and see this large plant bug running about for the first time, and to realize that I was actually collecting in Iowa. When this first specimen was safely bottled I proceeded to sweep the herbaceous vegetation along a fence row for a distance of about forty feet. An examination of my net revealed two more specimens of *Adelphocoris lineolatus* Goeze, also one or more specimens of *Miris dolabratus* Linn., *Stenotus binotatus* Fab., *Megalocroca recticornis* Geoff., *Capsus ater* Linn. and *Trigonotylus ruficornis* Geoff. A few minutes later, *Capsus simulans* Stål was also taken, likewise two more specimens of *lineolatus*. This assortment of Palearctic species is rather remarkable I should say and can scarcely be duplicated from any other locality in North America. On June 22, I swept over the same ground without taking another specimen of *lineolatus* Goeze. I thought the species must be rare and that it might be another year before additional specimens could be taken. However, one of my students, Mr. R. L. Preston, took two specimens on June 30, along a road near the Agronomy farm just south of Ames. On July 2, we made a special trip to this point to search for the unusual Mirid. I soon began taking one or two specimens with each series of sweeps with the net. Within half an hour I found that most of the adults and many nymphs were to be found on alfalfa and sweet clover. Further collecting has shown that *lineolatus* is breeding in large numbers on both these plants, and nymphs are

*Contribution from the Department of Zoology and Entomology, Iowa State College.

rare if not absent on other plants. During July the bug has been found in such large numbers on alfalfa and sweet clover that it suggests the possibility of becoming a pest on these important plants. I will take this occasion to propose the common name "Alfalfa plant-bug" for *Adelphocoris lincolatus* Goeze.

In Europe *A. lincolatus* Goeze has been reported as found on *Chenopodium*, *Trifolium*, *Leguminosae*, *Umbelliferae*, *Eryngium*, *Carduus*, *Salvia*, *Euphorbia*, and *Calluna*. Fallen (1807) described our bug as new under the name *Lygaeus chenopodii*, indicating what he took to be the host plant. As yet we have not found it breeding on *Chenopodium* in Iowa.

The question of when and where *Adelphocoris lincolatus* Goeze was introduced into Iowa is a point which will become of more interest as time passes and the bug is found in adjoining states. Mr. R. L. Preston is making a survey of its distribution while working on the life history of the species and will report his results at some future time. Just now it seems rather likely that the point of introduction was at Ames or Des Moines, with Ames more nearly the center of distribution as found by Mr. Preston. How long it has taken this insect to attain its present abundance and distribution is a question of interest to us. No specimens were taken in 1928, yet the writer and several students did fully as much collecting in this area last summer. During July, many specimens of *lincolatus* have been taken about electric lights on the campus; also we have found it very abundant in fields of alfalfa and sweet clover. The species has certainly increased greatly in numbers since last summer, or we most certainly would have found it then. A guess is not worth much but I would suggest that the species must have gotten its start from three to five years ago. Mr. Preston has taken specimens over an area of about 75 miles from south to north with Ames about the center of distribution.

Should this insect develop into a pest on alfalfa, as it gives some promise, it will become of wide interest and concern. In any case it represents the introduction and spread of an exotic

species, and as a biological problem, will interest many students of entomology. No doubt the species was imported into Iowa in the egg stage, which could easily happen if parts of the host plant were used as packing in some shipment of material from Europe. Just what materials have been shipped into our area is a matter we hope to investigate as opportunity permits.

It is hoped this notice may stimulate collectors in the states bordering Iowa and that some may sweep alfalfa and sweet clover during the next two or three years and report the occurrence and spread of *Adelphocoris lincolatus* Goeze.

As an aid for recognition of the species the following general description is given:

♂. Length 8 mm., width 2.8 mm. General coloration pale yellowish with a tinge of brown and dusky; scutellum with two fine, longitudinal fuscous marks on middle, corium usually with a triangular fuscous area on apical half, cuneus pale, membrane fuscous. Antennae yellowish to brown, apical half darker and usually reddish brown. Legs yellowish, femora with many black dots, anterior aspect with two rows of somewhat larger spots; tibial spines black, without distinct spots at base. Clothed with simple, pale yellowish pubescence, but black on the legs.

Head: width 1.36 mm., vertex .42 mm. Antennae: segment I, length .98 mm.; II, 2.87 mm.; III, 2.2 mm.; IV, 1.3 mm. Pronotum: length 1.3 mm., width at base 2.25 mm.

♀. Length 7.5 mm., width 2.9 mm. More robust than the male and usually somewhat paler in color, but otherwise very similar in form and coloration.

Nymph, fifth instar. Length 5.5 mm., width 2.4 mm. Head: width 1.17 mm., vertex .52 mm. Antennae: segment I, length .73 mm.; II, 2.3 mm.; III, 2 mm., IV, .85 mm. Color uniformly yellowish green, third and fourth antennal segments reddish brown, tips of wing pads becoming fuscous. Legs uniformly pale yellowish and marked with black spots as in the adult. Dorsum and legs set with short stiff black hairs; antennae clothed with black pubescence.

Size slightly larger than *Adelphocoris rapidus* Say, but easily distinguished by the paler color. The general habits and actions of *lincolatus* Goeze are very similar to our native species, but it runs about in the net even more swiftly than *rapidus* Say.

Observations on *Megathymus streckeri* (Lepid.: HesperIIDae).

By R. A. LEUSSLER, Omaha, Nebraska.

In the sand hills of Nebraska where the yucca flourishes, there is found a race of *Megathymus streckeri* which appears to be intermediate between *streckeri* Skinner and *streckeri-terana* B. & McD.

This race, however, as shown in a series of specimens from this locality, is so extremely variable in all its characters that I do not deem it advisable to propose a name for it.

Compared with *streckeri-streckeri*, and speaking generally, both males and females average somewhat larger and lack the light-brown shading of the discal area of the under surface of the secondaries. The males have the spots on the upper side of primaries noticeably larger, and on the under side both larger and better defined. The white spots on the under side of secondaries are less pronounced, and the dark blotches found in *streckeri-streckeri* when the spots are reduced, are almost entirely obsolete. In the females a prominent band of from 4 to 6 spots on the upper surface of the secondaries constitutes the chief difference. On the under surface of the secondaries this sex has the spots more yellowish than in *streckeri-streckeri*.

Judging from the original description of race *terana* and the figure of the female type, the Nebraska race is pretty close to *terana*, but as a rule the following differences can be noted: It averages larger in both sexes, although some individuals are quite as small as the types of that race; the spots on under surface of secondaries are more pronounced and in the female are yellowish; the spots on upper surface are not as deep orange yellow as in *terana*, and in the female the band of spots on upper surface of secondaries is better developed, although occasional small specimens appear which have the spots no better developed than *terana*. As stated above, there is a great deal of variation in Nebraska specimens. This variation is in the size of the insects; in the shape and size of spots; in

the number and color of spots. Some of the males match up pretty well with *streckeri-streckeri*, some of the females with *streckeri-tejana* and some with an unnamed female supposedly from northern Texas which B. & McD. have suggested may be intermediate between *streckeri-streckeri* and *streckeri-tejana*. It is my opinion that the Nebraska race is exactly that, *i. e.*, intermediate between the two named races, and that it is very plastic.

The insect flies in the sand hills from about the 5th of June until the latter part of that month. The males have a habit of settling on last year's flower stalks of the yucca plant with the forewings folded together and the hindwings in a horizontal position. In this posture they greatly resemble old dry seed pods of the yucca and are hard to detect. They are wary and hard to approach. When alarmed their flight is swift and they usually fly over the top of a hill and are lost to view. Their principal flight is from 9 in the morning until 3 in the afternoon. The females appear about a week later than the males. They are less active, sitting for the most part at the base of yucca plants with wings tightly folded. After the females appear the males become very active. They circle about in swift flight, in overlapping circles or fly zigzag fashion, frequently dropping back and seeming to explore the same ground over and over again.

Oslar has stated that the female of *streckeri* is crepuscular and that oviposition occurs from sunset until well into the night. My own observation does not bear out this statement. At least not as regards the *streckeri* of the sand hills. The females were observed to be ovipositing in the afternoon in brightest sunshine. Their flight at this time is quite slow and they seem so occupied with their purpose that it is not difficult to approach them. Soon after 4 o'clock both sexes become inactive, seeking resting places in the sparse grass or on the bare sand where they are hard to see. When flushed up they fly some distance and again settle as before. This they repeat

as often as they are flushed up. On the evening of one day when the insects had been on the wing in numbers, I made it a point to visit their haunts from 6 o'clock until dark and could not find a single individual although other butterflies (*Nathalis iole*, *Euptoicta claudia* and *Pieris protodice*) were observed, as well as Noctuid moths and beetles.

When ovipositing, the females, if not disturbed, fly from plant to plant, frequently resting to deposit an egg. The egg is deposited on either upper or under side of the yucca leaf about midway between the base and tip. The egg is smooth, bluish green in color, somewhat whitish at the crown. It is flattened and measures 4 mm. in circumference and 2 mm. in height. An egg secured immediately after it was deposited on June 14, hatched out June 26. The larva was 5 mm. in length, pale salmon pink in color with large black head and black on first segment back of the head. It ate the tender part of a yucca leaf and formed a cylindrical case in which it concealed itself. On June 29, it apparently had passed through its first moult, as it was considerably longer, lighter in color and the head was smaller in proportion. When 6 days old the larva gave evidence of its burrowing habit by boring into the cork of the bottle in which it was kept. When extricated and given the thick part of a fresh yucca leaf it burrowed into the fleshy part of the leaf and ate its way along the inside of the leaf, making a channel barely larger in diameter than the thickness of the larva itself. When resting, the larva does not remain at the end of this channel but draws back some distance. On July 13, it was $\frac{3}{4}$ inch long, dirty-white in color with dark head and dark spot on first segment. On that date I placed the young larva on a yucca plant in the open, when it entered the leaf from the under side, made its way, over a period of several days, to the main stalk and is apparently making its way downward into the root. At the point where the stalk meets the ground line the larva left a hole in which it will presumably pupate next May.

An Experiment in Marking Moths and Finding them Again (Lepid.: Noctuidae).

By AUBURN E. BROWER, Willard, Missouri

(Map, Plate II.)

The spread of species, the migration of flocks, and the records of individuals outside the usual range of the species have all been the subject of many scientific papers. The migratory swarms of *Alabama argillacea*, the cutworm moths, and other pests have received much attention from economic entomologists. But I have been unable to find any empirical data regarding the movement of marked individuals of the moths. The chances of ever again finding a marked moth are so small that nothing positive seems to have been ascertained regarding the movements of the individuals. In some sections, however, the genus *Catocala* seems to offer a chance for positive data as to the movements of individuals. Large in size, showy in color, single-brooded, of many species and forms, and in some localities found by day resting low-down on tree trunks, they offer a combination of characteristics which lend themselves to such an investigation.

In 1927 plans were made to mark some *Catocalas* and attempt to find them again, but the first requisite to finding them on tree trunks—a stretch of hot, dry weather during the height of the *Catocala* season—was absent. Again in 1928, weather conditions were unsatisfactory. In 1929 the happy combination of numbers of *Catocalas* with a severe drouth in the height of the *Catocala* season resulted in the following work.

The locality (seven miles northeast of Willard, Missouri) is in the Ozark Mountains in southwest Missouri, at an elevation of about 1050-1340 feet. The timbered hills bordering the higher lands are the best *Catocala* country. The area selected, about 1x1½ miles, has been my favorite collecting ground for the last fourteen years. The area contains four separated hollows, each a good collecting ground, separated by ridges and unfavorable hollows. In each of these hollows, except Long Hollow, the area occupied by the moths during hot, dry weather is compact enough so that it can be covered in a half-day.

Lacquers were found to be most satisfactory for marking the moths, as a non-flowing, quick-drying material is needed. Thick oil colors were satisfactory. With enamels, the scales had to be partially removed. Ordinary paint was unsatisfactory. Fine, short-bristled enamel brushes proved best, and all coloring materials needed brushing in, especially on some fresh moths.

A different color was used in each hollow. Bright green, white, red and purple were used, with yellow for some of the last moths. In each locality, on the first half day, the right fore-wing was marked, the next time the left wing, then both wings were similarly marked, and lastly the wings were marked differently. By using two colors many combinations would be easy. Each individual of a species or form received a different mark or combination of marks. Each insect as taken was given a consecutive number in a note-book, a sketch was made of the marked wing or wings, and the location of the tree on which it was captured was recorded.

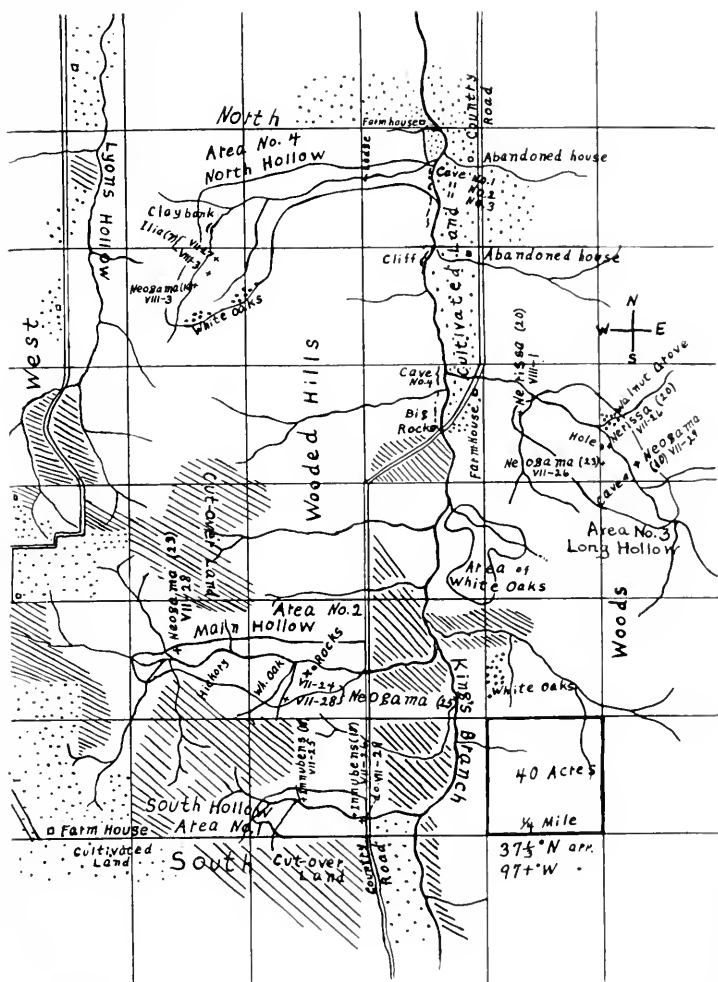
The cyanide jar (sodium cyanide) was used to stupefy the insects. A few were netted, but they were rubbed in the net and struggled so violently while being marked that considerable injury resulted, and none of them was ever found again. The original plan, to mark them as they rested on trees, was also abandoned, except for occasional specimens. The scales shed off coloring materials so readily that great difficulty was found in getting on any color, and the frightened moth had to be followed to see what, if any, mark had resulted, which could not always be done. With the cyanide jar, the moth could be turned out as perfect in appearance as before being caught, and any marking (which should not be too heavy) brushed into the scales. The sketch of the wing and marks could be accurately made, and, if the moth were turned out as soon as the struggles ceased, it would often be crawling up on a tree by the time the data had been recorded. Time and again individuals which had been marked were observed again before work was discontinued in that hollow. As soon as they recovered from the effects of the gas, they took the normal head-down position low-down on the tree trunks, and if they were flushed later, behaved normally in every way so far as I could see.

TABULATION OF MARKED MOTHS.
GIVING DATE, LOCALITY, AND NUMBERS OF ALL FORMS MARKED.

JULY.											AUGUST.										
CATOCALA	24	25	26	27	28	29	30	31	1	2	3	4	5	Totals							
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	Forms	Species					
	1*	2	1	2	1	3	4	3	4	2	1	3									
Ilia	1	11	4	4	2	7	7	6	6	5	1				61						
Conspicua			3	1	2	1	2	1						S	15						
Normani					1	1	1		1					e	4	80					
Neogama	2	7	3	2	1	10	3	9	1	6	4	6			a	62	62				
Amica			1	2	1	2	1		3					r	12						
Androphila	1	2			1	1	1	2						e	11						
Nerissa	1	2	1		10	9	3	5						h	31	54					
Epione	4	3	2	2	3		1	2		3	1	1		e	24	24					
Innubens	3	3	2	2		2	2	1		1	2	2		d	24						
Scintillans			1												1	25					
Laerymosa		1			3		2		2	3				i	25						
Evelina													1	n	1						
Paulina					1										1	27					
Palaeogama		1			2	2	1				1		1	L	8						
Annida			1											o	1	9					
Luctuosa	1													n	1	1					
Piatrix			1		1	1	1	1			1			g	7	7					
Obscura						1			1		1				3	3					
Residua		1		1	3			1			1		1	H	8	8					
Vidua			1		1						1			o	3	3					
Hubalis						2			3	1				l	6	6					
Flebilis												1	2	l	3	3					
Angusi													1	o	1	1					
Junctura										1				w	1	1					
16 Sps. 8 Vars.....	13	31	17	16	9	45	31	30	19	14	17	14		4		314	314				

*These numbers refer to the areas where marking work was carried on upon that date.

The decrease in numbers of marked insects toward the end of the work is partly due to unfavorable weather, but it is largely due to the fact that the time was devoted to searching for *Catocalas* marked instead of marking more.



MARKING MOTHS.—BROWER.

So many factors, such as lizards, squirrels, other insects, direct sunlight, wind-swayed vegetation and thunder storms cause the moths to change their position that they are not greatly frightened by their capture and marking. The number of times some individuals were found is proof that they do not desert the locality. Usually, marked individuals were recognized before being disturbed, and that was the end always sought.

The period when the work was carried on, July 24 to August 6, is the height of the *Catocala* season. The first six days were an unbroken stretch of hot, dry, and calm days. Light, hot winds blew from the west some days, and then the moths were most abundant, especially females. Beginning the night of July 29, local showers and cool winds at times resulted in disturbing meteorological conditions which continued to the end, the work terminating with a rain the night of August 5. No rain fell in the area except very light showers July 30 and August 3. August 4 was clear and bright, but with a cool east wind scarcely a *Catocala* could be found. The table shows the effects of the unsettled weather.

RETURNS FROM MARKED CATOCALAS

ILIA, marked July 25, in Main Hollow. Found July 30, 50 yards east.*

ILIA, marked July 27, in North Hollow. Found August 3, 70 yards southwest.

NEOGAMA, marked July 24, in Main Hollow. Found July 28, 125 yards southwest.

NEOGAMA, marked July 26 in Long Hollow. Found July 28, 1 mile south of west.

NEOGAMA, marked July 26, in Long Hollow. Found August 1, 25 yards north.

NEOGAMA, marked July 27, in North Hollow. Found August 3, 7 yards west.

NEOGAMA, marked July 29, in Long Hollow. Found August 3, 1 mile north of west.

NEOGAMA, marked July 29, in Long Hollow. Found August 1, 125 yards southeast.

*Part of the distances were paced, the others are estimates made on the ground.

- NEOGAMA, marked August 1, in Long Hollow. Found August 3, 175 yards south.
- AMICA, marked July 26, in Long Hollow. Found August 3, 45 yards east.
- AMICA form NERISSA, marked July 26, in Long Hollow. Found August 1, 330 yards northwest.
- AMICA form NERISSA, marked July 27, in North Hollow. Found July 28, 25 yards southwest.
- AMICA, marked August 1, in Long Hollow. Found August 3, 100 yards east.
- EPIONE, marked July 24, in Main Hollow. Found July 25, in the same place.
- INNUBENS, marked July 24, in South Hollow. Found July 25, 15 yards east and July 26, 78 yards west.
- INNUBENS, marked July 24, in Main Hollow. Found July 25, nearby.
- INNUBENS, marked July 25, in South Hollow. Found July 26, 330 yards east, and July 29, 360 yards east.
- INNUBENS, marked July 27, in Long Hollow. Found July 29, 10 yards west.
- INNUBENS, marked July 29, in Long Hollow. Found August 1, 35 yards northeast.
- INNUBENS, marked July 29, in Long Hollow. Found August 1, 235 yards northwest.
- LACRYMOSA, marked July 26, in Long Hollow. Found August 1, 90 yards northeast.
- LACRYMOSA, marked July 29, in Long Hollow. Found August 1, 25 yards west.
- LACRYMOSA, marked August 1, in Long Hollow. Found August 3, 220 yards southeast.
- PALAEOGAMA, marked July 26, in Long Hollow. Found July 29, 80 yards southwest.
- PALAEOGAMA, marked July 26, in Long Hollow. Found August 3, 40 yards northwest.
- PALAEOGAMA, marked August 1, in Long Hollow. Found August 3, 40 yards south.
- RESIDUA, marked July 24, in Main Hollow. Found July 25, 100 yards northeast and July 30, where marked.

RESIDUA, marked July 26, in Long Hollow. Found July 27, 25 yards southeast, July 29, 85 yards southeast and August 3, where marked.

RESIDUA, marked July 26, in Long Hollow. Found August 1, 43 yards southeast.

VIDUA, marked July 25, in South Hollow. Found July 29, 60 yards southeast.

(To be continued)

EXPLANATION OF PLATE II.

This map shows the section where the moths were marked. Unless otherwise indicated, the region is all timbered. The farm lands are stippled, and the cut-over land is obliquely shaded. The numbers and names of the four areas or hollows (enclosed by solid lines), where actual marking work was carried on, are used as column headings in the tabulation of moths marked and in the list of returns. Thus the area in which every moth was marked is given. Some of the places labeled on the map are unmentioned in the text, these and many more served as a basis for note-book entries of the exact place where every moth was marked or was found again on some later date.

A New Species of *Acmaeodera* and One New Subspecies (*Coleoptera*, *Buprestidae*).

By J. N. KNULL, Pennsylvania Bureau of Plant Industry,
Harrisburg.

***Acmaeodera pinalorum* new species.**

Form and size of *Acmaeodera guttifera* Lec., color dark bronze, elytra bluish black, each elytron with eleven irregular yellow spots (paratype with twelve spots which is probably a variable character). Head densely strongly punctured, front with long white pubescence, antennae serrate, beginning with the fifth joint.

Pronotum wider than long, widest in front of middle; front narrower than base, convex, sides broadly rounded from base to apex, side margins not visible from above, surface densely coarsely punctured, punctures coarser and confluent at sides, a short stiff hair arising from each puncture. Elytra at base as wide as base of pronotum, slightly wider back of base, sides sinuate on apical third, broadly rounded toward apices, side

margins serrate on apical half, surface with striae more evident on apical third, punctures of striae coarse, intervals each with a single series of fine punctures, each puncture with a short stiff hair.

Beneath densely coarsely punctured, pubescence short, prosternum produced in front into a broadly emarginate lobe which is rounded at ends, edge of last ventral turned down forming an apical plate, no trace of subapical plate. Length 8 mm., width 2.5 mm.

Described from two specimens labeled base of Pinal Mountains, ARIZONA, July, altitude 4,000 feet, Duncan and Parker, collectors. *Type* in writer's collection, paratype in the collection of Mr. D. K. Duncan who kindly allowed me to retain the types.

This species would fall in group *Acmaeodera lobatae*.*

Professor Fall kindly examined both insects herein described.

***Acmaeodera gibbula gila* new subspecies.**

Size and form of *Acmaeodera gibbula* Lec., color of body, head and pronotum bronze, elytra dark blue, entire insect void of yellow markings. Head densely coarsely punctured, thickly clothed with long white pubescence, antennae serrate beginning with fifth joint.

Pronotum twice as wide as long, sides regularly arcuately narrowed from base to apex, impressions moderately deep, side margins not visible from above, surface closely punctate, clothed with long white pubescence. Elytra at base as wide as base of pronotum, slightly wider just back of base, sides sinuate, then nearly parallel to back of middle, strongly rounded to apices, side margins strongly serrate back of middle, surface with striae more evident on apical third, second, third and fifth intervals more convex toward base, punctures coarser toward sides, very small in center toward base; intervals each with single series of fine punctures, a short stiff hair arising from each puncture.

Beneath densely punctured, legs and ventral surface with long white pubescence, prosternum produced in front into a subrectangular lobe which is truncate in front; last ventral with a thin broad apical plate which gives the appearance of a double margin. Length 9.5 mm., width 3.5 mm.

Described from a specimen in the collection of the writer labeled Gila River Valley, San Carlos, ARIZONA, August, D. K. Duncan collector.

*H. C. Fall—Jour. N. Y. Ent. Soc., V. 7, P. 35, 1899.

A New Butterfly (Lepid.: Nymphalidae).

By NORMAN R. GUNN, 1951 Yosemite Road, Berkeley, Calif.

Melitaea palla (Bdv), *Ab. hemifusa* nov.

Upper surfaces: *Primaries*—Typical as in male *palla* (Bdv). *Secondaries*—Submarginal and next two adjoining rows of spots are completely fused together. The basal area of secondaries is completely obscured by black, except for one elongated spot which does not vary from typical *palla*. Marginal row of spots same as in *pala* but separated from fused area by a narrow black band.

Under surfaces: *Primaries*—Yellow area reduced and fused at apex. Black markings reduced. *Secondaries*—Marginal row of spots normal but bordered on inner side by a distinct black line. Submarginal and adjoining two rows fused with yellow. The third marginal row of spots is not completely obscured and is reduced as it nears inner margin of secondaries. Basal area obscured by red except for one yellow spot. This fusion of yellow is similar to that of *ab. abuorma* (Wright) of *Melitaea hoffmani* (Behr).

Classification: *Ab. Hemifusion*. Secondaries well fused, primaries normal.

Data: *Holotype* male. Expanse 35 mm. Cazadero, Sonoma County, California. May 18, 1929 (G. E. Bohart, Collector). *Holotype* in the Bohart collection at Berkeley, California.

Life History: Probably same as in *palla*. Refer to Comstock's "Butterflies of California" for information.

The Fixation of Types.

By W. S. BLATCHLEY, Indianapolis, Indiana.

"The type specimen in biology is that *individual* of animal or plant, or any part of one, from which the description of a species has been prepared and upon which a specific name has been based. It is the *actual object* which serves as the type of a species in zoology or botany. Type specimens have a particular part and high value in descriptive zoology and botany, comparable to that of the actual object which is taken as the authoritative standard in any system of weights, measures, or coinage. When available for examination they take precedence over any published description or figure and are conclusive evidence in cases of doubtful or disputed specific identity."¹

Accepting the above as a full and, in my opinion, an excellent definition of a *type*, the question arises as to who best knows what that type is. Is it the author of the species who has used a certain individual specimen as most typical of the form which he has described and who has placed aside that individual and labeled it with the name he has given it and the word "type": or is it some other human who has never seen the author's true and only labeled type, but who, impressed perhaps by the importance of his own superior knowledge of the particular group to which the species in question belongs, "fixes" and designates a specimen in another collection as the type of the species in question?

In the past it has been my custom, when describing what I consider a new species, to select a certain typical individual specimen and to attach to it a red label "type." I have not always designated as part of the description this particular specimen as the "holotype" as I expected in time to prepare a single paper in which I would designate or fix the holotypes of all the species I have described.²

On pages 625 and 626 of the *Orthoptera of Northeastern America*, I described as new two species of camel crickets, *Ceuthophilus davis*i and *Ceuthophilus reche*bi, from specimens furnished me by W. T. Davis, of Staten Island, New York. I picked out the most typical example of each, labeled it with a red label "type" and placed on the pin also the name which I had given it. I retained these types in my collection and returned part of the other specimens to Mr. Davis. In the *Florida Entomologist*, XIII, 1929, pp. 18 and 19, Mr. T. H. Hubbell has made *reche*bi a synonym of *davis*i and has designated or "fixed" a certain specimen of each in the Davis collection as a "lectoholotype." Now I do not know, nor do I care, what the ruling of the Entomological Code is in such a case as this. I hold that it is an unjust and unreasonable procedure for the following reasons: (*a*), The author of the species is still living and has in his own collection the original holotype labeled as such: (*b*), The examples so labeled in the Davis collection may or may not be part of the cotypes which I examined and re-

¹ Century Dictionary, Vol VIII, p. 6562. The Italics are mine.

² This paper is now completed and ready for the press.

turned to Mr. Davis as such, as he had numerous other examples of the same species; (c). In similar procedures a person fixing a type, without seeing the one labeled as such by the original author, may even designate an example of a different species or a different genus from the one originally described under that name. Had I died without labeling a specimen in my collection as "type" then, and then alone, would Mr. Hubbell be justified in his action, and not even then until he had carefully compared the specimen so designated with those in my collection under that name.

The designating of a single specimen by the author as the "type" and the term "holotype" used therefor are both recent but very useful practices. According to Henshaw, Dr. J. L. Leconte named as new species 4734 forms of Coleoptera and, according to Calvert, Dr. G. H. Horn named 1582. In very few instances did either of these authors designate a holotype. Maj. T. L. Casey named probably eight or ten thousand species and it was not his practice to name holotypes in connection with his descriptions. H. C. Fall has named approximately 1200 and it is only in his later writings that he designates holotypes in the notes following his descriptions. If other authors were to follow Mr. Hubbell and designate lectoholotypes of numerous species described by these authors but outside of their original collections, there would be a veritable hodgepodge of nomenclatorial confusion. The action of Mr. Hubbell, whatever the Entomological Code may hold, is, in my opinion, much like the heirs meeting and attempting to divide a man's property who is on his death bed but yet alive; or like a Governor appointing a man to fill an office while his predecessor, though expected to die, is yet living and still holding the office.

In conclusion I will say that the holotype of *Ceuthophilus davisi* is a male, labeled "Staten Island, N. Y., Aug., 1917, Coll. by W. T. Davis" and that of *Ceuthophilus reichi* is a male labeled "Yaphank, N. Y., Aug. 26, 1916, Coll. by W. T. Davis." Both are in the collection of W. S. Blatchley, and not in that of W. T. Davis, and they will be "fixed" as holotypes, not lectoholotypes, in the paper above mentioned which will soon be issued.

The Night Flight of Diurnal Butterflies (Lepid.).

Butterflies are day-flying creatures, while most moths fly by night. There are exceptions, however, and it is a well-known fact that a few certain species of moths normally fly by day, but the meagre records of night flights of butterflies indicate that this is an abnormal or unusual condition.

Scudder deals with this topic in a chapter, entitled "Butterflies at Night",* in which he says that butterflies fly by day and generally by the brightest day and in the clearest weather, yet some groups love the forest gloom; a few favor twilight, and the exceptions to the general rule are those which fly by night. He then lists the following instances of this unusual condition:

Eugonia j-album, the Compton tortoise, hundreds of which had flown to a light-house lantern on the Island of Nantucket.

Chlorippe celtis, which is reported by Miss Murtfeldt as entering an open window at 10 o'clock one August evening.

Anosia plexippus, recorded by Merriam in large swarms that flew against and obscured the light of a light-house on Lake Ontario.

Anosia plexippus, *Vanessa atalanta*, *V. cardui*, *V. lunera*, *Euvanesa antiopa*, *Cyaniris pseudargiolus* and *Euphocades troilus*, recorded by Mr. Henry Edwards.

These seem to be the only records up to the time of Scudder's publication. I hereby append my own notes, in the hope of arousing students to make further observations on this interesting behavior; they all refer to one spot in St. Louis, Missouri, and the time is Central Standard.

Phyciodes tharos Dru. May 17, 1929. Flying around light at 11 p.m.

Pholisora hayhurstii Edw. June 11, 1929. Active at 9:15 p.m.

Epargyreus tityrus Fabr. June 7, 1929. Found on floor, dead, in artificially lighted room.

Papilio troilus L. July, 1929. Male observed flying around indoor 200-watt light after 11 p.m.

The study of periodicity in insects is now coming to the fore, and data of this kind are of value in solving problems, not only on when insects become active, but also why they become active at certain periods in each cycle of twenty-four hours.

HAROLD O'BYRNE, Webster Groves, Missouri.

A Preoccupied Name in the Oxybeline Wasps (Hym.: Sphecidae).

Oxybelus taprobanensis NOM. NOV.

Oxybelus ceylonicus Cameron, Ann. & Mag. Nat. Hist. 1900, V: 40; nec *Oxybelus ceylonicus* Cameron, Mem. & Proc. Manchester Lit. & Phil. Soc. 1897, XLI:79. V. S. L. PATE.

*In his *Frail Children of the Air*.

List of the Titles of Periodicals and Serials 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. Annals of the Carnegie Museum. Pittsburgh, Pa.
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. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
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 Laboratorio di Zoologia generale e agraria della
R. Scuola superiore d'Agricoltura in Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hrsg. Adolf Hoffmann. Wien, Austria.
27. Bollettino della Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
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. Transactions of the Entomological Society of 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". Berlin.
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. Comptes rendus hebdom. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
74. Sbornik entomolog. národního musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
76. The Scientific Monthly. New York.
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.
81. Folia myrmecol. et termitol. hrsg. Anton Krausse. Bernau bei Berlin.
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.
86. Zoologica, New York Zoological Society. New York.
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.
96. La Cellule. Liège, Belgium.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Académie Polonaise des Sci. et des Lett. Cracovie, Poland.
101. Tijdschrift voor entomologie, Nederlandsche Entomol. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.

Entomological Literature

COMPILED BY FRANK HAIMBACH AND LAURA S. MACKEY
UNDER THE SUPERVISION OF 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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual volume, and in some cases the part, left, &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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Allard, H. A.—Our insect instrumentalists and their musical technique. [An. Rep. Smiths. Inst.] 1928: 563-591, ill. **Burgess, A. F.**—Imported insect enemies of the gipsy moth and the brown-tail moth. (S). [U. S. Dept. Agric.] Tech. Bull. 86: 147 pp., ill. **Cockerell, T. D. A.**—Some results of a journey to Kaieteur Falls, British Guiana. [75] 4: 439-444. **Crowell, M. F.**—A discussion of human and insect societies. [5] 36: 182-189. ***Ewing, H. E.**—A manual of external parasites. 225 pp., ill. Springfield, Illinois, 1929. [New genera in Mallophaga, Anoplura & Siphonaptera]. **Ferris, G. F.**—The principles of systematic entomology. [Stanford Univ. Pub. Biol. Sci.] 5: 3-169, ill. **Horn, W.**—Ueber die resolutionen des IV. Internationalen Entomologen-Kongresses in Ithaca, 12-18 August 1928. [18] 23: 333-335. **Kusnezov-Ugamskij, N. N.**—Das massenaufreten einiger insekten in ihren uberwinterungsarten und biologische bedeutung dieser erscheinung. [Rev. Zool. Russe] 9: 124-125. **Murillo, L. M.**—Clave dicotomica general de los insectos. [Rev. Soc. Colombiana Cien. Nat.] 4: 195-200. **Park, O.**—Ecological observations upon the myrmecocoles of *Formica ulkei*, especially *Leptinus testaceus*. [5] 36: 195-215, ill. **Strand, E.**—Down with the type-cult. [5] 36: 228-231. **Strickland, E. H.**—Larder beetle infestations arising from tent caterpillars. [4] 61: 238.

ANATOMY, PHYSIOLOGY, ETC.—Becker, E.—Zum bau des kopfes der rhynchoten. I Teil. Bau des kopfes von *Naucoris cimicoides*. [Rev. Zool. Russe] 9: 54-96. **Crowell, M. F.**—A preliminary study of the tracheal system of the

mature larva of *Blepharipa scutellata*. [5] 36: 220-227, ill. **Needham, D. M.**—The chemical changes during the metamorphosis of insects. [Biol. Rev. & Biol. Proc. Cambridge Phil. Soc.] 4: 307-326, ill. **Rau & Rau.**—The sex attraction and rhythmic periodicity in giant saturniid moths. [Trans. Acad. Sci., St. Louis] 26: 83-221, ill. **Schrader, F.**—Notes on reproduction in *Aspidiotus hederæ* (Coccidae). [5] 36: 232-236, ill. **Verlaine, L.**—L'instinct et l'intelligence chez les Hyménoptères. X.—La reine des abeilles dispose-t-elle à volonté du sexe de ses oeufs? [33] 69: 224-238. **Wojtusiak, R. J.**—Entwicklungsgeschichtliche und psychographische studien an Mamestra-Raupen. [100] 1929: 1-54, ill. Ueber die raumorientierung bei *Pieris*-Raupen. [100] 1929: 59-66, ill.

ARACHNIDA AND MYRIOPODA. ***Ewing, H. E.**—(See under General.) **Roewer, C. F.**—Weitere weberknechte III. [Abh. Naturw. Ver. Bremen] 27: 179-284, ill. **Savory, T. H.**—On wolf-spiders' memories. [75] 4: 524-528.

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ANTS, BEES and WASPS. A Record of Observations of the Habits of the Social Hymenoptera. By Sir JOHN LUBBOCK (LORD AVEBURY). New ed., based on the 17th, edited and annotated by J. G. MYERS. With four colored plates by A. J. E. Terzi. E. P. Dutton Co., New York. 1929. Pp. xviii, 377, 6 pls., 31 text figs. \$3.75.

In this new edition of Lubbock's classical treatise on Ants the original text has been left intact and occupies about two-thirds of the volume. The remaining third, except for a few of Lubbock's own appendices, consists of annotations by the editor. These are exceedingly well done and greatly enhance the value of the book to readers who are not so familiar with the most recent writings upon insect behavior and the ecology of the social insects. Just as Lubbock himself continually inserted among the records of his own work the observations and conclusions of his predecessors and contemporaries including Huber, Forel, Emery, von Hagens, and others, so the present editor, following the spirit of Lubbock, has made available, in the annotations, the most recent observations and theories of Forel, Wheeler, von Frisch, Donisthorpe, Eidmann, Bequaert, Lutz, and others. These notes are largely actual quotations. Among them we find translations of von Frisch's work, being the most extensive account which has yet appeared in English. In the notes and in the text we find recorded both observations and interpretations and in both places it is the observations which excite our interest and the interpretations which merely divert us. We thus come to realize that good observations are ageless and permanent if recorded with sufficient care; and we find, indeed, that Lubbock has survived because he did not fall into the error of giving "general statements rather than . . . accounts of the particular experiments and observations on which these statements rest," for which Lubbock criticizes Huber on one occasion. Altogether the book continues to fulfill the author's purpose in that it shows "the great interest of the subject and the numerous problems which remain to be solved."—R. G. SCHMIEDER.

INSECTS THEIR STRUCTURE & LIFE. A Primer of Entomology. By GEORGE H. CARPENTER, D.Sc., Keeper of the Manchester Museum, sometime Professor of Zoology in the Royal College of Science for Ireland. Second edition, revised. New York, E. P. Dutton & Co., publishers. 21 x 14 cm., xii + 335 pp., 184 text figs., 4 colored plates. \$3.75. Received from the publishers Oct., 1928; not dated except after the preface: April, 1924.

Thirty years ago the present reviewer wrote a notice of the

first edition of this book, occupying a page in the NEWS for November, 1899. The preface to the volume now before us makes it evident that a second edition appeared in 1924. A copy of that date is not available and how far this revision differs (if at all) we can not say; no work of any year later than 1924 is cited in the classified "References to Literature", which occupy pp. 310-323. As compared with the first edition, the number of the chapters is the same and so (practically) are their titles and their subheadings, except that sections on wing-growth and metamorphosis have been added to Chap. II (Life History of Insects), on Germ-plasm and Body, Mutations, Alternative Inheritance, Sex-linked Inheritance, Inheritance and Segregation, Germinal Modifications and Darwinism and Mendelism to Chapter III (Classification and Evolution of Insects) and on Protura to Chap. IV (Orders of Insects). Many minor changes have been made in the text throughout the book and the page forms are entirely new. There are 184 text figures, the same number as before, but some of those of the first edition have been combined under one number and six are new to this text (nos. 22, 58, 91, 93, 135, 172). Four colored plates, from Poulton, Bateson and Watson, lacking in the first edition, illustrate protective resemblance in caterpillars, alternative (Mendelian) inheritance in moths, two species of Saturnid silk moths and their cocoons and the mimetic female varieties of *Papilio dardanus*. The literature list at the conclusion of the volume has been largely revised, although the number of titles (237) is only 20 more than that given in 1899.

This work of Carpenter's most resembles Folsom's among our American text books, in its many-sided treatment of the subject, but differs therefrom in giving much more space to taxonomy, describing the principal families under each order; but it is not designed to serve as a means of further identification, nor does it contain keys. It deals but very briefly (pp. 281-283) with the economic aspects of insects in their relations to man. All in all, it is an excellent volume and its illustrations, being taken so largely from American sources, fit it as well for use on this side of the Atlantic as in Great Britain.

P. P. CALVERT.

INSECTS, TICKS, MITES AND VENOMOUS ANIMALS OF MEDICAL AND VETERINARY IMPORTANCE. Part I.—Medical. By WALTER SCOTT PATTON, M.B., Dutton Memorial Professor of Entomology, Liverpool University, and Liverpool School of Tropical Medicine, and ALWEN M. EVANS, D.Sc., Lecturer on

Entomology in the same School. Illustrated by Edith Mary Patton, Alwen M. Evans and A. J. Engel Terzi. Photographs by M. Brown. With a Foreword by Emeritus Professor Robert Newstead. Made in Great Britain by H. R. Grubb, Ltd., Croydon. MCMXXIX. Crown 4to. x+785 pp., 374 text figs., 60 plates, 3 maps, large illustrated revision sheet. Obtainable only from the Entomological Dep't., Liverpool School of Tropical Medicine, at 20 shillings, including packing and postage, to any part of the world. The U. S. duty will bring the price to about \$5.68.

This portly volume replaces Patton and Cragg's *Textbook of Medical Entomology* (1913), stated to be now out of date and out of print. It has been published privately in order that it may be sold at the very reasonable price above stated. Had it been published in the usual way its price would have been prohibitive to most medical officers and nearly all students of entomology.

The authors state in the preface: "In writing this book we have had two objects in view. It has been primarily written for the medical officer approaching the subject for the first time The second, and perhaps the most weighty reason, is to make available in handy form not only the essentials of the subject, but a great deal of more detailed information which is at present neither available in books on entomology, nor even in papers on the subject we have devoted a large part of this book to the subject of morphology and phylogeny, believing that the former is of fundamental importance, not only as a guide to the systematic part of the subject, but also as a help to the investigator, in understanding the anatomy and homologies of the structures in which he may find pathogenic parasites."

Following the preface is a page of dedication of this book "to the memory of the following twelve well-known Medical Men and Scientists, and to other Workers of all Nationalities who have died while investigating the Etiology of those Diseases the causal Organisms of which are transmitted by Insects and Acari; J. M. Lazear, W. Myers, J. E. Dutton, F. M. G. Tulloch, F. Schaudinn, J. Carroll, S. von Prowazek, A. W. Bacot, F. W. Cragg, A. Stokes, H. Noguchi and W. A. Young."

Primarily this book is intended for those following the "course for the diploma in Tropical Medicine, University of Liverpool, and for the diplomas in Tropical Medicine and Hygiene in other tropical schools and universities." The Introduction, pp. 3-9, gives an outline of the way in which the course is given at Liverpool and the text is correspondingly arranged

under twenty-eight meetings of the class. Curiously enough, there is no table of contents of the book, although an alphabetical index occupies pp. 771-785. The following summary will indicate the sequence of subjects discussed, irrespective of their grouping under class "meetings".

Classification of the Animal Kingdom, of the Arthropoda and of the Hexapoda to Orders (pp. 10-36). External Anatomy (pp. 37-103) and Internal Anatomy (pp. 104-171) of Insects with especial reference to the Diptera. Wing Venation of the Diptera (pp. 171-189). Systematic Study of the Diptera of Medical Importance, beginning with the Nematocera and ending with the myiasis-producers (pp. 189-494). Siphonaptera (pp. 494-541). Anopleura, including Mallophaga, and Hemiptera (pp. 541-601). Arachnida, Acarina (pp. 601-664, 676-690). Linguatulida, Copepoda, Insects of Orders other than those above mentioned (pp. 664-675), Leeches (p. 675). Stinging, Vesicating and Venomous Animals (pp. 690-706). Dissecting, Collecting, Preserving, Mounting and Breeding Methods (pp. 706-735). Principles underlying control of injurious arthropods, control of mosquitoes and of *Glossina* (pp. 735-770).

Under each "meeting" the text is arranged in two parts, the first being the synopsis of a lecture, the second being illustrative laboratory work, comprising descriptions of mounted slides, or of specimens preserved in other ways, 558 in all, with notes on the habits, stations and other peculiarities of the species concerned. On page 8, the authors rightly say: "By cutting down the time spent on lecturing on this subject to the absolute minimum, more time is available for the study of the practical material in the laboratory where alone the student will learn the essentials of the subject." Some teachers will, perhaps, consider that even more of the lecture material may be transferred to the laboratory. Here and there are to be found summaries of certain lectures and laboratory work in order to emphasize the most important facts for the student. There is, in consequence, much repetition throughout the book.

With respect to taxonomy, it may be noted that only two suborders of Diptera are recognized, Orthorrhapha and Cyclorrhapha, the Pupipara being classified as subfamilies of the Muscidae Calypteratae; the Cyclorrhapha "are classified in two families, the Muscidae Acalypteratae and the Muscidae Calypteratae"; the species formerly included in the Oestridae "are classified in subfamilies of the Muscidae Calypteratae and are placed in what is believed to be their natural positions."

"It will be noted that we have retained the familiar and well

established names of medical importance. We see no satisfactory reason for increasing the difficulties of the medical officer by asking him to learn new and unfamiliar names of doubtful validity. To correct the name of an insect of old standing, in supposed obedience to the letter of the Law of Priority, is often to act contrary to the spirit of that Law. The plea for the retention of an old and familiar name, notwithstanding its questionable validity, is to be urged with particular force, especially when the insect named is either of medical or veterinary importance" (p. vii). "In this book the old and familiar names are strictly adhered to, for instance the yellow fever mosquito, the important carrier of the unknown parasite of the disease, is *Stegomyia fasciata*; the important carrier of the parasites of malaria in Tropical Africa is *Anopheles costalis*. Although the alternative names are given, we recommend our students to use these familiar names and no others" (p. 36). ["So this is progress!"]

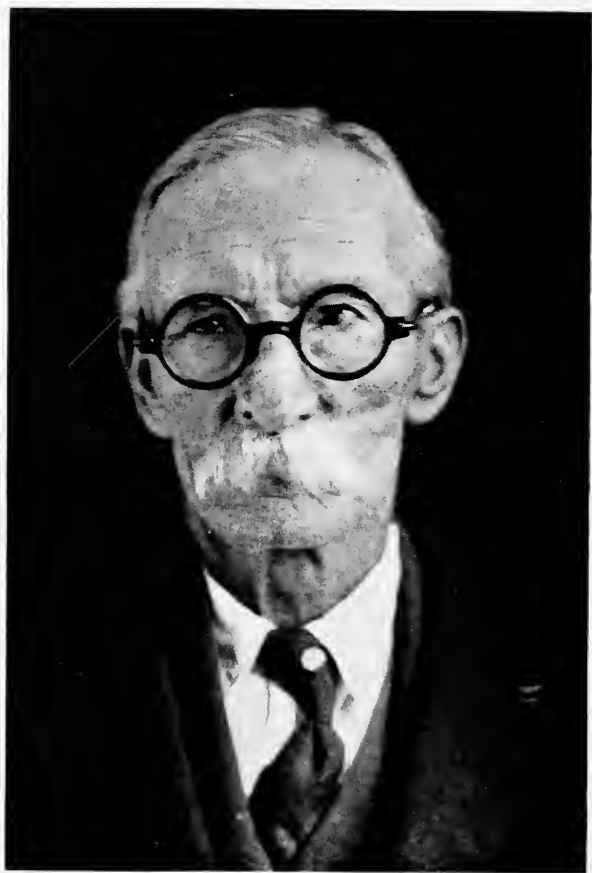
References to literature have been entirely omitted from this volume on the ground that "the medical officer stationed in the tropics is an isolated worker, has no library and certainly cannot afford to carry about with him a large number of journals and papers in which the information he wants may be found." We suspect that many others, not peripatetic medical officers, who will be glad to use this book for various purposes, will find it necessary to supply this lack.

The authors rightly claim that "the illustrations of the book are its special feature, for a large proportion are original and are drawings of the specimens exhibited" in the courses at Liverpool. Others are from the old *Patton and Cragg* and from a variety of sources. The fullness of their lettering and explanation will be of the greatest service to the many users which the book will find. Especially noteworthy are the numerous figures of internal organs and of sections, which will interest all students of morphology. The large "revision sheet" ($26\frac{3}{4} \times 17$ inches), consisting of figures of the principal arthropods discussed and attached to the back cover of the book, must not be forgotten.

We confidently predict that the authors' hopes as to the great usefulness of their work to both parasitologists and to those engaged in other fields of entomology will be fully realized.

Three other parts or volumes uniform with this are planned as follows: Part 2, Public Health by Patton, ready in 1930; Part 3, Tropical Hygiene by Patton and Evans, ready in 1930; Part 4, Veterinary by Patton and Pillers, ready in 1931.

P. P. CALVERT.



THOMAS NESMITH BROWN.

OBITUARY.

THOMAS NESMITH BROWN.

(Portrait, Plate III).

Thomas Nesmith Brown was born in Uniontown, Pennsylvania, on December 24, 1851, and died in the city of his birth on January 19, 1929. Thus briefly are recorded the beginning and the end of a life outwardly uneventful but in reality of singular interest and achievement.

While he was still a young man, Mr. Brown's attention became attracted to entomology through reading a book on butterflies, which he purchased at second hand. The interest thus aroused led him to further study, and to the collection of this and other groups; and for more than forty years he continued to build up a large and valuable private collection, especially of Lepidoptera and Coleoptera. He spent a year in California (1903) and a year in Oklahoma (1913); but for the most part his work was confined to western Pennsylvania and West Virginia, and especially the immediate vicinity of Uniontown.

He was particularly successful in collecting Cychrini, which he exchanged in large numbers for specimens from all over the world. There are at least two collections in Pacific Coast universities containing series of this group bearing Mr. Brown's name as collector, which is partially representative of the extent of his exchanges.

His method of collecting was interesting. He would visit some of the deep, secluded valleys among the mountains near Uniontown, and pile flat stones one on top of another, wherever he could find them. The following year he would go back and collect the beetles that had taken up residence in the convenient crevices thus provided. I am not sure that this procedure was original with Mr. Brown, but it certainly was effective as he used it, especially for such forms as *Scaphinotus (Irichroa) germari* Chaud. and *ridingsi* var. *monongahelae* Leng.

Mrs. Brown wrote me shortly after his death, "He had about fifteen thousand specimens in his collection, and he still was collecting till we would not let him go to the mountains, for it was not safe for him in the condition he was in." My own

memory is that his collection of all groups was even larger than this.

This indefatigable collector found time also to assemble an interesting group of geological specimens, and of Indian relics. He was further a skillful artist, executing a number of paintings of butterflies and moths, accurate and beautiful in detail. Most of his collections were given, shortly before his death, to the Benjamin Franklin High School, of Uniontown.

Mr. Brown's achievements were the more remarkable in view of the limitations under which he labored. Without even the advantage of attending high school, he educated himself, reading widely and understandingly in many scientific fields. Hampered by limited means, and forced even in the feebleness of age to earn his living day by day (he was a horticulturist and landscape gardener), he allowed nothing to discourage him from scientific and intellectual pursuits. I visited him last on his seventy-seventh birthday. In broken health, and mourning the recent death of his daughter, he was self-contained, uncomplaining, glad to converse on scientific subjects, eager for intellectual adventure, and undismayed by the spiritual adventure on which he knew he was soon to embark.

He is survived by his widow, Mrs. Louise Malone Brown, to whom he was married on September 13, 1877, and by one daughter, Mrs. Phoebe Glick, of Uniontown.

While Mr. Brown was known through correspondence and exchange to a wide circle of entomologists at home and abroad, his principal service was to his own community, where all his life he labored to stimulate interest in natural history, and in the study of the local fauna, flora, and physiography. He represented a fine type of amateur naturalist all too rare in America today. Particularly interested in young people, he always warmly welcomed the boys who came to him with their questions about the out-of-doors, encouraging and instructing them, lending his books and giving freely of his time. Those boys, one of whom was the present writer, will always hold him in grateful memory.

ROBERT C. MILLER.

University of Washington.

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TO CONTRIBUTORS. All contributions will be considered and passed upon at our earliest convenience and, as far as may be, will be published according to date of reception. The receipt of all papers will be acknowledged. Owing to the limited size of each number of the NEWS, articles longer than six printed pages will be published in two or more installments, unless the author be willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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DR. THOMAS J. HEADLEE

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North American Institutions featuring Lepidoptera.

XI. Rutgers University, New Brunswick, New Jersey.

By J. D. GUNDER, Pasadena, California.

(Plates IV, V.)

It is interesting to note that the principal colleges and schools in United States where entomology is seriously taught are non-sectarian. There is not much danger, therefore, of direct interference by certain classes of anti-evolutionists, so far as it may concern the study of insects.

Rutgers University at New Brunswick is the State University of New Jersey and was founded in 1766 by the former Protestant Dutch Church of America. It is one of the old colonial colleges and its history is set forth in a book entitled, "History of Rutgers College" published by Dr. Wm. H. Demarest in 1924. Like most of the old seats of learning, it is supported by accumulated private funds with occasional State and Federal aid. The school is situated on an original site of some thousand acres and occupies more than two hundred buildings, many of which are modern, while the majority are small and of the old stone and brick type, though quite suited for their purposes. The enrollment for 1929 was over nine thousand. The University divides its activities among six branches, called; the College of Arts and Sciences, the College of Engineering, the College of Pharmacy, the College of Agriculture, etc.

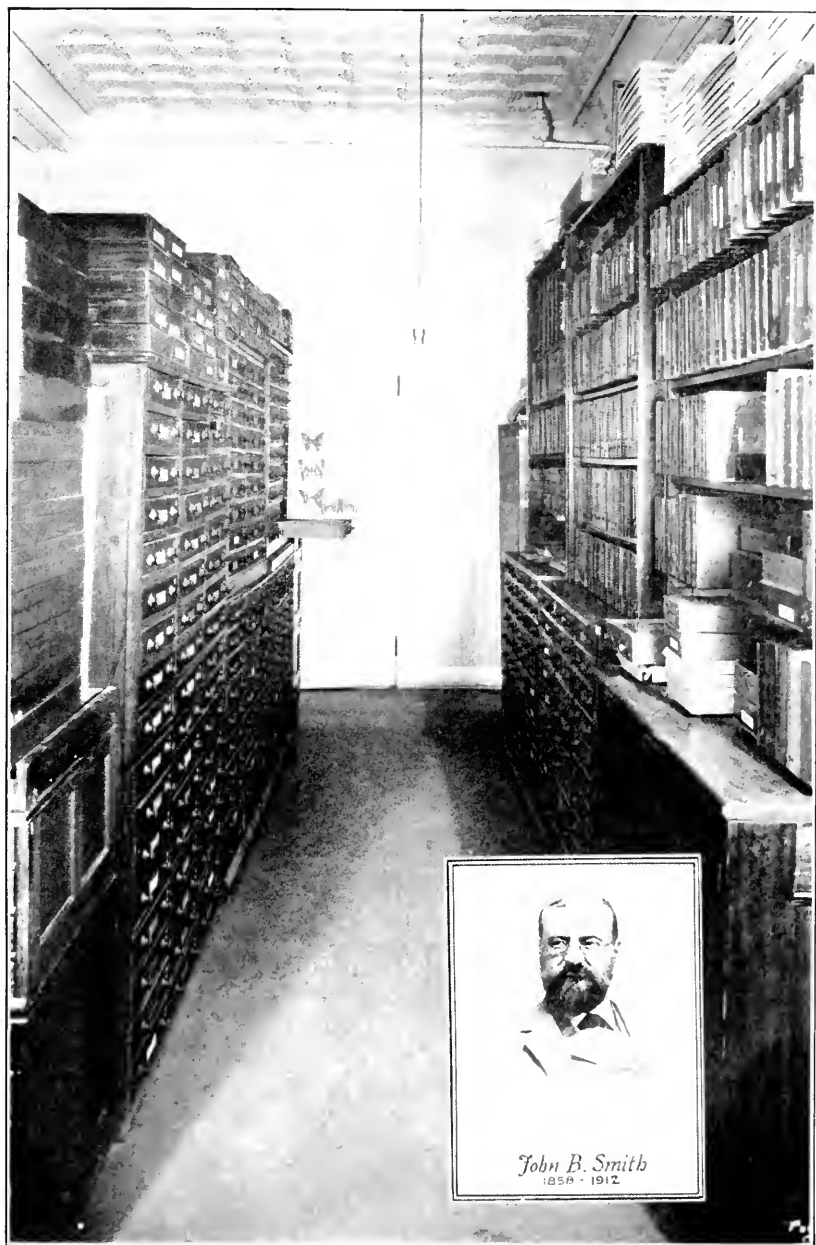
Of interest to lepidopterists is the Department of Entomology in connection with the College of Agriculture, because it was here that Dr. John B. Smith, Rev. Geo. Hulst and others developed their work and deposited their collections. Hulst instigated the first entomological studies in 1888. He was an alumnus of the Class of 1866 and when he died his collections of butterflies and moths were left to the school. Though many of his types are now in Washington, the bulk of his collections remain as he left them. Smith first came to Rutgers in 1889

and proceeded to organize the Entomological Department along educational lines, becoming its first professor in charge. At the same time he was appointed entomologist for the New Jersey Agriculture Experimental Station. Later, in 1898, his work merited the office of Chief State Entomologist. Dr. Smith was with the University up until the time of his death in March, 1912,¹ and probably his outstanding accomplishment was in the Noctuidae of which he described the types of many new species, adding approximately 800 to the collection. Smith's two Check Lists of Lepidoptera (1891 and 1903) are well remembered, but of course are long since out of date. His "Explanations of Terms used in Entomology" is still unique and no one seems willing to attempt a newer revision.

Dr. Smith did outstanding work in the field of economic entomology as well, bringing about the control of the San Jose scale. It is due to his research that miscible oils were placed on the market, as a means of controlling this and other scale insects. He accomplished the passage of the first insect laws in his state and his mosquito control work stands as a model for similar efforts elsewhere.

Plate V shows the collections as they appear today. They are well kept and in good order. Most of the Noctuidae are in the uniform cabinets to the left in the picture. Some day some one will segregate the type specimens, but whoever does this should know his business, otherwise the collection should be left as it is. There are about 30,000 lepidopterous specimens altogether. Aside from Smith's material there are about 100,000 mounted specimens in all orders in the Department's collection, as follows: 35,000 Coleoptera; 14,000 Hymenoptera; 4000 Hemiptera; 4000 Diptera; 1400 Orthoptera and representatives in other Orders in proportion. Although no new types have been added of late years, there is always that hope. However, the bulk of the collection is gradually increasing in size. Miss Augusta Meske, who is Dr. Smith's sister-in-law, is still an Assistant Entomologist in the Department. I understand there are 55 students taking a straight course in entomology at the present time.

¹ See obituary in May, 1912, ENTOMOLOGICAL NEWS; also notice in May, 1912, *Canadian Entomologist*, by Mr. Arthur Gibson.



An aisleway in the Entomology Building showing
Dr. Smith's collections as they look today.

Dr. Thomas J. Headlee was appointed to fill the vacancy caused by the death of Dr. Smith and he is shown on the accompanying Plate IV seated at his desk in conference with Mr. Carl Ilg. Dr. Headlee received his A.B. and A.M. at the University of Indiana and his Ph.D. at Cornell University. While interested generally in insect physiology, most of his studies have been along the lines of strict economic entomology and he has published more than 170 articles in various kindred journals. Among his first papers, though probably not his most important, was "A Study in Butterfly Wing Venation, with Special Regard to the Radial Vein of the front Wing", Smithsonian Miscellaneous Collections, 1907. A recent paper of interest appearing in the March, 1929, Jour. N. Y. Ent. Soc. is titled "Some Facts Relative to the Effect of High Frequency Radio Waves on Insect Activity". This article is in co-authorship with R. C. Burdette.

Every lepidopterist who goes to Rutgers to study the collections meets and knows Carl Ilg. Mr. Ilg has been with the Department as Laboratory Assistant since 1921 in charge of the insects and exhibit material. His special hobby is the making of miniature insect habitat groups. I have seen several of these little exhibit cases and they are truly clever. Mr. Ilg should be encouraged to pursue his talent along this line. Many museums and schools might be interested in such products. Mr. Ilg was born in Wurttemberg, Germany, and worked for a while at Cornell University.

The New Biological Laboratories at Canberra, Australia.

Dr. R. J. TILLYARD, the Commonwealth Entomologist, wrote to the editor of the NEWS on November 26, 1929: Our fine new Laboratory Building, which should have been ready by July, is still not complete, but we are in possession of half the ground floor. . . . We hope to be in possession of the entire building by January 1st, and we have also two fine new insectaries in good working order. Next year there will still remain the big central Administrative Block and the Botanical Laboratory to be built. . . . So we shall not be completely installed until December, 1930, or even later.

Philip Henry Gosse's Entomology of Newfoundland.

Introductory Note by F. A. BRUTON, M.A., Litt.D.,

27 Clevedon Rd., Weston-super-Mare, Somerset, England.

Philip Henry Gosse, the English Naturalist, landed at Carbonear, in Newfoundland, in the year 1827, when he was seventeen years old; and for some eight years he was employed in a shipping firm in that country. In May, 1832, he purchased a copy of Adams's "Essays on the Microscope" at a sale at Harbour-Grace, and of that year he wrote: "In 1832 I commenced that serious and decisive devotion to scientific Natural History which has given the bent to my whole life."

In 1835 he left Newfoundland, and bought a farm at Compton in Canada. Here, in the following year, as his biographer tells us, he wrote his first book, entitled: "Entomologia Terrae Novae", which has never been published. Early in 1839 he returned to England, and on the voyage he wrote his "Canadian Naturalist", which was published in London in the next year, and had a favorable reception.

In response to a number of requests from Canada and Newfoundland, the late Sir Edmund Gosse searched carefully, but without success, for his father's "Entomologia Terrae Novae". Since Sir Edmund's death, however, the volume has been found by his son, Dr. Philip Gosse. In a small book, with between sixty and seventy pages, there are nearly two hundred and fifty beautiful hand-painted figures of insects, larvae, and pupae, and the pages are headed, in very faint pencil, more or less according to the list of orders and genera given in the twelfth edition of Linnaeus's "Systema Naturae."

In this connection, it may be interesting to quote a few sentences from the author's preface to his "Manual of Marine Zoology", published many years afterwards. There he says:

It is now about twenty-four years ago that, in a land far remote from this, I began the study of Systematic Zoology with Insects.

In my ignorance, I attacked it entire and indivisible—collecting and trying hard to identify everything that I found, from the Cicindela to the Podura.

I had not an atom of assistance towards the identifications, but the brief, highly condensed, and technical generic characters of Linnaeus's "Systema Naturae"; over which I puzzled my brains, specimens in hand, many an hour.

At the beginning and end of the book, very faintly pencilled, are long lists of insects, which seem to be of the nature of memoranda. One list is headed: "Insects described but not painted herein." The book, however, contains no descriptions whatever, and we can only conclude that the intention was frustrated by other duties. That a wide field is covered may be seen from the list that follows. The pictures evoked the admiration of the experts at the British Museum.

With the consent of Dr. Philip Gosse, I took the book to the British Museum (Natural History) at South Kensington, in March, 1929, and there Major Austen, D.S.O., who is the Keeper of Entomology, very kindly arranged that I should submit the book in turn to the Heads of the various Sections under his direction. I must here acknowledge, most gratefully, the great kindness of Major Austen and the following members of his Staff, who spared no pains in the attempt to identify and classify the Insects figured in the book. The names are:

Mr. G. J. Arrow and Mr. K. G. Blair, (Coleoptera); Mr. W. E. China and Mr. R. J. Izzard, (Hemiptera); Captain N. D. Riley, Mr. W. H. Tams, and Mr. H. Stringer, (Lepidoptera); Mr. D. E. Kimmins, (Neuroptera); Dr. Waterston, Mr. R. B. Benson, and Dr. Charles Ferrière, (Hymenoptera); and Miss D. Aubertin and Mr. F. W. Edwards, (Diptera).

Some of the figures are named, but hardly any of these names would stand now; a few had been re-named by Mr. W. H. Edwards in 1882. English names ("Banded Veneer", etc.) had been appended to a number of the moths.

ENTOMOLOGIA TERRAE NOVAE

PHILIP HENRY GOSSE

List of Insects Figured, Pages 1 to 61.

ORTHOPTERA

ACRIDIDAE: *Melanoplus* sp.

DERMAPTERA

FORFICULIDAE: *Forficula* sp.

EPIHEMEROPTERA

Three larvae of *Ephemera*.

ODONATA

GOMPHIDAE: *Gomphus* sp. AESCHNIDAE: *Aeschna* 2 spp.
CORDULIDAE: Two specimens. LIBELLULIDAE: *Libellula quadrimaculata* Linn. LESTIDAE: One specimen. AGRIONIDAE: Two specimens.

THYSANOPTERA

Thrips, sp.

HEMIPTERA

PENTATOMIDAE: Doubtful genus pencilled *Cimex*. LYGAEDAE: *Eremocoris fesus* Say. MIRIDAE: *Calocoris norvegicus* Gmelin. GERRIDAE: *Gerris remigis* Say. CORIXIDAE: One specimen, probably *Arctocoris* sp. (pencilled: *Notonecta*). CICADELLIDAE: *Deltocephalus configuratus* Uhler, *Draeculacephala angulifera* Walker or *noveboracensis* Fitch, *Evacanthus acuminatus* Fabricius.

NEUROPTERA

HEMEROBIDAE: *Hemerobius* 2 spp.

TRICHOPTERA

LIMNOPHILIDAE: *Limnophilus* sp. Another specimen.

LEPIDOPTERA

Classified according to the Check-List of Lepidoptera of Boreal America: by Wm. Barnes and J. Mc. Dunnough.

RHOPALOCERA—PAPILIONIDAE: *Papilio glaucus canadensis* R. & J., *P. polyxenes brevicauda* Saunders. PIERIDAE: *Pieris napi (frigida)* Scud. gen. aest. *acadica*. Edw. NYMPHALIDAE: *Aglais milberti* Godt., *A. antiopa* Linn., *Vanessa atalanta* Linn., *Vanessa cardui* Linn. SATYRIDAE: *Oeneis chryxus calais* Scud., *Coccyonympha inornata* Edwards. LYCAENIDAE: *Heodes cyprianthe* Boisduval, *Plebeius scudderii aster* Edw., *Pl. aquilo* Boisduval, *Glaucopsyche lygdamus couperi* Grote.

HETEROCERA—NOCTUIDAE: *Euxoa* sp., *Agrotis plecta* Linn., *Lycophotia occulta* Linn. *Xylota nupta* Lintner, *Trachea finitima* Guenée, *Agroperina cogitata* Smith, *Eremobia claudens* Walker, *Hyppa xylinoides* Guenée, *Apamea nictitans* Linn., *Autographa brassicae* Riley, *A. putnami* Grote, *A. bimaculata* Stephens. LYMANTRIIDAE: *Notolophus antiqua* Linn. GEOMETRIDAE: *Rachela bruciata* Hulst, *Calocalpe undulata* Linn., *Dysstroma cervinifascia* Walker, *Eulype hastata* Linn., *Meso-*

leuca ruficiliata Guenée, *Lygris propulsata* Walker, *Eufidonia notataria* Walker, *Bapta vestaliata* Guenée, *Itame sulphurea* Packard, *I. subcessaria* Walker, *Pero honestarius* Walker. PYRALIDAE: *Crambus agitatellus* Clemens, *C. topiarius* Zeller, *C. innotatellus* Walker, *C. trichostomus* Christoph, *Evergestis straminealis* Hüb., *Phlyctaenia itysalis* Walker, *Pyrausta orphisalis* Walker. TORTRICIDAE: *Tortrix* sp. EUCOSMIDAE: *Epiblema* sp., *Olethreutes dealbana* Walker, *O. capreana* Hübner, *Ancylys biarcuana* Stephens. OECOPHORIDAE: *Depressaria* sp. (near *applanata* Fab.), *Dasyccra* sp. (near *sulphurella* Fab.). PTEROPHORIDAE: *Platyptilia carduidactyla* Riley.

COLEOPTERA

CARABIDAE: *Sphaeroderus lecontei* Dej., *Notiophilus aquaticus* Linn., ? *Agonum* or ? *Platynus* (probably *Platynus cupripennis* Say.), *Carabus maeander* Fisch., *Loricera pilicornis* Fab. DYTISCIDAE: ? *Agabus*, ? *Hydroporus*. GYRINIDAE: *Gyrinus* sp. STAPHYLINIDAE: *Crcophilus maxillosus* Linn. SILPHIDAE: *Necrophorus* ? *mortuorum* (Note: *mortuorum* is recorded from Nfld.). BYRRHIDAE: *Cytilus sericeus* Forst. (Nfld.). COCCINELLIDAE: *Coccinella trifasciata* Linn., *Adalia bipunctata* Linn. TELEPHORIDAE: *Telephorus* sp. ELATERIDAE: *Corymbites pictus* Cand., *C. triundulatus* Rand., *C. kendalli* Kirby. MORDELLIDAE: *Mordella* sp. PYROCHROIDAE: *Dendroides concolor* Newman. CEPHALOIDAE: *Cephaloon lepturoides* Hald. APHODIIDAE: *Aphodius fimetarius* Linn. CERAMBYCIDAE: *Criocephalus agrestis* Kirby, *Leptura* ? *lacta* Leconte, *Evodinus monticola* Rand. HALTICIDAE: *Phyllotreta vittata* Fab., *Chaetocnema* sp. CURCULIONIDAE: *Otiorhynchus* ? *sulcatus* Fab., *Orchestes* sp., *Sitona* 2 spp., *Notaris* ? *aethiops* Fab. or *puncticollis* Lec. (Nfld.), *Pissodes notatus* Fab., *Calandra* ? *granaria* Linn. or *oryzae* Linn. SCOLYTIDAE: *Dendroctonus rufipennis* Kirby.

HYMENOPTERA

TENTHREDINIDAE: Three larvae, *Cimbex violacea* Kirby, *Trichiosoma* (larva only), *Trichiosoma* sp. SIRICIDAE: *Urocerus albicornis* Fab. (female), *U. flavicornis* Fab. (male and female), *Sirex abbotii* Kirby (male), *S.* ? *cyaneus* Fab. (fe-

male). ICHNEUMONIDAE: (as numbered by Gosse): 1. *Coelichneumon coeruleus* Cresson (female), 2. *Ichneumon* sp. (male), 3. *Henicospilus* sp. (female), 4. *Ctenichneumon* sp. (female), 5. *Ephialtes* sp. (female), 6. *Ichneumon* sp. (male), 7. *Ctenichneumon* sp. (male). CLEONYMIDAE: one figure (not *Chalcis* as marked). FORMICIDAE: *Formica* or *Camponotus* (an alate form). CHRYSIDIDAE: *Chrysis* sp. VESPIDAE: *Vespa* sp., *V. maculata* Linn., *Odynerus* sp. CRABRONIDAE: *Crabro* sp. APIDAE: *Nomada* sp.

DIPTERA

TIPULIDAE: *Pedicia albivitta* Walker, *Eriocera spinosa* Osten Sacken, *Tanyptera dorsalis* Walker. PTYCHOPTERIDAE: *Bittacomorpha clavipes* Fab. STRATIOMYIDAE: *Stratiomyia laticeps* Loew, *Orycera* sp. TABANIDAE: *Chrysops* sp., *Tabanus zonalis* Kirby. ASILIDAE: *Laphria lasipus* Wiedemann. SYRPHIDAE: *Volucella* ? *erecta* Walker, *Syrphus* sp.

THE END.

A New Species of *Nemobius* from North Carolina (Orthoptera: Gryllidae).¹

By B. B. FULTON, N. C. State College, Raleigh, North Carolina.

*Nemobius sparsalsus*² new species.

This species was found in a strip of marsh grass, *Spartina stricta*, bordering a shallow sound near Carolina Beach, sixteen miles south of Wilmington, North Carolina. Its presence was detected by its distinctive type of song.

Type; female; Carolina Beach, N. C., Sept. 12, 1928. Types deposited in the U. S. National Museum.

Size large for the genus. Head as wide as pronotum. Eye 1.4 times as long as wide. Length of segments of maxillary palpus as follows: third 1.0 mm., fourth .7 mm., fifth 1.5 mm. Diameter of fifth segment increases gradually to tip which is slightly obliquely truncated; diameter at tip .35 mm. Pronotum 2.6 mm. long; greatest width at middle 3.4 mm.; slightly narrower at anterior and posterior margins; median line impressed; covered with fine brown pubescence and scattered black bristles. Tegmina cover about half the abdomen; dorsal

¹ Published with the approval of the Director of Research as Paper No. 35 of the journal series.

² From *Spartina*, marsh grass and *salsus*, salt.

field obliquely truncated; intermediate channel rather wide, distally narrowing to three-fourth of width at middle. Dorsal field of right tegmen with three complete veins, the external one forked, and a fourth nearly complete vein. Dorsal field of left tegmen with only one complete vein, which is forked, and a vestigial second vein. Hind tibia four-fifths and tarsus three-fifths the length of the femur. Spurs and spines of hind tibia unusually long for the genus; disto-ventral spurs very unequal in length; the longest inner spur (2.9 mm.) reaches the base of the disto-internal spur of the metatarsus; disto-internal spine nearly equals longest spur (2.7 mm.). Ovipositor slightly shorter than hind femur; with a slight but distinct curve about the distal third; upper edge nearly straight at tip, with low rounded teeth; extreme tip of upper rods obliquely truncated.

Color nearly uniform dark sepia, becoming nearly black on occiput, pronotum, dorsal field and upper portion of lateral field of tegmina. Proximal portion of hind femora lighter sepia. Faint trace of four lighter longitudinal lines on occiput.

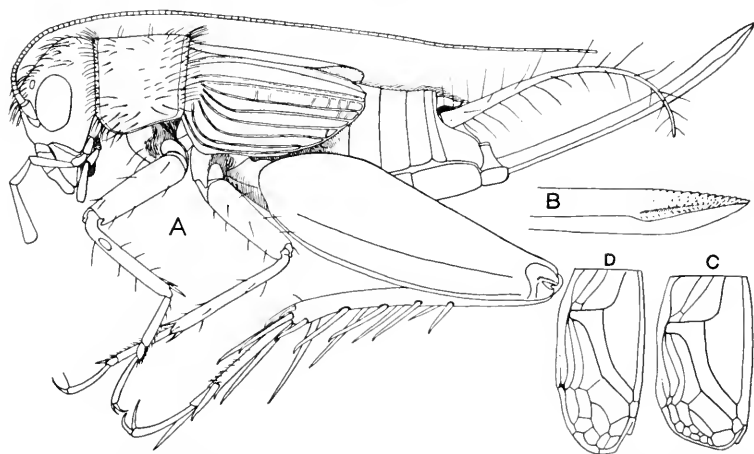


Fig. 1. *Nemobius sparsalsus*, new species. A. Lateral view of type. B. Enlarged view of tip of ovipositor. C. Dorsal field of tegmen of allotype. D. Same of *N. fasciatus socius* from Wilmington, N. C.

Exposed abdominal tergites each with pair of small slightly lighter blotches at level of cerci. Ovipositor black, tip dark reddish brown. Maxillary palpi sepia, distal portion of fifth segment darkest. Head, pronotum and tegmina shiny.

Allotype; male; same data as type. Similar to female in general structure and color. Tegmina broad and cover a little more than half the abdomen; distal margin of dorsal field broadly curved and oblique, apical area broader than long;

longest part of dorsal field near the fold and but little longer than lateral field. Proximo-internal spine of hind tibia specialized as in other native species.

Tegmina entirely dark sepia including all the veins. Exposed abdominal tergites black with fine brownish pubescence, concealed tergites shining black. Sixth and seventh abdominal tergites with paired obscure lighter spots at level of cerci.

Paratypic series; seven females, five males; same data as type. All of the females have the stout, slightly curved ovipositor with minutely truncate tip. All males have the obliquely truncated tegmina. No long-winged forms are present. With the exception of one female, the general coloration is dark sepia to black. In the exception noted all parts except the dorsum of abdomen and ovipositor are medium sepia, slightly mottled on head and pronotum but otherwise uniform. Dorsum of abdomen blackish and shows two paired rows of obscure lighter blotches on the exposed tergites, the additional rows above the level of the cerci. Measurements in millimeters:

	Pronotum Length	Tegmen	Hind Femur	Hind Tibia	Ovipositor
Type	2.6	4.4	8.4	6.8	7.5
Allotype	2.3	5.0	7.6	6.2 -	
Paratypes					
Females	2.1-2.6	3.6-4.7	6.8-8.5	5.5-7.0	6.4-7.5
Males	2.0-2.3	4.0-5.0	6.5-7.6	5.3-6.2	

Comparisons: The spurs and spines of the hind tibiae are relatively longer and in the larger specimens actually longer than those of any species examined. The minutely truncated tip of the upper rods of the ovipositor is a distinct character and on account of the mucky nature of the ground where the species is found, it could hardly be due to wear from the use of the organ in oviposition.

The species is distinct from *N. carolinus* and *N. confusus* by the unequal length of the disto-ventral spurs of the hind tibiae. It resembles *N. cubensis* and *N. palustris* in the curvature and shape of the tip of the ovipositor; even the minute truncation of the upper rods is approached in some specimens of these species by the rather sudden curvature of the lower margin of the upper rods close to the apex. It also resembles the last two species in the uniform dark coloration, but differs greatly from them in body size and length of ovipositor. From the subgenus *Allonemobius* the new species differs in the curvature of the ovipositor. It also differs further from *N. maculatus* and *N. ambitiosus* by the uniform body coloration; from *N.*

griseus and *N. griseus funeralis* by the lack of contrasting colors in the tegmina. In size it resembles only *N. fasciatus* and averages larger than the *N. fasciatus socius* which inhabits the same general region. It differs from all races of *N. fasciatus* by (1.) the stouter and more curved ovipositor, (2) the uniform dark color of the tegmina which in *N. fasciatus* generally have distinctly lighter veins or areas, (3) the uniform color of the pronotum, (4) the obliquely sub-truncate apical margin of the dorsal field of the male tegmina, extending but little beyond the lateral field. In dark specimens of *N. fasciatus* the lateral lobes of the pronotum are black above and the ventral margin is pale, even the blackest specimens generally have a pale spot of the ventro-caudal angle. In *N. fasciatus* the apical area of the dorsal field of the male tegmina is rounded and reaches its greatest caudal extension near the middle.

Habitat: The species was found only in 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. The grass grows about a foot high in a black silty mud which is partly or entirely submerged at high tide. The crickets live about the crowns of the grass and on the ground where they must have to be constantly on the alert to avoid the fiddler crabs which overrun the place.

It was practically impossible to collect the crickets by sweeping in the high grass. The series was obtained by holding the open net on the ground and herding the crickets into it by tramping down the grass.

Song: My attention was first attracted to the species by hearing the unique type of song. Its song is more varied in character than that of any species of the genus I have observed. The usual calling song consists of short notes about one per second at 80°F or about 3 notes per 5 seconds at 70°F. The pauses are of briefer duration than the notes. The sound is high-pitched but rather weak and wheezy for the size of the cricket. Each note increases slightly in volume and pitch after starting. There is no rhythmical regularity about the repetition of notes. Often when starting to sing and at irregular intervals

during the song a longer and louder note, 2 to 3 seconds long may be introduced.

When actively courting the female, the male resorts to short sharp chirps, 3 or 4 per second, but no louder than the longer notes. At times the long and very long notes and the short chirps may be mixed up promiscuously in the same song.

The only other cricket song heard in the *Spartina stricta* zone of the salt marshes was the silvery tinkling song of *Anaxipha exigua*.

Additional Data on *Nemobius sparsalsus* Fulton (Orthoptera: Gryllidae, Nemobiinae).

By MORGAN HEBARD, Philadelphia, Pennsylvania.

Having read the manuscript of Fulton's paper on this interesting species, we made a search for specimens of it in both the studied and unreported series of Gryllidae in the Philadelphia collections.

The results were somewhat surprising, as among the very large series of *Nemobius*, only seven specimens were found, six of these having been recorded as *Nemobius fasciatus socius* (Scudder).

The species closely resembles that insect superficially, but the characters given by Fulton readily distinguish it upon closer examination.

In many very dark individuals of *Nemobius fasciatus fasciatus* (De Geer) and its southern race *fasciatus socius* before us, the pronotum, without exception, has a pale area ventrad on the lateral lobes.

The tegminal truncation in the male sex of *sparsalsus* is valuable in distinguishing it from typical males of *fasciatus*, but in that species a brilliantly colored woodland condition of the central northeastern and southeastern mountainous portion of its range, mentioned by us only in our discussion of color in 1913,¹ also has truncate tegmina in this sex.

¹ Proc. Acad. Nat. Sci. Phila., 1913, p. 410, par. 3 and 4, p. 415, par. 1. That brilliantly colored condition we then believed to represent merely individual color variation, but we now think it probable that a woodland topomorph is represented, possibly worthy of nominal recognition; certainly is as worthy of such as the condition of *palustris* found in the southeast in sphagnum, which we there treated as *Nemobius palustris aurantius* Rehn and Hebard on page 472.

In females of *sparsalsus* the ovipositor curvature is distinct but not decided. The dorsal margin of the dorsal valves at the apex is armed with blunt teeth, quite distinct from the sharp serrations there developed in *fasciatus*, as observed by Fulton.

These notes are based on the following specimens:

Tybee Island, Georgia, September 2, 1911, (Hebard), 1 ♂² [Acad. Nat. Sci. Phila.].

Cedar Key, Florida, July 13, 1905, (Rehn and Hebard; on salt marsh tidal flats), 1 ♂, 1 ♀,³ [Hebard Cln.].

Everglade, Florida, April 9, 1912, (W. T. Davis),⁴ 1 ♂, 2 ♀, [Davis and Hebard Clns.].

Virginia Point, Galveston County, Texas, July 21, 1912, (Hebard; one only, under board on salt marsh (*Spartina*).), 1 ♂, [Hebard Cln.].

Measurements (in millimeters).

♂	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur	Length of Ovipositor
Tybee Island, Ga.	10.9	2.2	4.7	6.9	
Cedar Key, Fla.	10.7	2.2	4	7.3	
Everglade, Fla.	12	2.7	4.8	8.7	
Virginia Point, Tex.	10.8	2.4	4.8	7.8	—
♀					
Cedar Key, Fla.	9.8	2.6	3.8	7.9	7.8
Everglade, Fla.	11	2.8	4.1	8.7	8.9

We believe that the species is restricted to salt marshes and that it will probably be found quite generally distributed in such environment over its range. The present material shows that its distribution extends south from the type locality, Wilmington, North Carolina, along the Atlantic Coast around Florida to the Gulf Coast and there as far westward as the vicinity of Galveston, Texas. It is quite possible that the type locality represents the northern limit of distribution of *sparsalsus*.

² Recorded as *Nemobius fasciatus socius* by Hebard (Proc. Acad. Nat. Sci. Phila., 1913, p. 426) and by Rehn and Hebard (Ibid. 1916, p. 287).

³ Recorded as *Nemobius socius* by Rehn and Hebard (Proc. Acad. Nat. Sci. Phila., 1907, p. 316) and as *Nemobius fasciatus socius* by Hebard (Ibid., 1913, p. 426).

⁴ Recorded, as *Nemobius fasciatus socius* by Rehn and Hebard (Jour. N. Y. Ent. Soc., XXII, p. 114, 1914).

An Experiment in Marking Moths and Finding them Again (Lepid.: Noctuidae).

By AUBURN E. BROWER, Willard, Missouri.

(Continued from page 15).

RESULTS OF THE MARKING WORK.

The list of returns shows that thirty, or 9.55%, of the moths, were found a second time, four of them were found three times, and one of them was found four times. The last, a *C. residua*, was found four times on the same hillside, the last time within a few feet of where it had been marked eight days previously. All of those found three times were *innubens* and *residua*. Two *neogama* were found about one mile (see map) from where they were marked. On August 3, two *neogama* were found on the same white oak tree in North Hollow; one had been marked July 27 on a white oak tree 20 feet to the east, and the other had been marked July 29 in Long Hollow about one mile away.

The returns do not indicate any definite movement in one direction but a continuous shifting about; however, the results do not show what became of the numbers of *ilia*, *neogama*, and *epione* which were found in a hollow one day and which had completely disappeared by the next. The question of what all species do under unusual meteorological conditions is also an open one; nearby local showers greatly reduced returns. Where the moths were, which were marked in a hollow but were not found when that hollow was next worked but were found upon a still later visit, is another puzzle.

The age of the insects has a great influence upon the returns. Worn moths move about much more and presumably much farther than freshly emerged individuals, for most of the worn individuals were never found again. The period of emergence for four species was over, viz., *C. ilia*, *amica*, *junctura*, and *epione*. Of these, 159 specimens were marked and only 7, or 4.4%, were found a second time, none a third time. Of the 155 marked specimens of all other species 23, or 14.84%, were found a second time, three of them being found three times, and one more four times. These figures, despite the fact (as

a glance at the Table will show) that the majority of the former were marked during the first days of the work. It was not due to the death of the moths because many of the *ilias* live into September.

C. innubens emerges over a long period, and part were already worn. Of the 25 *innubens* taken, six (including form *scintillans*) were recorded as being distinctly worn, or with damaged wings, and only 1, or $16\frac{2}{3}\%$, was found again, and only the second time. Of the 19 specimens not recorded as especially worn, 5, or 26.31%, were found again, two of them twice more. *C. lacrymosa*, *angusi*, *habalis*, *vidua*, and *luctuosa* were just beginning to emerge when the marking started, and *robinsoni* had not yet appeared when the work terminated. Species like *innubens* and *residua*—possibly *amica* should be included as all marked individuals were much worn—appear to be more local in their habits than such species as *ilia*, *neogama*, *piatrix*, and others.

Quite as significant as the actual returns are the negative data because they are so much greater in quantity. An area would be thoroughly worked and nearly every moth found, captured and marked, but by the next day all, or all but one or two, would have completely disappeared. The morning of July 27, 31 moths were marked in North Hollow; the next morning after another hot, still night, only one, a *nerissa*, could be found. Not one of the nine marked *ilia* could be found, although the adjacent woods were covered in order to see if they had moved away from the hollow. Nevertheless, *ilia* was even commoner in the hollow than the day before, there being more present than could be caught and marked in the time available. July 26, 45 *Catocalas* were marked in Long Hollow; the next day only one was found. Eighty individuals of *ilia* and its forms were marked, but only two were ever found again.

These data have been presaged by former collecting experiences. *C. ilia* appears early, and after the middle of July perfect specimens are rarely taken, while many species do not reach the height of emergence until later than that date. Big,

blundering *ilias* always seem to frighten a scarce form away, especially the wary *lacrymosas*. A number of times in the past, the worn *ilias* have been netted, and all except the occasional females crushed and tossed aside, but such an attempt to free a favorite collecting hollow was found to be only a temporary relief. More *ilia* replaced those killed just as more *lacrymosa* replaced those taken, and with the former it could not have been a case of emergence. As a rule, a hollow which is closely collected one day is not as good the next as one untouched, but the numbers of *Catocalas*, many of them flown, which may be found there the next day is proof that the individuals do a great deal of shifting about. In the fore part of the season, *C. junctura* is found in caves and buildings, under ledges, cliffs, and banks, and on trees; but after hot, dry weather commences, the shallow caves in the cliffs are their favorite hiding places. A group of such caves (see *map*) have yielded many specimens in the last fourteen years. In the latter part of the season for the species, almost every visit yields from one to eight specimens, nearly all flown to badly worn; and at that time, except in rainy weather, only rarely can specimens be found under favorable ledges and in old buildings. The country has been searched for miles around without finding a similarly favored spot, so the conclusion that *C. junctura* flies in from unknown distances seems justified.

The results of this work show that *Catocalas* shift about a great deal, many apparently leaving the vicinity. Some species as *innubens* and *residua* seem to be local in their habits. All species move about much less when freshly emerged than after they become worn. So far as the data show, the movement is in no definite direction. Weather conditions have a great influence upon them. Marking individual moths and finding them again is feasible in some groups with favorable conditions.

An Appreciative Subscriber.

I wish to thank you for inserting my exchange notice; it gave me fine results and if you have space and care to insert it again in the NEWS for the coming year I will surely appreciate it very much.

JOHN IMSCHWEILER, Inglewood, California.

Recognition of *Lygus lucorum* Meyer from North America (Hemiptera, Miridae).

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

The first record of the occurrence of *Lygus lucorum* Meyer in the Nearctic Region was by P. R. Uhler (1886) in his "Check-List of the Hemiptera Heteroptera of North America". On the authority of Uhler, Mr. Van Duzee (1917) lists *lucorum* Meyer in his *Catalogue*, but no North American specimens have been recognized by any worker since the initial record.

When the writer (1917) published* his revision of the genus *Lygus* for America north of Mexico, no specimens of *Lygus lucorum* Mey. taken in North America could be located. The Uhler collection and other material in the U. S. National Museum was searched with negative results in an effort to find a specimen bearing the label "*Lygus lucorum* Mey." which might have served as the basis for the record by Uhler (1886). In the absence of authentic specimens the writer could not include *lucorum* Mey. among the recognized species of the Nearctic Region.

Recently I received an interesting letter, dated July 11, 1929, from Dr. H. T. Fernald, in which he writes:

About twelve years ago I turned over our college collection of Hemiptera to Dr. Parshley to name, and I believe that at that time he sent the Mirids on to you. At least many of our Mirids bear the label, "Det. H. H. Knight, 1917." When this material came back I was so rushed with other matters that I had no chance to look it over so it was arranged in the boxes by one of my assistants. Today I happened to pick out one of those boxes and found a specimen labeled as follows: lower label, '*Lygus spinolae* Meyer, Orono,' and with an X, meaning that it was originally named by Uhler; your label, 'Det. H. H. Knight, 1917. This does not occur in U. S. Should not use this record until collecting is authentic'; third label, printed number 519; fourth, the insect mounted on a point.

During the years when I lived at Orono, Maine, I collected Hemiptera quite carefully and kept a record of what I took. These printed numbers I put on to correspond with my entries in a book giving data about the captures, and the numbers were

*Bul. 391, Cornell Univ. Agr. Expt. Sta., 1917.

clipped from what was even then an old copy of the Naturalist's Directory, published in Salem. The type of these numbers was rather distinctive and on looking at the specimen this morning I recognized that number instantly and went to my record book, in which I find the following: "1885. August 25. Got Nos. 509-326 in the pasture back of the college..... 519. Green *Lygus lineolaris*?"

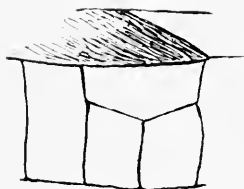
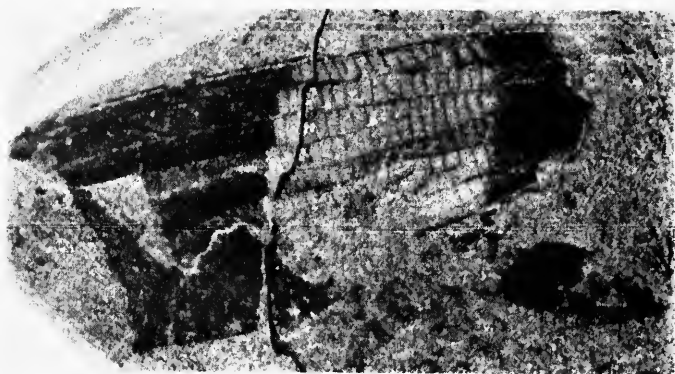
That insect was either later sent to Uhler and named, or was named by him at the time I was living with him in Baltimore in 1886.

I then wrote Dr. Fernald stating that I remembered the specimen quite well, but recalled that I thought it might represent *Lygus lucorum* Mey. instead of *L. spinolae* Mey. Not wishing to trust my memory for so long a period in a matter involving the record of an European species occurring in North America, I requested Dr. Fernald to again send the specimen for examination. Dr. Fernald very kindly complied with my request so I have been able to compare his specimen with European specimens of *L. lucorum* Mey. and *L. spinolae* Mey. The result is I find the Orono specimen to be *Lygus lucorum* Meyer.

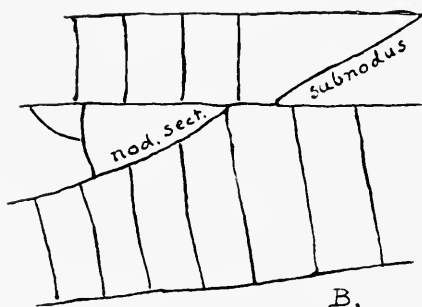
The species, *Lygus lucorum* Mey. and *Lygus spinolae* Mey., are closely allied green forms, yet may easily be separated by certain color characters that have been used by the best European authors without objection. In *lucorum* Mey. the cuneus is entirely green, whereas, in *spinolae* Mey. the cuneus is black at the extreme apex. There are also other characters but the color of the cuneus may be relied upon to separate the species.

The fact now seems well established, namely, that Dr. H. T. Fernald collected *Lygus lucorum* Mey. at Orono, Maine, Aug. 25, 1885. Dr. Uhler examined this specimen shortly after and gave Dr. Fernald the name *Lygus spinolae*. However, Uhler records *Lygus lucorum* Mey. in his Check List of 1886 and fails to mention *spinolae* Mey. I have asked Dr. Fernald his opinion of how the label *spinolae* Mey. can be explained for his specimen. He writes as follows:

It is my opinion now that Uhler named this specimen *Lygus spinolae* and that later, in preparing his Check List, either forgot all about it but had evidence from other sources of the presence of *lucorum* in this country, or else that, on thinking the matter over, he decided that this specimen was, after all,



A.



B.

PROTOTHORE EXPLICATA—COCKERELL

lucorum. I am positive that he gave me the name *spinolae* for it, or I would not have known anything about *spinolae*.

The writer hopes this article may stimulate some interest among the entomology students at Orono, and send them forth to search for the long lost *Lygus lucorum* Mey. It is possible that some of the collections made in that locality may even now contain this uniformly green *Lygus*. However, there is another green species, *Lygus pabulinus* L., which occurs in that area and may cause confusion in identification, but *pabulinus* L. is more slender and distinguished by having the carina across base of vertex obsolete on the middle. *Lygus lucorum* Mey. is about the size and shape of the tarnished plant bug (*L. pratensis oblineatus* Say), but uniformly green or yellowish green in color. By next summer it will be forty-five years since Dr. Fernald captured the only known specimen of *Lygus lucorum* Mey. from North America. Who will be the first to rediscover this long neglected species?

A Fossil Dragon-fly from California (Odonata: Calopterygidae).

By T. D. A. COCKERELL, Boulder, Colorado.

(Plate VI.)

It has seemed strange that the State of California, so rich in fossils of many kinds, possessed no deposits of fossil insects, with the exception of certain beetle elytra from the Pleistocene. Recently, however, Dr. Ralph W. Chaney was looking for fossil plants in the Eocene of Northern California, and at Phillips sawmill, five miles southeast of Montgomery Creek, Shasta County, he found the central portion of a dragon-fly wing in soft bluish rock. It occurred with fossil plants indicating a swamp habitat. The specimen, though imperfect, seems unquestionably to belong to the Zygopterous subfamily Polythorinae, at present confined to the Neotropical Region. I am inclined to interpret this as meaning that the Polythorinae originated in the north, not as representing an immigrant from some southern region.

At first, I was disposed to place the insect in the genus *Euthore*, but it combines characters of *Euthore* and *Chalcopteryx*, and considering its antiquity and location, there can be

little doubt that it represents a distinct genus, the distinctness of which would be more evident if we possessed the whole wing.

PROTOTHORE new genus.

Rather small species, the wings conspicuously marked, black and hyaline; (*a.*) stigma (pterostigma) large but slender, not as deep as the substigmal cells; (*b.*) base of stigma with a transverse cell below, composed of upper part of the first two substigmatic cells; (*c.*) postnodal cells numerous, about 43, of which 20 are before the median black area; the first 20 or more are much higher than long, some twice as high as long; (*d.*) cells beyond subnodus (23 before median black area) practically as in *Euthore*, but the cross-veins of cells in light area are not in a straight line with those above (*Chalcopteryx* character); (*e.*) subnodus ending some distance (about a cell's width) before origin of nodal sector (R_3 of Tillyard, M_2 of Needham); (*f.*) eight cells before doubling begins above nodal sector, but second cell with a triangular division above, doubtless a variable character.

Character *f.* agrees with *Euthore*, not at all with *Chalcopteryx*. Character *c.* agrees with *Chalcopteryx*. Character *e.* agrees with *Libellago*. Character *a.* is different from *Chalcopteryx* and *Euthore*. Character *b.* is probably not constant; a similar transverse cell may sometimes be seen in *Epiophlebia*, beyond the region of the stigma.

Protothore explicata new species.

Wing hyaline in middle, from about two or three cells beyond subnodus for a distance of about 7 mm., the end of the clear area curved apicad; rest of wing, so far as can be seen, black; the black extending as far as the stigma and probably to the apex; shape of wing, so far as can be seen, about as in *Euthore*. Nodus to base of stigma 14.5 mm.; length of stigma about 3 mm.; width (depth) of wing in region of subnodus about 9 mm., in region of stigma apparently 7.2 mm., but there is some disarrangement and overlapping, so the actual depth is doubtless greater.

I am indebted to my colleague Mr. Paul Shope for the photograph of the wing. The specimen belongs to the University of California.

Another Genus of Protura in California.

By. W. A. HILTON, Department of Zoology, Pomona College,
Claremont, California.

For a number of years we have been attempting to determine the distribution of insects and other arthropods in southern California. It was not until the spring of 1928 that Miss Edith Clayton, a student in the department, in connection with an investigation of soil insects, discovered a few specimens of this group in with a great host of Collembola and mites. She used a Berlese funnel and searched especially among the dead leaves at the bases of live oaks. Previous to this there have been a number of records within the limits of the United States. I have looked for them in a number of western states, and also in Cuba and Mexico, but without success. This failure to find them in regions where they might well be expected was due in part to the fact that I did not at first use the funnel method for collecting.

Ewing has described one new species, *Eosentomon yosemitensis*, from the Yosemite Valley and recorded the occurrence of another, *Acerentomon microrhinus* Berlese, from the same place. Our specimens do not correspond to either of these, in fact they belong to Berlese's genus *Acerentulus*. This makes a new record for the genus and adds one to the number of species known to occur here. Berlese mentions ten species from Italy and, as conditions in southern California are somewhat similar, we may reasonably hope for many more records from California.

A member of this genus described by Ewing from Takoma Park, Maryland, under the name of *Acerentulus barberi* differs markedly from ours. The most striking contrast between the two species is in the second and third abdominal segments, which in ours are not cone-shaped. The prothoracic legs are also proportionately shorter in these California specimens and the proportions of the body parts also differ. Berlese's species *Acerentulus perpusillus* resembles ours much more closely. The general shape of the body, the position of the pseudoculi and the general proportions of the legs and body parts are similar. His specimens were .6 mm. in length and our largest

were 1.2 mm. The distribution of the dorsal setae differs quite decidedly. Unfortunately Berlese's description does not give anything about the abdominal appendages and these seem to be quite important. Whatever species this California form may prove to be, at least it is clearly of the genus *Accerentulus*.

With such minute forms it would seem that specific descriptions should be quite detailed. Berlese's characterizations in some cases are very scant. The only virtue that saves some of them from being worthless is the series of very excellent drawings, but even here a few more might have helped to distinguish his species from others not known to him. The characters which must be used are many of them minute and for that reason careful drawings showing the positions of the setae and proportions of parts are very helpful. Proportions alone are good, but if the total length is given, measurements of other parts might more accurately indicate conditions.

It is our hope to extend the range of known forms in this group as soon as possible. However, it is not easy to find these specimens. If dead leaves or other materials containing them are too dry or too wet it is almost impossible to discover them. They are seldom abundant; we have usually found but one or two at a time. Those near Claremont were of various sizes but all seemed of the same species. Some were found at the edge of the mountains, others, apparently exactly like them, were discovered in the college park among the live oaks.

Possible Light on Geographic Distribution of Insects.

Entomologists interested in the fauna of the West Indies should not overlook a paper which appeared nearly a year ago but whose title and place of publication, although perfectly appropriate, would not find mention in strictly entomological literature. Reference is made to Prof. Charles Schuchert's "Geological History of the Antillean Region" (Bull. Geol. Soc. Amer., 40: 337-360, with 9 paleogeographic maps. Published March 30, 1929). The maps show the presumed distribution of land and water in southern North America, northern South America and the West Indies, in upper Carboniferous and lower Permian, Jurassic, Cretaceous, Eocene, Oligocene, Miocene and Pliocene times, and illustrate such questions as the existence and non-existence of land connections of these continents and islands.

New Species of Dolichopodidae from North America (Diptera).

By MILLARD C. VAN DUZEE, 12 Abbotsford Place, Buffalo,
New York.

***Rhaphium latifacies* new species.**

♂ : Length 4 mm. Face wide, silvery white, rounded below, its sides nearly parallel; proboscis and palpi black with black hairs and bristles; front covered with white pollen; antennae black, third joint half as long as the face, arista two-and-one-half times as long as third joint; beard white, moderately abundant.

Dorsum of thorax green, dulled with white pollen; pleurae blackish with white pollen; scutellum with two pair of marginal bristles. Abdomen blue-green with black hair and considerable white pollen, hairs on the venter whitish; hypopygium black, rounded above, conspicuous, its lamellae black, elongate triangular, one-third as long as height of hypopygium, inner appendages small, mostly concealed.

Fore coxae, all femora and tibiae yellow; apical third of hind femora and extreme tip of posterior tibiae black; fore coxae with black hair and bristles, both hair and bristles appear yellow in certain lights; middle coxae without a thorn at tip; all femora with pale hairs below, but these also appear black in certain lights and are not as long as width of femora; fore femora with long pale hairs on posterior surface; fore and middle tarsi from the tip of the first joint and whole of hind tarsi black; all tarsi plain; joints of fore tarsi as 41-14-13-10-10; of middle ones as 54-18-15-8-7; joints of hind pair as 41-27-20-10-9. Calypters, their cilia and the halteres yellow.

Wings grayish, darker in front of fourth vein; third vein bent backward towards the tip; last section of fourth vein quite sharply bent before its middle, parallel with third for a short distance at tip, ending just back of the apex of the wing; last section of fifth vein straight, twice as long as the crossvein.

Described from one male, taken by Owen Bryant, July 10, 1925, at Lake Agnes, Laggan, Alberta, at an elevation of 6,800 feet. *Type* in the U. S. National Museum. No. 20578.

***Rhaphium longibara* new species.**

♂ : length 4 mm. Face narrow, silvery white; palpi and proboscis black; front shining green; antennae black, third joint four-fifths, arista six-sevenths, as long as the face; beard white, abundant but not very long.

Thorax green with a little white pollen on front of dorsum and on pleurae; scutellum with one pair of bristles. Abdomen shining green, its hair black on dorsum, white on venter, third, fourth and fifth segments coppery at base; hypopygium black, rather small, flattened posteriorly, its lamellae filiform, broader at base, brown, fringed with long pale hairs, the lamellae as long as middle tibiae; inner appendages black, slender with a conspicuous lobe on one side near the tip, a little less than two-fifths as long as height of hypopygium.

All coxae, fore and middle femora and apical two-thirds of hind femora green; tips of fore and middle femora, basal third of hind ones and fore and middle tibiae and basitarsi yellow; hind tibiae mostly black, yellowish above on basal third; fore and middle tarsi from tip of second joint and whole of hind tarsi black, fore coxae with abundant, long, white hair; middle coxae with a black thorn at tip; middle femora with short white hair below; fore tibiae with two rows of long, bristly, black hairs on upper surface, these are as long as width of femora; middle basitarsus with three long bristles below near the base, the longest being three times as long as diameter of the joint; first joint of fore tarsi concave below, being narrowed in the middle, larger at each end and with a row of spine-like, short hairs below, which are about as long as diameter of joint; second joint a little widened in the middle below, the lower edge being slightly and evenly rounded, it has a row of delicate hairs below, which are a little shorter than width of joint in the middle, joints of fore tarsi as 33-25-8-6-8; of middle ones as 43-23-15-8-8; joints of hind ones as 35-29-21-17-11; Calypters and halteres yellow, the former with white cilia.

Wings grayish; third vein bent backward towards the tip; last section of fourth vein without a distinct bend, but arched so as to be parallel with third at tip, ending in the apex of the wing; last section of fifth vein straight, scarcely reaching the wing margin, it is 38, crossvein 20-fiftieths of a millimeter long.

♀ : One female taken two days later at the same place, is no doubt the same species; having the venation of the wings the same; the color of the legs about the same and the fore coxae with long white hair.

Its face broad, silvery white; third antennal joint one-third, arista one and a fourth times as long as the face; fore tibiae with one row of bristly hairs above on anterior edge; middle femora at extreme base, basal half of hind femora and basal three-fourths of hind tibiae yellow; fore and middle tarsi plain.

Described from one pair, taken at Banff, Alberta; *type*, male, on June 29, *allotype*, female, July 4, 1925, by Owen Bryant. The allotype was taken on Norquay Mt., at an elevation of 5,000-6,000 feet. Type in U. S. N. M., No. 20579.

Neurigona ornatus new species.

♂: Length 4.5 mm. Face linear, silvery white; front and occiput black with white pollen; antennae yellow, small; orbital cilia whitish yellow. Thorax black; prothorax, humeri, posterior edge of pleurae, outer margin of scutellum, root of wings and some of the sutures of the thorax yellow; dorsum of thorax dulled with gray pollen, especially the depressed space before the scutellum. Abdomen yellow with large shining black patches on the upper surface, that on second segment covering all the dorsum, except the posterior margin, on the following segments the black is more narrowed posteriorly. Hypopygium black, the basal part appearing more like an apical segment of the abdomen, outer part somewhat square in outline and with small, indistinct, yellowish appendages at tip.

Coxae, femora and tibiae yellow; fore tarsi with first three joints yellow, last two black, flattened, fourth nearly round when seen from above, fifth oval, longer than wide, cut off nearly straight at tip, one claw long and enlarged; all joints with long hairs above, which are about twice as long as the diameter of the joint, those on first joint a little shorter; middle and hind tarsi blackened from the tip of first joint; first four joints of middle tarsi with a row of stiff black hairs below, these are a little longer than the diameter of the joints; joints of fore tarsi as 103-64-28-8-12; width of last joint at tip as 10 and length of long claw the same; joints of middle tarsi as 137-48-30-19-12; of hind ones as 67-68-36-22-12. Calypters, their cilia and the halteres yellow.

Wings gray, veins brown almost to the root of the wing; last section of fourth vein bent near its middle, ending rather close to tip of third and considerably before the apex of the wing, third and fourth veins bent backward at tip; last section of fifth vein about three times as long as the crossvein; sixth vein strong and reaching the wing margin; anal angle of wing prominent.

Described from one male, taken by Owen Bryant, June 5, 1925, at Edmonton, Alberta, Canada. *Type* in the U. S. National Museum. No. 20580.

This is separated from all related species by the form of the anterior tarsi and their enlarged claw.

(To be continued)

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., FEBRUARY, 1930.

Entomology at the Convocation Week Meetings, December 27, 1929, to January 2, 1930.

Following is our annual summary of the programs of the eighty-sixth meeting of the American Association for the Advancement of Science, and of the associated societies held at Des Moines, Iowa, in so far as entomology is concerned.

The numbers of papers listed by the various societies were as follows:

Entomological Society of America.....	38
American Association of Economic Entomologists.....	83
American Society of Zoologists.....	12
Same, Joint Genetics Section.....	10
Ecological Society of America.....	1
American Meteorological Society.....	1
Section C (Chemistry), A. A. A. S.....	1
Wilson Ornithological Club.....	1
American Phytopathological Society.....	6
American Society of Horticultural Science.....	1
Total	154

These papers were distributed in subject as follows:

i		Affecting Man or other	
General Entomology	5	Animals	1
History of Entomology ..	2	Taxonomy	4
Teaching Entomology ...	2	General Economic	
Collecting Methods	1	Entomology	16
Cytology	3	Insecticides and	
Anatomy	5	Appliances	14
Physiology	24	Apiculture	9
Ecology	11	Affecting Cereals, Forage	
Geographical Distribution.	1	and Field Crops	14
Ontogeny	12	Do., Truck Crops	9
Genetics	11	Do., Greenhouse Plants ..	1
Parasites of Insects	7		

Do., Fruits and Fruit		Coleoptera (excluding the	
Trees	21	Japanese beetle	13
Do., Household and		Japanese beetle	5
Stored Products	7	Hymenoptera (excluding	
Do., Forest and Shade		<i>Apis</i>)	10
Trees	6	<i>Apis</i>	9
Carrying Plant Disease		Lepidoptera (excluding	
Germes	5	Codling Moth, Oriental	
ii		peach Moth, Corn-bor-	
Orthoptera	9	ers)	11
Psocoptera	1	Codling Moth	6
Odonata	1	Oriental Peach Moth	6
Ephemeraida	1	Corn Borers	3
Homoptera	15	Diptera (excluding <i>Dro-</i>	
Heteroptera	2	<i>sophila</i>)	11
Thysanoptera	1	<i>Drosophila</i>	3

Many of these figures are duplications, both between sections i and ii and also within each section.

The total of 154 is lower than that of any of the preceding six years, the loss being due to the much lower figure accredited to the Association of Economic Entomologists. Since the Northeastern branch of this Association held a meeting at New York, as recently as last November, at which many papers were presented, the decrease can probably be accounted for in this way. Papers on Physiology continue to hold a prominent place.

The Entomological Society of America, Prof. C. T. Brues, *president*, Prof. J. J. Davis, *secretary*, met December 28 to 30. The annual public address, "Economic Adventures of an Uneconomic Entomologist," was given by Dr. Wm. M. Mann, Director of the Zoological Park, Washington, D. C., on the evening of December 30. He dealt with some of his experiences in Mexico on the trail of insect pests that are likely to be shipped into the United States, especially the orange maggot (*A. ludens*), illustrated with lantern slides of scenes in Mexico.

The American Association of Economic Entomologists, Prof. T. J. Headlee, *president*, Mr. C. W. Collins, *secretary*, met December 29 to January 2. The annual address of the Presi-

dent, "Some Tendencies in Modern Economic Entomological Research," was delivered on December 31.

Both societies were invited by Iowa State College to visit the campus and laboratories of zoology and entomology at Ames, on Sunday, December 29, where dinner was served to 212 persons at the Memorial Union at 1 P. M. Following this Dean Beyer of the Science Division of the College gave a brief welcome to all the visitors. Dr. Herbert Osborn gave an informal address on the early history of entomology in the central states and called on Dr. C. P. Gillette to recount his personal experiences with Prof. Cook. Dr. S. A. Forbes, although expected to take part, was not present. Dr. H. H. Knight, to whom the NEWS is indebted for some of this information, writes that the trip to Ames was a great success according to all the comment he has heard.

The annual entomologists' dinner was held in the Hotel Savery, at Des Moines, on Tuesday evening, December 31.

Entomological Literature

COMPILED BY FRANK HAIMBACH AND LAURA S. MACKEY
UNDER THE SUPERVISION OF 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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an • preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Bandermann, F.—Botanisches und Entomologisches. [18] 23: 380-382. Chittenden, F. H.—Obituary. By L. O. Howard. [12] 22: 989-990, ill. Dingler & Henneberg.—Apionlarven in "springenden Kapseln". [Mitt.

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OBITUARY.

Among the entomologists whose deaths occurred during 1929, and whose passing has not hitherto been mentioned in the NEWS, was the Reverend ALFRED EDWIN EATON, monographer of the may-flies. He died at Northam, North Devon, March 23, 1929, and at that time was the senior Fellow of the Entomological Society of London, to which he was elected July 3, 1865. An obituary notice appeared in the *Entomologists' Monthly Magazine* (London) for May, 1929. In 1873 he accompanied B. Leigh Smith on a cruise to Spitzbergen. In 1874 he was naturalist to the British Transit of Venus Expedition to Kerguelen Land where he made extensive collections of plants and animals which he described and discussed in the *Philosophical Transactions* (vol. 168, 1879). His *Revisional Monograph of Recent Ephemeroidea* of 352 pages, appeared in the *Linnean Society's Transactions* (Zoology) between 1883 and 1887 and is well-known as the most authoritative treatise on this group of insects for many years. The types of the species described passed into the collection of the late Robert McLachlan, of Lewisham, London, who showed them to the writer in 1895. Supposedly they remain in Mr. Hugh McLachlan's possession. Among Eaton's other works on the may-flies were the 16 pages which he contributed to the Neuroptera volume of the *Biologia Centrali-Americana* (1892) and a brief one, his last on this group apparently, on those of the Seychelles (1913). He was also interested in the Psychodidae and published on the British members of this family (*Ent. Mo. Mag.* 1893-1898). *Science* for December 13, 1929, quoting from the *London Times*, states that his widow has presented his collection thereof, of over 1800 pinned specimens and about 200 microscopic slides, to the department of entomology of the British Museum. Besides the known British species, it includes much material from Switzerland, Algeria, Madeira, the Canary Islands and elsewhere. Mr. Eaton "had also accumulated extensive notes in preparation for a monograph on the group, and it is hoped that it may be possible to publish some parts of his manuscript."

FRANK HURLBUT CHITTENDEN, born in Cleveland, Ohio, November 3, 1858, died at Washington, September 15, 1929. He graduated from Cornell University in 1881 and was given the honorary degree of D.Sc. by the University of Pittsburgh in 1904. He entered the service of the Federal Department of Agriculture in April, 1891, and there remained until his death, becoming chief of the section on truck crops and insects affecting stored products. Dr. L. O. Howard, who contributes an obituary notice of him, accompanied by a portrait, to the *Journal of Economic Entomology*, for December last, writes: "Those of us who knew him best here in Washington, and who worked with him for very many years, think that he was probably the most learned man in America on everything relating to the insects that are found in the garden." In addition to the insects with which his section was particularly concerned, Dr. Chittenden especially studied the Coleoptera. Leng's *Catalogue* of the Coleoptera of America North of Mexico and the *Supplement* thereto cite 22 of his papers on this order, those purely economic being omitted. Lists of 140 of his writings, 1888-1904, on economic insects will be found in parts vi-viii of the *Bibliography of the most important contributions to American Economic Entomology* by Nathan Banks.

JAMES WALKER MCCOLLOCH, Professor of Entomology at the Kansas State Agricultural College since 1925, died at Manhattan, Kansas, November 11, 1929. He had received the B.Sc. of the same College in 1912 and was made Associate Professor in 1918. In addition, he was Assistant Entomologist (1912-18) and Associate Entomologist (1918 on) at the Kansas Agricultural Experiment Station. His chief work was on the chinch bug and the Hessian fly. Prof. G. A. Dean, in an obituary notice in the *Journal of Economic Entomology* for December, 1929, pays high tribute to the thoroughness of his investigations and his devotion to his duties. He was born at Anthony, Kansas, April 14, 1889.

Science for October 4, 1929, announced that "Dr. GEORGE F. GAUMER, of Izamel, Yucatan, discoverer of several new mammals and author of a monograph of the mammals of Yucatan, died on September 2." He collected insects also, some of which are quoted in the *Biologia Centrali-Americana*.

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MARCH, 1930

ENTOMOLOGICAL NEWS

Vol. XLI

No. 3



FERDINAND HEINRICH HERMAN STRECKER
1836-1901



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AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK, N.Y.



FRANK E. WATSON

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North American Institutions Featuring Lepidoptera. XII. American Museum of Natural History, New York, New York.

By J. D. GUNDER, Pasadena, California.

(Plates VII-IX.)

The American Museum of Natural History in New York City has a convenient public location on the west side of Central Park at 77th Street and occupies a rather large, long, five-story, red granite building with some fifteen acres of floor space. Its cornerstone was laid in 1874 by President U. S. Grant and the building was formally opened three years later by the succeeding President of the United States, R. B. Hayes. Though planned and built in the early '70s it is still admirably suited for the purposes of a great museum and fortunately there is sufficient ground area for further development. Recently announced building plans call for a new wing to be known as the South Oceanic Hall and an additional structure in honor of Theodore Roosevelt which will contain an African Hall. These extensions require an expenditure in excess of three million dollars. Perhaps the total cost of the present museum building is more than \$12,000,000¹.

The American Museum is governed by a self-perpetuating board of trustees of which Mayor Walker of New York, the City Controller and the President of the New York Park Board are *ex-officio* members. The president of the board of trustees is Dr. Henry Fairfield Osborn, the first vice-president, George F. Baker and the second vice-president, J. Pierpont Morgan.

Aside from being a well-known mecca for scientific research and a storehouse of valuable collections of natural objects, the Museum has of late years shared its educational facilities

¹In this regard it is interesting to note that the Los Angeles Museum in California is spending nearly \$10,000,000 alone for its new unit structure

directly with the New York Public School system. This exceptional and noteworthy activity comes under the head of the School Service Department where hundreds of science lectures are arranged for each year and where thousands of lantern slides are prepared and circulated, in addition to movable exhibits of demonstrative value. The American Museum of Natural History is sometimes popularly spoken of as "the largest school house in United States" and certainly no other scientific institution in this country or in Europe has taken the trouble to directly share and so well develop its educational potentialities.

While the American Museum does not claim to have originated the idea of habitat groups, or the life-like display of creatures amid their natural surroundings, it was the first large museum in this country to adopt this method for public display on an extensive scale and in all departments. Among the many beautifully executed habitat pictures to be seen, perhaps the one which attracts the most curious interest, is that of the famous dinosaur eggs from Mongolia collected by Dr. Andrews on his Third Asiatic Expedition. These eggs are depicted lying scattered in the original desert sand and rock just as they were discovered.

Of interest to entomologists are the insect habitat groups and various displays shown for the most part in the Hall of Insects on the third floor². Here are found graphically arranged the various phases of insect life, their anatomy, their importance in relation to man, their classification, distribution, evolutionary tendencies, etc. It is the most unique display room of its kind and much credit is due Dr. Frank E. Lutz, Curator of the Museum's Department of Entomology and his assistants for its well-planned installation. A rather informal photo³ of Dr. Lutz is reproduced on plate IX. This picture was taken several summers ago at one of the "Nature Trails" camps established in cooperation with the Museum near Tuxedo, New York. The "Nature Trails" organization was found-

² Plate VIII accompanying this article illustrates the original "Butterfly Group" of which many museums have made reproductions.

³ From an article entitled "Taking Nature Lore to the Public" by Dr. Lutz in the *Natural History Magazine*, Vol. 26, No. 2.

ed by the Doctor with the thought of giving the youth of New York a chance to study insect biology during their summer's vacation. It is hoped the "Nature Trails" idea will spread to many sections of the country. Dr. Lutz first came to the American Museum as Assistant Curator of Invertebrate Zoology in 1909. He is a good executive and has published many papers in various popular and educational journals. Leaning somewhat to the study of Arachnida, Dr. Lutz is rapidly building up a large museum collection of this class. Some years ago, in a paper on the distribution of West Indian spiders, he compared each genus with its distribution elsewhere as given by Simon. He has also made some taxonomic study of bees. His "Fieldbook of Insects" is well known and is an invaluable work of reference for amateurs wishing a general knowledge of the better known insects of the northeastern United States.

The American Museum has, from its beginning, acquired collections of insects. Baron Osten Sacken, while Russian consul general in New York City from 1862 to 1871, gave the Museum its first series of specimens. These consisted of many Diptera which were the Baron's favorite order; however there were almost a thousand species of various insects in the lot. About the same time Mr. Coleman T. Robinson, who collaborated with the well-known Mr. A. R. Grote, presented his collection of 3000 butterflies and moths. Mr. R. A. Whitthaus also gave some 2000 specimens especially donated as a study collection. Altogether these collections formed the start of the Museum's work in the entomological field. In 1888 Mr. William Beutenmuller was engaged to give his entire time to insects at the Museum and with his appointment as a regular curator, entomological activities went briskly ahead. Exhibition work along educational lines was begun and studies in life history and other phases of insect biology were undertaken. In 1892 the widely known collection of the actor, Mr. Henry Edwards, was purchased by subscription. This collection consists of about 250,000 specimens, mostly butterflies from many sections of the earth, as Mr. Edwards visited many exotic regions during his stage career. The Edwards types are kept separate. Probably Mr. Edwards will be longest remembered because

of his work on the lepidoptera of California and of the Pacific Coast. Of late years the Museum has been gradually increasing the size of its lepidopterous collections, especially adding to the exotics from Central and South America, but no really noteworthy collection containing types from the United States has been added since the Edwards material. All the butterflies and moths are kept in uniform size cabinets as illustrated on plate VII. (An Am. Mus. photograph by Mr. Julius Kirschur). These cabinets are enameled white on the outside and hold about one hundred drawers each. Substantial sliding doors hung from a trolley give ready access. I imagine there are about ten of these cabinets in the two rooms devoted exclusively to the study collections. All types are kept in a single cabinet of stronger construction which is painted a darker color. At this writing no estimate is available as to the total number of lepidoptera in the Museum.

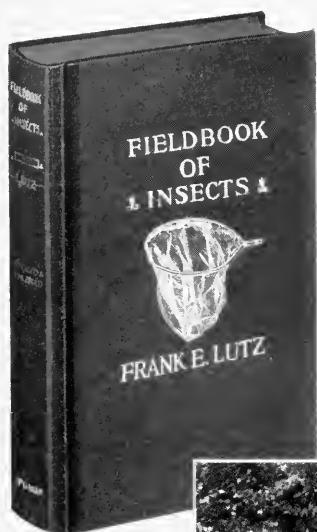
Since 1914 Mr. Frank Watson has been in charge of the collections under the title of Assistant in Lepidoptera. He was born in New York City in 1877 and has always resided there. His Degree of B.S. was received at Cooper Union in 1900. In the past Mr. Watson has described a score or more of American butterfly variations and practically all of his types are in the Museum. He is at present engaged upon a paper concerning West Indian Lepidoptera. Frank is a hard working fellow and busy from morning till night. The problem of taking care of the increasing number of deserving visitors to a great museum is gradually becoming a serious matter. Mr. Watson once told me his department averaged four a day and sometimes ten people wishing to see him or the study collections or the types. These folks, whether professional or semi-amateur, cannot be "hurried off". It all takes time and there seems no ready solution for the question. Tax-free public institutions and their employees must expect to be seen and be known.

The scientific staff of the Division of Zoology and Zoo-geography under which the entomological section is conducted consists of the following: F. M. Chapman, Sc.D., N.A.S., Curator-in-Chief; Frank E. Lutz, Ph.D., Curator (of Insect Life);



THE BUTTERFLY GROUP

This habitat group contains over 1200 specimens of the one species, the Monarch Butterfly (*Danaus menippe* Hbn.). They are shown in a natural cluster, temporarily at rest, during an accumulative migration. Am. Mus. photo.



Frank E. Lutz

A. J. Mutchler, Associate Curator of Coleoptera, C. H. Curran, M.A., Assistant Curator; Frank E. Watson, B.S., Assistant in Lepidoptera; Wm. M. Wheeler, Ph.D., Research Associate in Social Insects; Chas. W. Leng, B.S., Research Associate in Coleoptera; H. F. Schwarz, A.M., Research Associate in Hymenoptera.

The first Entomological Club in New York City was founded by Neumoegen, Grote, Graef, Koebele and Henry Edwards in 1880¹. Their meetings were held in the different private homes and the publication *Papilio* was published for four years in four volumes. *Papilio* was devoted exclusively to articles upon lepidoptera and it is still an asset to any library. For various reasons this original Club gradually ceased to exist and it was not until June 29, 1892, that the New York Entomological Society was organized, to become an incorporate society a year later. Through the foresight and fortunately early intercession of Mrs. Annie T. Slosson with the late President Morris K. Jessup, the Society established headquarters at the Museum and has been meeting there bi-monthly ever since.

The organ of the Society, the *Journal of the New York Entomological Society*, is now in its 38th volume. A recent bequest of ten thousand dollars towards publication by the late L. B. Woodruff assures its future. The issue of September, 1929, is of unusual interest because of the publication of the numerous intimate and entertaining letters of Dr. A. E. Schwarz, the well-known coleopterist. Every entomologist should read these letters. They were compiled and edited under the direction of John D. Sherman, Jr.

Collecting Male Polyphemus Moths (Lep.: Saturniidae).

On the night of July 10th, 1929, my coworker and I spent the entire night collecting the male polyphemus moths, which were lured to their death by two caged specimens of the opposite sex. We had to our credit next day just eighty-two specimens. The moths began appearing at about 10:30 and continued until four in the morning—when dawn began to break.—MRS. ELMER GRUBB, Fredericktown, Ohio.

¹ See article by G. P. Englehart in Ann. Ent. Soc. of Am., XXII, 3, 1929.

New Species of Dolichopodidae from North America (Diptera).

By MILLARD C. VAN DUZEE, 12 Abbotsford Place, Buffalo,
New York.

(Continued from page 55)

***Neurigona nigrimanus* new species.**

♂ : Length 5 mm. Face linear, silvery white; palpi yellow; front wholly covered with white pollen; occiput black with white pollen; antennae small, arista brown; orbital cilia white.

Thorax black with white pollen, which almost conceals the ground color on the depressed space before the scutellum, the edge around this space is yellow on the sides; most of the humeri, a stripe on each side extending from the humeri to the scutellum and posterior edge of pleurae yellow; abdomen yellow, second, third and fourth segments largely black, but this black narrowed on the sides posteriorly. Hypopygium black, somewhat square in outline, with small, mostly yellowish appendages at tip.

Coxae, femora and tibiae yellow; anterior coxae with yellow bristles at tip; first joint of fore tarsi dark brown, becoming black at tip, remaining four joints deep black, fifth joint very slightly thickened; middle tarsi brown, becoming black; hind tarsi with first joint yellow, remaining joints black; joints of fore tarsi as 87-45-23-10-11; of middle ones as 142-40-25-15-10; joints of hind tarsi as 66-63-37-19-15. Calypters, their cilia and the halteres pale yellow.

Wings grayish, slightly tinged with brown along the costa; third vein bent back at tip; last section of fifth vein bent near its middle, ending near tip of third and before the apex of the wing; last section of fifth vein three times as long as cross-vein; sixth vein long, nearly parallel with the wing margin, but bent a little to reach the margin; wing much narrowed at base.

♀ : Face wider than in the male; thorax black with humeri, a spot at root of wings, scutellum and posterior edge of pleurae yellow; abdomen yellow, base of second, third and fourth segments black, black on second narrowed in the middle of the dorsum; all tarsi yellow or brownish yellow with last joint black; wings with tips of third and fourth vein far apart, fourth ending almost in the apex of wing; anal angle more prominent and sixth vein shorter than in the male.

Described from one pair, taken by Owen Bryant, July 4, 1925, at Banff, Alberta. *Type* in the U. S. National Museum. No. 20581.

Dolichopus breviciliatus new species.

♂ : Length 5.5 mm. Face wide, sordid gray; palpi velvety black; front metallic bronze, dulled with gray pollen; antennae wholly black, short, third joint scarcely as long as wide, obtuse at tip; orbital cilia wholly black.

Thorax and abdomen dark green with slight bronze reflections, abdomen with black hair; hypopygium rather large, its lamellae black, a little brownish in the middle, nearly twice as long as wide, jagged and bristly on apical margin (shaped about as in figure 175a, Plate 12, Bulletin 116, U. S. National Museum).

All coxae, femora, tibiae and tarsi black with black hair and bristles; middle tibiae in the type with one bristle below; middle and hind femora each with one bristle near the tip, the latter ciliated with brown hairs, which are not as long as the width of femora; middle basitarsi with two large bristles above near the tip, otherwise the tarsi are plain; joints of fore tarsi as 56-26-16-14-14; of middle ones as 86-34-28-18-18; first three joints of hind tarsi as 111-60-42. Calypters and halteres yellow, the former with black cilia.

Wings dark grayish, tinged with brown in front; third vein straight; last section of fourth vein bent near basal third, parallel with third for some distance before its tip, ending considerably before the apex of the wing; crossvein and last section of fifth vein of nearly equal length; hind margin of wing not notched at tip of fifth vein, wing of nearly equal width; anal angle prominent.

Described from one male, taken by Owen Bryant, August 29, 1925, at Laggan, Alberta, on Paradise Mt., at an elevation of 6,700 feet. *Type* in the U. S. National Museum. No. 20582.

Polymedon flavitibialis new species.

♂ : Length 5.5 mm. Face wide, silvery white, reaching about its own width below the eyes; front green with a little white pollen; antennae black, all joints more or less yellow below, first joint long, third joint a little longer than wide, rounded at tip; arista with short pubescence; lateral and inferior orbital cilia white.

Thorax and abdomen green, dulled with white pollen; bristles of thorax inserted in indistinct brown dots; acrostichal bristles in two rows, extending nearly the whole length of thorax and becoming longer posteriorly; pleurae and coxae more black, white pollinose; there is a large, somewhat triangular white pollinose spot at suture and a small, silvery white, round spot

at outer posterior corners of dorsum; hairs of abdomen black; hypopygium (Fig. 1) black, large; outer lamellae large, black, very slightly yellowish at base, thickly covered with white pollen, upper surface with fine white hairs, below with long, blunt, blackish bristles, inner appendages partly reddish yellow, with a black hook at tip.

Anterior surface of fore coxae with small black hairs and black bristles at tip; all femora greenish black, thickly covered with white pollen; extreme tips of all coxae, tips of all femora, most of trochanters and all tibiae yellow or yellowish; all tibiae with large bristles above, their extreme tips brown or black, the black most conspicuous on fore pair; fore tibiae with one, middle ones without a bristle below; all tarsi yellow at base; hind tarsi blackened from tip of first joint, fore and middle ones from tip of second joint and with tip of first black; fore tarsi very slightly compressed and widened from tip of first joint, their pulvilli rather large, white; middle tarsi with the usual bend between second and third joints, second joint distinctly hollowed out just before its tip, on under side, third joint straight; hind tarsi with a large bristle below near base; joints of fore tarsi as 49-14-12-8-12; of middle ones as 70-25-26-16-12; those of hind pair as 57-55-34-19-18. Calyp- ters yellow with black tips and very long, yellow cilia; halteres yellow.



Fig. 1.

Wings grayish, crossvein, fifth vein and last section of fourth vein distinctly but narrowly bordered with brown; third vein bent back a little at tip, last section of fourth vein bent about as in the genus *Paraclius*, the part from the crossvein to bend about two-thirds as long as last part, its tip near tip of third and before apex of wing; last section of fifth vein does not reach the margin of wing, which is notched where the tip should be; crossvein as 37, from crossvein to wing margin at notch as 39; anal angle of wing prominent; sixth vein long but not reaching wing margin.

Described from one male, taken by F. H. Snow, August, 1902, in Southern Arizona. *Type* in the University of Arkansas.

***Paraclius elongatus* new species.**

♂ : Length 2.5 mm. Face narrowed below, silvery white, but the ground green color showing through on upper part;

front shining blue; palpi black; antennae rather large, black, third joint a little longer than wide, pointed at tip, arista with long pubescence; lower orbital cilia yellow.

Thorax green with blue reflections, shining, without a spot of white pollen at the suture; pleurae with white pollen. Abdomen green with broad metallic blackish bands at the incisures, its hairs black; hypopygium brown, a little reddish, rather long, but not thick, its lamellae oval, about twice as long as wide, yellow with a black border and short hairs all around the edge; there is a pair of rather long, bare, curved, horn-like, yellow inner appendages.

Fore coxae almost wholly yellow with black hair on anterior surface and bristles at tip; hind coxae yellow, a little blackened at base, middle ones largely black; all femora and tibiae yellow, posterior femora a little blackened at tip, especially on posterior surface; middle tibiae with two bristles below, one at middle, the other a little nearer the base, these bristles are quite close together, bristles on upper surface large; fore tarsi yellow, darker at tip, middle tarsi black from tip of first joint, hind ones wholly black; joints of middle tarsi as 32-18-15-11-8; first two joints of hind tarsi as 27-15. Calypters and halteres yellow, former with black cilia.

Wings grayish, a little tinged with brown in front of second vein; third vein nearly straight; last section of fourth vein quite abruptly bent, this bend broadly rounded and beginning at middle of the section, portion beyond the bend considerably concave posteriorly, its tip close to tip of third vein and far in front of apex of wing; last section of fifth vein only a little curved beyond the crossvein, it is 19; crossvein 11-fiftieths of a millimeter long.

♀: Almost like the male, except that the face is wide with its sides nearly parallel and the bend in last section of fourth vein not as much rounded.

Described from one pair, taken by H. H. Smith, May, 1906, at St. Vincent, West Indies. *Types* in the collection of the University of Arkansas.

This comes nearest *arcuatus* Loew, but in that species the fore and middle femora are brownish on upper edge, hind femora dark brown on most of apical half, middle and hind coxae black almost to the tip, and bend in last section of fourth vein is almost a right angle.

Insects Screened from Bean Samples (Hemip., Coleop., Orth., Hym., Dip.).

By A. O. LARSON and C. K. FISHER,

Division of Stored-Product Insects, U. S. Bureau of Entomology.

While inspecting samples of newly harvested beans in California for evidence of bean weevil infestations the writers observed that large numbers of insects of many species were among the beans. Such insects had probably sought food or shelter in the piles of bean vines in the field and had gone through the threshing machines, in which many of them had been killed. Observation has shown that some insects pass out of the bean threshing machines with the straw while others pass into the sacks with the beans. The latter are taken to the warehouses where they are separated from the beans and are sacked up with the screenings.

The numbers of insects varied in different samples from the same locality and the number of species varied as between different localities and different years. During past years Fuller's rose beetle, *Pantomorus fulleri* Horn, was frequently found in large numbers in samples of beans grown in the Chino district of San Bernardino County, but not a single specimen was found amongst the beans inspected in 1928. In 1927, *Dinocleus pilosus* Lec. was found in great numbers, sometimes eight or ten being in one sample, but in 1928 very few specimens were taken from beans grown in the same vicinity.

Of the Coleoptera, one or another of the lady beetles has been the most numerous each year, while *Chlorochroa sayi* Stål has been the most numerous of the Hemiptera.

By the time the samples reach the laboratory a good number of the insects are dead and too badly broken for identification. Especially is this true of the orders other than Coleoptera and Hemiptera.

During 1928 an effort was made to collect all living insects screened from 3,246 samples collected from Merced, Stanislaus, and San Joaquin Counties in California. Some of these insects were sent to Washington, D. C., where they were kindly determined by the specialists named below.

W. L. McAtee determined the following nine genera and nine species of Hemiptera: *Brochymena* 4-pustulata Fabr., *Chlorochroa sayi* Stål, *Euschistus conspersus* Uhl., *Neottiglossa cavifrons* Stål, *Thyanta custator* Fabr., *Murgantia histrionica* Hahn, *Corizus identatus* Hambl., *Lygaeus reclusatus* Say, var., and *Euryophthalmus cinctus* H. S.

E. A. Chapin determined the following 14 genera and 15 species of Coleoptera: *Necrophorus* sp., *Silpha ramosa* Say, *Acolus livens* Lec., *Cardiophorus* sp., nr. *tumidicollis* Lec., *Hippodamia convergens* Guér., *H. ambigua* Lec., *Coccinella californica* Mann., *Melanastus* sp., *Coniontis elongata* Csy., *Blapstinus pulverulentus* Mann., *Amphidora littoralis* Esch., *Lema nigrovittata* Guér., *Diabrotica soror* Lec., *Disonycha maritima* Mann., and *Sitophilus oryzae* L.

L. L. Buchanan determined the following six genera and four species of Coleoptera: *Curtonotus* sp., nr. *jacobinus* Lec., *Amara* sp., *Calathus quadricollis* Lec., *Agonum maculicollis* Dej., *Dinocleus pilosus* Lec., and *Cleonus* sp.

Of the Orthoptera a nymph of *Gryllus assimilis* Fabr. was determined by A. N. Caudell.

Of the Hymenoptera *Cryptus tejonensis* Cress. was determined by R. A. Cushman, and a broken ant was determined as *Camponotus* sp. by W. M. Mann.

C. T. Greene determined one dipteran as *Hermetia illucens* L.

Numerous broken specimens of Orthoptera, Hymenoptera, Diptera, and Lepidoptera, as well as a few broken specimens of Odonata, were sifted out of the beans and discarded.

In addition to the foregoing insects many specimens of the following four genera and five species of Coleoptera were collected: *Tenebroides mauritanicus* L., *Oryzaephilus surinamensis* L., *Tribolium ferrugineum* Fab., *T. confusum* Duv., *Trigonogenius globulum* Sol., and *Sitophilus oryzae* L. These had probably crawled in amongst the beans after the latter had reached the warehouses, as these insects are commonly found breeding in some of the sixteen warehouses from which the samples were taken.

Besides the discarded broken insects, which outnumbered

the others, there were collected 37 genera and 39 species in five orders. A pound would have been a very conservative estimate of the weight of the insects screened out.

The bean crop of the United States for the last five years, 1924 to 1928 inclusive, has averaged more than 17 million bushels or more than 1,023,000,000 pounds. The samples from which the above insects were screened weighed about 6,000 pounds. From these figures it appears that more than 85 tons of insects are carried into the warehouses with the newly harvested beans each fall. These insects are sacked up with the bean screenings and die, thereby reducing the numbers of both beneficial and injurious insects which would otherwise go into hibernation in or near the bean fields.

Descriptions of New Genera and Species of the Dipterous Family Ephydriidae. Paper VIII.¹

By EZRA T. CRESSON, Jr.

Ditrichophora painteri new species.

This species is unique in having the wings spotted somewhat similar to the species of the genus *Ilythea*. In the narrow parafacialia and cheeks, the relatively short second vein, curving abruptly into the costa, the species falls near *Ditrichophora nadineae* Cresson, from California.

Black; antennae except upper part of third segment, knees, apex of tibiae, and all tarsi, yellow. Halteres white. Wings clear with the following fuscous design: a narrow transverse spot at tip of first vein, including anterior crossvein, a large quadrate spot at costa midway between first and second veins, a similar spot including tip of second vein, another such spot between tips of second and third veins, a small spot including tip of third, an irregular diluted spot including posterior crossvein, and an irregular diluted design beyond the latter.

Subopaque, somewhat golden brown above, more whitish below; abdomen shining, somewhat opaque basally. Frons opaque with a broad suborbital line dilating anteriorly, and a preocellar triangular spot, black; otherwise the frons is brownish. Face

¹ Paper VI. See Ent. News, XXXV, p. 159 (1924).

Paper VII. See Ent. News, XXXVI, p. 165 (1925).

sparingly white pruinose; the linear orbits white; mesonotum with four series of well separated roundish, brown spots; scutellum with a pair of brown apical spots.

Frons quadrate; orbits parallel. Face scarcely one-third width of vertex, strongly broadening below, in profile, convex, concentric with eye-outline; parafacialia and cheeks linear; arista with five hairs. Abdomen broad with revolute lateral margins; fifth abdominal segment, in the male, subglobose with rounded apex. Fore femora of male with about three minute postflexor spinules. Wings slightly pointed at third vein; first and second costal sections subequal in length; second vein abruptly curving into costa. Length, 1.5 mm.

Type.—♂; Puerto Castilla, HONDURAS, May 6, 1926, (R. H. Painter; taken at Balsamo Farm, about 110 kilometers along the Truxillo Railroad from Puerto Castilla), [A. N. S. P., no. 6366]. *Paratypes*.—2♂, 1♀; topotypical.

***Ditrichophora balsamae* new species.**

This species, represented by one specimen, the type, differs from *Ditrichophora painteri* by the seven stripes on the mesonotum. I can find no other differentiating characters; but the specimen is not as fully developed nor in as good a condition as is possible. However the vittate mesonotum is very characteristic and it is thus at once distinguished from *painteri*, with which it apparently agrees in all other respects. Further description is unnecessary.

Type.—♀; Puerto Castilla, HONDURAS, May 6, 1926, (R. H. Painter; taken at Balsamo Farm, along the Truxillo Railroad from Puerto Castilla), [A. N. S. P., no. 6365].

***Polytrichophora boriqueni* new species.**

This species is more shining than is usual; the face is scarcely gray dusted, while the orbits are very white and distinct. Suggesting *Discocerina pulchra* Cress., described from Costa Rica, in many respects, but the face is not so narrow nor so distinctly marked.

Black; antennae including second segment but not apex of third, palpi, coxae, tibiae except dark median ring, and tarsi, yellow. Halteres white. Wings hyaline; veins pale. Mesonotum, scutellum, and abdomen shining; pleura slightly grayish. Frons rather opaque, brownish; face medianly grayish, orbits narrowly white.

Structurally similar to *pulchra*. Frons quadrate; face twice as long as broad; parafacialia very narrow, not dilating below, setulae inconspicuous. Cheeks not broader than parafacialia. Arista with four to five hairs. Mesonotal setulae nonseriated. Postflexor comb of fore femora not well developed as distinct spines. Second section of costa not much longer than third. Length, 1.7 mm.

Type.—♂ ? Adjuntas, PORTO RICO, June 26, 1915. [New York Acad. Sci.]. *Paratype*.—1 ♂ ? Mayaguez, PORTO RICO, February 15, 1915, [N. Y. Ac. Sc.].

***Hecamedoides buccata* new species.**

A robust, uniformly cinereous species with very broad cheeks; frontal orbital setulae wanting; parafacialia with distinct series of setulae; tibial spur minute. Wings noticeably lactaceous. Although lacking many of the characters typical of *Hecamedoides*, the present species is more closely allied to *Hecamedoides glauccella* (Stenh.) than to the species of *Discocerina*.

Black; frons below, face above, antennae, palpi, knees, bases and apices of tibiae, and all tarsi except apices, tawny to yellow. Halteres white. Wings lactaceous with veins, except costa and posterior crossvein, yellow. Opaque, cinereous; mesonotum somewhat yellowish tinged medianly. Abdomen less densely coated. Femora and tibiae cinereous.

Cheeks nearly as broad as eye-height. Fore femoral comb of about four small spines; hind tibial spur minute, scarcely spur-like. Length, 2.5 mm.

Type.—♂ ; Wildwood, NEW JERSEY, July 18, 1908, (Cresson), [A. N. S. P., no. 6367]. *Paratypes*.—3 ♂, 2 ♀ ; topotypical.

***Allotrichoma salubris* new species.**

Similar to *A. abdominalis* (Will.) but distinguished by the uniformly silvery pleura. The type is probably one of the specimens Dr. Williston had before him when he commented upon *Allotrichoma abdominalis*, in his "Diptera Brasiliana", Part 4, but it is entirely distinct from those before me which agree with the original description of *abdominalis*.

Opaque. Frons, facial carina above, mesonotum, scutellum, first two abdominal segments, dark brown to yellowish brown;

antennae, palpi and tarsi, black; remaining surfaces, including femora and tibiae, bluish gray. Wings lactaceous, or slightly darkened; immaculate, with yellowish veins.

Basal half of antennal arista bare and thickened, the three hairs confined to apical half. Fourth abdominal segment as long as the first three together, triangular and pointed apically. Second vein long and straight; second costal section four or five times as long as third. Otherwise similar to *abdominalis*. Length, 1.5-1.75 mm.

Type.—♂; BRAZIL, (H. H. Smith), [A. N. S. P., no. 6368].

A series of 84 specimens from Chaco, Paraguay, (Fiebrig), [Vienna National Museum] is before me which appear to be this species, but I do not care to consider them paratype.

***Axysta bradleyi* new species.**

Black; third antennal segment below, tip of palpi, extreme base of tarsi, yellow. Arista white and white pilose. Halteres dark. Wings hyaline, with dark veins. Shining to polished; sparingly brown pollinose; abdomen scabrous. Face grayish medianly, leaving the narrow orbits, which abruptly dilate near cheeks, shining.

Frons convex, horizontal, without distinct frontal bristles. Facial tubercle not prominent; facial profile vertical, twice as long as broad. Cheeks about one-fourth eye-height in width. Third antennal segment about twice as long as broad, conically pointed; upper margin concaved. Scutellum rather flattened, rugulose, slightly elongated. Length, 1.7 mm.

Type.—♂; Waycross, GEORGIA, May 8, 1911, [Cornell University Collection]. *Paratype*.—1 ♂; Muncie, ILLINOIS, June 8, 1917, [Illinois Nat. Hist. Survey].

***Nostima quinquenotata* new species.**

This pretty species is allied to *Philygria picta* (Fallen), differing in having five round, whitish spots on an infuscated wing: One in basal portion and one at middle of submarginal cell, one in apical portion of first posterior cell, one at middle of second posterior cell, and one in third posterior cell below posterior crossvein. The crossveins are far removed towards base of wings. The mesonotum is brown with lateral whitish stripes, similar to those of *picta*, but the scutellum is not velvety black. The type may be somewhat teneral, as it is very pale with all but the dorsal surfaces pale yellow. Length, 1 mm.

Type.—♀; Lloyds, Dorchester County, MARYLAND, July 10, 1907, (H. S. Barber), [U. S. N. M., no. 21851].

***Nostima niveivenosa* new species.**

A distinct species similar to *N. immaculata* Cresson described from Costa Rica, but the cross veins are conspicuously white.

Mesentum grayish with three to five brown stripes; abdomen shining, almost polished; a large dorsal triangle broadest at apical margin of second segment, spot at apical angles of third, ventral lobes and a pair of small round dots medianly near apical margin of fourth, and apical margin of fifth segments, whitish or silvery. Wings immaculate with crossveins white within whitish halos. Face prominent below but not abruptly so.

Type.—♀; Aguadilla, PORTO RICO, January, 1899, (A. Busck), [U. S. N. M., no. 21856].

The type has the antennae missing and the body somewhat greasy.

***Hydrina nigrescens* new species.**

Very similar to *Philygria debilis* Loew, but more blackish, not so brownish; frons much longer, about six-tenths as long as broad; cheeks broader; abdomen mostly shining; at most the second costal section one and one-half as long as third. Length, 1.75 mm.

Type.—♂; London Hill Mine, Bear Lake, BRITISH COLUMBIA, July 21, 1903, (R. P. Currie; 7000 feet alt.), [U. S. N. M., no. 21849].

The genus *Hydrina* Robineau-Desvoidy, as here used, is synonymous with *Philygria* Stenhammer, and is retained in the same sense as recognized by Haliday, Loew and Becker.

***Hyadina macquarti* new species.**

This species comes nearer to agreeing with the description of *Ephydra nitida* Macq. than to any specimen I have seen. It differs from *Ephydra rufipes* Meigen, which I have seen, in having the legs dark, with the apices of the femora and the extremities of the tibiae only, paler in some specimens. It differs from *Hydrina binotata* Cress, in having no whitish areas or spots on the wings; and from *Hyadina guttata* (Fallen), in the absence of the velvety-black pleural spot.

Type.—♂; Skagway, ALASKA, June 4, 1921, (J. M. Ald-

rich), [U. S. N. M., no. 21852]. *Paratypes*.—1 ♂, 2 ♀; topotypical. 2 ♂; Anchorage, ALASKA, June 15 and 19, 1921, (J. M. Aldrich), [U. S. N. M.].

Napaea halteralis new species.

This species is distinguished from *Parydra appendiculata* Lw. by the black halteres and tarsi, and white pollinose face. The females, which appear to be conspecific with the male type, have the halteres paler but tips of the knobs are black. This species is probably confined to the Pacific coastal areas of North America.

Black including halteres and tarsi. Wings brownish tinged, with tips of second to fourth veins, and crossveins clouded; whitish areas not very pronounced. Subopaque, yellow-brown pollinose, becoming white on face and cheeks, grayish on pectus and legs. No trace of grayish marks on mesonotum. Abdomen more shining, bluish.

Structurally similar to *appendiculata*. Length, 2 mm.

Type.—♂; Pullman, WASHINGTON, October 17, 1915, (A. L. Melander), [A. N. S. P., no. 6369].

Two topotypical females collected May 12 and June 15, I consider to be paratypic with the type, but they average larger, more shining; face whitish in the antennal foveae and along the orbits; mesonotum with faint grayish acrostical stripe; halteres knobs blackish but not decidedly so intense as in the type; wings more mottled with brown.

Parydra incommoda new species.

Similar to *P. bituberculata* but more shining; the pollinose vesture darker, ranging from dark brown to yellow-brown on the head and thorax. Very little grayish pollen, even below where it is generally pale yellowish and on the abdomen where it is decidedly tinged with brown.

Eyes distinctly horizontal. Frons strongly sculptured, and generally with a distinct longitudinal or roundish depression below ocellar tubercle. Face broader than long, about three-fourths as broad as vertex. Cheeks broader than eye-height. Scutellum quadrate, with lateral margins convex, rounding into the apex; the lateral bristled tubercle rather distinct. Wings with second costal section four times as long as third.

Type.—♂; Moscow Mountain, IDAHO, June 12, 1910, (A. L. Melander), [A. N. S. P., no. 6370]. *Paratypes*.—3 ♂, 5 ♀; topotypical.

Notes on Coleoptera—No. 2.

By J. N. KNULL, Pennsylvania Bureau of Plant Industry.

The following are miscellaneous rearing records and observations made by the writer unless otherwise stated. Practically all of the rearing was done indoors and for that reason the dates of emergence are not given. Clark's Valley is located in the Blue Mountains north of Harrisburg, Pennsylvania, and runs east and west. The nearest postoffice is Dauphin.

CLERIDAE.

TILLUS TRANSVERSALIS Charp. The writer has a specimen of this species in his collection which was taken in New York City by Mr. George Moetz. Evidently the larva or adult was imported with a shipment of goods.

THANASIMUS TRIFASCIATUS Say. Larvae of this species were taken in numbers from the outer bark of large dead and dying white pines (*Pinus strobus*) in Clark's Valley on November 6th. All of the larvae collected had constructed ovoid pupal cells in the thick outer bark which was about 1½ inches thick. These cells which were nearly at right angles to the grain of the wood were lined with a light colored substance which resembled silk. Some of the cells were four feet from the ground while others were found six inches from the bases of the trees. The larvae were caged in the warm laboratory and the adults emerged early in the spring. These larvae did not seem to respond to warm indoor conditions as many other Coleoptera do and some of them remained in their pupal cells until the following spring. It is quite evident that the larvae pass the winter in the pupal cells and that most of the adults emerge in June and July, as shown by collection records.

The main food of these larvae consisted of *Tetropium velutinum* Lec. although the trees were also infested with *Acanthoderes obsoletus* Oliv., *Gnathotrichus materiatus* Fitch, *Orthotomicus caelatus* Eich., *Hylurgops pinifex* Fitch, *Dryocoetes americanus* Hopk., and *Dendroctonus valens* Lec.

HYDNOCERA VERTICALIS Say. Adults were reared from dead linden (*Tilia americana*) branches infested with *Eupogonius pubescens* Lec. and *Grammoptera exigua* Newm. larvae, also from dead black oak branches (*Quercus velutina*) infested with larvae

of *Agrilus geminatus* Say. The material was collected in Clark's Valley.

ORTHOPLEURA DAMICORNIS Fab. Reared from white oak (*Quercus alba*) infested with *Phymatodes acreus* Newm. collected in Clark's Valley.

ELATERIDAE.

LUDIUS SULCICOLLIS Say. Adults were reared from dead sour gum (*Nyssa sylvatica*) wood infested with *Leptura emarginata* Fab. and *Charisalia americana* Hald. collected at Hummelstown, Pennsylvania.

BUPRESTIDAE.

DICERCA LURIDA Fab. Was reared from a dead branch of a living linden (*Tilia americana*) collected in Clark's Valley.

XENORHIPIS BRENDALI Lec. This insect seems to be so rare that a capture is worthy of record. An adult male was collected on a dead black oak branch in Clark's Valley on July 21.

CHRYSOBOTHIRIS CHRYSOELA Illig. A living adult was chopped from a dead branch of persimmon (*Diospyros virginiana*) collected at Wallaceton, Virginia, on October 3.

C. OROXO Frost. Through the kindness of Mr. Frank Haimbach and Mr. J. A. G. Rehn, the writer had a chance to work over three specimens of this species in the Horn collection in the Pennsylvania Academy of Natural Sciences. The material is labeled as follows, one male and female from North Carolina and another female from Virginia. The writer also possesses a large female labeled Fresno Co., Tennessee, June 11. Mr. C. A. Frost kindly sent me the type for comparison and in all of the southern specimens the chitinized areas of the dorsal surface were more pronounced and they lacked the grayish-green color of the punctured areas which is quite marked in the type and allotype.

C. SENSIGNATA Say. Reared from dead post oak (*Quercus stellata*) branches collected in Clark's Valley.

EUPRISTOCERUS COGITANS Web. One adult was reared from dead river birch (*Betula nigra*) collected in Clark's Valley. This is an unusual record as this insect normally breeds in alder.

AGRILUS DEFECTUS Lec. Reared from dead post oak (*Quercus stellata*) branches collected in Clark's Valley.

A. ARCUATUS Say. Adults which resemble subspecies *fulgens* Lec. were reared from dead shadbush (*Amelanchier canadensis*) collected in Clark's Valley, the tree having been girdled by a beaver. The material was reared from the main trunk which was about three inches in diameter. The larvae had worked beneath the bark and pupated in the sapwood, which is quite unlike the typical girdling of this species.

A. OTIOSUS Say. Reared from small dead branches of black walnut (*Juglans nigra*) collected in Clark's Valley.

A. GEMINATUS Say. Adults were reared from the small dead branches of black oak (*Quercus velutina*) collected in Clark's Valley.

A. BETULAE Fisher. A large series of this species was reared from dead river birch (*Betula nigra*) collected in Clark's Valley. A considerable variation in size and color was observed, the length ranging from 5 mm. to 11 mm., and many of the specimens were bright cupreous throughout the dorsal surface.

CUCUJIDAE.

CATOGENUS RUFUS Fab. During the latter part of April a Cerambycid pupa was taken from a pupal cell in a dead pitch pine (*Pinus rigida*) tree at Hummelstown, Pennsylvania. This pupa was placed in a glass vial and in a couple of weeks a larva of *Catogenus rufus* Fab. emerged. The larva proceeded to devour the dead Cerambycid pupa and in the course of a week the entire pupa was consumed. The *Catogenus* larva pupated in the vial and later the perfect adult emerged. The fact that this species is an internal parasite might account for the great variation in the size of the adults.

ALLECULIDAE.

MYCETOCHARES BINOTATUS Say. Numerous adults reared from the dead wood of a living sour gum (*Nyssa sylvatica*) tree collected at Hummelstown, Pennsylvania.

MELANDRYIDAE.

SYNCHROA PUNCTATA Newm. Reared from dead poison ivy (*Rhus toxicodendron*) stems collected at Harrisburg, Pennsylvania, and from dead ironwood (*Ostrya virginiana*) taken at Laporte, Pennsylvania.

PROTHALPIA UNDATA Lec. This species was recorded erroneously as (*Mystarus simulator* Newn.) in the *Canadian Entomologist** as breeding in *Viburnum dentatum* and ninebark (*Opulaster opulifolius*). The species was determined as *Prothalphia undata* Lec. by Mr. Ralph Hopping. The two species resemble each other superficially.

SCARABAEIDAE.

OCHROSIDIA VILLOSA Burm. This species was found breeding in a large lawn about two acres in extent near Middletown, Pennsylvania. The larvae had eaten the roots of the grass and in this way killed the plants. The blades of the grass had turned brown and could be raked up in large quantities.

CERAMBYCIDAE.

HYPERMALLUS VILLOsus Fab. Reared from dead yellow wood (*Cladrastis lutea*) branch collected at Philadelphia, Pennsylvania, by Mr. Floyd Smith and from a dead linden (*Tilia americana*) branch collected in Clark's Valley by the writer.

ELAPHIDION mucronatum Say. Reared from dead sweet fern (*Myrica asplenifolia*) stem collected in Clark's Valley.

GRAMMOPTERA EXIGUA Newn. Adults were reared from dead linden (*Tilia americana*) branches collected in Clark's Valley. The larvae did not enter the sapwood but worked between the bark and wood as stated by Craighead.†

CHARISALIA AMERICANA Hald. This species was found breeding in the dead decayed wood on the inside of a hollow sour gum (*Nyssa sylvatica*) at Hummelstown, Pennsylvania, by Mr. H. B. Kirk and the writer.

LEPTURA ABDOMINALIS Hald. The males of this species are usually black, but a male was reared from dead cypress (*Taxodium distichum*) collected at Cape Henry, Virginia, which had legs, head, thorax, scutellum, suture of elytra, humeral angles and an oblique band across apices of elytra black; the rest of the elytra was testaceous including a very small spot on the vertex of head. A female was reared which had the usual bi-colored legs in this sex, two very small black spots on pronotum, the rest of both dorsal and ventral surfaces was testaceous.

*A. B. Champlain and J. N. Knull, Can. Ent. V. 57, p. 114; 1925.

†F. C. Craighead—Dom. Can. Agl. Bul. 27, p. 96; 1923.

The species had a high percentage of parasitism by a species of Bethyloid determined by Mr. Rohwer as *Sclerodermus macrogaster* Ashm. The adults are wingless and follow the burrows of the larvae.

(To be continued)

Cleveland Museum Entomological Expedition.

Dr. George P. Englehardt, Director of Natural Sciences in the Brooklyn Museum, and Mr. John C. Pallister, Entomologist of the Cleveland Museum of Natural History, are making a brief trip into Central America in search of materials for entomological groups for the Cleveland Museum. They are the guests of Mr. M. F. Bramley, of Cleveland, who is making the trip in the yacht "Peary", which was used by MacMillan and Byrd in their Arctic Expedition in 1925. The party sailed from Long Beach, California, February 1. Before going to Guatemala they will spend a few days on the uninhabited island of Socorro.

Entomological Literature

COMPILED BY FRANK HAIMBACH AND LAURA S. MACKEY
UNDER THE SUPERVISION OF 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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

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SPECIAL NOTICES.—*Bibliographia Zoologica*.—Vol. 39. Just issued containing 1734 titles of entomological papers. **Biological Abstracts.**—Vol. III. Nos. 6-8. Just issued containing abstracts of 536 entomological papers. **Insects, Ticks, Mites and Venomous Animals of Medical and Veterinary Importance.** Part I. Medical. By W. S. Patton and A. M. Evans. 785pp., ill. This work should prove to be valuable to those interested in medical entomology. It can be secured only on application to Miss M. Brown, School of Tropical Medicine, Liverpool.

A HANDBOOK OF THE MOSQUITOES OF NORTH AMERICA, by ROBERT MATHESON, Professor of Entomology, New York State College of Agriculture, Cornell University. Published by Charles C. Thomas, Springfield, Illinois, and Baltimore, Maryland. Pages XVII + 268. Plates XXV. Figures 23. Price \$5.50.

Dr. Matheson has produced a volume which will be of the greatest value to all who are interested in the mosquitoes of the northern United States. His introductory chapters on the structure and biology of mosquitoes and their relation to human welfare are particularly good. He also includes chapters on the problem of mosquito reduction and on collecting and preserving mosquitoes and their larvae.

The systematic portion of the book takes up in turn the common North American species of *Anopheles*, *Aedes*, *Culex*, *Theobaldia*, *Psorophora*, *Tacniorhynchus*, *Uranotania*, *Orthopodomyia*, *Megarhinus* and *Wyeomyia*, with keys to the species by "adults", "males" and "larvae".

In his nomenclature, Matheson discards all subgeneric divisions, but follows Dyar, for the most part, as to genera and species, although he has adopted the British viewpoint to the extent of substituting *Theobaldia* for *Culicella*, and *Tacniorhynchus* for *Mansonia*. This latter change is particularly unfortunate, since *Tacniorhynchus* Lynch Arribálzaga 1891 (mosquitoes) must be considered to be a homonym of *Tacniorhynchus* Weinland 1858 (cestodes), and is therefore not available for use as a mosquito genus. It is also to be regretted that the arrangement of the genera in Matheson's book and of the species in the genera is entirely arbitrary, not corresponding to the natural relationships nor even following some alphabetical or chronological scheme.

Dr. Matheson's years of intimate acquaintance with the mosquitoes of the northeastern United States enable him to give a thoroughly satisfactory treatment of the species of this region, but the southern and western faunas are rather neglected, many of the more uncommon species being barely mentioned or entirely omitted.

The illustrations are numerous and carefully prepared. Dr. Matheson is to be especially congratulated on the admirable drawings portraying the basal portions of the male hypopygial structures of several genera in both dorsal and lateral views. The many figures of entire male hypopygia are very accurately drawn and will be useful, although I wish that they could have been printed a little larger. The figures of entire mosquito larvae, however, placed six to a page, are entirely too small for satisfactory use. To my mind, it would have been better to give larger scale figures of the head and tip of the abdomen only, as was done in Dyar's "Mosquitoes of the Americas."

There are far too many typographical errors in the book, and some of them are hard to forgive. Casual references to the genus *Megarhinus*, for example, are spelled correctly, but in the table of contents and in the section devoted particularly to this genus, it appears as *Meghorinus*. There are also some regrettably careless statements in the text. Under *Anopheles pseudopunctipennis* (page 91), for example, the larva of this species is described as follows: "The larva is almost identical with that of *maculipennis*. The only distinguishing character is the long drawn out condition of the leaves of the palmate hair tufts." In the larval key on a preceding page (page 84), Matheson has already used another "distinguishing character", the unbranched outer clypeal hairs, to separate out the larva of *pseudopunctipennis*, and there are many more which could be cited. In fact, the larva of *pseudopunctipennis* is entirely dissimilar to all the other North American species of *Anopheles* in almost every character which has been used in differentiating between the larvae of the different species of this genus.

Again, in his introductory discussion of mosquito reduction, on pages 59 and 60, Matheson says: "The problem of mosquito reduction involves two distinct points of view; (1) that of the public health official who has been and still is largely concerned with the reduction of mosquito-borne diseases; (2) that of the entomologist who urges that all species of mosquitoes be included in any plan of control." Of course Dr. Matheson can not have meant this statement to be taken literally. One cannot imagine, for example, an entomologist urging that any plan of mosquito control should include the destruction of all pitcher-plants in the area, because the harmless *Wyeomyia smithii* utilizes this breeding place. But even the idea of urging that any anti-malaria or anti-yellow fever campaign should include control of the mosquito nuisance in its program seems to me to be a step backward, opposed to the modern and scientific procedure of finding out the particular species of mosquitoes which are actually carrying disease, and then restricting control measures to them, so far as is possible, thus reducing the expense of mosquito control to a point where control work will actually be undertaken.—FRANCIS M. ROOT.

Doings of Societies

THE AMERICAN ENTOMOLOGICAL SOCIETY.

The stated meetings of the American Entomological Society for 1929 were regularly held in the rooms of the Entomological Department of the Academy of Natural Sciences. The average attendance was 17. Three members were admitted during the year, bringing the total to 59 resident members.

A number of distinguished visitors participated in our meetings, and while the average attendance was not as large numerically as may be desired, all the meetings were successful and enjoyable. The meetings of the Northeastern Branch of the American Association of Economic Entomologists were held in New York on November 21. This coincidence materially reduced our average attendance, as many of our members took part in these meetings in New York.

The outlook for 1930 is very promising as already 7 applications for membership are in the Secretary's hands.

At the meeting of January 24, Mr. J. A. G. Rehn gave a talk on African and Madagascan Grouse-locusts.

At the meeting of February 28th, Mr. Wm. M. Chapman spoke on his work at the Experiment Station in Florida, Mr. Frank M. Jones talked on finding of the bag-worm, *Oiketicus abbotti*, near Accomac, Virginia, Dr. Witmer Stone gave a graphic account of a trip made by him to the Chiricahui Mountains in Arizona.

At the meeting of March 28, Dr. J. Lyonel King gave a talk on the work carried on at the Japanese Beetle Laboratories in New Jersey.

At the meeting of April 25, Mr. J. A. G. Rehn made some remarks on the distribution of certain genera of Grouse-locusts; Dr. P. P. Calvert gave a talk on the moulting of insect larvae, especially the increase in the number of moults upon reducing the food supply.

At the meeting of May 23, Mr. Frank M. Jones exhibited carton nest and specimens of the ant, *Cremastogaster atkinsoni* Wheeler, from Royal Palm State Park, Florida.

At the meeting of September 26, Mr. Frank M. Jones spoke on his collecting trip at Martha's Vineyard, Massachusetts, during the past summer, listing many rare species; Mr. Chas. H. Ballou spoke of the experiment with the sap of geranium and its effect upon the Japanese beetles; Mr. Max Kisliuk spoke on the absence of Japanese beetles at Atlantic City in the past summer; Mr. Robert J. Titherington related his experiences in collecting insects in New Hampshire during his vacation.

At the meeting of October 24, Mr. R. C. Williams, Jr. spoke on the recent visit of Mr. and Mrs. Orazio Querci. Dr. P. P. Calvert spoke on the rearing in captivity from the egg of *Sympetrum vicinum* and of *Calopteryx maculata* (both Odonata) by Mr. F. Reese Nevin; Dr. Henry Fox spoke of the ability of bringing Japanese beetles through their various stages of development more quickly in high temperatures; Mr. Max Kisliuk suggested that if Japanese beetles would become established in Florida they would be a greater menace even than here; Mr. Ballou spoke of the effect of soil under certain conditions upon the development of insects; Mr. Revney, of Washington, spoke of the moulting in larval stages of insects, more especially of *Cimex lectularia*; Mrs. Margaret Cary exhibited specimens of *Apantesis vittata* (Lepidoptera) which she reared from eggs secured from a female captured in Fairmount Park, and several other species of *Apantesis* which she collected in New Hampshire in the past season; Mr. Frank M. Jones reported the behaviour of *Papipema* species (Lepidoptera) in the south as maturing later than in the north; Dr. Jesse M. Shaver, of Nashville, Tennessee, spoke of the development of *Chrysobothris femorata* (Coleoptera) under temperature control and of its injury caused to peach trees; Mr. Jos. S. Wade, of Washington, D. C., gave a brief outline of the scientific societies of Washington; Mr. J. A. G. Rehn made some remarks on the African species of the Blattid genus *Ectobius*; Mr. Frank Hainbach reported the capture in numbers of the European satin moth *Stilpnotia salicis* at New London, New Hampshire, in the past summer.

At the meeting of November 21, Dr. Levi Mengel, of the Public Museum and Art Gallery of Reading, gave a talk illustrated with lantern slides on his trip to Spain in the past summer.

At the meeting of December 19, Mr. Chas. A. Thomas, of State College Laboratory, Kennett Square, gave a talk, illustrated with lantern slides, on mushroom insects and wire worms (Elateridae).

FRANK HAINBACH, *Recording Secretary.*

APRIL, 1930

ENTOMOLOGICAL NEWS

Vol. XLI

No. 4



FERDINAND HEINRICH HERMAN STRECKER
1836-1901

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TO CONTRIBUTORS. All contributions will be considered and passed upon at our earliest convenience and, as far as may be, will be published according to date of reception. The receipt of all papers will be acknowledged. Owing to the limited size of each number of the News, articles longer than six printed pages will be published in two or more installments, unless the author be willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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Stated Meetings of The American Entomological Society will be held at 7.30 o'clock P. M., 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 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.



John Henry Comstock

Anna Watsford Comstock

ENTOMOLOGICAL NEWS

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No. 4

North American Institutions featuring Lepidoptera.

XIII. Cornell University, Ithaca, New York.

By J. D. GUNDER, Pasadena, California.

(Plates X, XI and XII).

If you know of young men or young women who really seem interested in entomology and who would like to make that science their life work, advise them to prepare for the New York State College of Agriculture of Cornell University at Ithaca, New York. There is no better school in America, or for that matter in Europe, where students will receive that specialized instruction and that ultimate prestige which the "trained" entomologist of the future must surely have. Whether the student's respective career leads to economic or systematic investigation, the laboratory or professorship, Cornell University offers the most in educational facilities, both in physical equipment and in personnel of faculty.

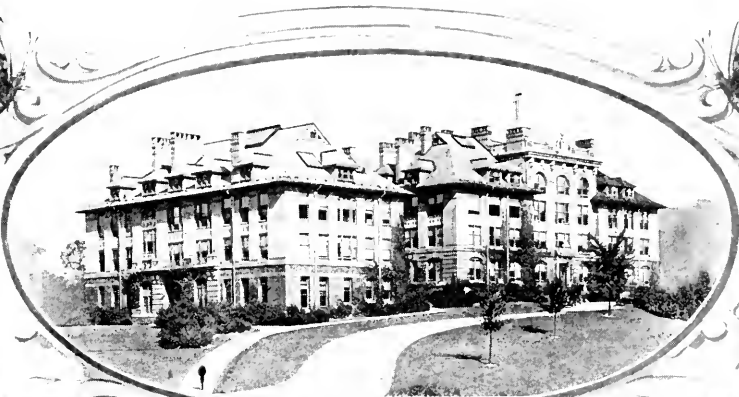
Ithaca is in the central-western part of New York State, easily accessible by railroad, and the University campus, which is just outside of town, occupies a picturesque site of about fifteen hundred acres in a hilly region overlooking Lake Cayuga. The campus itself is really a city of fine buildings composing the various colleges and schools which go to make up the University. Of note is the Library Building with its many fine individual collections of books. Other structures include, the Boardman Hall, Stimson Hall, Sibley College, Morse Hall of Chemistry, the Rockefeller Hall of Physics, the Willard Straight Hall and the buildings of the College of Agriculture, two of which are shown in the circle at the top of plate XI. There are about nine hundred persons on the University's teaching staff and last year the student enrollment was over five thousand.

Ezra Cornell (1807-74), an American business man, founded the University in 1868. He was born in Westchester, New York, of Quaker parentage, his father being a farmer and a

maker of pottery by trade. Ezra was industrious and besides learning the potter's trade, taught school in the district. For a while he worked as a carpenter and also managed a flour mill. About that time an initial telegraph line was being installed between Washington and Baltimore and young Ezra invented a digging machine for laying the wires underground.* Although the machine was a success, the system didn't work because electric insulation under the soil wasn't understood, so he proposed stringing the wires on poles. His idea, original at the time, was approved and Mr. Cornell became a contractor for the company and entered business on a big scale, making his first real money. In 1855 he was instrumental in forming the Western Union Telegraph Company. Having accumulated a very comfortable fortune by this time, he decided to retire from commercial life and revert to farming on a huge scale. Thus in 1858 he bought the land outside of Ithaca which was shortly to become the site of the University. Through politics he assembled certain United States and State land grants as a unit and by careful sales succeeded in getting the money all assigned to one institution of learning and that institution he founded on his farm as the Cornell University. At the same time he made a personal gift of \$500,000 towards buildings and thus the school was opened in 1868. Andrew D. White was the first president and remained in that position for twenty years. Fortunately Dr. White was a very able educator and worked unceasingly for the future of the school.

Although Cornell University continues to grow and now consists of eight well known colleges and the Graduate School, still its principal college, in fact, is the College of Agriculture and the Agriculture Department has always stood in the most preferred relation with the State of New York which made possible the erection of its best buildings in 1904. This is in entire accord with the wishes of the founder. Students of Agriculture who are residents of the State pay no tuition fees.

Definite entomological instruction and research were begun at the College of Agriculture in 1874 with the appointment of John Henry Comstock. A fairly recent photograph of Mr. and Mrs. Comstock is reproduced on plate X. Prof. Comstock is often referred to as America's Dean of Entomology and certainly his original work and devotion to that science merit



ROBERTS HALL, CORNELL UNIVERSITY
ITHACA, NEW YORK.



A. B. KLOTS

DR. W. T. M. FORBES

A. G. RICHARDS, JR

the title. He was born in Janesville, Wisconsin, February 24, 1849, graduating from Cornell in 1874, where he was appointed instructor in the same year. For two years he was United States Entomologist at Washington (1879-81) and held the post of Professor of Entomology and Invertebrate Zoology at the University from 1882 to 1914, when he retired as Emeritus. His principal works on entomology are: *A Manual for the Study of Insects*, *Introduction to Entomology*, *Insect Life*, *Notes on Entomology*, *Report on Cotton Insects*, *How to Know the Butterflies* (With Mrs. Comstock), *The Spider Book* and *The Wings of Insects*. He is also the author of numerous shorter papers.

Mrs. Comstock, better known as Anna Botsford Comstock, is almost as well known entomologically as her husband. Besides being a talented artist of natural history subjects, she is a wood engraver of note, having exhibited at the Chicago Fair in 1893 and the Paris Exposition in 1900. At the Buffalo Exposition in 1901, her work in wood engraving was awarded the Bronze Medal. In 1923 Mrs. Comstock was chosen by the National League of Women Voters as one of the twelve greatest living American women. Her published works include: *Ways of the Six Footed*, *Handbook of Nature Study*, *How to Keep Bees*, *The Pet Book and Bird, Animal, Tree and Plant Notebooks*.

The entomological activities of the University center around Roberts Hall and the class rooms and insect collections (third and fourth floors) are all in this building and the two immediately joining. Cornell has an enviable staff of well known instructors for entomology and the various professors seem especially interested in a variety of different insect orders in which much personal research work is being accomplished as time permits. Some of the older members of the faculty and their specialties are: J. G. Needham, Ph.D., Litt.D., D.Sc., Aquatic insects and Odonata; G. W. Herrick, B.A.S., Thysanoptera; C. R. Crosby, A.B., Arachnida; O. A. Johannsen, Ph.D., Diptera; J. C. Bradley, Ph.D., Hymenoptera; Robert Matheeson, Ph.D., Siphonoptera, etc.; P. W. Claassen, Ph.D., Plecoptera; L. P. Wehrle, Ph.D., Economic Entomology; W. T. M. Forbes, Ph. D., Lepidoptera, and G. L. Griswold, Ph.D., Injurious Insects.

For a teaching institution the collections of general lepidoptera are the best in the country. There are seven cabinets and racks holding about 900 drawers in which it is estimated there are over 50,000 mounted specimens. The butterflies of New York and northeastern United States are well represented and the moth collection is fairly large. A good deal of the material of Foulks, Murtfeldt and Fassl is accessible; much is still untouched in papers and on cotton. By far the best worked-up groups are those from South America where Dr. Forbes and others have collected and which have been given preferred attention. There are many boxes of small exotic moths collected at light in the tropics yet to be mounted and given temporary classification. Among these should be found much new material. Mr. A. B. Klots has recently been working with some of the Pierids, particularly *Erema*, and thus this family is in very fine shape. Colleges where entomology is taught need good collections of insects; however, it is not necessary that type specimens be retained.

Plate XI shows Dr. Forbes and the College's two students who at present are taking major work in Lepidoptera. Both Mr. Klots and Mr. Richards are promising young entomologists. Dr. Forbes was born in Westborough, Massachusetts, and attended Amherst, Cornell and Clark Colleges. He made an extensive trip through Asia Minor in 1907 and has twice visited countries in South America (1920 and 1927) for purposes of collecting and studying exotic Lepidoptera. The Doctor possesses a good private collection of European butterflies. His most recent extensive work was *The Lepidoptera of New York* which is a Cornell publication, memoir 68.

A great deal has been written in the NEWS and elsewhere about the Fourth International Congress of Entomology which met at Cornell in 1928 between August 12th and 18th, but I thought a reproduction of the official photograph of the delegates might be of interest in this connection. A somewhat similar picture was published in the October, 1928, *Journal of Economic Entomology* and I am indebted to that publication for my copy of the key to names. Only two names are omitted on the plate, being unknown to this author up to the time of going to press.

Notes on Coleoptera—No. 2.

By J. N. KNULL, Pennsylvania Bureau of Plant Industry.

(Continued from page 86.)

ANOPLODERA MUTABILIS Newm. Reared from partly decayed wood of alder (*Alnus rugosa*), large-toothed aspen (*Populus grandidentata*) and tulip poplar (*Liriodendron tulipifera*) collected in Clark's Valley.

A. PROXIMA Say. Reared from the dead decayed wood on the inside of a hollow sour gum (*Nyssa sylvatica*) collected at Hummelstown, Pennsylvania.

MOLORCHUS BIMACULATUS Say. Adults were reared from dead witch hazel (*Hamamelis virginiana*) collected at Rockville, Pennsylvania.

MOLORCHUS BIMACULATUS celti new subspecies.

A *Molorchus* was found breeding in hackberry (*Celtis occidentalis*) which seems to differ materially from the specimens of *Molorchus bimaculatus* collected and reared from other hosts in the same vicinity. The adults are much larger in size than those reared from many other hosts, although the branches in which these were breeding were no larger. The adults vary in length from 8 to 11.5 mm.

As compared with *Molorchus bimaculatus*, the antennae are relatively longer in the type male, pronotum longer and more nearly cylindrical, apices of elytra more broadly rounded, punctures of pronotum and elytra much finer, pubescence of entire insect longer and more dense. Length 11 mm., width 2.5 mm.

Described from a series in the collection of the writer which were chopped from the sapwood of dead hackberry (*Celtis occidentalis*) branches and one specimen from the sapwood of dead redbud (*Cercis canadensis*) collected at Hummelstown, Pennsylvania, in December. Type in the writer's collection. The adults mature in the fall and pass the winter in their pupal cells.

PHYSOCNEMUM VIOLACEIPENNE Ham. This species was reared from dead white oak (*Quercus alba*) branches from an inch to two inches in diameter collected in Clark's Valley. The dead branches were attached to the living trees and had died the previous spring. The larvae work beneath the bark parallel with the grain and pupate in the sapwood.

RHAPLOPUS SANGUINICOLLIS Horn. At Laporte, Pennsylvania, this species was found breeding in living fire cherry (*Prunus pennsylvanica*). Many trees had been killed by the work of this insect. The adults were quite numerous on the trunks of the infested trees during the warm parts of the days in the latter part of June.

NEOCLYTUS ACUMINATUS Fab. Reared from dead linden (*Tilia americana*) collected in Clark's Valley.

ANTHOBOSCUS RURICOLA Oliv. Adults were reared from dead alder (*Alnus rugosa*) collected in Clark's Valley.

EUDERCES PICIPES Fab. Reared from dead branches of post oak (*Quercus stellata*) collected in Clark's Valley.

*ASTYLOPSIS MACULA Say. Adults were reared from the dead wood of the following trees collected in Clark's Valley: poison ivy (*Rhus toxicodendron*), witch hazel (*Hamamelis virginiana*) and black walnut (*Juglans nigra*).

LEIOPUS VARIEGATUS Hald. Reared from dead poison ivy (*Rhus toxicodendron*) collected at Harrisburg, Pennsylvania.

LEPTURGES SIGNATUS Lec. Reared from dead white oak (*Quercus alba*) collected in Clark's Valley.

L. QUERCI Fitch. Reared from dead white oak (*Quercus alba*) branches collected in Clark's Valley.

EUPOGONIUS VESTITUS Say. Was reared from dead branches of walnut (*Juglans nigra*) and witch hazel (*Hamamelis virginiana*) collected at Hummelstown, Pennsylvania.

HIPPOPSIS LEMNISCATA Fab. Found breeding in the stems of living daisy fleabane (*Erigeron ramosus*) at Rutherford, Pennsylvania.

ANTHRIBIDAE.

EUSPIHYRUS WALSHI Lec. Reared from dead poison ivy (*Rhus toxicodendron*) collected at Harrisburg, Pennsylvania.

CURCULIONIDAE.

LAEMOSACCUS PLAGIATUS Fab. Reared from dead post oak (*Quercus stellata*) branches collected in Clark's Valley.

SCOLYTIDAE.

ANISANDRUS SAYI Hopk. Living adults were taken in Clark's Valley, on March 29th, from a dead stem of spice bush (*Benzoin acstivale*) which had evidently been killed by this species. Adults were also found working in living large leaved holly (*Ilex monticola*) at Laporte, Pennsylvania, on June 20th. The barkbeetles were determined by Dr. Blackman.

Notes on Several Species of North American Pachygasterinae (Diptera: Stratiomyidae) with the Description of a New Species.*

By FRANK M. HULL, Dickinson, Texas.

The accumulation of material in this group of interesting little flies has led to the following notes upon them, together with the description of new species of *Neopachygaster*. All of these species referred to below belong to the group with "unspined scutellum". The habits of the subfamily are unusually interesting. In late spring and early summer they seem to manifest a predilection for windows. I have frequently collected them in laboratories, street cars in the heart of a city, railroad coaches, etc. They are more usually found about deep woods near rotten logs and at such places they may be swept up from the grass.

ZABRACHIA POLITA Coq. A male and a female. A. and M. College, Mississippi, April 8th, 1922 (E. W. Stafford), and May 12, 1920 (F. M. Hull). Taken on windows and by sweeping.

NEOPACHYGASTER MACULICORNIS Hine. A number of specimens of both sexes, from A. and M. College, Mississippi, May 19, 1920 (E. W. Stafford, F. M. Hull); Columbus, Ohio, May 30, 1923 (F. M. Hull). Taken on windows only. The male of this species has dichoptic eyes. The sexes are readily distinguished by the differently colored pile of the thorax: in the male silvery, in the female more golden yellow.

***Neopachygaster vitreus* n. sp.**

This species differs from *N. maculicornis*, the only other described North American species in the uniform shining black color and size. The argenteus scales of that species completely lacking.

♂. Length 2.3 mm. On account of the furcate third vein, subglobose third antennal joint, and antennae near the middle of the head in profile, this species goes in to the genus *Neopachygaster*. It shows numerous differences from *N. maculicornis* Hine.

*Contributions from the Plant Lice Laboratory, Texas Agric. Exper. Sta.

Head practically as in that species. Front shining, glossy black, the silvery lateral margins of the eyes extending a short distance above the antennae, and meeting along a median line, to form a hemispherical silvery spot at base of antennae. Proboscis yellow. Antennae pale yellow; third joint somewhat globose, slightly higher than long, conspicuously darkened on the inner side; arista yellowish, blackish on apical half. Head in profile about one-and-one-half times higher than long. Antennae situated at middle of head in profile, or slightly above.

Thorax black, extremely glossy, covered on the dorsum with sparse, appressed, very silky pile, longer and heavier on the sides behind the humeri, and towards the middle arranged to form three obscure, narrow, median stripes; whole posterior half of dorsum uniformly pilose. Halteres yellow, knobs white. Scutellum rather simple, evenly rounded, shining black with pile similar to that of thorax, placed at an angle of not quite forty-five degrees; rim slightly emarginate at apex; extreme margin with numerous small nodular protuberances, more prominent than in *maculicornis*.

Abdomen short and globose, shining, glossy black, with sparse, pale, appressed, silky pile. Legs pale yellowish; coxae and femora, except bases and apices, shining blackish. Wings hyaline; third vein furcate, veins yellowish.

This specimen will be seen to be somewhat intermediate between *Neopachygaster* and *Eupachygaster* because of the strong prominences on the scutellar rim. A careful examination of *maculicornis* will also reveal small prominences of a similar nature, hence this character is not of importance in separating the two. Otherwise the scutellum is practically of the same shape as *Neopachygaster*. In its small size and shining black color it resembles *Zabrachia polita*. However, the third vein is distinctly furcate.

Type, a male, Ames, IOWA, July 15, 1923 (F. M. Hull). In my own collection.

EUPACHYGASTER PUNCTIFER Malloch. Apparently the male has not been taken before, and I append a short description of its essential differences from the female.

♂.—Eyes not quite touching, very narrowly divided. Front and likewise ocellar space triangular. The silvery pilose lateral border of eyes extends entirely up to where the eyes approach nearest, not confluent, separated by a narrow, shining black line. Median frontal groove prominent; otherwise head very much as in female.

Thorax quite different from that of the female. There is a broad median stripe or band, of fairly long, thick, appressed, brilliant silvery scale-like hair or pile. On the sides and back of the humeri, this becomes small patches of shorter, silvery scales, or scale-like hair. Halteres dark brown, knobs white. Abdomen and legs practically as in the female.

Type and one paratype in my collection. A number of specimens from MISSISSIPPI A. and M. College on the following dates: May 19 and 20, 1922, and April 28, 1920 (F. M. Hull).

There will thus be seen a rather striking resemblance to the male of *Neopachygaster maculicornis*, in the wide silvery band of the thorax; however, the holoptic eyes and different scutellum readily separate the two.

EUPACHYGASTER HENSHAWI Malloch. I have a single specimen that I formerly held to be an undescribed form and which appears to belong here. The following notes are included for comparison.

♀.—Front shining black. The silvery lateral margins of the eyes do not extend as far above the antennae as in *punctifer*. A median band, of short recumbent, slightly yellowish pile, begins where they leave off, divides at the ocelli, and extends beyond them, the pilose area divided in its entire length by a slender groove. This is equivalent to the M-shaped mark described by Malloch in *punctifer*, and in my specimens of that species it does not extend past the ocelli. First and second joints of antennae yellow; third orange, not so dark on inner side as in *punctifer*, about one-and-one-half times broader than long, and longer below, on the inner side; pubescence of annuli silvery and with a bead-like appearance; arista reddish at base, brownish apically (white in *punctifer*), and very short pubescent and much slenderer than in *punctifer*. Face dark grayish, more or less opaque.

Thorax opaque black, obscurely punctate on the greater, median part of dorsum, and from which proceeds short appressed, sparse, silky pile, somewhat yellowish in color. The silver, scale-like hairs are confined to a narrow median line, and to five or six rather regular rows, on outer side of dorsum between the humeri and base of wing. Halteres yellow, knobs white. Scutellum with similar punctures and pile as in *punctifer*, but with the preapical hump or bulge, very much less prominent.

Abdomen glossy, vitreous black, with pale, sparse, short appressed pile, but with none of the silver, scale-like hairs as

found in *punctifer*. Legs pale yellow, coxae brownish, femora, all but bases and apices, shining black. Wings hyaline; third vein furcate.

One female, A. and M. College, MISSISSIPPI, April 29, 1922 (F. M. Hull).

JOHNSONOMYIA ALDRICHI Malloch. A number of specimens of both sexes from several localities. A. and M. College, MISSISSIPPI, April 13, 1922 (F. M. Hull). Ames, IOWA, June 20, 1923, and Columbus, OHIO, June 2, 1923 (F. M. Hull). Collected both on windows and by sweeping. The above specimens agree well with the description. However, in the latter, there is no mention of a fairly distinct striped arrangement of the pile of the thorax. In my specimens three median stripes are easily discernible.

PACHYGASTER PULCHER Lw. Several specimens, both sexes, loaned by Professor J. S. Hine, seem to be this species. They agree well with the description, although the latter seems deficient on one or two points. It does not mention a slight bluish reflection apparent in the material before me. Moreover, in this series, the abdomen, especially in the male, is somewhat more elongate than is common among other members of the group. The above mentioned specimens were from Atherton, MISSOURI, May 25, 1922 (C. F. Adams) and Madison WISCONSIN, June 3, 1919 (A. C. Burrill).

The Preservation of Lepidopterous Larvae by Injection.

By A. C. COLE, JR., Ohio State University, Columbus, Ohio.

I have found, in the preparation of Lepidopterous larvae for display purposes in dry mounts, that the use of the methods listed below gave approximately 100% insurance against their destruction by museum pests, and in most cases caused the larvae to retain their original shapes.

I. INJECTING WITH THE VISCERA INTACT.

Fill a hypodermic syringe with one of the fluids specified below, being sure to use the needle indicated under the fluid.

Enter the needle into the anus being very careful not to puncture the wall of the intestine too near the opening. The wall must be punctured, however, as near the center of the larva as possible, and the needle thrust into the body cavity. As soon as the point of the needle is as far anterior as possible, inject the fluid into the body cavity, and extract the needle slowly. When the larva contains as much of the material as necessary withdraw the needle completely.

Most of the substances listed below will not exude from the opening if the correct needle is used. In case this happens, however, it will be necessary to plug the opening temporarily as soon as the needle is withdrawn.

Injection, due to the pressure of the fluid and the amount used, lengthens the larva considerably. During the process of hardening, however, the larva will again become nearly its normal size, due to a partial shrinking of the body-wall, around the internal organs. Those fluids which do not allow this shrinking or those which produce "over-shrinkage"* should be avoided.

The following fluids may be used:

Collodion—Use a needle with a medium diameter. Excellent results are produced. There is no apparent over-shrinking and no distinct discoloration. The resulting specimen is firm and quite life-like in appearance.

Formalin (40%)—Use a needle with a small diameter. Good results are obtained. There is a slight discoloration and over-shrinking.

Celluloid dissolved in acetone—Use a needle with a large diameter. This is quite difficult to inject due to its viscosity. It produces irregularity in the shape of the larva. There is no apparent discoloration and no shriveling.

II. INJECTING WITH VISCERA REMOVED.

The viscera are best removed by cutting a small slit at the extreme posterior end of the larva and rolling a glass tube antero-posteriorly on the body. As soon as the viscera have

*By overshrinking is meant the shrinking of the skin of the larva to such an extent that it is out of proportion to that of the living insect.

been removed the inside of the larva should be thoroughly washed with water. The specimen may then be injected with one of the fluids listed below.

Melted paraffin—A needle with a large diameter must be used. This material produces excellent results. Care must be taken, however, that the paraffin is not so hot that it scorches the tissue or discoloration will result.

Formalin and Plaster of Paris—Use a needle with a large diameter, or a medicine-dropper in this case. The results are very good, but the best results are obtained on large larvae. The formalin (40%) and plaster of Paris are mixed into a thin paste. This paste hardens in a short period and the work therefore must be done rapidly.

Celluloid dissolved in acetone—Use a needle with a large diameter. The results are quite good, although a slight over-shrinking follows.

It must be noted that none of these fluids will prevent discoloration completely, nor will the brighter colors of the larvae be preserved entirely. Some, however, tend to discolor more than others and this must be correlated with the preserving power of the fluids.

On a Family of Coleoptera new to the Fauna of North America with Description of One New Species (Gnostidae).

By W. S. BLATCHLEY, Indianapolis, Indiana.

On March 7, 1927, while collecting two miles east of Dunedin, Florida, I beat into an umbrella, from a large mass of Spanish moss attached to the limb of a dead pine snag, a small brown beetle which I at once recognized as new to my collection. On examining it closely that evening I found that I could not place it definitely in any of the known families of North American Coleoptera. It had but three segments in each antenna and resembled somewhat some of the Pselaphids belonging to the genera *Adranes* and *Fustiger*, but the tarsi were 5-jointed and the elytra entire and covering the abdomen.

On returning to Indianapolis in April I again gave it careful study, but was unable to identify it from any of the literature in my library. I then sent it to H. C. Fall, of Tyngsboro, Massachusetts, and later to Chas. Schaeffer, of Brooklyn, New York, two of the best Coleopterists in eastern North America, but both of them passed it up as a "strange and aberrant form," wholly unknown to them even as to family. Both suggested that the antennae had been broken off, leaving only the basal segments remaining, but this I doubted, as they had every appearance of being in normal condition.

In August, 1929, I took the specimen with me to New York City and showed it to Chas. W. Leng and A. J. Mutchler, but they could only guess as to its family relationships. Mr. H. S. Barber, of the U. S. National Museum, happened at that time to be at the Brooklyn Museum and as I had the specimen in a box with others which I wished to compare with those in the Schaeffer collection, I showed it to him. He at once recognized it as belonging to the family Gnostidae, as he had recently seen examples of that family taken by Dr. Wm. M. Mann from the nests of ants in the Panama Canal Zone. By referring to the available literature at hand, we soon found that it belonged to the genus *Gnostus* founded by Westwood in 1855,¹ the genotype being *G. formicicola* Westw., taken by Henry Walter Bates from the nest of an ant, *Myrmica* (*Crematogaster*) *victima* Smith, near Santarem,² Brazil. Of this ant and beetle Bates, the collector, wrote: "The ant, neuter and female, had its formicarium formed in hollow, dried suspended sipos;³ only one female in each formicarium. This ant has a small species of beetle (Paussidae) almost invariably in its company, one or at most two, in each colony. No beetle was found in any part of the sipos not inhabited by the *Myrmica*."

One other species of the genus, viz., *Gnostus meineri* Wasmann, has since been described⁴ from Valencia, Venezuela. It was found in the nest of the ant, *Crematogaster limata* Sui. Wasmann gives characters showing that it is very different from

¹ Trans. Entom. Soc. Lond., III, 1855, p. 90, pl. 8.

² A city on the Amazon, about half way up the river to Manaus.

³ A kind of vine.

⁴ Krit. Verzeichniss der Myrmekophilen und Termitophilen Arthropoden, Berlin, 1894, p. 216.

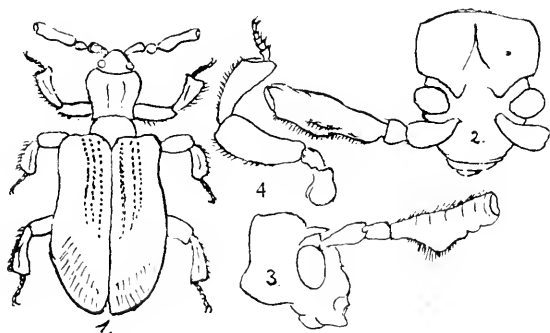
Westwood's species, as well as from the one found in Florida.

Westwood's long Latin diagnosis of the genus *Gnostus* includes also the structural characters of his species, *G. formicicola*. Freely translated, the principal characters of genus and species as given by him are as follows, those portions pertaining to the antennae and prothorax being included verbatim in the original Latin:

"Body minute, convex. Head small, immersed in thorax to the eyes, anteriorly rounded, subporrect.

"Antennae paullo ante angulos internos oculorum insertae, pronoto breviores subcylindricae; articulo 1mo subclavato, curvato, apice oblique truncato, articulo 2do in angulum inferum truncaturae apicalis articuli basalis inserto, basi gracili supra in angulum subacutum producto, articulo 3tio elongato, cylindrico apice truncato, subtus fere ad medium in angulum obtusum producto; hoc articulo, certo situ, quasi ex articulis sex arctissime conjunctis apparenti.

"Labrum small, transverse, angulate-produced in front. Maxillae minute, not bilobed; maxillary palpi 3-jointed, joint 3 largest, its middle slightly oval-inflated, apex acute. Labial palpi minute, 3-jointed, joint 1 annuliform; 2 curved, attenuate; 3 oval, apex subacute without setae.



1. *Gnostus formicicola* Westw.; 2, head from above; 3, head from the side; 4, front-leg. (After Westwood. Courtesy of Chas. W. Leng.)

"Prothorax oblongus, quasi in duas partes valde inaequales (postica multo minori) impressione divisus, pars antica capite multo latior; fossulis duobus paullo curvatis, longitudinalibus in discum notatus, lateribus rotundatis, in parte constricta

utrinque in hamis duos apicibus acutis fere conjunctis productis; parte postica transversa fere anticae latitudine aequali.

"Elytra large, more than twice the width of thorax, humeral angles rectangular, sides subparallel, tips rounded covering the abdomen; disc convex, glabrous, slightly setose, punctate-striate. Legs short, femora subclavate, tibiae compressed, slightly curved; tarsi short, all simple 5-jointed, joint 5 slightly the longer, slender. Abdomen with three visible segments, segment 1 very large, 2 very short, 3 medium, subtriangular."

The brief Latin description of his genotype is as follows:

"*Gnostus formicicola* Westw. Omino rufo-castaneus, nitidus, corpore et pronoto glabris; elytris punctato-striatis, corpore infra polito impunctato convexo. Long. corp. lin. $1 = 1/12$ unc. = 2 mm."

The specimen taken by me in Florida apparently differs from Westwood's species in characters pertaining to the antennae, and in the sculpture of thorax and elytra. It is therefore described as follows:

***Gnostus floridanus* sp. nov.**

Oblong, subcylindrical. Uniform dark reddish-brown, strongly shining. Antennae much as described by Westwood, the joints with fine scattered setae; joint 2 subglobose, one-half the length of 1; joint 3 as long as 1 and 2 united, gradually but feebly clavate, its apex truncate and under side with a very slight submedian angulation. Front lobe of prothorax with a wide and deep median groove lying between two very distinct, feebly divergent dorsal ridges, the posterior ends of these ridges thickened and projecting over the feeble transverse impression separating the two lobes of thorax. Elytra about three-fourths wider than front lobe of thorax; umbones prominent; disc without striae but with rows of very small scarcely impressed punctures, each puncture bearing a very fine short inclined yellowish seta, both punctures and setae visible only under high magnification. Length 1.6 mm.

Type a unique (sex undetermined) in the author's collection, taken near Dunedin, Florida, March 7, 1927.

Search for additional specimens in ants' nests and by beating other bunches of Spanish moss in the immediate vicinity of the type habitat has so far failed.

I have been unable as yet to definitely ascertain who first used the family name Gnostidae for the genus *Gnostus*.

Nathan Banks, who kindly looked up the matter for me, states that: "Very possibly it is due to Gemminger and Von Harold, in vol. I, of their Catalogue, 1868, p. 700." However, they there did not characterize the family but used the name Gnostidae as a family heading and placed under it three genera, viz., *Ectrephes* Pascoe; *Gnostus* Westwood and *Anapestus* King. King's name is now considered a synonym of *Ectrephes* and for this the family name Ectrephidae is now used, thus leaving *Gnostus* alone in Gnostidae.

Westwood, in the notes following his original characterization, after showing that *Gnostus* could not belong to the Paussidae, where it was originally placed by Bates adds: "Its nearest allies appear to be found amongst some of those Xylophaga of Latreille which possess 5-jointed tarsi, but it stands sufficiently detached from the whole of them as to constitute a distinct subfamily of its own." However, he gives neither a subfamily nor family name.

**Muscina stabulans Fall. (Diptera: Muscidae) Parasitic on
Arachnara subcarnea Kell. (Lepidop.: Noctuidae).**

At Toledo, Ohio on July 27, 1928 the author collected a pupa of *Arachnara subcarnea* Kell. in a stalk of *Typha latifolia*, which appeared to be parasitized. Two parasitic larvae emerged from the pupa on Aug. 11 and pupated externally, one emerging on Aug. 19 and the other on Aug. 20. These adults were determined by Dr. J. M. Aldrich of the U. S. National Museum at Washington as *Muscina stabulans* Fall. (The stable fly.)

The host pupa appeared in the stalk at the end of its larval burrow, about four inches under the surface of the water.

The author has observed on several occasions adult *Muscina stabulans* flying around *Typha latifolia* infested with *Arachnara subcarnea* but egg-laying was not observed. Inasmuch as the host larvae enter the *Typha* leaves at the tip, it is entirely possible that they were parasitized in this instar.

I believe this is the first recorded observation of a distinct parasitic habit of *Muscina stabulans*, and rearing experiments with this host should prove interesting.

Both the adult parasites and their pupal cases are now in my personal collection. —A. C. COLE, JR., Ohio State University, Columbus, Ohio.

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THE ENTOMOLOGICAL NEWS
1900 Race Street
Philadelphia, Penna., U. S. A.



**The Crambinae in the Brackenridge Clemens
Memorial Collection of the Academy of
Natural Sciences of Philadelphia¹
(Lepidoptera: Pyralidae).**

By FRANK HAIMBACH, Academy of Natural Sciences,
Philadelphia.

This paper deals especially with the North American species, which are represented in our collection by approximately two-thirds of the known species. A list of European species contained in our collection is also given. The tropical and neotropical species in our collection have not yet been studied by us.

We are desirous of building up our collection of Microlepidoptera, and this paper is the first of a series which will show to other Institutions and specialists just what we have, and from which it will be easy to see what we lack, and we invite correspondence with anyone who can furnish us with any species or sub-species which are not represented in our collection, with the view of obtaining such forms either by exchange or otherwise.

For specimens of like value we will give paratypes and other typical material in exchange.

We are citing in this paper all the types in our collection of forms here dealt with, including the designation of a number of forms of which we have selected single types (lectotypes) from larger series of cotypes. We have also noted all paratypes as well as specimens compared with types, and by whom compared.

Students of this group, as well as other groups which have been studied by us, are invited to consult our collections, and material sent to us for determination will be promptly returned, retaining only such species which are new to our collection.

The sequence of species and nomenclature here used, is that of Barnes and McDunnough's List², with such changes as were made by Dyar and Heinrich³ and the elimination of the genera

¹ Published by the aid of the Brackenridge Clemens Memorial Fund.

² Check List of the Lepidoptera of Boreal America, Decatur, Illinois, 1917.

³ The American Moths of the genus *Diatraea* and allies, by Harrison G. Dyar and Carl Heinrich. Proceedings of the U. S. National Museum, Vol. 71, pp. 1-48, 1927.

Chalcoela and *Dicymolomia*, which Forbes⁴ has placed with the Glaphyriinae.

The European species are arranged according to Arnold Spuler⁵, *Die sogenannten Kleinschmetterlinge Europas*.

MESOLIA BABOQUIVARIELLA (Kearfott).

ARIZONA: Nogales, July 4-7, 1903 (E. J. Oslar) [6; compared with type, Kearfott.].

MESOLIA ORACULELLA Kearfott.

ARIZONA: Oracle, July 3, 1905 (E. J. Oslar) [6; Topotypes].

MESOLIA HUACHUCAELLA Kearfott.

ARIZONA: Phoenix, August (Kunze) [♀; Lectotype, A. N. S. P., no. 7189, by present designation]. Globe, August 25 (Kunze) [1; Paratype].

PRIONAPTERYX NEBULIFERA Stephens.

NEW JERSEY: Brown's Mills Junction, July 21, 1907 (E. Daecke); Manumuskine, June 23, 1902 (E. Daecke) [2].

PRIONAPTERYX ACHATINA ZELLER.

NEW JERSEY: Holly Beach, July 10, 1904 (F. Haimbach) [1]. Seaside Park, July 12, 1911 (F. Weigand) [5].

PRIONAPTERYX CUNEOLALIS (Hulst).

NEW JERSEY: Five Mile Beach, July 31 (F. Haimbach) [1]. Wenonah, July 15 and August 24 (F. Haimbach) [2].

EUGROTEA YAVAPAI Kearfott.

ARIZONA: Yavapai County [Lectotype, A. N. S. P., no. 7190, by present designation].

PSEUDOSCHOENOBIVS OPALESCALIS (Hulst).

COLORADO: Clear Creek, July 13, 1914 (E. J. Oslar) [1].

UTAH: Vineyard, May 16 and August 6, 1917 (Tom Spalding) [3].

RAPHIPTERA MINIMELLA (Robinson).

MASSACHUSETTS: Bedford, August 25, 1907 [1].

PENNSYLVANIA: "Penn." [Type, A. N. S. P., no. 7447; same data, 1 Paratype]. Philadelphia, September 5 (F. Haimbach) [1].

⁴ The Lepidoptera of New York and Neighboring States. Cornell University Agricultural Station, Memoir 68, 1923.

⁵ Stuttgart, 1913.

NEW JERSEY: Lucaston, September 9 and 14 (F. Haimbach) [2]. Wenonah, May 15, 1910 (F. Haimbach) [1]. Cape May Point, July 24, 1915 (F. Haimbach) [1].

FLORIDA: Melbourne, March, 1907 (P. Laurent) [1]. Daytona, March, 1907 (P. Laurent) [1].

RAPHIPTERA ARGILLACEELLA (Packard).

CANADA: Ontario, Mer Bleue, June 22 [1].

CRAMBUS SATRAPELLUS Zincken.

NEW JERSEY: Lucaston, August 17 and September 7 (F. Haimbach) [5]. Wenonah, August 21 (F. Haimbach) [1]. Cape May Point, August 1, 1918 (F. Haimbach) [2].

GEORGIA: Thomasville, April 3, 1903 (M. Hebard) [1].

CRAMBUS HAUSTIFERELLUS Walker.

NEW JERSEY: Sea Isle City, September 5, 1908 (F. Haimbach) [7]. Anglesea, August 3, 1906 (F. Haimbach) [1]. Holly Beach, July 11 (F. Haimbach) [1].

FLORIDA: Dunedin, February 5, 1927 (W. S. Blatchley) [1]. Daytona, March (P. Laurent) [1].

CRAMBUS HAMELLUS (Thunberg).

CANADA: Manitoba, Cartwright, August 31-September 16, 1910 (J. F. Heath) [10]. British Columbia, Wellington, August 20, 1903 [1].

CRAMBUS CYPRIDALIS Hulst.

WASHINGTON: Pullman, September 27, 1898 (C. V. Piper) [2].

NEW MEXICO: Jemez Mountains, 64-6600 feet, September 9 (J. Woodgate) [10].

CRAMBUS PASCUELLUS (Linnaeus).

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [2]. Monmouth, June 25-26, 1906 [2].

NEW HAMPSHIRE: New London, June 17-19, 1929 (M. M. Cary) [1].

MASSACHUSETTS: Hyde Park, July 12, 1910 (F. Haimbach) [1].

NORTH CAROLINA: Black Mountains, July 2, 1912 (W. Beutenmuller) [1].

COLORADO: Chimney Gulch, Golden, September 10, 1907 (E. J. Osler) [3].

UTAH: Vineyard, July 11, 1917 (Tom Spalding) [2].

CRAMBUS LYONSELLUS Haimbach.

NEW YORK: Katonah, West Chester County, July (W. Beutenmuller) [♂; Type A. N. S. P., no. 7182]. Same locality, June (W. Beutenmuller) [Paratype, 1].

CRAMBUS DAECKELLUS Haimbach.

NEW JERSEY: Brown's Mills Junction, May 30, 1906 (E. Daecke) [♀; Type A. N. S. P., no. 7183]. Clementon, May 24, 1908 (F. Haimbach) [1].

CRAMBUS GIRARDELLUS Clemens.

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [1]. Monmouth, June 26, 1916 (C. A. Frost) [1].

NEW HAMPSHIRE: New London, June 20-July 11; August 10-20 (M. M. Cary) [2].

MASSACHUSETTS: "Mass." (C. Girard) [Type, A. N. S. P., no. 7293]. Hyde Park, July 15, 1910 (F. Haimbach) [1]. Bedford, July 14, 1907 (L. W. Swett) [1].

PENNSYLVANIA: Lower Merion Township, Montgomery County, July 15-28 (F. Haimbach) [2]. Philadelphia, July 12, 1906 (F. Haimbach) [1]. Philadelphia (H. Hornig) [2]. Roxboro, Philadelphia, July 9 and 21 (F. Haimbach) [2]. Fairmount Park, Philadelphia, July 12, 1906 (F. Haimbach) [1]. Clark's Ferry, July 4, 1915 (F. Haimbach) [2]. Weaver, July 21, 1917 (F. Haimbach) [1]. North Mountain, July 17 (H. W. Wenzel) [1].

VIRGINIA: "Va.", ♀ [1].

NORTH CAROLINA: Black Mountains, July 3, 1912 (W. Beutenmuller) [1].

SOUTH DAKOTA: Volga [1].

CRAMBUS LEACHELLUS (Zincken).

PENNSYLVANIA: Philadelphia, July 23 (F. Haimbach) [1]. Broomall, September 18, 1910 (F. Haimbach) [2].

NEW JERSEY: Lucaston, July 9-15 (F. Haimbach) [17].

VIRGINIA: Hot Springs, July 17-21, 1916, at light (M. Hebard) [2].

NEW MEXICO: Jemez Mountains, 6400 feet, July 14, 1917 (J. Woodgate) variety [1].

ILLINOIS: Chicago [1].

CRAMBUS UNISTRIATELLUS Packard.

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [8].

COLORADO: Denver (E. J. Oslar) [7].

CRAMBUS PRAEFECTELLUS (Zincken).

Crambus involutellus Clemens, without data. [Type, A. N. S. P., no. 7294].

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [3].

NEW HAMPSHIRE: New London, August 10-September 10, 1928 (M. M. Cary) [2].

MASSACHUSETTS: Framingham, May 9, 1925; June 27 and July 14, 1906 [3]. Everett, August 5, 1901 [1]. Hyde Park, August 22, 1907 (F. Haimbach) [2].

PENNSYLVANIA: Philadelphia, May 18-21, June 1, July 19 (F. Haimbach) [4]. Roxboro, Philadelphia, May 6-18, June 6-21, July 19 (F. Haimbach) [10]. Lower Merion Township, Montgomery County, May 4, 1916, July 26, 1921 (F. Haimbach) [2]. Perkasié, June 16 (F. Haimbach) [1].

NEW JERSEY: Sea Isle City, September 5, 1908 (F. Haimbach) [1]. Five Mile Beach, August 3-12, 1906 (F. Haimbach) [2]. Cape May Point, August 1, 1918 (F. Haimbach) [1]. Lucaston, September 11 (F. Haimbach) [1].

TEXAS: May 22 (no. 22, 1).

CRAMBUS OSLARELLUS Haimbach.

COLORADO: Clear Creek, July 3, 1907 (E. J. Oslar) [♀; Type A. N. S. P., no. 7184]. Same data [♂; Allotype]. Same data [Paratypes, 2].

CRAMBUS YOUNGELLUS Kearfott.

CANADA: Ontario, Mer Bleue, July 3, 1907 (C. H. Young) [Lectotype, A. N. S. P., no. 7191, by present designation].

CRAMBUS BIDENS Zeller.

CANADA: Ottawa, July 13-14, 1906 (C. H. Young) [2].

MAINE: Greenville, July 21-29, 1921 (F. Haimbach) [2].

NEW HAMPSHIRE: New London, August 10-30, 1928 (M. M. Cary) [3].

MASSACHUSETTS: Hyde Park, July 12, 1910 (F. Haimbach) [2].

PENNSYLVANIA: Lower Merion Township, Montgomery County, July 4, 1917 (F. Haimbach) [1].

NEW JERSEY: Wenonah, June 23, 1912 (F. Haimbach) [4].

CRAMBUS ALBOCLAVELLUS Zeller.

MAINE: Greenville, July 21-29, 1921 (F. Haimbach) [2].

NEW HAMPSHIRE: New London, June 17-19, 1929 (M. M. Cary) [1].

MASSACHUSETTS: Bedford, July 14, 1907 (C. W. Frost) [2]. Framingham, July 16, 1906 [1].

NEW YORK: Katonah, Westchester County, June, July, 1915 (W. Beutenmuller) [2].

PENNSYLVANIA: Philadelphia, June 9-25, July 8, 1914 (F. Haimbach) [7]. Roxboro, Philadelphia, June 13-27, July 2-21 (F. Haimbach) [19]. Lower Merion Township, Montgomery County, July 4-29, August 7, 1916 (F. Haimbach) [11]. Swarthmore, July 9, 1924 (E. T. Cresson, Jr.) [1]. Langhorne, July 10-11, 1922 (F. Haimbach) [8]. Weaver, July 21, 1917 (F. Haimbach) [7].

NEW JERSEY: Wenonah, June 23, 1912, July 20 (F. Haimbach) [4]. Cape May Point, July 3-26 (F. Haimbach) [4]. Five Mile Beach, July 31 (F. Haimbach) [1].

NORTH CAROLINA: Black Mountains, July 14-August 10, 1912 (W. Beutenmuller) [4].

CRAMBUS CAROLINELLUS Haimbach.

MARYLAND: Plummers Island, July 21, 1919 (G. M. Greene) [1].

VIRGINIA: Hot Springs, July 17, 1916 (M. Hebard) [1].

WEST VIRGINIA: "W. Va." [3].

NORTH CAROLINA: Black Mountains, July 19, 1912 (W. Beutenmuller) | ♂ ; Type A. N. S. P., no. 7185]. Same location, June 21-July 19, 1912 (W. Beutenmuller) [11 paratypes].

CRAMBUS AGITATELLUS Clemens.

Without data [Type, A. N. S. P., no. 7287].

MAINE: Monmouth, June 26, 1905 [1].

MASSACHUSETTS: Bedford, July 1, 1917 [1].

PENNSYLVANIA: Philadelphia, June 12 (F. Haimbach) [1]. Roxboro, Philadelphia, June 13, 1907, August 11 (F. Haimbach) [11]. Rockville, July 5, 1915 (F. Haimbach) [2]. Clark's Ferry, July 4, 1915 (F. Haimbach) [1].

NEW JERSEY: Wenonah, June 23, 1915 (F. Haimbach) [2].

CRAMBUS MYELLUS (Hübner).

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [1].

NEW HAMPSHIRE: New London, August 10-September 10, 1928 (M. M. Cary) [2].

CRAMBUS LAQUEATELLUS Clemens.

Without data [Type, A. N. S. P., no. 7295].

MASSACHUSETTS: Framingham, June 5-10, 1906 (C. A. Frost) [2].

PENNSYLVANIA: Philadelphia, May 14-18 (F. Haimbach) [3]. Roxboro, Philadelphia, May 19-June 9 (F. Haimbach) [13]. Lower Merion Township, Montgomery County, May 28-31 (F. Haimbach) [2]. Buckmanville, Bucks County, May 21-22 (F. Haimbach) [4]. Toughkenamon, Chester County, May 29-31 (E. G. Vanatta) [2].

NEW JERSEY: Wenonah, May 24 (F. Haimbach) [1].

OHIO: Cleveland [1].

CRAMBUS MULTILINEELLUS Fernald.

FLORIDA: "Fla." [1].

CRAMBUS HORTUELLUS (Hübner).

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [2]. Monmouth, July 1, 1905 [1].

MASSACHUSETTS: Hyde Park, July 8-12, 1910, and August 22, 1907 (F. Haimbach) [5]. Framingham, July 11, 1906 (C. A. Frost) [1]. Bedford, July 1, 1907 [1].

PENNSYLVANIA: Philadelphia, July 5-8, 1914 (F. Haimbach) [2]. Lower Merion Township, Montgomery County, July 29, 1916 (F. Haimbach) [1].

NEW JERSEY: Jamesburg, July 4 (F. Haimbach) [1]. Brown's Mills Junction, June 27, 1919 (F. Haimbach) [1]. Cape May Point, July 3, 1916, July 29, 1915 (F. Haimbach) [2].

OHIO: Cincinnati, August 3, 1907 (A. F. Braun) [1].

WEST VIRGINIA: "W. Va." [1].

CRAMBUS HORTUELLUS var. *TOPIARIUS* Zeller.

MAINE: Orono [1].

UTAH: Vineyard, July 7-16, August 4, 1917 (Tom Spalding) [10].

CRAMBUS HORTUELLUS var. *VACHELLELLUS* Kearfott.

NEVADA: Verdi, June 1-10 (A. H. Vachell) [Paratype].

CRAMBUS ALBELLUS Clemens.

Without data: [Type, A. N. S. P., no. 7286 and 1 Paratype].

MASSACHUSETTS: Hyde Park, July 12 (F. Haimbach) [2].

PENNSYLVANIA: Roxboro, Philadelphia, June 13, 1915 (F. Haimbach) [2]. Hulmeville, Bucks County, June 26, 1920 (F. Haimbach) [2]. Emilie, Bucks County, July 4, 1924 (F. Haimbach) [6]. Langhorne, July 2 and 22 (F. Haimbach) [9]. Perkasio, June 18 (F. Haimbach) [4]. Pocono

Lake, July 25 and 28 (G. M. Greene) [2]. Rockville, July 5 and 22, 1915 (F. Haimbach) [2].

NEW JERSEY: Brown's Mills Junction, June 22, 1919 (F. Haimbach) [1].

MARYLAND: "Md." [1].

NORTH CAROLINA: Black Mountains, June 10 (W. Bentenmuller) [2].

OHIO: Cincinnati, August 24, 1903 (A. F. Braun) [1].

CRAMBUS BIGUTTELLUS Forbes.

PENNSYLVANIA: Smithtown, June 29, 1911 (F. Haimbach) [2].

NORTH CAROLINA: Black Mountains, July 6, 1912 (W. Beutenmiller) [1].

OHIO: Cincinnati, September 19, 1903 (A. F. Braun) [1].*

CRAMBUS INNOTATELLUS Walker.

LABRADOR: *Crambus inornatellus* Clemens [Type no. 7565]. Upper St. Augustine River, August 5, 1912 (H. G. Bryant) [1].

CANADA: Alberta, Calgary, August, 1907 (H. S. King) [2]. Saskatchewan, Lloydminster, July 31 [2]. Manitoba, Aweme, July 12, 1907 [1]. Cartwright, July 20-24, August 8-13, 1907 (J. F. Heath) [5].

COLORADO: Platte Canyon (E. J. Osler) [2].

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [4]. King & Bartlett Lake (P. Laurent) [1].

NEW HAMPSHIRE: June 17-19, 1929 (M. M. Cary); August 10-30 (M. M. Cary and F. Haimbach); September 1-10, 1928 (M. M. Cary) [16].

CRAMBUS TURBATELLUS (Walker).

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [7].

MASSACHUSETTS: Hyde Park, July 13, 1910 (F. Haimbach) [1].

PENNSYLVANIA: Rockville, July 5, 1915 (F. Haimbach) [1].

VIRGINIA: Mountain Lake Park, July 26-31, 1906 (A. F. Braun) [1].

OHIO: Cincinnati, July 25, 1909 (A. F. Braun) [1].

CRAMBUS ELEGANS Clemens.

Without data: [Type no. 7285 and 1 Paratype].

MASSACHUSETTS: Hyde Park, August 21, 1907 (F. Haimbach) [1].

* This species was heretofore wrongly placed by me as *pusionellus* Zeller.

PENNSYLVANIA: Roxboro, Philadelphia, June 14-July 9 (F. Haimbach) [4]. Lower Merion Township, Montgomery County, June 26-July 24 (F. Haimbach) [7]. Swarthmore, September 9, 1915 (E. T. Cresson, Jr.) [2]. Langhorne, July 11-29, August 14 and September 11, 1922 (F. Haimbach) [5]. Edge Hill, June 25 (F. Haimbach) [1].

NEW JERSEY: Five Mile Beach, July 9, August 20-27 (F. Haimbach) [3].

VIRGINIA: Hot Springs, July 17-26 and August 11, 1916 (M. Hebard) [6].

WEST VIRGINIA: "W. Va." [1].

CRAMBUS POLINGI Kearfott.

ARIZONA: So. Ariz. (Poling) [Lectotype, A. N. S. P., no. 7192, by present designation].

CRAMBUS VULGIVAGELLUS Clemens.

Without data: [Type, A. N. S. P., no. 7289].

MASSACHUSETTS: Hyde Park, July 16-21 (F. Haimbach) [2].

NEW YORK: "N. Y." [3].

PENNSYLVANIA: Philadelphia, including Roxboro, September 6-15 (F. Haimbach) [7]. Lower Merion Township, Montgomery County, September 5-15 (F. Haimbach) [2]. Swarthmore, September 5, 1915 (E. T. Cresson, Jr.) [2]. Elwyn, September 17 (C. S. Wells) [1]. Langhorne, September 11, 1920 (F. Haimbach) [8].

NEW JERSEY: Lucaston, September 9 (F. Haimbach) [5].

TEXAS: October 17 [2].

OHIO: Cincinnati, September 3, 1902 (A. F. Braun) [1].

INDIANA: Bluffton, September 15, 1900 [1].

WISCONSIN: Crammoor, Wood County, August 25, 1907 (C. B. Hardenberg) [1].

COLORADO: Clear Creek, August 22, 1907 (E. J. Oslar) [2].

UTAH: Vineyard, August 9-11, 1917 (Tom Spalding) [2].

CRAMBUS PLUMBIFIMBRIELLUS Dyar.

CANADA: B. C., Kaslo, May, 1903 [1].

WASHINGTON: Pullman, July 7, 1898 (C. V. Piper [1; compared with type, H. G. Dyar]).

CRAMBUS DORSIPUNCTELLUS Kearfott.

COLORADO: Denver (E. J. Oslar) [3].

ARIZONA: Oracle, July 3, 1903 (E. J. Oslar) [1].

CRAMBUS RURICOLELLUS Zeller.

MASSACHUSETTS: Hyde Park, August 21-22, 1907 (F. Haimbach) [5].

PENNSYLVANIA: Roxboro, Philadelphia, September 6, 1917 (F. Haimbach) [3]. Lower Merion Township, Montgomery County, September 1-5 (F. Haimbach) [3]. Castle Rock, September 16 (F. Haimbach) [1]. Langhorne, September 11, 1922 (F. Haimbach) [1].

NEW JERSEY: Lucaston, September 7 (F. Haimbach) [1]. Anglesea, May 27, 1905 (F. Haimbach) [1].

OHIO: Cincinnati, September 2, 1903 (A. F. Braun) [1].

ILLINOIS: "Ill.", August 28-September 6 [3].

CRAMBUS RURICOLELLUS subspecies *canadellus* forma nov.

Generally darker than nimitypical form, and the median lines of primaries form two distinct dark brown bars. E. Chesley Allen in his "Some notes on the Crambinae of Nova Scotia",⁶ refers to this dark form. The locality where I collected these specimens is within seeing distance of the Province of Ontario, for which reason I consider the name given an appropriate one.

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [♂: Type, A. N. S. P., no. 7186; ♀: same data, *Allotype*; 3 *Paratypes*; 8 other specimens].

CRAMBUS TETTERELLUS (Zincken).

Without data: *Crambus camurellus* Clemens [Type, A. N. S. P., no. 7296].

PENNSYLVANIA: Philadelphia, including Roxboro, June 3-29, July 26, August 2-20, September 10-12 (F. Haimbach) [19]. Lower Merion Township, Montgomery County, July 5-29, August 3-22, September 15 (F. Haimbach) [7]. Langhorne, May 29-June 7, July 20-29, September 8-11 (F. Haimbach) [11].

VIRGINIA: Hot Springs, August 11-12, 1916 (M. Hebard) [7].

WEST VIRGINIA: "W. Va." [1].

NORTH CAROLINA: Black Mountains, June 16-23, 1912 (W. Beutenmuller) [3].

TEXAS: "Tex.", May 13, August 17, September 17-23 [12].

CRAMBUS DECORELLUS (Zincken).

MASSACHUSETTS: Bedford, July 14, 1907 (L. W. Swett) [2]. Hyde Park, August 29, 1907 (F. Haimbach) [1].

NEW YORK: Katonah, West Chester County, July 15 (W. Beutenmuller) [1].

⁶ Proceedings of the Entomological Society of Nova Scotia, 1917, pp. 92-94.

PENNSYLVANIA: Roxboro, Philadelphia, June 24, 1906 (F. Haimbach) [6]. Lower Merion Township, Montgomery County, June 16-July 5 (F. Haimbach) [10].

FLORIDA: Dunedin, March 23, 1920 (W. S. Blatchley) [1].

TEXAS: "Tex." [1].

CRAMBUS COLORADELLUS Fernald.

COLORADO: Clear Creek, June 27, 1906 (E. J. Oslar) [1].

NEW MEXICO: Jemez Mountains, 6400 feet, July 14-15, 1927; 6600 feet, September 4, 1915 (J. Woodgate) [3].

CRAMBUS MUTABILIS Clemens.

Without data: [Type, A. N. S. P., no. 7288; 1 Paratype].

MASSACHUSETTS: Framingham, July 16, 1906 [1].

NEW YORK: Katonah, West Chester County, July 15 (W. Beutenmuller) [2].

PENNSYLVANIA: Philadelphia, including Roxboro, June 2-29 (F. Haimbach) [12]. Lower Merion Township, Montgomery County, May 30-July 5, August 14, 1917 (F. Haimbach) [8]. Langhorne, June 5-8, July 29, 1922 (F. Haimbach) [7]. Honey Brook, Chester County, August 25, 1910 (W. W. Climensson) [1].

NEW JERSEY: Holly Beach, August 12, 1906 (F. Haimbach) [1]. Cape May, June 30, 1907 (F. Haimbach) [2].

NORTH CAROLINA: Black Mountains, June 21, 1912 (W. Beutenmuller) [2].

FLORIDA: Dunedin, March 15, April 17, 1920 (W. S. Blatchley) [2]. Homestead, May 14, 1915 (D. M. Castle) [1]. Enterprise, May 3, 1915 (D. M. Castle) [1].

TEXAS: April 27-29 [2].

MISSOURI: St. Louis (A. Busck) [1].

KANSAS: Douglass County, August (E. S. Tucker) [1].

COLORADO: Denver (E. J. Oslar) [2].

UTAH: Vineyard, July 11, 1917 (Tom Spalding) [1].

CRAMBUS MURELLUS Dyar.

. Colored drawing from type by National Museum artist.

CRAMBUS HEMIOCHRELLUS Zeller.

TEXAS: Galveston, May (F. H. Snow) [2].

CRAMBUS HAYTIELLUS (Zincken).

TEXAS: Brownsville, May 9 and 31, 1904 (H. S. Barber) [3].

CRAMBUS NEVADELLUS Kearfott.

NEVADA: Verdi, June 23-30 (A. H. Vachell) [Lectotype, A. N. S. P., no. 7193, by present designation].

UTAH: Vineyard, July 7-11, 1917 (Tom Spalding) [2].

CRAMBUS UNDATUS Grote.

CALIFORNIA: San Diego, February 2, 1908 (W. S. Wright) [1].

CRAMBUS TRISECTUS (Walker).

CANADA: Manitoba, Cartwright, August 31-September 4 (J. F. Heath) [9].

MASSACHUSETTS: Framingham, August 29, 1905 [1].

PENNSYLVANIA: Philadelphia, July 5, 1914 (F. Haimbach) [1]. Roxboro, Philadelphia, June 12, 1913 (F. Haimbach) [1]. Lower Merion Township, Montgomery County, June 1-10, July 6-25, August 6-16, September 5-27 (F. Haimbach) [14]. Honey Brook, Chester County, August 25, 1910 (F. Haimbach) [1].

NEW JERSEY: Five Mile Beach, August 20 (F. Haimbach) [1].

VIRGINIA: Hot Springs, July 10 and August 15, 1916 (M. Hebard) [2].

OHIO: Cincinnati, October 8, 1904 (A. F. Braun) [1].

INDIANA: Wells County, May 22, 1900 [1]. Bluffton, May 24, 1900 [1].

NEW MEXICO: Jemez Mountains, 6600 feet, August 30-September 9, 1915 (J. Woodgate) [4].

UTAH: Vineyard, August 11, 1907 (Tom Spalding) [2].

CRAMBUS SIMPLICIELLUS Kearfott.

ARKANSAS: Washington County, July-August (A. J. Brown) [Paratype].

PENNSYLVANIA: Philadelphia (F. Haimbach) [1].

CRAMBUS DIMIDIATELLUS Grote.

NEW MEXICO: Cloudcroft, June 17, 1902 (H. L. Viereck) [1].

CRAMBUS CALIGINOSELLUS Clemens.

Without data: [Type, A. N. S. P., no. 7283].

MASSACHUSETTS: Hyde Park, August 22, 1907 (F. Haimbach) [1]. Framingham, August 15, 1905 [1].

NEW YORK: Katonah, West Chester County, June 25 (W. Beutenmuller) [6].

PENNSYLVANIA: Roxboro, Philadelphia, June 16-22, July 3-10, August 2, 1915 (F. Haimbach) [14]. Lower Merion Township, Montgomery County, June 13-23, July 5-26, August 9-15 (F. Haimbach) [11]. Langhorne, June 5-7, July 20, 1922 (F. Haimbach) [4]. Weaver, July 21, 1917 (F. Haimbach) [1].

NEW JERSEY: Wenonah, July 19 (F. Haimbach) [1]. Five Mile Beach, July 9-17 (F. Haimbach) [2]. Cape May Point, July 24, 1914 (F. Haimbach) [2].

VIRGINIA: Hot Springs, July 26, August 6, 1916 (M. Hebard) [2].

NORTH CAROLINA: Black Mountains, July 23, 24, 1912 (W. Beutenmuller) [2].

CRAMBUS ZEELLUS Fernald.

PENNSYLVANIA: Weaver, July 21, 1917 (F. Haimbach) [1].

NEW JERSEY: Holly Beach, August 2, 1906 (F. Haimbach) [1].

OHIO: Cincinnati, July 16, 17 (A. F. Braun) [2].

MISSOURI: Kirkwood (Miss Murtfeldt) [1].

CRAMBUS MODESTELLUS Barnes and McDunnough.

NORTH CAROLINA: Black Mountains, June 4-28, 1912 (W. Beutenmuller) [4].

CRAMBUS LUTEOLELLUS Clemens.

MASSACHUSETTS: Hyde Park, July 8-16, 1910 (F. Haimbach) [2]. Framingham, July 21, 1906 [1].

NEW YORK: Katonah, West Chester County, June-July 15 (W. Beutenmuller) [4].

PENNSYLVANIA: Roxboro, Philadelphia, June 5-July 1 (F. Haimbach) [19]. Lower Merion Township, Montgomery County, June 17, July 1, 25 (F. Haimbach) [6]. Langhorne, June 7-July 16 (F. Haimbach) [12]. Weaver, July 21, 1917 (F. Haimbach) [5].

NEW JERSEY: Wenonah, July 15 (F. Haimbach) [1]. Five Mile Beach, June 28 (F. Haimbach) [1].

VIRGINIA: Hot Springs, August 12, 1916 (M. Hebard) [1].

NORTH CAROLINA: Black Mountains, July 5-26, 1912 (W. Beutenmuller) [2].

CRAMBUS LUTEOLELLUS var. ULAE Cockerell.

CANADA: Manitoba, Cartwright, July 27, 1908 (J. F. Heath) [1].

COLORADO: Golden, Chimney Gulch, July 15, 1904 (E. J. Osler) [1]. Clear Creek (E. J. Osler) [2].

HAIMBACHIA PLACIDELLA (Haimbach).

PENNSYLVANIA: Philadelphia, July 6 (F. Haimbach) [Paratype (*Crambus placidellus*)]. Lower Merion Township, Montgomery County, June 25-28, 1921 (F. Haimbach) [2]. Tullytown, July 9, 1922 (F. Haimbach) [2].

NEW JERSEY: Wenonah, July 27 (F. Haimbach) [Paratype (*Crambus placidellus*)]. Wenonah, July 28 (F. Haimbach) [1].

HAIMBACHIA SQUAMULELLA (Zeller).

PENNSYLVANIA: Lower Merion Township, Montgomery County, July 16-August 6 (F. Haimbach) [12].

NEW JERSEY: Wenonah, July 28 (F. Haimbach) [1]. Cape May Point, July 24-26 (F. Haimbach) [2].

GEORGIA: Kirkwood, July 23 [1].

NORTH CAROLINA: Black Mountains, July 22, 1912 (W. Beutenmuller) [1].

THAUMATOPSIS MAGNIFICUS (Fernald).

COLORADO: Maniton, June 30 [1].

NEW MEXICO: Jemez Springs, June 24, 1916 (J. Woodgate) [1]. Jemez Mountains, 6600 feet, July 15, 1915 (J. Woodgate) [1].

THAUMATOPSIS PEXELLUS (Zeller).

COLORADO: Denver (E. J. Oslar) [5]. Clear Creek, July 10, 1907 (E. J. Oslar) [4].

THAUMATOPSIS PEXELLUS var. COLORADELLUS (Kearfott).

COLORADO: Puebla, September, 1899 [Lectotype, A. N. S. P., no. 7194, by present designation (*Thaumatopsis coloradella*)].

THAUMATOPSIS GIBSONELLUS Kearfott.

CANADA: Ontario, Rostrevor, September 3, 1907 (Arthur Gibson) [♂: Lectotype, A. N. S. P., no. 7195, by present designation (*Thaumatopsis gibsonella*)]. Same locality and collector, September 5, 1907 [Paratype].

THAUMATOPSIS EDONIS (Grote).

NEW JERSEY: Lucaston, September 9-15 (F. Haimbach) [6].

TEXAS: "Tex." [1].

THAUMATOPSIS FERNALDELLUS Kearfott.

CANADA: Manitoba, Cartwright, July 2-August 8 (J. F. Heath) [6].

COLORADO: Clear Creek, July 20, 1907 (E. J. Oslar) [1].

ARIZONA: San Bernardino Ranch, Cochise County, 3750 feet, August (F. H. Snow) [2].

UTAH: Vineyard, July 11-16, 1917 (Tom Spalding) [2]. Stockton, September 2, 1904 (Tom Spalding) [1].

THAUMATOPSIS REPANDUS (Grote).

UTAH: Vineyard, July 16, 1917 (Tom Spalding) [1].

THAUMATOPSIS DAECKEELLUS Kearfott.

NEW JERSEY: Lucaston, October 10, 1902 (E. Daecke) [σ : Lectotype, A. N. S. P., no. 7188, by present designation]. Same locality and collector, October 7, 1905 [Topotype].

THAUMATOPSIS PECTINIFER (Zeller).

TEXAS: Brownsville, June, July [2].

EUFERNALDIA CADARELLA (Druce).

ARIZONA: Huachuca Mountains, August 27, 1903 (E. J. Oslar) [5].

OMMATOPTERYX TEXANA (Robinson).

WASHINGTON: Pullman, July 12, 1898 (C. V. Piper) [2].

COLORADO: Clear Creek (E. J. Oslar) [3].

UTAH: Vineyard, August 7-11, 1917 (Tom Spalding) [4].

ARIZONA: San Bernardino Ranch, Cochise County, 3750 feet, August (F. H. Snow) [2].

NEW MEXICO: Albuquerque (E. J. Oslar) [1].

ARGYRIA NIVALIS (Drury).

CANADA: Toronto [2].

MAINE: Greenville, July 21-29, 1919 (F. Haimbach) [1]. Monmouth, June 27, 1905 [1].

MASSACHUSETTS: Hyde Park, July 12, 1910 (F. Haimbach) [1]. Framingham, July 14, 1906 [1].

PENNSYLVANIA: Philadelphia, mostly at Roxboro, June 20-29 (F. Haimbach) [7]. Lower Merion Township, Montgomery County, June 29-July 17 (F. Haimbach) [3].

NEW JERSEY: Five Mile Beach (F. Haimbach) [1]. Cape May, June 30, 1907 (F. Haimbach) [1].

VIRGINIA: Hot Springs, July 2-August 1, 1916 (M. Hebard) [6].

NORTH CAROLINA: Black Mountains, July 11-17, August 13, 1912 (W. Beutenmuller) [4].

TEXAS: March 13 [2].

NEBRASKA: Omaha, June 20, 1920 (R. A. Leussler) [1]. Omaha (F. H. Marshall) [3].

ARGYRIA ARGENTANA (Martyu).

PENNSYLVANIA: "Pa." [1: *Argyria numulalis* Hübner].

NEW JERSEY: Wenonah, July 22 (F. Hainbach) [4]. Sea Isle City, September 12, 1908 (F. Hainbach) [1]. Holly Beach, August 12, 1906 (F. Hainbach) [1]. Five Mile Beach, June 19, 1904, July 3, August 6 (F. Hainbach) [4]. Cape May, June 30, 1907 (F. Hainbach) [3]. Cape May Point, July 26, 1914 (F. Hainbach) [2].

FLORIDA: Dunedin, April 3-30 (W. S. Blatchley) [2]. Daytona, March, 1907 (P. Laurent) [2].

NEBRASKA: Omaha, July 20, 1910 (R. A. Leussler) [1]. Omaha (F. H. Marshall) [3].

ARGYRIA AURATELLA (Clemens).

Argyria critica Forbes, new syn.

Forbes' description of *critica* agrees very well with Clemens' type of *auratella*, on which there is no trace of yellow on distal half of inner margin. Walker's description of *palchella* also makes no reference to the yellow marking on the distal, nor the inner, half of inner margin. Specimens which have this yellow marking along the inner margin are therefore a variety, which I do not consider worthy of a name, as both forms are taken together. On July 21, 1917, I collected a large series of this species at Weaver, Pennsylvania (near Harrisburg) in which the two forms were equally divided; the specimens were perfectly fresh, and must have emerged on that day, evidently from one brood. It appears to me to be a grade of intensity in pigmentation. Specimens collected by me at Southern New Jersey shore points are marked more intensely than those taken in Pennsylvania and more Northern points.

MASSACHUSETTS: "Mass." (S. H. Scudder, Jr.) [Type, A. N. S. P., no. 7284]. Framingham, August 8, 1907 (C. A. Frost) [1]. Hyde Park, July 8, 1910 (F. Hainbach) [1].

NEW YORK: Katonah, West Chester County, July (W. Beutenmuller) [1].

PENNSYLVANIA: Mount Airy, Philadelphia, July 28 (P. Laurent) [2 topotypes of *Argyria critica* Forbes]. Weaver, July 21, 1907 (F. Hainbach) [4].

NEW JERSEY: Wenonah, July 13-28 (F. Hainbach) [2].

Holly Beach, July 26, 1899 (F. Haimbach) [1]. Five Mile Beach, August 4 (F. Haimbach) [1]. Cape May Point, July 24, 1915 (F. Haimbach) [1].

ARGYRIA LACTEELLA (Fabricius).

FLORIDA: Dunedin, March 21-31, April 15, November 28 (W. S. Blatchley) [4].

PLATYTES MULTILINEATELLA (Hulst).

OHIO: Cincinnati, July 11, 1904 (A. F. Braun) [1].

FLORIDA: Melbourne, March (P. Laurent) [1]. Daytona, March (P. Laurent) [3].

PLATYTES PANOLOPE Dyar.

FLORIDA: Dunedin, March 29, 1921, April 28, 1920 (W. S. Blatchley) [2].

PLATYTES? ALLENI (Fernald).

PENNSYLVANIA: Philadelphia, June 2, 1914 (F. Haimbach), August (H. W. Wenzel) [2]. Lower Merion Township, Montgomery County, July 7-23, September 5 (F. Haimbach) [3].

NEW JERSEY: Sea Isle City, September 12, 1908 (F. Haimbach) [1].

EOREUMA DENSELLUS (Zeller).

PENNSYLVANIA: Lower Merion Township, Montgomery County, July 16-August 6 (F. Haimbach) [6]. Hulmeville, Bucks County, July 16, 1924 (F. Haimbach) [1].

TEXAS: May 20 [2].

CHILO MULTIPUNCTELLUS Kearfott.

ARIZONA: Carr Canyon, Huachuca Mountains, July, 1907 (H. A. Kaeber) [4].

CHILO PURITELLUS Kearfott.

ARIZONA: Carr Canyon, Huachuca Mountains, July, 1907 (H. A. Kaeber) [1].

CHILO PLEJADELLUS Zincken.

PENNSYLVANIA: Philadelphia, June 4-11, September 4 (F. Haimbach) [3]. Lower Merion Township, Montgomery County, August 14-29 (F. Haimbach) [4]. Tullytown, Bucks County, July 9, 1922 (F. Haimbach) [1].

CHILO FORBESELLUS Fernald.

NEW JERSEY: Anglesea, July 10 (P. Laurent) [1].

IESTA LISETTA Dyar.

FLORIDA: Dunedin, February 23, March 26-April 23 (W. S. Blatchley) [5].

DIATRAEA SACCHARALIS (Fabricius).

MEXICO: Vera Cruz (Koebele) [1].

DIATRAENOPSIS DIFFERENTIALIS (Fernald).

FLORIDA: Dunedin (W. S. Blatchley) [2].

DIATRAENOPSIS IDALIS (Fernald).

ILLINOIS: Chicago [1].

TEXAS: Brownsville, June [2].

ALAMOGORDIA PARALLELA (Kearfott).

NEW MEXICO: Alamogordo, April 26, 1902 (Viereck & Rehn) [♀: Allotype]. Same locality and collectors, April 26-May 4, 1902 [15 Paratypes].

OCCIDENTALIA COMPTULATALIS (Hulst).

CANADA: Cartwright, Manitoba, July 27, 1908 (J. F. Heath) [2].

UTAH: Vineyard, July 16-August 9, 1917 (Tom Spalding) [11].

COLORADO: Clear Creek, August 1, 1907 (E. J. Oslar) [1].

EUROPEAN SPECIES.

CRAMBUS COMBINELLUS Schiffermüller.

AUSTRIA: Vienna (Staudinger) [1].

Without data [2].

CRAMBUS COULONELLUS Duponchel.

Pontresina, July 15, 16 (F. E. Lowe) [2]. Rochers de Naye, July 12, 1911 (F. E. Lowe) [1]. Courmayeur, July, 1902 (F. E. Lowe) [2]. Engelberg, July 16, 1901 [2]. Preda Albula, P., July, 1913 (F. E. Lowe) [1].

CRAMBUS SPURIELLUS Hübner.

Pontresina, July 15-29, 1907 (F. E. Lowe) [4]. Steinen Alp, Berisal, July 25, 1911 (F. E. Lowe) [2]. Simplon, July 23, 1911 [1]. Eclepeus, June 1907 (F. E. Lowe) [1].

CRAMBUS INQUINATELLUS Schiffermüller.

Blightwell Heath, Suffolk, August 8, 1908 [1]. Miraborne, August, 1906 [7].

CRAMBUS SUBFLAVELLUS Duponchel.

Vizzavona, July 19-30, 1914 (F. E. Lowe) [6]. Tattone, July, 1914 (F. E. Lowe) [2].

CRAMBUS GENICULEUS Haworth.

St. Peter Port, August 20, 1916 (F. E. Lowe) [1]. Guernsey, October 23-30 (F. E. Lowe) [7].

CRAMBUS POLIELLUS Treitschke.

Without data [2].

CRAMBUS DELIELLUS Hübner.

Potsdam Str. [1]. Without data [3].

CRAMBUS LITHARGYRELLUS Hübner.

Zermatt, August, 1898, at light [2].

CRAMBUS TRISTELLUS Schiffermüller.

Without data [11].

CRAMBUS SELASELLUS Hübner.

Harwich district, July, August (G. F. Mathew) [5].

CRAMBUS LUTEELLUS Schiffermüller.

Breslau (Staudinger) [2].

CRAMBUS ZERMATTENSIS Frey.

Zermatt Str. [1].

CRAMBUS PERLELLUS Scopoli.

Harwich district, July, 1910 (G. F. Mathew) [2]. Instow, July, 1907 (G. F. Mathew) [1]. Without data [12].

CRAMBUS PERLELLUS var. *WARRINGTONELLA* Stt.

Harwich district, July 5, 1911 (G. F. Mathew) [1]. Wimborne, August, 1906 [1]. Instow, June, 1909 (G. F. Mathew) [1]. Risley Moss, Lancs, July, 1903 [1]. Pontresina, July 16-30, 1910 (F. E. Lowe) [2].

CRAMBUS ROSTELLUS Laharpe.

Seisser Alp (Staudinger) [1]. Pontresina, July 16-30 (F. E. Lowe) [3].

CRAMBUS SAXONELLUS Zincken.

Prague (Staudinger) [1]. Without data [2].

CRAMBUS FULGIDELLUS Hübner.

Without data [2].

CRAMBUS RADIELLUS Hübner.

Simplon, July 23, 1911 [4]. Laquinthal, July 14-22, 1911 (F. E. Lowe) [1]. Pontresina, July 13-30 (F. E. Lowe) [2]. Steiner Alp, Berisal, July 25, 1911 (F. E. Lowe) [1]. Without data [2].

CRAMBUS MARGARITELLUS Hübner.

Risley Moss, Lanca, July, 1904 [8]. Without data [2].

CRAMBUS PYRAMIDELLUS Treitschke

Preda Albula, P., July, 1913 (F. E. Lowe) [1]. Laguinthal, July 14-23, 1911 (F. E. Lowe) [1]. Trafoi, July, 1903 [1]. Mt. Pilatus, July 9, 1901 [2].

CRAMBUS PAUPERELLUS Treitschke.

La Grave, July 25-August 1, 1909 (F. E. Lowe) [1].

CRAMBUS CONCHELLUS Schiffermüller.

Rochers de Naye, July 12, 1911 (F. E. Lowe) [2]. Engelberg, July, 1901 [2]. Laquinthal, July 14-22, 1911 (F. E. Lowe) [2]. Val Tinire, June, 1907 (F. E. Lowe) [1]. Meizingen, July 6, 1904 [1]. No. 63 5/56, (Boll) [2].

CRAMBUS PINELLUS Linnaeus.

Nr. Wimborne, August, 1907 (G. F. Mathew) [8].

CRAMBUS MYELLUS Hübner.

Without data [1].

CRAMBUS SPECULALIS Hübner.

(Staudinger) [1].

CRAMBUS LUCTIFERELLUS Hübner.

Trofoi, July, 1903 [1]. Laquinthal, July 14-22 (F. E. Lowe) [1]. Pontresina, July, 1907, 1912 (F. E. Lowe) [4].

CRAMBUS CORSICELLUS Duponchel.

Tattona, July, 1914 (F. E. Lowe) [2].

CRAMBUS FALSELLUS Schiffermüller.

Camford, S. W., 1873 [1]. Cambridge, July [4]. Boroden, Edleston (F. Bond) [2].

CRAMBUS MACULALIS Zetterstedt.

Pontresina, July 16-30, 1910 (F. E. Lowe) [2].

CRAMBUS CHRYSONUCELLUS Scopoli.

Without data [8].

CRAMBUS CRATERELLUS Scopoli.

Without data [2].

CRAMBUS LUCELLUS Herrich-Schäffer.

Bondol, Cote de Azur, June 11-20, 1913 (F. E. Lowe) [2]. La Sté. Baume, July 12-15, 1914 (F. E. Lowe) [4].

CRAMBUS HORTUELLUS Hübner.

New Forest (C. Galliver) [7]. Unst., 1895 (P. M. Bright) [1].

CRAMBUS CULMELLUS Linnaeus.

Unst., 1895 (P. M. Bright) [5].

CRAMBUS DELICATELLUS Zeller.

Digne, June 14-25, 1910, July 16, 1909 (F. E. Lowe) [4]. Ste. Baume, June 25-July 2, 1912 (F. E. Lowe) [1]. Martigny, June, 1907 (F. E. Lowe) [2]. Vernet-Piz: Or., June 14-26, 1911 (F. E. Lowe) [1].

CRAMBUS DUMETELLUS Hübner.

Lancashire Hodgk. (F. Bond) [6]. New Forest (F. Bond) [2].

CRAMBUS PRATELLUS Linnaeus.

Pleinmont Gu., July, 1915 (F. E. Lowe) [8].

CRAMBUS ALIENELLUS Zincken.

Without data [4]. 1 labeled "Sienig."

CRAMBUS SILVELLUS Hübner.

July 27, '57 [2]. Without data [6].

CRAMBUS ERICELLUS Hübner.

Without data [3].

CRAMBUS PASCUELLUS Linnaeus.

Barum, July, 1905 [3]. Instow, June 26, 1908 (G. F. Mathew) [1]. Wicken, June 30, 1902 [3]. Beech Haven [1]. Neckar, Bischofsheim, B., June 25 (F. Weigand) [1].

CRAMBUS ULIGINOSSELLUS Zeller.

Without data [12].

CRAMBUS HAMELLUS Thunberg.

#31, August 31, '66 [3].

PLATYTES CERUSSELLUS Schiffermüller.

Without data [7].

PLATYTES ALPINELLUS Hübner.

Portsmouth, Moncraft, 1872 [4].

EROMENE BELLA Hübner.

La Ste. Baume, June 22-29, 1913 (F. E. Lowe) [3]. Nans-Var., June 25-July 11, 1914 (F. E. Lowe) [2]. Bondol, Cote de Azur, June 11-20, 1914 (F. E. Lowe) [1].

Centenary of the Entomological Society of France.

The Entomological Society of France, founded in 1832, will soon celebrate its centenary at Paris and desires to give to this event all possible splendor.

The official ceremony of the centenary, the celebrations and excursions which will be arranged for this occasion will occur at the same time as the Fifth International Congress of Entomology, which will be held at Paris in 1932. Invitations will be sent to the entomological societies of the entire world and we hope that many delegates will take part in the festivities, the program and date of which will be fixed later.

But it seems to us that such celebrations should not be the only manifestation by our society on the hundredth year of its existence. It will be appropriate to crown the magnificent series of one hundred volumes of *Annales de la Société entomologique de France* by the publication of an extraserial "Centenary" volume, containing a history of our Society from its beginning and also original memoirs by our best French authors and the best known entomologists of foreign countries.

Moreover, our Society wishes to publish a *Catalogue raisonné* of the Coleoptera of France and to complete the general tables of the *Annales*, unfinished since 1890.

It is evident that the realization of so extensive a program is dependent upon the resources which our Society will have

at its disposal. A subscription list has already been opened. It is hoped that all the members of our Society will impose on themselves the duty of subscribing and of rendering our centenary publications worthy of the efforts of our predecessors.

A later notice will fix the sum at which subscribers will have the right to receive the Centenary volume.

(Translated.)

For the Centenary Committee:

L. CHOPARD, *Secretary*. DR. R. JEANNEL, *President*.

A Note on the Longevity of a Paralyzed Orthopteran (Locustidae; Hymen.: Sphegidae).

On July 19, 1929, at Zion National Park, Utah, I surprised a large wasp (*Chlorion ichneumonium* (Linn.)) carrying an immature katydid (*Microcentrum* sp?). An attempt was made to capture them both but the wasp escaped, leaving its prey. This, upon examination, was found to have been paralyzed by the wasp. It was capable only of feeble movements of the antennae and palpi. Life processes evidently continued, as faeces were occasionally voided. It was placed in a cotton-stoppered vial which allowed circulation of air and prevented excessive evaporation. Note was made of its condition from day to day. It lived, as was evidenced by movements, from 14 to 17 days. The last few days decomposition set in at the extremities and on the 17th day it was definitely dead.—LOWELL A. WOODBURY, University of Utah, Salt Lake City, Utah.

Notes on *Corythuca pallipes* Parshley, and *Leptodictya* (Locustidae; Hymen.: Sphecidae).

The writer has been interested in the Tingididae for some time and has obtained two records which may be of interest. A rather large infestation of *Corythuca pallipes* Parshley was found in Garrett County, Maryland, feeding on its usual host plant, *Betula lutea* Michx. Heretofore the insect has not been reported south of New York. The infestation was near Bear Creek on the top of Keyser's Ridge, about 2000 feet above sea level. The insects were collected September 17, 1929.

On October 5, 1929, specimens of *Leptodictya simulans* Heidemann were collected by Dr. E. N. Cory from Petersburg, Virginia. These insects occurred in large numbers on *Arundinaria tecta* (Walt.) Muhl., where they had caused considerable damage. According to Blatchley's *Heteroptera of Eastern North America*, the host plant of this insect has never been reported. However, *L. simulans* should occur also on *A. macrosperma* Michx. These are the only two species of the Bam-buseae native to eastern United States as far north as Virginia and Maryland, where they grow in moist soil.—L. P. DITMAN, College Park, Maryland.

International Society of Ipidologists.

We note in the *Canadian Entomologist* for February, 1930, that a society by this name has been proposed by Dr. P. Spesivtzeff at a meeting of the International Congress of Forest Experiment Stations held at Stockholm, for the intensive study of the bark beetles. All those interested in bark beetles and desirous of joining the new society are requested to forward their names and addresses, with a statement of their more special interests, to Dr. I. Tragardh, Experimentalfältet, Sweden.

Some Coincidences in the Lives of Three Prominent New Zealand Entomologists of the Last Century.

Three boys were born in England—F. W. Hutton in 1836, Thomas Broun in 1838 and W. M. Maskell in 1840. All three, before they reached the age of twenty, entered the army. Maskell left England soonest, and went to New Zealand in 1860. Broun entered the army at the age of sixteen, during the Crimean War, and after the close of that war accompanied his regiment to Burma. Here he became attracted by the large size and brilliant colors of many of the tropical insects, and began to collect. Then came the outbreak of the Indian Mutiny and his regiment served in India during the whole period of the mutiny. He was present at the assault and capture of Delhi and at the relief of Lucknow. He retired from the army in 1862, married, and went to New Zealand in 1863. Hutton as a boy served as a midshipman in the navy. Later he received a commission in the Royal Welch Fusiliers, saw active service in the Crimea and in the Indian Mutiny. He was a naturalist by instinct. In 1866 he went to New Zealand and eventually was Professor of Biology in Canterbury College and stayed there for many years. He was also Curator of the Canterbury Museum.

Broun, when he got to New Zealand, found that the Maori War had broken out, and he was commissioned a Captain and served through the whole war. He was appointed Government Entomologist in 1890 and held the post for several years. He worked with insects until his death. He knew the Hemiptera and the Orthoptera and had a good knowledge of most of the other orders, but he was primarily a coleopterist.

Captain Hutton's work covered a broad range of entomological subjects, but in entomology he published over thirty papers of systematic importance.

Mr. Maskell, after reaching New Zealand, was a sheep farmer for some years. Later he became Provincial Secretary and Treasurer of Canterbury Province, and toward the end

of his life he was Registrar of the University of New Zealand. Originally a microscopist, he gradually became interested in the Coccidae, Aleurodidæ and Psyllidæ, at the same time working with the Desmids in botany. His work on scale insects made him known to entomologists all over the world.

That three boys born in England at about the same time should have become soldiers was not at all unlikely; that two of these boys should have served in the Crimea and in the Indian Mutiny was not unlikely; that all three of them should have gone to New Zealand at about the same time was not unlikely; but that all three of them added to these three coincidences a fourth coincidence that all became well known entomologists rounds out the story into something rather remarkable.

L. O. HOWARD, Washington, D. C.

Entomological Literature

COMPILED BY FRANK HAIMBACH AND LAURA S. MACKEY
UNDER THE SUPERVISION OF 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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Borodin, D. N.—Field insects of Russia, with special reference to insects introduced into America and their coefficient of injury. [Trans. 4th. Int. Cong. Ent.] 982-991, ill. **Brues, C. T.**—The insect fauna of thermal springs. [Trans. 4th. Int. Cong. Ent.] 237-240. **Carpenter, F. M.**—The lower permian insects of Kansas. Part 1. Introduction and the order Mecoptera. [Bull. Mus. Comp. Zool. Harvard Coll.] 70: 69-101, ill. **Chapman, R. N.**—Biotic potential, environmental resistance and insect abund-

ance. [X. Cong. Int. Zool. Budapest] 1209-1218, ill.

Chestnut, A.—Insect hunter. [Nat. Mag.] 15: 176-178, ill.

Cockerell T. D. A.—The future of taxonomy. [68] 71: 240-241.

Collin, J. E.—A protest against the use of abbreviations in original descriptions. [Trans. 4th. Int. Cong. Ent.] 303-305.

Corporaal, J. B.—Forum on problems of taxonomy: Determinations. [Trans. 4th. Int. Cong. Ent.] 795-796.

Corporaal, J. B.—The share of the Netherlands in the development of entomology in past centuries. [Trans. 4th. Int. Cong. Ent.] 357-360.

Cresson, E. T., Jr.—Index to the literature of the species of insects. [Trans. 4th. Int. Cong. Ent.] 484-488.

Edwards, F. W.—An account of a collecting trip to Patagonia and Southern Chile. [Trans. 4th. Int. Cong. Ent.] 416-417.

Efflatoun, H. C.—The development of entomological science in Egypt. [Trans. 4th. Int. Cong. Ent.] 737-742.

Estable, C.—Observaciones sobre algunos insectos del Uruguay. [An. Mus. Hist. Nat. Montevideo] 3: 57-92.

Flanders, S. E.—The mass production of *Trichogramma minutum* and observations on the natural and artificial parasitism of the codling moth egg. [Trans. 4th. Int. Cong. Ent.] 110-130, ill.

Felt, E. P.—Insect inhabitants of the upper air. [Trans. 4th. Int. Cong. Ent.] 869-872.

Felt, Cockerell & Troxell.—Scientific names. [68] 71: 215-218.

Heikertinger, F.—The principle of continuity in nomenclature. [Trans. 4th. Int. Cong. Ent.] 481-483.

Holland, W. J.—Forum on problems of taxonomy: Types. [Trans. 4th. Int. Cong. Ent.] 688-694.

Holland, W. J.—The mutual relations of museums and expert specialists. [Trans. 4th. Int. Cong. Ent.] 278-285.

Horn W.—On the splitting influence of the increase of entomological knowledge and on the enigma of species. [Trans. 4th. Int. Cong. Ent.] 500-507, ill.

Horn, W.—The future of insect taxonomy. [Trans. 4th. Int. Cong. Ent.] 34-51.

Jablonowski, J.—The black locust-tree-scale, *Lecanium robiniarum* and the European corn borer, *Pyrausta nubilalis*, a biological parallel. [Trans. 4th. Int. Cong. Ent.] 455-462.

Jeannel, R.—Forum on problems of taxonomy: Collections. [Trans. 4th. Int. Cong. Ent.] 797-800.

Kennedy, C. H.—The theory of nomenclature. [Trans. 4th. Int. Cong. Ent.] 665-672.

Lamborn, W. A.—The remarkable adaptation by which a dipterous pupa (Tabanidae) is preserved from the danger of fissures in drying mud. [Proc. R. Soc., London] 106, (B): 83-87, ill.

Le Cerf, F.—Une technique simplifiée pour la coloration des genitalia. [59] (B, III) 3: 147-152.

Martini, E.—Klima und seuchen vom standpunkte des entomologen. [Trans. 4th. Int. Cong. Ent.] 463-477.

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SPECIAL NOTICES.—**Fourth International Congress of Entomology.**—Ithaca, August 1928. Vol. 2. Transactions. Containing titles of 148 papers. **Monographie der paläarktischen arten des subgenus Dystroma** (truncata-citrata-gruppe) der gattung Cidaria (Geometrid). By F. Heydemann. [Mitt. Müncher Ent. Ges.] 19: 207-302, ill. [Altho treating of the palaearctic species its monographic nature makes this paper valuable to students of other faunae].

GENERAL CATALOGUE OF THE HEMIPTERA. G. Horvath, General Editor. H. M. Parshley, Managing Editor. Fascicle II MESOVELIIDAE par GÉZA HORVÁTH, M.D., Musée National Hongrois, pp. (8+) 15. Price, 50 cents. Fascicle III. PYRRHOCORIDAE by ROLAND F. HUSSEY, Sc.D., New York City. With bibliography by ELIZABETH SHERMAN, A.B., Mt. Vernon, N. Y. 144 pp. Price, \$1.50. Published by Smith College, Northampton, Mass., U.S.A., 1929.

The first fascicle, on the Membracidae, by Dr. W. D. Funkhouser, appeared in 1927 and was noticed in the NEWS for October, 1927, pages 254-255, where some general information on this series will be found. Fascicle II, in the *Avant propos*, gives a history of the family Mesoveliidae as a taxonomic unit, taken from Dr. Horvath's *Monographie* of 1915. The catalog proper occupies pp. 1-7 and lists the two genera and 14 species known from the entire world today, with their geographical distribution. One genus and three species: *Mesovelia bisignata* Uhler, *M. cryptophila* Hungerford, *M. douglasensis* Hunger-

ford, are recognized from North America. Pp. 8-14 contain a bibliography.

The Introduction, pp. 3-6, of Fascicle III, contains, *inter alia*, some interesting remarks on the geographical distribution, affinities and subdivisions of this family. "About one-third of all the known [360] species and more than half the genera [43] of the Pyrrhocoridae occur in the Indo-Malayan region, which thus appears to be the primary centre of distribution of the family." It is Dr. Hussey's belief that the two subfamilies, "the Euryophthalminae and the Pyrrhocorinae, are each worthy of elevation into distinct family rank, the two thus constituting the superfamily Pyrrhocoroidea", but for the present he retains "the family Pyrrhocoridae in its standard sense". Two new tribal names, Euryophthalmini and Physopeltini, are suggested and defined (p. 5) as subdivisions of the Euryophthalminae. Page 7 gives in tabular form the Systematic Arrangement adopted under subfamilies, tribes and genera, showing the number of species of each genus in eleven geographical divisions of the earth. Thus in North America 2 subfamilies, 7 genera and 23 species are known. The catalog occupies pp. 9-106; Appendix A, genera wrongly included in the Pyrrhocoridae, pp. 107-108; Appendix B, List of the Pyrrhocoridae described under generic names now assigned to other families, together with their present nomenclature, pp. 109-110; Appendix C, List of Pyrrhocorid species transferred by various authors to genera other than those under which they appear in this catalogue, pp. 111-113. The bibliography by Miss Sherman is on pp. 114-137. Finally there are two alphabetical indexes, one to genera and higher groups and one to species, pp. 138-144.

This is a catalogue which also serves as an index to the literature of the species of Hemiptera. It is, however, basically systematic in its structure; and unfortunately such structures are subject to serious changes when the status of the species are changed on account of Revisions, Monographs, etc., which are continually being proposed. This will, in time, necessitate reprinting the text in accordance with the new arrangement, which in turn will require rewriting and resetting of the type for the extensive bibliographical references. This will not only involve expense, but will open again the chance of errors creeping in. A new method of indexing the literature of the species of insects, which will obviate this reprinting and resetting was proposed by Ezra T. Cresson, Jr., at the Fourth International Congress of Entomology.*

P. P. CALVERT.

*Trans. 4th Intern. Cong. Ent., p. 484-487, (1929).

DIE WEBERKNECHTE UNGARNS von Dr. GABRIEL VON KOLOS-VÁRY; 4to., 112 pages, 11 plates, 67 text figures. 1929 Szeged (Ungarn) "Studium" Verlag, Budapest iv., Múzeum-Körút 21. Text in two parallel columns on each page, Magyar and German. 38 Reichsmarks. The object of the present work, says the author, is to fill some gaps in Hungarian Zoological literature and to complete the monograph of the Hungarian spider world which Otto Herman began by his treatise on spiders. He therefore presents us with this account of the Opiliones, or daddy-longlegs. It is of interest to others than students of the Hungarian fauna by virtue of the large amount of space which it devotes to the external morphology (21 pages), internal anatomy (30 pages) and mode of life (23 pages) of these Arachnids, as contrasted with 23 pages to the faunistic part. The author claims that it contains many details lacking in C. Fr. Roewer's *Die Weberknechte der Erde* (Jena, 1923, Verlag G. Fischer) and offers several new interpretations of this group of animals, largely due to his own studies on their morphology and anatomy. The more important results of his investigations which, the author believes, he has established are: a detailed description of the various kinds of spines found on the body surface and whose function is to secrete a thickish substance which, mixed with foreign particles, serves as a mechanical protection; the function and discharge of the stink-glands; explanations of the retractile chitinous tube of the male sexual organs, of the pseudotracheal chitinous canal and of the different development of the two sorts of intestinal contents; a reconstruction of the tracheal system from microscopic preparations and a new nomenclature for the same; the modes of life with special mention of juvenile individuals. The account of the internal anatomy is based chiefly on longitudinal and transverse serial microscopic sections of *Opilio parietinus* and on reconstructions made therefrom. Descriptions of the glands of the body surface, digestive, circulatory, respiratory, muscular, nervous and reproductive systems are given. The topics treated of in the chapter on modes of life are: distribution, dwelling places, relations to environment, food, pairing, egg-laying, ontogeny, phylogeny, migration, parasites and correlation between psychic and corporeal peculiarities and the account is based entirely on the author's personal observations and experiments. The plates show, on large scale, a dorsal view of the body, a profile of the head (or of the eyes only) and a more highly enlarged chelicera for each of 22 species; the text figures illustrate principally morphological and anatomical details.—P. P. CALVERT.

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No. 5



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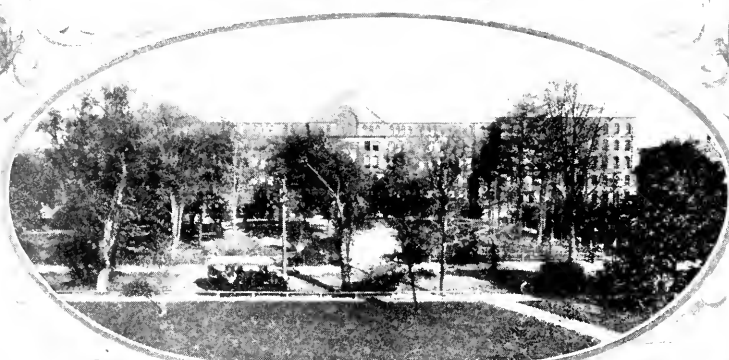
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(Plates XIII-XVI).

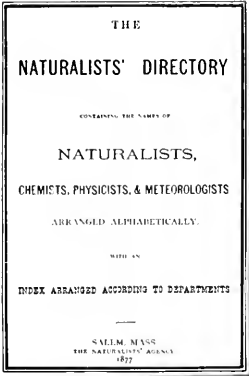
The Museum of Comparative Zoölogy is maintained by Harvard University and holds first place among American college museums. It is not confined to zoölogy, as the name might imply, but covers the entire field of natural history. As the result of being planned and built to originally house only exhibits of scientific nature for research and college instruction, its public rooms are smaller and less ornate than those of many of the more modern museums, but during the last few years, under the direction of Dr. Thomas Barbour, many changes have been made, so that to-day the institution is much more attractive to the general public than formerly. The new Alexander Agassiz Coral Reef Room with its beautiful models of some coral islands and its selection of fish and invertebrates of the characteristic fauna is of special interest. The mineralogical collection dates back to 1793 and is probably the oldest in America, while the botanical section includes the famous Gray Herbarium.

The nucleus of the University's collection was Louis Agassiz's private cabinet of natural history objects which was purchased for \$12,000 in 1852. By 1858 the quantity of study material had so grown that the school made an allowance for its maintenance. Fortunately in the year following, the State of Massachusetts took an active interest in the institution and appropriated \$100,000 for its increase. Additional large private subscriptions about this time made possible the start of construction on the present museum building. In 1876 the State relinquished all its rights to Harvard College and since that time the Museum has been controlled by the University, although the great increase in its collections was principally due

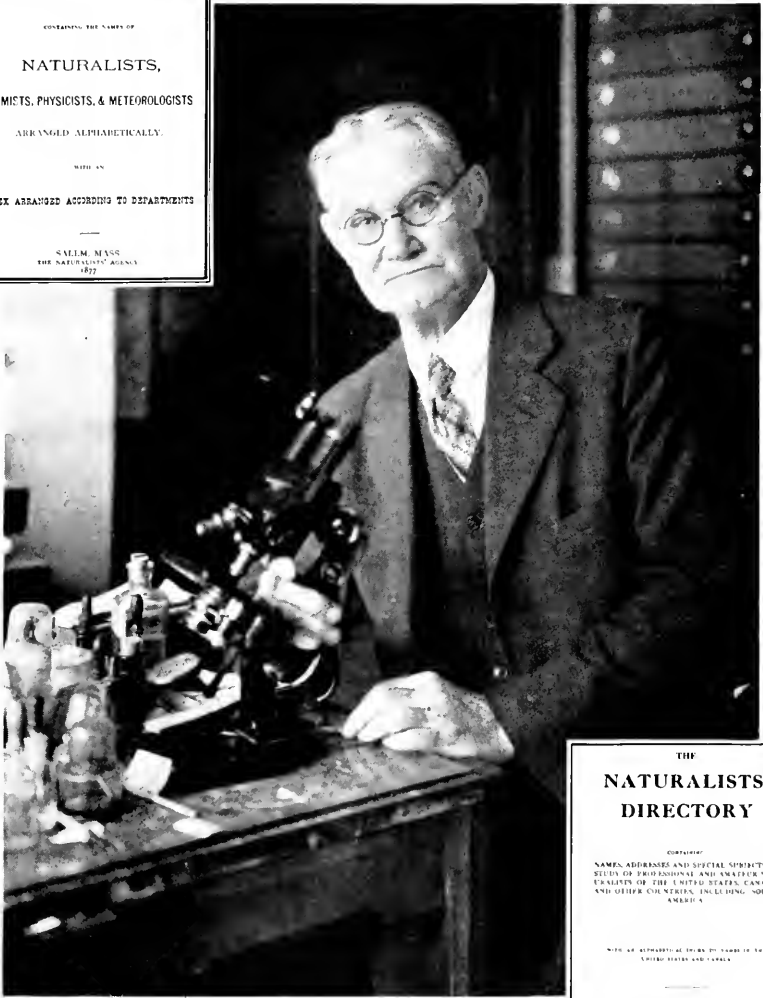
to the liberality of Alexander Agassiz who expended over \$1,000,000 for that purpose. It is rightly said that there would have been no Harvard Museum had it not been for Louis Agassiz, whose ambition and energy founded the institution, and for Alexander Agassiz, his son, whose successful commercial enterprises made possible its greater development.

Louis Agassiz, 1807-'73, was a native of Switzerland and the son of Protestant minister of Motier. He received his degrees of Doctor of Philosophy, and of Doctor of Medicine at Munich. While a professor of natural history at Neuchatel, he became interested in the study and classification of extinct fishes and early in life made an excellent European reputation for himself. Upon coming to United States in 1846 to fill a course of lectures, Dr. Agassiz decided to remain and accepted a professorship of geology at Harvard. That was in 1848, and from that time on he began his cherished plan of establishing at Harvard a great center of research in zoölogy which would more than compare with those he had known so well in Europe. Prof. Agassiz discouraged knowledge from text books and was wont to say, "If you study nature in books, when you go out of doors, you cannot find her", and that was one of the reasons why he desired large college collections for research. His pupils always had first-hand knowledge of what they were studying. Dr. Agassiz was principally interested in marine life and was America's first real student of ichthyology, making a well-financed trip to Brazil in 1865, and to California in 1871, especially to collect fishes. His son, Alexander, was likewise a specialist on oceanic life and took up his father's work, being curator of the Museum from 1874 to 1885. Unfortunately he died at sea on the "Adriatic," bound for U. S., in 1910.

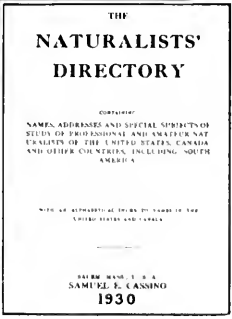
A Department of Entomology was set aside at the Museum in 1867 with H. A. Hagen, the neuropterist, as curator. For a while later on, Mr. Samuel Henshaw, the coleopterist, held the position and since 1916, Mr. Nathan Banks has been in charge. He is considered one of the few well-known authorities on Arachnida. Everybody likes Mr. Banks, and I think it is because there can always be found a kindly twinkle in his eyes! He asked me to work up the following notes as best I could, but I imagine that to leave them as they are will give



FIRST DIRECTORY 1877



LATEST DIRECTORY 1930



Samuel E. Cassino



ANDREW GREY WEEKS

everyone a better insight into the entomological activities of the Museum and into the splendid character of this man who is one of America's foremost curators of insect life.

"The 13th has always been unlucky for all spiders and bugs which get in my way. Perhaps it is because I was born at Roslyn, New York, on the 13th of April, 1868; however, be that as it may, Roslyn still remains a good town! Like all boys of a kind, I collected and my first book was Wood's *Insects at Home*. Graduated from Cornell in 1889 and thought so much of the school and the studying with Prof. Comstock that I took the postgraduate course the year following. Was employed in the old Division of Entomology at Washington under Riley from July, 1890, till September, 1892, when the Democratic Congress (bless their free-trade on insects) reduced appropriations and the young men were fired, or rather kissed goodbye. Went home to Sea Cliff, New York, where I carried on my insect studies, collected and began to publish largely on spiders. In 1896 was again appointed to the Government's Division of Entomology under the orderly régime of Dr. Howard with work on bibliography, ticks, mites, dipterous larvae, etc., until 1916, when I left to come up here. In the meantime had built up a good private collection of Arachnids and also Neuroptera. Have eight children and one helps as preparator in the Museum. Live twenty-five miles out of Cambridge at Holliston, on a ten-acre place, where the collecting is good and I sometimes find new spiders in the back yard. Don't know which of my published articles to recommend now, can't find that out till after I'm dead!"

Regarding the Museum's collections of insects, Mr. Banks writes: "The Museum has about 4800 glass-topped drawers, 15x18 inches, arranged in four rooms on the second floor.¹ These are mostly new with celotex bottoms. Our rooms average 25x30 feet, and there is a fifth room, nearly as large, which houses the entomological library. The Lepidoptera portion occupies about 1200 drawers and contains in the neighborhood of 1000 types. The Samuel H. Scudder collection of butterflies

¹ Author's note—The character and arrangement of some of these drawers is shown to the back of the group on Plate XIII.

was taken out of his old cabinets and put in with the general collection by Mr. Henshaw before I came, otherwise I probably would have left it separate. The micros, with material of Chambers, Dietz and Zeller, the geometrids of Packard and Sweet, and the butterflies of Scudder contain the bulk of the type material. The noctuids of Thaxter and Treat contain some of Grote's types. The bulk of the Jacob Doll collection was presented to us by Mr. Cassino and the A. Loveridge collection of East African butterflies was purchased by Dr. Barbour for the Museum and consists mostly of named material. Aside from the above there is a large amount of both native and exotic specimens which have been added throughout the years. In other groups we have extensive collections as follows: Neuroptera (Hagen and Banks); Orthoptera (Scudder and Morse); Diptera (Loew, Osten Sacken, Johnson); Coleoptera (Leconte, Melsheimer, Dietz, Bowditch, Blanchard, Hayward, E. D. Harris); Myriopoda (Chamberlin, Attems); Arachnida (Emerson, Peckham, Banks, Bryant) and fossil insects (Scudder). Types are not kept separate, but certain collections are. A generic card index system is being made to include all the collections, and the boxes in each order are numbered for ready reference. The Myriopods, Arachnids and Neuroptera have already been tabulated."

Massachusetts has produced many, many well-known entomologists in the past and today its record for numbers of good men remains unbroken. I wish the front plate (XIII) of this article could have included the portraits of W. M. Wheeler, of H. C. Fall, of L. W. Swett, but it is difficult to get a large group all together at one time for one photograph. Mr. A. P. Morse is curator of the Peabody Institute, at Salem, and has written many papers on Orthoptera. Mr. Arthur Loveridge, though employed in the reptile department of the Museum, is interested in butterflies and lived for over ten years in East Africa where he collected Rhopalocera and all of these are now in the Museum. Dr. C. T. Brues needs little introduction, being editor of *Psyche* since 1909. Dr. E. T. Learned is a practicing physician, specializing in Lepidoptera, particularly the *Apantesis* group. F. H. Carpenter works at the Museum under a Research Council fellowship, studying fossil insects and Neu-



William Clark

roptera. C. W. Johnson is an authority on certain Diptera and has been for years a steady contributor to *Psyche*; he is curator of the Boston Society of Natural History. Miss E. B. Bryant is permanently employed in the Entomological Department as an assistant and works mostly on spiders under Banks. Everyone knows Dr. Joseph Bequaert who specializes on Vespidae and Tabanidae. The Harvard Medical College is lucky to have him on their staff in the School of Tropical Medicine. He, as well as Dr. Wheeler and Dr. Brues, is now an Associate Curator of the Entomological Department and each has a room in the Museum. I understand Dr. Wheeler has moved all his books and collections over there.

The entomologists of the country owe a great debt of thanks to Samuel E. Cassino for his continual publication of the *Naturalist's Directory*. Imagine the number of amateur, and even professional, entomologists, who since 1877 (53 years to date), have had occasion to refer to those directories! I often wonder what motive there is, if any, or what brand of self-esteem there can be, which prompts a minority to leave their names and addresses out of a directory when insertion is conveniently solicited and scot-free? Mr. Cassino makes a special study of Geometrid moths and is attempting to work them out by genitalic classification. To date, he has made over six thousand slides for that purpose. His collection consists of two cabinets containing ninety-six drawers. Mr. Cassino was born in Salem, Massachusetts, January 4, 1856, and became interested in Lepidoptera under the guidance of A. S. Packard in 1874, when he drew and made the original engravings for the "Monograph of Geometrids". Most of Mr. Cassino's descriptions and notes appear in the *Lepidopterist*, a little entomological publication which he personally owns.

Andrew Gray Weeks is accumulating one of the few, really very large collections of exotic Lepidoptera in this country and to date they occupy forty-five cabinets. A good feature of the Weeks' collection is that everything is neatly labeled and named up-to-date. Some day, some museum will benefit by that collection. Mr. Weeks has described many new species and his two volumes, *Illustrations of Diurnal Lepidoptera Unknown to*

Science, are works of art in colored illustration. He was born in Boston, October 2, 1861, and graduated from Harvard College in '83. Since 1901, upon retiring from active business as head of the firm of Weeks & Potter, wholesale druggists, he has devoted himself to entomology and not without result. A good lepidopterist and a genial fellow to know.

After much persuasion I succeeded in getting my friend, Dr. B. Preston Clark, to send me a photograph of himself for this article. That specialization pays is certainly proved by what Dr. Clark has accomplished with the Sphingidae and I believe it can be safely said that he is the world authority on these moths. His list of desiderata shows only a few of all the known species and forms. Lately in his will, Dr. Clark has given his collection to the Carnegie Museum at Pittsburgh and the major portion, some 20,000 specimens, is already housed there. He still retains in Boston some 3000 examples needed for future study.

In the February, 1924, number of *Psyche* there is a very comprehensive history of the early entomological clubs of Massachusetts with notes on the beginning of *Psyche*, which was given its name by Scudder. It seems unnecessary to repeat or to add further to Mr. J. H. Emerton's well written article.

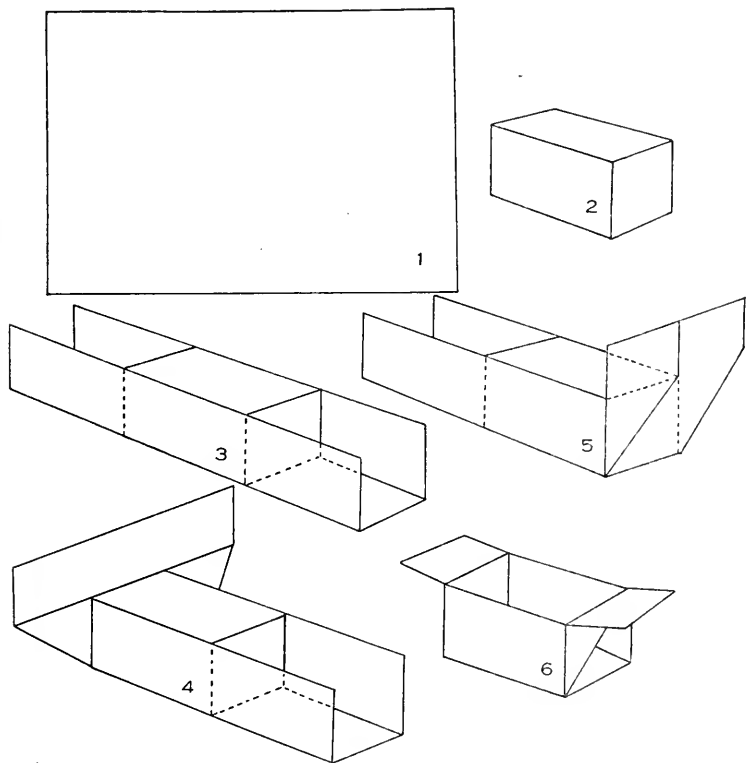
A Suggestion for Relaxing Small Insects.

By S. W. FROST, The Pennsylvania State College.

It often happens that one has occasion to relax a large number of small insects from different localities and with data which must be kept intact with the specimens. In rearing leaf-mining insects and other small species, the writer found it undesirable to kill the insects as soon as they emerged but allow them to obtain their full color. Under such conditions the insects frequently die in their rearing chambers and relaxing is necessary before pinning.

A small box made after the following description has been found very convenient for relaxing such insects. A large number of these paper boxes can be placed in a single relaxing jar with no danger of confusing records. The same sort of paper box has been used by morphologists for imbedding

sections in paraffin. They can be quickly folded and prepared without the use of glue or paste. For general purposes a piece of paper $2\frac{3}{4}'' \times 4''$ and a small wooden block $1\frac{3}{4}'' \times \frac{3}{4}'' \times \frac{3}{4}''$ (Figs. 1 and 2) serve best. Place the block in the center of the paper as in (3) with the longest dimension of the block



parallel with the longest side of the paper, bend the two sides of the paper around the edges of the block. Then fold the ends up as in (4), making neat creases. The projecting folds are then turned back as in (5). After all the folds are turned back, the ends can be turned down as in (6), which completes the box and prevents the ends from unfolding. In using the boxes, labels or data can be written on the ends of the boxes.

Proterandry and Flight of Bees (Hymen.: Apoidea). Second Paper.

By CHARLES ROBERTSON, Carlinville, Illinois.

This paper is to give details of the table in the article on the Proterandry and Flight of Bees, in ENTOMOLOGICAL NEWS 29:341. Further observations have found the females last in 162 cases. And the figures in the table were changed as follows:

	Males precede	Females follow	Females	Species
Osmiinae	—	28.4	62.1	72.7
Other Euceridae	10.6	—	60.4	—
Total bees	—	—	62.1	71.2

♂ first, ♀ last (109).

Prosopis (3).

PROSOPIS PYGMAEA ♂ April 20-Oct. 2, ♀ May 7-Oct. 11.

SAYI ♂ May 4-Aug. 26, ♀ May 7-Oct. 7.

ZIZIAE ♂ May 4-Sept. 28, ♀ May 18-Oct. 10.

Colletes (7).

COLLETES AMERICANUS ♂ Aug. 18-Oct. 15, ♀ Aug. 20-Oct. 30.

ARMATUS ♂ Aug. 17-Sept. 28, ♀ Aug. 23-Oct. 7.

BREVICORNIS ♂ May 29-June 17, ♀ June 7-29.

COMPACTUS ♂ Aug. 26-Oct. 8, ♀ Sept. 4-Oct. 21.

EULOPHI ♂ May 27-Sept. 28, ♀ June 13-Oct. 30.

INAEQUALIS ♂ March 20-May 5, ♀ March 21-May 31.

LATITARSIS ♂ June 13-Sept. 29, ♀ June 16-Oct. 1.

Andrenidae (16).

ANDRENA DUNNINGII ♂ April 4-24, ♀ April 24-June 3.

ERYTHROGASTRA ♂ April 11-May 17, ♀ April 12-May 27.

ERYTHRONII ♂ March 21-April 27, ♀ April 2-30.

GERANII ♂ May 3-27, ♀ May 11-June 19.

PRUNI ♂ April 12-29, ♀ April 18-June 8.

SAYI ♂ April 4-May 4, ♀ April 10-May 29.

OPANDRENA CRESSONII ♂ March 21-May 25, ♀ April 2-June 13.

PTERANDRENA ASTERIS ♂ Sept. 8-Oct. 15, ♀ Sept. 15-Oct. 21.

HELIANTHI ♂ Aug. 27-Sept. 28, ♀ Sept. 3-Oct. 10.

KRIGIANA ♂ May 10-June 1, ♀ May 12-June 15.

PULCHELLA ♂ Aug. 15-Sept. 10, ♀ Aug. 17-Oct. 3.

RUDBECKIAE ♂ June 10-July 14, ♀ June 12-Aug. 17.

PTILANDRENA G. MACULATI ♂ April 25-May 11, ♀ May 1-24.

TRACHANDRENA CRATAEGI ♂ April 26-May 22, ♀ April 27-July 1.

FORBESII ♂ March 17-April 25, ♀ March 31-June 9.

RUGOSA ♂ March 21-May 18, ♀ March 22-June 1.

Other short-tongued bees (7).

HALICTOIDES MARGINATUS ♂ Aug. 27-Sept. 10, ♀ Aug. 31-Oct. 3.

MACROPIS STEIRONEMATIS ♂ June 12-July 7, ♀ June 16-July 18.

PARANOMIA NORTONII ♂ June 26-Aug. 2, ♀ July 3-Sept. 9.

PSEUDOPANURGUS COMPOSITARUM ♂ Aug. 27-Oct. 4, ♀ Sept. 6-Oct. 29.

LABROSIFORMIS ♂ Aug. 3-Sept. 8, ♀ Aug. 15-Sept. 25.

LABROSUS ♂ Aug. 1-30, ♀ Aug. 3-Sept. 28.

RUGOSUS ♂ July 29-Aug. 22, ♀ Aug. 2-Oct. 1.

Osmiinae (10).

ALCIDAMEA SIMPLEX ♂ May 3-June 15, ♀ May 8-July 26

CENTROSMIA BUCEPHALA ♂ April 11-29, ♀ April 19-May 28.

CERATOSMIA LIGNARIA ♂ March 21-May 4, ♀ April 11-June 1.

MONILOSMIA CANADENSIS ♂ May 7-21, ♀ May 11-June 11.

NEOTRYPTETES TRUNCATUS ♂ May 28-Sept. 7, ♀ June 6-Oct. 18.

OSMIA ATRIVENTRIS ♂ March 25-June 3, ♀ April 14-June 20.

COLLINSIAE ♂ March 25-May 9, ♀ April 21-June 14.

CORDATA ♂ May 3-25, ♀ May 7-June 17.

ILLINOENSIS ♂ April 25-May 14, ♀ April 30-May 25

PUMILA ♂ March 23-May 18, ♀ March 25-June 24.

Megachilinae (10).

ANTHEMOIS CENTUNCULARIS ♂ May 11-Aug. 1, ♀ May 12-Sept. 8.

CHELOSTOMOIDES RUFIMANUS ♂ June 10-July 19, ♀ June 17-July 24.

CYPHOPYGA MONTIVAGA ♂ May 28-Aug. 6, ♀ May 31-Aug. 24.

MEGACHILE ADDENDA ♂ June 6-July 5, ♀ June 15-July 13.

BREVIS ♂ May 15-Oct. 11, ♀ May 21-Oct. 22.

GENEROSA ♂ June 12-Aug. 12, ♀ July 4-Sept. 28.

SEXDENTATA ♂ June 14-Aug. 18, ♀ June 16-Sept. 10.

OLIGOTROPUS CAMPANULAE ♂ June 25-Aug. 22, ♀ July 5-Sept. 14.

SAYAPIS PUGNATA ♂ June 5-July 14, ♀ June 7-Aug. 3.

SAYI ♂ July 3-Aug. 8, ♀ July 6-Oct. 5.

Coelioxys (4).

COELIOXYS GERMANA ♂ June 25-Aug. 14, ♀ July 3-Oct. 3.

MODESTA ♂ June 25-July 16, ♀ July 10-Aug. 23.

OCTODENTATA ♂ May 11-Oct. 9, ♀ May 29-Oct. 19.

TEXANA ♂ June 25-Aug. 1, ♀ July 4-Aug. 14.

Stelididae (3).

ANTHIDIUM PSORALEAE ♂ June 6-July 9, ♀ June 19-July 22.

MICROSTELIS LATERALIS ♂ May 9-June 14, ♀ May 19-June 20.

STELIDIUM TRYPETINUM ♂ June 6-Sept. 3, ♀ July 7-Oct. 18.

Nomadidae (11).

CENTRIAS AMERICANUS ♂ April 29-June 21, ♀ May 4-July 16.

GNATHIAS CUNEATUS ♂ March 21-May 5, ♀ April 7-June 11.

OVATUS ♂ April 4-May 18, ♀ April 17-June 8.

HEMINOMADA OBLITERATA ♂ April 24-May 10, ♀ April 25-May 22.

HOLONOMADA SUPERBA ♂ April 20-May 28, ♀ May 1-June 24.

VINCTA ♂ Aug. 27-Sept. 26, ♀ Sept. 3-Oct. 2.

NOMADA DENTICULATA ♂ April 9-May 11, ♀ April 21-June 13.

ILLINOENSIS ♂ April 4-May 11, ♀ April 17-June 1.

SAYI ♂ March 26-May 10, ♀ April 9-June 9.

PHOR INTEGER ♂ April 10-May 5, ♀ April 17-May 24.

XANTHIDIUM LUTEOLUM ♂ April 8-25, ♀ April 9-May 12.

Epeolidae and Melectidae (11).

BOMBOMELECTA THORACICA ♂ April 18-May 2, ♀ April 27-May 28.

EPEOLUS AUTUMNALIS ♂ Aug. 29-Sept. 20, ♀ Sept. 8-Oct. 13.

BIFASCIATUS ♂ June 12-Sept. 6, ♀ June 26-Oct. 3.

INTERRUPTUS ♂ May 29-June 16, ♀ June 6-19.

TRIEPEOLUS CONCAVUS ♂ June 26-Sept. 22, ♀ July 4-Sept. 28.

CONCOLOR ♂ July 3-Sept. 3, ♀ July 9-Sept. 19.

CRESSONII ♂ July 13-Sept. 29, ♀ July 29-Oct. 11.

DONATUS ♂ Aug. 7-Sept. 29, ♀ Aug. 23-Oct. 11.

LUNATUS ♂ July 12-Aug. 16, ♀ July 24-Sept. 3.

PECTORALIS ♂ Aug. 30-Sept. 29, ♀ Sept. 6-Oct. 21.

SIMPLEX ♂ July 13-Aug. 7, ♀ July 16-Sept. 4.

Tetralonia (4).

- TETRALONIA BELFRAGEI ♂ April 8-May 18, ♀ April 14-June 4.
 DILECTA ♂ April 18-June 20, ♀ April 20-July 4.
 DUBITATA ♂ April 13-28, ♀ April 17-May 2.
 ROSAE ♂ May 18-June 14, ♀ May 21-June 25.

Other Euceridae (18).

- ANTHEDON COMPTA ♂ July 10-Aug. 26, ♀ July 15-Aug. 28.
 CEMOLOBUS IPOMOEAE ♂ July 13-Aug. 30, ♀ July 15-Sept. 2.
 EPIMELISSODES OBLIQUA ♂ June 26-Sept. 28, ♀ July 4-Oct. 1.
 FLORILEGUS CONDIGNUS ♂ July 1-Aug. 23, ♀ July 5-Sept. 8.
 MELLISSODES AGILIS ♂ June 14-Oct. 5, ♀ July 11-Oct. 16.
 AUTUMNALIS ♂ Aug. 21-Oct. 6, ♀ Aug. 26-Oct. 22.
 BIMACULATA ♂ June 25-Aug. 30, ♀ July 2-Sept. 24.
 CNICI ♂ July 21-Sept. 9, ♀ Aug. 4-Sept. 21.
 COLORADENSIS ♂ July 10-Sept. 21, ♀ Aug. 5-Oct. 5.
 COMPTOIDES ♂ July 12-Aug. 26, ♀ July 13-Sept. 4.
 COREOPSIS ♂ June 13-29, ♀ June 14-July 8.
 NIVEA ♂ Aug. 14-Sept. 24, ♀ Aug. 31-Oct. 21.
 SIMILLIMA ♂ Aug. 8-Sept. 25, ♀ Aug. 17-Oct. 21.
 VARIABILIS ♂ June 20-Aug. 3, ♀ July 3-Aug. 20.
 VERNONIANA ♂ July 10-Sept. 20, ♀ July 25-Sept. 24.
 VERNONIAE ♂ July 27-Sept. 8, ♀ Aug. 4-Sept. 10.
 PEONAPIS PRUINOSA ♂ July 3-Sept. 14, ♀ July 15-Sept. 29.
 XENOGLOSSA STRENUA ♂ July 11-Sept. 21, ♀ July 29-Sept. 28.

Other long-tongued bees (5).

- ANTHEMOESSA ABRUPTA ♂ May 7-June 26, ♀ May 10-July 29.
 ANTHOPHORA URSINA ♂ April 8-May 28, ♀ April 18-June 22.
 EMPHOR BOMBIFORMIS ♂ July 21-Sept. 2, ♀ July 29-Sept. 11.
 MELITOMA TAUREA ♂ June 24-Sept. 26, ♀ June 27-Oct. 7.
 XYLOCOPA VIRGINICA ♂ May 5-June 24, ♀ June 1-July 5.

 Notice on Parasitic Hymenoptera.

Compilation of a list and bibliography of the *parasitic Hymenoptera* of North America has been started. Reprints, citing parasites by name—past and future—will be appreciated. R. L. TAYLOR, Bar Harbor, Maine.

Tsetse Flies—Past and Present (Diptera: Muscoidea).

By J. BEQUAERT, Harvard University Medical School,
Boston, Massachusetts

In this age of memorial celebrations—and this year's crop of such "post-mortems" promises to be quite heavy—entomologists might well stop and consider ways and means of commemorating the Centennial of the Tsetse-Fly. For the year 1830 witnessed the birth in entomological science of the genus *Glossina* (described by Wiedemann) as well as that of its most notorious member, *G. palpalis* (described by Robineau-Desvoidy).

As to the festivities most appropriate to the occasion, my entomological friends would probably differ as widely as any committee on centennials. The taxonomists, who might still be the majority, would, I suppose, insist upon erecting memorials at the type-localities of the several species of *Glossina*; but, being unable to agree as to just how many of their species are "valid," they could hardly hope to carry the meeting. The anatomists, the physiologists, the students of animal behavior and ecology, the protozoologists, and even some stray botanists would all want to have a voice in the matter. As the meetings of the committee would be dragging on—like a Peace or Disarmament Conference—the entomologists would discover to their dismay that a number of "outsiders" had wormed their way in, or perhaps I should say, had crashed the gates; these outsiders being, of course, veterinarians, medical men, and even a sprinkling of game wardens and colonial politicians. The din of the discussion would now reach a high pitch, and shortly afterwards the committee would adjourn *sine die*.

I hope the reader will pardon the foregoing fantasy, which, moreover, has a serious purpose. The point I want to make is that, in the course of a century, the *Glossina* has grown from a mere curiosity in the cabinet of two taxonomic entomologists to a problem of first magnitude in colonial politics. Measured by the standards in vogue in the Western Hemisphere, the tsetse-flies have been highly "successful," for they have certainly succeeded in keeping their names in the public prints.

Only a few months ago they even invaded the daily newspapers, when a Middle-Western medical "authority" made the startling discovery that the tsetse-fly was a deadly menace to American Civilization. I hasten to dispel any misgivings that might be abroad in the matter: there is not the faintest probability that the tsetse will ever depopulate North America or even check the overcrowding of our happy land.

To simply compile a bibliography of all the writings dealing directly or indirectly with the tsetse would take weeks of monkish labor. With the many diverse ramifications of the subject, such a list would easily include between 1,500 and 2,000 titles. Few could, of course, ever hope to have the time or opportunity to consult all these publications in the original—a good illustration of the appalling problem with which the working entomologist is now daily confronted. Luckily for the student of tsetse-flies, an unusually energetic Belgian, my friend Mr. Emile Hegh, of the Belgian Colonial Office, has appointed himself the official chronicler of all doings in Glossinology. In the *Bulletin of the Brooklyn Entomological Society* for June 1923, I reviewed a pamphlet on *Glossina* by Mr. Hegh and Major Austen, published in 1922. Mr. Hegh has since been working at a much more ambitious project, namely that of reproducing in full, but in a French translation, every important bit of information published on the tsetses, arranging these extracts under a few general headings. The first volume of this imposing undertaking was issued a short time ago.¹ I shall use it as a basis for a brief review of our present knowledge of the genus *Glossina*.

To use a French colloquialism, the early history of tsetse-flies loses itself in the night of time. That indefatigable student of fossil insects, Professor Cockerell, has described from the Miocene shales of Colorado four apparently quite distinct species of flies, which unmistakably belong to the genus *Glossina*. A glance at the two fine photographs in Mr. Hegh's book (Figs.

¹ Les Tsé-Tsés. Tome Premier. Généralités. Anatomie. Systématique. Reproduction. Gîtes à Pupes. Ennemis Prédateurs et Parasites. By Emile Hegh. (Brussels, 1929). One volume, large octavo, of xiv+742 pp., with 15 color plates and 327 text figures.

9 and 10) will convince the most skeptical. In structure these extinct species are surprisingly like the living forms. Since the tsetses are among the most specialized of the higher Diptera, well worthy to form a family of their own, it is evident that the Miocene forms must have had a long history back of them. It is safe to assume that their pedigree will eventually be traced at least to the Cretaceous, if not to the Middle Mesozoic. Not the least astonishing feature of some of the Miocene *Glossinae* is their large size. With a wing length of 16 mm. and a proboscis of 6.5 mm., they surpass anything now alive. In the largest living species, *G. fusca* and *G. nigrofusca*, the wing reaches only 12 to 13 mm. and the proboscis 4 to 5.3 mm. It would seem that the *Glossinae* are now on the wane. Perhaps the Tertiary Epoch should be called the "Age of Tsetses" as well as that of Mammals.

The history of Glossinology makes fascinating and instructive reading. Happily Mr. Hegh devotes to it over 100 pages of his Introduction (pp. 19-65) and of his chapter on Taxonomy (pp. 167-229). Moreover, for most topics the author uses the historical method of presentation, which is always captivating. In some respects he has given us an epitome of the progress of Entomology during the past century. At any rate, his account reflects unusually well the rapid evolution of our Science, from the narrow attitude of the purely descriptive taxonomist, to the broader outlook of the general biologist, and the latter-day emphasis on the relations of insects to human welfare. The beginnings of our Science were slow and awkward. At first entomologists were quite content to describe the stray tsetses brought home by travelers. Wiedemann established his genus *Glossina* without comments. Robineau-Desvoidy boldly added to his description of *G. palpalis* the remark that the proboscis was "innocuous," by which he evidently meant that the fly did not suck blood. Macquart embroidered this opinion. "It is probable," he says, "that this fly does not live on animal blood like the stable flies, but on the nectar of flowers. The two setae contained in the proboscis and forming the sucking apparatus are so fine that one can hardly conceive how they might

be able to pierce the skin; the weakness of this organ seems to be further shown by the modification of the palpi, which are lengthened and hollowed out into a sheath for the proboscis." This quotation might be pondered by those biologists who are prone to deduct the probable habits of an insect from some structural peculiarity. Indeed the proboscis of the tsetse-flies seems eminently adapted to the sucking of nectar; yet none of these flies has ever been stalked sipping a flower. Moreover, since there are horse-flies the female of which indifferently bites animals or sucks nectar, I for one would not be surprised if eventually some species of *Glossina* were observed visiting flowers.

We shall not be delayed long by the purely taxonomic side of the tsetse problem. For one thing specialists disagree as to just how many *Glossinac* should be regarded as valid species. Mr. Hegh has cut this Gordian knot by giving in succession Major Austen's classification, which includes 17 species, and that sponsored by Professor Newstead, who recognizes 20. Moreover, one additional species, *G. newsteadi* Austen, has been added within the past few months, since the publication of Mr. Hegh's book. One point of general interest is that, while the specific characters of the females are frequently obscure or unreliable, the external genitalia, or terminalia, of the males present very striking differences among the several species.

The area occupied nowadays by *Glossina* lies strictly within the limits of what the old-fashioned zoogeographers call the "Ethiopian Region,"—*viz.*, continental Africa south of the Tropic of Cancer and the extreme southwestern corner of Arabia. The occurrence of one species, *G. tachinoides*, in southwestern Arabia is especially noteworthy. Each species occurs over only part of the general area of the genus. While some of the species are apparently rare or at any rate restricted to a small area, the two most common ones are abundant and very widely distributed, although they seem to exclude each other. *G. palpalis* covers the Guinean or West African Subregion, beyond which it extends but little along the wooded banks of the larger rivers. *G. morsitans*, on the other hand, inhabits (to-

gether with its race *submorsitans*) much of the Sudanese and East-and-South African Subregion, entering only the grasslands at the outer edges of the West African Subregion. Obviously the distribution of these two flies is at present regulated by ecological factors, even though such factors are insufficient to account for the distribution of the genus *Glossina* as a whole. Furthermore, *G. morsitans* is clearly on the decline: within historic times it has receded from much of the territory it once covered in South Africa. It is no longer found, for instance, at its type locality, where it was discovered in 1846 by Oswell and Vardon. The rapid destruction during the nineteenth century of the vast herds of game that once roamed over South Africa, undoubtedly had much to do with the regression of this tsetse.

Some of the adventurous hunters and explorers of the first half of the nineteenth century have given us the first reliable accounts of the habits of *Glossina*. The word "tsetse" was introduced into the English language by R. Gordon Cumming (1850), in his *Five Years of a Hunter's Life in the Far Interior of South Africa*; but David Livingstone (1857) focussed the attention of the scientific world upon the ravages of the fly. The origin and meaning of the word "tsetse" has released a flood of printer's ink, although most of these writings belong in the realm of folklore or even of biblical exegesis. Originally the word was applied to the South African *G. morsitans*. It has often been stated that certain native tribes used it as an imitation, or onomatopoeia, of the buzzing noise the fly makes *when in flight*. In all the many years of my dealings with various species of *Glossina* in the field, I have failed to notice any buzzing or other noise they might make *while flying*. As a matter of fact, the silent manner in which they alight and leave their victim is one of the characteristics of these insects. All tsetses, however, make at times a high, shrill singing noise, *when resting*, before or after feeding, especially when sunning themselves. It is quite possible that, where *G. morsitans* is very abundant, this singing of the resting flies might have been attributed to the many flying individuals.

The early South African observers reported that *G. morsitans* was not uniformly distributed, but that it swarmed in certain well-defined districts—so-called “fly-belts”—while it was practically absent from the intervening areas. This peculiarity has led to much speculation and incidentally to a protracted discussion between live-stock breeders and sportsmen. The many field studies of the bionomics of tsetse during the past twenty-five years tend to show that the local distribution of these insects is regulated by a number of factors of about equal importance. Only two of these will be briefly touched upon here.

Undoubtedly every species of *Glossina* prefers a particular type of country because of the fly's peculiar requirements for shade and moisture, either as adult or in the pupal stage. Perhaps the majority of the species can get along with a low relative humidity and a prolonged dry season and will consequently be found in regions covered with one of the many types of open vegetation, which the botanists include under the general term “savannas.” This group comprises, among others, *G. morsitans*, *G. pallidipes* and *G. tachinoides*. As a rule, though, these species avoid pure grassland, but prefer thickets of dense bush, wooded savanna, or parkland. The most xerophilous, or “bone-dry,” of all is *G. longipennis*, which frequents thorny bush in some of the semi-desert parts of Northeastern Africa. On the other hand, *G. palpalis*, *G. pallicera*, *G. fusca*, *G. nigrofusca* and a few others, thrive best in the moist rain forest country, where the rainfall is evenly distributed over the year. *G. palpalis*, the species carrying African Sleeping Sickness in man, is more hygrophilous than the others, being found along or close to water that is edged in by a dense growth of trees and bushes. The West African *G. pallicera*, though likewise a rain forest fly, roams much farther afield. There have also been attempts at correlating certain species of tsetse with definite species of plants, but it is doubtful whether such associations are of more than very local significance. At 4,000 feet above sea-level, all tsetse-flies become very scarce and I know of no reliable record of their occurrence at 5,000 feet or higher.

Ecological conditions alone are, however, inadequate to account for the local abundance or scarcity of tsetse. The feeding habits are at least equally important. In addition to shelter the flies need food, and, being strictly hematophagous, they will thrive best where their favorite animal hosts are most plentiful. In the case of *G. palpalis*, there is every indication that the flies travel away from their breeding places to points where people gather along the shaded banks of rivers, where animals come to drink, or where crocodiles or other favorite hosts are particularly numerous. For *G. morsitans*, the connection between the fly-belts and the game seems well demonstrated by the regression of this species from much of the country it formerly occupied south of the Limpopo River, by its fluctuations in areas swept by rinderpest about 1897, and by its disappearance from some parts of Katanga since the settlement of the country by whites some fifteen years ago.

(To be continued)

A European Beetle Found in New York (Coleop.: Curculionidae).

On December 11, 1929, we received five living specimens of *Cleonus piger* Scopoli from Branchport, New York, where they had been found among dried beans in storage. The specimens were determined by L. L. Buchanan. In February we visited the farm from which the weevils came and found more specimens in bags of beans stored in an unheated room of the farm house. The farmer stated that in hand-picking his crop of beans he had found more than a hundred of the beetles and had thrown them into the fire. Their association with the beans would seem to be purely accidental. Evidently the beetles had sought hibernating shelter in the piles of bean vines in the field and were brought into the barn with the crop. Many of them escaped injury when the beans were threshed and being of about the same size and shape as the beans passed through the fanning mill with the grain.

Cleonus piger is reported to be a pest of sugar beets in Central Europe. Its other foods are said to be *Carduus* and *Cirsium*.—C. R. CROSBY AND W. E. BLAUVELT, Cornell University, Ithaca, New York.

Entomological Literature

COMPILED BY FRANK HAIMBACH AND LAURA S. MACKEY
UNDER THE SUPERVISION OF 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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.

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THE SMALLER ORDERS OF INSECTS.—**Banks, N.**—A classification of the Psocidae. [5] 36: 321-325. **Ide, F. P.**—The nymph of the mayfly genus *Cinygma*. [4] 62: 42-45, ill. **Lestage, J. A.**—Contribution à l'étude des larves des Ephéméroptères. VI.—Les larves dites fouissenses. Le régime des larves.—Les larves et les poissons. [33] 70: 79-89. ***McDunnough, J.**—The Ephemeroptera of the north shore of the Gulf of St. Lawrence. [4] 62: 54-62, ill. ***Navás, R. P. L.**—Insecta nova. (S). [Mem. Pont. Accad. Sci., Roma] 12: 15-32, ill. ***Navás, R. P. L.**—Insectos del museo de Paris. (S). [Brotéria] 26: 5-24, ill. ***Reed, E. P.**—Sobre *Notiothauma reedi*. (S). [44] 32: 310-313, ill. **Rosewall, O. W.**—The biology of the book-louse, *Troctes divinatoria*. [7] 23: 192-194, ill. **Wheeler, W. M.**—Is *Necrophylus arenarius* the larva of *Pterocroce storeyi*. [5] 36: 313-320.

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HEMIPTERA.—***Drake, C. J.**—Some Tingitidae from Brazil. [19] 25: 25-26. **Fletcher, R. K.**—A study of the insect fauna of Brazos County, Texas, with special reference to the Cicadellidae. [7] 23: 33-54, ill. **Glendenning, R.**—Further additions to the list of aphids of British Columbia. [Pro. Ent. Soc. Brit. Col.] 1929: 54-57. ***Hungerford, H. B.**—Concerning *Velia inveruglas* and related forms. (Veliidae). (S). [7] 23: 120-124, ill. ***Knight, H. H.**—New species of *Pseudopsallus* with an allied new genus described (Miriidae). [19] 25: 1-8. ***Lawson, P. B.**—Two new *Alconeura* (Cicadellidae) with notes on other species. [19] 25: 44-46. ***Lawson, P. B.**—Three new leafhoppers from the southwest (Cicadellidae). [55] 6: 135-138. ***Lawson, P. B.**—Some new *Dikraneura* (Cicadellidae) with notes on other species. [4] 62: 35-42, ill. ***Morrison, H.**—An interesting new genus of *Iceryine* coccid. (S). [95] 43: 17-20, ill. **Myers, J. G.**—Observations on the biology of two remarkable cixiid planthoppers (Homoptera) from Cuba. [5] 36: 283-292. **Prell, H.**—On the nomenclature for the broods of periodical insects. [7] 23: 27-32. **Schrader, F.**—Observations on the biology of *Protortonia primitiva* (Coccidae). [7] 23: 126-132, ill. **de la Torre-Bueno, J. R.**—Records of Anthocoridae, particularly from New York. [19] 25: 11-20. ***Usinger, R. L.**—Two new species of *Vanduzeeina* from California (Scutelleridae). [55] 6: 131-133. **Venables, E. P.**—Observations on the woolly aphid of the apple. [Pro. Ent. Soc. Brit. Col.] 1929: 28-33. **Walley, G. S.**—Note on the validity of *Corixa* (1762) (Corixidae). [19] 25: 49.

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SPECIAL NOTICES.—*Die Fliegen der Palaearktischen Region*. Ed. by E. Lindner. Stuttgart, 1924-. This work, although treating of the palaearctic species only, should be valuable to serious students of diptera. Forty numbers (Lieferungen) have been issued with many colored plates.

Recent Publications on Stoneflies.

1. FALL AND WINTER STONEFLIES, OR PLECOPTERA OF ILLINOIS. By THEODORE H. FRISON. Ill. Nat. Hist. Sur. Bull. Vol. XVIII, Art. II pp. 345-409, 1929, with 77 text figures. "In this paper are presented the results of an investigation of the biological and systematical characteristics of five genera, comprising eleven species, of the little known fall and winter stoneflies occurring in Illinois. It has been found that these species differ biologically from one another in respect to their seasonal adjustments, the habitats they prefer, in position, and in many other details of their life histories. In opposition to general ideas concerning the food habits of the order as a whole, the adults as well as the nymphs were found to be herbivorous."

"Because of a previous erroneous designation of a genotype,

it has been necessary to replace the generic name of *Nephelopteryx* Klap with *Taeniopteryx* Pict. (*Sensu str.*), revive the name *Brachyptera* for another generic complex, substitute *Taenionema* for a Nearctic complex, and erect a new Nearctic genus *Strophopteryx*, and three species new to science have been described (*Allocapnia mystica*, *A. forbesi* and *Leuctra claasseni*)”.

The above summary indicates the thoroughness with which Dr. Frison has pursued the detailed study of these small stoneflies. So painstakingly has he searched the large and small streams of the state that it seems quite unlikely that any additional species of the fall and winter forms will soon be discovered in Illinois.

Except for Newcomer's¹ observation on the feeding habits of *Taeniopteryx* (sen. lat.) and Wu's² comprehensive study of *Nemoura vallicularia* practically nothing has been published in North America on the biology of the Nemouridae and Capniidae.

Dr. Frison has, with considerable detail, studied the biology of the nymphs and adults of the following six species: *Taeniopteryx nivialis* Fitch, *Strophopteryx fasciata* Burm., *Allocapnia mystica* Frison, *A. recta* Clsn., *A. granulata* Clsn., and *A. vivipara* Clsn. In addition to these, both nymphs and adults are described of: *Taeniopteryx parvula* Bks., *Leuctra claasseni* Frison, and *Allocapnia pygmaea* Burm., and the adult of *A. forbesi* Frison as well as an adult female *Capnia* sp.

Keys are included for separating the species of both nymphs and adults. The figures depict the genital and other structural characters, photographs of nymphs, adults and habitats.

2. STUDIES ON STONEFLIES OF JAPAN. By MASUZO UÉNO. Mem. Coll. Sci., Kyoto Imp. Univ. Ser. B. Vol. IV, No. 2 (Art. 4) pp. 97-155. 1929, with one plate and 26 text figures. "In the present paper are chiefly recorded well-defined nymphs representing the fourteen known genera and a curious nymph of the new genus *Scopura*. Besides these immature forms here recorded are added descriptions of six adult stoneflies which seem apparently to be of new species."

A little more than a page is devoted to the discussion of "Habitats and Distribution." This is followed by a key to the genera of nymphs found in Japan and by descriptions and inci-

¹ Newcomer, E. J. Some Stoneflies Injurious to Vegetation. Jr. Agr. Res. Vol. XIII, No. 1, pp. 37-42, 1918.

² Wu, C. F. Morphology, Anatomy and Ethology of *Nemoura*. Bull. Lloyd Libr. No. 23, Ent. Ser. No. 3, pp. 1-81, 1923.

dental observations on the behavior of some of the nymphs and adults. The illustrations are excellent. Most interesting is the description of a nymph which Uéno christens *Scopura longa* and appears to be related to *Pteronarcys* and *Leptoperla*. This nymph possesses a ring of copious gill tufts which surround the entire tenth abdominal segment and which are said to be retractile. The subanal lobes are extremely long and slender. Unfortunately the adult of this species is not definitely known so that its affinities can be ascertained with certainty.

3. (a) THE ECOLOGY OF TROUT STREAMS IN YELLOWSTONE NATIONAL PARK, by RICHARD A. MUTTKOWSKI, Bull. N. Y. State College of Forestry, Roosevelt Wild Life Annals, Vol. 2. No. 2, pp. 155-240, 1929. (b) THE FOOD OF TROUT STREAM INSECTS IN YELLOWSTONE NATIONAL PARK. By RICHARD A. MUTTKOWSKI and GILBERT M. SMITH; Above publication, pp. 242-263. On page 186-190 of the first of the above papers, notes are given on the occurrence and behavior of the stoneflies which were found in the streams in Yellowstone Park. *Pteronarcys californica* Newpt. and *Acroncuria pacifica* Bks. were found to be most abundant and the discussion centers largely around these two species. Of *Pteronarcys californica* Muttowski says: "Strange to say they eat plant food almost entirely, differing in this respect from other perlod nymphs." As a matter of fact only the species belonging to the family Perlidae (except *Peltoperla*) are carnivorous, all the rest being herbivorous in food habits.

In the second paper, on the Food of Trout Streams, tabulated data are given (pp. 246-249) on the food of the nymphs of *Pteronarcys californica* Newpt., *Acroncuria pacifica* Bks. and *Perla verticalis* Bks., showing that of these three species only *P. californica* is essentially an herbivore while the other two species are mainly carnivorous. The mistakes which have crept into the "List of References" at the end of the second paper and into the introduction of the first paper are not sufficiently serious so as to be misleading.

It is gratifying to know that within the last few years the stonefly fauna of China has begun to receive some attention. Both Dr. C. F. Wu of Yenching University, Peiping, and Mr. Y. T. Chu of St. Johns, Shanghai, have published several papers in *The China Journal*, describing new species of Plecoptera from China.

Mention should also be made of the papers which Mr. R. Despax has published, in Bull. Soc. D'Hist. Nat. de Toulouse, on the Nemouridae, during the past year.

A. B. Martynov, of de Gorsky Institute Agronomique, in 1928, published a paper on Plecopteren des Kaukasus, in *Travaux de la. Sta. Biol. du Caucase du Nord*, in which he describes 17 new species and 2 new forms of *Nemoura* and *Leuctra*.

Within the next few months the reviewer hopes to publish a manuscript on the immature stages of the stoneflies of North America in which will be included descriptions, figures and biological notes of some 70 species.

P. W. CLAASSEN.

OBITUARY.

STEPHEN ALFRED FORBES

May 29, 1844—March 13, 1930

Exceeding by more than fifteen years the biblical allotment, a long life of unusual influence and productiveness ended on March 13, 1930, with the death of Dr. S. A. Forbes, chief of the State Natural History Survey and professor of entomology, emeritus, in the University of Illinois. Doctor Forbes was one of the outstanding entomologists of that pioneer group who wrote the first chapter of America's entomological history in such strong and enduring fashion.

Born May 29, 1844, in Stephenson County, Illinois, he spent his early years on his father's farm. Reviewing his subsequent accomplishments, one is astonished to learn that his early schooling was much neglected, that he never graduated from a college, and that he never took a formal college course in any of the many subjects he subsequently taught.

Fatherless from the age of 10, he enlisted as a private in the 7th Illinois Cavalry in 1861 at the age of 17, and advanced to a captaincy at 20. He spent four months in a Confederate prison. After recovering from the diseases there contracted, he returned to his regiment and continued in active service until the end of the war. Following the war he studied in Beloit Academy and nearly finished the course in medicine at Rush Medical College; but, changing his plans, he began the independent study of natural history while a teacher in the

public schools of Illinois. By private study he also mastered French, Spanish and Italian and learned to read Greek.

His public service began with his appointment, in 1872, as curator of the museum of the State Natural History Society, at Normal, Illinois. Five years later the museum became, by legislative enactment, the State Laboratory of Natural History with Mr. Forbes as director. Five years later (1882) he was appointed by the governor to succeed Cyrus Thomas as the fourth State Entomologist of Illinois. In 1884 Forbes became professor of zoology and entomology at the University of Illinois, and the offices of State Entomologist and director of the State Laboratory of Natural History were moved to Urbana. In 1888 he was made Dean of the College of Science, which position he filled for sixteen years. In 1909 the department of entomology was organized separately from zoology, with Professor Forbes as Head. Without interrupting his fifty-six year period of service to the State and the University, his title was changed in 1917, when the State Laboratory of Natural History and the State Entomologist's office were merged into the Natural History Survey, a Division of the State Department of Registration and Education, with Dr. Forbes as its chief. He became emeritus professor of entomology in 1921, but continued as chief of the Survey until his death.

His publications in natural history, begun in 1870 in the *American Entomologist and Botanist*, numbered at the time of his death over 500 titles, of which about 400 dealt with various phases of entomology. His most important papers are to be found in his eighteen *Reports on the Injurious and Beneficial Insects of Illinois*, in the *Bulletin of the State Laboratory of Natural History*, later the *Bulletin of the State Natural History Survey* and in his *Final Reports on the Biology of Illinois*. Some of the best known of his entomological publications deal with the insects of Indian corn, of strawberries, of sugar beets, the chinch bug, Hessian fly, white grubs, San Jose scale, corn root aphid, army worm, codling moth, black flies and insect diseases. In all of these subjects, and others, he made fundamental contributions to economic entomology and ecology,

which have endured and are today models of clarity, originality and completeness. His writings are characterized by their remarkably simple and lucid expression, their excellent illustrations, their intensely practical, economic nature, and reveal a deep appreciation of fundamental biological principles and of the importance of the interrelations of insects with their environment and with other living things.

Those who know only his entomological writings, may be surprised at the wide variety of his biological interests, and to know that his publications dealt in masterly fashion with such diverse subjects as birds, fishes, crustacea, leeches, bacteria, rotifers, the parasites of swine, museum methods and pedagogy. His most intimate friends and associates marveled at his interest in, and depth of understanding of other fields of knowledge: history, music, art, politics, languages, literature, agriculture, horticulture, world affairs, the social sciences—he studied them all in order to relate his own work most effectively to the material and intellectual progress of his state.

Although his nearly sixty years of public service in a single broad field of knowledge and in one state, is almost without precedent, Professor Forbes found time to do many other things. He took a deep and active interest in civic and charitable affairs. He maintained to the end of his career a profound interest in the teaching of natural science, especially in the high schools. One of the last big tasks that he accomplished was a comprehensive plan for making available to the high schools of the State hundreds of sets of the publications of his department, each set comprising over 5,000 pages of printed matter and illustrations on the native insects, birds, fishes, trees and other forms of life. In his earlier years he made a number of scientific surveys outside of Illinois as a special agent for the United States Fish Commission. He managed in 1893, an unusually comprehensive and original exhibit at the World's Columbian Exposition in Chicago. He was an American delegate to the third international entomological congress, at Oxford in 1912. He was one of fifteen entomologists who have been named as Honorary Fellows in the Entomological Society

of America, and in 1928 was elected as one of two honorary members of the fourth international congress of entomologists held at Cornell University. He was a member of the National Academy of Sciences and of the American Philosophical Society. Many other honorary and scientific organizations have given him the highest distinction at their command. He twice served as president of the American Association of Economic Entomologists, and has also held the highest office in the Entomological Society of America, the Ecological Society of America, and the Illinois State Academy of Science.

He was affectionately called "the dean of American Economic Entomologists", "the first economic ornithologist in America", "the founder of the science of ecology". He was credited with having laid the foundation of taxonomic work on American crustacea and was a recognized authority on conservation, particularly fresh water biology and stream pollution. In 1884 Indiana University conferred upon him the degree of Doctor of Philosophy, and in 1905, at the conclusion of his long service as Dean, he was given the honorary Doctorate of Laws by the University of Illinois.

Professor Forbes maintained his physical vigor and tireless industry and enthusiasm until about two weeks before his death. Clara Gaston Forbes, who became his wife in 1873, preceded him in death by less than two months.

Fearless, eternally youthful, unostentatiously confident and inspiring, never seeking favor or preferment but continually in demand by recognition of his worth, this man was revered by his peers and colleagues for his breadth and clarity of vision, his kindly, helpful criticism and sympathy, his infectious enthusiasm, his brilliant intellect and impregnable strength of character, and his loyal and genial friendship.

C. L. METCALF.

FRANK HAIMBACH, lepidopterist, secretary and treasurer of The American Entomological Society, died April 1, 1930. A notice of his life and work will appear in a later number of the NEWS.

JUNE, 1930

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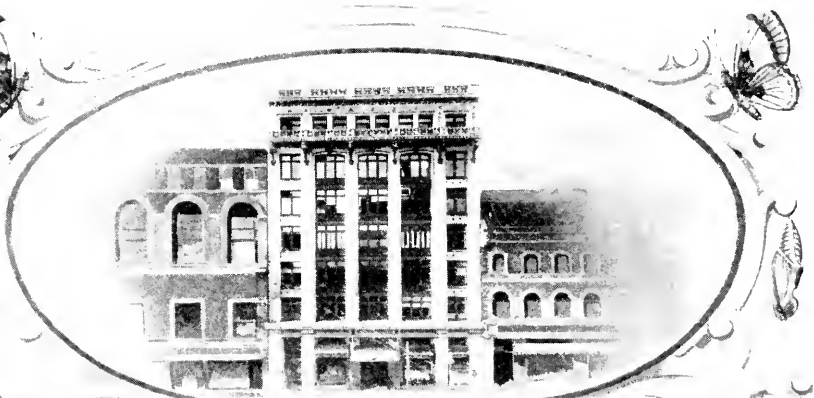
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By J. D. GUNDER, Pasadena, California.

(Plates XVII, XVIII).

Most friendly relations have existed for many years between the entomologists of the United States and Canada. There is little natural barrier between the countries and their questions of economic and systematic importance are similar. An example of the mutual and beneficial co-operation in the matter of insect control is shown by the conferences which have been held during recent years to devise ways and means of fighting the European corn borer and other pests. Fortunately the official entomologists of both countries have been men of high character and free from certain stupid personalities of excessive nationalism.

Canada first appointed a special entomologist in 1884, but the real development and expansion of the work did not begin until about 1909 when the dreaded brown-tail moth was found in shipments of nursery stock from France. This necessitated the passing of special legislation in 1910, giving the Agriculture Department power to inspect plant products entering Canada, and to take such means as were considered advisable to prevent the spreading of harmful insects already prevalent. By 1914 entomology had developed to such an extent that a separate sub-department of the Government's Department of Agriculture was set aside under the title of Entomological Branch and headquarters were established in the Birks Building¹ at Ottawa

¹This six-story building is down-town in the business section and the offices of the Branch occupy the upper floors, the lower floors being devoted to various commercial businesses and shops. Although the location is convenient, there is always that hazard of fire which would destroy, not only departmental records, but insect collections as well. If types are at least separated into separate drawers or cabinets, they can perchance be carried out in time. I have in mind the destruction by fire of the

where they remain today. The present divisional organization consists of the following well-known officials: Arthur Gibson, Dominion Entomologist and Head of Branch; J. M. Swaine, Associate Dominion Entomologist and administrator of the Division of Forest Insects; H. G. Crawford, Chief of the Division of Field Crop and Garden Insects; L. S. McLaine, Chief of the Division of Foreign Pests and Suppression, and J. H. McDunnough, Chief of Division of Systematic Entomology.

Mr. Arthur Gibson was born in Toronto in 1875 and has been in the service of the Canadian government for over thirty years. He entered the Federal Department of Agriculture in 1899 as assistant in the division of botany and entomology at the Experimental Farm, Ottawa and in 1908 was promoted to the position of chief assistant entomologist. Upon the death of Dr. Hewitt in 1920, Mr. Gibson was made Dominion Entomologist and head of the Entomological Branch, a position which corresponds to that at present held by Dr. Marlatt and formerly by Dr. L. O. Howard. Mr. Gibson is a very able organizer and a thorough entomologist and Canada is fortunate to have had for so many years such a capable executive in office.²

Dr. James H. McDunnough is known to practically every entomological student in this country and abroad because of his splendid work in the Order Lepidoptera. Few systematists have had the chance, or the ability, to accomplish as much as he has. I think he deserves to be called a builder of great Lepidoptera collections.

From 1909 to March 25, 1919, Dr. McDunnough was curator of the William Barnes collection at Decatur, Illinois and he was the first man to systematically arrange this largest of boreal American collections. One of the results was the Barnes & McDunnough Check List of 1917. This list was not a repro-

Academy of Sciences in San Francisco which was similarly located. Had the lepidopterous types of Behr and others been separated out of the main collections, they could have been saved. Certain insect types which were separated, WERE SAVED. I call Mr. Gibbon's attention to the point of type-separation and also, for example, to the arrangement for valuable types which the American Museum has inaugurated.

² Photo Plate XVII, showing Mr. Gibson at his desk, was unfortunately reversed in the original making. Mr. Gibson is not left-handed and also he is much better looking than the photo would give him credit for being!



CANADA



J. McEwen

duction, like many of the older lists, but was original in revision and today the moth, or Heterocera, portion continues to be the latest available compilation. While at Decatur he also revised the Cossidae and the *Olene* group of moths, in addition to writing many smaller papers with Dr. Barnes. Mr. Foster H. Benjamin once told me that working on Lepidoptera under Dr. Barnes was "like taking a post-graduate course, you really began to make fewer mistakes".

When Dr. McDunnough went to Ottawa, in April, 1919, to take charge of Canada's budding National Collection of Insects and to devote himself to its systematic study, he found plenty to do. There were many thousands of insects in unclassified condition which had to be sorted into families and genera; the specimens needed systematic transfer into additional steel cabinets in order to have them available for future study and there was only a small entomological library, scarcely suited to the demands of a systematist. How rapidly Canada's collections have been built up is noted in a recent article by Dr. McDunnough, when he says—"I am proud to say that today we have a National Collection of Insects which ranks among the leading collections of the North American continent and a taxonomic library which is not only one of the finest specialized libraries in Government service, but also probably the best of its kind in Canada".

The insects are housed in more than 30 steel cabinets which contain approximately 1600 drawers apportioned as follows: 625 for Lepidoptera; 250 for Coleoptera; 225 for Diptera; 200 for Hymenoptera; 50 for Hemiptera; 50 for Orthoptera; 75 for Odonata; 50 for Ephemeridae and 25 drawers for various Neuropteroid insects. There are also several cabinets containing alcoholic material of Arachnida, Odonata and Ephemerida and slide-cabinets for material in plant-lice, fleas, thrips, etc. The following Lepidoptera collections of note contribute towards the general collection: Dr. James Fletcher collection, excluding types which were deposited in Washington, D. C.; Capt. Gamble Geddes collection consisting of general material collected in the vicinity of Sudbury and Trenton; C. H. Young collection purchased in 1913 and the result of twenty years'

collecting near Ottawa, being rich in Microlepidoptera and containing some paratypes in the Pyralidae and Tortricidae; Arthur Gibson collection of general Lepidoptera with many bred specimens; F. H. Wolley-Dod collection, especially good in western Noctuidae and the J. W. Cockle collection (purchased) from Kaslo, British Columbia, consisting of Mr. Cockle's moths and all of his types.

Up to the present and since being with the Entomological Branch, Dr. McDunnough has published in the neighborhood of 100 taxonomic papers and has described nearly 250 new Lepidoptera and Ephemera (may-flies). The types of nearly all of these are deposited in the National Collection. Each summer, as time permits, the Doctor makes profitable field trips into western districts and unexplored territories. Much of north-western Canada remains virgin to the entomologist and he hopes to work out these areas.

Dr. McDunnough has been editor of the Canadian Entomologist since 1921. He was born at Toronto, Ontario on May 10, 1877, receiving an A. M. at Queens College (Canada) and his Ph.D. at Berlin in 1909.

Everybody would like to see published, a Check List (if possible, annotated) of Canadian Lepidoptera and such a list is *very much* needed. A well-edited catalogue on where to go, when to go and what to collect in Canada would be a most valuable contribution as published by the Entomological Branch. Such a paper might be the means of renewing interest in Lepidoptera.

A New Butterfly Aberration (Lepid.: Nymphalidae).

By K. M. FENDER, McMinnville, Oregon.

PHYCIODES MYLITTA (Edw.), n. aberr. *macyi*.

I have caught an aberration of *mylitta* that I shall call *macyi*, the main difference between this and *mylitta* being on the underside of the secondaries. All the spots in the limbal area are fused into one broad silvered line. *Macyi* has the same expanse as *mylitta*.

Type: McMinnville, Oregon, one specimen, September 6, 1929, in the author's collection.

Type Fixation.

By MORGAN HEBARD, Academy of Natural Sciences,
Philadelphia, Pennsylvania.

In the January ENTOMOLOGICAL NEWS¹ appeared a caustic attack by W. S. Blatchley on the fixation of single types of two of his species by T. H. Hubbell. Blatchley has well defined a "type" in the modern restricted sense now generally accepted, but evidently does not appreciate the vast difference between marking a specimen as such and its valid published first fixation.

The unique type (sometimes termed holotype) is all important we agree, and Blatchley's present trouble is entirely due to his failure to designate such types in his descriptions of new species published in his "Orthoptera of North-Eastern America" in 1919. Such action he knew at that time to be generally considered of the utmost importance, indeed it has been a requisite in all publications of the American Entomological Society since 1914.

He now says he has expected to publish fixations of the types of all his species in a single paper, but as eleven years have passed since the description of the species discussed, we are not nearly as surprised as he to find that someone else is first in making these selections. That he had labelled a specimen of each species "type" in his collection might have been a factor in choosing the proper specimen as type, but more than one specimen of the original series of a species has often been labelled "type" in the past and labels can be removed or shifted. The fact remains that, *until the single type of a new species has been designated in print, each specimen included without query in the originally described series must be considered a cotype. Any such specimen may be chosen as type and the first published designation of such (by the author of the species or anyone else) fixes the type of that species irrevocably.*

As Hubbell's is the first fixation of the type of the species *Ceuthophilus davisii* and *Ceuthophilus rebebi* (described by Blatchley in 1919) and is based in each case on a cotype in the Davis Collection (from which the original series came), that

¹ Volume XLI, pages 17 to 19.

action is valid and is not in any way affected by Blatchley's belated attempt to fix as these types specimens in his own collection, made paratypes for all time by Hubbell's earlier and first published fixation.

Whether he likes or not, Blatchley's negligence has forced another to select these types and *if the type of a species has not been indicated in the original description and a specimen, included without query in the originally described series, is subsequently indicated in print as the type of that species, all subsequent type designations are thereby invalidated* and have no significance whatever.

Blatchley states that he neither knows nor cares what the ruling of the Entomological Code may be in a situation such as his present dilemma. We are satisfied that Hubbell has obeyed the rules for single type selection and that his action will be upheld.

As a matter of fact, as the selector has the right to choose any cotype, has not Hubbell made the wisest choice in each case in taking a specimen from the series of cotypes belonging to the collection which was the source of that entire series, rather than from one of the cotypes given to the describer in return for the work he had done? Such is indeed the almost universal practice today between institutions or between individuals.

We have asked James A. G. Rehn for any further comments he might have on this matter and he has furnished the following:

Mr. Blatchley in his arguments evidently declines to admit that an individual author has no more control over a species once published by him than any other student. Once given to the world, a species is world property without prior lien, and if the original author failed to indicate a single type and he or anyone else has not done so in the intervening time, any investigator can designate any one of the *originally* studied series as the single type, no matter where it may be located, provided that it was before the describer at the time of description. Mr. Blatchley's contention would return to Philadelphia quite a few insect types which have since been fixed in the collections of

other Institutions, although the main series on which the species were based, and so labelled "type", are in the Academy of Natural Sciences. Therefore our remarks are not inspired by opposition, but instead by the practice of entomologists at this time, and the universally recognized right of any of the original material to be selected as the single type by any investigator, the published fixation being the court of last resort.

Behavior Notes on the Yellow Jacket, *Vespa germanica* (Hymen.: Vespidae).

By PHIL RAU, Kirkwood, Missouri.

(Plate XIX.)

While no opportunity has presented itself to make a complete study of this widely distributed wasp, these desultory notes on certain aspects of its behavior may be of interest in making us better acquainted with this already familiar little terror of summer picnics, commonly known as the yellow-jacket. That it is a familiar figure, we all know; that it is of general distribution is evidenced by the reports that it is common throughout the United States, in Europe and Canada.

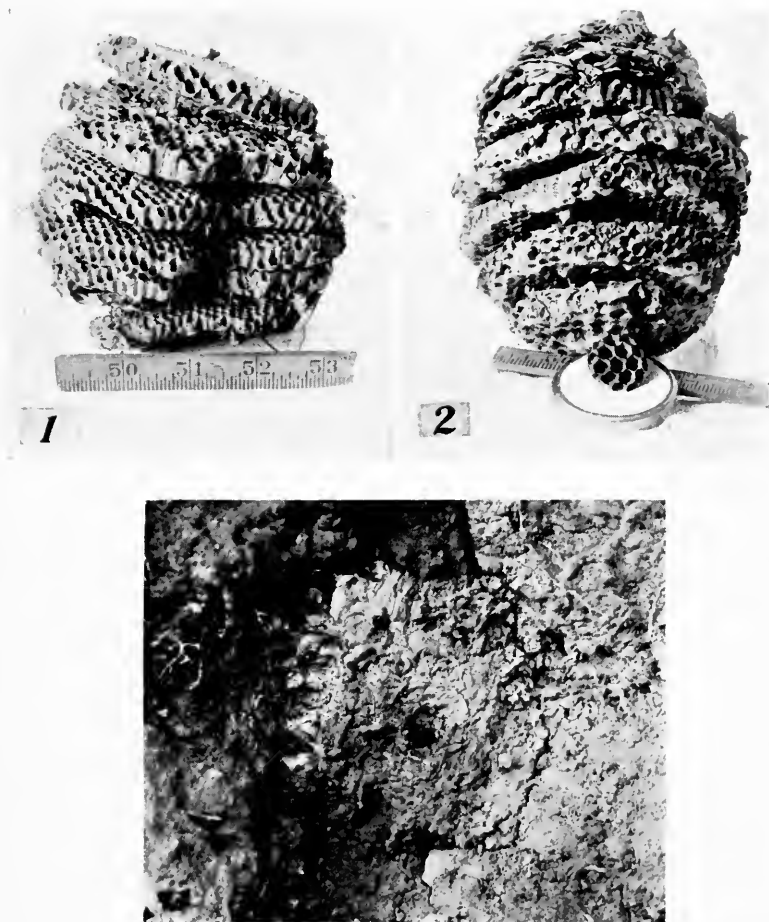
One colony of *V. germanica* was discovered at Wickes, Missouri, on September 2, 1920. A hole in the ground, three-fourths inch in diameter, went down to the roof of this nest, which was two and one-half inches below the surface of the ground. The burrow containing this nest was almost apple-shaped, four inches deep and three to three and one-half inches in diameter. The whole nest had probably been covered, or the pocket in the ground lined, with a layer of paper, like the covering of a *V. maculata* nest, for many scraps of this material lay at the bottom, but people had poured water into this hole and otherwise tried to exterminate the wasps, and this maltreatment had probably broken up this covering sheath. The nest itself consisted of three combs, one atop the other, and connected by strong props or pedicels.

The nest was opened at 9 a. m. and a cyanide jar placed in the opening. During the next two hours, about twenty wasps returned; this gives an indication of the number out of the

nest at that hour in the morning. In opening the nest forty-nine workers and one queen were found; this makes an adult population of approximately 69 workers and one queen; no males were found at that date. During the next two hours, no workers returned, so one can safely place the population of this colony at 70 individuals. Besides this, 64 sealed cells, 25 large larvae and 20 eggs composed the well-filled nest. Both the top and the bottom tier of cells were almost empty; 95 per cent. of the life was in the middle comb.

The nest was taken home and placed in a cage. Within the next two days, 10 workers emerged, quite active, despite the inverted position of the nest. They ate honey greedily, and were often found with their heads inserted deep into the empty cells. They were quite friendly, and soon came like pets after molasses. Later a large stable fly was crushed and placed on the nest; soon it was found that the thorax was completely eaten out but the head and abdomen remained untouched. Thus they were fed daily on molasses and grape jelly and seemed contented; they walked about on the nest, always active and alert, but never attempted to fly out.

Two nests were excavated at the end of the season, and figs. 1 and 2, Plate XIX, show the full-sized nests just before the disbanding of the colony. The nest in fig. 1 was built in a depression in a terrace facing a busy street; the hollow was enlarged from time to time by the wasps carrying out pellets of dirt in their jaws and dropping them while in flight. This nest, inverted in the figure to show construction of the cells, was $5\frac{1}{4}$ inches high and had six large combs, and in addition a small one 2x2 inches at the bottom (not shown in fig.). This nest was unique in that the papery covering, which usually envelopes the entire nest, was thin and sparse everywhere except the place where it was needed most, the portion of the nest exposed to the street. Here not only was it heavy, thick and well constructed, but it was colored a light yellow to match beautifully the clay of the terrace. Other nests of this species were made of a dark gray material very unlike this one in color. It was so difficult to distinguish the nest from the bank that in



BEHAVIOR NOTES ON YELLOW JACKETS.—RAU.

taking the nest I jabbed my trowel into the nest thinking it was the terrace. Figure 3 shows this clay-colored paper-wall with opening in the center amid the surrounding bank and shows an ideal condition of protective coloration. One can hardly give the wasps credit for consciously making this color selection. Very likely the whole fabric was accidental, or at least got its start that way. The wasps probably fell heir to a light-colored wood pulp and in addition, in their duties of carrying out mud pellets, some mud may have gotten mixed with the saliva, or pulp.

While most nests have round combs, as in fig. 2, nest in figure 1 had each comb indented at the same point, so as to form a sort of stairway from comb to comb making it quite easy of access to the workers.

The nest in fig. 2 was unearthed by Mr. A. F. Satterthwait of Webster Groves, Missouri. The height of the nest was $5\frac{1}{2}$ inches and had 5 large combs, and in addition a small one of 15 cells at the very bottom.

This nest too was taken at the end of the season, and therefore was a full-grown nest. This nest was reached by the inhabitants through a hole in the flat surface of the earth, and had its enormously thick paper sheets, not at the side of the nest as in fig. 1, but at the top where it would serve better for protection from the elements. The thickness of this papery roof was in excess of one inch.

The wasps seem not to know when the season nears its close, and there is an enormous waste of immature life when cold weather approaches. At the end of the season one often finds many cells in course of construction, and enormous numbers of eggs and larvae, which can never reach maturity.

It is well known that these little creatures are scavengers, but I have not been sure heretofore that they attack and kill other insects for food. At last one morning at an early hour I saw one of them in the road attacking a red-winged moth; hence it seems that this wasp, besides picking up bits of dead animal remains, also gets live prey by direct attack. In this case the wasp evidently had attacked prey that was in torpid condition due to the chill of the night. When I crept near and ex-

amined it, I found a goodly chunk had been bitten out of the side of the thorax, with the fore-wing and leg still attached. The wasp proceeded to bite off the wing and then the leg, and discarded them; it then took up the fleshy part of the portion bitten out, mounted into the air in a flight of orientation and flew to a tree near by, thence away. Since she had taken her flight of orientation, I expected her to return, so I stealthily examined her moth; it was still soft, and beside it lay the discarded wing, and also the head which she had amputated.

True to my expectations, she returned after five minutes, flew direct to her moth, removed the left hind wing and then struggled to get rid of the right ones. She then removed a large mouthful of choice meat from the abdomen, flew to the tree as before and away to the northwest. After just four minutes she again returned, flew direct to the carcass and got another portion with a leg still attached to it; with this she repeated her course, to the tree and thence away again to the northwest.

During her absence of five minutes, I thought to do a little experimenting. All this time I had been sitting on the ground about eighteen inches from her morsel, and my paraphernalia less than a foot from it. I suspected that she had associated me and mine with the location of her property; therefore I removed, bag and baggage, six feet to the north. My removal must have caused some confusion, for it took her five minutes to find what she sought. She took her morsel and departed by her established route. After six minutes she returned. In the interval I had placed a green leaf over the abdomen of the moth and moved its bright-colored wings an inch away. Upon returning, the wasp flew to the wings, examined them and tried to bite off a tiny bit of muscle tissue at the base, walked away a moment, returned and again scrutinized the wings and surroundings, this time more excitedly, until quite by chance she discovered the carcass under the edge of the leaf. She began to bite off another portion as before, when an accident occurred which added to the interest of the experiment. A dog ran past and put her to flight. She flew away in a huff, and fluttered about in the vicinity for two minutes, and when she returned she again came to the bright wings, bit at them and examined them

just as before and flew away, came back and explored the region on foot repeatedly and for twenty minutes seemed to try her utmost to locate her lost property. She had left without a flight of orientation after she had found it under the leaf, and although she was absent only two minutes before she tried to come back to it, she could not tell where it lay. Then I removed the leaf, whereupon she found it almost at once and proceeded to get her morsel. These disturbances and tricks may have taxed her patience too much, or her wants may have been satisfied; at least she returned no more. The moth proved to be a female heavily laden with eggs; this is the first intimation I have had that this little wasp, commonly regarded as an enemy, may be of economic value.

Another *V. germanica* was found early in the morning feeding on a grasshopper, *Daucus carolina*. The victim often moved its wings violently, showing it had just been stung. It was an adult hopper, many, many times as large as the assailant, but the cold night had made it sluggish and hence easy prey to an alert hunter. Another was seen to sting an adult hopper, follow it in its agonized flight and sting it repeatedly until lost from view. These wasps were at other times seen crowding around a grasshopper carcass enjoying the flesh for food.

Several *V. germanica* came to a cedar tree in the yard early one September morning, evidently in search of food. While watching them, I saw a *V. maculata* pounce upon one of them. The pair struggled violently for several seconds; then I placed them in a test tube. Even there the *V. maculata* continued the angry onslaught, and when at last they became separated, the little victim gave a few feeble kicks and was dead. Despite the severe sting, *V. germanica* occasionally falls prey to the dipterous robber fly. On September 10, a yellow species of robber fly was seen flying from plant to plant with a worker wasp of *germanica* dangling from its legs, and Bromley records (*Psyche* 21: 194, 1914) having taken 17 specimens of this wasp from *Proctocanthus philadelphicus*.

As late in the season as October 19, more than a hundred of these workers were congregated on a dry picnic plate trying to derive some invisible food therefrom. Near by lay some blue

grapes, untouched and intact. I split the skins of these and put them on the plate, and in a minute all the wasps were eagerly crowding over each other to get at the dainties. It is surprising that these famished workers did not see, or having seen they could not break through the tough skins of the fruit to get at its juices.

There has been some discussion as to whether ants, bees and wasps can communicate with one another; especially whether, if one insect finds a store of good things, it is able to communicate with others and advise them of its location. Lubbock proves that ants have this power, but if this wasp can do likewise, I failed to see evidence of it in a case that came under my observation. For two days I watched an individual come to the clay bank in quest of prey and leave each time with a chalcid parasite in her mouth. She would come and go, and never did I see more than that one there. If she had made known this supply to the others, they surely would have come in numbers, but only this one appeared at intervals of ten or fifteen minutes. This one followed a regular system in her hunting; she would alight at one end of the bank near the top, and then fly sidewise, close to the bank and facing it, directly to the other end, bobbing up and down on the wing all the way. Occasionally she would dodge down, searching crevices or burrows for a moment, or leap at her prey in midair; if unsuccessful, she would repeat the search in the same way. The chalcids were so abundant here that she had little difficulty in finding them; her main trouble seemed to be that they were so minute that they could easily get away. Sometimes she took her prey direct to her nest, but more often she clung to the wall and went through the motions of turning it over and biting it—a performance which appeared absurd on account of the small size of the prey.

EXPLANATION OF PLATE XIX.

Figs. 1 and 2. Nests of *Vespa germanica*.

Fig. 3. The nest shown in Fig. 1 in the terrace showing how the hollow was walled up with paper sheets resembling in color and roughness the surrounding soil.

Gall Wasps and the Species Problem.¹

By H. M. PARSHLEY.

We all describe new species and presumably know what we are doing and what we are dealing with; and yet, to quote a favorite remark of my old friend Charles W. Johnson, the way to start a hopeless and endless argument is to ask any group of taxonomists the simple question: What is a species? Since Darwin explained the origin of species and De Vries wrote about elementary species, the science of genetics has grown up and made plain a whole realm of knowledge that was largely unknown and unsuspected by those investigators and which, it is fair to say, remains unknown or at least unused by a majority of modern taxonomists. Meanwhile geneticists have come to agree as a matter of course that the evolution of species has occurred and is occurring by means of mutations, while old school naturalists, when they refer to mutations at all, are wont to deny that these, the only known hereditary modifications, produce new forms that can be given specific rank. It appears that true species are supposed to contain some vague essence apart from mutational characters, and hence remain controversial and indefinable though recognizable to the initiated eye.

This situation has given rise to the academic dogma that species are groups of organisms demarked for "purposes of convenience." Young students are customarily informed that the lofty and forbidding structure of taxonomy is just a filing system, arbitrarily divided into more or less orderly compartments into which, "for convenience", the infinitely varying and eternally overlapping items of nature are more or less reasonably assorted. If a student observes two related species which nevertheless seem to be perfectly distinguishable, he is reminded that somewhere or sometime intermediate forms undoubtedly might be found, that the law (or rather the dogma) may be fulfilled. There has been in the minds of taxonomists an uneasy feeling that somehow a clean distinction between two groups is in a sense immoral, that apparent limits of variation must

¹ Contributions from the Department of Zoology, Smith College, No. 165.

be illusory. All this, of course, represents the enduring and often unconscious effect of early teachings in Darwinian evolution by infinitesimal gradations, an effect which persists in spite of what is definitely known about mutation. As a matter of fact, there is not the slightest reason to suppose that groups of organisms, whether species or higher categories, must always merge into each other by insensible gradations, either in space or in time; and it is now certainly in order to repudiate this dogma and to cease from imposing it on students and applying it to the materials of taxonomic study. Species are natural segregations, when properly understood, as distinct in nature as they are in our cabinets and catalogues.

That the adoption of this principle does not at once solve all problems is abundantly shown in Dr. A. C. Kinsey's recent book on the species of the genus *Cynips*;² but this monograph shows with equal clearness how illuminating this principle is when applied thoroughly to adequate materials. Here is a highly specialized group of insects, occurring over a wide area of the earth's surface, extremely numerous and accessible to the collector, and possessing available characters of a physiologic as well as of a morphologic nature. It should be said also that in Professor Kinsey the group has a remarkably assiduous and discerning student. Now what emerges as the result of this unusual combination of mind and matter?

In the first place, the material basis of this study is adequate beyond that of almost any other taxonomic work you may choose to compare with it. The pinned specimens of the insects numbered more than 17,000 (of which 16,899 are in the author's possession and available for qualified inspection), the galls about 54,000. In twelve years the author has traveled more than 32,000 miles to collecting specimens and geographic data, and he has employed an efficient system in taking true and representative samples. More than 100 collectors in Europe and America have contributed their findings. Out of 93 forms the author has examined the holotypes of 80, 7 not being in exist-

² The Gall Wasp Genus *Cynips*, A Study in the Origin of Species. Indiana University Studies, Vol. XVI, Nos. 84, 85, 86; Waterman Institute for Scientific Research Publications No. 42. 577 pp., 429 figs. 1930.

ence. His descriptions, including agamic and bisexual forms, literature, synonymy, distribution, inquilines, parasites, discussion, etc., average perhaps four pages each; and there are 429 figures, including maps, whole insects, galls, and morphologic details. There is a key, lists of pre-occupied names and excluded species, general and special bibliographies, and an index. All done with the highest regard for honesty and accuracy and without regard for expense of time, trouble, or money.

Many specialists in other groups will want to examine the descriptive portion of the work with minute care and will be sure to find something of value for their own investigations and methods of expression; but I venture to say that all biologists who are at all interested in evolution, genetics, and species formation will do well to study and reflect upon the introductory essays in Part I. These deal especially with the origin of species, the taxonomic method, the species concept, mutations, physiologic species, the isolation of species, hybridization, and phylogeny. They are highly condensed and I do not propose to do them the injustice of further compression here, but shall content myself with the statement of a few of the main ideas.

The taxonomic method would soon be restored to dignity if Kinsey's principles were to find general application. These include intensive treatment of restricted phylogenetic units regardless of arbitrary geographic or national limits; the use of numerous specimens collected to show real ranges; consideration of physiologic as well as morphologic variations, with especial effort to distinguish mutations; careful regard for the various degrees of relationship; and an intelligent use of findings from other fields of scientific research. Such principles cannot be employed in hasty "revisions" and certainly have no application in the haphazard description of novelties about which practically nothing is known. And it is the common absence of these qualities that has marked out ordinary taxonomic work for the scorn of biologists in general.

Systematic zoologists will observe with interest the rather curious predicament in which Kinsey finds himself, admittedly, as a result of his work with gall wasps. He has arrived at a

definite understanding of the species concept, but his nomenclatorial problem is not solved, as he frankly admits (page 24). After remarking that individuals show variation and that also "there are many more points of uniformity than of variation among individuals taken from a given locality and habitat," he says

Finally, the limits of variation of any character prove to be strikingly uniform throughout the great populations which we propose to call species. Whenever we have taken a reasonably large sample from any point over the usually considerable range of a species, the biometric data have not proved fundamentally different from the data for any other fair sample from any other point in the range.

This leads to the genetic definition of a species as "a population with common heredity." Such a population, having a common store of genes which express themselves as mutant characters and the graded variations caused by multiple factors, must constitute a genuine taxonomic entity "which is more than a few cabinet specimens or a bottle full of experimental material or a Latin binomial in a textbook"—and by no means the arbitrary unit of "convenience" of which we have heard so much. And now for the unsolved problem.

The word "species," as just defined, refers to the biologic species, the fundamental category of living things which are biologically identical and thus constitute a single "kind." But hybridization between these real species, and various degrees of relationship among them, give rise to a number of categories that must be recognized between the lowest and what in entomology is ordinarily called a genus. Kinsey talks of his 93 "species" when engaged in biological discussion, but in his descriptive section and in his checklist he gives 26 nomenclatorial species, under which the rest are listed as "varieties." This is simply and solely a concession to existing customs and codes, which is made only because Professor Kinsey hesitates to propose a new taxonomic category with a new name between the true species (temporarily called variety by him) and the genus. The reader must keep in mind this predicament; and if he does

so, no confusion need arise while we wait for some one to answer the author's call with a proposal "that will coördinate biologic concepts of species with questions of convenience in systematic botany and zoology."

Reading this magnificent piece of scientific work, all who have published monographs of similar general character must feel a deep sense of admiration and an even deeper sense of their own short-comings, as I most certainly have in comparing my *Essay on the American Species of Aradus* with the "Gall Wasps." But each one will doubtless know how to justify his course with some degree of satisfaction. In truth, the "species" of certain groups (of *Aradus*, for example, I tend fondly to imagine) may well correspond in large part to the biologic species that Kinsey has so clearly demonstrated in *Cynips*. And certainly it would be impossible, in many groups, for the investigator, however able and zealous, to discover the body of data on mutations, hybridization, reproduction, and physiology which makes Professor Kinsey's work take on at once the proportions of a classic. But there it stands, along with Dunn's *Plethodontidae* and a few other works, an example of what can be done, and must be done, if taxonomy is to be anything more than a convenient means toward efficiency, if it is to take a respectable place as a branch of modern biology.

**Dynastes tityus (Scarabaeid) in Pennsylvania and
the Rathvon and Auxer Collections
of Coleoptera.**

By PHILIP P. CALVERT, University of Pennsylvania,
Philadelphia.

Several years ago, when bringing together data on the zoological significance of eastern Pennsylvania and New Jersey, my attention was attracted to the following passage, by Prof. S. S. Haldeman, in the Section on Zoology of Charles B. Trego's *Geography of Pennsylvania*, 1843, page 79:

Pennsylvania is the northern limit of *Scarabaeus tityus*, the largest beetle found here, which is about two inches in length, of a yellowish gray colour, spotted with black. We have met with but one native specimen.

I was interested to learn the records of this species in Pennsylvania and the present paper gives the results of my search. I am greatly indebted to Mr. Charles Liebeck of Philadelphia and, through him, to Mr. A. B. Champlain, of the Bureau of Plant Industry, at Harrisburg, for references to the literature, and to both of them, to Professors R. C. Schiedt, H. H. Beck and M. Carroll, of Franklin and Marshall College, and to Mr. W. S. Fisher, of the United States National Museum, for reading the manuscript of this paper and suggesting improvements in it.

The earliest record of *Scarabacus* (*Dynastes*) *tityus* as occurring in this state seems to be the inclusion of the species in Fred. Val. Melsheimer's *A Catalogue of Insects of Pennsylvania Part First*, Hanover, York County, 1806. On Page 1, "Tityus, Fabr."¹ appears as the ninth species of the list, under the third genus *Scarabacus*. No locality is given for this or any other species. Mr. Banks has kindly informed me that in the Melsheimer Collection, now in the Museum of Comparative Zoology, at Cambridge, Massachusetts, there is only one specimen of *tityus* and it has no locality label. Mr. Warren S. Fisher writes that the United States National Museum is "fortunate in having a copy of Melsheimer's *Catalogue* from the Melsheimer library. In this copy are a great many handwritten notes, probably made by one of the Melsheimers, but these notes do not give any additional information on *D. tityus*."

The second record, that published by Thomas Say in Volume I of his *American Entomology*, 1824, in connection with Plate IV (pages not numbered) is much more definite. He says of *Scarabacus tityus*:

This insect is so extremely rare in Pennsylvania, that the late Rev. F. V. Melsheimer, the parent of Entomology in this country, and a very industrious collector, found but two individuals in eighteen years. An instance has however occurred, in which the appearance of a considerable number of them occasioned no little surprise in the neighborhood where they were discovered. A mile or two southward of Philadelphia, and near the

¹ So Melsheimer, but the species was first described by Linnaeus, *Syst. Nat.*, (12th edit.), II. p. 542, Nr. 5, 1767. "Habitat in America septentrionali".

river Delaware, an old cherry-tree was blown down by a violent current of wind, and my informant saw the remains of numerous individuals, in and about a cavity of the tree, laid open by the shock of its fall. That there might be no mistake as to the species, he exhibited the thorax of a male he had chosen from the mutilated fragments.

As to the precise locality from which Say's specimens came, Mr. Liebeck writes to me: "After due reflection, based on the city's possible southern limit in 1824 and the then natural environment, I judge the specimens were found somewhere between South and Mifflin Streets, which was all natural elevated ground above tide-water effects and more in conformity with the breeding habits of an insect of this kind."² In the last quarter of the nineteenth century, the southern part of Philadelphia, where it was not built up, was the scene of the collecting labors of Mr. Liebeck, the late Henry W. Wenzel and other well-known coleopterists. None of them ever found *tityus* in this region, as Mr. Liebeck assures me, and I have a memorandum that Mr. Wenzel told me on August 8, 1924, that he knew of no other Pennsylvania record than that of Haldeman which I showed to him.

The next specimen observed in point of time may have been that referred to by Prof. Haldeman in the *Geography* of 1843 quoted above, or it may have been one of those seen by Dr. S. S. Rathvon, of Lancaster, as related in a manuscript communication published by Dr. J. A. Lintner in 1891.³

The first specimen of *D. tityus* I ever saw (a female) was in the possession of the late Judge Libhart of Marietta, Pa., in 1839, and was captured near Wrightsville, York County, Pa.

² William Allen's "Plan of the City of Philadelphia and Adjoining Districts in 1828" (Library, Histor. Soc. Penna.) supposedly shows the built-up parts of the city by shading, and the southern limits of buildings thus indicated are: between Swanson and Front Streets, down to, but not south of, the Navy Yard, which occupied the area between Prime and the present Wharton Sts., Front St. and the Delaware River; between Front St. and Moyamensing Road, to the line of Johnson's Lane, which, as a lane, extended from Moyamensing Road west to Fifth St. between Wharton and Reed Sts.; west of Moyamensing Road, not south of Carpenter St., except for a few scattered buildings.

³ Seventh Rept. on the Injurious and other Insects of the State of New York, Albany, p. 253.

Twenty years later, I received a male specimen that was captured in the same county opposite Marietta which is about three miles above Wrightsville . . . In 1859 or 1860 a large willow tree was blown down by a storm at the village of Safe-Harbor in the county of Lancaster. The trunk, inside, was much decayed, and in it were found about twenty specimens, and a number of larvae. I did not learn of this for a week or ten days thereafter, and was only able to secure a single pair, from a person in Lancaster city who obtained them on the spot. . . . I subsequently came into possession of a female which had been captured near New Holland about ten miles east of Lancaster. The largest specimen that I have ever seen from this state was taken within our city limits in 1870. This one, a male, I kept alive in a wire cage for several days, but he eventually forced some of the wires apart and made his escape and was never recovered. In 1873, in a wood about three miles northeast of Lancaster city . . . under the bark in the rotten wood, I secured three very large specimens of larvae which I believed to belong to *Dynastes*." [These larvae were lost on his way home.]

Dr. Asa Fitch mentioned in 1859⁴ that he had specimens of *tityus* from Pennsylvania; one is tempted to conjecture that he may have received them from the sources which supplied Rathvon.

The Reverend Daniel Ziegler collected Coleoptera at or near Kraeutz Creek, six miles from York, Pennsylvania, and doubtless at other localities in York County. He was born at Reading, Pennsylvania, in 1804, and died at York, in the same State, in 1876. With Haldeman, E. F. Melsheimer and John G. Morris, he composed the Entomological Society of Pennsylvania of 1842 and succeeding years. His collection also is now in the Museum of Comparative Zoology, and Mr. Banks writes that in it are three specimens of *Dynastes tityus* "and one of them has the usual blue label with the word *tityus* across the top, and below that on the right the initial F for the author and

⁴ Noxious Insects of New York, Rept. 3, p. 49. Mr. K. F. Chamberlain, Assistant State Entomologist, writes from the New York State Museum at Albany (March 11, 1930): "We have your letter of February 25 regarding Pennsylvania records of *Dynastes tityus* in the collection of Dr. Asa Fitch. I regret very much that we cannot confirm these records since we do not have any of the Fitch Coleoptera. Some fifty or sixty types of Hemiptera together with a few butterflies represent all of the Fitch material that we have."

on the left the male sign. Below that is the word Pa., which indicates, of course, Pennsylvania." ⁵

Dr. John Hamilton, in his *Catalogue of Coleoptera of South-western Pennsylvania* of 1895 ⁶ states that *tityus* was found at Jeannette, Westmoreland County, by H. Klages, and Mr. Champlain wrote that "a specimen is in our collection labeled 'Jeannette, Pa., H. G. Klages—June'."

Lastly, Mr. Warren S. Fisher writes (March 15, 1930): "There are no Pennsylvania specimens of *Dynastes tityus* in the U. S. National Museum collection, but about 1904 I collected a single specimen of this species at my home, Highspire, Dauphin County, Pennsylvania. Unfortunately I can not give you the exact date as my collection was destroyed by fire. It was the only specimen I found, although I collected in that vicinity for many years."

To ascertain whether any of Rathvon's specimens of *tityus* were still in existence, the writer made a visit, on June 29, 1925, to Franklin and Marshall College, Lancaster, Pennsylvania, where Rathvon's collection is preserved. Thanks to Prof. Mitchell Carroll, of the Department of Biology, and Prof. Herbert H. Beck, of the Department of Chemistry, I was enabled to examine the collection at my leisure and with the following results.

The collection occupies one hundred boxes in cases on the top floor of the College Museum. The boxes measure 25.3 x 33 x 6.75 cm., have glass tops and are tight-fitting. Thirty-six of them are in a case marked "Div. W", which was constructed to hold one hundred; the remaining sixty-four are in flat museum cases. On the end of one of these cases is the inscription: "The S. S. Rathvon Collection of Beetles. Presented by Dr. Henry Bobb of East Greenville, Pa., in memory of his son Eugene, an honored alumnus of F. & M." Most of the specimens bear a circular blue label, 4 mm. in diameter, without any

⁵ Hagen has a biographical sketch of Ziegler (Can. Ent. 17: 132-133, 1885, reprinted in 16th Ann. Rept. Ent. Soc. Ontario, p. 22, 1886). For Ziegler's collection, see Hagen, Can. Ent. 16: 196-197, 1884. For the Entomological Society of Penna., see Morris, Amer. Jour. Sci. (2) 1: 27, 1846; Can. Ent. 13: 186, 1881.

⁶ Trans. Amer. Ent. Soc., xxii, p. 337.

lettering upon it. Some have a circular green label of the same size. Many specimens also bear numbers, *e. g.*

Tetraopes basalis	1492	circular	blue	label
Tetraopes annulatus	5161	"	"	"
Tetraopes ornatus	2954	"	green	"
Dorcadion fuliginosum	2079	"	"	"
Cicindela duodecemguttata	19	"	blue	"
Cicindela dorsalis	9	"	"	"
Cicindela modesta	1935	"	"	"

Other specimens bear locality labels, as some of those now to be quoted. In box No. "44 Dynastidae," I found the following specimens of *Dynastes tityus*:

- (1) ♀ 45 mm. long, ms. label "Dynastes tityus ♀ find near Wrightsville, Yk. Co., Pa.," ms. label "Georgia, also round blue label.
- (2) ♂ 47 mm. long, ms. label "York Co. Pa.," also round blue label.
- (3) ♀ 42 mm. long, ms. label "York Co., Pa.," also round blue label.
- (4) ♂ ms. label "Dynastes tityus ♂ Ken. [?] 863", also round blue label.
- (5) ♀ ms. label "Dynastes tityus ♀ Ken [?] 863", also round blue label.
- (6) ♂ ms. label "Georgia", also round blue label.
- (7) ♀ ms. label "Dynastes tytius ♂ [sic] Lin 862, also round blue label.
- (8) ♂ Printed label "L. T."
- (9) ♀ no labels.
- (10) ♂ 42 mm. long, label "863 Va."

I was not sure that the handwriting of the first label quoted above for specimen No. (1) is the same as the handwriting of the label "Georgia" of the first specimen and of the labels of specimens (2) and (3); these last three labels were surely written by the same hand.

Mr. Fisher comments thus: "The numbered specimens in the Rathvon Collection are probably the numbers assigned to the specimens by Rathvon for his numerical catalogue cited below, which was probably only partially completed and lost after his death. I have tried to check up these numbers but they do not

correspond to any of the numbers used in the published catalogues."

On comparing this list of specimens with Rathvon's communication to Lintner, one is tempted to believe that the first specimen is Judge Libhart's female of 1839 and that the additional label "Georgia" has been carelessly transferred from another specimen; that the second is the male "captured in the same county opposite Marietta", received "twenty years later". Here, however, the possibilities of identification apparently cease.

A catalogue of the Rathvon Collection is preserved at the Museum. It was not accessible at the time of my visit, but Prof. Beck, Director of the Museum, gave me the following information concerning it in a letter of July 14, 1925:

Rathvon's "Catalog" is an alphabetically constructed list of the cases in which the different species are stored. There is at the beginning a brief history of the collection (by S. S. R.). He started collecting in 1842. The cabinet contains a portion of the collection of Prof. Hentz, late of Alabama, begun by him about 1815. Hentz sold his collection to Prof. Haldeman (in 1840). The small colored disks attached to the pins of all the insects are general indications of locality, blue—North America, purple—South America, green—Europe, yellow—Asia, etc. The historical account ends with: "A few State localities are attached to some of the insects, but this is more fully detailed in a numerical catalogue of species which in due time will be made to accompany the cabinet." This was probably never made.

At another point S. S. R. says: "The insects from Pennsylvania in this collection were mainly obtained along the southwestern margin of Lancaster County and the N. E. border of York C. A few were obtained from northwestern Pennsylvania but the larger number from the State are from the valley of the Susquehanna, near Marietta and the hills on both sides of the river from Bainbridge to McCall's Ferry. During the last ten years (from 1865) some additions were made to the collection from the vicinity of Lancaster City and the Conestoga."

There is no further information about numbers 862 and 863 which Dr. Carroll had asked me to search for particularly.

(To be continued.)

Tsetse Flies—Past and Present (Diptera: Muscoidea).

By J. BEQUAERT, Harvard University Medical School,
Boston, Massachusetts

(Continued from page 164.)

I believe that the psychology of the flies should also be considered. Of course, my mentioning "psychology" in connection with tsetses cannot fail to elicit a smile from those of my readers to whom all animals—and especially insects—are pure mechanisms, some kind of glorified alarm-clocks. Yet I claim that the tsetse is an animal with what Professor Forel would call "a well-balanced mind." To be sure, it might fail miserably if subjected to any of the "intelligence tests" devised by modern psychologists for army recruits or terrestrial snails. But in tropical nature, with its many contingencies and hazards, our *Glossina* moves about fearlessly and manages to thrive notwithstanding the handicap of extremely slow reproduction. During the many tedious hours which I have spent travelling up and down the African rivers, I have had plenty of opportunity to watch the behavior of *G. palpalis*. What impressed me most was the unobtrusive, yet deliberate manner in which it stalks a prospective victim.

There are many features in the external and internal anatomy of tsetses showing the high degree of specialization to which I have alluded before. Unfortunately it is not possible to enter into many anatomical details. The mouth-parts, the digestive tract, and the reproductive organs offer perhaps the most striking peculiarities, some of which are of importance in connection with the rôle of the flies as vectors of disease. In the proboscis, the mandibles and maxillae have disappeared, the labrum and labium forming together a slender, needle-like tube, which encloses the very long hypopharynx. At rest the proboscis is placed horizontally between the palpi; but, when about to bite, it is lowered into a vertical position, the palpi remaining in the original place. The skin is pierced by the movements of the labella at the tip of the labium and the proboscis is thrust as far as its bulbous base will permit into the tissues of the victim, as a rule quite rapidly.

The statement is frequently made that the bite of the tsetse is unusually painful and that, when a fly is infected with trypanosomes, the spot where it bites will swell up and become inflamed. Personally I have found the immediate reaction to the bite to be extremely variable: sometimes it was felt at once, even before the fly had a chance to suck blood; but often it was entirely overlooked. I have reached the conclusion that many factors influence the reaction of the victim, such as individual sensibility, the distance of a bite from a nerve, the temperature, the number of flies, and others. I have often observed *G. palpalis* completing its meal on the leg of a native or on the nose of a dog, without the fly being in the least disturbed. In most cases the only reaction of the tissues near the bite is an itchy feeling of short duration; sometimes there is a little swelling, and very rarely the bite is followed by considerable oedema persisting for a long time. On one occasion in the Belgian Congo, some twenty years ago, my entire left hand was very badly swollen following the bite of a single *G. palpalis*; but as no ill-effects followed, I cannot regard this as a symptom of the fly having been infected with disease.

In the digestive tract the unusual development of the salivary glands and of the crop is most noteworthy. The crop, when filled to capacity, extends to unbelievable proportions. In a series of experiments with flies fed on blood in capillary glass tubes, my friend Dr. J. Rodhain and his co-workers found that in one meal *G. morsitans* absorbs between 0.05 and 0.09 c.c. of liquid. *G. palpalis* may even be more voracious, since Macfie calculated that a female of this species is capable of imbibing 1.6 times her body weight of blood, and a male 1.3 times his body weight. The complicated process of digestion has recently been studied by Lester and Lloyd (1928). During feeding, the salivary glands secrete a powerful anticoagulin, which delays the clotting of the blood while stored in the crop. As the blood passes from the crop to the midgut, a coagulin secreted in the mesenteron rapidly clots it, in order to retain the food in that region of the alimentary tract while draining and assimilation take place.

(To be continued)

Notes on Utah Vespidae (Hymen.).¹

By C. LYNN HAYWARD.

The following paper is one of a series of reports to be made on the Hymenoptera of Utah in the collection of the Brigham Young University. This collection has accumulated as a result of several summer expeditions conducted by the Department of Zoology and Entomology under the direction of Dr. Vasco M. Tanner. These expeditions have now covered the major part of the state of Utah and have also extended somewhat into the surrounding states. Some private collectors have also contributed specimens to this collection.

It is the purpose of this paper to report the species of Vespidae belonging to the subfamilies Masarinae, Polybiinae, Polistinae and Vespinae now represented in the Brigham Young University collection. Although this report includes chiefly the Utah species, specimens taken in surrounding states are also listed. It is thought that the collection is complete and extensive enough to be fairly representative of this region; however, further collecting will probably result in an extended known range for some of the forms, and will doubtlessly reveal some additional species especially of Masarinae.

In preparing this distributional list, the writer has used the classification suggested by Dr. J. C. Bequaert (1918) in his *Vespidae of the Belgian Congo*, except that at his suggestion the subfamily name Polybiinae has been used in place of Epiponinae and the genus name *Vespula* instead of *Vespa*.

The writer wishes to express appreciation to Dr. Bequaert for his assistance in the determination of certain doubtful specimens and for his many helpful suggestions, and to Dr. Vasco M. Tanner, head of the Department of Zoology and Entomology, Brigham Young University, for his assistance and encouragement.

Subfamily MASARINAE.

1. PSEUDOMASARIS (TORYNA) VESPOIDES Cress. UTAH: Glendale, July, 1927, two males (Call); La Sal Mountains, June,

¹ Contribution number twenty from the Department of Zoology and Entomology, Brigham Young University, Provo, Utah.

1927, one male (Kartchner); Ute Mountains, Utah-Colorado line, two males (Tanner); Provo, May, one male (Cottam); Uinta Mountains, Granddaddy Lakes, August, 1926, three females; Aspen Grove, Timpanogos, one female (Tanner); Bryce Canyon, June, 1926, one female, (Rasmussen); Zion National Park, one female (Liddle).

WYOMING: Burnt Fork, June, 1926, one male (Brown).

IDAHO: Paris Peak, Bear Lake County, five females and eight males, July, 1929 (Hayward).

P. vespoidea is apparently the commonest masarid occurring in the mountainous regions of Utah and surrounding states. The writer has seen this species in great numbers on Paris Peak, July 25, at an elevation of about 9,000 feet. They were visiting flowers of *Pentstemon* sp. at the time they were observed.

2. PSEUDOMASARIS (PSEUDOMASARIS) MARGINALIS Cress. UTAH: Bear Ears, Elk Ridge, June, 1927, one male (Tanner).

3. PSEUDOMASARIS (COTYLEDON) EDWARDSII Cress. UTAH: Zion National Park, June, 1929, three males and one female, (Tanner); Wellsville Canyon, June, 1926, one female (Hayward); Deep Creek Mountains, June, 1928, one female (Tanner); Logan, July, 1928, four females (Hayward).

4. PSEUDOMASARIS ZONALIS Cress. IDAHO: Paris Peak, Bear Lake County, July, 1929, one male (Hayward).

5. PSEUDOMASARIS sp. UTAH: Aspen Grove, Timpanogos, two females (Tanner); Provo, one female (Kartchner).

The three specimens listed above do not satisfactorily run to any of the species described in Dr. Bradley's key. They conform most closely with *P. occidentalis* Cress., but differ from this species in a number of important respects. The three specimens in the collection apparently agree very closely with each other in both morphological characters and coloration.

(To be continued)

A New Textbook of Entomology.

Prof. Dr. H. Weber, now at the Technische Hochschule, Free City of Danzig, has in preparation a *Lehrbuch der Entomologie*, to be published by G. Fischer at Jena, and will be glad to receive papers bearing on this subject.

On the Seventieth Birthday of Dr. Adelbert Seitz.

— Wohl sind Keinem unter all die Blüten
Rosen ohne Dornen eingestreut;
Aber glücklich ist, wer dennoch sinnig
Sich des Schönen, Hohen, Wahren freut;
Ihm ersteht, in wunderbarem Glanze,
Jede Blume im Erinnerungskranze.

PHILIPP HAIMBACH,
Der Kranz der Erinnerung.

From the pen of A. V. Herff, a friend of his youth, we extract the following from "The life of Dr. Adelbert Seitz":

Dr. Seitz was born of a noble family of Mainz, on February 24th, 1860, being the youngest of three children. Through the influence of his father he became interested in nature study in his sixth year; he was, however, soon to lose this guiding spirit, as his father died when Adelbert was but eight years old. After this he lived with his mother at Darmstadt, until her death, which occurred when she was past ninety years of age.

In 1871 he matriculated at the Darmstadt Gymnasium, and in 1879 at the Bernheim Gymnasium, whence he graduated. In 1880 he entered the University of Giessen, where he studied medicine and natural history, especially zoology, and there received his degree in 1885 as Doctor of Medicine and Philosophy.

In 1886 he absolved his military duties, and in 1887 made a voyage to Australia, to study the fauna of that country; being without means, he traveled as the ship's doctor, and as at that time ships would remain in port for weeks at a time, he had the opportunity in Sydney to meet William MacLeay. This benevolent gentleman took him on a number of excursions into the interior, and it was there that he conceived the thought of writing his great work, *Die Grossschmetterlinge der Erde*.

In 1888 he made his first trip to Brazil; in 1890 he turned toward the East, visiting Japan, and then the Ethiopian region, and from then on he never rested, having now 59 voyages to his credit, including his present one to Brazil.

In 1892 he accepted the directorship of the Zoological Garden at Frankfurt on Main; at this time the financial condition of the garden seemed almost hopeless, several years preceding showing an annual deficit, and with no money on hand with which to purchase animals for the garden. Within ten years of his incumbency the garden had procured a rhinoceros, a hippopotamus, more than forty ostriches, sixteen giraffes, dozens of leopards, over one hundred kangaroos, and many of the larger species of apes.

In 1908 Dr. Seitz retired from his position as Director of the Zoological Gardens, receiving a liberal pension; he then returned to Darmstadt, when and where he began his life's work, *Die Grossschmetterlinge der Erde*. It was diligently carried on, and many parts were published, until the interruption caused by the great world war. For a number of years the publication was much curtailed but, thanks to the indefatigable spirit of the editor, normal production has again been resumed and parts are coming along regularly.

Of no less importance are his many published narratives on his various expeditions, which deal not only with the faunas of the countries visited, but also with the countries themselves, their peoples and customs. Noteworthy also among his writings are *Allgemeine Biologie der Schmetterlinge*, *Seidenzucht in Deutschland*, numerous papers on *Das System und Phylogenie der Schmetterlinge*, and many others, all of which are original and characteristic of this versatile man, who stands in the first rank among the entomologists of all nations.

With all his knowledge and many achievements, Dr. Seitz is extremely modest, entirely unselfish, and always willing to assist others.

We join with his many friends and admirers in wishing him continued health and strength to carry on his chosen work.

(The late) FRANK HAIMBACH, Philadelphia.

Preliminary Report on Nomenclature Proposals.

In the December issue of ENTOMOLOGICAL NEWS, XL, 1929, pp. 329-333, Dr. C. W. Stiles, Secretary of the International Commission on Rules of Zoological Nomenclature, has published a series of proposals concerning suggested changes in the International Rules.

A special committee on Nomenclature has been appointed by the Entomological Society of America to study these proposals and make a report. A preliminary report is here presented for your consideration. If you have suggestions, either affirmative or otherwise, please transmit the same to the chairman of our committee, Dr. T. D. A. Cockerell, University of Colorado, Boulder.

(1) (1930B) We favor the 5/6ths amendment, which prevents the blocking of proposals by a single individual.

(2) (1930D) We believe the "elimination" principle is unworkable as a rule.

(3) (1930F) We think the "binary" papers should be rejected, except certain early ones which have been currently accepted.

(4) (1930G) We do not favor taking the 12th instead of the 10th edition of the *Systema Naturae* as the starting point. The date 1758 has long been accepted, and to change now would cause great inconvenience.

(5) (1930H) Publication. It is very important to settle more precisely the meaning of the term publication, as applied to taxonomic works.

(a) Take the case of privately printed papers with new species, only to be obtained through the favor of the author. According to the rules, they are not published. (See the controversy between Hay and Osborn concerning priority in publishing a fossil elephant. Osborn claims that Hay has no priority, as his paper was privately printed and not sold.)

(b) Trouble has also occurred with reference to the distribution (by private favor) of separates prior to the publication of the work from which they are taken. But if the separates are placed *on sale* prior to the publication of the whole part or volume, apparently they are validated.

(c) A technical difficulty arises in the case of works widely distributed (especially to libraries) but not sold; thus for example the *Memoirs of the U. S. National Academy*, and the publications of many Experiment Stations. Usually they later appear on the market second hand, but at the time of original distribution they may be considered not technically published, though it seems that in practice they are always admitted. It might be recommended that part of the edition should always be placed on sale.

(d) More precise definition of a lay journal seems desirable. It has been suggested that "Nature" is not to be recognized as a place of publication for new names. Few, however, would go so far as this. (cf. the famous "Erlangen list" as a case in dispute.)

(e) It really seems necessary, or seems that it will eventually be necessary to take further steps to define "publication." Papers may now be published in the most obscure places, and technically "placed on sale" while remaining quite unknown to zoologists. It might be held necessary (as under the copyright law) to deposit copies in at least

a certain number of central libraries, which would stamp them with the date of receipt.

- (f) Date assumed correct unless *proved* incorrect. In a good many cases *proof* is impossible, but the presumption one way or the other is very strong. We think that in such cases the nearest approximation to the truth must be accepted.

(6) We strongly support *oidca* as the ending for superfamily names. Here is a point: some authors (*e.g.* Van Duzee in his Catalogue of Hemiptera) consider that a higher group name (family, etc.) dates from the first proposal of the group with a name, regardless of whether that name was in the form now current. Some hold that it dates only from the first publication in proper (as now considered) form. This should be definitely settled. There are good cases in Hemiptera and Odonata.

- (7) We think the Poche proposals are not desirable.

T. D. A. COCKERELL,
H. H. KNIGHT,
J. M. SWAINE.

(A) A matter which ought to be dealt with is this: what constitutes the designation of a type specimen? It ought to be obligatory to label the holotype, and state the type locality (if more than one locality is given) in publication. When no designation appears in publication, and the "species" was a mixture, should a private mark override the work of a reviser who gives the characters of the two or more species involved, and restricts the name to one of them? Can a reviewer designate the type locality from among two or more given, and does that designation hold, in the absence of any printed indication to the contrary?

T. D. A. C.

(B) Could we or should we ever adopt a rule that in the case of possible rival names for a species, when the indications are not quite clear, that name should be preferred which is based on a type deposited in a large public museum? There is, and will be, an increasing incubus of species badly described (often in the wrong genus) by more or less irresponsible persons, sometimes for the sake of increasing the number of "types" in private collections. It is a difficult problem.

T. D. A. C.

List of the Titles of Periodicals and Serials 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. Annals of the Carnegie Museum. Pittsburgh, Pa.
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. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
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 Laboratorio di Zoologia generale e agraria della
R. Scuola superiore d'Agricoltura in 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 Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
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. Transactions of the Entomological Society of 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". Berlin.
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. Comptes rendus hebdom. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
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84. Ecology. Brooklyn.
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89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
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98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Académie Polonaise des Sci. et des Lett. Cracovie, Poland.
101. Tijdschrift voor entomologie, Nederlandsche Entomol. 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.

(C) We need a rule on the permissible length of names—*e.g.*, that a specific name should not exceed six syllables.

T. D. A. C.

(D) I agree that in the future it ought to be made obligatory to label the holotype and state the type locality in publication. It seems obvious that the designation of type specimens can be made only by publication. Private marks or labels can have no validity until published any more than manuscript names for species. In view of our present system of rules it seems logical that the first published designation of a type (Lectotype) specimen (from among the cotypes) should hold just as it does in the case of designating the type species of a genus.

H. H. K.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF
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 numbers within brackets [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an • preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.

Papers published in the Entomological News are not listed.

GENERAL.—Curran, C. H.—Some insects from Barro Colorado. (S) [15] 611-620, ill. Forbes, S. A.—Obituary. By H. Osborn. [12] 23: 472-473, ill. Frost, S. W.—Collecting leaf-miners on Barro Colorado Island, Panama. (S). [76] 1930: 443-449, ill. Gleason, H. A.—A plea for sanity in nomenclature. [68] 71: 458-459. Howard, L. O.—Man and insects. [Jour. Maryland Acad. Sci.] 1: 84-89. McColloch, J. W.—In memoriam. By R. L. Parker. [103] 3:

51-52, ill. **Stewart, M. A.**—The insect visitants and inhabitants of *Melilotus alba*. [6] 38: 43-46. **Theobald, F. V.**—Obituary. [8] 66: 92-93; [9] 63: 95-96. **Weiss, H. B.**—Olaus Magnus, credulous zoologist, and archbishop of the sixteenth century. John Bunce's panegyric on the Spanish fly. [6] 38: 35-37; 49-51.

ANATOMY, PHYSIOLOGY, ETC.—**Allman, S. L.**—Studies of the anatomy and histology of the reproductive system of the female codling moth. [67] 5: 135-164, ill. **Beattie, M. V. F.**—Physico-chemical factors in relation to mosquito prevalence in ponds. [Jour. Ecology] 18: 67-80, ill. **Cavanaugh & Tilden.**—Algal food, feeding and case-building habits of the larva of the midge fly, *Tanytarsus dissimilis*. [84] 11: 281-287, ill. **Cecil, R.**—The alimentary canal of *Philaenus leucophthalmus*. [43] 30: 120-130, ill. **Denis, J. R.**—Existe-t-il un dimorphisme dans le sexe femelle chez les Myzine? [24] 99: 15-22, ill. **Dobzhansky, T.**—Genetical and environmental factors influencing the type of intersexes in *Drosophila melanogaster*. [90] 64: 261-271. **Dolley, W. L.**—The relation between luminous intensity and the length of the refractory period in the eye of *Eristalis tenax*. [42] 56: 185-191, ill. **Fletcher, F. W.**—The alimentary canal of *Phyllophaga gracilis*. [43] 30: 109-119, ill. **Gause, G. F.**—Studies on the ecology of the Orthoptera. [84] 11: 307-325, ill. **Grandi, G.**—Contributi alla conoscenza biologica e morfologica degli Imenotteri melliferi e predatori. [Bol. Lab. Ent. Ist. Sup. Agr. Bologna] 2: 255-290, ill. **Grandi, G.**—Studio morfologico e biologico della *Blastophaga psenes*. [Bol. Lab. Ent. R. Inst. Sup. Agr. Bologna] 2: 314 pp., ill. **Grassé, P. P.**—Etude écologique et biogéographique sur les Orthoptères Français. [78] 63: 489-537. **Hase-man, L.**—The hessian fly larva and its method of taking food. [12] 23: 316-321, ill. **Hollande, A. C.**—Remarques au sujet des tératocytes du sang des insectes: origine de ces cellules. [Arch. Zool. Exp. Gen. Notes et Rev.] 69: 1-11, ill. **Howland, L. J.**—Bionomical investigation of English mosquito larvae with special reference to their algal food. [Jour. Ecology] 18: 81-125, ill. **Jahn, L. A.**—The internal anatomy of the mydas fly. [43] 30: 85-97, ill. **Krüger, E.**—Ein beitrage zur mimikryfrage. [17] 47: 13-14. **Lutz & Hicks.**—An analysis by movietone of a cricket's chirp (*Gryllus assimilis*). [40] 1930: 14 pp., ill. **Maréchal, P.**—Sur trois

Hyménoptères se développant dans un cocon en mosaïque (*Miscophus spurius*; *Oxybelus bipunctatus*; *Mutilla rufipes*). [Mem. Soc. Ent. Belgique] 23: 23 pp., ill. **Morland, D. M. T.**—On the causes of swarming in the honey bee (*Apis mellifera*): An explanation of the brood food theory. [35] 17: 137-149, ill. **Pesola, V. A.**—Banaanikärpänen (*Drosophila melanogaster*) perinnöllisyystieteen palveluksessa. [Luonnon Ystävä] 33: 73-86, ill. **Rau, P.**—Mortality of *Polistes annularis* wasps during hibernation. [4] 62: 81-83. **Staniland, L. N.**—Presence of a yeast in the death watch beetle. [31] 125: 635. **Ulrich, W.**—Die strepsipteren-männchen als insekten mit halteren an stelle der vorderflügel. [46] 17: 552-624, ill.

ARACHNIDA AND MYRIOPODA.—***Bishop & Crosby.**—Studies in American spiders: genera *Ceratinopsis*, *Ceratinopsidis* and *Tutaibo*. [6] 38: 15-33, ill. **Bonnet, P.**—Les araignées exotiques en Europe. Observations sur deux Héteropodes de la Guinée et sur deux Mygales de la Guyane, gardées en captivité en France. [24] 99: 49-64, ill. **Jacot, A. P.**—Shorter articles and discussion. Biological notes on the moss-mites. [90] 64: 285-288.

THE SMALLER ORDERS OF INSECTS.—**Enderlein, G.**—Die klassifikation der Coniopterygiden auf grund der recenten und fossilen gattungen. [Arch. Klass. Phylog. Ent.] 1: 98-114, ill. ***Jordan, K.**—Two new American fleas. [71] 35: 268-269, ill. **Krawany, H.**—Trichopterenstudien im gebiete der lunzer seen. [Int. Rev. Ges. Hydro. & Hydro., Leipzig] 23: 417-427, ill. **Sikes, E. K.**—Larvae of *Ceratophyllus wickhami* and other species of fleas. [Parasitology] 22: 242-259, ill.

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ill. ***Davis, W. T.**—The distribution of cicadas in the United States with descriptions of new species. [6] 38: 53-72, ill. ***DeLong, D. M.**—A new species of bean leafhopper from Haiti. [4] 62: 92-93, ill. **Goding, F. W.**—Synonymical notes on Membracidae. [6] 38: 39-42. ***Lawson, P. B.**—Another season's trap-lighting of leafhoppers. [103] 3: 35-43. **Marshall, G. E.**—Some observations on Orins (Triphleps) insidiosus. [103] 3: 29-32. ***Tuthill, L. D.**—Four new species of the Deltocephalus group (Cicadellidae). [103] 3: 44-47. ***Walley, G. S.**—Heteroptera from the north shore of the Gulf of St. Lawrence. [4] 62: 75-81, ill.

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DIPTERA.—***Bau, A.**—Vier neue Cuterebra-arten aus Sudamerika. (Oestridae). [56] 9: 81-89. ***Curran, C. H.**—Three new Diptera from Canada. [6] 38: 73-76. **da Costa Lima, A.**—Sobre a revalidação do genero Taeniorhynchus (Culicidae). [Mem. Inst. Oswaldo Cruz] 23: 105-108. **Enderlein, G.**—Der heutige stand der klassifikation der Simuliiden. [Arch. Klass. Phylog. Ent.] 1: 77-97, ill. ***Frey, R.**—Eine neue mittelamerikanische Dipterengattung mit gestielten augen. [51] 6: 44-48. **Johnson, C. W.**—Some notes on mosquitoes. [Bull. Boston Soc. Nat. Hist.] 1930: 16-20, ill. **Keilin & Tate**—On certain semi-carnivorous anthomyid larvae. [Parasitology] 22: 168-181, ill. ***Lengersdorf, F.**—Die ausbeute der deutschen Chaco-Expedition 1925-26. Diptera. Lycoriidae (Sciaridae). (S). [56] 9: 55-59. ***Lindner, E.**—Die ausbeute der deutschen Chaco-Expedition 1925-26. Diptera. Richardiidae. (S). [56] 9: 60-62. **Painter, R. H.**—Notes on Kansas bot flies. (Oestridae). [103] 3: 32-35. ***Prell, H.**—Zur kenntnis von bau und entstehung einiger brutbildtypen bei rindenbrütenden borkenkäfern. [46] 17: 625-648, ill. ***Van Duzee, M. C.**—New species of Dolichopodidae from North America and the West Indies. [4] 62: 84-87.

COLEOPTERA.—**Alluaud, C.**—Additions aux Carabidae du Coleopterorum Catalogus édité par W. Junk et S. Schenckling. [24] 99: 5-8. **Bertrand, H.**—Captures et élevages de larves de Coléoptères aquatiques. [24] 99: 65-77, ill. **Blair, K. G.**—Oxford University Greenland Expedition, 1928. Coleoptera from Greenland. [75] 5: 394-400. ***Brown, W. J.**—New species of Coleoptera. [4] 62: 87-92. **Dalla' Torre & Voss.**—Coleopterorum Catalogus. Pars 110. Curculionidae: Archolabinae, Attelabinae, Apoderinae. 42 pp. ***Fleutiaux, E.**—Liste des Melasidae de la Guyane Française et descriptions d'espèces nouvelles. [24] 99: 29-47. **Hetschko, A.**—Coleopterorum Catalogus. Pars 107. Colydiidae. 124 pp. Pars 108. Phalacridae, Mycetophagidae, Tretothoracidae, Jacobsoniidae, Cavicoxumidae, Gnostidae. 26 pp. Pars 109. Cucujidae, Thorictidae (Suppl.), Cossyphodidae (Suppl.). 122 pp. **Hofeneder, K.**—Einige beobachtungen an *Xenos vesparum* (Strepsiptera). [20] 45: 13-16, ill., cont. ***Maulik, S.**—New injurious Hispinae. (S). [22] 21: 45-56, ill. **Roberts, A. W. R.**—A key to the principal families of Coleoptera in the larval stage. [22] 21: 57-72. **Struble, G. R.**—The biology of certain Coleoptera associated with bark beetles in western yellow pine. [67] 5: 105-134, ill. **Trägårdh, I.**—Some aspects in the biology of Longicorn beetles. [22] 21: 1-8, ill.

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OBITUARY.

Mr. J. D. Gunder telegraphed to the Editor of the NEWS on May 1: "Dr. Barnes of Decatur passed away this morning." Mr. Gunder devoted his article in our issue for last October to Dr. WILLIAM BARNES and his collection, recording some entomological reminiscences of his subject. In that paper the statement was made that Dr. Barnes' health was not as good as usual and it is with deep regret that we now register his departure from among us.

JULY, 1930

ENTOMOLOGICAL NEWS

Vol. XLI

No. 7



FERDINAND HEINRICH HERMAN STRECKER
1836-1901



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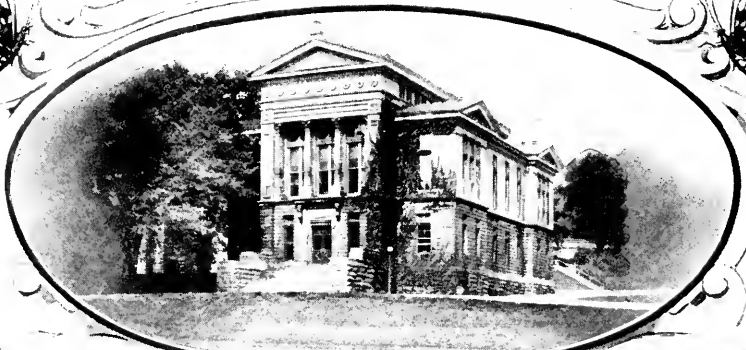
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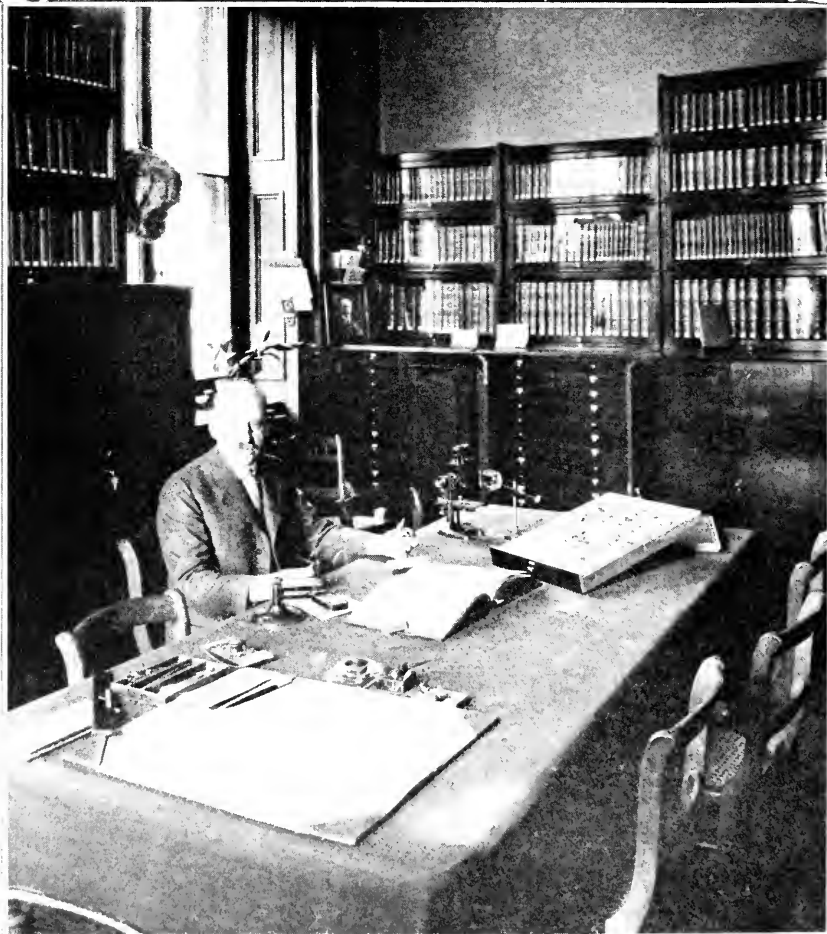
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Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the "News" will furnish reprints of articles 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.



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ALBERT F. WINN

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North American Institutions Featuring Lepidoptera.

XVI. Peter Redpath Museum, Montreal, Canada.

By J. D. GUNDER, Pasadena, California.

(Plate XX.)

Peter Redpath is remembered because of his munificent donations to the McGill University and probably the most noteworthy is the Museum which bears his name. It was opened in 1882 primarily as a research depository for study collections in connection with the school and occupies a conspicuous site on a terrace overlooking the campus amid rows of stately elm and maple trees. The structure which is shown on Plate XX is of grey limestone of Greek design and like other buildings on the campus and in Montreal, has that solid, lasting appearance so characteristic of the metropolis. Though not a large museum and comparatively unknown, it is of special interest to the entomological world because of its being the depository of important collections of Canadian insects. Montreal has long been a center of entomological activity.

In the September, 1901, ENTOMOLOGICAL NEWS, there appears an article by Mr. Hal Newcomb, entitled "A Trip to Montreal," giving an account of the Lepidoptera collections which he found in the city. At that time there were a number of private collections, more or less extensive, well cared for and accurately labeled, but those in museums were negligible, for as yet the Redpath Museum had not developed its entomological department and the Lyman Entomological Room was non-existent.

Readers of the NEWS may recall the tragic death of Mr. H. H. Lyman and his wife in the disaster of the S. S. Empress of Ireland, which was sunk by collision in the Gulf of St. Lawrence, outward bound, on the 29th of May, 1914. Our pages contain an obituary note in Vol. XXV, pp. 335-6, and a more extended account of his life, with portrait and partial list

of writings on Lepidoptera, is given in the *Canadian Entomologist*, Vol. XLVI, p. 221. Mr. Lyman was an industrious collector and built up not only a splendid cabinet of Lepidoptera and their types, but a good library at the same time. In his will he expressed the wish that the McGill University, in accepting his collections, would provide a suitable place in the Museum to house the cabinets, etc., and that the room be known as "The Lyman Entomological Room." He provided as well, a sum of money for the care, maintenance and augmentation of the collection. There was also a proviso that the library be kept in close proximity, a provision which is thoroughly appreciated by anyone doing taxonomic work.

When the material was delivered to the Museum it consisted of 4 cabinets of 30 drawers, each containing about 12,000 specimens, and innumerable boxes of all kinds chuck-full of unmounted and unsorted examples. During the latter part of his life Mr. Lyman's hobby had unfortunately out-grown the time he was able to devote to it. With a knowledge of this condition in mind the University authorities appointed Mr. Albert F. Winn to take charge of the collections and the entomological department of the University and he has proved a very capable curator. Mr. Winn was born in Montreal in 1870 and has always made his home there. He is a member of various entomological societies, including the Entomological Society of London since 1915. At different times he has held offices in the local Branch Society and is a steady attendant at all its meetings. Much credit is due Mr. Winn for keeping active and alive the old time collecting spirit around Montreal. Too often do entomological centers die because one never sees new faces and there seems no one capable of looking into the future in the interest of the local group or of themselves. Mr. Winn has published much in the *Canadian Entomologist*, beginning about 1891, and also a number of his papers have appeared in the *News*. He has sent over 50 new species for description to specialists, never caring to write them up himself, but allowing others to take that responsibility.

Today the Henry Lyman collection has grown to over 60,000 named Lepidoptera and in other orders the collection has in-

creased from next to nothing to more than 200,000 specimens. Of almost equal historical value to Lyman's types are his specimens of practically everything collected by H. K. Morrison in the early '80s, on his various annual excursions to the western United States. These specimens are generally in series of four of a kind and are part and parcel of the same lots sent to W. H. Edwards and others for naming. Any that were sent out by Morrison before descriptions were in print, were subsequently shown to Edwards and identified by him.

Besides the Lyman types there is also in the Museum the collection and types of the Rev. T. W. Fyles.

The old D'Urban collection of North American material is of little value.

The Pearson collection is a mixed lot of Canadian and United States specimens, though well preserved.

The Bowles collection is fairly large and many fine moths are represented. In the old days this collection was considered quite good.

During this last year the private collection of North American Lepidoptera of Mr. Winn has been acquired by the Museum. It is probably the largest Canadian collection ever made, being rich in named local Lepidoptera in long series and consists of more than 15,000 specimens. Throughout the years Mr. Winn has made many trips in eastern Canada and elsewhere. The Winn collection of exotic Lepidoptera and North American Coleoptera was presented to the Lyman Entomological Room in 1915.

Aside from the North American fauna, which is given preference in every way, there are many Lepidoptera from other regions; notably the butterflies of India of which three good collections have been brought together. One made by the late Lionel de Niceville, collected in Northern India near Sikkim and presented by Dr. C. J. S. Bethume; another from Ceylon, made by Dr. Arthur Willey of the University while he resided in those parts, and the last made by Dr. A. A. Dunlop who stayed many years in Bengal. Recently the Museum has purchased many fine butterflies from that famous European collector, Signor O. Querci. This material is mostly from

Italy, Spain and Portugal and is noted for its absolutely perfect condition. More will be said in later chapters about Mr. Querci, who is at present on a field collecting trip in Cuba.

In conclusion regarding the collections, I might add that many of the rare species collected by the early lepidopterists of the Province of Quebec and the older members of the local Societies have found their way into the safe-keeping of the Peter Redpath Museum. Many insect labels bear the faded signatures of Couper, Barwick, Caulfield, Knetzing, Gibb, Trenholme, Holmes, Fyles, Denney, Chagnon and others. Most of these good fellows have long since passed away, but their names are familiar on the first pages of Canadian entomological history.

The Lyman Entomological Room is used as the monthly meeting place of the local club, the Montreal Branch of the Entomological Society of Ontario, and Mr. Winn has asked me to say that visiting collectors and research workers are particularly invited to attend their meetings. All entomologists are welcome at anytime, however.

A List of Entomological Societies in the United States and Canada.

Doctor L. O. Howard writes: "A few years ago the *Entomologische Zeitschrift* (May 8, 1926) published a list of the German entomological societies, indicating the number of members. There were thirteen in all, with a total membership of 562. I think it would be interesting to all American entomologists if you would publish in *Entomological News* a list of the entomological societies of the United States with an indication of their membership."

We heartily endorse Dr. Howard's suggestion and request the secretaries of all entomological societies and clubs in the United States and Canada to send to the Editor of *Entomological News*, Zoological Laboratory, University of Pennsylvania, Philadelphia, Penna., a statement of the addresses and dates of foundation of their respective associations, the names of the president and secretary of each and the number of active (or resident), of corresponding and of honorary members, that the NEWS may bring together and publish in its pages just such a list as Dr. Howard has in mind.

Notes on Utah Coleoptera.¹

By the late H. J. PACK.

This paper records the occurrence of a number of species of beetles, some of which have not heretofore been listed from Utah. Some of the wire-worms and long-horned beetles occasionally become rather destructive to field crops or shade or forest trees. The writer wishes to thank Dr. E. C. Van Dyke for his kindness in determining the Cerambycids and Mr. M. C. Lane for naming the Elaterids.

Family CERAMBYCIDAE, Long-horned Beetles.

1. *PRIONUS CALIFORNICUS* Mots. Collected at Bountiful, August 24, 1929 (Pack); Fort Duchesne, July 10, 1926 (C. J. Sorenson), July 20, 1927 (K. Sorenson), August 1, 1927 (W. Sorenson); Logan; Ogden, July 12, 1906; Provo, 1924 (C. J. Sorenson).

2. *TRAGOSOMA DEPSARIUM* (L.). Logan, August 5, 1903, August 5, 1921 (G. E. King), September 12, 1923 (Knowlton), September 23, 1923 (Pack).

3. *ASEMUM ATRUM* Esch. Ephraim, June 17, 1904; Logan, June 22, 1903 (twenty specimens); Providence, July 15, 1904.

4. *CRIOCEPHALUS PRODUCTUS* Lec. Logan, July 14, 1929 (Pack).

5. *ROMALEUM HISPICORNE* (L.). Provo, August 26, 1925 (C. J. Sorenson); on poplar trees at a tourist auto park, Salt Lake City, August 1929 (Pack).

6. *RHAGIUM LINEATUM* Oliv. Logan, July 9, 1904, May 29, 1919 (Henderson).

7. *STENOCORUS VESTITUS* Hald. Bountiful, June 1929 (Pack); Logan Canyon, July 4, 1909 (Hoff).

8. *S. VESTITUS ATER* Leng. Logan, June 15, 1929 (Pack).

9. *EVODINUS MONTICOLA* (Rand.). Richfield, June 13, 1903.

10. *ACMAEOPS SUBPILOSA* Lec. Bountiful, July 20, 1929 (Pack); Pleasant Grove, June 21, 1929 (Pack).

11. *TYPOCERUS BALTEATA* Horn. Logan.

¹Contribution from the Department of Entomology, Utah Agricultural Experiment Station. This manuscript was prepared by G. F. Knowlton after the death of Dr. Pack (died January 5, 1930); therefore any mistakes in compiling the list should be credited to the one preparing it for publication. Publication authorized by Director, February 7, 1930

12. *ROSALIA FUNEBRIS* Mots. Logan, September 3, 1923 (Knowlton), September 13, 1923 (Pack), July 1929 (Pack); Salt Lake City (Maughan).

13. *SEMANOTUS LIGNEUS* Fab. Logan, April 17, 1905.

14. *S. NICOLAS* (White). Logan, April 8, 1918.

15. *CALLIDIUM ANTENNATUM* Newm. Logan, April 10, 1904, April 23, 1905; Payson, April 18, 1904.

16. *ANTHOPHILAX MIRIFICUS* Bland. Logan, July 9, 1904.

17. *XYLOTRECHUS ANNOSUS* (Say). Lewiston, May 23, 1923 (Knowlton).

18. *NEOCLYTUS CAPREA* (Say). A number of adults were reared from apple wood, by school children at Castleton, spring of 1929; Logan, April 26, 1916 (C. J. Sorenson).

19. *CROSSIDIUS DISCOIDEUS* (Say). Brigham, September 2, 1927 (Knowlton); Logan, September 7, 1906.

20. *BATYLE IGNICOLLIS* (Say). Fairview, July 20, 1929 (Pack).

21. *MONOCHAMUS SCUTELLATUS* (Say). Draper, August 1909 (Titus); Logan, August 14, 1921 (G. E. King); Logan Canyon; Provo, August 15, 1924 (C. J. Sorenson).

22. *OBEREA TRIPUNCTATA BASALIS* Lec. Cache Junction, July 3, 1912 (Hagan); Logan; Manti, June 16, 1903. Several specimens were collected at Franklin, Idaho, May 24, 1923 (Knowlton).

23. *TETRAOPES FEMORATUS* Lec. Deseret, July 1, 1926 (Knowlton); Fort Duchesne, August 1, 1927 (C. J. Sorenson); Logan, July 20, 1927 (Knowlton); Ogden, June 12, 1927 (Knowlton); Pleasant Grove, July 23, 1929 (Knowlton); Provo, July 25, 1927 (Knowlton); Syracuse, June 29, 1929 (Knowlton). This form is very common in northern Utah.

Family OEDEMERIDAE.

24. *CALOPUS ANGUSTUS* Lec. Hyrum, April 10, 1916; Logan, April 6, 1905; Ogden, April 7, 1915.

25. *COPIDITA BICOLOR* (Horn). Logan, August 6, 1907 (Ball).

26. *OXACIS SERICEA* Horn. Numerous on Russian thistle at Grantsville, July 24, 1929 (Knowlton); Plain City, August 5, 1903; Willard, August 7, 1903.

Family ELATERIDAE, Click Beetles.

27. *AEOLUS DORSALIS* (Say). In clover at Garland, August 2, 1929 (Pack); Logan, July 20, 1929 (Pack); Ogden, May 23, 1929 (Knowlton).

28. *LIMONIUS INFUSCATUS* Mots. Bountiful, May 11, 1929 (Pack and Janes); Logan, April 6, 1905; Millcreek, April 18, 1910 (Titus).

29. *L. BASILLARIS* (Say). Logan.

30. *PHILETES CALIFORNICUS* (Mann.) Lewiston, September 9, 1929 (Pack and Knowlton).

31. *ATHOUS PALLIDIPENNIS* Mann. Logan, July 30, 1904.

32. *LUDIUS MORULUS* (Lec.). Logan, July 9, 1904.

33. *L. PROPOLA* (Lec.). Bountiful, July 12, 1929 (Pack and Janes).

34. *L. FALLAX* (Say). Fairview, July 10, 1929 (Pack); Divide, Sardine Canyon, June 26, 1929 (Pack).

35. *L. LEUCASPIS* (Germ.). Salt Lake City, June 6, 1929 (Knowlton).

36. *L. INFLATUS* (Say). Cache Junction, June 3, 1912 (Hagan); Logan, May 17, 1929 (Knowlton); Mantua, June 1, 1929 (Pack); Divide, Sardine Canyon, June 26, 1929 (Pack).

37. *L. SEMIVITTATUS* (Say). Logan; Trenton, April 29, 1927 (Knowlton).

38. *HEMICREPIDIUS CARBONATUS* Lec. Austin, June 25, 1926 (Knowlton); Logan, June 20, 1903 and July 13, 1907.

39. *H. HIRTUS* Cand. Logan, July 20, 1929 (Pack and Knowlton).

40. *CRYPTOHYPNUS SQUALIDUS* (Lec.). Logan, September 2, 1903.

41. *AGRIOTES FUCOSUS* (Lec.). Newton, July 1927 (Pack).

42. *A. FERRUGINEIPENNIS* Lec. Logan, July 5, 1906 and July 4, 1907.

43. *DOLOPIUS LATERALIS* Esch. Bountiful, May 25, 1929 (Pack); Cache Junction, April 15, 1906; Logan, August 5, 1903 and September 12, 1904; Mantua, June 1, 1929 (Pack); Provo, June 10, 1906.

44. *MELANOTUS FISSILIS* (Say). St. George, June 17, 1923 (Hawley).

45. *M. OREGONENSIS* (Lec.). Bountiful, June 20, 1929 (Pack); Tooele, June 14, 1929 (Knowlton).
46. *CARDIOPHORUS GAGATES* Er. Logan, 1923 (Knowlton).
47. *C. TENEBROSUS* Lec. Logan, July 9, 1904; Mantua, June 1, 1929 (Pack).
48. *C. CARBONATUS* Bl. Bountiful, May 29, 1929 (Pack and Janes); Logan, April 2, 1905 and April 10, 1910.

Notes on Utah Vespidae (Hymen.).

By C. LYNN HAYWARD.

(Continued from page 205).

Subfamily POLYBIINAE.

6. *MISCHOCYTARUS FLAVITARSIS* SAUSS. UTAH: Zion National Park, August, 1926, five females (Tanner); Bryce Canyon, two females (Tanner); Moab, June, 1927, three females and two males (Tanner, Cottam, Kartchner, Call); Ute Mountains, Utah-Colorado line, June, 1927, one female (Tanner); Provo, nine females (Tanner, Call, Hayward); Rosevere Creek, Raft River, June, 1927, one female (Tanner); Logan, July, 1926, two males (Hayward); Logan Canyon, Tony's Ranger Station, June, 1926, one female (Brown); Springville, one male (Hayward); Raft River Mountains, El. 10,000 ft., one female (Beck).

CALIFORNIA: Stanford University, July, 1921, two females (Tanner).

ARIZONA: Bisbee, one female (Curtis).

IDAHO: Moscow, one female (Sudweeks); Burley, two females (Beck).

An interesting observation in connection with the specimens of this species in the collection is the close correlation between coloration and locality. While the species as a whole is extremely variable in color and size, the specimens from a given locality have a marked likeness in this respect. Specimens from southern Utah, California, and Arizona are on the whole much lighter in coloration and generally smaller in size than are those from northern Utah and Idaho. The specimens from any limited area are remarkably alike; however, there seem to be some sexual variations, since, in the five specimens from Moab,

the mesothorax is considerably darker in the males than in the females.

Subfamily POLISTINAE.

7. *POLISTES FUSCATUS* var. *AURIFER* Sauss. UTAH: Zion National Park, July, 1925, eleven females (Tanner); Pine Valley, June, 1929, one female (Tanner); Lyndyl, September, one female (Tanner); Sheep Creek, Duchesne County, June, 1926, one female (Hayward); Central, June, three females (Tanner); La Sal, June, 1927, seven females (Call); Ute Mountains, Utah-Colorado line, June, 1927, one female (Tanner); Wellsville Canyon, June, 1926, six females (Tanner, Hayward).

CALIFORNIA: Harbor City, San Pedro, one female (Beck).

NEVADA: Lehman Cave, Mt. Wheeler, one female (Tanner).

ARIZONA: Kiabab Forest, July, 1927, one female (Call).

According to Dr. Bequaert, *P. f.* var. *aurifer* and *P. f.* var. *variatus* show such a close intergradation that it is often practically impossible to satisfactorily separate certain specimens of the two varieties. In Utah, these two forms apparently may occupy the same locality and their exact ranges are not well established. Dr. Bequaert suggests, however, that *aurifer* is the more western and *variatus* the more eastern form in the state.

8. *POLISTES FUSCATUS* var. *VARIATUS* Cress. UTAH: Provo, seventeen females, seven of which were taken in January (Tanner, Hayward); Logan, August and September, two males (Hayward); Aspen Grove, Timpanogos, three females (Tanner); Riverdale, June, 1926, two females (Tanner, Brown).

IDAHO: Lava Hot Springs, four females (Beck); Driggs, June, 1928, one female (Kartchner); Paris, July to September, seventeen specimens (Hayward).

9. *POLISTES FUSCATUS* var. *FLAVUS* Cress. UTAH: St. George, August, 1926, thirteen females (Tanner); Santa Clara, August, 1926, two females (Tanner).

Present records seem to indicate that this species is to be found in Utah only in the Lower Sonoran Zone of the extreme southern part.

10. *POLISTES FUSCATUS* var. *APACHUS* Sauss. UTAH: St. George, eight females, two of which were taken in December, 1923 (Tanner); Bluff, San Juan River, June, 1927, thirty-seven females and two males (Tanner, Cottam, Call, Kartchner); Green River, June, 1927, two females (Tanner); Moab, June, 1927, seventeen females (Tanner, Cottam, Call, and Rasmussen).

11. *POLISTES CANADENSIS* L. var. ARIZONA: Kiabab Forest, Rim of Grand Canyon, July, 1927, twenty-eight females (Tanner, Cottam, Rasmussen, Call).

Dr. Tanner reports that this form was very common on the rim of the Grand Canyon of the Colorado on the day the above collection was made. Dr. Bequaert states that this form is apparently without a variety name, but that it is entirely distinct from the *P. canadensis* L. which occurs in tropical America.

Subfamily VESPINAE.

12. *VESPULA ARENARIA* Fab. (= *diabolica* Sauss.) UTAH: Wellsville Canyon, June, 1926, two queens (Tanner); Utah Lake, East Side, one worker (Beck); Aspen Grove, Timpanogos, twenty-one workers and two males (Tanner).

IDAHO: Moscow, one queen (Sudweeks); Driggs, June, 1928, one worker (Kartchner).

Although fairly abundant in the northern part of the state, the species seems to be far less common than its variety *fernaldi*.

13. *VESPULA ARENARIA* Fab. (= *diabolica* Sauss.) var. *fernaldi* Lewis. UTAH: Riverdale, June, 1926, seven queens (Tanner, Brown, Hayward); Bear Ears, Elk Ridge, June, 1927, two queens (Tanner, Call); Lakota, Bear Lake, June, 1926, three queens (Tanner); Summit Daniel's Canyon, El. 8,000 ft., July, 1926, one queen and one worker (Tanner, Hayward); Sheep Creek, Duchesne County, June, 1926, two queens (Cottam, Hayward); Logan Canyon, Tony's Ranger Station, June, 1926, five queens (Cottam, Brown, Hayward); La Sal Mountains, one queen (Tanner); Farr West, June, 1926, one queen (Hayward); Payson, one worker (Call); Aspen Grove, Timpanogos, ten workers and one male (Tanner); Provo, twenty-five workers (Hayward).

CALIFORNIA: Stanford University, May, 1923, one worker (Tanner).

WYOMING: Fort Bridger, June, 1926, one queen (Brown); Burnt Fork, June, 1926, one queen (Hayward).

COLORADO: Mesa Verda National Park, two queens (Call, Kartchner).

IDAHO: Paris, six queens and fifteen workers (Hayward).

14. *VESPULA ARCTICA* Rohw. UTAH: Aspen Grove, Timpanogos, two males (Tanner).

V. arctica is apparently a rare form in Utah.

15. *VESPUULA MACULATA* L. UTAH: Three queens, six workers, one male (Tanner); Aspen Grove, Timpanogos, seven workers and two males (Tanner); Logan Canyon, Tony's Ranger Station, June, 1926, four queens (Cottam); Rosevere Creek, Raft River Mountains, June, 1927, three queens (Tanner); Riverdale, June, 1926, two queens (Tanner, Brown); Lakota, Bear Lake, June, 1926, two queens (Tanner); Wellsville Canyon, June, 1926, one queen (Tanner).

NEVADA: Leham Cave, Mt. Wheeler, June, 1928, one queen (Tanner).

IDAHO: Paris, June and August, one queen and one worker (Hayward).

This species is well distributed throughout the state of Utah, especially in mountainous regions.

16. *VESPUULA CONSOBRINA* SAUSS. UTAH: Riverdale, Weber River, June, 1926, one queen (Cottam); Deep Creek Mountains, June, 1928, one queen (Beck); Utah Lake, East Side, one queen (Beck); Logan Canyon, Tony's Ranger Station, June, 1926, one queen (Tanner).

V. consobrina is apparently not a common form in Utah, and the present records indicate the northern parts of the state as its chief range.

17. *VESPUULA OCCIDENTALIS* CRESS. UTAH: St. George, eleven queens (two taken in December, 1925) and five workers (Tanner); Zion National Park, August, 1926, sixteen workers (Tanner); La Sal Mountains, June, 1927, four queens (Tanner, Kartchner); Moab, two queens (Call); Bryce Canyon, one worker (Tanner); Provo, one queen and three workers (Tanner, Cottam, Beck); Green River, one queen (Tanner); Douglas, June, 1926, two workers (Tanner, Hayward); Aspen Grove, Timpanogos, five workers (Tanner); Riverdale, June, 1926, four queens (Hayward); Wellsville, June, 1926, two queens (Tanner); Logan Canyon, Tony's Ranger Station, June, 1926, two queens (Tanner, Brown); Summit Daniel's Canyon, El. 8,000 ft., June, 1926, one queen (Hayward).

CALIFORNIA: Stanford University, April and May, four queens and three workers (Tanner, Duncan); San Jose, two workers (Duncan); Berkeley, July, 1915, one worker (Smart).

NEVADA: Lehman Cave, Mt. Wheeler, one queen (Tanner).

COLORADO: Mesa Verda National Park, June, 1927, two queens (Call, Kartchner).

IDAHO: Paris, twelve queens (Hayward); Moscow, two workers (Sudweeks); Driggs, June, 1928, one queen and one worker (Kartchner); Lava Hot Springs, one queen (Beck).

The records indicate that *V. occidentalis* is the most evenly distributed of any of the species found in the state. It is probably the most common form to be encountered throughout the entire region.

18. *VESPUA ATROPILOSA* Sladen. UTAH: Sheep Creek, Duchesne County, June, 1926, one queen (Cottam); Provo, June, 1929, four queens (Hayward); Utah Lake, East Side, four males (Beck); La Sal Mountains, one queen (Rasmussen); Logan, one queen (Hayward).

COLORADO: Mesa Verde National Park, June, 1927, one queen (Call).

IDAHO: Paris, one queen (Hayward).

19. *VESPUA VULGARIS* L. UTAH: Aspen Grove, Timpanogos, one male (Tanner); Summit of Daniel's Canyon, June, 1926, (Hayward); Logan Canyon, Tony's Ranger Station, two queens (Tanner).

CALIFORNIA: Berkeley, June, 1915, one worker (Smart).

IDAHO: Lava Hot Springs, one queen (Beck).

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Tsetse Flies—Past and Present (Diptera: Muscoidea).

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(Continued from page 203).

The most baffling part of the whole history of tsetse flies is their viviparous mode of reproduction, which was discovered by Sir David Bruce (1895-1896) in Zululand, probably with *G. pallidipes*. In this connection the reader will be amused by the following fabulous account of viviparity in the tsetse presented in all seriousness to the French Academy by L. de Castelnau in 1858. "The Bushmen," he says, "assert that this fly is viviparous, and Mr. Edwards, the companion of Mr. Chapman, and a highly intelligent man, having one day expressed to them his disbelief as to this, they brought him a pregnant female, and having in his presence opened it along the middle line of the abdomen he states that he saw three little flies ready to take flight emerge from it." In the female tsetse the reproductive organs consist essentially of the same parts as in other insects. A pair of ovaries open by means of a common oviduct in a spacious uterus, capable of great distension. The ovaries are, however, asymmetrical, owing to the alternate ripening of a single egg in the lowest follicle on either side. Fertilisation takes place as the egg passes through the oviduct, in which open the paired ducts of the spermathecae. The egg then progresses into the uterus, where it hatches in a day or so. Here the larva remains during all three stages, being fed by peculiar uterine or milk glands, a system of bilateral branching organs forming a network on either side of the uterus. The common duct from these glands opens just below the ducts of the spermathecae on a small conical papilla, or teat, from which the larva sucks its nourishment. The uterus is also surrounded by a very complex system of tracheae, which bring air to the uterine cavity. In about ten days, under favorable conditions, the larva is full-grown and the female expels it from the vagina, the anal extremity first. After its expulsion the larva takes no food, but it buries itself in the earth, sand or humus,

and its skin hardens into a puparium. With the exception of the genus *Glossina*, this peculiar type of viviparity is known only for the Hippoboscidae, Nycteribiidae and Streblidae, among the Diptera; all these insects being commonly called "pupiparous." Some purists have objected to this term, on the ground that in these flies the female expels a full-grown larva and not a pupa. Yet to simply call them "larviparous" would merely obscure matters, since it would in no way distinguish their case from that of the many other insects that deposit young larvae, freshly hatched from the eggs, and that have made no provision for intra-uterine feeding and respiration. Unless some obliging Greek scholar will provide us with a brand-new term, I see no objection to calling the tsetse pupiparous. Except for the fact that the tegument is not yet hardened, the larva of *Glossina*, when voided by the female, is essentially a puparium.

One more point before leaving the reproductive system. If we examine the third stage larva when nearly full-grown in the female uterus, we notice at the anal extremity a pair of black, sclerotized and almost spheroidal protuberances, which Newstead has called the polypneustic lobes. I believe that the homology of these structures has been misunderstood. The surface of each lobe is more or less divided into three areas by faint grooves and thickly studded all over with papillae, which, as Newstead (1918) has shown, are respiratory openings. A comparison with a series of other Muscoid larvae or puparia (such as, for instance, that published by C. T. Greene in 1921 and 1925) indicates that the polypneustic lobes are not "additional stigmata" (Newstead) or "protective organs" (Roubaud), but modified stigmal plates with an exaggerated branching of the three usual slits or "peritremes." They represent an extreme development of C. T. Greene's "braincoral type" of stigmal plate. Within the deep pit enclosed by the inner lips of the two polypneustic lobes, one finds on either side a small, somewhat raised plate, which in my opinion is the "button", or vestigial scar of the posterior stigma of an earlier larval stage. These two scars have no longer a respiratory function in the third stage, so that the names "posterior stigmata" or "paired ab-

dominal stigmata", applied to them by Roubaud, Stuhlmann, and Newstead are misnomers.

Through what combination of circumstances, or determinism, have the tsetses and the other pupiparous Diptera mentioned above acquired this complicated and slow method of perpetuating the species? Roubaud alone has attempted to answer this question. He regards the *Glossinac*, although free-living, as typical ectoparasites of vertebrates, physiologically as specialised for a blood diet as the Hippoboscidae and Nycteribiidae. He claims that normal, true pupiparity occurs only in flies that are exclusively hematophagous and that live at a constant high temperature. This explanation, though plausible, is not quite satisfying. It fails to take into account the fact that the advantages of a pupiparous mode of reproduction are by no means obvious. Moreover, tropical countries teem with many other free-living biting insects, not to mention the numerous strict ectoparasites, which show no tendency whatsoever toward viviparity. Nevertheless it would seem that some general principle must be involved, since pupiparity has been acquired independently in at least two, if not four, distinct lines of evolution.

The psychic alertness which I have claimed for the tsetses, is displayed once more in the behavior of the gravid females. In search for a vertebrate host the flies roam far and wide; but when parturition is about to take place, the female seeks out the most favorable environment for her offspring. As Roubaud (1909) and G. D. H. Carpenter (1912) have shown in a series of experiments, the pupae of *Glossina* are very fastidious in their requirements of light, humidity and temperature. In addition, the several species differ considerably in this respect. The larvae of *G. palpalis*, for instance, are deposited in cool, shaded, dry places, preferably near the banks of rivers or lakes. An appropriate natural breeding ground of this species often yields hundreds of pupae. Roubaud found that in dry, shaded sand, at a temperature of 25° to 27° C., the pupa develops normally in about 32 or 33 days. The pupae of the savanna species, on the other hand, are not found in the neighborhood of water, though they are also hidden in loose, dry,

shaded material; they are always much scattered and rarely more than ten living pupae are found in one spot. For *G. morsitans* trees hollowed near the base and the shelter beneath fallen trunks are favorite breeding places.

The pupae are so well hidden in nature that a weary search is often needed before they can be discovered. Yet they are not entirely able to escape their enemies, the most powerful of which are a number of endoparasitic insects. For some reason as yet obscure, *G. palpalis* seems to be rather free from parasitic attacks: although hundreds of pupae found in nature have been bred of this species, they have yielded only one proctotrupid, which I discovered years ago in Katanga, and one chalcid, obtained by G. D. H. Carpenter in Uganda. No less than twenty parasites attack the pupae of *G. morsitans* (and its race *submorsitans*) and these cover a wide range of groups: mutillids (3 species), braconids (1 species), proctotrupids (1 species), and chalcids (8 species), among the Hymenoptera, and bombyliids (7 species) among the Diptera. The three mutillids have been placed in *Mutilla*, but they are not congeneric with *Mutilla europaea* and, moreover, seem to represent two distinct genera. The bombyliids have recently been revised by Austen (1929), who places them all in the genus *Thyridanthrax*. Of predaceous arthropods, spiders, dragon-flies, and robber flies may occasionally catch an adult tsetse; but certain predaceous fossorial wasps of the genera *Bembix* and *Oxybelus* are perhaps more important enemies of the flies. In his discussion of the enemies and parasites of *Glossina*, Mr. Hegh seems to have overlooked an interesting account of *Bembix* preying upon *G. palpalis*, published by Father Guillemé in the *Revue Congolaise* for 1910 (vol. I, pp. 145-150, Pl. IX).

Most of the topics which I have discussed thus far cover the subject-matter of Mr. Hegh's first volume. The author promises us a second volume, which will deal with the detailed distribution of the species, their habitats, the biology of the adult flies, the feeding habits, the influence of external factors, the methods of control, and the technique used in studying these insects. Some of these points I have touched upon incidentally.

The discussion of the others may safely wait until Mr. Hegh's work is completed. Since, however, he does not intend to deal with the relation of tsetse to disease, I shall close this review with a few comments on this important problem. I shall attempt to keep as strictly as possible within the entomologist's premises.

The annoyance caused to man and beast by the bite of tsetse is unimportant as compared to the rôle these flies play in the transmission of certain diseases. Originally the ravages caused by the tsetse in South Africa were blamed on some "poison" injected by the fly. In 1895, Sir David Bruce announced his epoch-making discovery that nagana, or fly-disease, in domestic animals was caused by a blood parasite carried by *Glossina* from sick to healthy animals. So far as known at present, all diseases caused in man or animals by the bite of tsetse are due to flagellate Protozoa of the genus *Trypanosoma*. Although all species of *Glossina* must be under suspicion as potential vectors, some of them are of outstanding significance in this respect. In general one may say that the rarer or more local species are negligible. The most prevalent type of human trypanosomiasis, or African Sleeping Sickness, as it is often called, is caused by *Trypanosoma gambiense* and transmitted by *G. palpalis*. Consequently it is only contracted within the area occupied by this species of tsetse, which, as I have pointed out above, covers fairly well the West African Subregion. Outside this area, however, a different type of human parasite, which has been called *Trypanosoma rhodesiense*, has given much concern to the medical authorities of Rhodesia and Tanganyika Territory. It is carried by some of the savanna species of *Glossina*, viz., *G. morsitans*, *G. brevipalpis*, and *G. swynnertoni*. The several trypanosomes that cause disease in domestic animals are often hard to tell apart, so that no two authorities agree as to how many kinds there are. These animal parasites are transmitted by *G. palpalis*, *G. morsitans*, *G. brevipalpis*, *G. longipalpis*, *G. pallidipes* and *G. tachinoides*. Wild game plays the rôle of reservoir of the virus, as it is apparently but little or not affected by the flagellates, but infects the flies that eventually will carry the disease to the domestic animals.

Tsetse-flies are not merely mechanical transmitters of the trypanosomes of vertebrates, but the flagellates in the flies go through a definite, though wholly asexual, cycle of development, until they produce infective forms known as "metacyclic trypanosomes." The cycle is not the same for all the species of trypanosomes and one may recognize three different types. In one type, represented by the human parasites, *T. gambiense* and *T. rhodesiense*, the cycle starts in the midgut of the fly, but the infection spreads forward to the proboscis, and eventually to the salivary glands where the infective metacyclic trypanosomes are produced, which are injected in the bite by way of the hypopharynx. In the second, which is that of the animal parasites, *T. congolense* and *T. simiac*, the development in the midgut is followed by invasion of the hypopharynx in the proboscis, but not of the salivary glands. In the third, known for the animal parasites, *T. vivax*, *T. uniforme* and *T. caprac*, the whole development occurs in the proboscis, there being no intestinal phase and the infective forms entering the hypopharynx directly.

This bare outline suggests some rather intricate biological relations between the trypanosomes and their tsetse hosts, which naturally raise the question as to whether the flies or the vertebrates were the original hosts of these flagellates. The most generally accepted view is, as Wenyon (1926) states, that the trypanosomes of vertebrates were originally purely insect flagellates which gradually became adapted to the blood medium in the gut when the insects became bloodsuckers. Later the flagellates passed into the vertebrates and became adapted to life in the blood stream. Some cogent arguments can be advanced in support of this view. Flagellates similar or closely related to trypanosomes parasitize many other arthropods, even non-bloodsucking species. Moreover, the trypanosomes seem to do no harm to the tsetses. Yet some other peculiarities seem difficult to understand and will necessitate a number of auxiliary hypotheses if one accepts the theory of the *Glossinac* as original hosts.

In the first place, the trypanosomes are not hereditary in the flies nor can they be transmitted by cysts voided in the faeces. The only manner in which newly hatched tsetses can possibly become infected, is by biting an animal the blood of which contains trypanosomes. We must therefore assume that the ancestors of the living tsetses became infected with their flagellates at an early period in their geological history, when they had other feeding habits or at least were not yet strictly blood-sucking. They could then become infected by absorbing cysts voided by other individuals. Secondly, it is a curious fact that the cycle of development of the pathogenic trypanosomes runs its full course in only a small percentage of any species of tsetse: in the other individuals the trypanosomes ingested with the blood simply disappear. The proportion of flies that may become infective is extremely variable and depends upon a multitude of factors, some of which are not yet properly understood. Under ordinary experimental conditions, not more than 2 to 8 per cent of *G. palpalis* ever become capable of transmitting the human trypanosome, *T. gambiense*, a fact which reduces considerably the danger of man becoming infected with African Sleeping Sickness. Again here, we shall have to suppose that this resistance of the fly to the Protozoon is a later development in the phylogeny of the flagellate infection. It may have been caused by the fly not always being able to absorb, with the blood of the infected vertebrate, the right stage of trypanosome, capable of further development in the insect. Or perhaps some reaction of the vertebrate blood upon the flagellate was involved which gradually rendered the trypanosome better adapted to life in the blood stream than in the intestinal tract of the tsetse. Of course, there are other possibilities too.

The transmission of flagellates by tsetse-flies raises many other interesting questions, which, however, I must leave in abeyance. It is high time for me to conclude, for I have been prowling dangerously near the outer fringes of the entomologist's domain. I fear that the protozoologists will become restless and put up "no-trespassing" signs on their own favorite hunting grounds.

**Dynastes tityus (Scarabaeid) in Pennsylvania and
the Rathvon and Auxer Collections
of Coleoptera.**

By PHILIP P. CALVERT, University of Pennsylvania,
Philadelphia.

(Continued from page 201).

Mr. Jos. S. Wade, in his invaluable *Bibliography of Biographies of Entomologists*,⁷ has cited but two biographies of S. S. Rathvon. One is the very brief notice of his death in the *News* for April, 1891, page 80. The other is by F. W. Goding,⁸ which we have not seen.

The library of the Historical Society of Pennsylvania in Philadelphia, contains at least two other sources of information concerning Rathvon and, as neither these nor Goding's biography are accessible to many entomologists, we summarize them here. The longer account is entitled *Simon S. Rathvon, Ph.D., Lancaster's Oldest Living Devotee of Science* by S. M. Sener, Esq. It is an eight page reprint from *Christian Culture*, but is undated and bears no notation as to the volume number or original pagination; it is accompanied by a wood-cut portrait of Rathvon.⁹ Sener describes himself as a friend and pupil of Rathvon and wrote his account while Rathvon was living; it is likely that he obtained his information at first hand. The other source is an unsigned article in the *Biographical Annals of Lancaster County, Pennsylvania*. Publishers: J. H. Beers & Co., 1903.

Simon Snyder Rathvon was born at Marietta, Lancaster County, Pennsylvania, April 24, 1812, and died in the city of Lancaster, March 19, 1891. As Simon Snyder was Governor of the State from 1808 to 1817, one may conjecture that the infant received his first two names from that circumstance. His parents were Jacob Rathvon, gunsmith, who settled at Marietta in

⁷ *Annals Ent. Soc. Amer.*, xxi, pp. 489-520, Sept., 1928.

⁸ *Penna. State Hortic. Assoc. Official Doc.* no. 4, 3 pp., no date.

⁹ Prof. Carroll has kindly ascertained for me that *Christian Culture* was "A Local Interdenominational Journal, published monthly at No. 9 North Queen St., Lancaster." It was continued for three volumes through the years 1890, '91 and '92. S. M. Sener's paper, quoted above, occurs in Vol. I, No. 10, pp. 7-8. Through Prof. Carroll also, I owe to Mr. Anstaett, librarian of F. & M. College, the information that J. H. Beers & Co. was a Chicago firm.

1810 and died in 1839, and Catharine Myers, of York County, who died at Marietta in 1825. Jacob was the son of John George Rathvon (Dec. 7, 1747-Aug. 7, 1799), a lieutenant in the Pennsylvania militia during the Revolutionary War, and Christine Kraemer (d. July 21, 1799), of Warwick township. John George, in turn, was a son of Christian Rathvon, who, with a brother George, settled in Conestoga township, Lancaster County, in 1740, having emigrated from either southern Germany or Switzerland.

Simon S. Rathvon's formal education was obtained between his seventh and tenth years, at three common schools, where he learned to "read, write and cipher as far as compound division". From 1827 to 1832, he was apprenticed to John Bell, tailor, in his native town. "In 1832 he commenced tailoring on his own accord and subsequently went to Philadelphia but returned to Marietta and carried on his trade there until he removed with his family to this city [*i. e.* Lancaster] and to-day may be seen actively engaged at the bench" (Sener). In 1832 he became a member of a literary society which numbered among its members Prof. S. S. Haldeman, Judge J. J. Libhart and others; it was soon merged into a Lyceum of Natural History with Rathvon as secretary. Sener reproduces some interesting early entomological experiences of Rathvon in the latter's own words and credits Haldeman with giving him his chief stimulus to the study of insects. Referring to Rathvon's acquisition of Haldeman's collection, Sener says "all that remains of the Hentz-Haldeman collection is now in the collection of Dr. Rathvon."

Rathvon's attention was largely directed to the economic side of entomology¹⁰ and he became Professor of Entomology to the State Horticultural Society in 1861, Professor of Entomology to the Philadelphia [correct name, Pennsylvania] Horticultural Society in 1864 and Entomologist to the Lancaster County Agricultural Society in 1869. He was one of the founders of the Linnean Society of Lancaster in 1862, and became its cura-

¹⁰ A list of 29 of his publications in this field, from 1854 to 1880, is given in Samuel Henshaw's *Bibliography of the more important Contributions to American Economic Entomology*, Part V. Washington, Govt. Printing Office, 1896.

tor, treasurer and entomologist. He was in editorial charge of the *Lancaster Farmer* from 1869 to 1884. Franklin and Marshall College gave him the degree of Ph.D. in June, 1878.

On May 27, 1834, he married Catherine Freyberger at Marietta, and had seven sons and four daughters.

Two other entomological collections are in the Franklin and Marshall College Museum, those of Dr. M. W. Raub, comprising North American and exotic Lepidoptera and Coleoptera, and of Samuel Auxer, consisting of Coleoptera, Lepidoptera, Hemiptera, Hymenoptera and Neuroptera. Unfortunately, with the exception of some beetles in the Raub collection marked as from Lancaster, most of these specimens lack locality labels. While visiting the Rathvon Collection, however, I saw a male specimen of *tityus* in a box reposing in another room. It had printed labels "Dynastes Tityus Linn" and "Pa.". This box, Prof. Carroll informs me, was part of the Auxer Collection.

A brief obituary notice of Samuel Auxer (1835-1909) was published in the NEWS for February, 1909, page 96, but some additional information concerning him and his collection has come to me from Mr. Fisher and from Prof. R. C. Schiedt, Emeritus Professor of Biology at Franklin and Marshall, through Prof. Carroll. Mr. Fisher writes:

I was very well acquainted with Samuel Auxer and went collecting with him a number of times. He usually collected between Lancaster and the Susquehanna River near Pequa. He also did some collecting in the Mount Hope region along the South Mountains, Lancaster County. Mr. Auxer usually did not label his specimens, but gave a number to the material collected each time in a certain locality, the numbers corresponding to a number in his note book, where he kept the date, locality and any other important records. After his death Mrs. Auxer asked me to come to Lancaster and look over his library, and we made a thorough search for this note book but it could not be found. It was probably thrown among some trash and carted away, although Mrs. Auxer did not remember seeing it. Mr. Auxer corresponded and exchanged specimens with collectors in all parts of the United States, and since most of his material was unlabeled, it is impossible to determine where the specimens were collected.

Samuel Auxer kept a second-hand book store in Lancaster,

but he had retired from the business before I became acquainted with him. A large number of the books from the store were at his home and were sold after his death. I do not remember Mr. Auxer mentioning anything about Rathvon during any of my visits to his place.

Mr. Ernst Jeheber was also a very good friend of Mr. Auxer, and he was also at Auxer's home helping to straighten out the library and collection. Mrs. Auxer wanted to sell the collection and Jeheber told me he might buy it. Mr. Jeheber was a German tailor and worked at his trade in Lancaster. He was interested in Lepidoptera and had a very nice local collection, mostly in plaster mounts and in almost perfect condition. I went collecting with him a great many times, but in December, 1914, received a letter from him in which he said he was going to [West Point,] New York, and that he would write to me later, but I never received any note from him. In this letter he mentioned that he was selling his entire collection to Mr. [Charles Fred] Grimm, also a German collector, [of 649 St. Joseph St., Lancaster], but this probably referred only to his Lepidoptera collection. It seems certain that Mr. Jeheber bought the collection from Mrs. Auxer for Dr. Schiedt, as Jeheber was not interested in Coleoptera, and he did not have the room to keep the collection or the money to spend on a personal collection, as he had a very large family. I am enclosing Mr. Jeheber's last letter to me as I thought it might be of some interest to you. [Insertions enclosed in square brackets in the preceding account have been taken from this letter. P. P. C.]

Previous to my correspondence with Mr. Fisher, Prof. Carroll had written me that Jeheber bought the Auxer Collection and that Dr. Schiedt bought it from Jeheber.

It is remarkable that, in spite of the extensive and intensive collecting of Coleoptera which has been done in Pennsylvania within the last fifty years, so few specimens of *tityus* have been found, and the rediscovery of this species in the State is a quest worthy to be undertaken by our naturalists. They may find some hints, perhaps, in the late Mr. Manee's account¹¹ of collecting *tityus* in North Carolina. It is to be hoped that Rathvon's collection will be carefully preserved and that some local and enthusiastic entomologist, through antiquarian research, will be able to learn more of the provenance of its specimens than it is now possible to ascertain.

¹¹ Ent. News, xxvi, p. 266, 1915.

On *Tropisternus sublaevis* Lec. and *T. quadristriatus* Horn (Coleoptera: Hydrophilidae).

By H. C. FALL, Tyngsboro, Massachusetts.

Of the above-named species, *T. (Hydrophilus) sublaevis* was described by Le Conte in 1855 from Nebraska and Georgia. There are at present in the Le Conte Collection two Nebraska specimens (♂ ♀), but none from Georgia, and this was the case thirty years ago when I first examined the Le Conte types. *T. quadristriatus* was described by Horn in 1871 from specimens collected "near the seacoast of New Jersey." A few years later (1874) this species was suppressed by Horn himself as identical with *sublaevis* Lec.

Just what became of the Georgia specimen of *sublaevis* mentioned by Le Conte is unknown to me. I had suspected that between 1871 and 1874, in accordance with a custom prevailing with Le Conte and Horn of sharing their material, the Georgia specimen was turned over to Horn and led him to pronounce his species the same as that of Le Conte. On inquiring of Mr. Liebeck he informs me that there is only a single example each of *quadristriatus* and *sublaevis* in the Horn collection, the former bearing a "N. J." label, the latter without indication of locality but with a small square on the pin bearing the number "10" as though sent by some correspondent for determination. I think it unlikely that this is the Georgia specimen of Le Conte, but whether so or not, it is identical with the one on the *quadristriatus* label.

In 1902, August 10-12, Mr. Frederick Blanchard and the writer collected at Marion, Massachusetts, on the shore of Buzzard's Bay. From brackish pools near the shore line we took specimens of a *Tropisternus*, which from the similarity of localities we judged correctly to be the *quadristriatus* of Horn. A day or two later I compared these Marion specimens with the Nebraska types of *sublaevis* and satisfied myself that they were specifically distinct, a result which might reasonably be anticipated when the remoteness and difference of habitat conditions are considered.

Some eight or nine years ago I received from M. d'Orchymont a letter of inquiry concerning certain of our species of *Tropisternus*. In reply I sent him among others a specimen of

the Marion *quadristriatus* and expressed the opinion that Horn had been in error in uniting the species with *sublaevis*. This opinion is reflected in d'Orchymont's paper of 1922,¹ where he gives both *quadristriatus* and *sublaevis* a place in his table, though admitting his uncertainty as to the precise status or position of the latter. In reality *sublaevis* is out of place in d'Orchymont's table where it stands with a question mark next to *quadristriatus*, its true position being with those species having the pubescent area of the hind femur very small. As a matter of fact *sublaevis* by this table runs directly to *xanthopus* Sharp, with which I have no doubt whatever of its identity, *sublaevis*, of course, being the older name. In this connection d'Orchymont's remark that he received from the British Museum specimens identified by Sharp as *sublaevis*, and that they proved to be *xanthopus*, is interesting and significant.

So far as *sublaevis* and *quadristriatus* are concerned there are two characters by which they may be definitely separated, one, however, requiring the presence of males.

Pubescent area of hind femur very small, confined to the extreme base; sternal keel nearly or quite smooth in both sexes	<i>sublaevis</i>
Pubescent area of hind femur comparatively large, occupying fully the basal third; sternal keel with numerous moderately coarse punctures in the male, nearly smooth in the female, except at the basal declivity.....	<i>quadristriatus</i>

Sublaevis is represented in my collection by specimens from El Paso, Texas and Albuquerque, New Mexico, and I have seen specimens from Denver, Colorado, sent me for identification by Mr. Liebeck. M. d'Orchymont has seen two examples from California and four of somewhat larger size from Texas, all being identified as *xanthopus*.

Of *quadristriatus* my only representatives are those taken as above noted at Marion, Massachusetts. This species is probably restricted to the near vicinity of the Atlantic coast line, and may or may not be confined to the more or less brackish waters of that region. There can be no doubt I think that Le Conte's original Georgia *sublaevis* belonged to the present species.

¹Le Genre *Tropisternus* II. Annals de la Société Entomologique de Belgique, LXII, 1922.

And now a word as to *T. glaber* Herbst. As is well explained by d'Orchymont in the paper above referred to, there are now no specimens in European collections which can be fixed upon as the original types of Herbst, or that can safely be assumed to be the equivalent thereof. The *glaber* of Le Conte may or may not be the same as that of Herbst, but in any case there would seem now to be no better course than to consider it as representative of the species. The question then is just what is the *glaber* of Le Conte? The Le Conte series, as I have myself observed, looks complex; it probably comprises two and possibly more species. D'Orchymont has already described one new species (*blatchleyi*) at the expense of *glaber*.

Le Conte did not label his types as such; it has been customary, however, in dealing with his collection to consider the specimen on the name label as the type, provided it agreed with his description, and in the case of *glaber* I have noted that this agreement exists.

As the result of a critical survey of the specimens in my collection hitherto assigned to *glaber*, I have sorted them into four series, each possessing a combination of characters differing in some respects from each of the others. To one of these groups—my no. "3"—Le Conte's type is assignable; I am, however, not yet prepared to assert anything as to the constancy or significance of the differences observed in my limited material. Further study with additional specimens may permit the drawing of some definite conclusions.

The National Museum of Costa Rica.

On March 8, 1930, Professor J. Fidel Tristán was appointed Director of the Museo Nacional de Costa Rica, at San José, after he had served for thirty years as professor in the colleges of San José as well as Director of the Colegio de Señoritas and of the Liceo de Costa Rica. Professor Anastasio Alfaro is Chief of the Zoological Department. Owing to the economic situation of the country, the Museo has suffered for a long time. It is now hoped to revivify it.

XI International Congress of Zoology.

The X. International Congress of Zoology (Budapest 1927), accepting the invitation of the Italian Government, unanimously decided to hold its XI. Session in Padua 4-11 September, 1930, under the chairmanship of Prof. Paolo Enriques, Director of the Institute of Zoology, Comparative Anatomy and Physiology in the Royal University.

We have the honour to invite all Zoologists and the friends of Zoology to be present at this International Congress.

Prof. PAOLO ENRIQUES, President of the Congress; Prof. GIANNINO FERRARI, Rector of the University; Count FRANCESCO GIUSTI, Mayor of Padua.

Applications for membership should be sent by registered post, if possible, to; Prof. PAOLO ENRIQUES Congresso Zoologia, Via Loredan 6, Padova (Italy) together with fee, 100 lire (cheques should be made payable to "Banca Commerciale Italiana Padova, Presidente Congresso Zoologia"). Fee may also be sent directly to the Bank (to the above mentioned account). The membership-card will be sent as a receipt. There will be a section for Entomology.

The Rocky Mountain Conference of Entomologists.

The seventh annual meeting of the Rocky Mountain Conference of Entomologists will be held in Pingree Park, Colorado, August 18 to 23 inclusive. As in the past the meeting will be held at the Colorado Agricultural College Forestry Lodge and will be planned that all members of the family may attend and enjoy themselves. The sessions for papers will be informal with ample time for discussion. We will be pleased to have subjects of papers at an early date. To those that have not attended any of the previous meetings it might be said that bedding and meals are furnished at a prorated cost that has always been reasonable. Since the meeting place is more than 50 miles from Fort Collins, the nearest source of supplies, it is important that those arranging for the care of the crowd know in advance just how many expect to attend. Transportation to the park will be available for those not having their own cars. A later notice giving more of the final details of arrangements will be sent to those indicating that they may attend. A card to the Secretary will bring you this later notice.

GEORGE M. LIST, Secretary—Fort Collins, Colorado.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF
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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

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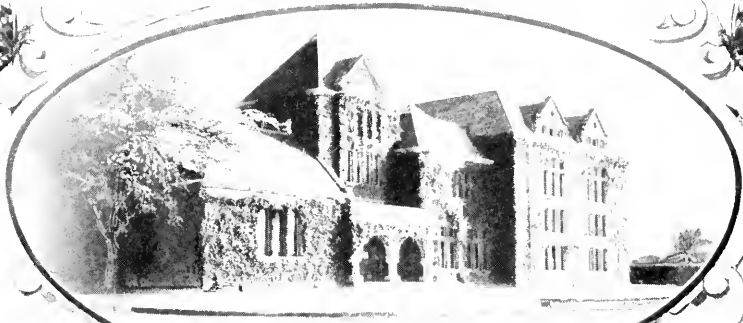
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North American Institutions Featuring Lepidoptera.

XVII. Bishop Museum, Honolulu, T.H.

By J. D. GUNDER, Pasadena, California.

(Plates XXI-XXIII).

The Bernice P. Bishop Museum of Honolulu was founded by Charles Reed Bishop in memory of his wife, Princess Bernice Pauahi Bishop, who was the last of the royal descendants of Kamehameha I, the great native king of the Hawaiian Islands. From a single room, erected in 1889, the Museum has grown, until now it includes a large stone building (see Plate XXI) containing six exhibition halls and two three-story concrete buildings which house the offices and scientific study collections. Another large stone building, at present occupied by the Kamehameha Schools, in whose grounds the Institution is situated, will be used for future exhibitions.

The Museum is devoted solely to the study of the Polynesian peoples and the natural history of the islands of the Pacific and its halls are open daily to the public without charge. In addition to a large attendance of tourists and island residents, several thousands of school children are brought by classes each year to view the exhibits. The study collections and excellent library are always available to scientists and others interested in the various subjects represented.

The collections include one of the largest and certainly finest series of objects illustrating the life, customs and beliefs of the Polynesians in the world. Of natural history specimens there are splendid bird collections, a few mammals, reptiles and marine invertebrates, a representative collection of fish, and a very extensive collection of mollusks, including over 900,000 pulmonates or land shells. The herbarium contains a valuable and rapidly growing collection of plants from the Pacific Islands and neighboring tropical regions.

Regarding the insect collections. Since the time of the early

Pacific explorers the insects of Hawaii and other isolated Pacific island groups have attracted the attention of entomologists. Because of isolation and varying environmental conditions, these Islands contain a very unique and specialized insect fauna. The interesting specimens, and many of them were unique, which found their way to Europe as the result of the first explorers, or in the case of Hawaii of the early collection made by Rev. Thomas Blackburn, aroused a very considerable interest. Certain exploring expeditions were sent out to this region, notably that of Dr. R. C. Perkins to Hawaii. Perkins collected about a hundred thousand specimens on which material the splendid "Fauna Hawaiiensis" was based. Also, the presence of Dr. Perkins in the Islands at the time of a severe sugar leafhopper outbreak, led eventually to the control of this and other pests, and to the establishment in Hawaii of several entomological laboratories, notably those of the Hawaii Sugar Planters' Association. The residence of these entomologists and their organization into the Hawaiian Entomological Society¹ has caused the insect fauna of Hawaii to be better known than that of any other similar island region in the world, and has made Hawaii famous for its successful control of insect pests by natural enemies.

Portions of the insect groups collected by Perkins are now in the Bishop Museum and many specimens taken by other entomologists in the Islands have also been placed there, making the Museum's collection as a whole one of the best reference collections of Hawaiian insects. In 1915 the Museum acquired Richard Helm's material of some 22,000 specimens from Australia and New Zeland. The late W. M. Giffard has contributed several valuable collections from Hawaii, Samoa and the Solomon Islands. Several expeditions have secured specimens in many of the South Pacific Island groups. There are loan collections from Australia, Fiji, Japan, China, Guam, Southern Asia, Africa and North America. The col-

¹ Several members of the Hawaiian Entomological Society are shown on plate XXIII. Mr. W. M. Giffard has since passed away. I am sorry that F. Muir, C. E. Pemberton, L. A. Whitney and R. H. Van Zwaluwenburg were absent when the picture was taken.



Tinostoma smaragdita
Meyrick



Omiodes blackburni
Butler



Feltia dislocata
Walker



Lyeaena blackburni Tully



Scotorythra paludicola
Butler



Vanessa tammenea Esch.



Plusia peryllota
Meyrick



Eriopygaes eucledias
Meyrick



Hyopcala velans Walker



Agrotis cinetipennis
Butler



THE HAWAIIAN ENTOMOLOGICAL SOCIETY

F. X. Williams, E. H. Bryan, Jr., D. T. Fullaway, E. M. Ehrhorn, F. C. Hadden, G. P. Wilder, J. F. Illingworth, H. F. Willard, W. M. Giffard, J. S. Rosa, O. H. Swezey, A. C. Mason

lections from Samoa were combined with those made by Buxton and Hopkins in the preparation of "Insects of Samoa" published by the British Museum.

At the present time an Entomological Survey of the Pacific Islands is being conducted jointly by the Bishop Museum and the Hawaiian Sugar Planters' Association. Two collectors have been in the field for over a year and extensive series of specimens have been secured in Tahiti and in the Marquesas Islands. These will be placed in the Museum and field work is being continued to include all other island groups.

Plate XXI shows the commodious entomological room where the collections are stored. There are eight 28-drawer and four 30-drawer steel cabinets housing the various insect orders, in addition to some 300 Schmitt boxes. The Lepidoptera of Hawaii occupies 31 drawers, while 7 drawers are devoted to those of the South Sea Islands and 14 to the Australian collections. There are only two butterflies native to Hawaii; one a *Vanessa* and the other a *Lycuena*, both of which are shown on Plate XXII. A number of moths are also extremely local. Probably the most noteworthy is the famous green Sphinx, *Tinostoma smaragdita* Meyk. This unique example is in the British Museum. At considerable expense and upon two separate occasions, Dr. P. B. Clark of Boston had August Kische, of San Francisco, visit the type locality, but without success. It seems that the remote district and the time of year when specimens should be found are against the strength of the average collector. I wonder that my friend F. X. Williams, of Honolulu, doesn't try to dig this thing up? They would probably be worth their actual weight in gold.

In 1907 Mr. Otto Swezey was appointed Honorary Curator of Entomology at the Museum and he has since become Consulting Entomologist. Through his efforts and those of other workers, the insect collections are well arranged and classified. Mr. Swezey was born in Rockford, Illinois, on June 7, 1869, obtaining his A.B. at the Lake Forest College and his M.S. at Northwestern University. He has been in the Islands since August 12, 1904, and his entomological papers have, for the most part, been published in the Bulletins of the Experiment

Station, H.S.P.A. and in the Proceedings of the Hawaiian Entomological Society. He is well known for his work on the study and control of sugar cane pests and the biological control methods used, *i.e.* the introduction of natural enemies. The problems have largely been those of combating the leaf-hopper, weevil borer and the root-grub. Just at present Mr. Swezey is much interested in the study of the insect fauna of the native forests and their welfare from an entomological standpoint. The Agricultural Station of the H.S.P.A. has about sixty persons on its staff, of which seven are employed in the Department of Entomology. The Station is in the residence district of Honolulu, about two miles from the water front and occupies some seven acres of grounds laid out in experimental cane-plots, etc. There are five main buildings with about thirty rooms and laboratories. Mr. Swezey spends practically all of his time at the Station, except one half day a week which he devotes to the work on insects at the Bishop Museum.

I am indebted to Mr. E. H. Bryan, Jr., Curator of the Museum, and to Mr. Otto Swezey as well for much of the information contained in this article. The Lepidoptera shown on the plate were loaned to me for photographic reproduction by the Museum through the courtesy of Mr. Swezey. By the way, if any entomologist wants an interesting vacation, plus unusual collecting, go to Honolulu. (And don't forget to try for the Green Sphinx!). The "boys" over there give visitors a real welcome and offer every hospitality.

Emendatory Notes on the "Handbook of North American Dragonflies" (Odonata).

By JAMES G. NEEDHAM, Cornell University, Ithaca, New York.

An *errata* sheet for the *Handbook of Dragonflies of North America* (Springfield, 1929) was printed and before the end of 1929 was mailed to all purchasers of the volume, insofar as these could be located. Among the errors, mostly verbal and typographical, there were half a dozen of importance, and likely to mislead the user of the *Handbook*, and I desire to call atten-

tion to them here for the benefit of any who may have been missed in the distribution of the *errata* sheets.

Most serious were three transpositions of names on the figures: *Gomphus furcifer* and *G. villosipes* on p. 116; *Somatochlora septentrionalis* on p. 195, and *S. whitthousei* on p. 196; and *Lestes vidua* and *L. forcipatus* on p. 278.

There are two keys in which the numerals at the right hand margin got disarranged. In the key to the species of *Ophiogomphus* on p. 68, 10 at the right margin should be 13, and 8 should be 11. And in the key to the species of *Sympetrum* on page 232 in the same margin, 8 should be 6, 6 should be 10, and 10 should be 8.

The statement on p. 310 that "The nymphs of none of our American species [of *Coenagrion*] have as yet been made known" was a clear oversight. References should instead have been made to Walker's account of the nymph of *Coenagrion resolutum* in *Canad. Ent.* 46: 353, 1914.

These errors, and all others hitherto discovered, will be corrected in a second printing, soon to be made.

One species was omitted that should have been included, and one was included that should have been omitted.

I overlooked a record by Dr. Calvert in *Biologia Centrali Americana; Neuroptera*, p. 225 of the occurrence of *Micrathyria hagenii* Kirby at Esperanza Ranch near Brownsville, Texas. This Neotropical genus has not elsewhere been reported from the United States. It will run out in the key to genera of Libellulinae to *Erythrodiplax* on page 202, but will be distinguishable from that genus by the possession of an extra (more than the one always present) crossvein above the bridge. Its nymph is still unknown.

I included *Tramea virginia* Rambur, not because of its name, nor for the sake of disagreeing with the opinion of my friend, Dr. Ris, but because I thought that such a strong-flying species might possibly have been taken on our coast. But I have since examined a good many collections of dragonflies from China, and have found this species in every one of them; and I now feel sure, that a species, taken by every collector in the Orient,

would have been taken again here by some one since Rambur's time if it were a member of our fauna. I think, therefore, that it should have been omitted.

The restoration of the name *Cannacria* and the suppression of *Brachymesia* should perhaps have a word of explanation. The former name was based on *C. batesi* Kirby,¹ and later *C. gravida* Calvert was properly associated with it. *Brachymesia* was based on *Erythemis furcata* Hagen, and was monotypic. Then these three species were lumped together, improperly in my judgment, under the name *Brachymesia*, that name having page precedence over *Cannacria*.

Cannacria batesi and *C. gravida* are closely allied species and *E. furcata* is very different. The former are slender brown species, rather narrow-winged and with slender parallel-sided abdomen; the last named is a stocky red species with slowly tapering abdomen and with much broader hind wings. Some of the differences may be tabulated as follows:

Characters	<i>E. furcata</i>	<i>C. batesi</i> and <i>C. gravida</i>
Abdomen	stouter, regularly tapering	long and slender, more contracted on 3
Its base	hardly inflated	much inflated
Segment 8	2/3 of 9 + 10	as long as 9 + 10
♂ superior appendages	with tapered tips	with inflated tips
Length of hind wing	less than three times its width	more than three times its width
Its breadth increasing proximally	to the hind angle	to level of tip of Cu ₂

There are other minor venational differences in *E. furcata* such as fewer antenodal crossveins, and an anal area in the hind wing filled with more elongate cells in less regular rows.

These differences lead us to restore the generic name *Cannacria* for the two species that were formerly placed in it. What

¹ This name should have been replaced by *C. herbida* (Gundlach), *teste* Calvert, Trans. Amer. Ent. Soc. 45: 365-366, the latter name having priority.

to do with the third species was then the question. In most respects it is very like *Sympetrum*. Indeed it is a less aberrant member of that genus than are others that are regularly placed in it: less aberrant than the North American *S. corruptum* and *S. illotum* and far less than the Holoarctic *S. pedemontanum*, or the East Asian *S. uniforme*. The superior appendages of the male are almost identical in form with those of *S. kunckeli*, and are very like those of *S. ardens*, *S. eroticum*, *S. parvulum* and *S. ignotum*. The tip of the inferior appendages is less widely notched than in *S. ruptum*. The anterior lamina of the second segment is not higher or more deeply notched than in *S. anomalum*. Finding so much agreement with the various members of *Sympetrum* (a genus that the splitters may have inadvertently overlooked hitherto) we put it in that genus.² It seems to exhibit no characters that are not shown among the species of that genus.

All the bibliographers, including ourselves, have overlooked one publication in which appears a photographic figure of the so-called *Cannacria furcata*: *The Common Dragonflies about Kansas City*, by Beth Boright, *The Nautilus*,³ 3:30, 1899, Plate I, fig. 17. The specimen shown in that figure, collected in a park at Kansas City, Missouri, is now in the Cornell University collection by gift of Dr. Merrill.

Two reviewers have found much fault with the incompleteness of our distribution data. We stated in our Introduction (page 47) that "For the convenience of the user distribution and size are condensed to a single line at the head of each description; and both are stated broadly." Completeness was not aimed at. We are not able to understand why similar criticism was not made of our statement of size, for we gave only one measurement.

Our treatment of the genus *Leucorrhinia* suffered from lack of material for study. We had plenty of specimens of *L. intacta* but not any other species; and of *L. borealis* we were not able to obtain any. Even yet an adequate description of that species is lacking in our literature.

² Kennedy has recently (*Science* 70:504, 1929) gone out of his way to proclaim how near he once came to putting it where it belongs.

³ A Kansas City Manual Training High School publication.

An European Plant-bug (*Amblytylus nasutus* Kirschbaum) recognized from Massachusetts (Hemiptera, Miridae).*

By HARRY H. KNIGHT, Ames, Iowa.

Recently the writer received a small lot of Hemiptera for determination from Mr. C. W. Johnson, of the Boston Society of Natural History. Among the Miridae collected on Nantucket Island, Massachusetts, I find three specimens of the European species, *Amblytylus nasutus* Kirschbaum, not before correctly recorded from this country. These specimens, two males and a female, were taken July 27, 1928, by Mr. Johnson in "Hidden forest", at Polpis, near the eastern end of the island.

Blatchley (Jour. N. Y. Ent. Soc., xxxvi, 1928, p. 15) has reported *Amblytylus* from Indiana, following the recognition of the genus by Mr. Van Duzee. Blatchley reviews the generic characters of *Amblytylus* and concludes with this statement: "A half dozen or so species are known from southern Europe, and the first one taken in this country is herewith described". Unfortunately he gives it a new name, *Amblytylus vanduzeei* n. sp., without further consideration of which European species it might represent. His description, as far as it goes, fits *nasutus* Kirschb. perfectly, and I am convinced his specimens represent the same species as that taken on Nantucket Island by Mr. Johnson.

For comparison and study the writer has a small series of specimens from England and from various parts of Germany, some of which came named as *affinis* Fieb. and some as *nasutus* Kirschb. I have been unable to recognize more than one species in this material, hence I have given considerable study to all the descriptions given under these names, trying to find characters that would separate *affinis* Fieb. from *nasutus* Kirschb.

Fieber (1864) in his original description for *affinis*, makes only one comparison with *nasutus* Kbm., namely: "Ist bei *Amblytylus nasutus* Kbm. einzureihen, von welchem ihn die anders gezeichnete Membran sogleich unterscheidet."

* Contribution from the Department of Zoology and Entomology, Iowa State College, Ames.

Douglas and Scott (1865) sent a British specimen to Fieber for determination and received it back with the name *Amblytylus affinis* Fieb. attached, also the following note: "Allied to *Amblytylus nasutus*, but with different markings on the membrane." Fieber also compares *affinis* with species in allied genera which is of no significance here.

Reuter (1879) in his great work on the European Miridae gives a key for the species of *Amblytylus* and would separate our forms as follows:

- 4 (5) Dorsum abdominis concolor. Pallidior
nasutus Kirschb.
 5 (4) Dorsum abdominis nigrum. Color multo obscurior.
affinis Fieb.
Hemelytra inter venas late fusco-colorata

Saunders (1892) describes *affinis* Fieb. and states: "In the ♀ the entire insect is generally ochreous, in the ♂ the abdomen is black above. Dr. Reuter gives this character to both sexes, but in all my females the abdomen is pale above except at the extreme base."

The writer's examination of specimens reveals the same condition reported by Saunders. I also find that the membrane markings vary in intensity, the males generally darker although some males are light in color as is usual for the female. The male genital structures are identical for all specimens examined, both light and dark colored males included.

Reuter (1879) in his description of *affinis*, states that the rostrum is shorter, attaining base of fourth ventral segment, whereas, for *nasutus* Kbm., attaining middle of venter. I do not believe this statement is significant since the fourth ventral segment is rather near the middle of venter. I am unable to find any difference in length of rostrum among the specimens at hand. Without wasting further time and space I will conclude by giving the synonymy as follows:

AMBLYTYLUS NASUTUS Kirschbaum.

1855 *Lopus nasutus* Kirschbaum, Jahrb. Ver. Nat. Herz. Nassau, x, p. 281; (Sept.) Rhyn. v. Wiesb., Caps., p. 121.

1860 *Capsus (Capsus) nasutus* Flor, Rhyn. Livlands, I, p. 552.

- 1861 *Amblytylus nasutus* Fieber, Eur. Hemiptera, p. 319.
 1864 *Amblytylus affinis* Fieber, Wien. ent. Monatschr., viii, p. 332.
 1865 *Amblytylus affinis* Douglas & Scott, Brit. Hemiptera, p. 389.
 1875 *Amblytylus nasutus* Reuter, Rev. Crit. Caps., (ii), p. 148; Acta Soc. Faun. Fl. Fenn., I, p. 164.
 1875 *Amblytylus affinis* Saunders, Trans. Ent. Soc. London, 1875, p. 298.
 1879 *Amblytylus nasutus* Reuter, Hem. Gymn. Eur., II, p. 211, pl. 3, fig. 1.
 1879 *Amblytylus affinis* Reuter, Hem. Gymn. Eur., II, p. 212, pl. 3, fig. 2.
 1883 *Amblytylus nasutus* Reuter, Hem. Gymn. Eur., III, p. 535. (Key).
 1883 *Amblytylus affinis* Reuter, Hem. Gymn. Eur., III, p. 535.
 1892 *Amblytylus affinis* Saunders, Hem. Heterop. Brit. Is., p. 305.
 1909 *Amblytylus affinis* Oshanin, Verz. Palaearkt. Hemip., I, p. 881.
 1909 *Amblytylus nasutus* Oshanin, Verz. Palaearkt. Hemip., I, p. 881.
 1910 *Amblytylus nasutus* Hübner, Jahreshefte d. Vereins f. vaterl. Naturkunde in Württ., 66, p. 257.
 1910 *Amblytylus affinis* Hübner, Jahreshefte d. Vereins f. vaterl. Naturkunde in Württ., 66, p. 259.
 1929 *Amblytylus vanduzeei* Blatchley, Jour. N. Y. Ent. Soc., xxxvi, p. 15.

The Night Flight of Diurnal Butterflies (Lepid.).

By KENNETH J. HAYWARD, F.E.S., F.R.G.S., English Club,
Buenos Aires.

Mr. Harold O'Byrne's article on page 20 of the January issue of the ENTOMOLOGICAL NEWS (Vol. XLI) led me to look up my own records of a similar nature and I was surprised at the number that had accumulated in the last dozen years.

I have not seen Scudder's "Frail Children of the Air" and am not therefore in a position to comment on his records of night flights of butterflies mentioned in that book, but I cannot agree with Mr. O'Byrne that records in which only the name of the species, date and time of the nocturnal flight, and

possibly some additional irrelevant details, are given, are of any scientific value. To have value they must contain also details of atmospheric conditions prevailing at the time of flight, and should in every case be accompanied by the observer's opinion of the possible or probable cause of the unusual time of flight. I regret that in the records I add below, the most essential data, those concerning climatic conditions, will be found wanting, since I have never considered any of the instances quoted of sufficient scientific interest to do more than briefly note them in my day books.

Frankly, I do not see that much is to be gained by the collection of data on isolated night flights of recognised day-flying, sun-loving, butterflies. In this connection I do not include certain shade-loving, dusk-flying groups whose habits need special study to clear up the question of whether they habitually fly during any portion of the night.

How frequently does one disturb a confirmed night flying moth during one's daily round and cause it to fly, albeit unwillingly. Surely the same thing must happen to day-flying butterflies at night. Disturbed from their resting places by moving animal life, or by some action of the elements, they have, as the moths we disturb by day, but one alternative, they must fall to the ground or fly, and, if sufficiently awake, instinct will suggest the use of wings. That one so seldom sees this happen is due to varying causes. To the fact that we do not normally move about at night in the haunts where butterflies sleep and if we do the darkness prevents our seeing the butterflies should they fly, and undoubtedly to the fact also that the butterflies, being for the most part small-bodied, are able more effectively to cling to their grass stems or to the leaves that shelter them than the heavy-bodied moths. Butterflies that are seen indoors at night flying round the lights do not come within the scope of any study such as is suggested, unless they have entered after dark from without. For the most part they are insects that have entered in search of dry shelter during the daylight hours and doubtless mistake the brightness for daylight. Nor do the two records quoted by Scudder of quantities of *Eugonia j-album* and *A. plexippus* flying at night round the lighthouses on Nantucket Island and Lake Ontario belong here; they belong rather to the study of insect migration.

Since however more records are asked for, I add my own, though I do not see that they can be of any great value without the essential data which I cannot give.

End of July or early August, 1919. *Vanessa urticae* L. entered a lighted room at Bruton (Somerset) England about 10-11 p.m. An insect that had almost certainly been disturbed from its roosting place amongst the woodwork of the window shades where they could be commonly found.

Feb. 19, 1920. *Gegenes nostradamus* F. entered my light trap at Reservoir (near Aswan) Upper Egypt. I have several times found species of *Grypocera* at light and refrain from comment.

June 22nd, 1920. *Colias croceus* Fourcr. (*edusa* L.) entered my light trap at Reservoir sometime after 11 p.m. Undoubtedly disturbed by some night-prowling animal from the berseem (alfalfa) that grew directly before and very close to my light.

Oct. 10, 1920. *Parnara mathias* F. Found flying at light at Maadi (just outside of Cairo). The insect was at that time fairly common all round the house.

June 30, 1921. *Dryas pandora* Schiff. At the outside lights of an hotel above Platres, Cyprus. The hotel was right amongst the pine forests where *pandora* was flying commonly. Platres is on the Southern, or Troödos, range at about 4000 feet.

Oct. 6th, 1921. Another *C. croceus* entered the trap at Reservoir at about 10 p.m. after flying about blindly for several minutes. It approached from the direction of the berseem and had without doubt been disturbed.

Nov. 20th, 1921. This time a *Pyrameis cardui* L. entered the trap. A very common butterfly that usually slept amongst the berseem.

Nov. 5th, 1923. *Eunica tatila* H-S. and *Glutophrissa drusilla* Hbn. flew aboard ship off the Brazilian coast between 7 and 10 p.m. during a heavy rainstorm with strong southerly gale. At the same time a very large number of night-flying moths and some other insects arrived and all had probably been blown out by the violence of the wind.

Nov. 9th, 1923. *Pyrameis huntera* F., f. *brasiliensis* Moore flew aboard ship off the southern Brazilian coast, arriving about 11 p.m.

May 1st, 1924. *Colias lesbia* was flying on my lighted verandah. There was alfalfa growing within 100 yards (Villa Ana, Prov. Santa Fé).

May 28th, 1924. Another *Colias lesbia* sought shelter from a tropical downpour of great violence. How it managed to struggle through the rain after being swept from its shelter is another matter. Probably many essayed the task and were beaten to the ground.

Sept. 9th, 1924. Yet another *Colias lesbia*, a male, flew to my verandah light.

Dec. 29th, 1925. A specimen of *P. huntera*, f. *brasiliensis* came to light. A common insect that has a habit of sleeping under eaves and such like places and may possibly have been disturbed from a few feet from the light.

Jan. 29th, 1927. A small unidentified *Thecla*, which was common around a tall bush before my house at that time, was seen sitting on the wall beneath the outside light. There is no doubt that it had arrived after dark.

The above records from May 1st, 1924, till Jan. 29th, 1927, both inclusive, were made at Villa Ana in the Province of Santa Fé in the Argentine Republic.

Feb. 17th, 1929. A female *Euptoicta claudia* Cr., s. sp. *hortensia* Blanch. was flying around a coloured cabaret sign in Calle Maipú, in the centre of Buenos Aires, at 10.30 p.m.

I add a record that would be more in place under the heading "The Day Flight of Nocturnal Moths".

July 28th, 1921. On the southern range of the Island of Cyprus, between Platres and Troödos, I captured, at about 12.30 p.m., a specimen of *Hippotion celerio* L. that in the bright sunlight of a small forest glade by the side of a stream was flitting from flower to flower, feeding a little at each, and apparently quite oblivious to the fact that it had come from its resting place some seven hours too early.

A Synopsis of the Genus *Macromeigenia* Including the Description of One New Species

(Diptera : Tachinidae).

By H. J. REINHARD, College Station, Texas.

The genus *Macromeigenia* was established by Brauer and Bergenstamm¹ with *Tachina chrysoprocta* Wied. as the type and sole species. Wiedemann's description does not mention the source of his type series but his species is not uncommon in the northeastern section of the United States. In 1921, I described *friocensis*² a closely related form but referred it to the genus *Ernestia*. Subsequently Dr. J. M. Aldrich sent me a specimen of *chrysoprocta*, and from a comparison of the two species it appears that *friocensis* is congeneric although quite distinct specifically. A third apparently undescribed species, also from Texas, is herein referred to the genus and a key to the species given below.

¹ Zweifl. d. Kaiserl. Mus., Vol. 5, 1891, p. 311.

² Annals Entomological Society of America, Vol. 14, 1921, p. 329.

Key to species of Macromeigenia.

1. Sides of front and face golden; apex of abdomen yellow.
chrysoprocta Wiedemann.
- Sides of front and face gray; apex of abdomen black...2
2. Arista slender on apical half; third antennal joint of ordinary length; costal spine usually distinct.
frioensis Reinhard.
- Arista thickened almost to tip; third antennal joint unusually long; costal spine absent.....*ovcuii*, new species.

MACROMEIGENIA CHRYSOPROCTA Wiedemann.

Tachina chrysoprocta Wied. Auss. Zweifl., Vol. 2, 1830, p. 309.

Macromeigenia chrysoprocta B.&B. Zweifl. d. Kaiserl., Mus., Vol. 5, 1891, p. 311.

Although this species has not been reported from the Southwest, it ranges southward to Virginia, South Carolina, and Georgia. Two specimens are in my collection, one female from Tennessee taken June 12, 1922, without collector's label; and one male from Maryland collected on flowers of *Daucus*, August 14, by Dr. C. H. T. Townsend. The species may be instantly recognized by the striking golden front and face and needs no further description.

MACROMEIGENIA FRIOENSIS Reinhard.

Ernstia frioensis Rein. Ann. Ent. Soc. Am., Vol. 14, 1921, p. 329.

The type locality is Frio County, Texas. Fourteen additional specimens including both sexes have since been received from the following localities, all in the western part of the State: Presidio, Marathon, Barstow, Balmorhea, Menard, and Spur. This series is rather uniform in size ranging from 7 to 9 mm. in length.

The female differs from the male in having the third antennal joint narrower and yellow near base, the pulvilli short, eyes less hairy, and the usual orbital bristles present. The front is only slightly wider, by micrometer 0.368 of the head width as compared with 0.350 in male (average of five in both). Genital segments short and retracted with no piercer present.

In the male the posterior forceps are keeled behind near base, divided and divergent beyond the middle, with the tips blunt and broadly rounded on the posterior extremity; outer forceps about as long as inner, basal part raised along the middle, tapering uniformly to tips which are rather pointed.

These items with the original description cover the essential details of the species.

Macromeigenia owenii, n. sp.

Male: Front at vertex 0.381 of head width in the one specimen, projecting prominently below; face of unusual length and strongly receding, rather narrowly and very deeply excavated with the ridges practically parallel on entire length, bare except a few bristles next to vibrissae, which are situated close to mouth; eyes rather small, densely hairy; parafrontals and sides of face with dense plumbeous pollen, thinner on cheeks so that the yellow ground color is apparent on upper part in certain angles; median stripe blackish, before triangle about equal to width of parafrontal which widens rapidly downward; one pair (inner) verticals developed; ocellars present, proclinate; frontals about 8 in number, the uppermost two stout and reclinate but not very long, below antennae the rows strongly divergent extending to level of arista; parafrontals with numerous bristly hairs extending downward almost to middle of face; parafacial bare on lower half, not narrowed downward, about equal the width of facial depression; antennae of enormous length, basal joints yellow, third black except at base, about eight times longer than second; arista black, thickened almost to tip, basal joints short but distinct; cheeks one-half the eye height; proboscis short, moderately stout, labella fleshy; palpi yellow, slender to tip, with a few long hairs on lower edge; posterior orbits broad below narrowed toward vertex; occiput with two rows of bristles above and rather dense fine pale hairs beneath.

Thorax cinereous, when viewed from behind the dorsum shows four black stripes in front and five behind, the median one not extending in front of suture; scutellum reddish at apex, also covered with dense cinereous pollen, which appears somewhat thinner on middle of disk in a flat rear view. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; humeral 4; post-humeral 3 (anterior and posterior ones small); presutural 2; notopleural 2; supraalar 3; intraalar 3; postalar 2; preopleural 1; sternopleural 2, 1; scutellum with one discal, three large lateral and a smaller decussate apical pair; postscutellum normal; infrascapular hairs absent; calypters semitransparent, white.

Abdomen black, much longer than broad and rather thick to apex; dorsum entirely covered with changeable cinereous pollen which has a brownish tinge on hind margins of the intermediate segments; the latter each with a pair of discal, besides a median marginal pair on second and a marginal row on third; first segment with a smallish median marginal pair; fourth with discal and marginal rows; genital segments black, of ordinary

size; fifth sternite deeply divided with a V-shaped incision, the lobes black.

Legs black, mid tibia with one bristle near middle of outer front side; hind tibia subciliate on outer posterior edge with one long bristle near middle; claws and pulvilli elongate.

Wings hyaline; no costal spine; veins yellowish, bare except third which has two setules at base; fourth vein with a rounded obtuse bend without stump, joining the third at costa and closing the first posterior cell well before apex of wing; tip of hind cross vein much nearer to bend than small cross vein; last section of fifth vein short.

Length, 10 mm.

Described from one male specimen collected at Presidio, TEXAS, September 9, 1928, by W. L. Owen, Jr., for whom the species is named.

Type: Male, Cat. No. 42,883, U.S.N.M.

The species is less robust in build than the genotype *chrysoprocta*, and is much more densely pollinose having a general pale gray appearance. In the latter respect it is very similar to *frioensis* from which it differs in the thickened arista, longer antennae, more protruberant front, etc. The host relations are unknown.

Changes in the Department of Entomology, Massachusetts Agricultural College.

After 31 years of continuous service as head of the Department of Entomology at the Massachusetts Agricultural College, Dr. Henry T. Fernald retired on July 1st, 1930, to devote his time to his study of the Sphecoidean wasps and other researches in Entomology. For administrative purposes, the Departments of Entomology, Zoology and Geology have been combined into a single major department, with Dr. Clarence E. Gordon, Professor of Zoology and Geology, as head.

Dr. Charles P. Alexander has been promoted to a full professorship, in charge of the college instruction in Entomology. Dr. G. Chester Crampton continues in charge of all work in Insect Morphology and Phylogeny. Assistant Professor Arthur I. Bourne has been made a Professor, in charge of research in the Agricultural Experiment Station. Mr. Clayton L. Farrar has been promoted from Instructor in Apiculture to Assistant Professor, and Dr. Harvey L. Sweetman has been appointed Assistant Professor, in charge of the courses in Insect Ecology and Physiology.

Dr. Fernald will remain at Amherst until about October 1st, but thereafter will reside at 707 East Concord Avenue, Orlando, Florida.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF
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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—**Balduf, W. V.**—Our friends the insects. [Trans. Illinois State Acad. Sci.] 21: 46-68. **Barnes, W.**—Obituary. By G. P. Engelhardt. [19] 25: 143-144. **Bromley, S. W.**—Bee-killing robber flies. [6] 38: 159-176, ill. **Cook, W. C.**—Some influences of location upon light trap catches. [4] 62: 95-98. **Dodd, F. O.**—An investigation of the methods of preparing and mounting insects for permanent preservation. [Trans. Ill. State Acad. Sci.] 22: 298-329. **Hamlyn-Harris, R.**—The relative value of larval destructors and the part they play in mosquito control in Queensland. [Proc. R. Soc. Queensland] 41: 23-38, ill. **Heikertinger, F.**—Ueber "Transformative Schutzfärbung" und ihre wissenschaftliche begründung. [97] 50: 193-219. **Hingston, R. W. G.**—The Oxford University Expedition to British Guiana. [Geog. Jour., London] 76: 1-24, ill. **Hora, S. L.**—Ecology, bionomics and evolution of the torrential fauna, with special reference to the organs of attachment. [Phil. Tr. R. Soc. London] 218, (B): 171-282, ill. **Howard, L. O.**—Striking entomological events of the last decade of the Nineteenth Century. [76] 1930: 5-18. **Hudson, G. V.**—Over eenige nieuwigheden in de Entomologie. [58] 8: 76-83. **Internationale regeln** der zoologischen nomenklatur. [79] 16: 1-15. **Kessler, E.**—Der wahrheit zur liebe zu "Ein ausflug in die umgebung New Yorks". [14] 44: 89-90, 98-99. **Lutz, F. E.**—Aquatic insect pets. [15] 1930: 389-401, ill. **Marshall, J. F.**—A new form of appa-

ratus for photographing insects. [22] 21: 139-140, ill. **Martensen, Th.**—Concerning the opinions rendered by the international commission on zoological nomenclature. [34] 89: 284-285. **Poche, F.**—Richtigstellung der wiedergabe eines von 649 zoologen gestellten antrages seitens des sekretärs der internationalen nomenklaturkommission. [34] 89: 268-271. **Reverdin J. L.**—Obituary. By E. Bujard. [Compte Rendu Soc. Phys. Hist. Nat., Geneve] 47: 8-11. **Sawa, R.**—A preliminary survey of the Arthropodan fauna of the University Farm at Komaba. [Jour. Coll. Agric. Imp. Univ. Tokyo] 10: 329-345, ill. **Schmitz, H.**—Phoriden aus eipaketen von locusta migratoria in Daghestan. [Naturhist. Maandblad] 19: 67-69, ill. **Thorpe, W. H.**—Biological races in insects and allied groups. [Biol. Rev. & Biol. Proc. Cambridge Philo. Soc.] 5: 177-212, ill. **Van Hay, M. E.**—Observations et experimentation personnelles faites en 1926-1929 sur les rapports des insectes et des fleurs. [Bull. Soc. R. Bot. Belgique] 62: 82-86. **Weiss, H. B.**—Insects and witchcraft. [6] 38: 127-133.

ANATOMY, PHYSIOLOGY, ETC.—**Allard, H. A.**—The chirping rates of the snowy tree cricket (*Oecanthus niveus*) as affected by external conditions. [4] 62: 131-142, ill. **Aubel & Levy**—Le potentiel limite d'oxydo-réduction dans les chenilles de *Galleria mellonella*. [77] 104: 862-864. **Beeson, C. F. C.**—Sense of smell of longicorn beetles. [31] 126: 12. **Benazzi, D. M.**—Superrigenerazione del tarso e conseguente autotomia esuviale in una larva di *Aeschna*. [Natura, Milano] 21: 105-107, ill. **Benazzi, M.**—Manifestazioni quantitative della rigenerazione negli insetti. [Riv. Biol. Milano] 11: 625-631. **Buddenbrook, W. V.**—Beitrag zur histologie und physiologie der raupenhäutung mit besonderer berücksichtigung der versonschen drüsen. [46] 18: 701-725, ill. **Bugnion, E.**—Les organes buccaux de la nébrie. (*Nebria complanata*) avec la description de l'arc pharyngé de cet insecte. [33] 70: 115-143, ill. **Chidoba, S.**—Appareil de Golgi, vacuome et chondriome pendant la spermatogenèse de *Dytiscus marginalis*. [77] 104: 1094-1095, ill. **Cockayne, E. A.**—Thoracic and elytral abnormalities in Coleoptera. [36] 78: 61-65, ill. **Codreanu, M. R.**—La nutrition et l'action sur l'hôte de *Symbiocladius rhithrogenae*, Chironomide à larve ectoparasite des nymphes d'Ephémères. [69] 190: 1462-1464. **Constantineanu, M. J.**—Der aufbau der sehorgane bei den im suesswasser lebenden Dipterenlarven und bei puppen und imagines von *Culex*. [89] 253-346, ill. **Cousin, M. G.**—Le developpement endoparasitaire de la larve ectoparasite de *Mormoniella*

vitripennis. [69] 190: 1530-1532. **Cunningham, J. T.**—Evolution of the hive-bee. [31] 125: 857. **de Lépiney, J.**—Contribution a l'étude du complexe biologique de *Lymantria dispar*. [Mem. Soc. Sci. Nat. Maroc] 23: 100pp., ill. **de Lépiney, J.**—Sur le comportement des adultes de *Schistocerca gregaria*. Sur l'instinct grégaire chez *Schistocerca gregaria*. [77] 104: 350-352; 352-354. **Fisher & Parkin.**—Presence of a yeast in the death watch beetle (*Nestobium rufo-villosum*). [31] 125: 892. **Friele, A.**—Die postembryonale entwicklungsgeschichte der männlichen geschlechtsorgane und ausführungswegen von *Psychoda alternata*. [46] 18: 249-286, ill. **Gaecks, H.**—Die maulwurfsgrill. [Mikrokosmos] 23: 153-159, ill. **Götze, G.**—Zur phylogenie, physiologie und biologie der *Apis*-Schwärme. [97] 50: 219-234. **Gresson, R. A. R.**—Certain phenomena of tenthredinid oogenesis as revealed mainly by Feulgen's nuclear reaction. [53] 73: 617-631, ill. **Henig, B.**—Ueber die chordotonalorgane der schmetterlingsraupen. [34] 89: 183-186, ill. **Heymons, R.**—Ueber die morphologie des weiblichen geschlechtsapparats der gattung *Scarabaeus*. [46] 18: 536-574, ill. **Heymons & von Lengerken.**—Studien über die lebenserscheinungen der Silphini. VI. [46] 18: 170-188, ill. **Hirschler & Hirschlerowa.**—Sur la coexistence de l'appareil de Golgi, du vacuome et des mitochondries dans les cellules sexuelles males chez *Gryllus campestris*. [77] 104: 952-954, ill. **Hövenner, M.**—Der darmtraktus von *Psychoda alternata* und seine anhangsdrüsen. [46] 18: 74-113, ill. **Hughes-Schrader, S.**—Contributions to the life history of the *Icerya* coccids, with special reference to parthenogenesis and hermaphroditism. [7] 23: 359-380. **Ke, O.**—Morphological variation of the prothoracic gland in the domestic and the wild silkworms. The granular bodies in the brain of the domestic and wild silkworms. [Bull. Sci. Kjusu Imp. Univ. Fukuoka] 4: 12-21; 37-44, ill. [Japanese and English]. **Lopez, A. W.**—Ability of mature grubs of *Leucopholis irrorata* (Melolonthidae) to survive submergence in water. [The Philippine Jour. Sci.] 42: 307-308, ill. **McClung, C. E.**—Orthopteran material for cytological studies. [Bull. Dept. Biol. Yenching Univ.] 1: 85-86. **Marcu, O.**—Die geschlechtsunterschiede der stridulationsorgane einiger Curculioniden. [Bull. Sec. Sci. Acad. Roumaine] 13: 8-13, ill. **Marcu, O.**—Beitrag zur kenntnis der tracheen der Hymenopteren. [34] 89: 186-189, ill. **Melis, A.**—Contributo alla conoscenza dell'anatomia degli stigmi degli insetti (Stigmi di larve di Lepidotteri e Coleotteri). [Redia] 18: 125-160, ill. **Metcalf, C. L.**—The mouthparts of insects.

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A MANUAL FOR THE STUDY OF INSECTS. Revised Edition. By JOHN HENRY COMSTOCK, Emeritus Professor of Entomology in Cornell University, and ANNA BOTSFORD COMSTOCK, Emeritus Professor of Nature Study in Cornell University, and GLENN W. HERRICK, Professor of Entomology in Cornell University. Nineteenth Edition. Ithaca, New York, The Comstock Publishing Co. (Copyright, 1930). 23.5 x 15.5 cm. Pp. xiii, 401, 633 text figs. 3 pls. Price \$4.00.

Much historical interest attaches to this nineteenth edition of a long- and well-known text. The preface to the original edition, dated December, 1894, signed by John Henry Comstock, is reprinted here. Following is a Foreword, dated April 5, 1929, also signed by him, stating that the intended revision of the Manual, begun in 1914, resulted in a new textbook, *An Introduction to Entomology*, but having had it still in mind to revise the Manual, making it more elementary, failing health caused him to pass this task on to Professor Herrick. An introduction dated Dec. 2, 1929, by the latter says: "The aim of the revision has been to keep the Manual in form and arrangement practically as it was first written. The attempt has been made, of course, to bring the subject matter down to date, to simplify it and to condense it somewhat in order to bring it within the horizon of the beginning student. The more advanced student has been adequately cared for by Prof. Comstock's much more extended work, '*An Introduction to Entomology*' and by other works of somewhat similar character."

We have made some comparisons with a copy of the fourth edition (1901 which has x + 710 pages, 797 figures and 6 plates. Part of the difference in size is due to the new edition's having a larger page form with more lines to the page, partly to the omission of some passages, especially from the sections in smaller type of the earlier text. But there are also many minor changes in content and phraseology. The keys are often

entirely new and from varied sources. Many of the old figures have disappeared, new ones have been added, many are familiar, even with altered legends corresponding to changed views. Pronunciation of scientific names is usually indicated by long or short signs over the vowels in the names themselves rather than by an accented syllabification in parentheses. Some idea of the condensation obtained is seen by a comparison of the indexes at the end of the two editions, that of the new revision containing fewer entries. Incidentally, the word "mimic" occurs in neither index and perhaps the only reference to this phenomenon is the very brief statement on page 275 of the new book, under *Basilarchia archippus*.

This revised edition undoubtedly will continue the usefulness and the tradition of its predecessors among new generations of students to whom its senior authors, alas, may be personally unknown.

PHILIP P. CALVERT.

A GENERAL TEXTBOOK OF ENTOMOLOGY by A. D. IMMS. Second Edition. New York, E. P. Dutton & Co. 1930. 703 pp., illustrated. \$10.80.—The first edition of this excellent work was reviewed in the NEWS, vol. xxxvi, pp. 283-286 for Nov., 1925. That a new edition is now demanded is a striking testimony to its merits, and as the author says in the preface to this present volume: "The necessity for issuing a second edition, in a comparatively short interval of time, is taken as an indication that this book has fulfilled a definite requirement. The labour of revision has been considerable, and sincere thanks are due to those entomologists in various parts of the world who lightened the task by their comments upon individual paragraphs, or sections of several of the chapters. In more than one instance the reviewers' criticisms have also proved helpful.

In the second edition various additions and emendations have been made. The most important are the revised classifications affecting the orders Dermaptera, Isoptera and Thysanoptera; the supplementary literature at the end of many of the chapters, and the notes on recent advances in the subject incorporated in the Addenda on pp. 668-72. One new diagram has been added and three of the text-figures have been replaced by new illustrations. Special thanks are due to the McGraw-Hill Book Company, of New York, who allowed the use of an illustration from *The Anatomy and Physiology of the Honey Bee*, by Snodgrass.

The perennial subject of taxonomic nomenclature is always a difficulty in a book of this description. In reply to criticisms by specialists it may be pointed out that the latest names in many cases have not been adopted, but rather those which are best known and most widely used."

BIOLOGIE DER HEMIPTEREN, eine Naturgeschichte der Schnabelkerfe, by DR. H. WEBER, of Danzig (formerly of Bonn). *Biologische Studienbücher*, Vol. XI, 543 pages, 329 figures. Published by Julius Springer, Berlin, 1930. For sale in the United States by G. E. Stechert & Co., 91 E. 10th St., New York. Price, bound, \$10.95.

The very title of this book, *Biology of the Hemiptera*, suggests a heroic undertaking on the part of its writer, and a mere glance through its profusely illustrated pages shows that the author has not shirked his self-imposed responsibility. Moreover, the volume is without question one of the best publications of recent times in biological entomology. Within it the writer brings together not only a review of practically all that has heretofore been written on the life and structure of the Hemiptera, but also the results of his own extensive and minute studies of those complex hemipterous mechanisms that for a century past have baffled the skill of insect anatomists. The Hemiptera, though one of the most important orders from the standpoint of economic entomology, have remained one of the least understood of all the major groups of insects. This work gives to Hemipterology at once a new status, and the book is one to which all students of sucking insects must have access. A brief review of its contents will best support this statement.

Of the five principal sections under which the contents of the volume are treated, the first deals with movements and sensory activities. It includes details of the skeletal structures concerned with locomotion, the musculature and mechanism of the legs, the various uses of the appendages, the structure of the wings and the mechanism of flight, the organs of stridulation, the structure of the nervous system and the organs of sense, and the sensory reactions.

The second section treats of the various organs and systems of organs accessory to metabolism, including those of ingestion, digestion, distribution, oxidation, and elimination. It contains a wealth of information on the structure and mechanism of the feeding organs to be obtained from no other single source, and much of the matter in this subject is based on the author's own intimate knowledge of the hemipterous head and the structure of the mouth parts. In numerous, clear-cut line drawings the various types of feeding mechanisms are shown with all their intricate detail of structure and musculature, and many obscure features of the piercing and sucking processes are convincingly explained. The long-standing mystery of how the coccids, for example, thrust their slender, folded mouth bristles at full

length into the plant tissue is beautifully and simply elucidated. The accomplishment is shown to depend upon two things: first there is a clasp in the base of the labial groove which can securely hold the bundle of mouth bristles; and second, each bristle is independently provided with short protractor and retractor muscles. On relaxation of the labial clasp, one mandibular bristle is thrust out as far as its minute protractor muscle can extrude it, then the other follows until the two tips meet, after which the maxillary bristles are exerted until their tips lie between those of the mandibular bristles. Now the labial clasp comes into action and grasps the bristle bundle, holding it in the new position while the retractor muscles take up a fraction of the slack in the loop of the bundle within the crumena, and at the same time extend the protractors. Thus again the mechanism is ready for exertion, and by another advance, first of one piercing bristle, then of the other, and finally of the sucking maxillary tube, the entire bundle is sunken a little deeper. With each repetition the bristle loop grows smaller, the exerted bundle reaches a little farther, until at last the food stream of the host is tapped. The same mechanism is present in all Hemiptera, whether the retracted bristles are straight, folded in a crumena, or looped outside the head.

The rest of this section is devoted to the sucking mechanism and the ingestion of food, the salivary glands, the alimentary canal, the processes of digestion, the ectodermal glands and their various secretions, respiration, and circulation.

The third section, on the sex life and development, begins with a description of structural differences between the males and females, and the anatomy of the sexual organs. Then comes a full account of the external genital organs, with many details of the various methods of copulation. This is followed by descriptions of the eggs, the structure of the ovipositor, and an account of the methods of egg-laying adopted by different members of the order. Embryology is treated briefly, but many interesting things are given concerning the hatching of the eggs and the care of the young. Under *metamorphosis* the structural changes between the young and adult are shown, and the postembryonic development of the Coccidae and related forms is fully illustrated. Many examples of viviparity, polymorphism, and heterogeny are then discussed, and a special sub-section is devoted to the life-cycle of the Aphididae.

The last two sections have to do with the relations of the insects to the environment, both inanimate and animate. The book closes with 14 pages of closely printed bibliographical references, and ends with generic and subject indices.

A volume such as this *Naturgeschichte der Schnabelkerfe* will be a welcome addition to every general entomological library, since few lines of work do not somewhere touch upon the sucking bugs; to the hemipterist, however, it will be an indispensable acquisition, since it puts before the eye of the special worker in Hemiptera a comprehensive view of the entire field of this subject. Moreover, if we may look at it from another phase, the book must be seen as the most recent proof to American entomological students of the folly of thinking we can survive without a knowledge of foreign languages.

R. E. SNODGRASS.

OBITUARY.

MRS. ANNA BOTSFORD COMSTOCK.

Anna Botsford Comstock, emeritus professor of nature study at Cornell University, well-known wood engraver and author, died at 10:45 o'clock Sunday morning, August 24, at her home, 123 Roberts Place, Ithaca, New York. She had been in failing health for more than a year, but had been well enough to lecture at the university, and had just completed a series of talks for Summer session students on August 15.

Anna Botsford Comstock was born September 1, 1854, on a farm among the hills of Cattaraugus County, New York. Her grandparents were pioneers, moving their families and goods with ox teams from New England to the wilds of Western New York. Her mother, Phoebe Irish, was of Quaker stock, which followed William Penn to America. Her father was a descendant of Henry Botsford, who settled in Milford, Connecticut, in the 17th century, and of Nathaniel Foote, who arrived in Wethersfield, Connecticut, in 1636.

Mrs. Comstock spent the first 10 years of her life on the farm where she acquired her early enthusiasm for out-of-door life. Then her parents moved to the village of Otto, a few miles away and built a home in which they lived during the rest of their lives. Anna Botsford continued her education by attending the village school, and at the age of 14 taught for one term in the primary department of this school to fill the

place of a teacher who was ill. At the age of 16 she became interested in a college education and was sent to Chamberlain Institute at Randolph, a Methodist seminary with an excellent faculty. In 1873 she graduated from a college preparatory course and pronounced the salutatory in Latin on the Commencement stage. After teaching for one year she entered Cornell University and graduated in 1878. In 1885 she received the B. S. degree.

At Cornell she met John Henry Comstock, who had graduated four years earlier, and was an instructor in zoology. They were married October 7, 1878, and lived in a house on the campus for 33 years until the ground on which it stood was needed for University purposes.

In 1879 Mr. Comstock was made entomologist to the United States Department of Agriculture, and obtained a two years' leave of absence from Cornell to take up this work. He was overburdened with duties, and Mrs. Comstock began assisting him, first with his correspondence, and later, when he was unable to find an artist skilled in the use of the microscope, she undertook to illustrate his reports upon the scale insects of the citrus fruits and was subsequently given a position as assistant in the entomological division, working there with her husband until their return to Cornell.

At this time Prof. Comstock was planning to write, for the help of his students, a manual for the study of insects, and it became Mrs. Comstock's ambition to illustrate this book. In order to do this she learned the art of wood engraving, studying with John P. Davis at Cooper Institute, New York. The manual was published in 1895, but meanwhile its illustrator had gained so much skill in representing the texture of butterflies' wings that she was elected to the Society of American Wood Engravers and to the special section of original engravers, among whom are the best that the world has produced. Her engravings were exhibited at many European and American expositions and she won the Bronze Medal at the Buffalo Exposition.

When, in 1896, the first appropriations were made at Cornell University for introducing nature study into the rural schools, Mrs. Comstock was asked to assist in this work and was made an assistant professor in the Extension Department in 1898. Subsequently she became a regular lecturer in Cornell University, and was made a professor of nature study in 1920. During the year 1899-1900 she was an extension lecturer at Stanford University.

The Handbook of Nature Study, a volume of more than 900 pages, illustrated, and published in 1911, was an outgrowth of her work with school teachers in the state. The book has gone through 15 editions and is in use in Alaska, Australia, Japan, China and England, as well as in the schools of the United States and Canada.

Mrs. Comstock was made editor of the Nature Study Review, now combined with the Nature Magazine, in 1917, and is the author of many nature stories in periodicals for children. Her books include: Ways of the Six-Footed; How to Know the Butterflies (with her husband); How to Keep Bees; Confessions to a Heathen Idol; The Pet Book; Bird, Animal, Tree, and Plant Notebooks.

She was associate director of the American Nature Association, a member of the Society of American Wood Engravers, and of Sigma Xi.

Mrs. Comstock had no children of her own, but she has mothered hundreds of lonely boys and girls, many of them coming from farm homes to work their own way through the University. She and Professor Comstock made their home a place of rendezvous, not only for those who were interested in the particular fields of work to which they were devoting their time, but also to any who needed a helping hand.

Mrs. Comstock is survived by her husband, who has been an invalid for several years. — KATHARINE FINCH in *Ithaca Journal News*, Aug. 25, 1930.

Portraits of Prof. and Mrs. J. H. Comstock were published by Mr. Gander in ENTOMOLOGICAL NEWS for April, 1930, plate X.

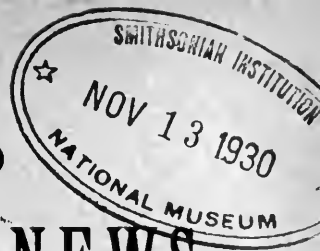
DR. GEORGE DIMMOCK died at Springfield, Massachusetts, his native town, on his seventy-eighth birthday, May 17, 1930, as announced in *Science* for May 23. He received the bachelor of arts degree from Harvard in 1877 and that of doctor of philosophy from Leipsic in 1881, after working in Leuckart's laboratory, his thesis being *The Anatomy of the Mouth Parts and of the Sucking Apparatus of Some Diptera* (Boston, 1881), probably his best-known entomological paper. In it he compared the trophi of *Culex*, *Bombylius*, *Eristalis* and *Musca*. In 1881-82 he studied at the Sorbonne, Paris. From 1877-1890 he was an editor of *Psyche*, the late B. Pickman Mann being his associate for part of this period. His subsequent entomological work has been mainly anatomical and has concerned scales and glands of insects (*Psyche*, 1882, 1883) and the early stages of Carabid, Coccinellid and Chrysomelid beetles. Some of his papers on Coleoptera were written in co-operation with the late Frederick Knab (1904). He contributed the chapter on Coleoptera to the *Riverside Natural History* (1881) and an article on *Belostomidae and some other Fish-destroying Bugs* to the Annual Report of the Fish and Game Commission of Massachusetts for 1886. P. P. CALVERT.

JAMES WATERSTON, of the British Museum of Natural History, died April 28, 1930. He was born at Paisley, Scotland, in 1879. He gave special attention to parasitic arthropods and had intended to write a monograph of the Mallophaga. An obituary notice is in the *Scottish Naturalist* for May-June, 1930.

We greatly regret to record the death of ERNEST BAYLIS, an Associate Editor of ENTOMOLOGICAL NEWS, on July 6, 1930. An appreciation and biographical notice will appear in the next number of this journal.

CORRECTION.

Page 135, April, 1930. For line 11 substitute line 27; for line 27 substitute "simulans Heidemann (Heteropt.: Tingidae)." The table of contents on the cover of the April number has these two titles correct.



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TO CONTRIBUTORS. All contributions will be considered and passed upon at our earliest convenience and, as far as may be, will be published according to date of reception. The receipt of all papers will be acknowledged. Owing to the limited size of each number of the NEWS, articles longer than six printed pages will be published in two or more installments, unless the author be willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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Stated Meetings of The American Entomological Society will be held at 7.30 o'clock P. M., 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 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.





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PLATE XXIV.

FRANK HAIMBACH.
1912.

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Frank Haimbach.

(Portrait, Plate XXIV.)

Frank Haimbach died April 1, 1930, following a short illness. He was born in Philadelphia, July 2, 1859; his parents were of French and German extraction, and although both were born in Germany they came to America in their youth and settled in Philadelphia, becoming naturalized citizens.

His early education was somewhat limited, but he had inherited from his parents a love of cultural things, particularly Natural History and in his early days wandered with them through Fairmount Park and along the banks of the Schuylkill, where he would collect insects and plants, so that his interest in nature had manifested itself before he was six years old. His father was an intellectual man and wrote a great deal of poetry, some of which was published in Philadelphia in 1899 under the title of "Poetische Blätter". His mother sent to Germany for his first entomological books from which he learned to mount insects and make containers and cabinets for his collection.

His interest in nature study was lifelong. Circumstances never permitted him to travel, but his Sundays and the very little leisure he had was spent in collecting trips to the pine barrens in New Jersey and the many delightful suburbs of Philadelphia, along the Wissahickon Creek, Chester and Delaware Counties and the woods and fields of Roxborough.

He carried on an extensive correspondence with collectors all over the world, buying and exchanging specimens, and practically all of his leisure time was spent either in the fields collecting or in his study mounting and arranging the specimens, devoting most of his attention to the Lepidoptera and particularly the smaller moths.

He contributed valuable data to Dr. John B. Smith for his

list of the insects of New Jersey, and was a recognized authority on the Heterocera.

His beautiful collection of over 40,000 Lepidoptera he presented to the Academy of Natural Sciences, prior to his death.

For a number of years he acted as Secretary for the Feldman Collecting Social; he was a member of the American Entomological Society and was its Secretary and Treasurer at the time of his death. The last few years of his life were the culmination of an ambition he always had of devoting his entire time to Entomology; he became associated with Dr. J. R. Schramm on "Biological Abstracts" and spent the balance of his time in the Department of Entomology in the Academy of Natural Sciences of Philadelphia, during which time he wrote several valuable papers.

On March 27th, 1928 he was appointed Special Aide in this department in charge of the "Brackenridge Clemens Memorial" and was studying and arranging the large collection of Microlepidoptera at the time of his death.

A list of his Entomological Contributions follows:

- 1905. *Desmia funeralis* Hubner and variety *subdivisalis* Grote. ENT. NEWS. XVI, 121.
- 1907. Two new species of *Crambus* and a new variety of *Haematopsis grataria* Fabricius. ENT. NEWS. XVIII, 44-45.
List of the Lepidoptera of Five-Mile Beach, N. J. ENT. NEWS. XVIII, 217-228.
- 1908. New *Pyalidae*. ENT. NEWS. XIX, 263-264.
- 1915. New *Heterocera*. ENT. NEWS. XXVI, 321-325.
- 1928. A list of the species and descriptions of new forms of the American genus *Zale*, and a new form of *Safia* Trans. Am. Ent. Soc. LIV, 215-231.
- 1930. The *Crambinae* in the Brackenridge Clemens Memorial Collection of the Academy of Natural Sciences of Philadelphia ENT. NEWS. XLI, 113-134.
- 1905-1909. Secretary's reports of the meetings of the Feldman Collecting Social. ENT. NEWS. XVI-XX.
- 1930. Secretary's Report of meeting of the American Entomological Society. ENT. NEWS. XLI.
- 1930. The Seventieth Birthday of Dr. Adelbert Seitz. ENT. NEWS. XLI, 206-207.

Frank Haimbach was a kindly gentleman; he was always glad to assist other entomologists in their work or help amateurs in the technic of mounting, preparing, and classifying insects. Many of the prominent entomologists of his generation were his close friends, and they and the younger students of the subject were constant visitors at his home. He endeared himself to all of his scientific associates at the Academy and is particularly mourned by his friends in the Department of Entomology and his fellow members of the American Entomological Society.

He is survived by his wife, Ida, two daughters, Miss Minna and Mrs. Charlotte Lyons, and two sons, Frank, Jr., and Albert. Another son, Philip, died in 1901 at the age of eighteen years. His loss was a double one to his father as he, too, was interested in the same studies and a close companion in his entomological work.

ROSWELL C. WILLIAMS, JR.

MR. HAIMBACH AND HIS CONNECTION WITH THE GERMAN-TOWN ENTOMOLOGICAL CLUB, 1926-1930.

Mr. Haimbach was introduced to Eastburn Thompson by Mr. Henry W. Fowler, of the Academy, one day in Langhorne, and was invited to see Mr. Haimbach's collection. Easie told the Club all about it at our next meeting and we were all invited to go to Langhorne to see the collection.

So one wintry, snowy day the fathers of the Club members transported twenty ten- eleven- and twelve-year-olds to Langhorne. We were not only shown the collection but were presented with some delightful duplicates and had a chance to see a real entomological laboratory.

From that moment Mr. Haimbach showed the keenest interest in our Club, as he believed that it was essential to foster the interest of young entomologists. He came to our Club meetings, presenting scientific papers. He gave an exhibition of mounting of tiny butterflies and moths. He judged our mounting contests, and we spent many gloriously happy Sunday afternoons in his quaint, low-ceilinged study. He had the

enthusiasm of youth, and was as eager and excited as we were over any interesting specimen. He had untiring patience with our ignorance and never once did he make us feel other than his entomological peers. His kindliness of spirit, his accurate scientific knowledge, his skill and his old-world courtesy are part of the precious heritage of his friendship.

Our crowning adventure with him was his visit to our New Hampshire home last August. Easie, Jack Cadbury, Barbara and Stephen Cary and I will never forget those joyous days. We took him to the top of Mt. Washington in a car that boiled and sputtered; we caught *Brenthis montinus* in a sunny meadow near the top, and although it was too late for *Oenecis semideca*, Mr. Haimbach caught an *Anartia* or two and some other small moths that pleased him tremendously. We had a south east storm during his stay with delightfully foggy nights, so that our light-trap worked to perfection. We shall never forget him with his cyanide bottles and his net, bagging tiny creatures. He was up late and early, getting a five A. M. start so as to get his treasures off the white walls of the cottage before sunrise. I turned over the desk in the living room for his exclusive use while there, and when not collecting he pinned with exquisite precision his specimens in Schmitt boxes. He returned laden with treasures, leaving behind him the memory of happy days with a man great of heart, of boyish enthusiasm, and we all pronounced him our most delightful guest. Plans were all laid for his return this summer.

Ever since we have known him we have collected Microlepidoptera for him on all of our trips, and with his unfailing courtesy and generosity he credited all these things to me in the Academy collection and in its records.

Something very big has gone from our lives, but the Club has passed a resolution to the effect that in our feeble way we shall endeavor to carry on the work which he has laid down. This is the spirit which he would wish us to have, rather than mourning for his passing.

MARGARET M. CARY.

Another and more recent (1929) portrait of Mr. Haimbach appeared in the News for December, 1929, Plate XVII.—EDITOR.



ENT. NEWS, VOL. XLI.

PLATE XXV.

ERNEST BAYLIS.
1928.

Ernest Baylis.

(Portrait, Plate XXV.)

ERNEST BAYLIS, Associate Editor of ENTOMOLOGICAL NEWS, passed away at one o'clock Sunday afternoon, July 6th, 1930, at South Sterling, Pennsylvania. He was in his 54th year. He was born at Ipswich, England on February 8th, 1877. At the age of fourteen, he developed an abiding interest in Natural Science and he collected insects generally at that time, but chiefly the Lepidoptera. He was a very sincere and active collector even up to the hour of his death. He had gone on a collecting trip in the Pocono Mountains and while there was stricken and died upon his return, after an illness of but fifteen minutes.

His first entomological studies were on the British Lepidoptera and after acquiring almost all the known species in his territory, he started to collect Coleoptera which were his principal interest at the time of his death.

In November of 1912 he left England and came to the United States and made his home in Philadelphia, where, after getting settled, he continued to collect Coleoptera and finally specialized in the Cicindelidae and the Cerambycidae. Mr. Baylis was a commercial artist by profession but devoted all his spare time to collecting and the study of entomology. Most of his field work in this country was done within seventy miles of Philadelphia, Pa. Though his collection does not contain any types, it comprises one of the finest representations of that territory extant. He was a very fine technician and it was a pleasure to examine his collection; every label is of the same size and is set in the same position and height on the pin, and the antennae and legs of every specimen are all set alike, each box making a fine picture in itself.

On March 22nd, 1917, Mr. Baylis was elected a resident member of the American Entomological Society. He was also President of the Feldman Collecting Social and the last meeting of this Society was held at his residence in October, 1926. He was an Honorary member of the Suffolk Naturalists Society of Framingham, England.

In January, 1928, he was appointed an Associate Editor of

ENTOMOLOGICAL NEWS and held that position when he passed away.

Though he did not describe any new species or publish anything, he was one of the most active collectors of recent years in the American Entomological Society, and it is certain that many of his captures will establish new records for the particular territory in which they were taken, all the dates of capture and localities being accurately recorded.

Through his passing the society loses a very valuable member and associate.

JOHN C. LUTZ.

A List of Butterflies of the Ozark Region of Missouri.

By AUBURN E. BROWER, Willard, Missouri.

The published lists of Lepidoptera collected by the St. Louis collectors give a good idea of the butterflies of that region. As this locality is about 225 miles southwest of St. Louis, in Greene County, and the records extend the range of a number of species of the East and record some additional Gulf Coast forms, it seems desirable to publish them. A few of the records are for Forsyth, Taney County, Missouri, sixty miles to the south on the White River, and about fifteen miles from the Arkansas line.

Collecting has been carried on for the last fourteen years for Lepidoptera in general. Except for the Hesperiidæ, the butterflies have been closely collected so the list should be fairly complete. Questions regarding identification have been checked against the Cornell University collection with aid of Dr. W. T. M. Forbes.

PAPILIO PHILENOR L., common.

POLYXENES Fabr., common.

CRESPHONTES Cram., uncommon.

GLAUCUS L., fairly common.

TROILUS L., very common.

MARCELLUS Cram., uncommon.

form TELAMONIDES Feld., fairly common.

LECONTEI R. & J., common.

ab. BROWERI Gunder, one June 23, 1918.

The usual red markings are replaced by deep yellow.

- PIERIS PROTODICE Bdv. & Lec., common.
 gen. vern. VERNALIS Edw., fairly common.
 RAPAE L., very common.
- NATHALIS IOLE Bdv., scarce, but became common in 1919 and 1920. One albino has been taken.
- ANTHOCHARIS GENUTIA Fabr., very scarce; in April, 1919, a number were taken.
- CATOPSILA EUBULE L., common. This species migrates through August, September, and October, coming from the northwest.
- PHILEA L. One seen ? when collecting was first started; positively identified at Forsyth, October 11, 1927.
- ZERENE CAESONIA Stoll., common.
 gen. autumn ROSA McNeill, in the fall, rare in the spring.
 form IMMACULSECUNDA Gunder, paratype, September 27, 1917.
- EURYMUS EURYTHEME Bdv., common.
 gen. vern. AUTUMNALIS Ckll., scarce.
 The other forms are all believed to be present, but the application of the names seems uncertain.
- PHILODICE Godt., very common.
 gen. vern. ANTHYALE Hbn., uncommon.
- EUREMA MEXICANA Bdv., very scarce. It is fairly common at Forsyth.
- NICIPPE Cram., uncommon.
 ab. FLAVA Stkr., very scarce.
- EUTERPE Men., very common.
 form ♀ ALBA Stkr., common.
- DANAUS ARCHIPPUS Fabr., common in spring and fall. This species like *Catopsila eubule*, and others migrates southeastward in the fall and northwestward in the spring.
- ENODIA PORTLANDIA Fabr., common in the summer.
- NEONYMPHA EURYTUS Fabr., very common in June and July.
- CERCYONIS ALOPE race OLYMPUS Edw., fairly common, common in 1929.
- DIONE VANILLAE L., scarce, became rather common in 1926.
- EUPTOIETA CLAUDIA Cram., fairly common.
- ARGYNNIS IDALIA Dru., very scarce.
 CYBELE Fabr., common.
- EUPHYDRYAS PHAETON Dru., scarce. All of the colonies of larvae which have been found were upon tall growing Gerardias high up on dry, thinly wooded ridges.

- PHYCIODES GORGONE Hbn., uncommon.
 NYCTEIS Dbl. & Hew., common.
 THAROS Dru., very common.
 form MARCIA Edw., uncommon.
- ANTHANASSA TEXANA Edw. A single much battered ♀ of this species was taken at Forsyth, October 23, 1927, following two or three days of westerly winds.
- POLYGONIA INTERROGATIONIS Fabr., common.
 form UMBROSA Lint., common.
 COMMA Harris, uncommon.
 form DRYAS Edw., rare.
 PROGNE Cram., scarce.
- AGLAIS J-ALBUM Bdv. & Lecon. This species has been seen twice.
 ANTIOPA L., scarce in early spring and fall.
- VANESSA ATALANTA L., common.
 VIRGINIENSIS Dru., common.
 CARDUI L., common.
- JUNONIA COENIA Hbn., very common.
- BASILARCHIA ASTYANAX Fabr., fairly common.
 ARCHIPPUS Cram., uncommon.
- CHLORIPPE CELTIS Bdv. & Lec., scarce.
 CLYTON Bdv. & Lec., scarce.
- ANAEA ANDRIA Scud., common.
- LIBYTHEA BACHMANI Kirt., uncommon.
- CALEPHELIS BOREALIS G. & R. One was taken August 10, 1919, and a number were found in a limited area in early August, 1926.
- STRYMON CECROPS Fabr., common.
 M. ALBUM Bdv. & Lec., two specimens, July 26 and October 24.
 MELINUS Hbn., fairly common.
 TITUS Fabr., scarce in June and July, especially on flowers of *Asclepias tuberosa*.
 EDWARDSI Saund., two upon June 14, one June 24. All are very large, collected flying about oak bushes.
 CALANUS Hbn., common in June.
- MITOURA DAMON DISCOIDALIS Skin., in July, very scarce.
- INCISALIA HENRICI G. & R., one April 20, 1919, one seen (?) April 13, 1924.
- FENISECA TARQUINIUS Fabr. Two specimens have been taken, both high in the dry hills near the divide; furthermore no alders have been found in this section of the state. In 1927 a number were taken in a yard of hard maples where they

- were flitting about Virginia creeper infested with Fulgoridae, this was in Springfield, Missouri.
- HEODES HYPOPHLEAUS Bdv., rare until 1926 when a number were taken.
- HEMIARGUS ISOLA Reak., scarce, but common one year.
- EVERES COMYNTAS Godt., very common.
- LYCAENOPSIS PSEUDARGIOLUS Bdv. & Lec., fairly common.
- EPARGYREUS TITYRUS Fabr., very common.
- ACHALARUS LYCIDAS A. & S., fairly common.
- COCCEIUS PYLADES Scud., very common.
- THORYBES DAUNUS Cram., common.
- PYRGUS TESSELLATA Scud., very common.
- PHOLISORA CATULLUS Fabr., common.
- STAPHYLUS HAYHURSTI Edw., uncommon.
- THANAOS BRIZO Bdv. & Lec., common in early spring.
- MARTIALIS Scud., uncommon.
- JUVENALIS Fabr., common.
- HORATIUS Scud. & Burg., fairly common.
- ANCYLOXYPHA NUMITOR Fabr., uncommon.
- PAMPHILA LEONARDUS Harris, uncommon.
- HYLEPHILA PHYLAEUS Dru., common.
- POLITES CERNES Bdv. & Lec., very common.
- PECKIUS Kirby, common.
- ATALOPEDES CAMPESTRIS Bdv., very common.
- CATIA OTHO EGEREMET Scud., common.
- POANES HOBOMOK Harris, fairly common.
- form POCOHONTAS Scud., uncommon.
- ZABULON Bdv. & Lec., uncommon.
- ATRYTONE AROGOS Bdv. & Lec.
- EUPHYES VESTRIS Bdv., uncommon.
- AMBLYSCIRTES VIALIS Edw., uncommon.
- CELIA Skin., one July 25, 1929, and one imperfect specimen that is probably this at Forsyth September 14, 1927. Compared with specimens in the U.S.N.M.
- MEGISTIAS FUSCA G. & R., scarce.
- LEREMA ACCIUS A. & S., one October 15, two October 22.
- LERODEA EUFALA Edw., uncommon.

Prof. G. F. Ferris at Cambridge, England.

Professor G. F. Ferris, of Stanford University, is spending the present academic year at Cambridge University, England, in the Molteno Institute of Parasitology. During this time he expects to complete the series of papers on "Contributions Toward a Monograph of the Sucking Lice" and to carry out some other work in connection with ectoparasitic insects.

North American Institutions Featuring Lepidoptera.**XVIII. The Museums of Cuba.**

By J. D. GUNDER, Pasadena, California.

(Plates XXVI-XXVIII.)

The study of entomology is going right ahead in Cuba and the people in general seem to be taking more interest in the subject, as evinced by the increased number of local collectors. The museums are featuring better public displays of insects than formerly, so I believe the next decade will witness a marked advancement in the working out of the fauna of the Island. What is needed in the future are more men like Dr. Mario Sanchez Roig, Director of the Natural History Museum of Havana. Dr. Roig is an all-around naturalist, specializing in paleontology, as well as entomology and he has built up the largest museum of natural history in the Country. It is located at No. 827 Cerro Street in an old residence adapted for museum purposes, but a new building is contemplated on the site within the next few years. Dr. Roig began active field work in 1903 and not long ago opened his Institution to the public. He is fortunate in having the cognizance and support of the Government and only recently issued the first bulletin called "Memoria", as Volume I, Number I. There is an excellent cabinet of display butterflies in his museum and the Lepidoptera study collection consists of eighty drawers and some 250 boxes containing about 14,000 specimens. Cuban Sphinges, Catopsilias and Papilios are well represented. Some of this material was collected by Mr. Cervera and Mr. Gomez de la Maza who are local enthusiasts. Dr. Roig is to be congratulated upon his excellent work which at times has been carried on under great difficulty.

In the Institute of Havana is found the Valle Yznage Museum. (See plate XXVII). It consists of several rooms and was the gift in 1896 of Mr. Modesto del Valle. Here are displayed good collections of Cuban and foreign birds and mammals and also a fair collection of Cuban insects prepared by Gundlach during his trips through the Island from 1860 to 1890. There is also a considerable collection of nearly 4000 species of Cuban and foreign shells.



MUSEO DE HISTORIA NATURAL
HAVANA, CUBA



DR. MARIO SANCHEZ ROIG

In the same Institute, but entirely individual, is a room which is called the "Museo Cubano Gundlach". In this depository are kept many of the type specimens of Coleoptera, Lepidoptera, Diptera, etc., which were described by Gundlach. I am sorry I have such meager data on this evidently important material, but there is a pamphlet called "Zoologia" or "Catalogo General" describing this little museum and its collections which was written by Dr. Pedro V. Ragnes in 1914. This catalogue consists of 150 pages of text and probably gives note of many of Gundlach's original specimens. Aside from Lepidoptera the room contains a very complete collection of Cuban birds captured and prepared by this gentleman. I am glad to produce on plate XXVII, a picture of Colonel Serafin Espinosa, M.M. He is Director of the Havana Institute and also Auditor del Ejercito de Cuba. Colonel Espinosa advocates greater study of natural history subjects in Cuban schools and in doing splendid work in popularizing the biological sciences.

In addition to the museums in Havana, there is an important institution in the City of Santiago de Cuba, which is the next largest municipality and is situated in the eastern portion of the Republic. It is called the Bacardi Museum and was opened to the public on May 20, 1928, as a gift from the widow of Emilio Bacardi, a wealthy Cuban manufacturer. The building is a beautiful structure and cost about \$80,000. (See plate XXVIII). Its collections consist mainly of historical relics from the war of Cuban Independence which was fought for the most part in the mountains around the city. However, there is some natural history material, including a series of birds and a few mammals. The Lepidoptera consist of a cabinet of specimens collected by Mr. E. Chivas in the neighboring hills and these are of value because of being mounted and named by Gundlach. The Rhopalocera are well represented, while the Heterocera consist of a few showy specimens. Perhaps the most interesting specimens are three co-types of *Papilio gundlachi*. Mr. Jose Bofill and his son are directors of the Institution and are doing what they can to build up the collections. It is due to the persistence of the elder Mr. Bofill that the Museum came into existence and

his son will undoubtedly carry on the labors so well commenced.

American entomologists will be interested in reading something of the life work of Mr. Ozario Querci who with his family are at present collecting Lepidoptera near the City of Santiago. This famous European family has an international reputation for field work and for the last year or more has been employed jointly for Messrs. F. Johnson, A. G. Weeks and R. C. Williams collecting in eastern Cuba. There is hardly a collection in Europe or, for that matter, in any part of the world which does not have butterflies collected by this gentleman. A photograph of Mr. and Mrs. Querci, his daughter, Mrs. Romei and grand daughter, *Lycaena* is shown on plate XXVIII; together with Dr. F. Sabas, a Cuban naturalist and Mr. Bofill and his son. Little Miss *Lycaena Romei* has the unique distinction of being named after that popular genus of butterflies. Mr. Querci has kindly given me the following personal biography. It reveals the joys and sorrows of the entomological "game" and unfolds the life of a real European lepidopterist.

"I was born in Rome, Italy, on October 11, 1875," writes Mr. Querci, "and as a child collected butterflies which Mother and I used to set into books. Studied chemistry at the University of Rome and later became a state officer for testing precious metals. When about sixteen years old I met Miss Clorinda Di Nino who also liked to collect butterflies and in 1896 we were married and had our daughter Erilda. Being continually employed and with little time and less money to devote to field work, it was not until 1908 that I sent my first rather poor captures in exchange to Dr. Otto Standinger of Dresden. In 1909 we lived at Formia near Naples and by this time my daughter was old enough to accompany her mother when she was going into the country and they made good captures, especially near the district of Aurunci. I went to Milan and offered the specimens to Count Turati, who took the best rarities and asked his servant to give me some money. As I only received 50 liras, I returned home discouraged and threatened to do no more with entomology. However, before completely renouncing my hobby, I wrote Mr. Charles Oberthür of Rennes and for several years he generously supported our collecting.

In 1914 due to the war Mr. Oberthür had to stop purchasing, but out of the kindness of his heart he donated me one complete copy of his great work "*Études de Lépidoptérologie comparée*." This same year we went to Florence to live where we continued to collect and I made field trips to Calabria. My women folks the next year journeyed to the Island of Elba for specimens and in that period of the war were suspected of being spies, but their business was eventually understood. In 1917 my wife and daughter made a long trip to collect above Palermo in Sicily. There living was hard and dangerous as people said deserters of the war were hidden in the mountains. During all those trips my family sent me their catches by post daily and sometimes the specimens arrived in Florence fresh and almost alive. I mounted them with the help of a clever boy and sometimes was obliged to work the whole night. Often I did not have much money to buy food as I sent what money was earned back to the family. Dr. Roger Verity gave me some support, but as he only paid 10 liras per 100 mounted specimens and a moderate rate for rarities, we suffered poverty. Our beautiful Sicilian material finally allured Lord Rothschild, Mr. Bethume-Baker and other British lepidopterists and they began purchasing at suitable rates, so that my wife and daughter could afford to make unhampered tours in Calabria, Campania, Abruzzo, Molise, Romagna and Garfagnana. They lived in the last named country during the disastrous earthquake. This period of our field work marked the beginning of better times, at least for a period.

In 1920 my daughter married Dr. Enzo Romei and they had their daughter which we named *Lycaena*. I was a pensioner and dedicated all my time to lepidopterology with the help of my son-in-law. Together with Dr. Verity I published in the 'Entomologist's Record' of London, 'An annotated List of the *Grypocera* and of the *Rhopalocera* of Peninsular Italy.' Some other articles were also published in the same magazine and in the Oberthür volumes. In 1924 the Italian Government asked us to collect in Northern Africa at Tripolitania. Dr. Romei went there first alone and later with his wife. About this time the Museum of Barcelona asked me to undertake some explor-

ation in Spain and the agreement was almost signed when the Dictator Primo De Rivera annulled the contracts made by the Catalan people. I did not want to renounce this good trip, so my wife and I pawned what we had in our home and we went to Spain. I had no idea that living in that country was so expensive and when we arrived on June 3, 1924 in Aragon, we saw that we did not have money enough to return home and therefore had to keep on ahead. I wrote to all the European men I knew asking them for advances on material. We had to continue our enterprise. Fortunately from England, France, Belgium and Austria came fine responses, and in Aragon my wife discovered the new species which Mr. Sagers named *Coscinia romei*, dedicating it to my granddaughter Lycaena. In the spring of 1925 my son-in-law started for Sierra Nevada (Andalusia) and with the help of Lord Rothschild, Mr. Bethune-Baker and Mr. Williams, of Philadelphia, he found one local form of *Parnassius apollo* which was considered one of the rarest European butterflies. In 1926 we went to Cuenca (New Castile) for Lord Rothschild because he wished some specimens of *Zygaena ignifera* which is a rather good thing. Wife and I left for Portugal in 1927 and there I was named Naturalist of the University of Lisbon. With this new income I was able to have my daughter and granddaughter again with us to help collect, and from Portugal we again went to Cuenca, but my daughter returned to Italy again because there was a children's epidemic and we didn't want to risk her life. While I was at Cuenca, I was asked to go to Barcelona and write a 'Catalogue of the Diurnals of the Iberian Peninsula' which I did the following season. My daughter and granddaughter had by this time returned to us and we enjoyed splendid collecting in the Pyrenees Mountains. Just now we are all in Cuba with the help of our American friends and the collecting is proving quite good. I would like to work in Haiti, but doubt if it is possible.

I have known and dealt with most European lepidopterists and I think that my best friend was Oberthür, at least he gave me my start. Altogether I should guess, as a family, we have collected over half a million butterflies. Most European cab-



MUSEO "VALLE YZNAGA"
HAVANA, CUBA.



COLONEL SERAFIN ESPINOSA



MUSEO MUNICIPAL EMILIO BACARDI MORAN
SANTIAGO DE CUBA, CUBA.



Standing—BOFILL, Jr., MRS. ERILDA ROMEI, DR. F. SABAS, MRS. QUERCI
Seated—JOSE BOFILL, LYCAENA ROMEI, ORAZIO QUERCI

inets hold series of our labors and I have never knowingly mounted a poor specimen. Our best series of butterflies is probably in the Tring Museum, as Lord Rothschild received the choice for some twelve years. Interesting numbers are in the Museum of Biology of Barcelona and Bocage Museum of Lisbon. In the Academy at Philadelphia is a good series of Rhopalocera and Grypocera purchased by Mr. Williams, also a fine series of Italian Grypocera. Specimens are also in Boston (Weeks collection), in Reading, Pennsylvania, and in Montreal. Of course, there are untold lots sent all over Europe, India, Japan and elsewhere. The Roger Verity collection in Florence, Italy, contains many fine lepidoptera from our native home collecting and he has some few specimens from the Iberian Peninsula. Cristo, Cuba. February 3rd, 1930."

The Puparium of *Basilis corynorhini* (Ferris) (Diptera : Nycteribiidae).

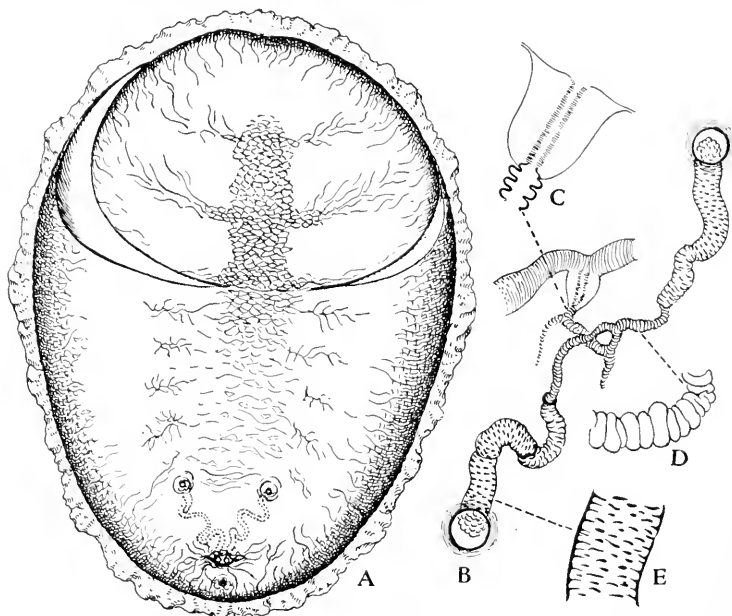
By G. F. FERRIS, Stanford University, California.

The information at present existing in regard to the developmental stages of the Nycteribiidae is still sufficiently meager to justify any additions that it may be possible to make. The larvae of various species have been seen and briefly described, something is known of their internal structure, and in the case of two species, *Cyclopodia greefi* Karsch and *Ercmoctenia progressa* (Muir), there is available detailed information concerning the developmental stages and reproductive habits. There seems to be no information concerning the immature stages of any of the New World species.

Puparia of *Basilis corynorhini* (Ferris) were found by the writer in some abundance deep in a mine tunnel in Deep Springs Valley, Inyo County, California, Sept. 24, 1928. These puparia were attached to the rock and appeared as flattened, black objects about 2 mm. long, looking very much like the familiar puparia of Aleyrodidae. Although they clung closely to the rock they could be removed without injuring them. Many of the puparia were empty, but several contained adults that were ready to issue and which permit the identification of

the species. It has previously been known from a single adult female.

These puparia agree very closely in their general character with those of the two species mentioned above. The ventral side, as in the other species, is thin and translucent, the dorsal side convex, heavily sclerotic and pigmented. It is evident that



Basilia corynorhini (Ferris).—A, puparium, dorsal aspect, operculum partially broken away; B, spiracular openings and tracheal trunk of right side; C, D, E, details of tracheal trunk from areas indicated.

in this species, as in the others where the process of larviposition has actually been observed, the larva is pressed by the female against the substratum while still soft and thus more or less "glued" down. About the margin there appears a thin, irregular rim that is evidently formed at this time.

The general appearance of the larva is as shown in the figure. The sclerotic derm of the dorsum is marked with rather faint reticulations, which in the median region become more distinct. Segmentation is very faintly indicated by the direction of the sculpturing. The anterior third or more of the

dorsum is involved in the operculum which breaks away at the time of emergence of the adult.

The tracheal system pertaining to the larva remains in part attached to the puparium. It is of a type that has been described at various times in the Nycteribiidae, but it has been possible to make some observations that extend our knowledge of the details of its structure. As in other Nycteribiidae, there are four spiracular openings, arranged in a triangle toward the posterior extremity of the body, the members of one pair being close together and borne on a slight tubercle. These are simple openings. The members of each lateral pair are connected by a longitudinal trunk (fig. B). In this species these trunks present some peculiar characteristics. The trunk is of a quite definite form, the curves as shown in the figure being apparently rather definitely fixed. For about one third of its length from each opening the trunk is of rather large diameter, is smooth walled, with numerous papillae on its inner surface (fig. E). The median third, however, is noticeably smaller and is composed of a series of coarse rings almost suggesting a string of beads (fig. D). From the middle point there arises a single, slender, coarsely-ringed branch, which sends off two short caecum-like branches and then expands into a curious, smooth, bell-shaped structure (fig. C), with a very narrow, fringed lumen, that communicates directly with the main tracheal trunk. Speiser has described the main tracheae of one species as lacking taenidia, but they are certainly present in the small portions of the trunks that remain in the specimens at hand.

A specimen of the larva of *Nycteribia pedicularia* Latr. is at hand for comparison and it would appear that there are differences in the tracheal systems of these two species. In *N. pedicularia* the tracheal trunks are of the same size throughout and are of the same character as the thicker portions of the trunk in *B. corynorhini*. It is possible that careful study will show differences which might permit at least the generic identification of such puparia.

The male of *B. corynorhini* has been unknown. Males are present in the material dissected from puparia, but it is hardly possible to figure and describe them accurately.

On the Naming of Individual Variants in Lepidoptera.

By ALEXANDER B. KLOTS, Cornell University, Ithaca, N. Y.

Of late taxonomists have been viewing with more or less irritation and alarm the increasing tendency of some workers to apply scientific names to individual variants in a wholesale manner, and even to establish systems to be followed in such application of names. It is very much to be hoped that this matter may be brought forward for open discussion by as many people as possible, in order that something may be done to reconcile such actions with recognized methods of scientific procedure, if such is possible.

Any recent worker in North American diurnals cannot have failed to find himself swamped in a sea of "transition forms", a term under which Mr. J. D. Gunder has been applying scientific names to a very large number of individual variants. As an aid in the application of such names Gunder has formulated a system of classification for the RHOPALOCERA (1) in which are included a number of points which appear to merit serious consideration. Inasmuch as Cockerell has recently commented upon this system, (2) pointing out some of the weak places, the present writer hopes that a discussion may be started of some of the points involved, and that Mr. Gunder will see fit to explain these points through the pages of this or of any other periodical.

WHAT, BIOLOGICALLY, ARE INDIVIDUAL VARIANTS?

The author considers that any individual which differs noticeably from the norm of its species (whatever that may be) will fall into one of the two very general categories which follow:

1. The characters in which the individual differs from the norm of its species have been caused by the direct effect of environment upon the soma alone, are not inheritable, and will not be directly transmitted to the offspring of the individual.
2. The characters in which the individual differs from the norm of its species, however caused, are inheritable and may be transmitted directly to the offspring of the individual.

The fundamental difference is that of inheritance. We cannot admit that any characters in an individual, no matter how striking, unless they are controlled by the germ-plasm, can directly affect the evolution of the species to which the individual belongs. Such individuals may indeed be of interest to the person interested in gathering together a collection of oddities; they may be of potential interest to the taxonomist if it is considered that the influence which produced the somatic changes may conceivably produce a change in the germ-plasm; but in comparison with those individuals in which a modification of the germ-plasm has actually taken place they must always occupy a place of very minor importance.

On the other hand it is undoubted that variants whose variations are directly inheritable hold the utmost significance for the student of taxonomy, for such individuals must undoubtedly have some effect on the evolution of their species. Just how great or how little this effect may be depends on an infinity of circumstances, but unquestionably merits the most careful investigation. It is equally obvious that investigation of such variants or "Mendelian forms" or "mutants" to give them their recognized names, should be made only by a worker with a knowledge of genetics, who will perform careful and exhaustive breeding experiments. To attempt the classification of such mutants, knowing nothing whatsoever about them except their appearance, and taking into account only the most prominent features of that, is to show either an almost complete ignorance of modern biology, or an unquenchable but misplaced optimism. Equally useless and misleading is any attempt to state whether any given variant can possibly affect the evolution of its species without exhaustive experiments by a trained worker to accurately determine the genetical status of the variant. Even this is not sufficient. A mutation may occur frequently enough to be of interest to a collector of oddities without being able to have any appreciable effect on its species. In such connection Jordan's Law, which postulates the existence of some sort of a barrier between all separating subspecies, is of the utmost importance. The mathematical calculations of Gerould (3: p. 520-

525) as to the chances of mutations affecting the general population of a species are extremely significant. Any work that does not take these factors into consideration is hardly to be taken seriously as far as its scientific value is concerned.

WHAT ARE TRANSITION FORMS?

As defined by Gunder (1) the "transition form" is composed of "individuals which occur irregularly within a species or within a race, and which by change of color or by change of pattern graduate with persistent characteristic similarity from near parental type up to definitely limited variation away from parental type." In the first sentence of the same article the statement is made that "The transition forms of the order Lepidoptera represent the most tangible and discernible evidence we can offer of gradual evolutionary change taking place within any of the orders of the insect class." In a very recent article (4) Gunder further states that "We are making a progressive step in that direction by classifying transition forms and allowing them the recognition they deserve. Their grade on the evolutionary stage is no longer a matter of guess work."

According to the above statements the "transition form" is supposed to affect the evolution of its species in a definite way. It must be understood that this way is with regard to the color and pattern differences which Gunder describes as occurring between the "transition form" and normal individuals of the species. It seems evident that according to this theory the "transition form" must be able to transmit the characters for these differences directly to its offspring by means of the germ plasm. If it were not able to do so it could hardly affect the evolution of its species unless we wish to suppose that its mere presence would inspire its more normal brethren to higher and more aberrant aims in life.

The "transition form" may therefore be regarded as a mutant in those characters in which it differs from the norm of the species. It is therefore by definition probably merely another name for "Mendelian form" or "mutant", and as such is superfluous.

The phrase "persistent characteristic similarity" is evidence that in defining "transition form" Gunder had some idea of orthogenesis in mind. Whether any of the various theories known as orthogenesis are acceptable or not is hardly to be discussed here. One thing only is evident—before any series of variants can be regarded as in any way orthogenetic that type of variation must be shown to occur with some degree of frequency. For the great majority of "transition forms" named by Gunder this will not hold. Most of them are of very rare occurrence compared to the great numbers of normal individuals of the species. Their orthogenetic status is therefore very doubtful.

All of this is, however, taking a great deal for granted. Before describing any specimen or series of specimens as a "transition form", mutant or member of an orthogenetic series the exact status of that specimen should be known, and the only way to accurately determine this status is by careful genetic experiments. The mere appearance of a specimen counts for very little, and is often misleading. By appearance alone nobody, in the absence of breeding experiments, can safely state whether any specimen is a mutant or a somatic-limited variant. It is well known that many striking variants may be produced by subjecting the pupa to extremes of temperature or humidity (5 and 6). It is equally well known that many other striking variants are mutants (3, 7 and 8).

There is therefore a considerable probability that Gunder has by practice made the term "transition form" fully as inclusive as "aberration" to which he himself objected as too inclusive. The use of the term should therefore be stopped before further confusion results.

ON THE CLASSIFICATION OF TRANSITION FORMS.

Gunder has proposed a system for the classification of "transition forms" in which all such variants are placed in one of the following categories: melanism, chromatism, albinism, pel-lucidism, immaculism, albifusism, chromatifusism and melanifusism.

The following subjects for classification under this system are suggested:

1. The forms of *Heliconius melpomene* in large series.
2. The eye colors of *Drosophila melanogaster*.
3. The melanic and melanistic forms of *Scelania bilunaria*, *Tephrosia Ectropis bistortata* and *Tephrosia E. crepuscularia*. (The melanic forms of the first two are Mendelian recessives, that of the last one is a Mendelian dominant, and the intermediate forms are heterozygous (7)).

In example 1 application of this system would be nearly impossible, and meaningless; in example 2 it would be meaningless and misleading; and in example 3 it would be misleading; in all three it would cause confusion and would be a sheer waste of time. The system of the geneticists is unquestionably better.

This classification, taking into account as it does only a few of the most prominent characters, is necessarily incomplete and superficial. No attention is paid to structural characters or, of course, to lethals, the appearance of which may profoundly affect the evolution of a species.

However the main point in which exception is taken to this system is that the classification is based on only a few phenotypic characters. While granting that to some people a purely phenotypic classification of mutants may be desirable, the writer postulates that to be worth anything such a classification should include *all* characters, not merely the most obvious ones.

It is an undeniable fact that the more a person knows about any phase of biology the more he comes to realize that most broad generalizations are untrustworthy. Such an attempt as Gunder's to classify all pattern changes of Lepidoptera, or even of Rhopalocera, or even of North American Rhopalocera in eight categories is one of these untrustworthy generalizations. That such a generalization may lead to actual error is all too obvious. The case of the GEOMETRIDAE cited is an excellent example of this.

(To be continued.)

Distributional List of Tachinid Flies from Utah.*

By J. A. ROWE, University of Utah, Salt Lake City, Utah.

This paper represents a preliminary study of the distribution of the Tachinid Flies from Utah. It is based upon specimens of this group which are now in the collections of the University of Utah, at Salt Lake City, and the Brigham Young University, at Provo, Utah. This List is by no means complete, and as further collection in the state proceeds, no doubt, many new records will be added.

At this time I wish to express my appreciation and gratitude to Dr. R. V. Chamberlin and Mr. A. M. Woodbury under whose direction this work was undertaken, and whose suggestions and criticisms have proved invaluable. I wish to thank Dr. V. M. Tanner of the Brigham Young University who has so generously turned his collection over to me, and finally Dr. J. M. Aldrich of the U. S. National Museum, who has verified all my determinations and has so kindly returned all specimens sent to him. He has also given me many references to literature that would have otherwise taken much time to find.

VIVIANIA GEORGIAE B. & B. St. George, 1924, A. M. Woodbury.

BELVOSIA BIFUSCATA Fab. Salt Lake City.

MELANOPHYRYS FLAVIPENNIS Will. University of Utah Campus, Salt Lake City, 1929, L. A. Woodbury.

LINNAEMYIA COMTA Fall. Cedar City, 1919; Miners Peak, Iron Co., 1919; Parowan, 1919, H. R. Hagan.

ERNESTIA AMPELUS Wlk. Flaming Gorge, Green River, 1926, V. M. Tanner; Salt Lake City, 1915, H. R. Hagan.

METAPHYTO GENALIS Coq. Salt Lake City, (U. of U. Campus), 1918, H. R. Hagan.

PHOROCERA FLORIDENSIS Ins. St. George, 1919, H. R. Hagan.

WINTHEMIA QUADRIPISTULATA Fab. Aspen Grove, Elev. 8000 ft. (Near Provo), V. M. Tanner.

TACHINOMYIA sp. Zion National Park, 1929, Coll. A. M. Woodbury.

GONIA SEGUAX Will. Salt Lake City, 1920, on blossoms of

* Contribution from the Zoological Laboratory of the University of Utah. No. 38.

Milletus, Coll. T. R. Chamberlin.

G. EXUL Will. Logan, 1929; Yosemite National Park, Calif., 1925, Coll. V. M. Tanner; Bismarck, N. D. M. W. Reese.

G. FRONTALIS Say. Salt Lake City, 1924-1928, Coll. A. M. Woodbury; Provo, 1928, J. A. Rowe.

G. sp.? Three other specimens of *Gonia* are in our collection which have the following records: Hamlin Valley, 1928, on *Opuntia* sp?; Springdale, 1928, V. M. Tanner; Santa Clara, 1928, A. M. Woodbury; Flaming Gorge, on thistles, 1926, V. M. Tanner.

SPALLANZANIA HESPERIDARUM Will. Sheep Creek, Duchesne Co., 1926, Clarence Cottam.

TROCHILODES SKINNERI Coq. Aspen Grove, Elev. 8000 ft., 1928, V. M. Tanner.

PELETERIA ITERANS Wkl. Salt Lake City, 1915-1923, T. R. Chamberlin; Cedar City, 1919; Bellevue, 1919, H. R. Hagan.

P. CORNIGERA Curr. Aspen Grove, Elev. 8000 ft., 1929, V. M. Tanner.

P. INCONFESTA Curr. Aspen Grove, Elev. 8000 ft., 1929, V. M. Tanner.

P. CAMPESTRIS Curr. Maple Canyon, 1923, S. Aldous; St. George, 1919, H. R. Hagan; Cedar City, 1919, H. R. Hagan; Tooele, 1927, A. M. Woodbury; Eureka, 1927, A. M. Woodbury.

P. TOWNSENDI Curr. St. George, 1929, V. M. Tanner.

ARCHYTAS LATERALIS Macq. Santa Clara, 1919, H. R. Hagan.

PARACHYTAS DECISA Wlk. Sheep Creek, Duchesne Co., 1926, C. Cottam; Lake Hotel, Yellowstone National Park, 1929, V. M. Tanner; Parowan Canyon, 1918, H. R. Hagan.

FABRICIELLA ELEGANS Wied. Collected in Utah but exact locality unknown.

F. DAKOTENSIS Towns. Wellsville Canyon, flying among the flowers, 1926, V. M. Tanner.

F. ROSTRATA Tothill. Cedar City, 1919; Salt Lake City, 1915-19, S. J. Snow.

F. ACUMINATA Tothill. Maple Canyon, San Pete Co., 1923, S. Aldous.

F. SPINOSA Tothill. Male Canyon, Sanpete Co., 1923; Parowan, 1919; Miners Peak, Iron Co., 1923, A. M. Woodbury.

HYSTRICIA ABRUPTA Wied. Aspen Grove, Elev. 8000 ft., V. M. Tanner.

DEJEANIA VESTATRIX O. S. Parowan Canyon, 1923; Maple Canyon, Sanpete Co., 1924; Zion National Park, 1924; Coll.

A. M. Woodbury. Provo, 1929, V. M. Tanner; Sheep Creek, Dushesne Co., 1926, C. Cottam.

PARADEJEANIA RUTILOIDES Jaen. Box Canyon (Maple Canyon?) 1923, Coll. A. M. Woodbury.

JURINIOPSIS ADJUSTA V. I. W. Box Canyon, Sanete Co., 1923; St. George, 1923, A. M. Woodbury.

WOHLFAHRTIA MEIGENII Schin. Cedar City, 1919, H. R. Hagan.

MASIPHYA CONFUSA Ald. Parowan Canyon, 1919, H. R. Hagan.

APHITIA OCYPTERATA Towns. Aspen Grove, Elev. 8000 ft., 1928, V. M. Tanner.

Dynastes tityus in Pennsylvania and Delaware (Coleop.: Scarabaeidae).

Dear Dr. CALVERT: I was much interested in your *Dynastes tityrus* paper in the June NEWS, partly because the insect has turned up here in New Castle County, Delaware, twice to my knowledge, and partly for a reason which I will explain. First, I have an earlier published record for "Pennsylvania". If at the Academy you will take down Vol. IV (1774) of DeGeer's *L'Histoire des Insectes*, and turn to page 306, you will find this record, and reference to an illustration of the insect, Pl. 18, fig. 10. A portion of the text reads: "M. Acrelius m'a envoyé ce Scarabé de Pensylvanie, ou, il l'a trouvé dans les bois, * * * M. Acrelius m'a dit, que le Scarabé pince très-fort avec ses deux grandes cornes, que se recontrent avec leurs pointes quand il hausse le tête." And now comes my other reason for special interest in DeGeer's insects of 'Pensylvanie'. Acrelius was the Swedish pastor at *Christina (Wilmington, Delaware)*; many if not most of the North American insects described by DeGeer were sent him by Acrelius, with frequent text references to this fact, sometimes "captured by Acrelius in his garden", etc. Acrelius was here from 1749 to 1756. After his return to Sweden he wrote "A History of New Sweden", which has been translated into English and published by the Historical Society of Pennsylvania, 1874. In the preface to his "History", Acrelius wrote "Although my recreation consisted, in a great measure, in the collection of insects, birds, fish, quadrupeds, plants, ores, gravels, clay, etc., which I gathered at the expense of his Excellency, the Chamberlain, Mr. Charles deGeer, for his valuable cabinet". * * * In his day, what is now Delaware,

spoken of as the three lower counties on the Delaware, *was* part of the Province of Pennsylvania. Acrelius was "Provost of the Swedish Churches in America, and Rector of the Old Swedes' Church, Wilmington, Del." and undoubtedly was familiar with portions of Pennsylvania proper, as well as with the three lower counties (now Delaware). It would be interesting to go through DeGeer more thoroughly than I have attempted to do, and to determine in how many instances his references to collections by Acrelius are definite enough to change type localities from "Pensylvanie" to New Castle County, Delaware.

The Swedish pastors—several of them at least—took a keen interest in natural history. In the library of the Pennsylvania Historical Society, Philadelphia, is a type-written copy (translation) of the journal of Hesselius, who took charge of Christina Parish, 1713. This 80-page manuscript (never published, I believe) is largely taken up with natural history observations, and includes a most interesting account of the 17-year cicada, as he observed it and inquired into its history. I do not recall that he mentions *Dynastes*, which I suppose has always been a rarity here; the two captures referred to in the early lines of this letter were taken perhaps twenty years ago (they are in the collection of our local Society of Natural History), and I'm not sure that record was made (or if made, preserved) of their dates of capture.

I'm sorry that Acrelius, as he says, "carefully abstained from the department of Natural History" (meaning, I suppose, for publication) "inasmuch as the celebrated Professor Kalm, somewhat before, and during my time, was visiting the same regions for this special object". I hope, some day, you'll take a look at the Hesselius paper, which I took notes from several years ago and found very interesting.

In the first edition of Say's "American Entomology," of which I believe a copy is kept under lock and key at the Academy (Mr. Cresson will recall it), plate II and text (pages not numbered) relate to "*Scarabaeus tityus*", and fix the date of its occurrence in the old cherry tree at Philadelphia at about 1813 ("about four years ago", Say's publication being dated 1817).

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2000 Riverview Avenue,

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF
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 numbers **within brackets** [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

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ANATOMY, PHYSIOLOGY, ETC.—**Allard, H. A.**—Changing the chirp-rate of the snowy tree cricket *Oecanthus niveus* with air currents. [68] 72: 347-349. **Baumgartner & Payne.**—Intra vitam technique for the study of the living cells of insects. [68] 72: 199-201, ill. **Borgmeier, T.**—Zur morphologie und biologie von *Pseudohypocera nigrofascipes* (Phoridae). [34] 90: 92-104, ill. **Buxton, P. A.**—Evaporation from the meal-worm (*Tenebrio*) and atmospheric humidity. [Pro. R. Soc. London], (B), 106: 560-577, ill. **Crampton, G. C.**—Some anatomical details of the pupa of the archaic tanyderid dipteran, *Protoplasma fitchii*. [10] 32: 83-95, ill. **Cressman, A. W.**—The feeding rate of the Australian lady beetle, *Vedalia cardinalis*. [47] 41: 197-203, ill. **Crevecoeur, A.**—Y a-t-il coexistence normale de la reine et d'ouvrières pondeuses dans les ruches d'abeilles? [33] 70: 209-215. **Delkeskamp, K.**—Biologische studien über *Carabus nemoralis*. [46] 19: 1-58, ill. **Dubuisson, M.**—Cardiac automatism in insects. [The Collecting Net] 5: 166-167. **Edwards, E. E.**—On the morphology of the larva of *Dorcus parallelipedus*. [Jour. Linnean Soc., London] 37: 93-108, ill. **Friedrich, H.**—Weitere vergleichende untersuchungen über die tibialen scolopalorgane bei orthopteren. [94] 137: 30-54, ill. **Hibbard, H.**—Some cytological observations on the silk gland of *Bombyx mori*. [The Collecting Net] 5: 109-111. **Hirschlerowa, Z.**—Sur les composants plasmatiques des cellules sexuelles males chez *Phryganea grandis* (Trichoptères). [77] 104: 1155-1157, ill. **Huettnner, A. F.**—Meiosis in *Drosophila melanogaster*. [The Collecting Net] 5: 112-113. **Kemper, H.**—Beiträge zur biologie der bettwanze (*Cimex lectularis*). [46] 19: 161-183, ill. **Mail, G. A.**—Viability in eggs of *Aedes campestris* (Culicidae). [68] 72: 170. **Miley, H. H.**—Internal anatomy of *Euryurus erythropygus* (Diplopoda). [43] 30: 229-254, ill. **Pflugfelder, O.**—Zur embryologie des skorpions *Hormiurus australasiae* [94] 137: 1-29, ill. **Rayleigh, L.**—The iridescent colours of birds and insects. [Pro. R. Soc., London], (A), 128: 624-641, ill. **Reuter, E.**—Beiträge zu einer einheitlichen auffassung gewisser Chromosomenfragen. [Acta Zool. Fenn.] 9: 484pp., ill. **Slifer, E. H.**—Mitotic activity in the grasshopper embryo. [The Collecting Net] 5: 115-116. **Swingle, M. C.**—Anatomy and physiology of the digestive tract of the japanese beetle. [47] 41: 181-196, ill. **Tokunaga, M.**—The morphological and biological studies on a new marine crane-fly *Limonia* (*Dicranomyia*) *Monostromia*, from Japan. [Mem. Coll. Agric. Kyoto Imperial Univ.] 1930: 93pp., ill. **Vimmer, A.**—Souborný přehled po tracheálním systému larev hmyzu dvojkrídleho. [Caso-

pis] 26: 68-88, ill. **Wiedemann, J. F.**—Die zelluloseverdauung bei lamellicornierlarven. [46] 19: 228-258, ill. **Yung-Tai, T.**—Recherches sur l'histogenèse et l'histophysiologie de l'épithélium de l'intestin moyen chez un Lépidoptère (*Galleria mellonella*). [Bul. Biol. Fr. & Belg.] Suppl. 12: 144pp., ill.

ARACHNIDA AND MYRIOPODA.—**André, M.**—Sur une larve d'acarion parasite de l'homme et des animaux en Uruguay, appartenant au genre *Thrombicula*. [54] 8: 355-361, ill. **Attems, G.**—Myriapoda. 2. Scolopendromorpha. [Das Tierreich] 54: 308pp., ill. **Bristowe, W. S.**—Notes on the biology of spiders. I. The evolution of spiders' snares. II. Aquatic spiders. III. Miscellaneous. [75] 6: 334-353, ill. ***Bryant, E. B.**—New species of the genus *Nysticus* (Arachnida). [5] 37: 132-140, ill. ***Marshall, R.**—The water mites of the Jordan Lake Region. [Trans. Wisconsin Acad. Sci., Arts & Let.] 25: 245-249, ill. **Verhoeff, K. W.**—Bronns Tierreichs in wort und bild. Bd. V. Abt. 2, Myriapoda. Diplopoda. Lief. 10: 1523-1674, ill.

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LEPIDOPTERA.—***Clark, B. P.**—Sundry notes on Sphingidae and descriptions of seven new forms. [Proc. New England Zool. Club] 12: 25-30. ***Gehlen, B.**—Neue Sphingiden. (S) [14] 44: 130-131, ill. [18] 24: 217-220. **Gunder, J. D.**—Butterflies of Los Angeles County, California. [38] 29: 39-95, ill. ***Hall, A.**—New forms of Nymphalidae in the collection of the British Museum. (S). [9] 63: 156-160. ***May, E.**—*Agrias claudia roquettei*. (S). [Bol. Mus. Nac., Rio de Janeiro] 5: 35-38, ill. ***McDunnough, J.**—Notes on *Scotogramma oregonica* and its allies. [4] 62: 180-183, ill. ***Meyrick, E.**—Exotic Microlepidop-

tera. (S). [3] 577-608. **Talbot, G.**—A monograph of the Pierine genus *Delias*. Part 5: 220-259, col. pl.

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SPECIAL NOTICES.—Danmarks Fauna.—Biller VIII. (Halipilidae, Dytiscidae & Gyrinidae.). By V. Hansen. The descriptions and illustrations of the larvae in this work on Danish Coleoptera will probably be interesting to those studying these immature stages. 233pp., ill. **Die Tierwelt Deutschlands.**—Zweiflugler oder Diptera. IV. Syrphidae and Conopidae. By P. Sach and O. Krober. A valuable paper to students of these families. 142pp., ill.

Doings of Societies

THE ROCKY MOUNTAIN CONFERENCE OF ENTOMOLOGISTS.

The seventh annual meeting of The Rocky Mountain Conference of Entomologists was held in Pingree Park, August 18 to 23, 1930, inclusive. This again took the form of an informal meeting at the State Agricultural College Forestry Lodge in the mountains. Members of the families of a number of the entomologists joined in the occasion. A total of 52 were present. The following are those that were directly interested in entomology:

C. L. Marlatt and W. H. Larrimer, Washington, D. C.; C. P. Gillette, Carl A. Bjurman, Mrs. Esther Travis, Miss Miriam A. Palmer, John L. Hoerner, Sam C. McCampbell, Leslie B. Daniels, Geo. M. List, F. T. Cowan, C. R. Jones, R. G. Richmond and Bernard Travis, Fort Collins, Colorado; Bernard Liston and Rowan Potter, Wichita, Kansas; A. W. Lingquist, Manhattan, Kans.; John C. Hamlin, Geo. J. Reeves and I. M. Hawley, Salt Lake City, Utah; W. A. Shands and D. G. Rice, Grand Junction, Colorado; C. J. Drake and Tom A. Brindley, Ames, Iowa; J. H. Newton, Paonia, Colo.; A. P. Sturtevant and C. L. Corkins, Laramie, Wyoming; Leonard Haseman, Columbia, Missouri; Wilber G. Fish, Ithaca, New York, and Elwood H. Sheppard, Reading, Minnesota.

A total of ten sessions were held during the week for discussion and presentation of papers. The following is a list of the formal subjects discussed:

Orthoptera.—The Control Campaign Against the Mormon Cricket, F. T. Cowan.

Coleoptera.—The Rose Snout Beetle, J. L. Hoerner; The Potato Flea Beetle, L. B. Daniels; Alfalfa Weevil Population, J. C. Hamlin; Notes on the Alfalfa Weevil, I. M. Hawley.

Hymenoptera.—Food Habits of the Agricultural Ant, C. R. Jones.

Homoptera.—The Beet Leaf Hopper, W. A. Shands; Generic and Specific Characters of Aphids, M. A. Palmer.

Apiculture.—Work of the Intermountain Bee Station, A. P. Sturevant; Metabolism Studies of the Honey Bee, C. L. Corkins.

General.—Onion Insects of Iowa, C. J. Drake; Importance of Insect Physiology and Morphology, Leonard Haseman; The Work of the United States Bureau of Entomology, and the Mediterranean Fruit Fly Situation, C. L. Marlatt; New or Outstanding Insects of the Year, Leonard Haseman, J. H. Newton, C. J. Drake, G. I. Reeves, A. W. Lindquist, B. Liston, R. Potter, W. A. Shands, F. T. Cowan, S. C. McCampbell, C. P. Gillette; Early Notes on Colorado Insects, C. P. Gillette; Red Clover Pollinization, R. G. Richmond; Temperature and Humidity Control Boxes, T. A. Brindley; Cherry Insects of Northern Colorado, G. M. List; Some External Parasites of the Rodent Family, Sciuridae, in Colorado, S. C. McCampbell; Heat, Caramelization and Regranulation of Honey, R. G. Richmond.

Symposium.—Research in Entomology: Training for Research, C. P. Gillette; Organization for Research, C. L. Marlatt; Opportunities in Research, W. H. Larrimer; What is Wrong in Entomological Research, The Youngsters.

It was the unanimous opinion of those present that this type of meeting should be continued.

The officers elected for 1931 were C. P. Gillette, Chairman; George I. Reeves, Vice-Chairman; George M. List, Secretary; C. R. Jones, Treasurer.

GEORGE M. LIST, *Secretary*.

CORRECTION.

ENT. NEWS, Vol. xli, page 242, July, 1930. The author of the article credited to Orfila, R. N.—La primera exposición Entomológica Argentina efectuada en Buenos Aires del 19 al 25 de Septiembre de 1928, should have been given as Dallas, E. T., and the correct reference is [104] 2: 121-156.

Subscriptions for 1931 are now payable.

DECEMBER, 1930

ENTOMOLOGICAL NEWS

Vol. XLI

No. 10



FERDINAND HEINRICH HERMAN STRECKER
1836-1901

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Stated Meetings of The American Entomological Society will be held at 7.30 o'clock P. M., 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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MEXICAN MINISTRY OF AGRICULTURE
MEXICO CITY MEXICO



DR. ALFONSO DAMPF

ENTOMOLOGICAL NEWS

VOL. XLI.

DECEMBER, 1930

No. 10

North American Institutions Featuring Lepidoptera.

XIX. Entomological Institutions in Mexico.

By J. D. GUNDER, Pasadena, California.

(Plates XXIX-XXXIII).

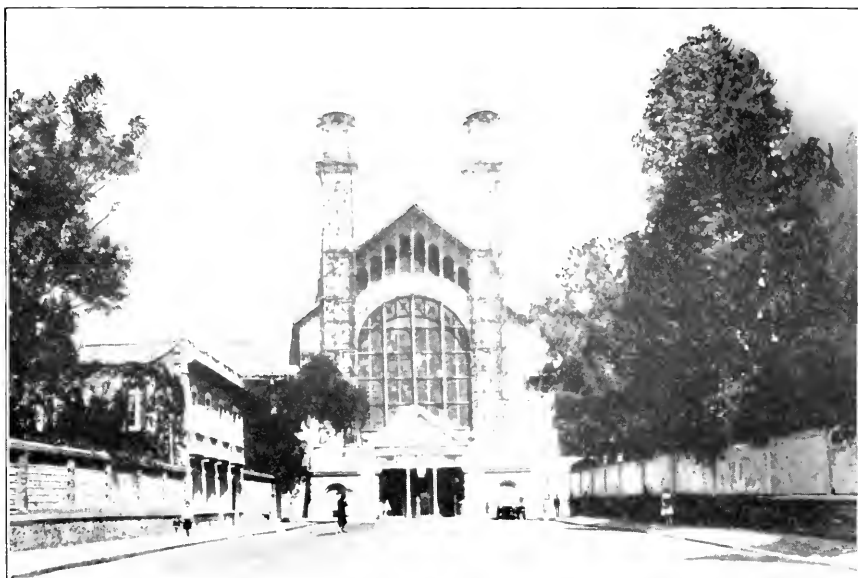
Mexico, to North American entomologists, is one of the most interesting countries in the world for it presents a field of virgin and almost unlimited possibility. With a great diversity of climate and vast land areas, ranging from tropical to near arctic on the lofty peaks, its variety of forms can only be compared to certain of the western countries of South America. Before the great Ice Age began and before the glaciers dominated our territory, North America was inhabited, not only by the present fauna and flora, but also by a great number of the southern plants and animals, which retreated to the south before the cold and found refuge in the plains and mountains of Mexico. The entomological fauna of Mexico is therefore of interest to every taxonomist and student collector and especially to those in south-western United States, not only for the great similarity which exists, for example, between the insect world of Arizona and of Sonora, or between Texas and Tamaulipas, but chiefly for the stock of preglacial fauna now distributed over the mountains of this southern Republic. It is too early, of course, to discuss from a zoological point of view, the history of Mexican insect life, which is very imperfectly known. Unfortunately Mexican entomology is still in its infancy.

Many species of Lepidoptera from Mexico were originally described by Linnaeus and his associates and in recent years since the publication of the *Biologia Centrali-Americana*, research work has been greatly stimulated. F. D. Godman and Osbert Salvin prepared the *Biologia* parts relating to the Rhopalocera and Herbert Druce and others completed the Heterocera sections.

The oldest of the Mexican lepidopterologists and the owner of the largest collection of Mexican butterflies and moths is Mr. Robert Müller of Mexico City. See Plate XXXIII. Aided by numerous local collectors and for over a period of 40 years, he has accumulated nearly 5000 species, including Pyralids. Practically all his new species and forms, numbering nearly 1000, were described several years ago by the late Dr. H. G. Dyar and by Schaus, Busck and Clark and the types of practically everything are in the National Museum at Washington, except paratypes which were retained by Müller. There are still some 500 undescribed lepidoptera in the collection, mostly Noctuids and Geometrids. Recently Mr. Müller's nephew, Prof. Max Draudt, a well known collaborator of Seitz, has published some new forms of Noctuids and Bombycids from this outstanding collection. Another lepidopterist of note in Mexico is Mr. Pablo Petersen of Puebla. His collection, though extensive, does not contain type material.

At the present time organized entomological investigation, including the study of lepidoptera, is being carried on by three separate institutions or at three individual centers of research. All are in Mexico City and each has men in charge who are thoroughly scientific and capable, so that the next decade should see a more rapid advancement in entomological knowledge within the Republic.

FIRST. At the Mexican Plant Protection Service of the Ministry of Agriculture, which combines the activities of the U. S. Bureau of Entomology, of the Plant Quarantine and Control Administration, the Insecticide & Fungicide and of the Phytopathological Service of the U. S. Bureau of Plant Industry. The building of the Department of Research, which includes a chemical, a bacteriological, a mycological and an entomological laboratory, with insectaries and experimental fields, is shown at the top of Plate XXIX and is under the direction of Dr. Alfonso Dampf. This building is quite new, being only recently occupied and the grounds were not in shape when the photo was taken. The Department possesses a collection of Mexican insects in all Orders and a special collection of agriculture pests. Breeding experiments with material from all parts of Mexico



THE NATIONAL MUSEUM OF NATURAL HISTORY OF MEXICO CITY



DR. ISAAC OCHOTERENA, DIRECTOR



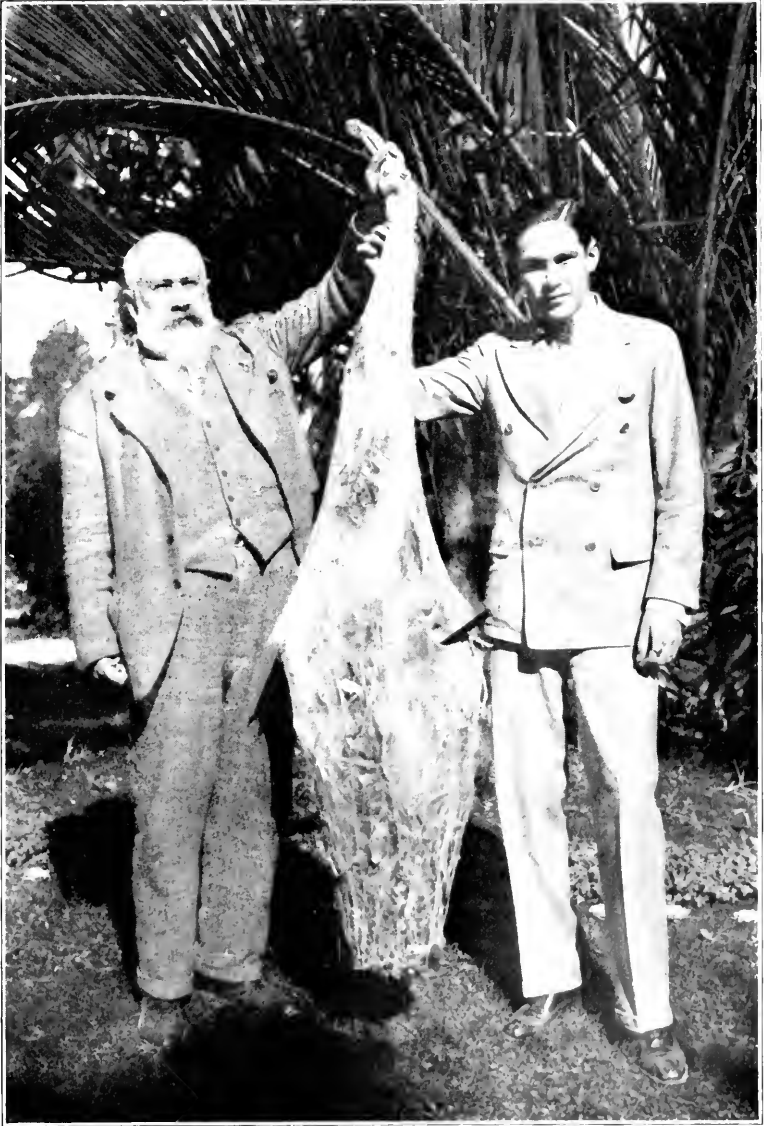
Dr. W. J. Holland, Dr. C. C. Hoffmann and Dr. I. Ochoterena on the terrace of the Casa del Lago in Mexico City.
Dr. Holland is holding a cover-glass containing a specimen of *Clisiocampa azteca* which they are interested in examining.

yield interesting specimens, especially in Lepidoptera and Coleoptera. Plate XXXII shows a silk nest of *Eutachytera psidii* built by living caterpillars and the man to the left is Leopold Conradt, curator of the Republic's entomological collections. He is an old experienced field man who has made entomological trips to central Asia and tropical Africa, and who collaborated with Godman & Salvin as editors when they were assembling data, especially on Coleoptera from Guatemala and Mexico as well. The man to the right in the picture is Mr. Ignacio H. Olmedo, a capable young entomologist from the Department.

Dr. Dampf is organizing and building up Mexico's entomological service and he is doing about what Riley and Howard accomplished for the United States in the early days. Conditions in Mexico are quite different, both politically and economically however. The Doctor was born on the small island of Dagoe in the Baltic Sea, between Sweden and Esthonia, November 20, 1884. He went to school in Reval, Esthonia, where he had the good fortune to come in touch with that first class lepidopterist and scientist, Wilhelm Petersen, known through his profound investigations on the morphology and anatomy of Lepidoptera. The University years were spent in Königsberg, the home of Immanuel Kant, the great philosopher, and the doctors' degree was received in 1909, when he entered the staff of the Zoological Museum of the University, as assistant keeper of the collections with a view of preparing for a professorship. A trip in 1910 to Egypt and in 1912 to the Faroe Islands in the North Atlantic were used to collect entomological material. In 1913 he followed a call of the Imperial Colonial Office and became Government Entomologist in German East Africa, now Tanganyika Territory. At this time a fascinating period of travel and collecting began, only to be interrupted and ended by the world war. Dr. Dampf was for a year and a half Director of the Cotton Experiment Station at Mpanganya on the Rufiyi River near which wild elephants, zebras, waterbucks and hippopotamuses abounded. Later he enlisted under the immortal Lettow-Vorbeck and went into the brush to defend East Africa against a foe who was a hundred times stronger and more numerous. The years of 1918 and

1919 were passed in Egypt (entomological results unpublished) and between 1920-23 quiet entomological work was again continued in the old City of Königsberg. By October, 1923, the old continent was changed for the new and Dr. Dampf was invited to Mexico by the government to become professor of entomology and parasitology. Numerous field trips through Mexico followed, including a six months' expedition on horse-back into Yucatan, British Honduras and Guatemala. These excursions yielded the necessary knowledge of the land and folk and brought an enormous amount of material together which is still being sifted. In 1927 the Plant Protection Service of the Mexican Government was founded and Dr. Dampf was appointed Head of the Research Department, a position which he still holds. His 85 publications comprehend Lepidoptera, Aphaniptera (fleas), Diptera and agriculturally and medically important subjects. He has just finished an article on an interesting lepidopteron from baltic amber and recently sent in a description of the first Mexican Paussid (Ins., Coleoptera). Also he is working on a monograph of the Mexican Simuliids (black flies or buffalo gnats). His personal collection includes Microlepidoptera, slides of fleas and insects of economic importance.

SECOND. The Department of Public Health in Mexico City with its dependency, the Institute of Hygiene, is where studies in medical entomology are being carried on. The entomological laboratory at the Institute is under the direction of Prof. C. C. Hoffmann, who is actively working on the mosquitoes of Mexico. He has published extensive papers on Mexican ticks and has investigated the transmission of a filariasis by the *Simulium* gnats. Prof. Hoffmann has a fine personal collection of Mexican Lepidoptera and has described several species and forms. His collection is probably next to Müller's in size and is being continually built up. It has the reputation of being in perfect order and up-to-date. A portrait of Prof. Hoffmann is found on Plate XXXI together with those of I. Ochoterena and Dr. W. J. Holland. Dr. Holland was in Mexico City this last spring setting up a replica of the skeleton of the dinosaur *Diplodocus carnegiei* for the National Museum and I am indebted



LEOPOLD CONRADI (Left) and I. H. OMETTO (Right) Holding a Silk
Nest of the Social Living Caterpillars of *Eutachyptera psidi*



DON ROBERTO MÜLLER OF MEXICO CITY HAS THE LARGEST
COLLECTION OF MEXICAN LEPIDOPTERA

to the Doctor for this picture. He also furnished me with certain data concerning entomological conditions in Mexico.

THIRD. At the Biological Institute of the Mexican National University various phases of entomological study are continually in progress. This Institution was formerly under the supervision of the Mexican Secretary of Agriculture, but last year came under the control of the University. The actual director is Prof. Isaac Ochoterena who is a fine scientist and known more as a pathologist and botanist. Portrait on Plate XXX. His staff works on problems of pure and applied science, as on hydrobiology and microbiology and on the flora and fauna of Mexico in general, etc. Prof. Hoffmann and Prof. Leopoldo Ancona H. are on the entomological staff of this Institute and they have published various and many papers on Mexican entomology.

Prof. Isaac Ochoterena was born at Atlixco, Puebla in 1885 and he is the son of the late Colonel Pedro Ochoterena, who was a distinguished Mexican militarist in the defense of his Country at the time of the so-called Maximilian Government. Prof. Ochoterena's early studies were accomplished in the old National Preparatory School and a few years afterwards he was appointed Inspector of Education in the State of Durango. Later he was called to the chair of embryology and histology of the National Medical College and to professorship in the Military Medical School. He has written a text book on biology and published some 76 scientific papers, of which a third or more are dedicated to the histology of the nervous system.

Prof. Ochoterena is head of the National Museum of Natural History in Mexico City which is fostered by the Biological Institute of the University. It is located on Calle Chopo and occupies a huge building constructed of steel and glass (Plate XXX). This building was erected a number of years ago as one of the structures used by the International Exposition. At the time it was filled with Japanese exhibits. Its replacement by a thoroughly modern museum building has been for a long time agitated. This Museum, which is the principal one in Mexico, originates from the union of several ancient museums

and from the collections of the Mexican geographical explorations. Prominent naturalists such as Villada, Urbina, Rovirosa, Herrera, Mendoza, Penafiel, Patoni, Ferrari-Perez and a local host of others have contributed towards its contents. The botanical department boasts of a splendid herbarium and there is a well classified collection of rocks and minerals. The library of the Institution contains a rich selection of books and pamphlets numbering more than twenty thousand. The collections of insects on display are largely synoptic in character, and, while many Mexican insects are shown among the Lepidoptera, there are also fair series of the Lepidoptera of other parts of the world. I believe this Museum houses the only public display, or only good public display, of insects in Mexico.

[This article concludes the series on "North American Institutions featuring Lepidoptera" which has been running continuously in the News since February, 1929. I would like to take this opportunity of expressing my sincere thanks to the many entomologists who have made possible the numerous plates and these pages of text. The future will decide whether they have been worth while.—AUTHOR.]

Spiders Found in the Stomachs of *Sceloporus graciosus graciosus* (B. & G.) (Araneina).

The following list represents the species of Spiders found in the stomachs of a series of lizards of the species *Sceloporus graciosus graciosus* (B. & G.), which were collected at localities in Utah as indicated below.

Mr. Gertsch identified the spiders, most of which were males.

GNAPHOSIDAE Gen. et sp? Fillmore Canyon, June, 1927, U. of U. Zool. Exp.

ARANEA sp? Fillmore Canyon, June, 1927, U. of U. Zool. Exp.

XYSTICUS SIMPLICIOR Chamberlin and Gertsch. Fillmore Canyon, June, 1927, U. of U. Zool. Exp.

LYCOSA AVIDA (Walckenaer). Ephraim, Utah.

PELLENES HIRSUTUS Peckham. Hatch, Utah, June, 1927, U. of U. Zool. Exp.

PELLENES OREGONENSIS Peckham. Hatch, Utah, June, 1927, U. of U. Zool. Exp.

PHIDIPPUS sp? Fillmore Canyon, June, 1927, U. of U. Zool. Exp.

WILLIS J. GERTSCH and LOWELL A. WOODBURY,
University of Utah, Salt Lake City, Utah.

Descriptions of Four New Species of Mimetic Miridae (Hemiptera).*

By HARRY H. KNIGHT, Ames, Iowa.

Coquillettia nigrithorax n. sp.

Clavus white and therefore suggestive of *foxi* Van D., but differs otherwise in the black color of head, thorax and legs; also differs in the smaller size and relatively longer rostrum.

♂. Length 4.3 mm., width across base of cuneus 1.3 mm. Head: width .69 mm., vertex .30 mm. Rostrum, length 1.3 mm., just attaining hind margin of sternum. Antennae: segment I, length .26 mm.; II, 1.21 mm.; III, 1.12 mm.; IV, .56 mm.; black. Pronotum: length .69 mm.; width at base 1.12 mm.

Color black, coxae and femora of front legs, and sometimes lower half of face, brown with orange tinge. Clavus opaque white, tinged with yellow, blackish at base; corium clear white, black on apical third; embolium pale, fuscous at base and black on apical third. Cuneus opaque white on basal half, tinged with yellow bordering the black on apical half. Membrane uniformly blackish, pale with milky tinge across basal three-fifths of larger areoles. Ostiolar peritreme and posterior margin of third abdominal segment white as in allied species.

Holotype: ♂ September 9, 1928, Tucson, ARIZONA (A. A. Nichol); author's collection. *Paratypes*: 3 ♂ August 16, Apache County, 2 ♂ August 18, 1927, Socorro County, Arizona (R. H. Beamer).

Coquillettia granulata n. sp.

Allied to *atrithorax*, but differs in the smaller size, white discal area of membrane, and the fine, white granular coating on all parts of the body.

♂. Length 3.4 mm., width .98 mm. Head: width .69 mm., vertex .31 mm. Rostrum, length 1.17 mm., reaching to near posterior margins of middle coxae. Antennae: segment I, length .21 mm.; II, 1.08 mm.; III, broken; black. Pronotum: length .62 mm., width at base .99 mm.

Black, jugs and lora brownish; all parts of body including hemelytra and legs, finely coated with a white granular exuda-

* Contribution from the Dept. of Zoology and Entomology, Iowa State College, Ames, Iowa.

tion which is rather similar to that found in many species of *Platytytellus*. Hemelytra black, transversely white across clavus, corium, and embolium between tip of scutellum and tip of clavus; basal two-fifths of cuneus opaque white. Membrane fuscous, larger areoles and discal area between and extending distad to slightly beyond a line connecting tips of cunei, milky white. Ostiolar peritreme and posterior margin of third abdominal segment, white.

♀. Length 3.4 mm.; wingless, ant-like. Uniformly black, covered with a fine granular white residue as in the male. Head: width .74 mm., vertex .60 mm.; length .99 mm., rather thick. Pronotum: length .58 mm., greatest width (.62 mm.) across coxal clefts which are visible from above; strongly and evenly convex but more cylindrical than globose. Without vestige of wings; tergite of first abdominal segment strongly arched, pale; posterior margin of second tergite and the posterior half of the sternite of third segment, pale. Abdomen behind the third segment strongly globose, sparsely clothed with pale pubescence.

Holotype: ♂ May 21, 1909, West Wats, UTAH (E. D. Ball); author's collection. *Allotype*: same date as the type. *Paratypes*: 3 ♂, taken with the types. The writer is indebted to Dr. Ball for this species which was received unmounted in a pill box with a few other specimens.

***Sericophanes albomaculatus* n. sp.**

Allied to *triangularis* Kngt., and having very similar white markings, but differs in the more convex scutellum and in the shorter second antennal segment which is not equal to basal width of pronotum; also differs in the dark brown color and blackish membrane.

♂. Length 3.6 mm., width 1.09 mm. Head: width .69 mm., vertex .32 mm. Rostrum, length 1.64 mm., reaching upon fourth ventral segment, dark fuscous brown. Antennal segment I, length .216 mm., pale brownish; II, .92 mm., brown to fuscous; III, .65 mm., dark fuscous; IV, .56 mm., blackish. Pronotum: length .64 mm., width at base 1.05 mm.; disk dark chestnut brown, shining, calli, collar, and anterior half of propleura, reddish brown. Scutellum conically produced, distinctly higher than in *triangularis*; mesoscutum declivent, sloping sharply downward to the grooved line separating the scutellum. Hemelytra dusky brown, fuscous bordering the white

spots and inner apical angles of corium; white spots nearly as in *triangularis*, a subtriangular white spot on basal half of corium, its apex on clavus and base on embolium; a smaller white spot on corium bordering base of cuneus, also a small round spot on corium bordering claval suture just before apex of clavus. Cuneus dark chestnut brown to blackish, shining; embolium brownish black between the white spots, also shining. Membrane and veins uniformly dark fuscous. Ventral surface and legs dark brown to blackish, hind coxae, ostiolar peritreme, and middle coxae except base, white. Dorsum sparsely clothed with erect, long pale hairs, also intermixed with some shorter pubescent hairs.

Holotype: ♂, Fort Davis Mountains, TEXAS (O. C. Poling); author's collection.

***Cyrtopeltocoris gracilentis* n. sp.**

Allied to *albo-fasciatus* Reut., but differs in the longer second antennal segment, more slender head and more strongly arched scutellum.

♂. Length 3.5 mm., width across base of cuneus 1.04 mm. Head: width .69 mm., vertex .30 mm.; from base of vertex to tip of tylus .60 mm., height of an eye .35 mm. Antennae: segment I, length .23 mm.; II, 1.04 mm.; III, .86 mm.; IV, .60 mm.; pale dusky, last two segments more brown. Pronotum: length 1.04 mm., width at base .86 mm. Scutellum more strongly convex or conically produced than in *albo-fasciatus*. Color reddish brown to dark brown and with white marks nearly as in *albo-fasciatus*. With band of white crossing clavus midway between tip of scutellum and tip of clavus and extending across corium to radial vein; also white on tip of corium bordering cuneus. Membrane and veins uniformly pale fuscous. Legs brown, hind and middle coxae and the trochanters, pale; apices of tibiae pale; tarsi, fuscous apically. Clothed with fine, short, pale pubescence, sparsely intermixed on hemelytra and scutellum with a few long, erect pale hairs.

Holotype: ♂ September 5, 1926, Eufaula, ALABAMA (H. H. Knight), collected at light; author's collection.

I have previously recorded this specimen as *Cyrtopeltocoris albo-fasciatus* Reut. (Can. Ent., lix, 1927, p. 41), but more critical study shows that it is structurally distinct, although having a very similar color aspect.

The Sexes of *Andrena hitei* Cockerell (Hym.: Andrenidae).

By ELVEN C. NELSON.

In 1907 Professor T. D. A. Cockerell described in the *Annals and Magazine of Natural History* *Andrena hitei* from Boulder, Colorado. The species was described from the female, a strikingly attractive species of *Andrena*. Ever since an unsuccessful search has been made for the male. There is no male in this region which looks like the female, but this is not astonishing for often the male is very unlike the female. Curiously enough there is a beautiful *Andrena* in the European fauna which looks so much like our species that the two can be confused. The most conspicuous difference is the size, the European species, *A. fulva* Schrank, being larger than *hitei*. The male of the European species is known. Professor Cockerell received some of these males and at once was struck by the thought that the male of *hitei* might be similar to that of *fulva*. I was asked to see if I could find a male which answered the requirements. Several species were near but no good evidence was present to prove that any one was the correct male.

I have been working on the genitalia of *Andrena* and in view of the results from this work I felt that the correct male could be found by means of the genitalia.

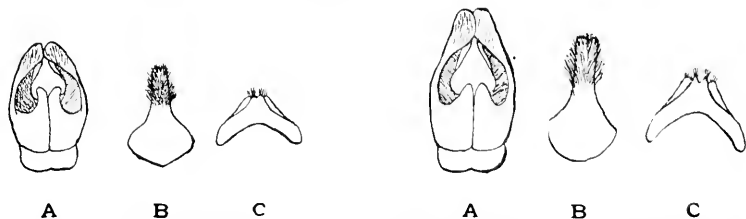


Fig. 1. *Andrena hitei*, Cockerell (*rubifloris* Viereck and Cockerell). Specimen from Florissant, Colorado.

Fig. 2. *Andrena fulva*, Schrank. Specimen from Europe.

A. Genital armature. B. Eighth ventral plate. C. Seventh ventral plate.

I made dissections of *fulva* and the possible males of *hitei*, and the results were even better than had been expected. I found that only one male had genitalia which closely resembled

those of *fulva*. This male also most nearly meets the other requirements as shown by *fulva*.

This male was described as *A. ribifloris* in 1914 by Viereck and Cockerell in a paper "New North American Bees of the Genus *Andrena*" in the Proceedings of the United States National Museum, vol. 48, p. 32 (1914). The species was described from Florissant, Colorado, and has since been collected near Gresham in Boulder County. The female of the species was not found at Florissant but it is not uncommon to find the males of *Andrena* without accompanying females. I have collected *A. hitei* at Boulder, visiting flowers of *Ribes*, the genus of plants from which the male *ribifloris* was collected. According to Viereck (in letter to Cockerell) *A. hitei* occurs also in Nebraska and Montana. Without any reasonable doubt *ribifloris* is the male of *hitei*. The name *hitei* has priority over the name *ribifloris*.

Some Mating Habits of *Callosamia promethea* and *Telea polyphemus* (Lepid.: Saturniidae).

On June eighteenth a female *Callosamia promethea* moth emerged from a cocoon on our screened porch and by three o'clock in the afternoon a flock of males had collected. One of these was introduced into the cage with the female and mated immediately. For experiment's sake, another male was introduced into the cage. He shortly found his way to the mated pair and tried persistently to force them apart with his feet, abdomen and claspers. Being unsuccessful, he obtained a grip on the female's abdomen close to the first male and clung there until we pulled him off.

That same evening two female moths of *Telea polyphemus* were tied out for mating. On the morning of June the nineteenth, we examined them at 4.30 o'clock and found one with two males clinging to her in exactly the same manner as the *Promethea* male of the previous afternoon, while the other female moth was alone. We took the moths in and removed the superfluous male from the mating pair and placed him with the lone female. He mated with her but they did not stay together long.

This may be a common occurrence, but in our many years of observation we have never seen it happen before or read of its happening.

HARRIET A. WICKWIRE.
ADELE CALALE.

On the Naming of Individual Variants in Lepidoptera.

By ALEXANDER B. KLOTS, Cornell University, Ithaca, N. Y.

(Continued from page 302).

SHALL WE APPLY SCIENTIFIC NAMES TO INDIVIDUAL VARIANTS?

The purpose of taxonomy is twofold. In the first place the taxonomist must differentiate organisms and attach to each one a scientific name so that ready reference may be had to it by means of this name. This is nomenclature, and one of its most fundamental principles is that the name of an organism should furnish a *permanent, easy and convenient* index to the organism. Secondly the taxonomist, by a study of all possible characters, attempts to so classify organisms that his system of classification will show the past and present relationships of the organisms to each other. This is phylogeny.

Phylogeny is of undeniable importance, but must not be allowed to overburden nomenclature. From the binomial system of Linnaeus we have progressed to a recognized trinomial system. The use of subgenera is still optional, but such use means many quadrinomials. Numerous workers may take exception to this (9) but on the whole the use of the quadrinomial is well established. Surely this is far enough.

Let us then see what would be the result if, following the system of naming advocated by Gunder we should attempt to classify a hypothetical species which possessed all of the forms that this system holds nameable. Such species may conceivably exist, although the writer is glad to say that he has not seen any printed reference to such a conglomeration. The result would be: *Claudius (Megaclaudius) crosbyi occidentalis* f. loc. *pasadenensis* f. aest. *megacephalus* f. ♀ *inimicus* f. tr. *absurdus* Jones. That is an example of phylogeny overbalancing nomenclature. Very few taxonomists could stand the continued strain of association with such horrors.

In view of the possibility of such absurdities becoming an

everyday occurrence it seems that serious consideration should be given to the emendation of Article 14 of the International Code of Zoological Nomenclature suggested by the British National Committee on Entomological Nomenclature (10). According to this emendation any term used as a "name" for any concept lower than subspecies would have no status in respect of priority. The effect of this in lightening the burden of nomenclature would undoubtedly be excellent. However even with the rigid definition of "subspecies" as "being a geographical or (in the case of parasites) host variation" specimens might be named as "subspecies" by over-enthusiastic workers, or by individuals over-anxious to see their names in print, which did not entirely merit that definition.

In fairness to Mr. Gunder the author must state that in the previously cited "octonomial" the only category originated in Mr. Gunder's system is that of "local form". Even that is not strictly original with him, being identical with various categories of Continental authors.

In Barnes and Benjamin's Check List of North American Diurnals (11) now four years old, 18 names are listed under *Eurymus philodice* (Godt.) as either valid names or synonyms applicable to categories lower than subspecies. Still more such names have since been applied, I believe. It so happens that we know something about the genetics of *philodice* (3) but even with the knowledge that the white female form of this species is Mendelian, or perhaps because of this knowledge, it is the opinion of many (13, 14) perhaps of most entomologists that these forms should not be given scientific names. In dropping them the burden of the overworked taxonomist and cataloguer would be immeasurably lightened. In the genus *Euphydryas* the case is even worse. In his recent revision of the genus, which, incidentally, includes some really valuable taxonomic work, Gunder lists 23 such names under *E. chalcedona* (Dblly. & Hew.) (12).

In the same check list we find that under *Basilarchia weidemeyrii* (Edw.) the name *sinefascia* (Edw.) is used to designate

the race from Arizona, while *angustifascia* B. & McD. is listed as "f. norm.". The absurdity for the necessity for such procedure becomes apparent when we consider that *sinefascia* applies to a rare individual variant, while the great majority of specimens of the race are *angustifascia*. That a name applied to a rare aberration should have to be used to include all of the normal specimens as well and that a separate name should then have to be applied to these is against all taxonomic principles.

Needham (9) has recently entered a plea for the use of common sense in limiting the length of names, in which all thinking zoologists and botanists cannot but join. The International Commission on Zoological Nomenclature has taken a most praiseworthy stand in the matter by holding as invalid such names as *Brachyuropushkydermatogammarus*. What then are we to think of such names as *hemiluteofuscus* and *nigrisupernipennis* as applied by Gunder to "transition forms" of *Euphydryas chalcedona* and *colon* respectively (11)? It is as if "octonomials" were not enough and we must needs break the taxonomist's back with such jaw-twisters.

Inasmuch as at least a considerable number of individual variants are probably mutations, the naming of such individuals would actually be objectionable to geneticists. To the geneticist belongs the right to designate these individuals after his own fashion. He has his own system of so doing, one much better adapted to his peculiar needs than that of formal scientific nomenclature, and he should be permitted to apply it as he wishes.

All this does not mean that the writer considers that the taxonomist should have nothing to do with individual variants. If he is a good taxonomist he will indeed be vitally interested in them, for he sees that in many of them there is the stuff of which evolution is made. But if he is a wise taxonomist he will leave their detailed study to the geneticist who specializes in that study, and will be content to accept the geneticist's conclusions about them. He can help the geneticist by collecting

variants and by figuring them and publishing data on them, thus giving the geneticist an idea of what experimental material may be available. Such work can also be of value to the collector who may be at a loss as to what name to apply to an aberrant specimen, and who might otherwise unwisely name it as a species or subspecies. As such it should be encouraged and given every help; but it should not be considered as a part of scientific nomenclature.

SUMMARY AND CONCLUSIONS.

1. Individual variants whose aberrant characters are non-inheritable can have no effect on the evolution of their species. Individual variants whose aberrant characters are inheritable may have a very decided effect upon the evolution of their species. In any case the detailed study of such variants should be undertaken only by a properly qualified geneticist and is not a part of the work of the taxonomist, although the results of such study are of profound interest to him.

2. Any attempt to classify individual variants by phenotypic characters alone is necessarily superficial and may be extremely misleading. While such classifications may be of interest they can be of value only if all phenotypic characters are taken into account.

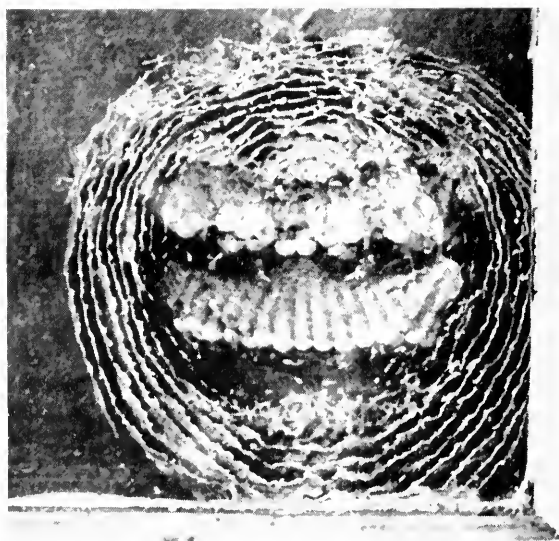
3. The term "transition form" as defined by Gunder is superfluous, meaning no more than "Mendelian form" or "mutant". "Transition form" as used by Gunder has come to mean no more than "series of aberrations" and is therefore superfluous in this sense as well.

4. Scientific names should not be applied to any concept lower than subspecies, and when so applied should have no status in scientific nomenclature. If designation of such forms is necessary this should be done in some manner which cannot be confused with scientific nomenclature.

5. Open discussion in print by taxonomists and geneticists of the subject of classification and designation of concepts less than subspecies is very much to be desired.

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NEST OF *VESPULA ARENARIA*.—HUNGERFORD.

**An Unusual Nest of *Vespula* (*Dolichovespula*)
arenaria Fabr. (= *V. diabolica* de Saussure¹).
(Hym.: Vespidae).**

(Plate XXXIV.)

By H. B. HUNGERFORD, Lawrence, Kansas.²

Our paper-making wasps are among the most generally known insects. Even the casual observer recognizes these wasps and their paper nests and has proper respect for the ability of the insects to resist undue familiarity. The more observing student finds the habits of these wasps of absorbing interest. He knows from experience that much of the sinister reputation of these little creatures can be discounted. With due regard for their nervousness and respect for their proper rights one may learn a great deal about the home life of these paper makers. The material of which their nests are made is composed of fibers of weathered or decayed wood properly masticated. We have two common sorts of "paper makers", the *Polistes* that suspend a single open comb from some support³ and the *Vespas* which have two or more combs, one beneath the other enclosed in a paper bag. The *Polistes* in their open combs can be studied with ease. The *Vespas*, on the other hand, which live either in a covered house suspended from a tree limb or other support or in the ground are not observable. The accompanying photographs show how one colony of *Vespula arenaria* Fabr. (= *V. diabolica* de Saussure) built an "observation hive" of its own free will and accord. This was in an old abandoned log cabin at the south end of Munro Lake, Cheboygan County, Michigan. The nest was built between a window and the rough boards used in "boxing up" the window on the outside. The interspace between glass and board was approximately one inch. The wasps had gained entrance through a crack between the boards and fashioned an interesting sectional nest. This nest was one inch thick—four and a quarter inches wide, by four and a half inches high. It consisted of two layers of comb and was covered with nine layers

¹ Determination made by Doctor J. Chester Bradley.

² Contribution from the Biological Station of the University of Michigan, Douglas Lake, Michigan.

³ See Phil Rau, *Ecology*, Volume X, No. 2, April, 1929.

of paper, the edges of which adhered closely to the glass on one side and to the board on the other. These several paper walls with their interspaces, make a splendidly insulated shelter. The wasps were studied, of course, from the inside of the house where their activity in the nest could be observed through the glass window pane. There was a remarkable difference in the temperature between the surface of the glass in front of the nest and elsewhere on the window—that in front of the nest was decidedly warm, elsewhere it was cool to cold, depending upon the weather. These *Vespas* heated their brood chamber and maintained the temperature against the lowered degrees outside.

On August 9th, 1929, Doctor George Nichols made some flash light photographs of the nest as seen from within the building and Mr. F. Gray Butcher and I placed a charge of carbon bisulphide in the space and then carefully loosed the nest from the window pane and now have it mounted with its board support in a small case for exhibition at the Biological Station of the University of Michigan on Douglas Lake. We caught one queen and twenty-five workers. There were others flying about.

Maternal Instinct in a Membracid (*Platycotis vittata*) (Homop.).

By R. H. BEAMER, Dept. of Entomology, University of Kansas,
Lawrence, Kansas.

(Plate XXXV.)

Numerous nymphs of *Platycotis vittata* were taken in the Sequoia National Forest, Tulare Co., California, on a broad leafed oak. Persistent use of nets, however, failed to procure a single adult and the party began scanning the tips of oak twigs for nests of nymphs in the hopes of finding out more about this interesting membracid. Soon a cluster of very small nymphs was located and, sitting an inch or so down the twig from the nearest little one, was an adult female. Continued examination of the nearby oaks revealed several nests and in almost every case, a female stood sentinel, always between the



MATERNAL INSTINCT IN A MEMBRACID-BEAMER

young and the body of the tree. She would move around the limb when approached but would allow herself to be taken rather than fly away from her perch. The occurrence was too regular to be a mere coincidence and it was conjectured that the mother must actually guard her young throughout their nymphal stages. As if to add the needed proof for the obvious conclusion, a small wasp (Vespidæ), flew toward a nest of 5th instar nymphs. When it approached to within an inch or so of the twig, the membracid flew at it. The wasp deflected its course circled and returned. The membracid, which had alighted on the twig on the other side of her nest, dashed at the wasp again. Again the wasp missed the twig but returned in a few seconds. Each time as the wasp approached, the mother raised her wings to be ready and when the wasp drew near, she dashed at it with such fury as to frighten it away. Once the vespid alighted on the nymphs but was instantly attacked and left without its prey. After perhaps a dozen attempts the vespid apparently grew discouraged and departed. The membracid flew to her young, crawled over the spot where the vespid had alighted, apparently examined to see that they were uninjured; then, making sure all was well again flew to the twig just below the nest, turned her head toward her young and stood immobile.

The twigs where the young are found are marked with small punctures arranged in spiral form part way around the limb. The rows of spirals are perhaps $\frac{1}{2}$ inch apart. The nymphs sit very close together on the limb often overlapping each other and cling tenaciously to their support. *

The accompanying photograph (Plate XXXV) shows the mother guarding her young.

Proterandry and Flight of Bees. III. **(Hym.: Apoidea.)**

By CHARLES ROBERTSON, Carlinville, Illinois.

The first paper was in ENT. NEWS 29:341, the second in 41: 154. Except in Bombidæ and Halictidæ, cases in which the male is first and the female last may be regarded as normal and the rest fragmentary. Some bees, however, are known to be proterogynous.

♂ first, ♀ last, fragmentary.

ANDRENA SALICACEA ♂ March 25-April 2, ♀ April 16-26.

EPIMELISSODES ILLINOENSIS ♂ July 13, ♀ July 16-Aug. 13.

PROSOPIS THASPII ♂ May 8, ♀ June 9-15.

♂ first, ♂ ♀ end together.

CLISODON TERMINALIS ♂ May 25-July 27, ♀ June 6-July 27.

NOMADA CRESSONII ♂ April 20-May 18, ♀ May 3-18.

PROSOPIS EULOPHI ♂ May 12-June 15, ♀ June 13-15.

TRIEPEOLUS HELIANTHI ♂ Aug. 11-Oct. 3, ♀ Sept. 18-Oct. 3.

♂ first and last.

COLLETES NUDUS ♂ June 20-Aug. 2, ♀ July 10-27.

HOLCOPASITES ILLINOENSIS ♂ June 6-Aug. 23, ♀ June 9-Aug. 9.

NOMADA PARVA ♂ May 5-29, ♀ May 11-14.

SIMPLEX ♂ March 26-April 11, ♀ April 10.

VICINA ♂ Sept. 8-Oct. 19, ♀ Sept. 15-Oct. 15.

XANTHIDIUM LUTEOLOIDES ♂ April 4-May 5, ♀ April 21-May 3.

PERDITA OCTOMACULATA ♂ Aug. 13-Sept. 24, ♀ Aug. 17-Sept. 20.

PERDITELLA BOLTONIAE ♂ Aug. 30-Sept. 8, ♀ Sept. 3.

PROSOPIS SANICULAE ♂ May 15-Sept. 13, ♀ May 31-July 8.

TRIEPEOLUS NEVADENSIS ♂ July 7-Sept. 6, ♀ July 26-Aug. 27.

REMIGATUS ♂ June 28-Sept. 3, ♀ July 9-Aug. 29.

♂ ♀ first, ♀ last.

ANDRENA CARLINI March 20, ♂ ends April 28, ♀ June 9.

INTEGRA May 23, ♂ ends June 8, ♀ June 23.

NUBECULA Aug. 13, ♂ ends Sept. 25, ♀ Oct. 30.

SALICIS March 17, ♂ ends April 22, ♀ May 2.

SALICTARIA March 31, ♂ ends April 29, ♀ June 22.

OPANDRENA ZIZIAE May 3, ♂ ends May 26, ♀ June 17.

PARANDRENA ANDRENOIDES March 20, ♂ ends May 17, ♀ June 5.

PTERANDRENA SOLIDAGINIS Aug. 13, ♂ ends Oct. 19, ♀ Oct. 22.

PTILANDRENA POLEMONII April 14, ♂ ends May 11, ♀ May 20.

TRACHANDRENA CLAYTONIAE April 10, ♂ ends May 12, ♀ June 19.

COLLETES AESTIVALIS May 8, ♂ ends June 23, ♀ July 1.

ASHMEADIELLA BUCCONIS June 6, ♂ ends June 13, ♀ Aug. 29.

COELIOXYS SAYI May 21, ♂ ends Sept. 12, ♀ Oct. 4.

MEGACHILE MENDICA May 16, ♂ ends Sept. 30, ♀ Oct. 11.

PROCHELOSTOMA PHILADELPHI May 8, ♂ ends June 23, ♀ June 26.

SAYAPIS POLLICARIS June 25, ♂ ends July 6, ♀ July 10.

ANTHEMURGUS PASSIFLORAE July 21, ♂ ends Aug. 30, ♀ Sept. 9.

CALLIOPSIS ANDRENIFORMIS May 30, ♂ ends Sept. 19, ♀ Oct. 14.

HETEROSARUS PARVUS May 28, ♂ ends June 15, ♀ Oct. 23.

PSEUDOPANURGUS ASTERIS Aug. 23, ♂ ends Oct. 21, ♀ Oct. 23.

♂ ♀ first, ♂ last.

ANDRENA ILLINOENSIS March 25, ♂ ends May 24, ♀ May 22.

OPANDRENA PERSONATA April 24, ♂ ends June 11, ♀ June 8.

♀ first and last.

ANDRENA MANDIBULARIS ♂ March 29-April 25, ♀ March 17-May 22.

NASONII ♂ May 3-18, ♀ April 21-May 31.

IOMELISSA VIOLAE ♂ April 11-29, ♀ March 30-May 20.

OPANDRENA BIPUNCTATA ♂ March 25-May 22, ♀ March 17-June 1.

SEROTINA ♂ May 12-June 25, ♀ May 4-July 7.

PTERANDRENA aliciae ♂ Aug. 24-26, ♀ Aug. 13-Sept. 20.

PTILANDRENA erigeniae ♂ April 5-May 3, ♀ March 25-May 14.

TRACHANDRENA hippotes ♂ April 12-May 18, ♀ April 10-June 29.

MARIAE ♂ March 26-May 5, ♀ March 25-May 17.

NUDA ♂ May 1-June 13, ♀ March 17-June 16.

SPIRAEANA ♂ June 1, ♀ May 30-June 11.

AMEGILLA WALSHII ♂ July 14-31, ♀ July 6-Sept. 20.

CERATINA DUPLA ♂ March 21-Oct. 23, ♀ March 17-Nov. 6.

EPEOLUS PUSILLUS ♂ Aug. 26-Sept. 25, ♀ Aug. 14-Oct. 23.

EPIMELISSODES ATRIPES ♂ Aug. 21, ♀ Aug. 4-Sept. 8.

MELISSODES TRINODIS ♂ July 3-Sept. 25, ♀ June 14-Oct. 6.

COELIOXYS RUFITARSIS ♂ July 11-17, ♀ July 4-Oct. 19.

DICERATOSMIA CONJUNCTA ♂ April 28, ♀ April 14-July 4.

HOPLITIS CYLINDRICUS ♂ April 27-May 15, ♀ April 21-July 20.

NEOTRYPTES BARBATUS ♂ June 20, ♀ June 15-July 17.

XANTHOSARUS LATIMANUS ♂ June 7-Oct. 6, ♀ May 28-Oct. 20.

HOLONOMADA AFFABILIS ♂ April 23-June 21, ♀ April 18-June 28.

PLACIDA ♂ Sept. 8-27, ♀ Sept. 6-Oct. 19.

PSEUDOPANURGUS RUDBECKIAE ♂ Aug. 3-Sept. 7, ♀ Aug. 1-Sept. 12.

SOLIDAGINIS ♂ Aug. 12-Sept. 7, ♀ Aug. 11-Oct. 4.

VERBENAPIS VERBENAE ♂ July 2-Sept. 1, ♀ June 28-Sept. 10.

ZAPERDITA MAURA ♂ July 17-Aug. 1, ♀ July 7-Sept. 3.

PROSOPIS ILLINOENSIS ♂ May 12-Aug. 30, ♀ May 9-Sept. 20.

♀ first, ♂ last.

CALLIOPSIS COLORADENSIS ♂ Aug. 21-Sept. 24, ♀ Aug. 20-Sept. 19.

MEGACHILE PETULANS ♂ June 19-Sept. 20, ♀ June 17-Sept. 2.

PSEUDOPANURGUS ALBITARSIS ♂ June 11-Sept. 8, ♀ May 29-Sept. 5.

Halictidae.

AGAPOSTEMON RADIATUS ♀ April 1-Nov., ♂ June 21-Nov.

SPLENDENS ♀ May 1-Oct. 28, ♂ July 13-Oct. 28.

TEXANUS ♀ April 10-Oct. 21, ♂ July 11-Nov.

VIRESCENS ♀ May 8-Nov., ♂ July 21-Nov.

AUGOCHLORA FERVIDA ♀ May 10-Nov., ♂ July 5-Oct. 28.

VIRIDULA ♀ March 25-Oct. 30, ♂ July 2-Oct. 20.

CHLORALICTUS ALBIPENNIS ♀ May 8-Oct. 3, ♂ July 17.

COERULEUS ♀ April 10-May 15, ♂ June 15.

COREOPSIS ♀ April 14-Nov., ♂ June 18-Nov.

CRESSONII ♀ March 17-Sept. 26, ♂ July 2-Oct. 31.

ILLINOENSIS ♀ April 1-Nov., ♂ July 9-Nov.

NYMPHAEARUM ♀ May 5-Aug. 12, ♂ July 27.

OBSCURUS ♀ April 23-Oct. 15, ♂ June 6-Nov.

PILOSUS ♀ March 17-Nov., ♂ June 6-Nov.

PRUINOSUS ♀ March 21-Aug. 25, ♂ June 7-Oct. 24.

SPARSUS ♀ March 21-Nov., ♂ June 4-Nov.

TEGULARIS ♀ March 26-Nov., ♂ June 10-Oct. 25.

VERSATUS ♀ March 17-Nov., ♂ June 6-Nov.

ZEPHYRUS ♀ March 21-Nov., ♂ June 7-Nov.

CURTISAPIA CORIACEA ♀ April 5-Sept. 30, ♂ July 23-Oct. 19.

FORBESII ♀ March 28-Oct. 31, ♂ June 15-Oct. 28.

FUSCIPENNIS ♀ June 14-27, ♂ Oct. 1-Nov.

DIALICTUS ANOMALUS ♀ May 9-Oct. 31, ♂ Oct. 11-31.

EVYLAUS ARCUATUS ♀ March 25-Nov., ♂ June 14-Aug. 8.

FOXII ♀ March 25-Sept. 20, ♂ June 8-July 8.

NELUMBONIS ♀ May 22-Aug. 20.

PECTINATUS ♀ June 11-Aug. 25.

PECTORALIS ♀ April 16-Nov., ♂ June 16-Nov.

QUADRIMACULATUS ♀ April 22-Oct. 18, ♂ July 10-13.

TRUNCATUS ♀ April 26-Aug. 13, ♂ June 29.

- HALICTUS LEROUXII* ♀ March 17-Oct. 19, ♂ June 10-Aug. 26.
 PARALLELUS ♀ May 10-Aug. 29, ♂ June 24-Oct. 10.
ODONTALICTUS LIGATUS ♀ March 31-Nov., ♂ June 6-Nov.
OXYSTOGLOSSA CONFUSA ♀ March 25-Nov., ♂ June 18-Oct. 30.
 PURA ♀ March 21-Nov., ♂ June 8-Nov.
 SIMILIS ♀ April 18-Nov., ♂ June 16-Oct. 28.
PARALICTUS CEPHALICUS ♀ May 9-July 21, ♂ July 15.
 PLATYPARIUS ♀ March 17-Nov., ♂ Sept. 20-23.
 SIMPLEX ♀ April 17-June 26.
SELADONIA FASCIATA ♀ March 17-Oct. 31, ♂ June 9-Oct. 31.

Of the females, 17 begin in March, 12 in April, 9 in May, 2 in June; 17 end in November, 11 in October, 3 in September, 6 in August, 1 in July, 2 in June, 1 in May. Of the males, 20 begin in June, 8 in July; 13 end in November, 12 in October, 2 in August, 1 in July.

Sphæcodini

- DIALONIA ANTENNARIAE* ♀ April 18-Oct. 2, ♂ Sept. 4.
DREPANIUM FALCIFERUM ♀ April 11-July 26, ♂ July 7.
MACHAERIS STYGIA ♀ April 24-Oct. 15.
PROTERANER RANUNCULI ♀ April 25-Sept. 19, ♂ April 26-Oct. 28.
SPHÆCODES ARVENSIS ♀ March 31-Aug. 17, ♂ June 14-Aug. 20.
 HERACLEI ♀ May 17-Aug. 24, ♂ July 13-Aug. 2.
 MINOR ♀ April 20-July 29.
SPHÆCODIUM CRESSONII ♀ April 19-Oct. 23, ♂ June 11-Oct. 29.
 SMILACINAE ♂ June 19-Aug. 11.

Of the females, 1 begins in March, 6 in April, 1 in May; 2 end in July, 2 in August, 1 in September, 3 in October. Of the males, 1 begins in April, 3 in June, 1 in July; 3 end in August, 2 in October.

Bombidae

- BOMBIAS AURICOMUS* ♀ April 11-Oct. 23, ♂ July 1-Sept. 24,
 ♂ July 9-Oct. 5.
 FRATERNUS ♀ April 18-Sept. 16, * ♂ July 5-Oct. 9,
 ♂ July 30-Oct. 15.
 SEPARATUS ♀ April 12-Oct. 25, ♂ May 16-Oct. 8,
 ♂ July 5-Oct. 10.
BOMBUS AMERICANORUM ♀ March 15-Nov., ♂ May 18-Oct.
 24, ♂ July 10-Oct. 27.
 BIMACULATUS ♀ April 4-May 23, ♂ May 14-July 28,
 ♂ July 7-21.

IMPATIENS ♀ April 7-Oct. 5, ♂ May 16-Nov., ♂ July 9-Nov.

VAGANS ♀ April 7-Sept. 3, ♂ May 15-Oct. 1, ♂ July 27-Oct. 3.

PSITHYRUS LABORIOSUS ♀ June 22-Aug. 12, ♂ Aug. 11-Sept. 18.

VARIABILIS ♀ April 28-Oct. 19, ♂ Aug. 4-Nov.

Of females of Bombinae, 1 begins in March, 6 in April; 1 ends in May, 2 in September, 3 in October, 1 in November. Of the workers, 5 begin in May, 2 in July; 1 ends in July, 1 in September, 4 in October, 1 in November. Of the males, 7 begin in July; 1 ends in July, 5 in October, 1 in November.

Except *Proterancre*, the Halictidae and Bombidae are really proterandrous. The early females belong with the males of the fall before.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF 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 numbers within brackets [] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. 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 have an * preceding the author's name.

(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 the change in the method of citing the bibliographical references, as explained above.

Papers published in the Entomological News are not listed.

GENERAL.—Andrews, J. S.—The digestion of a mouse by a tarantula. [Proc. Indiana Acad. Sci.] 39: 305. Barnes, W.—Biographical Note. By E. P. Van Duzee [55] 6: 16. Cockerell, T. D. A.—The biota of Newfoundland. [4] 62: 213-214. Comstock, A. B.—Obituary. By G. W. Herrick. [12] 23: 889-890. Davis, J. J.—Insects of Indiana for 1929. [Proc. Indiana Acad. Sci.] 39: 291-303, ill. de la Torre Bueno, J. R.—What is a species? [19] 25: 229. DeLong, D. M.—Contributions to biology of insects. [7] 23: 513-520.

Felt, E. P.—A popular guide to the study of insects. [N. Y. State Mus. Handb.] 6: 147 pp., ill. **Gibson, A.**—Contributions to applied entomology. [7] 23: 537-542. **Graham, S. A.**—Contributions to ecology of insects. [7] 23: 532-537. **Gunder, J. D.**—A new insect camera of compact design. [4] 62: 215, ill. **Gunder, J. D.**—A new moth collecting gun. [19] 25: 208, ill. **Gunder, J. D.**—A convenient collecting container for butterflies. [19] 25: 225, ill. **Gunn, N. R.**—Obituary Note. By R. F. Sternitsky. [55] 6: 19. **Hutchins, R. E.**—A new method of making wing prints of the wings of butterflies. [4] 62: 215-216. **Maheux, G.**—Le Quatrième Congrès International d'Entomologie. [98] 57: 188-195. **Mickel, C. E.**—Contributions to taxonomy of insects. [7] 23: 507-512. **Osborn, H.**—Biographical note. [7] 23: 397-398, ill. **Rober, J.**—Die leistungen eines entomologischen instituts von weltruf. [14] 44: 201-208, ill. **Sherborn, C. D.**—Index animalium. Parts 20-22, pp. 4931-5702, Index phyllochroma-ryzo. **Silvestri, F.**—Aparato para recolección de pequeños artrópodos. [Soc. Española Hist. Nat., Madrid] 5: 11-13, ill. **Stiles and Hassall.**—Key-catalogue of parasites reported for primates (monkeys and lemurs) with their possible public health importance. [U. S. Hyg. Lab. Bull.] 152: 409-601. **Sweet, H. E.**—An ecological study of the animal life associated with *Artemisia californica* at Claremont, California. [13] 22: 75-115. **Weiss, H. B.**—More about Doctor Brickell's "Natural History of North Carolina". [6] 38: 313-315.

ANATOMY, PHYSIOLOGY, ETC.—**Becton, E. M.**—The alimentary tract of *Phanaeus vindex* (Scarabacidae). [43] 30: 315-323, ill. **Forbes, W. T. M.**—What is chitine? [68] 72: 397. **Gaebler, H.**—Die postembryonale entwicklung des tracheensystems von *Eristalis tenax*. [46] 19: 427-492, ill. **Hayes, W. P.**—Contributions to morphology of insects. [7] 23: 521-525. **Hertzer, L.**—Response of the Argentine ant (*Iridomyrmex humilis*) to external conditions. Studies on the Argentine ant queen (*Iridomyrmex humilis*). [7] 23: 597-600, 601-609. **Howe, M. B.**—A study of the tarsal structure in Cicadellidae. [43] 30: 324-339, ill. **Krautwig, M.**—Untersuchungen am Kornkäfer (*Calandra granaria*). [89] 52: 539-596, ill. **Phillips, E. P.**—Contributions to physiology of insects. [7] 23: 525-531. **Robinson, V. E.**—The mouth-parts of the larval and adult stages of *Dermestes vulpinus*. [7] 23: 399-414, ill. **Saez, F. L.**—Investigaciones sobre los cromosomas de algunos ortópteros de la América del Sur. I. Número y organización de los complejos en cuatro géneros de acridios. [Rev. Mus. La Plata] 32:

317-363, ill. **Swingle, M. C.**—Anatomy and physiology of the digestive tract of the Japanese beetle. [47] 41: 181-196, ill. **Weyer, F.**—Ueber ersatzgeschlechtstiere bei termiten. [46] 19: 364-380, ill.

THE SMALLER ORDERS OF INSECTS.—***Barnes, H. F.**—A new thrips-eating gall midge, *Thripsobremia liothripis*, gen. et. sp. n. (Cecidomyiidae). (S). [22] 21: 331-332, ill. ***Chapman, P. J.**—Corrodentia of the United States of America: I. Suborder Isotecnomera. [6] 38: 219-290, cont. ***Ewing, H. E.**—The taxonomy and host relationships of the biting lice of the genera *Dennyus* and *Eureum*, including the descriptions of a n. g., subg., and four n. s. (S). [50] 77, Art. 20: 16 pp. ***Ide, F. P.**—Contribution to the biology of Ontario mayflies with descriptions of new species. [4] 62: 204-213, ill., cont. **Mills, H. B.**—A preliminary survey of the Collembola of Iowa. [4] 62: 200-203. **Montgomery, B. E.**—Records of Indiana dragonflies. IV. 1929. [Proc. Indiana Acad. Sci.] 39: 309-314. **Ris, F.**—A revision of the Libelluline genus *Perithemis*. (S). [Univ. Michigan Mus. Zool.] Misc. Pub. 21: 50 pp., ill. **Ulmer, G.**—Key to the genera of Ephemerida. [Bull. Dept. Biol., Yenching Univ., Peking] 1, pt. 3: 1-18. ***Williamson & Williamson.**—Five new Mexican dragonflies. [Occ. Pap. Mus. Zool. Univ. Michigan] No. 216: 34 pp., ill. ***Williamson & Williamson.**—Two new neotropical Aeshnines. [Occ. Pap. Mus. Zool. Univ. Michigan] No. 218: 15 pp., ill.

ORTHOPTERA.—***Beier, M.**—New and rare Mantodea in the British Museum. (S). [75] 6: 432-460, ill. ***Moreira, C.**—Forficulideos do Brasil. [Inst. Biol. Def. Agric., Rio de Janeiro] Bol. 7: 34 pp., ill. ***Rehn, J. A. G.**—On certain Tropical American genera of Stenopelmatinae with descriptions of two new West Indian species (Tettigoniidae). [1] 56: 363-373, ill. ***Uvarov, B. P.**—Second species of the genus *Marellia*, Semiaquatic grasshoppers from S. America. [75] 6: 543-544.

HEMIPTERA.—**Ball, E. D.**—The toadhoppers of the genus *Phylloscelis* (Fulgoridae). [4] 62: 192-195. ***Ball, E. D.**—A new species and variety of *Scolops* with notes on others (Rhynchota, Fulgoridae). [55] 6: 9-11. ***Barber, H. G.**—Essay on the subfamily Stenopodinae of the New World. (S). [70] 10: 149-238, ill. ***Beamer, R. H.**—Some *Erythroneura* of the obliqua group (Cicadellidae). [7] 23: 417-456, ill. **Beamer, L. D. & R. H.**—Biological notes on some western cicadas. [6] 38: 291-305. ***da Costa Lima, A.**—Segunda nota sobre especies do genero *Eucalymnatus*

(Coccidae). (S). [Mem. Inst. Oswaldo Cruz] 24: 85-87, ill. **De Long, D. M.**—A monographic study of the North American species of the genus *Deltoccephalus*. [Ohio State Univ. Stud. Ser.] 2, No. 13. ***Gillette & Palmer.**—Three new aphids from Colorado. [7] 23: 543-551, ill. ***Hungerford, H. B.**—Two new water bugs from the western U. S. A. (Nepidae and Notonectidae). [4] 62: 216-218. ***Hungerford, H. B.**—New Corixidae from western North America. [55] 6: 22-26, ill. ***Knight, H. H.**—New species of *Ceratocephalus* (Miridae). [19] 25: 187-198. **Lehman, R. S.**—Some observations on the life history of the tomato psyllid (*Paratrioza cockerelli*). [6] 38: 307-312. **Muir, F.**—On the classification of the Fulgoroidea. [75] 6: 461-478. ***Muir, F.**—Three new species of American Cixiidae (Fulgoroidea). (S). [55] 6: 12-14, ill. ***Walley, G. S.**—A new *Arctocorixa* with a note on synonymy (Corixidae). [19] 25: 203-206, ill.

LEPIDOPTERA.—***Box, H. E.**—A new moth borer of sugar-cane in Argentina (Pyrilidae). [22] 21: 307-308, ill. ***Forbes, W. T. M.**—Heterocera or moths (excepting the Noctuidae, Geometridae and Pyralidae) of Porto Rico and the Virgin Islands. [Sci. Surv. P. R. and Virg. Ids.] 12, pt. 1: 171 pp., ill. **Forbes, W. T. M.**—A new *Mechanitis* (Nymphalidae). [6] 38: 317-318. (S). ***Forbes and Leonard.**—A new leaf-miner of cotton in Porto Rico. [Jour. Dept. Agr., P. R.] 14: 151-157, ill. ***Gehlen, B.**—Neue Sphingiden. (S). [14] 44: 174-176, ill. ***Keifer, H. H.**—California Microlepidoptera IV. [55] 6: 27-34, ill. ***Meyrick, E.**—Exotic Microlepidoptera (S). 609-640. ***Spitz, R.**—Ueber neue brasilianische insektenformen. [17] 47: 39-40, cont. **Stichel, H.**—Lepidopterorum Catalogus. Pars 40. Riodinidae II: Nemeobiinae II et Riodininae I. 113-544. ***Stichel, H.**—Eine neue Riodinide von Amazonas. [18] 24: 257-258. **Tissot, A. N.**—A new food plant of the buckeye butterfly. [39] 14: 52. **Van Duzee, E. P.**—*Lepidomys irrenosa* [in Florida]. [55] 7: 8. **Zikán, J. F.**—Die "Schreckaugen" von *Caligo eurylochus-brasilienis*. (S). [17] 47: 33, cont.

DIPTERA.—***Aldrich, J. M.**—American two-winged flies of the genus *Stylogaster*. (S). [50] 78, Art. 9: 27 pp. **da Costa Lima, A.**—Nota sobre a *Wyeomyia* (*Dendromyia*) *luteoventralis*, 1901 (*Culicidae*). (S). [Mem. Inst. Oswaldo Cruz] 24: 35-39, ill. **da Costa Lima, A.**—Sobre especies do genero *Miamyia*, subgenero *Miamyia* (*Culicidae*). (S). [Mem. Inst. Oswaldo Cruz] 24: 73-78, ill. ***Frost, S. W.**—The leaf-miners of *Aquilegia*, with a description of a new

species. [7] 23: 457-460, ill. ***Edwards, F. W.**—Notes on exotic Chaoborinae, with descriptions of new species (Culicidae). (S). [75] 528-540, ill. **Newcomb, E. J.**—(See under Hymenoptera). ***Reinhard, H. J.**—Two new North American species of muscoid flies (Tachinidae). [19] 25: 199-202. **Rogers, J. S.**—The summer crane-fly fauna of the Cumberland Plateau in Tennessee. [Occ. Pap. Mus. Zool. Univ. Michigan] No. 215: 50 pp., ill. ***Schmitz, H.**—Diptera of Patagonia and South Chile. Part VI. Fascicle I.—Sciado-ceridae and Phoridae. [Dipt. Patagonia & S. Chile] 6: 1-42, ill. **Sellers, W. F.**—The identity of *Zenillia blanda* and *Z. virilis*, with notes on *Z. blandita* (Tachinidae). [7] 23: 568-576, ill. **Shannon & Davis.**—Observations on the Anophelini (Culicidae) of Bahia, Brazil. [7] 23: 467-505, ill. ***Van Duzee, M. C.**—Diptera of Patagonia and South Chile. Part V. Fascicle 1.—Dolichopodidae. [Dipt. Patagonia & S. Chile] 5: 92 pp., ill. ***Van Duzee, M. C.**—The dipterous genus *Sympycnus* in North America and the West Indies. [55] 6: 35-47.

COLEOPTERA.—***Blaisdell, F. E.**—Studies in the Melyridae. VIII. [55] 6: 17-19. ***Blake, D. H.**—Synonymies of Antillean Chrysomelidae, with descriptions of new species. [19] 25: 209-223. ***Brown, W. J.**—Coleoptera of the north shore of the Gulf of St. Lawrence. [4] 62: 231-237, cont. ***Fisher, W. S.**—Notes on the rhinotrachine beetles of the family Cerambycidae, with descriptions of new species. (S). [50] 77, Art. 19: 20 pp. **Flanders, S. E.**—Notes on the life-history of *Lindorus lophanthae*. [7] 23: 594-596, ill. **Leech, H. B.**—Notes on Phymatodes vulneratus with a new host record (Cerambycidae). [4] 62: 191-192. ***Nevermann, F.**—Zwei neue Colydiiden aus Costa Rica. [2] 26: 110-114, ill. ***Psota, F. J.**—The Moneilema of North America and Mexico. I. [Col. Contr.] 1: 111-141, ill. **Rex, E. G.**—The Asiatic beetles in New Jersey. [N. J. Dept. Agric.] Circ. 178: 3 pp., ill. ***Schedl, K. E.**—Notes on the Pityophthorinae (Ipidae) I. Description of new species. [4] 62: 195-199, ill. **Snapp, O. I.**—Life history and habits of the plum curculio in the Georgia peach belt. [U. S. Dept. Agric. Tech. Bull.] 188: 91 pp., ill.

HYMENOPTERA.—***Bondar, G.**—Contribuição para o conhecimento dos Hymenopteros phytophagos Calcidoideos. (S). [Bol. Mus. Nac., Rio de Janeiro] 6: 111-117. ***Cockerell, T. D. A.**—A new subgenus of Andrenine bees. [55] 7: 5-8. **Cockerell & Blair.**—Rocky Mountain Bees. [40] 433: 19 pp., ill. **Flanders, S. E.**—Races of *Trichogramma*

minutum. [55] 6: 20-21. **Newcomer, E. J.**—Notes on the habits of a digger wasp and its inquiline flies. [7] 23: 552-563, ill. **Rau, P.**—The behavior of hibernating *Polistes* wasps. [7] 23: 461-466. **Salt, G.**—Postscript to "Stylopized Vespidae", in *Psyche*, Vol. 36, 1929, pp. 249-282. [19] 25: 226-228. **Smith, H. D.**—The bionomics of *Dibrachoides* dynastes a parasite of the alfalfa weevil. [7] 23: 577-593, ill. ***Smith, M. R.**—Descriptions of three new North American ants, with biological notes. [7] 23: 564-568, ill.

SPECIAL NOTICES.—Opuscula Ichneumonologica.—

By O. Schmiedeknecht. Suppl. Bd. Fasc. 8. Completes the genus *Amblyteles* and begins *Platylabus*. p. 65-140; 1-4.

INSECTS THEIR WAYS AND MEANS OF LIVING, by ROBERT EVANS SNODGRASS, U. S. Bureau of Entomology. Volume Five of the Smithsonian Scientific Series (Editor-in-chief Charles Greeley Abbot, D.Sc., Secretary of the Smithsonian Institution. Published by Smithsonian Institution Series, Inc., New York) 1930. Pp. 10 (unnumbered), iv, 362. 15 pls. in colors, 186 text figures. [The books of this series are for sale only in the complete set.*]

We have a strong suspicion, derived from the preface of this entertaining volume, that the author, chiefly and favorably known as a morphologist and physiologist, has endeavored to make the subject of his studies not the "dry and tedious" matter which the reading public has considered it to be. As far as an entomological—and therefore biased—reader may judge, he has certainly succeeded. Who can resist this description of the termite queen and king? "With the increase in the activity of her ovaries, her abdomen enlarges and she takes on a matronly appearance, attaining a length fully twice that of her virgin figure and a girth in proportion. The king, however, remains faithful to his spouse; and he, too, may fatten up a little, sufficiently to give him some distinction among his multiplying subjects. The termite king is truly a king, in

* The publishers (50 Church St., New York), have supplied the following information. Smithsonian Scientific Series is sold in complete sets of twelve volumes, eight of which are ready for delivery. Subscriptions are taken for the complete set, bound in buckram \$150, in parchment or red leather \$198. A royalty of 10% of the sales price is paid to the Smithsonian Institution by the publishers and it is understood these funds are used for research purposes. Subjects of the other eleven volumes are briefly: 1. The Smithsonian Institution, 2. The Sun, 3. Minerals, 4. North American Indians, 6. Wild Animals, 7. Man, 8. Cold-Blooded Vertebrates, 9. Warm-Blooded Vertebrates, 10. Plant Life, 11. Invertebrates, 12. Mankind in China.

the modern way, for he has renounced all authority and responsibility and leads a care-free life, observing only the decorums of polite society and adhering to the traditions of a gentleman; but he also achieves the highest distinction of democracy, for he is literally the father of his country." (p. 139). "The golden rule of the termite colony is 'feed others as you would be fed by them'." (p. 144).

There are ten chapters: I. The Grasshopper [growth, development, enemies]; II. The Grasshopper's Cousins [the saltatory Orthoptera with an interesting presentation of their sound-production]; III. Roaches and Other Ancient Insects; IV. Ways and Means of Living [wherein structure and function are correlated]; V. Termites; VI. Plant Lice; VII. The Periodical Cicada [a hero who "has delivered the great thrill" so that "all his acts of everyday life acquire head-line values," but who evidently has not signed his "contracts with the box-office management in advance," his anatomy and his behavior at and immediately after hatching]; VIII. Insect Metamorphosis; IX. The Caterpillar and the Moth [with a detailed account of the anatomy and metamorphosis of the tent caterpillar—"a caterpillar is a young moth that has carried the idea of the independence of youth to an extreme degree, but which, instead of rising superior to its parents, has degenerated into the form of a worm"]; X. Mosquitoes and Flies.

We must give another sample of Mr. Snodgrass's advances to the reading public; it is from Chapter VI: "Moreover, the story is not yet complete, for it must be added that all the generations of the aphids, except one in each series, are composed entirely of females capable in themselves of reproduction. . . . How insects do upset our generalizations and our peace of mind! We have heard of feminist reformers who would abolish men. With patient scorn we have listened to their predictions of a millennium where males will be unknown and unneeded—and here the insects show us not only that the thing is possible but that it is practicable, at least for a certain length of time, and that the time can be indefinitely extended under favorable conditions." But ten pages later comes the denouement: "A prosperous, self-supporting feminist domination appears to be established. When summer's warmth, however, gives way to the chills of autumn, when the food supply begins to fail, the birth rate slackens and falls off steadily, until extermination seems to threaten. By the end of September conditions have reached a desperate state. October arrives, and the surviving virgins give birth in forlorn hope to a brood

that must be destined for the end. But now, it appears, another of those miraculous events that occur so frequently in the lives of insects has happened here, for the members of this new brood are seen at once to be quite different creatures from their parents. When they grow up, it develops that they constitute a sexual generation, composed of females and *males*! Feminism is dethroned. The race is saved. The marriage instinct now is dominant, and if marital relations in this new generation are pretty loose, the time is October, and there is much to be accomplished before winter comes." (pp. 156, 166).

But the reviewer hastens to correct any impression that the book is frivolous or "flapperesque," which might arise from the reading of these quotations alone. The serious-minded reader will find no temptation to risibility in perusing the consideration of metamorphosis. "The real metamorphosis in the life of the butterfly . . . is not the change of the caterpillar into the adult, but the change of the butterfly egg in the embryo into a caterpillar. Yet the term is usually applied to the reverse process by which the caterpillar is turned back into the normal form of its species." (p. 228). Our author adopts the view of E. Poyarkoff that the pupa of insects with complete metamorphosis corresponds to the immature stage of the adult*—not the last nymphal stage—of insects with incomplete metamorphosis; that the reason for the pupa is probably to be found in the delayed growth of the adult muscles, the quicker hardening of the cuticular covering of the body wall and the consequent need of a new cuticula for the attachment of those muscles (pp. 254-261).

It is hardly necessary to tell those acquainted with Mr. Snodgrass's previous publications that the illustrations in the present volume, almost without exception, are from his own skillful pencil. May we also add that the unidentified damselfly, figure 2 of Plate I, is *Neurobasis chinensis* L., presumably race *australis* Selys.

MORPHOLOGY AND EVOLUTION OF THE INSECT HEAD AND ITS APPENDAGES. By R. E. SNODGRASS. Smithsonian Miscellaneous Collections, vol. 81, no. 3. Washington, Nov. 20, 1928, 155 pp., 57 figs.—This is the second of the morphological studies which the author initiated by his *Morphology and Mechanism of the Insect Thorax* (1927) noticed in the NEWS for October, 1927. It is strictly for the serious-minded, even though the first sentence expresses regret "that we must arrive at an under-

* A somewhat similar view was expressed by Deegener in his *Wesen und Bedeutung der Metamorphose bei den Insekten*, Leipzig, 1910, p. 69.

standing of things by way of the human mind." It consists of seven sections: I. Evolution of the arthropod head, II. General structure of the insect head, III. The head appendages, IV. Summary of important points, V. The head of a grasshopper, VI. Special modifications in the structure of the head [in various insects], VII. The head of a caterpillar. The most prominent feature is the constant recourse to the muscles to determine homologies and these organs are figured in detail. "The scientific study of the comparative anatomy of insects must look for its advance in the future to a wider knowledge of muscles and mechanism" (p. 90). "The importance of the study of musculature for the understanding of the insect skeleton . . . can not much longer be ignored" (p. 95). Out of the great mass of results presented we make arbitrary choice of a very few to be mentioned in this notice. The most generalized mandible in arthropods is best developed in Diplopods, where it is similar to a maxilla, lacking only a galea and a palpus (pp. 62-63). The mouth parts of arthropods have been derived from organs having the structure of *uniramous*, *ambulatory* legs; all the primitive arthropod appendages were probably of this character. Biramous and natatory appendages are characteristic of the Crustacea only and are probably secondary adaptations to an aquatic life (pp. 82-83). Crampton's view that the gula is a differentiation of the base of the labium is supported (pp. 128-131).

THE THORACIC MECHANISM OF A GRASSHOPPER, AND ITS ANTECEDENTS. By R. E. SNODGRASS. *Smiths. Misc. Colls.*, vol. 82, no. 2. Washington, Dec. 31, 1929. 111 pp., 54 figs.—Here also chief use is made of the muscles in interpreting the skeleton. "Though the study of the insect skeleton will remain the most important branch of insect anatomy for purposes of taxonomic description, it is becoming evident that the morphology of the skeleton is not to be understood without a knowledge of the relations that exist between the cuticular modifications and the muscles" (p. 51). The thoracic muscles of the Carolina locust (*Dissosteira carolina*) are here described and figured in detail. In his paper of 1927, Mr. Snodgrass recognized two lines of differentiation in the Pterygota through the adoption of different mechanisms for moving the wings; one of these was that found in the Odonata, the other in the rest of the winged orders. To-day his interpretation has changed: "The wing mechanism of the dragonflies is . . . merely an extreme modification of that common to all insects" (p. 94).

PHILIP P. CALVERT.

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EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. 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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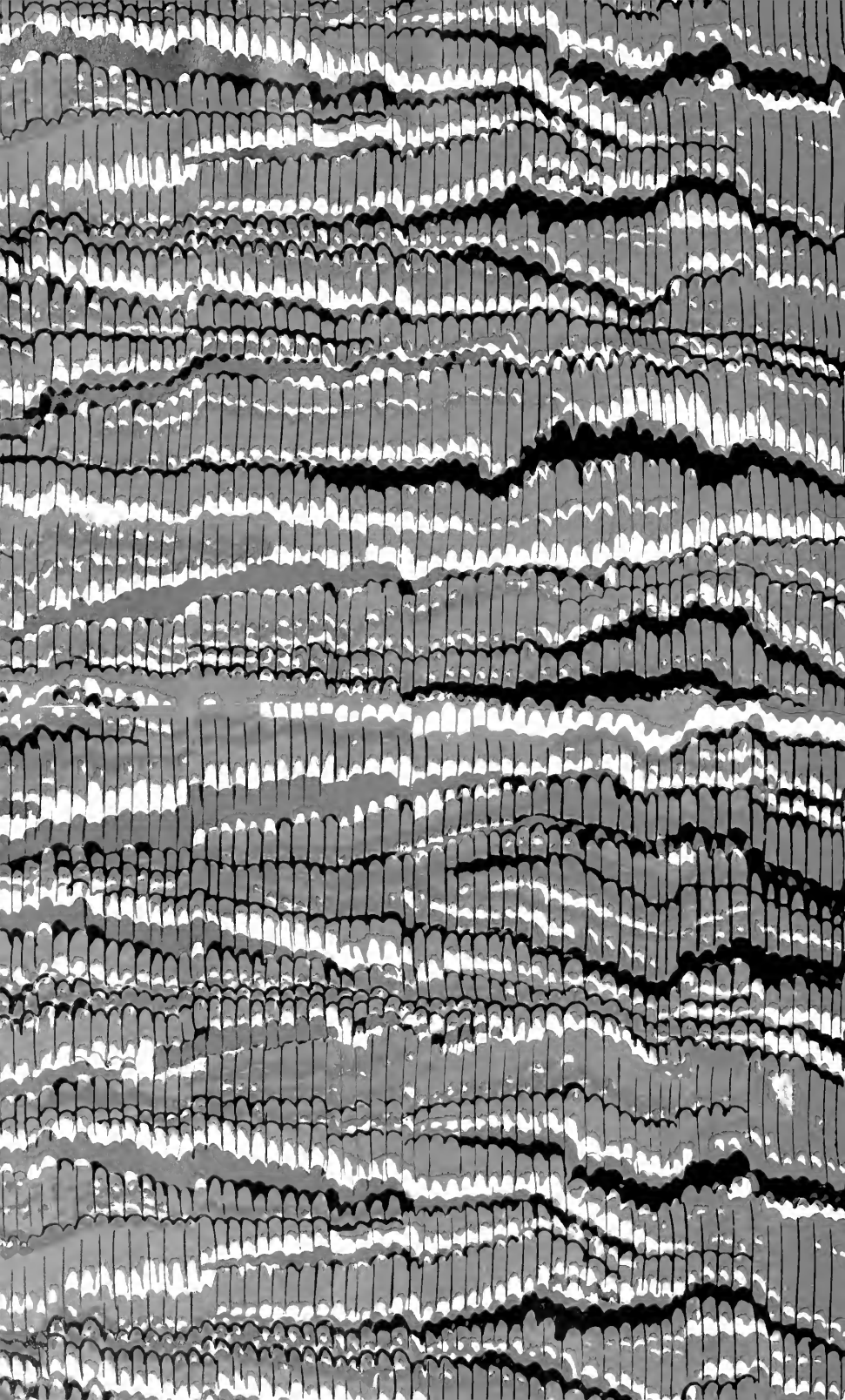
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