

# The Lepidopterists' News

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## THE RESULTS OF A COLLECTING TRIP TO THE GASPÉ PENINSULA

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So few lepidopterists have collected in the interior of the Gaspé Peninsula that the authors felt it would be worthwhile to record the results of a trip into Gaspesian Park made during July, 1950. Most maps indicate a road following the valley of the Cascapedia River northward to the mountainous area of the interior. After one rather unsuccessful night of collecting in the fertile lower valley near Cascapedia village, we decided to follow this river route northward as far as it would take us, and set out on July 13, after securing travel permits from the local forest ranger.



Station 2. Cascapedia Road

We drove nearly all day, gradually passing from the mixed coniferous and deciduous zone of the lower valley into pure Hudsonian spruce forest, as the terrain became more mountainous. After about 60 miles of travel we reached the beginning of an old trail (very hard to find) to the base of Mt. Albert. We hopefully camped there in our cars, thinking we might traverse the 2½ miles to the mountain's base the next day. The outer edge of a hairpin turn provided good parking space part way up a long, steep

grade. Farther down the hill the road passed through a deep ravine, and from farther up we could look across a valley at the smooth, treeless summit of Mt. Albert. Even on that date several snow-filled ravines were visible on its western side. Our stopping place (Sta. 1) was around 1000 ft. elev., and the tree line was perhaps at 2500 ft. or lower.

At Sta. 1 the forest was composed almost entirely of tall, slender spruce trees, festooned with grey and green lichen that hung from the dead branches like Spanish moss. The forest floor was an unbroken carpet of green moss, with little undergrowth. There was some birch, and alder, and along the roadside an abundance of raspberry, *Epilobium*, and various low plants. The night was warm and dark, and our 4 gasoline lanterns brought good results. Sugaring was a complete failure.

The next morning, greeted by rain, we abandoned all hope of following the trail to the base of Mt. Albert and, afraid of a washout along the road, began the return journey. We paused for lunch near an abandoned mining camp and soon afterwards were overtaken by sunny skies. We stopped at a point (Sta. 2) eleven miles south of Sta. 1, and there spent the second night (see figure). The vegetation here was less alpine in character, with more birch, alder, and willow, a much greater variety of herbaceous plants, and less lichen than at Sta. 1. The spruce forest had more underbrush. The blackflies and mosquitoes were much worse, and gathered about us in swarms, dispersing only at nightfall. The fly-repellents we carried seemed to have little effect. The night of July 14 was cooler and moths were not so active.

The next morning we awoke shivering, and returned to civilization on a clear, cool day, stopping to collect butterflies here and there along the way.

### ANNOTATED LIST OF SPECIES TAKEN

- Papilio brevicauda gaspeensis* McD. 1 fresh ♀ flying along a road, 21 mi. up the Cascapedia R., July 15.  
*Papilio glaucus canadensis* R. J. Common all along the Valley of the Cascapedia, but most specimens rather worn. July 13-15.  
*Colias interior* Scud. Gaspesian Park, July 15.  
*Pieris napi oleracea* Harr. Quite common along the roadside, Valley of the Cascapedia, July 13, 15. Found as far up as Sta. 2.  
*Pieris rapae* L. Cascapedia Rd., July 15.  
*Speyeria cybele*, small race resembling *novascotiae* McD. Cascapedia Rd., July 15, 1 ♂.

- Speyeria atlantis Edw. Cascapedia Rd., as far in as Sta. 2; a ♂ and ♀, both quite normal looking.
- Boloria myrina atrocostalis Huard. Near the Federal Mines, Gaspesian Park, July 14, 2 ♂♂, 1 ♀.
- Polygonia gracilis G. R. About 21 mi. up the Cascapedia R., 1 worn specimen flying along the road, July 15.
- Limenitis arthemis Dru. Present in enormous numbers along the Cascapedia Rd. for perhaps 10 or 15 mi. beyond the village of Cascapedia, July 13. It seemed to be confined to the zone of deciduous trees in the lower part of the valley. On entering the zone of Hudsonian spruce forest farther on, we found that artemis disappeared.
- Plebeius saepiolus Bdv. Common in suitable places along the road as far up as Sta. 2, July 13-15. Their condition varied from worn to very fresh.
- Carterocephalus palaemon Pall. About 10 mi. S. of Mt. Albert, July 14, one specimen.
- Smerinthus jamaicensis geminatus Say. Cascapedia, July 12, a ♂.
- Lexis bicolor Grt. Sta. 1, July 13, 2 specimens.
- Parasemia parthenos Harr. A large Arctiid, presumably this, seen flying in the daytime near Sta. 2, July 14.
- Allypia langtoni Couper. Near Sta. 2, one of each sex, July 14 (others seen).
- Colocasia sp., probably propinquilinea Grt. Sta. 1, July 13. A melanic ♂.
- Panthea acronyctoides Wlk. Sta. 1, July 13. 4 specimens, averaging rather dark.
- Acronicta tritona Hbn. Sta. 2, July 14.
- Acronicta fragilis Gn. Sta. 1, July 13.
- Heptagrotis phyllonhora Grt. Stations 1 and 2, July 13, 14.
- Diarsia jucunda Grt. Sta. 2 (2).
- Anomogyna sincera H.-S. Sta. 1 (2 ♂♂) and Sta. 2 (1 ♂), July 13, 14.
- Anomogyna perquiritata Morr. Sta. 1, July 13, 2 ♂♂ at light; these differ slightly from Nova Scotian examples in genitalia, but are still closer to perquiritata than to speciosa.
- Anaplectoides pressus Grt. Sta. 1, July 13, 1 ♀.
- Polia latex Gn. Cascapedia, July 12. A worn ♀ at light.
- Polia secedens Wlk. 5 specimens of this rare species came to light at Sta. 2, July 14.
- Lacinipolia lorea Gn. Sta. 1, July 13.
- Septis impulsa Gn. Sta. 2 (1).
- Nycteola frigidana Wlk. 4 bred from larvae on willow at Sta. 2 emerged in the 2nd week of Aug.
- Syngrapha microgamma montana Pack. A single specimen taken on a barren mountain slope, near the old Federal Mines, Gaspesian Park, July 14.
- Lomanaltes eductalis Wlk. Sta. 1 (1).
- Epizeuxis sp. that may be conclisa Wlk. Sta. 1, July 13 (5).
- Olene plagiata Wlk. Extremely abundant at Sta. 1. Also at Sta. 2, but scarcer. Over 30 taken.
- Habrosyne scripta Gosse. Sta. 1 (1); Sta. 2 (many).
- Drepana arcuata Wlk. Sta. 1, July 13.
- Drepana bilineata Pack. Sta. 1, July 13.
- Scopula quadrilineata Pack. Stations 1 and 2, July 13, 14.
- Scopula frigidaria Moesch. Common at Sta. 2, July 14; flushed from the roadside herbage by day, and came in numbers to light. Over 20 taken.
- Cosymbia pendulinaria Gn. Common at both Stations 1 and 2.
- Lobophora nivigerata Wlk. Cascapedia, July 12 (1).
- Neodezia albovittata Gn. Sta. 1, July 13 (2). Flying by day.
- Calocalpe undulata Linn. Sta. 1, July 13. Flying by day. Bred from a larva on willow at Sta. 2.
- Eupithecia castigata Hbn. Sta. 1 (5), Sta. 2 (2).
- Eupithecia luteata Pack. Sta. 1 and 2, July 13, 14.
- Eupithecia satyrata Hbn. Sta. 1, July 13 (2).
- Eupithecia gibsonata Tayl. A Eupithecia larva on Arbor Vitae on the Gaspé coast, opposite Dalhousie, N.B., was probably this. It died of parasitism.
- Eupithecia grata Tayl. Sta. 1, July 13 (1).
- Eupithecia geminata Pack. Sta. 1, July 13 (1).
- Eupithecia russellata Swett. Common at both Stations 1 and 2.
- Diactinia silaceata albolineata Pack. Sta. 1, July 13, 2 ♂♂, 1 ♀; Sta. 2, July 14, 2 ♂♂.
- Dysstroma walkerata Pears. Sta. 1, 1 ♂, 1 ♀; Sta. 2, 1 ♂.
- Dysstroma hersiliata cervinifascia Wlk. Cascapedia, July 12 (1).
- Hydriomena renunciata Wlk. Very common at Sta. 1, July 13. Present also at Sta. 2, but less plentiful there. Large series taken. Also taken at Cascapedia, July 12.
- Xanthorhoe luctuata obductata Moesch. Sta. 1, July 13, 10 specimens.
- Xanthorhoe unangulata intermediata Gn. Sta. 2, July 14.
- Xanthorhoe designata emendata Pears. Sta. 1, July 13.
- Xanthorhoe ferrugata Clerk. Sta. 1, July 13, several, including form unidentaria Haw.
- Xanthorhoe algidata Moesch. Common at Sta. 1, July 13 (over 30 taken). Not seen at Sta. 2.
- Xanthorhoe iduata Gn. 6 specimens at Sta. 2. Not seen at Sta. 1.
- Xanthorhoe abrasaria congregata Wlk. Sta. 2, July 14 (4).
- Mesoleuca ruficillata Gn. Sta. 1, flying by day. Common.
- Epirrhone alternata Müller. Sta. 1 (1).
- Eulype hastata gothicata Gn. Sta. 1, July 13 (8). Flying by day.
- Eulype subhastata stygiata McD. Sta. 1, 2 specimens flying by day.
- Venusia cambrica Curt. Very common at both Stations 1 and 2.
- Hydrelia incornata Hlst. Cascapedia, July 12.
- Hydrelia albifera Wlk. Sta. 2, July 14.
- Semiothisa granitata Gn. Present at Stations 1 and 2.
- Semiothisa orillata Wlk. Cascapedia, 2 at light, July 12.
- Itame fulvaria Vill. Near Sta. 2, July 14. Netted in the daytime.
- Paraphia piniata Pack. Sta. 1, July 13 (6).
- Protoboarmia porcelaria indicataria Wlk. Sta. 1 and 2, July 13, 14; Cascapedia, July 12.
- Anacamptodes larvaria Gn. At rest on a tree trunk near Cascapedia, July 13.
- Campaea perlata Gn. Sta. 1, July 13.
- Pero morrisonarius Hy. Edw. Cascapedia, July 12.
- Caripeta divisata Wlk. Cascapedia, July 12.
- Callizzia amorata Pack. Sta. 2, July 14.
- Hepialus mustelinus Pack. Sta. 1, July 13, 1 ♂.
- Undetermined Aegeriid, probably a species of Ramosia Engelhardt. Sta. 2, July 15, 1 ♂, taken when it landed on the road.



THE DE RABIÉ PAINTINGS OF LEPIDOPTERA IN THE BLACKER LIBRARY OF ZOOLOGY, MCGILL UNIVERSITY, WITH NOTES  
ON THE BUTTERFLIES REPRESENTED THEREIN

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The remarkable paintings of Hispaniolan natural history made by the engineer de Rabié in the years 1771 to 1784 have already been discussed in a paper by Wetmore (1930). Wetmore, however, described in detail only the paintings of birds, which were his special interest. He also summarized the salient features of the known history of the paintings, and for convenience some of this information may be repeated here.

De Rabié was of French nationality, and seems to have been employed for many years as a government engineer in the Northern Department of Haiti, then a French possession. He is known to have prepared plans for a structure built in Haiti as early as 1752, and he was painting birds of the island as late as 1784. He died in Paris in 1785. His interest in natural history began about 1771. He appears to have had no knowledge of Linnaean nomenclature, but instead used vernacular names, some of which are apt and even picturesque.

The paintings themselves are done in water colour on paper which, although rough, is of good quality. In almost all cases the subjects are depicted at about their natural size. In the butterflies, as in the birds, virtually all the species whose provenance can be ascertained from internal evidence are clearly of Hispaniolan origin, and I think that Wetmore is right in considering these paintings as definite early Hispaniolan records of the species concerned. Some of the paintings bear the inscription "au Cap", which no doubt means Cap Haitien.

The paintings are on sheets of various sizes, some bearing one, but the majority more than one, figure. They have been mounted where necessary on larger sheets, and have been bound into four volumes, of which the one that interests us is titled "Insectes et Coquilles". "Insectes" is taken in a broad sense to comprise arthropods of many kinds, including even some marine Crustacea. A large proportion of the insects represented are Lepidoptera. Thirty-four species of butterflies are shown; these are listed below. There are figures of early stages of six of these species.

The paintings of adults are detailed and remarkably accurate for the period. Even subspecific characters are almost always unmistakably shown. Under as well as upper sides are figured in a number of cases. The paintings of larvae are inferior in quality to those of the adults, but usually give a good impression of the general appearance. What are no doubt food plants are also figured. I do not venture to identify these, but I reproduce de Rabié's vernacular names, which are in some instances self-explanatory.

The species figured are all represented in the

existing fauna. It is noteworthy, however, that several of them are now very rare. In only two species is there any suggestion that the population of the 18th Century differed from that of the present day. In each of these the specimen figured shows characters suggestive of the existing population of a neighbouring island.

HESPERIIDAE

1. Perichares phocion phocion (F.); "la nuit". The larva is figured as green, with a double yellow longitudinal stripe; it is on a grass identified as "herbe de Guinée".
2. Phemiades antiqua (H.-S.); "le léopard".
3. Hylephila phyleus (Dru.); also as "le léopard", but on a different plate from the preceding.
4. Urbanus dorantes cramptoni Comst.; "l'hiron-delle".
5. Urbanus proteus (L.); "le bacha".
6. Phocides pigmalion pyres (G. and S.); "le timpan". This insect is now rare.

PAPILIONIDAE

7. Graphium zonaria (Butl.); "le busque". This species is very rare at the present time.
8. Battus polydamas polycrates (Hopf.); "le chapellet". The under side is figured, and shows the characteristic markings of the subspecies, except that the marginal lunules of the hind wing are represented as being separated from the margin.

PIERIDAE

9. Appias drusilla boydi Comst.; "Pierrot". A male is figured, plain white, without markings above or below.
10. Ascia monuste (L.); "le brunet". The specimen is pale below, with extensive but rather indefinite brown markings. In Comstock's (1943) arrangement it would be referable to A. monuste monuste.
11. Eurema elathea (Cr.); "la commette". A male is figured, without dark dusting beneath.
12. Eurema proterpia proterpia (F.); "l'anguleux". The specimen is of the dry form (gundlachia Poey), with strongly angulate hind wings and the veins not lined with black. The outer margin is not black bordered, although the costal margin is.
13. Eurema sp.; "le point du jour". I was unable to identify this figure. The general appearance is that of a male of E. lisa (Bdv. & Lec.). The fore wing has no discal dot, however, and there are no rusty markings on the under surface of the hind wing.
14. Phoebis statira hispaniolae Munr.; "le moucheté". A female of what appears to be this

butterfly is illustrated. It differs from the only female specimen of the subspecies I have seen - the allotype - in that the ground colour is orange-buff instead of pale yellow. The Hispaniolan subspecies is now rare.

15. Phoebis orbis browni Munr.; "le fardé". A male, with the expected characters of the subspecies. The species is rare.
16. Phoebis thalestris (Ill.); also as "le fardé", but not on the same plate as P. orbis. A male is figured.
17. Phoebis sennae sennae (L.); "le paillet d'or". A male, with very weak brown markings beneath.

#### NYPHALIDAE

18. Anetia pantherata pantherata (Mart.); "le tigre". I follow the nomenclature of d'Almeida (1939).
19. Lycorea ceres cleobaea (Latr.); "le noeud de ruban". The larva is figured on "papayer". It is closely similar to that figured by d'Almeida (1939, Pl. 30) for L. ceres ceres (Cr.). The head and anal segment are black, the thoracic and subanal segments white, and the remaining segments yellow. Each of the pale segments has a black, anterior, transverse band and a black, oblique, lateral patch. The prolegs are black, and there is a long pair of mesothoracic filaments. The pupa is yellowish green, with a number of black spots.
20. Danaus plexippus portoricensis Clark; "le manteau ducal". The specimen figured approaches very closely normal examples of the existing population of Puerto Rico. The fore wing is short, with the outer margin relatively erect; the submarginal spots of the hind wing are obsolete, and the veins on the under side lack white edging; the subapical spots of the fore wing above are white, but the more basal pair is fully developed, not lacking as in typical portoricensis. It is interesting, though perhaps not very significant, that the specimen resembles those now found in Puerto Rico more closely than do most Hispaniolan individuals of the present day. The larva and pupa are recognizably figured.
21. Siderone nemesis nemesis (Ill.); "la furie".
22. Anaea troglodyta troglodyta (F.); "le mor doré", and "la pertuisane" (on different plates). The specimen has the expected characters of the Hispaniolan subspecies.
23. Marpesia chiron (F.); "le corcet".
24. Historia acheronta cadmus (Cr.); "le quint".
25. Colobura dirce wolcottii Comst.; "la pleureuse". The larva is figured on "bois trompette". It is black, with white tubercles on the body and a pair of black, white-tipped tubercles on the head. The pupa is suspended by the cremaster, and is gray-brown and stick-like, with leaf-like dorsal flaps on the abdomen.
26. Myscelia antholia (Gdt.); "la nuit". A splendid specimen, with the characteristic large patches. The species is now excessively rare. De Rabié can hardly have confused it with Perichares phocion, to which he applied the same vernacular name.
27. Hypolimnas misippus misippus (L.); "le superbe". The specimen is a male. The early

record from the Western Hemisphere is interesting, although Linnaeus described the species from "America" in 1764. As is well known, the American population belongs to the African subspecies, and was without doubt introduced by human agency in historic times.

28. Metamorphia stelenes stelenes (L.); "le verd d'eau". The larva is figured on "herbe à pe-tard". It is shown as being black, with four rows of branched purple spines on the body, and on the head a pair of long black spines which bear purple branches. To judge from the description by Wolcott (1923), de Rabié's figure of the larva is inadequate. The pupa is depicted as being flattened and somewhat Apatura-like. The head is bifid and the thorax bears a low mid-dorsal cone; the abdomen is expanded dorso-ventrally, and bears two slender, black, mid-dorsal spines, one behind the other on the highest part.
29. Anartia lytrea lytrea (Latr.); "la fraise". The specimen belongs to the large, pale subspecies that is characteristic of Hispaniola.
30. Junonia evarete zonalis (Fldr.); "le petit oculé".
31. Euptoieta hegesia ?hegesia (Cr.); "la musique". The specimen figured is of considerable interest, as the markings in the cell of the fore wing, although faint, definitely consist of transverse bands extending from radius to cubitus. This character would place the specimen in the subspecies hegesia, which is now confined to Cuba and Jamaica; hegesia is replaced in Hispaniola by the subspecies watsoni Comstock, which also occurs in Puerto Rico. The present distribution pattern is a little anomalous, and, although we cannot rule out the possibility that the specimen figured by de Rabié was aberrant, or that his draughtsmanship was faulty, it is nonetheless tempting to speculate that the subspecies hegesia has been replaced in Hispaniola by the subspecies watsoni in very recent times, presumably by invasion from Puerto Rico. This hypothesis receives some support from the fact, noted by Comstock (1944), that the present Hispaniolan population shows traces of contamination with hegesia elements, as compared with topotypical watsoni from Puerto Rico.
32. Dione vanillae insularis (Mayn.); "le nacré". The well known larva is figured on "pomme de liane".
33. Dryas iulia hispaniola Hall; "le rocon". The figure is of a male, exactly similar to those now found on the island.
34. Heliconius charitonius churchi Comst.; "le quint rayé". The revision by Comstock and Brown (1950) had not appeared when I examined de Rabié's figure, and I could not, therefore, compare it with their characterization of the existing Hispaniolan population. I noted only that the figure showed extremely broad yellow bands.

#### OTHER INSECTS

In addition to the butterflies, enumerated above, there are paintings of a considerable number of moths. Unfortunately, I was not equipped to

## Munroe: THE DE RABÍE PAINTINGS OF LEPIDOPTERA - concl.

identify these. The Sphingidae are well represented, with species of at least seven genera; the life histories of several species are illustrated. There are also some noctuids, mostly of the more showy species, and a few syntomids, arctiids, and geometrids. In addition to the Lepidoptera, there are various Coleoptera, Hymenoptera, Orthoptera, and Diptera, again with some life histories, and a few Arachnida, myriapods, and Crustacea.

## ACKNOWLEDGMENT

I wish to thank the Librarian of McGill University for giving me permission to publish this short account of an interesting and unique set of paintings.

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This is Contribution No.2797, Div. of Entomology, Science Service, Dept. of Agriculture, Ottawa, Canada; the author is Agricultural Research Officer.

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WALTER RICHARD SWEADNER

The investigation of the biology of interspecific hybridization has long been one of the most pressing needs in the field of evolutionary theory. Much of the literature on such hybridization is in the form of scattered, brief notes. Two of the

most important of the few sustained studies are by lepidopterists. Prof. Federley's now classic series of papers on the chromosomal behavior in crosses between species of "Pygaera" and other moths have had a great influence. Dr. Walter R. Sweadner produced another notable analysis, his report on field studies of hybridization in the large Nearctic saturniid moths of the genus Platysamia (= Hyalophora, in part). He carried hundreds of cocoons, primarily of P. cecropia (Linné), into the western areas occupied by several other Platysamia, allowed virgin cecropia females to lure wild males, and studied the offspring resulting from subsequent intermatings.

Although interested in Lepidoptera as a young man, Sweadner studied electrical engineering in college and received a B.S. degree in that subject in 1927 from the Carnegie Institute of Technology in Pittsburgh, Pennsylvania. However, during his college years his proximity to the Carnegie Museum and its very large Lepidoptera collections doubtless led to the stimulation of his entomological interests. He enrolled as a graduate student in the Department of Zoology of the University of Pittsburgh and received his M.S. degree in 1931 and his Ph.D. in 1934. From 1929 to 1934 he served as Assistant in Zoology and in 1934 and 1935 as Lecturer. From 1935 to 1941 he held the appointment of Instructor at the Erie Branch of the University. At one time he was Visiting Professor at Thiel College. From 1941 until his death he was Assistant Professor of Zoology at the University of Pittsburgh.

From 1930 to 1941 Sweadner had frequently worked on the insect collection at the Carnegie Museum as a volunteer worker. Since his college days he had

known Andrey Avinoff (see Shoumatoff, Lep. News, vol.4: pp.7-9; 1950). Dr. Avinoff was appointed Director of the Museum the year before Sweadner's graduation from college. During Avinoff's directorship, on 1 March 1941, Dr. Sweadner was appointed Assistant Curator of Entomology. The next year he was promoted to the Curatorship. He was faced with the heavy task of organizing and arranging the Lepidoptera collection, which had been left in a chaotic state by its principal assembler, W. J. Holland (see J. E. Remington, Lep. News, vol.1: p. 98; 1947). Dr. Sweadner has described the extent and areas of emphasis in the collection in the Lep. News, vol.2: p.80; 1948. By 1948 he had largely completed the work of organization. He had also sought out and marked clearly the individual specimens used by Holland in preparing the plates of The Butterfly Book, a service of importance in solving many future nomenclature questions. Shortly before his death, he had offered to prepare for the Lep. News a list of the species figured, with the precise data on the label of each, and of course his offer was gladly accepted. Apparently he had no opportunity to begin the list.

Aside from the Platysamia research, Sweadner's major publication was a revision of the Karanasa butterflies, which he wrote with Dr. Avinoff. He had to finish it alone after the death of Dr. Avinoff in 1949, and it was not published until twenty-eight days after his own untimely death. The Memorial Note in the Karanasa monograph includes the following tribute: "Dr. Sweadner surmounted limitations of time and strength to re-study Karanasa in the light of final acquisitions, to prepare the manuscript and to see it through the press. He actually read final proofs on the very eve of a major [surgical] operation, an admirable instance of scientific devotion at a time of great physical stress and mental travail. He recovered sufficiently to approve everything except the introductory material and the final color proof of Plate 11, only to succumb unexpectedly from post-operative complications on January 13, 1951."

From time to time Sweadner worked on problems of medical entomology. As a graduate student he was a research employee of the Mercy Hospital in Pittsburgh (1930-32) and experimented with the therapeutic use of fly maggots in cleaning up certain infections (see bibliography, below). In 1944 he directed investigations of the role of insects in the poliomyelitis epidemic in the Pittsburgh area. His own tragically early death followed a major operation necessitated by another dreaded disease.

Sweadner was born on 11 August 1903 at Beaver, Pennsylvania, the son of Robert W. and Kathaleen (Campbell) Sweadner. He was said to be in the tenth generation born in the territory of the present U.S.A. He was married in 1941 and is survived by his wife, Marie W. Sweadner, and two small children.

Dr. Sweadner was a Charter and Sustaining Member of The Lepidopterists' Society. He was a member of the Nominating Committee which selected the first officers of the Society, and championed particularly the nomination of several non-professional members. He was also a member of the Pennsylvania Academy of

Science, the Society of Sigma Xi (for research scientists), and the Society of Systematic Zoology.

Sweadner was a keen collector and a clever field man. He found the enigmatic Sphinx francki Neum. in a new locality. He made a film showing the mating of Heliconius charitonius (Linné) in Florida before the female made her first flight. But he wrote only a few papers for publication, as the list below shows. Friends believe he was just entering his period of regular productivity with the publication of the Karanasa monograph. His loss is poignantly felt by a very large number of lepidopterists who knew him personally or by correspondence.

I wish to thank Dr. George Wallace, Sweadner's successor as Curator, for providing me with many of the detailed data and for arranging the loan of the portrait.

C. L. Remington

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A DRAFT KEY TO EPIMECIS (GEOMETRIDAE)

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The genus Epimecis Hübner (Bronchelia Guenée) contains the largest of American geometers. While there are not very many species, they are generally somewhat confused in collections, and the following key, though neither critical nor complete, should be of some help in sorting material. It is planned for the males, but will normally apply to females, if one remembers that in this genus they are larger, usually a little more evenly colored, and tend to have much weaker dark marginal markings below. It is based mainly on material in the U.S. National Museum and the Cornell collection.

- 1. Hind wing angled, the two scallops between M<sub>1</sub> and M<sub>2</sub> being large, deep, and in line with each other; under side deep orange buff . . . . . jamaicaria Oberthür
- Hind wing rounded, all the scallops being rather similar; under side rarely (plumbilinea) bright yellowish . . . . . 2
- 2. Male with ground white and an apical black patch beneath which extends solidly in to the pm.\* line (which is far out) but not below M<sub>2</sub>; pm. line double, dark, and pale-filled on costal half, but single, dark, and scalloped on inner half; female also pure white, with the st.\* shade absent, or represented by a shade along upper half of pm. line . . . . . 3
- No such apical black patch in male, or the patch with a strong extension below M<sub>2</sub>; ground hardly ever pure white . . . . . 5
- 3. Apical area below solid black or with very limited marginal white in male, solid white in female; smaller species . . . . . 4
- Terminal area below contrasting whitish in both sexes, the black (♂) or blackish (♀) almost limited to the subterminal area; larger species . . . . . anonaria Felder
- 4. Markings heavy and lines broad in both sexes, the two elements of the pm. on hind wing wider than the white space between them . . . . . curvilinea Warren
- Markings light in both sexes, the two elements of pm. line light and separated by much more than their width . . . . . puellaria Guenée
- 5. Subapical black area cut off abruptly above M<sub>2</sub>,

\* "pm. = postmedian; "st." = subterminal.

- with at most a small separate spot in cell Cu<sub>1</sub>; a small white species . . . . . detexta Walker
- Dark marginal or submarginal shade below when present extending uninterrupted below M<sub>2</sub> . . . . . 6
- 6. Black outer area extending in to the pm. line, which is far out . . . . . 7
- Black or dark shade when present not nearly reaching in to pm. line, which is far in on costal half of fore wing . . . . . 9
- 7. Under side lemon (♂) or pale yellow (♀); the whitish apical spot and terminal spot in cell M<sub>2</sub> contrasting on upper as well as under side . . . . . nasica Draudt
- Without the two conspicuous pale spots on fore wing; under side never yellow, rarely tawny . . . . . 8
- 8. Upper side brown in male, with a very broad brown st. zone in female; dark shade below diffuse, broad in front, with more or less distinct pale subterminal dots near its outer edge . . . . . vexillata
- Upper side umber on a cream ground, under side white, with a narrower, blacker and more defined dark st. band, with more distinct pale st. dots near its outer edge . . . . . diffundaria Walker
- 9. Under side ochre, and upper side with ochre tint; a st. gray patch of special scaling extending from middle of cell M<sub>2</sub> to bottom of cell M<sub>3</sub>; larger on both wings in male, in female smaller on fore wing only . . . . . plumbilinea Warren
- Under side dark gray, almost evenly, upper side also blackish . . . . . 10
- Under side light with darker shading, or almost evenly white; no special scaling . . . . . 11
- 10. North American . . . . . hortaria, form carbonaria Haimbach
- South American . . . . . conjugaria (?), f. fumaria Schaus
- 11. Pm. line pale in a dark shade, or double, dark, and somewhat diffuse, with pale filling . . . . . 12
- Both pm. and st. lines similar, wavy, and pale with double gray shading, the pm. short; a dark species with luteous under side (Jamaica) . . . . . scolopacea Drury

- Pm. line below when distinct fine, dark, and single or with a much weaker second line; waved or scalloped . . . . . 14
12. Ground above brownish; under side with a continuous dark submarginal band . . . . . 13
- Upper side marked with dark gray on dirty white; submarginal marking on under side black, leaving a large white patch in cell M<sub>2</sub> and reaching the margin above it . . . . . conjugaria Guenée
13. Slightly smaller; under side of fore wing usually with a small fragment of a pale wavy st. line toward costa, projected on the blackish st. stripe . . . . . matronaria Guenée
- Slightly larger, browner, yellower below; st. usually represented by a fairly complete series of pale dots in the outer edge of the blackish shade . . . . . fraternaria Guenée
14. Under side of fore wing with a broad dark shade below, reaching the margin and leaving only small scattered white marginal spots . . . . . 15
- Dark shade below much narrower, purely subterminal, with a continuous pale marginal zone . . . . . 16
15. Ground above darker and browner, st. shade below sharply defined, leaving small pale marginal areas . . . . . subalbida Warren
- Ground above paler and grayer, the st. shade below diffuse on fore wing, gradually paling to margin, on hind wing leaving almost continuous white spots . . . . . fumistrotata Warren
16. Subterminal shade almost absent below, but ground above decidedly luteous . marcida Warren
- St. shade well developed below . . . . . 17
17. Ground above practically white, the terminal darkening conspicuous in male in the form of a narrow and well marked bend on both wings . . . . . pudivaria (of Nat. Mus.)\*
- Ground above luteous, heavily dark-dusted . . . . . 18
18. Smaller, more luteous, the subterminal shade on the fore wing below weaker, though usually well marked, with the series of pale st. spots near its outer edge . . . . . 19
- Larger and more fuscous above; st. shade below conspicuous on both wings, dark and even . . . . . patronaria Walker
19. Darker, the ground more contrasty, the discal dot of hind wing usually strong; North American . . . . . hortaria J. E. Smith
- Paler and more evenly marked, sex for sex; the discal dot on hind wing normally obsolete; South American . . . . . repressa Prout
- 
- \* The type of pudivaria Guenée, as figured by Oberthür, Études de Lépidoptérologie Comparée, fig. 1716, looks more like what should be the proper female of marcida; pale luteous above and nearly immaculate below.



## NOTICES OF BOOKS AND SPECIAL PUBLICATIONS IN PRINT

LARVAL FOODPLANTS. A VADE-MECUM FOR THE FIELD LEPIDOPTERIST. By P.B.M. Allan. London, 1949. 126 pp. Available bound from the publisher: Watkins and Doncaster, 36 Strand, London W.C. 2, England.

The problem of acceptable foodplants is a common one to every rearer of Lepidoptera and an important one to an investigator of the speciation and adaptation of phytophagous insects. Mr. Allan has compiled for the British macro-Lepidoptera a list of the known plants on which each species may be reared successfully from egg to pupa; thus he omits plants on which females occasionally oviposit by mistake or on which larvae will feed at first but be unable to complete development. This little book is essential to British workers, valuable to any collector in the Palearctic region, and useful even in North America in providing leads by which unknown foodplants of related Lepidoptera may be guessed.



LES LÉPIDOPTÈRES. By Jean Bourgoigne. La Nature, no. 3194: pp.175-181, 4 pls. (2 col.), 13 figs, and cover. 1951. Subscription 1500 fr. or \$5.50 per year, publ. by Masson et Co., Paris 6<sup>e</sup>, France.

M. Bourgoigne has summarized in few words several of the most interesting aspects of the life of Lepidoptera, in part a condensation of his fine review of Lepidoptera in the new Traité de Zoologie. This article is beautifully illustrated by photographs by Le Charles and Vanden Eeckhoudt, by drawings, and by two colored plates from the Traité. La Nature is a semi-technical review of the sciences.



AN ANNOTATED LIST OF THE LEPIDOPTERA OF ALBERTA. By Kenneth Bowman. Canadian Journ. Zool., vol.29: pp. 121-165. 1951.

This is a tersely annotated check-list of all



## NOTICES OF BOOKS AND SPECIAL PUBLICATIONS IN PRINT - cont.

the Lepidoptera known to Mr. Bowman from Alberta. It is a pleasure to find a faunistic study in which an attempt is made to deal with the entire Order, instead of the butterflies alone. There is an extensive introduction by E.H. Strickland in which the vegetation, soil, and rainfall are described for each of 21 "Ecological Areas" of Alberta from which collections came. The checklist gives, for each species, key numbers referring to one or more of the 21 areas instead of giving specific locality names for each species. The months of known flight are indicated by roman numerals. The nomenclature has in general been treated meticulously, with decisions to accept recent changes like *Boloria*, *Ramosia*, and *Vitacea*, but interestingly, to reject others like *Speyeria*, *Limenitis*, *Proteides clarus*, *Antheraea polyphemus*, and *Hyalophora cecropia*. The subspecies treatment appears to be muddled. Presumably flying together, we find two subspecies of: *Papilio machaon*, *Colias pelidne*, *Pieris occidentalis*, *Argynnis cybele*, *A. atlantis* (three!), *A. callippe*, *A. mormonia*, *Nymphalis milberti*, *Hesperia comma*, and so on. Immigration might make one or two valid, but not so many. Further confusion comes from failure to discriminate between subspecies and mere forms; there is complete chaos under *Colias eurhytheme*. Something like 1500 species are reported for Alberta, about 40% being Microlepidoptera; over 130 are butterflies.

**LE MIMÉTISME.** By Lucien Chopard. 335 pp., 100 text figs. 1949. Payot, 106 Boulevard St.-Germain, Paris.

The title of this book is misleading to one accustomed to the restricted use of the term "Mimicry"; in the latter sense it is a special type of adaptive coloration based usually on the distastefulness of a potential prey species and the resemblances which arise in the course of evolution allowing another species to share the immunity of the distasteful or otherwise protected species by resembling its color and pattern. In fact, this is a summary of the whole subject of adaptive coloration in animals, and lepidopterists may regret that only three of the eleven chapters are devoted to "Le Mimétisme". M. Chopard is Sous-Directeur of the Paris Museum, and a noted Orthopterist. He points out in his preface that the 1940 monograph by Hugh B. Cott (*Adaptive Coloration in Animals*, Methuen and Co., London) is the prime review of information on its subject. He adds that he regards Natural Selection as a powerful factor in evolution, but, unlike Cott, he believes that it does not explain everything. And this theme pervades the whole book. It is unfortunate that very many small inaccuracies and several misconceptions have been allowed to appear in the pages. One is surprised to find the school of "sélectionnistes néo-darwiniens" characterized as English, when many of its most influential members are now Americans (Dobzhansky, Simpson, Wright, Mayr, et al) and the school of "mutationnistes" labeled as American (examples given are Goldschmidt -- a German most of his life, A.F. Shull -- whose present influence is probably slight, and R.C. Punnett -- an Englishman)! This is not the clean, precise work which the subject demands, and yet the problems of adaptive coloration are generally well set forth for the French lay reader for whom it was presumably intended.

**BULLETIN BRITISH MUSEUM (NATURAL HISTORY), ENTOMOLOGY.**  
 "A Revision of the Family Ceracidae". By A. Diakonoff. Vol.1: pp.171-219, 34 figs. 1950.  
 "The Type Specimens of Certain Oriental Eucosmidae and Carposinidae". By A. Diakonoff. Vol.1: pp.273-300, pls.3-8, 2 figs. 1950.

These two papers by Dr. Diakonoff comprise No.2 and No.4 of an attractively printed new series, of which an editorial note states: "Parts will appear at irregular intervals as they become ready. Volumes will contain about three or four hundred pages, and will not necessarily be completed within one calendar year." The price of the Ceracidae revision is 10 shillings, that of the other paper is 8 shillings. Both are well illustrated.

Dr. Diakonoff regards the Ceracidae as very distinct from the other five families of Tortricoidea (Melanolophidae, Phalonidae, Eucosmidae, Chlidanotidae, Tortricidae) and gives a key for separating the six tortricoid families. He characterizes the Ceracidae in detail and gives a key to the 4 genera and to the species of each. They occur from India to northern Japan and far eastward into the East Indies. No larvae and pupae are known in structural detail.

The other *Bulletin* deals primarily with fixing lectotypes of Meyrick's Oriental Eucosmidae and Carposinidae; Dr. Diakonoff also erects ten new species. Many of Meyrick's species are sunk as synonyms.

**ECOLOGICAL AND SYSTEMATIC STUDY OF THE HESPERIOIDEA OF TEXAS.** By H.A. Freeman. *Southern Methodist Univ. Studies*, no.6: 67 pp. 1951. Available from: Southern Methodist University Press, Dallas, Texas; paper cover, \$1.50.

The author doubtless is better acquainted with Texan skippers in the field than any previous collector. The present paper gives his notes on habits and "flower preferences" for most of the 144 species reported from Texas and is a useful contribution to the natural history of the Hesperioidea. The flower "preferences" actually appear to be simply lists of flowers (very many cultivated) on which each species has been found, and are not based on detailed studies of PREFERENCES. There are keys to genera and, often, species, with brief descriptions. Precise Texan localities and dates are given for each species. No illustrations are included, and there are no synonyms or taxonomic additions or changes. No attention has been directed to the foodplants of larvae other than *Megathymus*.

**BUTTERFLIES OF GRAND CANYON NATIONAL PARK.** By John S. Garth. *Grand Canyon Nat. Hist. Assoc.*, Bull.11: 52 pp., 25 figs., cover in col., map. 1950. Available from the Association, P.O. Box 219, Grand Canyon, Ariz., in paper cover, \$0.75.

This is a briefly annotated list of the butterflies known from the Park. It is illustrated by 25 excellent original black-and-white photographs and a good colored photo on the cover. There are no other aids to identification. The list is based on very few records.



DE DANSKE SPINDERE. By Skat Hoffmeyer. 198 pp., 23 col. pls., many text figs. 1948. Universitets forlaget, Aarhus, Denmark.

The author points out that the "Spindere" are not phylogenetically a unit. The families dealt with in this volume are certainly a heterogeneous lot: Sphingidae, Notodontidae, Drepanidae, Cymatophoridae (= Thyatiridae), Thamatopoeidae, Lymantriidae, Lasiocampidae, Endromididae, Saturniidae, Arctiidae (g.l.), Zygaenidae, Aegeriidae, Psychidae, Limacodidae, Cossidae, and Hepialidae. All of the Danish species are included. The colored plates are good and depict the upperside of the adults of all the species and the larvae of many. Some ova, larvae, pupae, and aberrations are shown in the text figures. Unfortunately, I cannot read thoroughly the Danish text, but in general it appears to discuss the habits, flight seasons, Danish distribution, larval habits and foodplants, and aberrations or other color forms. It appears to be an excellent guide to Danish Lepidoptera, in combination with other volumes to follow.

DE DANSKE UGLER. By Skat Hoffmeyer. 347 pp., 32 col. pls., sev. text figures. 1949.

This volume has the same plan as the "Spindere" volume but deals with the single family Noctuidae. All species are figured in color (adults) and in addition there are larvae of 204 species! The text figures are largely of aberrations and ♂ genitalia.

CURSO DE ENTOMOLOGIA. III. MORFOLOGIA INTERNA. By Eduardo del Ponte. Published by the Museo Argentino de Ciencias Naturales in Buenos Aires, Argentina. Pp.103-161, figs.44-88, 1 pl. 1950.

This is another in the Curso series which is intended to provide a good textbook of entomology written in Spanish (see Lep. News, vol.4: p.68 for a notice of parts I, II, IV, V). The present part, on internal anatomy of insects, summarizes the present textbook knowledge of the several organ systems. It is illustrated by a large number of figures redrawn from a few authors, primarily Snodgrass. It maintains the sound standard of the four earlier parts.

MOTÝLI DENNÍ. By Rudolf Schwarz. Vol.1: 14 + XLII pp., 48 col. pls.; 1948. Vol.2: 10 + LXIX pp., 48 col. pls.; 1949. Available bound from the publishers: Vesmir, Nakladatelská a Vydavatel'ská, Spol. S R.O., Praha VII, Dobrov'ské ho 27, Czechoslovakia, or perhaps better through personal arrangement with a member of the Lep. Society living in Czechoslovakia.

The two small volumes introduce a series planned to cover the Lepidoptera of Central Europe. These deal with the butterflies, volume 1 including the Papilionidae, Pieridae, and Satyridae and volume 2 the Nymphalidae, Riodinidae, Lycaenidae, and Hesperidae. The rather brief text is in Czech and therefore of little use to most lepidopterists, but the 96 colored plates are very good and every species is referred to by its latin name. The plates figure for most species: the adults of both sexes, the lar-

va, and the foodplant; some pupae are also shown. The third volume containing the Sphingidae and Aegeriidae was due to be published in 1951, but we have not yet received it.

LÉPIDOPTÈRES HOMONEURES. By Pierre Viette. Faune de France, vol.49: 83 pp., 73 figs. 1948. Available from: Paul LeChevalier, 12 rue de Tournon, Paris VI<sup>e</sup>, France, for 550 francs.

This slim volume is a monographic summary of high quality. About one-third of the pages form an introduction to the Order Lepidoptera, with well illustrated discussions of the aspects of the morphology, life history, and systematics relating to classification of the Lepidoptera, and brief collecting, preserving, and mounting instructions.

There is a key to the major groups of Lepidoptera, with the following classification:

- Suborder Homoneura
  - Micropterygoidea
  - Hepialoidea
- Suborder Heteroneura
  - Monotrystia
    - Stigmelloidea
    - Incurvarioidea
  - Ditrystia
    - Hesperioidea
    - Papilionoidea
    - Bombyces
    - Gecmetres
    - Noctuelles
    - Sphingidae
  - Cramboidea
  - Cossoidea
  - Psychoidea
  - Tortricoidea
  - Tineides

The body of the work deals with the French representatives of the Homoneura (Micropterygidae, Eriocranidae, Hepialidae). M. Viette gives for each species full references and descriptions of the wings, genitalia, the larva if known, the habits, and the distribution. There is a good number of clear figures. France has 13 species (1 genus) of Micropterygidae, 7 species (3 genera) of Eriocranidae, and 9 species (3 genera) of Hepialidae. A few points of unusual habits are worth repeating here. The adults of two Micropteryx come regularly in large numbers to the flowers of Caltha. The females of Hepialus humuli and hecta fly in search of the males, whereas the reverse is found in Korscheltellus, as in nearly all Lepidoptera. In the Pyrenees there is a hepialid (K. pyrenaicus) with flightless, stubby-winged females.

OPERATION SATURNID. By John P. Duane and John E. Tyler. Interchemical Review (house organ of Interchemical Corp.), vol.9: pp.25-28. 1950.

This widely publicized paper purports to announce data indicating that the female "Samia" cecropia attracts potential mates by emitting infra-red radiation within a certain wave-length corresponding to the length of the hairs on the antennae of the male cecropia. Even granting that a few psychologists believe olfaction to be based on infra-red perception, a reader can hardly consider the data of this article as giving a significant indication of an infra-red mechanism for sexual attraction. The writers were apparently unaware of the voluminous literature on sexual attraction or of the progress in identifying the attractant (which is NOT produced in the thorax!).

## BUTTERFLY COLLECTING IN COLORADO

by F. Martin Brown  
Colorado Springs, Colorado

Each year I receive letters from naturalists who plan to spend some time in Colorado, each writer asking for advice in planning his trip. Bearing in mind this interest, I have assembled what I know of the opportunities in Colorado. The best maps -- other than the regular auto route maps -- are the Sectional Aeronautical charts (Cheyenne, Denver, and Trinidad cover all but the westernmost 65 miles).

Colorado is spectacular in its variety. The eastern third is High Plains, semi-arid and grass-covered except where irrigation has allowed agricultural development in the broad river valleys. The northern half is more developed, more moist, and more accessible than the southern half. The middle third is mountainous, and forested ranges alternate with grassy parks. Main roads are good and accommodations plentiful along them. Secondary roads are poor and accommodations all but non-existent. The western third is a high plateau deeply dissected by canyons. The highlands sustain a good forest; the lowlands are covered with sagebrush. The altitude ranges from 3386 feet above sea level on the eastern border to 14,402 feet at the top of Mt. Elbert. Elevations up to 14,000 feet are reached by automobile (Pikes Peak and Mt. Evans, both in the Front Range). Many highways cross the mountains at or near tree-line (in Colorado about 11,800 feet). Four great river systems have their origins in the state, the Colorado, the Rio Grande, the Arkansas, and the Platte. Five life-zones are represented by large areas.

Collecting on the eastern plains starts in early April and peters out by the end of June, although there are some purely summer things that make a stop or two worthwhile while crossing the plains. Collecting between 6500 feet and 8500 feet is best from mid-May to the end of June. The month of June is the best time between 8500 and 10,000 feet although lately this area continues to be good through July and there is a distinct summer group of species every year. Above 10,000 feet collecting picks up during the middle of June and is good through July. Above tree-line mid-July through August is the most productive period. Throughout Colorado ideal collecting stops about the end of August.

The Lepidoptera of the state are rather poorly known. Small areas west of Fort Collins, Boulder, Denver, and Colorado Springs have been collected with some regularity and thoroughness. The same is true of the northern part of South Park, an area west of Capulin in the San Luis Valley, and around Fruita on the western slope. Most of the mountainous areas have been sampled. The eastern plains and the western plateaus and canyons are practically unknown; there the season is early and about over when outside collectors can visit. The six known resident collectors in Colorado live in or near the mountains and do their collecting in the high lands.

Generally speaking the fauna of the Canadian, Hudsonian, and Alpine Zones in the mountainous mid-

third of the state is uniform from north to south. Of course there are local variations, but most of the species found in one range will be found in the others. The Transition and Upper Sonoran Zones on the eastern plains carry a fauna different from that in the same zones on the western slope. In the east there is a noticeable difference between the fauna of the Platte watershed and that of the Arkansas. Except in the extreme southwest, the fauna of the western plateau country is reasonably uniform and essentially that of the Uinta Basin in Utah.

For collectors wishing to spend a profitable summer in one area I would suggest any of the mountain ranges. The Front and Park ranges are pretty well known. The others have been visited only casually. Probably the most interesting unexplored areas lie in the Sangre de Cristo range facing the eastern plains between the Arkansas River and the New Mexican boundary.

For the collector wishing to sample the state during the month of July, I suggest the following itinerary: Come in from the east through Denver, collecting in the cottonwood groves and open prairies en route. From Denver go southwest through Morrison to Fairplay; work the oak thickets for *Theclinae*. Beyond Morrison work Turkey Creek and Bailey (*Minois meadi* Edw.); both are Mead stations from which Edwards described many "Colorado" species. From Fairplay head north over Hoosier Pass to Breckenridge and Dillon. Stop in the top of Hoosier (11,400 ft.) and go up to tree-line afoot; DON'T TRY TO DRIVE THE WOODROAD. In July you will get a good sample of alpine here, including *Erebia callias* Edw. Try the high willow bogs near Alma and on the way down to Breckenridge for some late *Boloria* (*frigga sagata* B. & B., *freijsa* Thun., *eunomia alticola* B. & McD.). From Dillon turn west to Leadville via Fremont Pass. At Leadville turn south to Twin Lakes; work the dry hills south of the lakes for *Philotes battoides centralis* B. & B. You will find it on flowers with *Plebeius acmon lutzii* Gertsch. Go westward over Independence Pass (12,200 ft.). There is good collecting on the eastern approach and at the summit. Drop down the western side to Aspen and Glenwood Springs. From Glenwood continue westward to Grand Junction, working the roadsides for *Speyeria* and *Theclinae*. From Grand Junction strike southeast to Montrose and Ouray; pretty good collecting all the way. Take the Million Dollar Highway over the top to Silverton and then down to Durango; there is good collecting most of the way. From Durango head eastward to Pagosa Springs and Wolf Creek through excellent collecting country. Continue to Alamosa, LaVeta Pass (a low one), and Walsenberg. This is a little late for the San Luis Valley but some Skippers will fly. From Walsenberg go northward to Pueblo and eastward along the Arkansas to Kansas. This last leg will yield little, but what you take will be interesting. You may find rarities like *Leptotes marina* Reak. and *Yvretta rheus* Edw. and *carus* Edw.



by F. Martin Brown  
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## IV. SAMPLE SIZE

In the section of the preceding article devoted to frequencies I presented Table 6 showing how the size of the sample affected the S.D., 95% limits and 99% limits of a frequency. I want to discuss this table a little more. For convenience it is repeated.

TABLE 6.

The Standard Deviation and Certain  
Limits for 37.5% Frequency

| N    | S.D.  | 95% limits | 99% limits |
|------|-------|------------|------------|
| 8    | 17.1% | 4.2-70.8%  | 0 -81.6%   |
| 16   | 12.1% | 13.8-61.2% | 6.4-68.6%  |
| 64   | 6.1%  | 25.6-49.4% | 21.4-53.2% |
| 200  | 3.4%  | 30.8-44.2% | 28.7-46.3% |
| 1000 | 1.5%  | 34.5-40.5% | 33.5-41.5% |

The table makes it evident that as the sample size increases the S.D. decreases. It is also evident that as the sample size increases the limits become narrower. All of this, of course, applies only to samples drawn from the same population. Such a table is easy to construct for any frequency that is desired. I explained in Section III how to calculate the S.D. of a frequency. The 95% limits are found by adding to and subtracting from the chosen frequency a number that is 1.96 times the S.D. To determine the 99% limits you use 2.58 as the multiplier of the S.D.

When samples that are not the same size are being compared, the safest procedure is to use the limits established by the smaller sample. For greater accuracy arithmetically, or when in doubt, take the square root of the sum of the squares of the two S.D. involved as the S.D. of the difference. Let me show this by example: Suppose that we have a pair of samples, the larger numbering 64 specimens, the smaller 16. The frequency for a character among the specimens in the larger sample is 25%; this yields an S.D. of 5.4%. The frequency with which the character appears in the smaller sample is 50%, with an S.D. of 12.5%. Calculating the limits and putting the data into a table we have Table 7.

Since the case is doubtful it is best to test the difference in the conventional manner, as follows. The S.D. of the difference between the two frequencies, computed as outlined above, is 13.6%.

TABLE 7.

Certain Data on Two Frequencies

| N  | F   | S.D.  | 95% limits | 99% limits |
|----|-----|-------|------------|------------|
| 16 | 50% | 12.5% | 25.5-74.5% | 17.7-82.3% |
| 64 | 25% | 5.4%  | 14.4-35.6% | 11.1-38.9% |

When the difference, 25%, is divided by 13.6 we get a "t" score of 1.8. Such a difference may be expected about once among 14 samples drawn from the same population. I would not consider it significant.

A much simpler method for determining the probability that the two samples were drawn from a single population is that found in the Chi-Squared test. This will be explained in the next article in this series. In fact, the Four-fold Table method for applying the Chi-Squared test was designed for just this sort of problem. Chi-Squared in this case is 3.8 and from the tables we find that  $P = 0.05$ . This means that we might expect to find 5% of the samples drawn from a population with differences as great or greater than occur in our example.

Turning from frequencies to linear measurements and indices, we find the effect of the size of the sample is equally important. However, in these cases the sample size has already been taken into consideration. Sample size enters directly into the calculations for both the S.D. and p.e.m. of such measurement. For the comparison of two series we use the p.e.m. Here it is easy to see that as the sample size increases when the S.D. is constant, the p.e.m. decreases.

I hope the above paragraphs make it clear that the arithmetic involved in the statistics we have studied takes into consideration the size of the samples. It should show why the larger the sample studied, the better or more representative the parameters derived from the sample.

Another factor that involves sample size is the interpretation of "t" scores. The significance of the value of "t" depends in large part upon the chance the investigator is willing to accept. In many fields of statistical investigation significant values for "t" have been accepted. It is reasonable to accept a lower value of "t" as significant in planned and controlled experiments than for studies of uncontrolled natural populations. Raymond Pearl, one of the greatest American students of the statistics of natural populations, insisted that to be significant "t" must equal at least 6 when data from samples of a natural population are being examined.

## Brown: SIMPLE STATISTICS FOR THE TAXONOMIST - cont.

He was primarily interested in man, an animal about which there is sufficient information to establish with some degree of accuracy limits to the size of the population. Our studies revolve about animals for which there is little knowledge of the total population from which our samples are drawn. Further in this article I shall present some very crude estimates of the size of the ANNUAL CROP of two species of butterflies. When data is drawn from the various annual crops over a period of years the population that has been sampled reaches enormous dimensions. Because of this I prefer to go one unit beyond Pearl and generally use 7 as the critical number for "t". In Table 8 I have presented the value of "t" in terms of chance. The nearest whole number has been used for the smaller values of "t". For the larger values the numbers have been rounded off to three significant digits. The term "billion" is the American billion --  $10^9$ .

TABLE 8.

The Probability  
of a Larger Deviation in Terms of "t"  
Between Samples Drawn from the Same Population

| "t" | when p.e.<br>is used | when S.D.<br>is used |
|-----|----------------------|----------------------|
| 1   | 1:1                  | 1:3                  |
| 2   | 1:5                  | 1:21                 |
| 3   | 1:22                 | 1:369                |
| 4   | 1:142                | 1:15,772             |
| 5   | 1:1,341              | 1:1.7 million        |
| 6   | 1:19,300             | 1:500 million        |
| 7   | 1:427,000            | 1:400 billion        |
| 8   | 1:14.7 million       |                      |
| 9   | 1:730 million        |                      |
| 10  | 1:65 billion         |                      |

[Here again I quote Mr. Calhoun's comment since it throws light on the perplexing problem of dealing with a natural population as opposed to a controlled experiment. "I think the discussion may be misleading. I would respect Pearl's judgment that a "t" of 6 is good in population work, but would suggest that the reason is not based on probability. Just the opposite. Such astronomical probabilities as are associated with high "t" values are, I submit, fantastic and quite meaningless as standards of significance. If my "t" told me RELIABLY that I ran a risk of 1 chance in 1000 of being wrong in drawing a certain conclusion I would only ask more if my life

depended on the decision. The important point here, I think, is "t" is judged NOT TO BE RELIABLE. In other words we believe that in dealing with natural populations the probabilities that go with a t-test ARE NOT THOSE LISTED IN THE TABLES, and are in fact dangerously lower. The difficulty is in the "normality assumption" for the population, and, much more, in the uncertainties of the sampling procedure. We are afraid (justly) of having gotten samples from two different, localized pockets in which the homogeneity of the samples lead to a falsely small S.D.

"The point of the emphatic comment is that I think the next advance is in the direction of abandoning guesswork on how large "t" should be for safety, and rather of trying to make good estimates as possible of (a) the normality of the population and (b) much more valuable: estimates of how much the S.D. has been underestimated." ]

Here is how Table 8 is read: If the "t" score of the difference of two means is 1 -- the p.e. having been the basis used -- such a difference is to be expected every other time that samples are drawn from a true population. If the "t" score of the difference between two means is 6 then such a difference is to be expected from ONE sample among 19,300 drawn from a homogeneous population. Similarly if the Standard Deviation is used as the basis for "t", as in the case of frequencies, a "t" score of 1 is to be expected once among four samples (actually 3.7 samples) and a "t" score of 6 once among 500 million samples.

To assume that the same "t" score is going to have the same significance in two problems is poor science. Let me explain my reasons for saying this.

Every sample is a definite fraction of a finite whole population of a species. Unfortunately, with the exception of man, we have no real idea of the size of the population of any species. Species are often considered "rare" or "common" depending upon their occurrence in collections. This in turn depends upon how actively the habitat of the species has been collected. It also depends upon the collector-interest in the species. For instance, my collection contains about a half dozen specimens of *Pieris rapae* (Linne) and over 100 *Colias behrii* Edwards. I think you will agree with me that in nature *behrii* is not 17 times as abundant as *rapae*! There collector-interest determined the number of specimens in my collection.

The determination of the size of a natural population is extremely difficult. In fact it seems well nigh impossible to do it with any degree of accuracy. Fully realizing this I have attempted to gather some crude estimates of population size. The conclusions I reach below may be as much as 100% in error. I believe their only significance is as estimates of the LOWER possibility of the size. If in time I feel that the results are worthwhile I will publish the data in detail with its supporting statistics. Here are assays on two species stripped to the bare essentials to make my point.

Parnassius smintheus sayi Edwards: This is a common form in most of the forested areas of the Rocky Mountains. I have made some estimates of the density of its population in Colorado and particularly in El Paso County. At the peak of the season, there appear to be 120 individuals per acre in El Paso Co. and other areas in Colorado. In El Paso Co. there are about 60,000 acres occupied by the species. This means that at the peak of the flight there are AT LEAST 7,200,000 individuals in the County. The area just considered is probably less than 0.001 of the total area occupied by sayi. So I do not think it an exaggeration to say that the annual crop of sayi is over 7 billion individuals!

If while studying the variation of this subspecies I use a series of 70 individuals, my conclusions are based upon ONE TEN-MILLIONTH of the annual crop! Under such conditions the errors due to the size of the sample are bound to be great. Just suppose that the "average" New Yorker were to be described from one randomly selected individual! Or the "average" American from 15 persons randomly selected from one locality. Yet isn't that just what is being done by the vast majority of taxonomists?

Boloria frigga sagata (Barnes and Benjamin): This is a form that might well be considered rare. During 1950 I made some estimates of its population density over almost all of its known range. At the peak of the flight there were about 12 individuals per acre. The area occupied by this insect is something under 10,000 acres. This would put the 1950 crop at about 120,000 individuals. For this insect a sample of 70 specimens comes close to being one

two-thousandth of an annual crop.\*

Now let us see how all of this affects the significance of "t". First let us examine the situation as it exists for sayi. The total population will yield at least 100 million samples of 70 specimens each. On a purely mathematical basis I should seek a "t" score of at least 8.5 before stating that two samples are different (see Table 8). However I feel confident that my sample is not composed of the 70 most extreme specimens in the entire population. So when comparing this sample with another I will not require so high a "t" to indicate a significant difference. By using some high-powered mathematics I arrive at a "t" score of about 5.5 being significant in the case of this subspecies. This is for studying the variation WITHIN the subspecies. For comparing this subspecies with another I will stick with the suggestion made earlier and use a "t" score of 7.

Applying the same reasoning to sagata and using a sample size of 30 specimens I find that the SAME DEGREE of variation as "t"± 5.5 for sayi will be indicated by "t"± 3.6. Again this applies to variation within the subspecies. For comparing this subspecies with others I am willing to grant significance to a "t" score of 5. In this and the preceding paragraph I have used "t" scores based upon p.e. For those involving the Standard Deviation I would use 3.9 instead of 5.5 for sayi and 2.5 instead of 3.6 for sagata.

\* Ed. note: This figure should not be quoted too freely by future investigators of population-size. My experience suggests that the sagata colonies occupy much more than 10,000 acres. C.L.R.

[To be continued]



EDWARD C. JOHNSTON

In the passing of Edward C. Johnston in his sixty-third year, entomologists lost a field collector of great distinction, and those of us who knew him personally lost a treasured friend. Mr. Johnston died 9 April 1951, of a coronary attack in his home at Seattle, Washington. He was a Charter Member of the Lepidopterists' Society.

Edward Johnston was general manager of the fur seal administration in the Pribilof Islands for ten years before his retirement in 1950. He had been with the Fish and Wildlife Service for twenty-six years. He was born in Cottonwood Falls, Kansas, and graduated from the University of Kansas in 1911.

Although possessing the training and methodical thoroughness required of a taxonomist, Mr. Johnston preferred to limit himself to field collecting. At least thirty-five new species and other forms of Lepidoptera were described wholly or in part from material collected by him. But he is perhaps best known entomologically for his fruitful collecting in the Pribilof Islands, Alaska, where he increased the number of known species of Heterocera from eight to

twenty species. (See his paper in the Lep. News, vol.4: pp.27-30; 1950.) He also collected quantities of Coleoptera and Trichoptera that he generously passed on to his friends. A fine collection of land shells was donated to the California Academy of Sciences some years ago, for which he was made a life member. One new species of plant was also described from material that he collected. Five species of moths were named in his honor: Eupithecia johnstoni McD., Platyptilia johnstoni Lange, Scopula johnstonaria McD., Orthosia johnstoni McD., Euxoa johnstoni McD., and Chionodes johnstoni Clarke.

Edward Johnston was happiest when he could leave behind the cares of the office and spend a few days and nights in some of the beautiful collecting locales of the West.

Donald P. Frechin  
Bremerton, Washington

[Mr. Frechin has obtained the very extensive Johnston collection of moths. Mr. Johnston was always cooperative in supplying material to taxonomists for revisional studies, and Mr. Frechin will also honor all requests from specialists for material in the collection. - Editor.]

RESULTS OF HUMIDITY TESTS WITH PAPILIO PUPAE

by P.H.H. Gray  
Macdonald College, Quebec

A female Papilio ajax L. (= polyxenes Fab.), with wing-radius of 48 mm., was caught on 15 Aug. 1951. It laid about 75 eggs on parsley under a wire-screen cage, in the garden, and died on 18 Aug. The larvae fed on the parsley under the cage until 22 Sept., when the temperature fell to 40° F., and all were brought into the basement, at 67°, and kept in large box-cages. The boxes were lined with card, upon which the larvae began to suspend on 27 Sept. On 6 Oct., 68 pupae were counted, cut away from the card, and stored under different conditions.

Twenty-eight were placed each in a small tube, and the tubes in groups of seven in jars, which in turn were placed in atmospheres of differing relative humidities, 100, 80, 40, and 20 per cent; air (pupal) humidity, and that developed from moist soil. The first four conditions were obtained by means of water (for 100%), KOH solutions at specific gravities of 1.175 (for 80%), 1.380 (for 40%), and 1.490 (for 20%). These specimens were kept in the basement.

A group of nine was placed in the cold store, where the temperature fell to 40°, and the humidity was that of outside the house. Fourteen had suspended on the wooden ceiling of a cage; this cage was placed under a closed porch, in a closed garden shed, where the temperature was only a little higher than outside.

The first insect to emerge was one from the group in the basement, on 16 Dec.; the last of this group emerged on 12 Feb., twenty-one emerging between 6 and 28 Jan. The jars containing the groups of seven pupae were removed from their relative-humidity conditions on 16 Dec., the outsides of the jars washed and dried, and the jars placed in separate wire-gauze cages. Those wintering in the cold store were transferred to the basement (66°) on 15 Feb.; these emerged between 3 Mar. and 7 Apr. Those that were under the porch were transferred to tubes in the basement on 15 May; the last of these emerged on 28 May.

The conditions, numbers of insects, and averages of the wing-radii of the insects under each condition, are given in the Table.

The following points can be noted, in addition to those relating to the wing-radii, which will be discussed later: the saturated atmosphere, from water, caused all seven pupae to die, the contents having an odor of bacterial decomposition; the humidity produced by moist soil appeared to be close to that of saturation, as judged by the deposit of free water on the inner wall of the jar, but three females emerged; and 40% relative humidity desiccated the pupae, which remain as hard dry well-preserved specimens.

The outstanding result of breeding this series

is that the wing-radius of each specimen of 19 ♂♂ and 19 ♀♀ is significantly less than the average for wild specimens. This is shown clearly by the figures given below. The wing-radii of the bred ♀♀ are not significantly longer than those of the bred ♂♂.

| Bred 1950 |          | Wild           |          |
|-----------|----------|----------------|----------|
| ♂♂ (19)   | 36.1 mm. | 1949,1950 (6)  | 46.3 mm. |
| ♀♀ (19)   | 39.1 mm. | 1945-1950 (10) | 45.7 mm. |

(The 10 wild ♀♀ include one of 55 mm. The wing radii of wild specimens caught in 1950 measured as follows:

♂♂ (4); 45, 47, 47, 48; ave. 46.8  
♀♀ (6); 41, 42, 45, 45, 47, 48; ave. 44.7)

It would be unnecessary to demonstrate the statistical level of the significance of the difference between the bred and the wild specimens; it can, however, easily be shown that the difference between them, of either sex, is of a high level of significance, the statistic  $t$  being, for one random set of six of the bred male specimens, compared with the six wild ones, about 6.7; the probability of such a value being obtained by chance is much less than once in a hundred cases.

RELATIVE HUMIDITY TEST WITH PUPAE OF  
PAPILIO AJAX, 1950, 1951

| Set | Condition  | No. of pupae | Emerged |      |    |      |
|-----|------------|--------------|---------|------|----|------|
|     |            |              | ♂♂      | mm.  | ♀♀ | mm.  |
| A   | Outside    | 14           | 4       | 35.5 | 5  | 37.2 |
| B   | Cold store | 9            | 8       | 36.8 | 1  | 39.0 |
| C   | 100% r-h   | 7            | 0       | -    | 0  | -    |
| D   | 80% r-h    | 7            | 1       | 34.0 | 5  | 39.5 |
| E   | 40% r-h    | 7            | 0       | -    | 0  | -    |
| F   | 20% r-h    | 7            | 4       | 36.5 | 3  | 40.0 |
| G   | Pupal r-h  | 7            | 2       | 35.5 | 2  | 39.0 |
| H   | Soil r-h   | 7            | 0       | -    | 3  | 40.7 |

Note: five were crippled; four yielded a parasite; two (H) were moldy; one (H) dried; one (A) decomposed; one (B) did not emerge. One ♂ of A measured 32 mm.

The time has now arrived for the preparation of the Society's annual Field Season Summary. This has the dual object of keeping the members in touch with the season's collecting activities in North America, and of assembling a permanent record of variations in the occurrence of Lepidoptera from year to year.

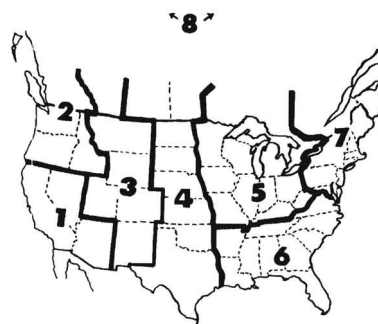
The success of the Season Summary depends on the willingness of lepidopterists to contribute information to it. In past years reports have been received from only a fraction of the active members. Some have been unable to spare the time to write out even a brief account of their experiences during the season, but probably many more have simply been too modest about the value of the contributions they could have made. Experience has shown that even brief reports, giving data on a few species, may fill in a missing piece of the general distribution picture. The ideal report from an individual observer is an elaborate document, requiring lengthy preparation, based on extensive field work. It is rare, however, for even professional entomologists to have time or facilities for the working up of a report of this kind. The backbone of the summary has invariably been formed by the piecing together of the small reports of a large number of observers who have each had only limited time to spare for collecting and reporting on collecting. Do not, therefore, fail to send in a report only because you feel that it is less complete than you would have wished to make it. Meagre information, as long as it is accurate, is better than none, and the smallest contribution will be welcomed by the regional co-ordinator. Full credit is always given to contributors to the Summary.

It is often not possible to publish in detail in the News all the data sent in by contributors to the Summary. Records that are not published are not, however, lost; they are incorporated in a permanent file maintained by the Society, and form from year to year a cumulative record of present and past conditions.

As in past years, information is desired bearing on the following subjects: 1) relative abundance and normal or abnormal times of occurrence in the fauna as a whole; 2) correlation of these with environmental conditions, natural or artificial; 3) variations in abundance or time of appearance of particular species, and the apparent causes, if any, of such variations; 4) migrations; 5) unusual occurrences, extensions of known range, establishment or spread of species introduced from abroad.

Reports should give as much as possible of the following information: a) area covered and extent of collecting; b) weather during the collecting season and during the preceding winter; c) comparison of the season as a whole with the preceding season (whether all or some groups were more or less numerous, whether emergences were earlier or later in various parts of the season); d) factors likely to affect success of collecting (as opposed to actual abundance or rarity of the Lepidoptera); e) status of natural enemies; f) artificial changes in the environment (clearing, burning, draining, cultivation, insect control measures, etc.); g) dates of occurrence and relative abundance of particular species -- if the list is extensive, orderly arrangement, either by taxonomic position or by date of occur-

rence, is desirable, and if a number of localities are covered these should be arranged geographically; in this section COMMON SPECIES SHOULD NOT BE NEGLECTED, as they are more likely to yield data comparable from year to year and from one place to another than are scarce species; the approximate date of the main emergence of a species is more significant than the date of the first individual's appearance; h) ideally the full flight period should be specified, with separate broods if possible being distinguished; i) what known migrant species were present and in what numbers, and details of any past or directional movements observed; j) unusual occurrences; new state, province, or area records; progress of introduced species; k) outbreaks of pest species.



SEASON SUMMARY ZONES

As usual, the continent is divided for purposes of the Summary into eight areas, shown on the map. For each area a separate summary will be prepared by the area co-ordinator, an active lepidopterist resident in the area. REPORTS SHOULD BE SENT DIRECTLY TO EACH APPROPRIATE AREA CO-ORDINATOR BEFORE DECEMBER 10. A list of the areas and co-ordinators follows:

- Area 1.** (Southwest) - LLOYD M. MARTIN,  
Los Angeles County Museum, Exposition Park,  
Los Angeles 7, Calif.
- Area 2.** (Northwest) - J.C. HOPFINGER,  
Brewster, Wash.
- Area 3.** (Rocky Mountains) - J. DONALD EFF,  
820 Grant St., Boulder, Colo.
- Area 4.** (Great Plains) - H.A. FREEMAN,  
1335 Overhill Drive, Garland, Texas.
- Area 5.** (Central) - P.S. REMINGTON,  
5570 Etzel Ave., St. Louis 12, Mo.
- Area 6.** (Southeast) - RALPH L. CHERMOCK,  
Dept. of Biology, University of Alabama,  
University, Ala.
- Area 7.** (Northeast) - S.A. HESSEL,  
8 Woodmere Blvd., Woodmere, L.I., N.Y.
- Area 8.** (Far North) - T.N. FREEMAN,  
Division of Entomology, Central Experimental  
Farm, Ottawa, Ontario, Canada.

Mr. Freeman is the new coordinator for Area 4, replacing Mr. Stallings, who had asked to be relieved of the duty after four years. Mr. Hessel replaces the writer for Area 7.



Eugene G. Munroe



## FIELD NOTES

MORTALITY OF NYPHALIS MILBERTI LARVAE

During the summer of 1950 I collected about fifty fully grown larvae of Nymphalis milberti (Godt.) from patches of nettles growing on low land near the salt water. Though a few of these were killed for specimens, the greater number I kept alive in the hope of rearing some butterflies. From all these larvae I did not get one adult. As far as I could make out they were parasitized 100 % by a tachinid fly. A few may have died from other causes, but great numbers of dipterous pupae were in the cages.

The evident abundance and destructiveness of this particular parasite seems to fit in very well with the scarcity of N. milberti during the summer months. (See Lep. News, vol.4: p.13.) On the other hand I have no evidence to show the butterfly is a migrant persistent enough to continue restocking the locality regularly. Some day the marking and releasing of butterflies may shed some light on this question.

Richard Guppy  
Wellington, B.C.



## OVIPOSITION OBSERVATIONS

The following notes were made in the vicinity of Ithaca, New York. I regret that none of the plants were identified.

On 2 July 1949 at noontime, a Meadow Fritillary, Boloria toddi (Holland), was seen depositing an egg on a half-dead blade of grass. The grass leaf was green and brown and near some violet plants. This particular butterfly landed and proceeded to walk over leaves and grasses, and beneath small growths of various field plants, such as wild carrot, mustard, dandelion, etc. It was hidden from view at times, then walked up into the sunshine, flew off a few feet and landed near other violets. Sometimes it landed on violets, but never seemed to lay any eggs on the plant, at least none that I could find. On 19 Sept. 1949, another B. toddi was seen at noon. It laid an egg on a dead stem of wild carrot. The stem had been cut down and was lying among other dead vegetation. I saw no violets around, but no thorough search was made. This oviposition was near the same area as that of 2 July.

Polygonia interrogationis (Fab.) was observed while it laid five eggs. At the time I was not sure what was going on. I was in the shade of a small elm tree and all that could be seen was a silhouette of leaves and butterfly against the sky. It was difficult to know whether I was seeing a butterfly or a leaf. It had not moved after it first landed except to pivot once. After a minute or so it suddenly flew off and did not lay any more eggs on that tree. This butterfly was noticed only because I was watching and hoping for it to show up, so I could get some eggs. Investigation showed it had laid five eggs on the serrated edge of a small leaf at the end of a branch. These eggs have a sparkle

to them, and so have the eggs of the Painted Lady, Vanessa cardui (L.).

Vanessa cardui is one species that I would say lives dangerously. Laying eggs on thistles must be a ticklish job. I know picking the leaves with the eggs is no pleasure. On 5 August 1949 one was seen laying eggs on some small thistles that were only 6 to 8 inches high. They were second growth plants, the field having been cut over a few weeks previous. I watched her place one egg and found it easily. I could not find any more eggs then, so came back a few minutes later and carefully searched the group of thistles. Four more eggs were found. All were laid on the upperside of leaves, and one right on top where small leaves were unfolding, which place is a mass of spines. Naturally, all eggs were laid near a spine or spines. The wavy edge of the leaf makes it difficult to find the eggs. Turning the leaves this way and that I could locate the eggs by their sparkle. Two eggs, about 1/2 inch apart, were on the same leaf. I picked five eggs knowingly but the total came to six; one egg did not have the sparkle that the others had so perhaps it was laid a few days earlier. A few days earlier I had noticed another cardui ovipositing on burdock. Two eggs were found and picked. One was laid on a flower bed right in the midst of prickles. The second one was placed on the underside of a small leaf beneath a flower bud. The times of ovipositing were at noon and 5:45 p.m. All eggs hatched in 3 days.

The Least Skipper, Ancyloxypha numitor (Fab.), seems to bounce through the grass, stopping here and there to place an egg on a grass blade. On 5 June 1949, I observed one that landed on a blade of grass and the abdomen curved to place an egg. A gust of wind made the grass twist so that the butterfly was on the opposite side of the leaf and out of view. Twice this happened but the egg was finally laid on the upperside of the blade. This particular grass has a very broad blade, about 1/2 inch across at its widest part. Eggs were also laid on narrow grasses, but mostly on these broad grasses, of which there is a good-sized patch on a slope. On 13 August I again observed numitor laying eggs on this broad-leaf grass.

Joseph A. Keji  
Ithaca, New York

## NOCTURNAL MOTHS FEEDING IN DAYLIGHT

While a few Phalaenidae species, chiefly among the Plusiinae, can be commonly seen flying in daylight, most are very strictly nocturnal. It may be of interest to note that on 26 Aug. 1950 I observed a number, probably 25 or 30 individuals, of Feltia ducens Wlk. flying in bright sunshine, about four in the afternoon. The moths were visiting and feeding in flowers of Grindellia and were easily caught. I took enough to make identification certain, and let the remainder go, as the species is very common.

Richard Guppy  
Wellington, B.C.



NOTES ON COLLECTING POLYGONIA FAUNUS SMYTHI

Every year for the preceding five years I have had fun in pursuit of this rare subspecies but have never been able to collect it in great numbers. In 1950, however, I succeeded a little better than previously, probably owing to my green net bag, which enabled me to capture six. This subspecies, which is still unknown to many collectors, is no doubt the shyest and swiftest flier of all the eastern Polygonia and only found on mountain roads in the Great Smokies at an elevation of about 3000 ft. I have never seen it settled on flowers, but always on dirt roads, and even with favorable weather conditions I have passed days without seeing even one. I cruise slowly with my car in low gear over these roads, at times for miles before I detect one. Their habit is peculiar, and it takes patience and a keen eye to detect them on the dusty roads surfaced with coarse gravel, but whenever I see what appears to be the edge of a little blade sticking out of the ground then I know it is Polygonia faunus smythi Clark.

A typical experience for me is about as follows. I stop the car within about twenty feet. The "blade" has not moved; perhaps I have made a mistake; but no, a little breeze is tilting the insect slightly to one side reminding me of a wind blowing into a sail. Approaching very cautiously, I now can see the black underside; surely I will be able to capture it. I am less than ten feet away, but the net will not reach and it casts a shadow. The insect stirs; sensing danger it darts into the wood. It moves so quickly that I fail to notice for a few moments that it has already emerged again and settled perhaps thirty feet below where I was standing. Having another chance, I creep up again to almost within net length but it will not wait. This procedure will recur perhaps three or four times, after which the smythi finally disappears. Even when I come back after several hours or on the next day, hoping that I will find it again on that spot, I meet with disappointment.

A year earlier I had been advised that I would waste my time trying to sneak up on them, and that the only way to capture them is to intercept them. But I could not apply this tactic inasmuch as they were flying in the opposite direction. It seems strange that a light drizzle of rain does not disperse them. I caught three under such circumstances although some others when disturbed would fly underneath the embankments for protection. There the net is useless, and I have lost quite a few this way. The foodplant and larva is unknown to me. They fly at the same time as Speyeria diana (Gram.), the beginning of July. I have also captured some at the end of July and always in excellent condition.

Theodore Bock  
Cincinnati, Ohio

HILLTOPS AND ANTHOCARIS

Dr. J. Benjamin Ziegler and the writer took a two-day field trip, 15-16 May 1951, with high hopes of netting some of the interesting Incisalias, etc. We scoured the environs of Mount Peter, situated at

the northern extremity of Greenwood Lake, in the State of New York. With the exception of a few Incisalias irus (Gdt.) and Hesperia metea (Scud.), our efforts were more or less in vain. However, we experienced something so peculiar that we believe that other lepidopterists might be interested. The circumstances are as follows. We were anxious to take a series of Anthocaris genutia midea Hbn. but during several hours' search in what looked like a favorable habitat neither of us saw a single specimen. After a "bucolic lunch" one of us (G.W.R.) became fascinated with a rocky outcropping, some thirty feet or so higher than the surrounding terrain, which promised possibilities of interesting flora (if not Lepidoptera). After the top of this outcrop of crystalline rock had been gained, what should appear but two male genutia in bloodless combat. One was netted, the other escaped. The netted specimen was barely dead in the cyanide bottle when another male appeared, and so on until a total of four specimens (all males) had been secured. Dr. Ziegler happened to be within hailing distance, so after hearing what had happened he was advised to take the writer's place to see if genutia persisted in assuming an "elevated position" in lepidopteran society. Apparently this was the case because he took three more males within the course of a few minutes. In all, seven males were secured, not a single female being seen at any time. The peculiar circumstances connected with this incident are that no specimens of genutia were seen anywhere else in the environs of Mount Peter although we did see one specimen (possibly a female) while driving home at a lower altitude.

The question naturally arises: - what kind of "tropism" or attraction is involved in occurrences of this kind? In other words, what are the factors which cause genutia and some other species of butterflies to prefer higher places? There must be a definite reason, so if anyone reading this episode can offer an explanation we, and possibly others, would be very glad to have it. Incidentally, rock-creep or other suitable cruciferous plants for female genutia were not in evidence so these factors can probably be ruled out. Is it possible that high ground is selected by belligerent male genutia as a battlefield?

George W. Rawson  
Summit, New Jersey

[Ed. note: From our experience in New Haven with A. midea, I believe the males simply indicated the beginning of the brood. It also seems probable that one or more species of Arabis were present on the outcrop, though perhaps inconspicuous. C.L.R.]

ON THE DISTRIBUTION OF HELIOPETES DOMICELLA (Erichson)

H. A. Freeman, in "Notes on Some Tropical American Skippers" [Field & Lab., vol.17: p.78; 1940] notes the scarcity of authentic North American records of domicella. In addition to those he listed may be added: Brown Canyon, Baboquiviri Mts., Arizona, 20 March and 24 March 1938, 1 ♂ each; Sabino Canyon, Arizona, 31 July 1940, 1 ♂.

J. W. Tilden  
San Jose, Calif.



OBSERVATIONS ON THE BUCK MOTH, HEMILEUCA MAIA, ON LONG ISLAND, N.Y.

Although I have been interested in Natural History for many years, it is only since 1948 that I have attempted to make a collection of our local Lepidoptera. I had looked for Hemileuca maia (Drury) weekly, during September and October of 1948 and 1949, but without success. On 14 Oct. 1950 I saw my first one about 3 miles north of Westhampton Beach Railroad Station, which is about 75 miles east of New York City. It was seen at 1:30 P.M. and the temperature was 60° F. with bright sun.

On 16 Oct. between 10:30 and 11:00 A.M. one moth every minute flew by me as I was stationed on a dead-end road about one mile north of Westhampton Beach Railroad Station and near the Westhampton Airport. The temperature was 60° with bright sun. There had been a heavy frost the night before, temperature down to 40°. All maia had stopped flying by 2 P.M. This locality later proved to be about the center of abundance of this species as I checked for about 22 miles east and about 12 miles west for this moth. About every 200 ft. for at least a mile was a dead moth run over by cars travelling on this main road across the Island, 7 miles north and south, between Westhampton Beach and Riverhead. This road runs through the center of the scrub oak, food plant of this moth, and which is found only in the central portion of Long Island. This stretch is undeveloped with not a single house, outside of a small airport.

On 17 Oct. I arrived at Westhampton airport at 7:30 A.M., 47°, clear, no wind. The first maia was seen at 8:20, next at 8:28, and the next at 8:38 for an average of 3 per hour. From 10:30 to 11:00 A.M., temp. 62°, 37 were seen (I collected 9), for an average of 74 per hour. From 11:00 to 11:30 27 were seen (5 collected) for an average of 54 per hour. From 11:30 to 11:45 I saw 9, for an average of 36 per hour.

On 18 Oct. it was cloudy, temp. 60°, and the first maia was not seen until 9:17 A.M. I went 7 miles east to Hampton Bays and only saw a single one there about 10 A.M. in typical scrub oak area. I then went east to Sag Harbor, 22 miles east of Westhampton Airport, and did not see a single one although the scrub oak occurs there. Roy Latham of Orient also after many years of searching has not been able to find it around Sag Harbor. He too has never seen it east of Hampton Bays. He says it does not occur between Riverhead and Orient Point (north-east tip of L.I.), a distance of 28 miles, because the scrub oak does not occur there. So it apparently does not occur between Hampton Bays and Montauk Point, a distance of 39 miles. I went back to Westhampton Airport and from 2:30 to 2:45 P.M., clear, 66°, only two were seen for an average of 8 per hour.

On 19 Oct. from 11:53 to 12:03 noon, 65°, slight haze, 20 were seen for an average of 120 per hour. From 3:10 to 4:15 P.M., foggy, 62°, only 2 were seen, the last at 4:12, for an average of 2 per hour. At 1 P.M. 2 were seen at East Manorville, 7 miles west of Westhampton Airport. On 21 Oct. from 8:00 to 8:50 A.M., clear, 50°, only one seen at

8:10. From 10:40 to 11:10 I saw 55 (12 collected) for an average of 110 per hour. On 22 Oct. about 10 were seen by Gilbert Raynor at West Manorville, 11 miles west of Westhampton Airport. On 23 and 24 Oct. none were seen, due presumably to continuous clouds and some light rain. On 25 Oct. from 11:15 to 11:45 A.M., clear, 60°, 32 were seen for an average of 64 per hour. It had rained until 8:30 but was clear by 10:30.

On 1 Nov. from 10:40 to 11:10 A.M., clear, 69°, 6 were seen (2 collected) for an average of 12 per hour. This was the last day any were seen and may be the latest date for Long Island. I understand it was 81° in New York City, which was the highest temperature ever recorded in any November in the history of the N.Y. City Weather Bureau. It rained all day on 4 and 5 Nov. so I did not go to the Airport. On 6 Nov. none seen from 11:10 to 11:50 A.M., clear, 50°. On 8 Nov. from 11:20 to 11:50 A.M., clear, 65°, none were seen.

It is of interest to note that only two females were seen, both unable to fly as their wings did not seem to be fully developed. The first was found on 21 Oct. and killed. The next was caught 25 Oct. in the road, kept overnight in a jar. The next morning there were about 100 light green eggs in the jar. It was kept for another day but the wings did not develop to the point where it could fly. It died in the jar the second day after I found it.

Roy Latham saw the first maia of the year, a male, at Great Pond, west of Riverhead, on Oct. 8, which he believes to be the earliest date for Long Island. This was the locality where Latham had found them in former years but could find none for the past three seasons. It is about 4 miles northwest of Westhampton Airport. Latham states that this moth is supposed to settle down by noon and only a few scattered individuals fly during the afternoon and when it is mild and still, even up to sunset. I too found this to be generally true; very few were seen after noon.

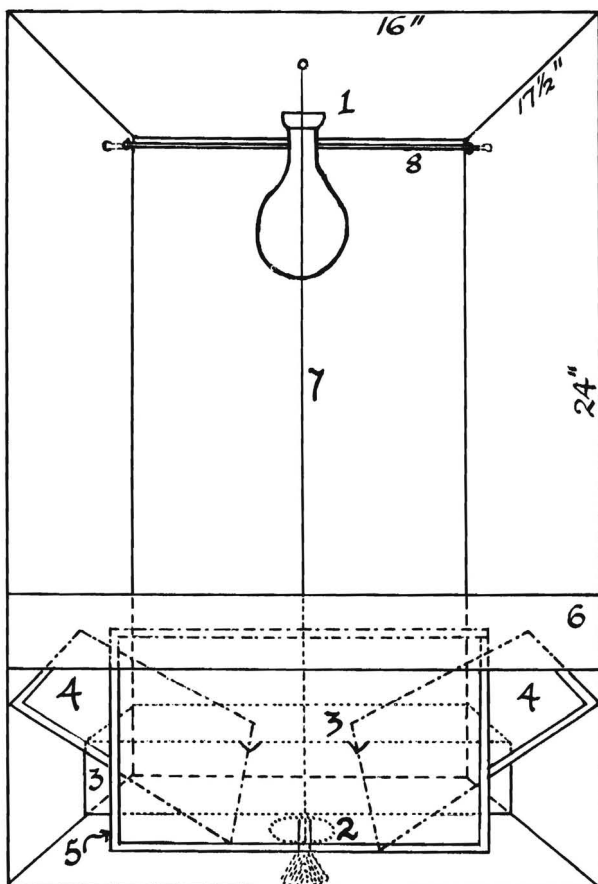
I found I could capture about 50% of all those within about 75 feet if I waited until they got out into the road. If I missed the first time with the net it was usually a waste of time to attempt further capture as they put on speed and usually went higher. Nearly all were flying less than six feet high. Nearly half of them feigned death after capture in the net or if they landed outside the net on the ground. (See Lep. News, vol. 4: p.46, 1950, where E.G. Voss of Michigan mentions his experience with Catocala feigning death, which he had never observed before among the moths.)

LeRoy Wilcox  
Speonk, L.I., N.Y.

MAKE PLANS TO ATTEND  
THE SECOND ANNUAL MEETING  
CHICAGO NAT'L HISTORY MUSEUM, DECEMBER 28-29

by P. H. H. Gray  
Macdonald College, Quebec, Canada

The following is a description of a simple portable light-trap, which has proved to be of some value during the past summer. Up to the time of writing (31 August 1951) about 150 different species of moths have been taken, including two *Catocala* species (*cerogama* and *ultronia*) and specimens of *Celama pustulata*, which latter has not hitherto been taken in this locale.



MULTIPLE-REFLECTOR LIGHT TRAP  
transparent-perspective diagram

A packing carton measuring 24" by 16" by 17½", with the top removed, was lined with rough-surfaced white paper. Previously to putting in the paper, a circular hole 2" in diameter was cut in one end (now the top), its center 3" from the back, to admit a lamp fitment [(1) in the diagram (see figure)] and one of 3" diameter (2) in the floor (the other end of the carton), its center 9" from the open edge. A sloping shelf of the pasteboard (3), 5½" wide from front to back, was made to lie 3" high at the back sloping to a bar 2" high at the front, making a counter at the back of the box. The front edge of the counter is about ½" below the top edge of the bar, to enable two notches to be cut 5" apart in the middle of the bar. The

notches are to admit the edges of the long sides of two mirrors in white frames. The other long sides of these two mirrors tilt back against the sides of the box, as shown (4,4) in the diagram. The near lower corners of these mirrors rest against a third mirror (5) which faces the back of the box, tilted at a suitable angle. The base (long side) of the third mirror may rest 3" to 5" inwards from the front edge of the floor; the top (the other long side) of this mirror rests against a bar of pasteboard (6) 2" wide fastened to the front edges of the box. In the experimental model being described the mirrors measure 10¼" by 8¼". (The lateral mirrors do not reach the front edges of the box, but are shown thus in the diagram to overcome the difficulty arising from perspective.) The front of the box from the top of the bar down is closed with black paper.

In operation the box rests on four feet, of a height sufficient to allow the circular hole in the floor to fit exactly over the open mouth of a bottle of cyanide; a pint sealer for the cyanide, and pint-sized ice-cream cartons have been found best for these purposes. Suspended by a string (7) from the roof is a small blackened glass funnel, of such diameter as just to fit within the neck of the cyanide bottle but swinging freely below the neck; this allows moths to enter the bottle but discourages their exit. A knot at the funnel end of the string will prevent the funnel from sliding down. The bottle rests in a can.

Moths attracted by the single lamp (100 watt power only has so far been used) find that they are confronted with seven reflections of it, and some plummet into the bottle after vainly trying to find an exit from the box; most of them rest on the paper and can easily be bottled by hand. The mirrors can be hinged inwards to scare up or bottle specimens that settle behind them.

No.8 in the diagram is a telescopic brass curtain rod, passing through holes at the top of the sides, 1" from the back; this is for coiling the extension cord (say 20 feet) and for carrying the whole outfit. The total weight of the apparatus, as made, is 8¼ lb. The cost lies in the lamp, its fitment and cord, and the mirrors.



#### NEW ASSOCIATE EDITOR

According to the Constitution, one of the four Associate Editors shall be responsible for the annual Season's Summary, published as the last issue of each volume of the *Lep. News*. It is a pleasure to announce that Dr. Eugene Munroe, of the Canadian Department of Entomology in Ottawa, has accepted this post. He is assuming responsibility for the Summary immediately, by supervising the eight area summaries for 1951 and preparing them for publication. His instructions to cooperators appear in this issue.

C.L. Remington

## RECENT LITERATURE ON LEPIDOPTERA

Under this heading are listed each month papers on Lepidoptera from all the scientific journals which are accessible to us and our cooperating abstractors. It is hoped that eventually our coverage of the world literature will be virtually complete. It is intended that every paper published since 31 December 1946 will be included. Abstracts give all new subspecies and higher categories with genotypes and type localities. Papers of only local interest are merely listed. Papers devoted entirely to economic aspects will be omitted.

Beginning with this issue abstracts will be listed in sections according to the content of the papers. Space limitations make it necessary to list each paper only once, under the most applicable heading; all papers containing descriptions of new subspecies or higher categories will be listed in section B. Headings are as follows: A. General; B. Systematic; C. Morphology; D. Variation and Genetics; E. Distribution and Phenology; F. Biology; G. Physiology and Behavior; H. Migration; I. Technique; J. Miscellany.

## A. General

85. Bourgogne, Jean, "Ordre des Lépidoptères" [In French]. In *Traité de Zoologie*, vol.10, fasc. 1: pp. 174-448, 3 pls., 246 figs. Paris: Masson et Cie. 1951. General account of the order. Describes morphology and biology of all stages in great detail; summarizes classification, with brief to extensive descriptions of each family. [P.B.]
86. Herbulot, Claude, *Atlas des Lépidoptères de France, Belgique, Suisse. Fascicule III: Hétérocères (fin)* [In French]. 145 pp., 12 pls. Editions N. Bouée, Paris. 1949. This concluding volume deals with the Geometridae, Lasiocampidae and micros. See note in *Lep. News*, vol.2, p.88. [P.B.]
87. Hoffmeyer, Skat, *De Danske Spindere* [In Danish]. 198 pp., 23 pls., 24 figs. Aarhus: Universitetsforlaget. 1948. Descriptions of Danish macroheterocera (except Noctuidae and Geometridae, but including Aegeriidae, Psychidae, Limacodidae, Zygaenidae, Cossidae, Hepialidae). Adults of all spp., and larvae of many, are figured in color. [P.B.]
88. Hoffmeyer, Skat, *De Danske Ugler* [In Danish]. 347 pp., 32 pls., 58 figs. Aarhus: Universitetsforlaget. 1949. Companion volume to the last; covers all Danish spp. of Noctuidae. [P.B.]
89. Richards, A. Glenn, *The Integument of Arthropods. The Chemical Components and Their Properties, the Anatomy and Development, and the Permeability*. ix+411 pp., 65 figs. Minneapolis: Univ. Minnesota Press. 1951. A summary and synthesis of previous work on the subject. Invaluable as a reference. [P.B.]
90. van Son, G., *The butterflies of Southern Africa. Part I. Papilionidae and Pieridae*. 237 pp., 40 pls., 135 figs. Pretoria: Transvaal Museum (Memoir no. 3). 1949. Covers all South African spp. in these 2 families. Keys to families, subfamilies, tribes, genera, species, and named forms (in polytypic spp.). All categories are fully described. Black and white figures of all spp.; successive plates show both surfaces of all specimens. The ♂ and ♀ genitalia of all spp. are figured, as are other important structural details. Life histories, when known, are described and extensively illustrated. Habits are discussed, the distribution outlined, and localities of specimens examined are noted. This volume should be a model for all similar works on the Lepidoptera; the number and high quality of the illustrations is particularly impressive. [P.B.]
91. Various authors, *Iconographia insectorum japonicorum* [In Japanese]. 2d Ed. 1745 pp., 15 pls., about 5000 figs. Tokyo: Hokuryukan, Ltd. 1950. Brief descriptions of all spp. of insects found in Japan, each illustrated by good line drawings. [P.B.]
92. Viette, Pierre, "Lépidoptères Homoneures" [In French]. *Faune de France*, no.49: 83 pp., 68 figs. Paris: Lechevalier. 1948. Introductory account of morphology and biology of the Lepidoptera, with keys to suborders and superfamilies. Description of families, genera and spp. of Homoneura found in France (Micropterygidae, Eriocraniidae, Hepialidae), with keys; figures of some adults and ♂ genitalia of most. Distribution is given, and early stages are described (when known). [P.B.]

## B. Systematic

93. Amsel, H. G., "Die Microlepidopteren der Brandt'schen Iran-Ausbeute. 2. Teil" [In German]. *Arkiv för Zool.*, ser.2, vol.1: pp.223-257, 84 figs. 17 Oct. 1950. Pyralidae. Describes as new: *APROCRATIA* (type *Proceratia rhexogramma* Meyr.); *OCRISIODES*, *O. chirazalis* (Comé; Fort Sine Sefid); *Nephoteryx rectangulella* (Keredj); *N. oxybiella* (Bender Tchahbahar); *Phycita mianella* (Mian-Kotal; Sine Sefid); *P. comeella* (Comé; Mian-Kotal; Sine Sefid); *P. ardekanellella* (Comé); *P. taftanella* (Kouh i Taftan); *P. balutchistanella* (Bender Tchahbahar); *Salebria nigrosquamalis* (Sine Sefid; Comé); *S. pittionii* (Chiraz; Fort Mian-Kotal; Kouh i Binaloud); *S. mimicalis* (Comé); *S. tachahbaharella* (Bender Tchahbahar); *S. acrobasella* (Tchourum); *SALEBRIODES*, *S. ephestiella* (Fort Mian-Kotal); *SEFIDIA*, *S. persica* (Sine Sefid); *PARASEFIDIA*, *P. benderella* (Bender Tchahbahar); *Ambesa umbriferella senganella* (Fort Sengan); *Pristophora khorassanella* (Kouh i Binaloud); *Rhodophaea farsella* (Fort Mian-Kotal; Fort Sengan); subgenus *RHODOPHAEOPSIS*, and type sp. *R. (R.) iranalis* (Mian-Kotal; Comé); *R. (R.) senganella* (Fort Sengan; Kouh i Taftan); *R. (R.) khachella* (Fort Sengan); *R. (?) taftanella* (Kouh i Taftan; Fort Sengan); *Tephris diversella* (Jerico, Palestine; Fort Sengan); *HAFISIA*, *H. lundbladii* (Comé); *Bostra bifascialis* (Comé; Fort Mian-Kotal); *B. farsalis* (Comé); *B. luteocostalis* (Fort Mian-Kotal); *Synclera interruptalis* (Bender Tchahbahar); *Loxostege malekalis* (Tahte Malek); *L. farsalis* (Comé); *Pachyzancla fascinalis* (Bender Tchahbahar); *ELBURSIA*, *E. stocki* (Keredj); *Pionea khorassanalis* (Kouh i Binaloud); *Pyrausta sefidalis* (Sine Sefid); *P. mechedalis* (Kouh i Binaloud); *Titanio hyrcanella* (Chiraz; Fort Sine Sefid). Describes previously unknown ♂♂ of *Emmalocera leucosarca* and *Aproceratia rhexogramma*. *Pyrausta levilinealis* a synonym of *P. pontica*. Re-describes *Melathrix praetextella*. Figures ♂ genitalia and wing pattern of most spp., and wing pattern of 4 new genera. Type specimens and type localities not specified; all localities are given above (all in Iran unless otherwise noted). [P.B.]
94. Amsel, H. G., "Die Microlepidopteren der Brandt'schen Iran-Ausbeute. 3. Teil" [In German]. *Arkiv för Zool.*, ser.2, vol.1: pp.525-563, 5 pls. 7 Apr. 1951. Pyralidae. Describes as new: *Ancylolomia micropalpellata* (Sardze); *A. benderella* (Bender Tchahbahar); *ARDEKANIA*, *A. farsella* (Comé); *Ephestia xylobrunnea* (Bender Tchahbahar); *Ancylolomia arimanella* (Comé; Nissa); *A. cinnamomella persicolella* (Comé; Sine Sefid; Keredj); *A. sefidella* (Sine Sefid; Chiraz); *A. albicostella* (Tchourum; Chiraz); *Aproceratia senganella* (Fort Sengan); *MECHEDIA*, *M. pristophorella* (Kouh i Binaloud); *TAFTANIA* (type *Pristophora oxyvyma* Meyr.); *Synoria comeella* (Comé; Sine Sefid); *KHORASSANIA*, *K. hartigi* (Kouh i Binaloud; Sine Sefid; Comé);

- SCLEROBIODES, *S. persica* (Comé); *Divona* (*Megasis*) *parvella* (Comé); LARISTANIA, *L. sardzella* (Sardze; Bender Tchahbahar); UNCINUS, *U. hypogryphellus* (Comé); SENGANIA, *S. rühmekorfi* (Fort Sengan); *Nephopteryx ardekanella* (Comé); *N. cornutella* (Bender Tchahbahar); BELUTCHISTANIA, *E. squamalis* (Bender Tchahbahar); *Rhodophaea bouchirella* (Tchouroum); *R. (Rhodophaeopsis) chirazella* (Chiraz); *R. (R.) persicella* (Chiraz; Fort Mian-Kotal); *Myelois micropunctella* (Keredj; Chiraz; Fort Sine Sefid); *M. britannicella* (England; misidentified as *M. cribrella*); *M. conformella* (no locality); *M. constans* (Sine Sefid); PARAEMPORIA, *P. monotona* (Comé); *Witlesia* (*Scoparia*) *silacealis* (Comé); *Bostra pseudospaniella* (Mian-Kotal; Chiraz); *B. comealis* (Comé); *KATJA*, *K. mira* (no locality); *Dattinia sardzealis* (Sardze); *D. hyrcanalis* (Bender Tchahbahar; Sardze); *D. mimicalis* (Bender Tchahbahar); *Constantia* (*Macroctenia*) *baloutchistanalis* (Bender Tchahbahar); *TCHAHBAHARIA*, *T. dentalis* (Bender Tchahbahar); *Evergestis affinis* (Comé); *E. paragrummyi* (Comé; Mian-Kotal); *Loxostege mira* (Bender Tchahbahar; Tahte Malek); *Trigonuncus nissalis* (Nissa; Keredj; Soultanabad); *APYRAUSTA*, *A. persicalis* (Sine Sefid); *Titanio nissalis* (Nissa); *Tegostoma uniforma* (Fort Sengan); *Heliothela flavomarginalis* (Sardze); *Emprepes comealis* (Comé). Describes the previously unknown ♂ of *Pristophora velocella*, *Taftania oxycyra*, *Cybalomia triplacogramma*, *Phlyctaenodes platyphaea*; synonymizes *Myelois cinerethella* and *ottoella* under *M. circumdatella*. Figures ♂ genitalia of all new spp., and wing pattern and venation of some. The author's failure to identify type specimens or list type localities (all localities mentioned are given above) is most unfortunate. The procedure in naming *M. britannicella*, which is presumably based on the description and figures of ♂ genitalia given by Pierce and Metcalf, is scarcely valid! [P.B.]
95. Bradley, J. D., "Notes on the family Arrhenophanidae (Lepidoptera: Heteroneura), with special reference to the morphology of the genitalia, and descriptions of one new genus and two new species." *Entomologist*, vol.84: pp.178-185, 6 figs. Aug. 1951. Describes as new: *ECPANTHOPHANES*, *E. anachoreta* (Sierra del Libano, Colombia); *Cnissostages mastictor* (Drosi, Costa Rica). Transfers *Arrhenophanes chiquita* Busck to *Ecpanthophanes*; synonymizes *A. inca* Meyrick under *A. perspicilla* Stoll. Describes and figures ♂ and ♀ genitalia of *C. mastictor* and *A. perspicilla* and ♂ genitalia of *E. anachoreta*, and figures venation of *Ecpanthophanes*. [P.B.]
96. Brooks, C. Joslin, "A revision of the genus *Tenaris* Hbn. (Lepidoptera: Amathusiidae)." *Trans. R. Ent. Soc. Lond.*, vol.101: pp.179-238, 8 pls., 1 map, 1 fig. 10 Nov. 1950. Describes as new: *T. catops gebiensis* (Gebi Is.); *T. gorgo gorgias* (Rawlinson Mts., New Guinea); *T. honrathi ladas* (Oetakwa R., New Guinea); *T. hyperbolus hyginus* (Waigau Is.); *T. h. hyaeus* (Nomnaghe, New Guinea); *T. h. hyllus* (between Kikori and Purari Rivers, British New Guinea); *T. h. qenone* (Central New Guinea); *T. myops phrixus* (Andai, New Guinea); *T. alocus* (Rawlinson Mts., New Guinea); also four new 'forms'. Figures of adults, ♂ genitalia, venation, and specialized scales. Gives a key to spp. [P.B.]
97. Collette, C. L., "A revision of the genus *Eloria* Walker (Heterocera, Lymantriidae)." *Ann. Mag. Nat. Hist.*, 12th ser., vol.3: pp.813-865, 3 pls. Oct. 1950. Describes as new: *E. muzo* (Muzo, Colombia); *E. noyesi goyaz* (Viannopolis, Goyaz, Brazil); *E. peruviana* (Chambireyacu, near Yurimaguas, Peru); *E. ucayali* (Cantamana, R. Ucayali, Peru); *E. cavallo cavallo* (Cavallo-Cacho, Peru); *E. c. burityensis* (Burity, 30 mi. NE of Cuyaba, Matto Grosso, Brazil); *E. c. zoyga* (Viannopolis, Goyaz, Brazil); *E. melaroy* (Rio Negro, Colombia); *E. teffe* (Teffe, Brazil); *E. guaneéi* ("Cayenne", Fr. Guiana); *E. batesi* (Humayta, Brazil); *E. charassomena* (Teffe, Brazil); *E. roraima* (Roraima, Br. Guiana); *E. rosenbergi* (Paramba, Ecuador); *E. melaphleba* (Chanchamayo, Peru); *E. hoplochares* (St. Paulo d'Oliveira, Brazil); *E. pelocraspeda pelocraspeda* (R. Caqueta, Colombia); *E. p. mossi* (Santarem, Brazil); *E. fumicosta* (Cubulco, Vera Paz, Guatemala); *E. copharpe* (Espiritu Santo, Brazil); *E. lyra* (R. Cayapas, Ecuador); *E. orosi orosi* (Orosi Vulcan, Irazu, Costa Rica); *E. o. borealis* (La Cambre, Honduras); proposes *E. walkeri* for *E. festiva* Wlk. (*nec* Cramer). Figures ♂ genitalia of most spp., both old and new. Gives keys to spp. and species groups. [P.B.]
98. Diakonoff, A., "The type specimens of certain Oriental Eucosmidae and Carposinidae (Microlepidoptera) described by Edward Meyrick, together with descriptions of new Eucosmidae and Carposinidae in the British Museum (Natural History)." *Bull. Brit. Mus. (Nat. Hist.)*, Ent., vol.1: pp.275-300, 6 pls., 2 figs. Sept. 1950. Describes as new: (Eucosmidae) *Acroclita argyrophenga* (Khasi Hills, Assam); *A. falcigera* (Kegalle, Ceylon; Dibidi, N. Coorg); *A. lithoxoa* (Pusa, Bengal); *Bactra coronata* (Bandong, Java); *E. monochorda* (Maskeliya, Ceylon); (Carposinidae) *Meridarchis drachmophora* (Mt. Goliath, Dutch New Guinea); *M. dryas* (Mao, N. Manipur; Kohima, Naga Hills); *M. ensifera* (Tanglo, Sikkim); *M. rodea* (Snow Mts., Upper Setekwa R., Dutch New Guinea; Ougarra, Brit. New Guinea); *Picrorrhyncha atribasis* (Dharmasala, Punjab). Type localities not specified. Genitalia not described, except for *Bactra* spp.; this is a fault for which the author criticizes Meyrick! Lists types for Meyrick's spp. of 15 genera of Eucosmidae and 7 of Carposinidae; many of these are lectotypes selected by the author. Synonymizes many spp. Describes and figures ♂ genitalia of *Bactra*, *Lobesia* and *Parabactra* spp., and discusses structure of *Lobesia*. See review in *Lep. News*, vol.5: p. 61. [P.B.]
99. Hemming, A. F., and L. A. Berger, "Nouvelles règles de nomenclature. Application au cas *Colias hyale* et *Colias australis*" [In French]. *Lamblilicene*, vol.50: pp.2-9. 25 Feb. 1950. Reviews the decisions of the International Commission, to the following effect: the rules of priority are made applicable to names of infra-specific rank; such names, however, have no priority or validity as specific or subspecific names unless elevated to such rank by a later author; in the latter case, the authority for the names is the author elevating them, and the date, for purposes of priority, is the date of publication of such elevation; names applied to populations are to be considered as of specific or subspecific rank, and all others as of infra-specific rank, except that names published before July 1948 are to be considered as of the higher rank unless the original description clearly indicates the contrary (i.e. a name applied to an individual aberration is to be considered infra-specific). This badly-needed revision and clarification of the rules relieves the taxonomist of the necessity of considering the host of aberrational names in questions of priority. According to the new rules the correct name for the recently discovered sibling species, long confused with *C. hyale*, is *C. australis* Verity 1911, since *alfacariensis*, used by Berger in 1945 when the species was first recognized, was published by Ribbe as an aberrational name (in 1905) and has priority on the specific level only as of Berger's publication. [P.B.]

## RECENT LITERATURE ON LEPIDOPTERA - cont.

100. Herbulot, C., "Diagnoses de nouveaux genres de Geometridae Larentiinae" [In French]. *Rev. Franç. Lépid.*, vol.13: pp.25-26. "Jan.-Feb." [31 Mar.] 1951. Describes as new the following genera (with type spp.): *DYSRHOE* (*Ortholitha rhoigyra* Prout); *CATARHOE* (*Cidaria basochesiata* Duponchel); *GLAUCORHOE* (*Cabera unduliferaria* Motschulsky); *ARCHIRHOE* (*Hydriomena neomexicana* Hulst.). [P.B.]
101. Herbulot, C., "Un nouvel *Epirrhone* d'Amérique du Nord" [In French]. *Rev. Franç. Lépid.*, vol.13: pp. 26-27. "Jan.-Feb." [31 Mar.] 1951. Describes as new *E. sperryi* (Lloydminster, Saskatchewan); species is misidentified as *E. tristata* in American lists. [P.B.]
102. Kapur, A. P., "The identity of some Crambinae associated with sugar cane in India and of certain species related to them (Lepidoptera: Pyralidae)." *Trans. R. Ent. Soc. Lond.*, vol.101: pp.389-434, 10 pls. 30 Dec. 1950. Describes as new: *Chilo tamsi* (Peermade, Travancore); *CHILOTARAEA* (type *Chilo infuscatus* Snellen); *C. bandra* (Bandra, Bombay); *DRASA* (type *Diatraea cashmirensis* Hampson); *Proceras indicus* (Pusa, Bihar); *BISSITIA* (type *Chilo steniellus* Hampson); *Coniesta hampsoni* (Nilgiri Hills); *C. belgaumensis* (Belgaum); *GIRDHARIA*, *G. tauromma* (Kangra Valley, Punjab). Revision covers all Indian species of the above genera and of *Stenochilo*. Keys to the genera and spp. List of extralimital, misidentified or insufficiently known species which are excluded. Figures of genitalia of all, and of adults and structural details of some species. [P.B.]
103. Kiriakoff, S. G., "Sur la classification et la phylogénie de la superfamille Notodontoidea (F. d'Almeida Kiriakoff)" [In French]. *Bull. Ann. Soc. Ent. Belg.*, vol.86: pp.236-255. 28 Dec. 1950. Recognizes the following families, subfamilies and tribes: Diopsideae: Diopsideae, Josiinae; Notodontidae: Tarsolepidinae, Notodontinae (Notodontini, Pygaerini, Gluphisiini); Thyretidae. The Thaumatopeoidea are placed in the Notodontini. Separation from the Phalaenoidea and classification within the superfamily is based mainly on the structure of the tympanum. The Diopsideae are regarded as nearest to the common ancestry of the superfamily; the Thyretidae are a late offshoot. The group is presumed to have had a neotropical origin, and a Wegenerian account of its subsequent dispersion is given. [P.B.]
104. Klots, Alexander B., "Notes on the genus *Eurema* (Pieridae) in the United States." *Lep. News*, vol.2: pp.51-52. May 1948.
105. de Lattin, Gustav, "Türkische Lepidopteren. II." [In German, Turkish abstract]. *Istanbul Univ. Fen Fakult. Mecmuasi*, series B, vol.16: pp.45-73, 1 pl., 8 figs. 1951. Describes as new: *Criphia rubellina sabulicolor* (Agrotidae; Gazlayntep, Turkey); *Agrochola helvola vulpina* (Agrotidae; Bevek, Turkey); *Cidaria variata balcanicola* (Geometridae; Bebek); *Endotricha flammealis carnealis* (Pyralidae; Bebek). Lists 239 spp., belonging to 16 families of Heterocera, with localities; comments on some variable or confusing spp., with figures of ♂ genitalia and tables for separation of 8 closely related pairs. Figures adults of new ssp. and several others. [P.B.]
106. Munroe, Eugene G., "The genus *Junonia* in the West Indies (Lepidoptera, Nymphalidae)." *Amer. Mus. Nov.*, no.1498: 16 pp. 3 Apr. 1951. Describes as new *J. evarate michaelisi* (Coamo Springs, Puerto Rico). General discussion of this confusing genus: includes all West Indian forms in *coenia* (1 ssp.) and *evarate* (= *lavinia*) (3 ssp.), and regards *zonalis* and *genoveva* as "wet" and "dry" season forms of *evarate*. [P.B.]
107. Toxopeus, L. J., "On the collecting localities of some Linnean types (Lep. Rhopalocera)." *Idea*, vol.8: pp.53-74, 1 pl., 1 fig. 31 Jan. 1951. On account of old sources and nautical maps fixes localities of Linnean types of *Papilio sarpedon*, *P. ascanius*, *P. java*, and *P. candida*, and reconsiders subspecific relations within some of these species, thus: *P. (Graephium) sarpedon lycianus* n. n. for *P. s. sarpedon* auctt. not L.; *P. (G.) sarpedon corbeti* n. n. for *P. s. sarpedon* auctt. not L. (= *P. s. melas* Fruhst.), with *gemmatus* f. n. the dry season form; *P. (Atrophaneura) ascanius* L. (1768) for *P. antiphus* F. (1893); and *P. neascanius* n. n. for *P. ascanius* Cram. (1775) from Brazil; *Anaphaeis java java* (L.) is the subsp. from Noord Island (topotype), S. Sumatra, and Java. *Pieris candida candida* (L.) is introduced in Noord Island from Canton; its synonyms are *P. glyceria* (Cram.) and *P. c. malayica* (Mart.). [A.D.]
108. Travassos, Lauro, "Contribuição ao conhecimento dos "Arctiidae". XXIII. Gênero *Purius* Walker, 1855" [In Portuguese]. *Rev. Brasil. Biol.*, vol.11: pp.43-47, 11 figs. Feb. 1951. Detailed description of *P. pilumnia* ♂; ♀ unknown to author. [P.B.]
109. Travassos, Lauro, "Contribuição ao conhecimento dos "Arctiidae". XXIV. Sobre o gênero *Evius* Walker, 1855" [In Portuguese]. *Rev. Brasil. Biol.*, vol.11: pp.181-187, 17 figs. June 1951. Detailed description of generic characters and of *E. hippia*. [P.B.]
110. Varin, G., "Contribution à l'étude des races des Satyridae de France et du Nord de l'Afrique" [In French]. *Rev. Franç. Lépid.*, vol.11: pp.395-398; vol.12: pp.9-15, 341-347. "Oct.-Nov." [16 Dec.] 1948; "Jan." [28 Feb.] 1949; "Nov.-Dec. 1950" [8 May 1951]. Survey of *Melanargia* races. Describes as new: *M. galathea xantonica* (Deux-Sevres, etc., France); *M. g. vocontia* (Hautes-Alpes); *M. g. paludosa* (Marais d'Aigues-Mortes, Gard, France); *M. sylvius moghrebiana* (Morocco); *M. japygia caussica* (Gard, etc., France). No type localities given. Discusses geographical variation of these spp. and *M. lachesis*. [P.B.]
111. Viette, P., "Contribution à l'étude des Hepialidae (12<sup>e</sup> note). Genres et synonymie" [In French]. *Lambillionea*, vol.49: pp.101-104. 25 Oct. 1949. Considers valid the following genera (with spp. included): *Phimatopus* Wallengren (*hecta* L., *hectoides* Bdv., *behrensis* Stretch, *sequoiolus* Behr); *Korscheltellus* C. B., subg. *Korscheltellus* (*lupulinus* L.), *Gazoryctra* Hbn. (*ganna* Hbn., *macilentus* Ev., *confusus* Hy. Edw., *macglashani* Hy. Edw.) and *Pharmacis* Hbn. (*carna* Esp., *bertrandi* Le Cerf, *pyrenaicus* Donz., *castillanus* Obth., *armoricanus* Obth.); *Triodia* Hbn. (*sylvinus* L., *laetus* Stgr., *amasinus* H. S., *nubifer* Led.). Synonymizes *Hepialus okninski* under *Korscheltellus fusconebulosus*, and lists ssp. of latter. Transfers *niphonica* Btlr. to *Palpifer*. [P.B.]
112. Viette, P., "Supplément au Catalogue des Lépidoptères Hétérocères de l'Océanie française" [In French]. *Bull. Soc. Ent. France*, vol.56: pp.14-16. Jan. 1951. Describes as new: *Asota caricae melanensis* (Hypsinae; Efate Is., New Hebrides). Lists 35 spp., belonging to 10 families, omitted from the previous list (abstract in *Lep. News*, vol.3: 298). [P.B.]
113. Viette, P., "Les types de Tineides de Constant" [In French]. *Rev. Franç. Lépid.*, vol.12: pp.337-341. "Nov.-Dec. 1950" [8 May 1951]. Selects lectotypes for 44 spp. (Lyonetiidae, Lithocelletidae, Coleophoridae, Elachistidae, Scythrididae, Oecophoridae, Cosmopterygidae, Gelechiidae) from specimens of Constant's original series: all in Paris museum. [P.B.]

## C. Morphology

114. Barth, Rudolf, "Das Duftorgan von *Pantherodes pardalaria* (Hbn., 1823) (Geometridae, Geometrinae)" [In German, Portuguese abstract]. *Rev. Brasil. Biol.*, vol.11: pp.105-118, 12 figs. Feb. 1951. Morphological description of the scent organs of the ♂ hind tibia in this species. [P.B.]
115. Bödewadt, Geert Hinrich, "Untersuchungen über das Zellteilungsgeschehen in der Entwicklung der Flügelanlagen von Kleinschmetterling" [In German]. *Biol. Zbl.*, vol.70: pp.31-64, 4 figs. 1951. Investigation of the mechanism of wing development in *Ephestia* and *Galleria* by a study of cell division in the wing primordium. [P.B.]
116. Dunk, H. C., "A gynandrous *Ochloides venata*." *Entomologist*, vol.84: p.93. Apr. 1951.
117. Harrison, J. W. Heslop, "A hybrid between *Pieris napi* male and *P. rapae* female (Lep. Pieridae)." *Entomologist*, vol.84: pp.99-101. May 1951. Description of all stages of a series of specimens. Adults structurally sterile ♂; patterned like intersexes. [P.B.]
118. Henke, K., "Über Ordnungsvorgänge in der Spätentwicklung der Insekten" [In German]. *Rev. Suisse Zool.*, vol.55: pp.319-337. 1948. Discussion of the development of wing pattern in *Ephestia kühniella*. [P.B.]
119. Jorg, M. E., "Un organo de especial diferenciación anatómico-microscópico en la oruga de *Morpho catenarius argentinus* (Lep. Rhop. Morphidae)" [In Spanish, English abstract]. *Acta Zool. Lilloana*, vol.5: pp.131-136, 1 pl., 2 figs. 28 Oct. 1948. Morphology and histology of an eversible glandular structure found ventrally on the prothorax of the full-grown larva. [P.B.]
120. Mukerji, S., and Hukam Singh, "Studies on the chaetotaxy of larvae of *Plusia* species (Lepidoptera: Phalaenidae). *Proc. R. Ent. Soc. Lond. (B)*, vol.20: pp.15-24, 3 pl. 20 Feb. 1951. Describes setal arrangement on the head and body of reared last instar larvae of three species. [P.B.]
121. Newman, L. Hugh, "A gynandromorph *Lysandra bellargus* from the Folkestone Hills." *Entomologist*, vol.84: pp.185-186. Aug. 1951.
122. Parsons, R. E., "Gynandromorph *Pieris napi*." *Entomologist*, vol.84: p.70. Mar. 1951.
123. Rempel, J. G., "A study of the embryology of *Mamestra configurata* (Walker) (Lepidoptera, Phalaenidae)." *Canad. Ent.*, vol.83: pp.1-19, 6 pls., 2 figs. Jan. 1951. Detailed description of development to end of egg stage, with good figures. [P.B.]
124. Seiler, J., "Analyse des intersexen Fühlers von *Solenobia triquetrella* (Psychidae, Lepid.)" [In German]. *Rev. Suisse Zool.*, vol.58: pp.489-495, 2 figs. June 1951. Antennae of intersexes are intermediate only in being part ♂ and part ♀, each individual part is entirely of one sex, not transitional. [P.B.]
125. Vlette, P., "Contribution à l'étude des Hepialidae (14<sup>me</sup> note). Les pièces buccales" [In French]. *Bull. Mens. Soc. Linn. Lyon*, vol.18: pp.206-207, 4 figs. Dec. 1949. Shows that 'postantennae' and 'mandibles' figured in *Zenophasus schamyli* by Tindale are only pilifers and part of maxilla. Figures mouth parts of *Zenophasus* (well developed) and 2 other genera (progressively reduced). Subfamily Zenophasinae not valid on basis of structure of mouth parts. [P.B.]
126. Way, M. J., "The structure and development of the larval cuticle of *Diataraxea oleracea* (Lepidoptera)." *Quart. Journ. Micr. Sci.*, vol.91: pp.145-182, 3 pls. 5 figs. June 1950. A very thorough study, covering chemistry of the cuticle and moulting phenomena as well as histology. [P.B.]

## D. Variation and Genetics

127. Cockayne, E. A., "*Abraxas grossulariata* L. ab. *areomarginata* ab. nov. (Lep. Geometridae)." *Entomologist*, vol.84: pp.128-131, 1 pl. June 1951. Figures reared series of this aberration; its genetics were not worked out because of loss of the stock. [P.B.]
128. Collier, A. E., "A Note on the genetics of *Pararge megera* ab. *excessa*." *Entomologist*, vol.84: pp.56-57. March 1951. Inconclusive breeding experiments. [P.B.]
129. Goodson, A. L., "New varieties of British butterflies." *Entomologist*, vol.84: p.30. Feb. 1951. Two aberrations named. [P.B.]
130. Kiriakoff, Sergius G., "Ecological races in Lepidoptera." *Lep. News*, vol.2: p.39. Apr. 1948.
131. Leeds, H. A., "British aberrations of the Gatekeeper Butterfly, *Maniola tithonus* (Linnaeus 1771); Meadow Brown Butterfly, *Maniola jurtina* (Linnaeus 1758); and the Small Heath Butterfly, *Coenonympha pamphilus* (Linnaeus 1758)." *Proc. Trans. South Lond. Ent. Nat. Hist. Soc.*, 1948-1949: pp.80-122b, 3 pls.; 1949-50: pp.81-82, postscript. Feb. 1950, Apr. 1951. Describes all known aberrations of these three spp.; figures 56 specimens in color. Aberrations are named according to a standard system of Latin names which appears to cover most variation in these spp. and some related ones, but which is somewhat clumsy (e.g. ab. *postquadriexcessa*) and not generally applicable. Genetic information is regrettably absent. [P.B.]
132. Lampke, B. J., "Catalogus der Nederlandse Macrolepidoptera, IX" [In Dutch]. *Tijdschr. Ent.*, vol.92: pp.113-218, 15 figs. "1949" [1950]. This part contains Geometridae (continued). Numerous new forms described (descriptions and more important discussions translated in English in footnotes). [A.D.]
133. Lenek, Oskar, "Über eine Zucht von *Boarmia gemmaria* Brahm forma *rebeli* Aigner" [In German]. *Ent. Nachrichtenbl.*, vol.3: pp.121-124, 8 figs. May 1951. Breeding experiments with a melanic mutant. Redescribes 'form' and names several new ones. [P.B.]
134. Loberbauer, Rud., "*Rhyacia margaritacea* Vill., ihre Biologie und ihre Variationsbreite" [In German]. *Ent. Nachrichtenbl.*, vol.3: pp.128-130. May 1951. Habits and variation; names 3 'forms'. [P.B.]
135. Loritz, Jeannine, "Une curieuse aberration de *Polyommatus escheri* Hb." [In French]. *Rev. Franç. Lépid.*, vol.11: p. 364. Sept. 1948. Names a melanic aberration. [P.B.]
136. Sargeant, W. T., "*Lycaena phlaeas* ab. *schmidtii*." *Entomologist*, vol.84: p.21. Jan. 1951. Records specimen with aberrant marking on one fore wing only. [P.B.]
137. Sevastopulo, D. G., "The genetics of East African Lepidoptera. II." *Entomologist*, vol.83: pp.256-258. Nov. 1950. Describes and names a simple recessive mutant in *Orgyia basalis*. [P.B.]
138. Neschner, Emil, "Einige auffällige *Pieris napi*-form" [In German]. *Ent. Nachrichtenbl.*, vol.3: p. 108. Feb. 1951. Names a 'form'. [P.B.]
139. Thompson, J. Antony, "A new form of *Pieris napi* L." *Entomologist*, vol.84: p.177. Aug. 1951. Names an aberration, probably genetic. [P.B.]
140. de la Torre y Callejas, Salvador Luis, "Sobre una nueva forma de *Nathalis iole* Boisduval (Lepidoptera, Pieridae)" [In Spanish]. *Mem. Soc. Cubana Hist. Nat.*, vol.20: pp.89-91, 1 pl. June 1951. Describes and names a seasonal form. [P.B.]
141. Varin, G., "Quelques aberrations de *Melanargia galathea* L. de la région parisienne" [In French]. *Rev. Franç. Lépid.*, vol.11: pp.356-359, 1 pl. Sept. 1948. Describes and figures 8 named aberrations; 2 are new. [P.B.]



## RECENT LITERATURE ON LEPIDOPTERA - cont.

## E. Distribution and Phenology

142. Bowman, Kenneth, "An annotated list of the Lepidoptera of Alberta." Canad. Journ. Zool., vol.29: pp. 121-164, 1 map. Apr. 1951. Discusses ecological areas in the province; lists 1825 forms. [P.B.]
143. Daltry, H. W., "Entomology." Trans. Ann. Rep. N. Staffs. Field Club, vol.81: pp.104-110; vol.82: pp. 130-137; vol.83: pp.83-87. 1947-1949. List of spp. collected. [P.B.]
144. Kaisila, Jouko, "Ancylis partitana Chr. (Lep., Tortricidae), neu für die Fauna Europas, in Finland gefunden" [In German]. Ann. Ent. Fennici, vol.13: pp.1-5, 4 figs. 31 Mar. 1947. Figures adult and ♂ genitalia and distinguishes sp. from A. comptana. [P.B.]
145. Kaisila, Juoko, "Einige Theorien über die Entwicklung der europäischen Schmetterlingsfauna" [In Finnish, German summary]. Ann. Ent. Fennici, vol.13: pp.11-16, 1 map. 31 Mar. 1947. Summary of theories of the development of the modern distribution of Lepidoptera in Europe. [P.B.]
146. Lichy, René, "Documents pour servir à l'étude des Sphingidae du Venezuela (Lepid., Heter.) (9<sup>e</sup> note)" [In French]. Bol. Ent. Venezolana, vol.7: pp.67-89, 2 pls., 1 map. Dec. 1948. Discusses similarity of fauna with that of upper Amazon. Redescribes and figures Phlegethontius leucospila and Eupyrroglossum venustum and lists 4 other spp., all new to Venezuela; notes on 48 other spp. [P.B.]
147. MacNay, C. Graham, "A summary of the more important insect infestations and occurrences in Canada in 1947." 78th Ann. Rep. Ent. Soc. Ontario: pp.71-89. 1948.
148. MacNay, C. Graham, "A summary of the more important insect infestations and occurrences in Canada in 1948." 79th Ann. Rep. Ent. Soc. Ontario: pp.66-87. 1949.
149. MacNay, C. Graham, "A summary of the more important insect infestations and occurrences in Canada in 1949." 80th Ann. Rep. Ent. Soc. Ontario: pp.57-77. 1950.
150. Peltonen, Osmo, "Zur Schmetterlingsfauna von Viena" [In Finnish, German summary]. Ann. Ent. Fennici, vol.13: pp.131-144, 1 map. 29 Oct. 1947. Annotated list, covering all families. [P.B.]
151. Skogsborg, Jan, "Depressaria impurella Tr. (Lep. Tin.) ny för Sverige" [In Swedish, English summary]. Ent. Tidskr., vol.72: pp.75-76. 15 Apr. 1951. New Swedish record. [P.B.]
152. Valletta, Anthony, "Additions to the list of Lepidoptera, Heterocera, of the Maltese Islands." Entomologist, vol.84: pp.64-66. Mar. 1951. Includes 7 Noctuidae, 2 Geometridae, 9 Pyralidae, 4 Tortricidae, 3 Gelechiidae, 1 Tineidae, 1 Monopidae, 1 Tischeriidae. [P.B.]
153. Various authors, in Ann. Rep. For. Ins. Surv., Dept. Agr. Canada, 1946 [1947], 1947 [1948], 1948 [1949], 1949 [1950], 1950 [1951]. This series contains a great deal of information on distribution, outbreaks, and fluctuation in numbers of economically important insects, including Lepidoptera. [P.B.]
154. Various authors, "Field season summary of Lepidoptera - 1947 season." Lep. News, vol.1: pp.88-96. Dec. 1947.
155. Wojtusiak, Roman J., and Halina Wojtusiak, "Contributions to the knowledge of the lepidopterological fauna of Eastern Lithuania" [In Polish, English summary]. Fragm. Faun. Mus. Zool. Polon., vol.5: pp. 159-183, 1 fig. 18 Dec. 1947. Brief ecological description of area studied, and an annotated list of 299 spp. collected. [P.B.]

## F. Biology

156. Callan, Edward McC., "A note on Sarcophaga lambens (Wied.), a parasite of the South American Bollworm, Sacadoses pyralis Dyar." Revista Ent., vol.17: pp. 474-475. "Dec. 1946" [20 Jan. 1947]. Records several other lepidopterous hosts. [P.B.]
157. Freiberg, Marcos A., "La oruga de la alfalfa en la Argentina, Colias lesbia (Fabricius) (Lep. Pier.)" [In Spanish]. Inst. Sanid. Veg. Argentina, ser.A, no.36: 29 pp., 17 figs. 1947. Redescribes sp.; describes and figures ♂ genitalia, adult (several series from different localities), larva, and pupa. Discusses biology, parasites, taxonomic history, and economic importance. [P.B.]
158. Griot, Mario, and Amelia Icart, "Observaciones sobre Allocota bruchi Bréthes, parasito del "bicho de cesto" [In Spanish]. Inst. Sanid. Veg. Argentina, ser.A, no.31: 14 pp., 12 figs. 1947. External parasite apparently restricted to Oiketicus kirbyi. Description of early stages and host relations. [P.B.]
159. Griot, Mario, and Amelia Icart, "Observaciones sobre un parasito del "bicho de cesto", Psychidomira brasiliensis (Brethes)" [In Spanish]. Inst. Sanid. Veg. Argentina, ser.A, no.36: 13 pp., 10 figs. 1947. Life history and biology of this parasite of Oiketicus kirbyi. [P.B.]
160. Kanervo, Veikko, "Über das Massenaufreten der Gammaeule, Plusia gamma L. (Lep., Noctuidae), im Sommer 1946 in Finland" [In German]. Ann. Ent. Fennici, vol.13: pp.89-104, 5 figs., 2 maps. 29 Oct. 1947. Discusses distribution and development of outbreak; lists plants attacked and parasites. [P.B.]
161. Kaussari, M. "Earias insulana Boisdu." [In French]. Ent. Phytopath. Appl., Iran, no.4: pp.12-14. June 1947. Summary of a paper in Persian on the morphology, biology and control of this noctuid pest of cotton. [P.B.]
162. Keifer, H. H. "Systematic entomology." Bull. Calif. Dept. Agr., vol.36: pp.168-172. 1947. Habits of Myelois venipars, Argyrotaenia citrana, Apterona crenulella. [P.B.]
163. Pohjola, Mauno U., "Orgyia antiqua L. (Lep., Lymantriidae) als Heidelbeerschädling" [In Finnish, German summary]. Ann. Ent. Fennici, vol.13: pp.22-23. 31 Mar. 1947. Account of an outbreak on Vaccinium. [P.B.]
164. Rauhala, Aarre, "Über ein Massenaufreten von Colias hyale L. (Lep., Pieridae) in Helsinki im Spätsommer 1942" [In Finnish, German summary]. Ann. Ent. Fennici, vol.13: pp.23-24. 31 Mar. 1947.
165. Soenen, Alb., "Contribution à l'étude du Carposcapse" [In French]. Parasitica, vol.3: pp.82-91. 1947. Control of C. pomonella, with notes on biology. [P.B.]
166. Spencer, G. J., "On the oviposition habits of Dargida procincta (Lepidoptera: Phalaenidae)." Proc. Ent. Soc. Br. Columbia, vol.43: p.10. 4 Feb. 1947.
167. Steyaert, R. L., "Quelques données sur la biologie de la Pyrale du Caféier Dichocrocis (Conogethes) crocodora Meyr" [In French]. Parasitica, vol.3: pp.129-130. 1947. Habits and control. Lists 1 parasite. [P.B.]
168. Walton, W. R., and C. M. Packard, "The Armyworm and its control." U. S. Dept. Agric. Farmers' Bull., no.1850: 10 pp., 7 figs., 1 map. Oct. 1947. Distribution, biology, parasites and control of Cirphis unipuncta. [P.B.]
169. Williams, Evelyn Gilstrap, "Butterflies and moths." School Nature League Bull., ser.18, no.1: 4 pp., 7 figs. Sept. 1947. Popular account of biology of Lepidoptera. [P.B.]

## G. Physiology and Behaviour

170. Agrell, Ivar, "The diapause problem." Année Biol., vol.55: pp.287-295, 3 figs. Apr. 1951. Summary of some recent work in diapause in Lepidoptera and other insects. [P.B.]
171. Bounhiol, Jean-Jacques, "Voltinisme expérimental (suppression de la diapause) imposé à plusieurs générations successives de Bombyx mori L." [In French]. C. R. Acad. Sci., vol.232: pp.2360-2362. 18 June 1951. Diapause not essential for vitality of stock. [P.B.]
172. Drilhon, Andrée, and René-Guy Busnel, "Les acides aminés libres et les substances fluorescentes du sang et du tube de Malpighi de la chenille de Bombyx mori L." [In French]. C. R. Acad. Sci., vol.232: pp.182-184. 8 Jan. 1951. Chromatographic analyses of silk-worm larvae. [P.B.]
173. Drilhon, Andrée, René-Guy Busnel, and Constantin Vago, "Les acides aminés libres et les substances fluorescentes du sang, et des tubes de Malpighi, de la chenille de Bombyx mori L., atteinte de la maladie à polyèdres et de la flacherie" [In French]. C. R. Acad. Sci., vol.232: pp.360-361. 22 Jan. 1951. The very different effects of these two diseases on the blood constituents are recorded. [P.B.]
174. Shteinberg, D. M., "Gormony u nasekomykh" [In Russian; Hormones in insects]. Uspekhi Sovremeni Biologii, vol.25: pp.401-418. 1948.
175. Szekessy, V., "Zusammenhang zwischen Funktion und Querstreifung beim Insektenmuskel" [In German]. Ann. Hist.-Nat. Mus. Nat. Hungarici, vol.40: pp.89-96, 2 figs. 1947. Number of striations in insect muscle is not species-specific, but depends on frequency of contraction and work done by the muscle. Some of the work was done on Sphinx. [P.B.]

## H. Migration

176. Beebe, William, "Migration of Danaidae, Ithomiidae, Acraeidae and Heliconiidae (butterflies) at Rancho Grande, north-central Venezuela." Zoologica, vol.35: pp.57-68, 1 fig. 17 Apr. 1950. Records of migration for 3 Danaidae, 31 Ithomiidae, 2 Acraeidae, and 19 Heliconiidae. [P.B.]
177. Beebe, William, "Migration of Pieridae (butterflies) through Portachuelo Pass, Rancho Grande, north-central Venezuela." Zoologica, vol.35: pp.189-196, 1 pl. 27 Nov. 1950. Records of 44 spp. Figures all; gives species range and field characters. [P.B.]
178. Beebe, William, "Migration of Nymphalidae (Nymphalinae), Brassolidae, Morphidae, Libytheidae, Satyridae, Riodinidae, Lycaenidae and Hesperidae (butterflies) through Portachuelo Pass, Rancho Grande, north-central Venezuela." Zoologica, vol.36: pp.1-16, 2 pls. 20 Apr. 1951. Records 55 Nymphalinae, 4 Brassolidae, 1 Morpho, 1 Libytheana, 12 Riodinidae (all are figured); 14 Satyridae, 12 Lycaenidae, 41 Hesperidae. Gives species range, and field characters of most. [P.B.]
179. Campbell, J. L., "An experiment in marking migratory butterflies." Entomologist, vol.84: pp.1-6. Jan. 1951. 300 Vanessa cardui and 100 V. atalanta marked and released; 4 recaptures. [P.B.]
180. Erkamo, V., "Pyrameis (Lep., Nymphalidae) - Beobachtungen im Sommer 1946" [In German]. Ann. Ent. Fennici, vol.13: pp.8-11. 31 Mar. 1947. Data on migration in Finland. [P.B.]
181. Speyer, W., "Die Wandergewohnheiten und der Flug des grossen Kohlweisslings (Pieris brassicae L.)" [In German]. Zeits. Pflanzenschutz, Pflanzenschutz, vol. 55: pp.335-341. 1948. Data on migration in Germany; this species seems to have regular north and south migrations like those of the Monarch. [P.B.]

## I. Technique

182. Ackermann, Otto, "Plastic mounts for butterfly and moth collections." Lep. News, vol.2: p.31. Mar. 1948.
183. Agenjo, R., "Posibilidad de determinar lepidopteros en estado de pupa, mediante estudio de los aparatos genitales" [In Spanish, German summary]. Proc. VIII Int. Ent. Congr., pp.530-534, 2 figs. 1950. Points out that genitalia, in some spp. at least, are well developed and typical in the pupal stage and will serve for identification. [P.B.]
184. Bauer, David L., "Methods for collecting Buck-moths (Hemileuca, Saturniidae)." Lep. News, vol.2: pp.81-82. Oct. 1948.
185. Fletcher, Frank C., "Papering insects in the field." Ward's Nat. Sci. Bull., vol.21: pp.51-53, 1 fig. Mar. 1948.
186. dos Passos, Cyril F., "The photography of types of Lepidoptera." Lep. News, vol.3: pp.41-42. "Apr.-May" [July] 1949.
187. Richard, F., "Chasseurs d'autrefois et d'aujourd'hui" [In French]. Lambillionea, vol.49: pp.35-38, 54-56, 81-84. 25 Apr., 25 June, 25 Aug. 1949. Remarks on old and modern collecting equipment and methods. [P.B.]
188. Taschenberg, E. F., "Laboratory rearing of Grape Berry Moth." Journ. Econ. Ent., vol.44: pp.256-258, 1 fig. Apr. 1951. Polychrosis viteana. [P.B.]
189. Townes, Henry, "A cabinet for Schmidt boxes." Coleop. Bull., vol.5: pp.21-27, 1 fig. Apr. 1951. Complete instructions for building such a cabinet; cost about \$13. [P.B.]
190. Wilde, W. H. A., "A bivalve type of insect feeding cage." Canad. Ent., vol.83: pp.206-208, 3 figs. Aug. 1951. Describes and figures an improved cage for confining insects on the food plant. [P.B.]

## J. Miscellaneous

191. Abbot, John, "Notes on my life." Lep. News, vol. 2: pp.28-30. "Mar." [June] 1948.
192. Diakonoff, A., "A short report on the damage caused to lepidopterology during and after the Pacific war in Java and Malaya." Lep. News, vol.2: p.79. Oct. 1948.
193. Kiriakoff, Sergius G., "A report on the war damage to lepidopterology in Europe." Lep. News, vol.2: pp. 49, 61, 80; vol.3: p.4. May, June, Oct. 1948; June 1949.
194. Lempke, B. J., "Rebel's edition of Berge's Schmetterlingsbuch." Journ. Soc. Bibl. Nat. Hist., vol.2: pp.171-172. Sept. 1949. Information on the dates of publication of the fascicles. [P.B.]
195. Muesebeck, C. F. W., "Common names of insects approved by the American Association of Economic Entomologists." Journ. Econ. Ent., vol.43: pp.117-138. 1950.
196. Suomalainen, Esko, "Zur Ausbreitung der Schmetterlinge durch die Eisenbahn" [In German]. Ann. Ent. Fennici, vol. 13: p.182, 1 map. "31 Dec. 1947" 1948. Notes on the spread of Calotaenia celsia and Procus bicolorius in Finland by railway. [P.B.]
197. Toxopeus, L. J., "Vlinders van de Minahassa in Noord-Celebes" [In Dutch]. Idea, vol.8: pp.100-101. 31 Jan. 1951. Note on the important collection of P. Zondervan, saved and preserved during Japanese occupation of N. Celebes. [A.D.]
198. Twinn, C. R., "The Lepidoptera in fact and in poetry: part II - the moths." Pesta, vol.15, no.5: pp.24-30. May 1947. References to moths and caterpillars in Shakespeare, etc. [P.B.]
199. Webb, Damian, "A moth like a hummingbird." Country Life, vol.102: pp.876-877, 6 figs. 31 Oct. 1947. Macroglossum, beautifully figured. [P.B.]

## NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or reject unsuitable notices. Unless withdrawn sooner by the member, each notice will appear in three numbers. We can not guarantee any notices but expect all to be bona fide. Please notify us of any abuse of this service.

The Abellana High School Lepidopteran Club, Cebu City, Cebu, PHILIPPINES, wishes to exchange Cebu butterflies for species from all other parts of the world. Collectors interested in exchanging should write directly to the Club.

Rarities from Spain: Erebia palarica, E. zapeteri, Lycaena idas and ssp. chapmani, L. dolus ssp., Coenonympha leander iphioides, Lysandra corydon caelestissima, L. albicans, etc. Also many rare endemic spp. from Atlas Mts. of Morocco, Argynnis lyauteyi, A. auresiana, Lycaena bavius fatma and many others. Will sell, or exchange for better Palaearctic and Nearctic Rhopalocera only, preferably Alpine and Arctic spp. Colin W. Wyatt, Cobbetts, Farnham, Surrey, ENGLAND.

Tropical butterflies wanted for art work for cash or exchange. Write what you have, quantity, and price in first letter. Anton Jelinek, 3900 Diversey Ave., Chicago 47, Ill.

Wish to get in contact with companies or individuals who desire butterflies for art work. Taking orders for 1952. M. Eugene Smith, Newnan, Georgia.

Wanted: tropical butterflies and moths, papered or pinned. Private collections wanted from all parts of the world. Will pay cash. Ben Karp, 3148 Foot-hill Blvd., La Crescenta, Calif.

Megathymus wanted - specimens of this genus from all localities. Will buy or exchange. Have Megathymus for exchanges. Don B. Stallings, Caldwell, Kansas.

Exchange desired in all groups of Macros, esp. Geometridae. Lepidoptera from Colorado (Parnassius, Colias, Oeneis, etc.), Illinois, and southern Indiana offered in trade. Ronald H. Leuschner, 1172 S. Wenonah Ave., Oak Park, Illinois.

Japanese Rhopalocera and some moths, including Japanese (and including Formosan) Rhopalocera and some moths offered in exchange for Rhop. and some moths from all parts of the world. Especially Satyridae, Lycaenidae, Papilionidae, Nymphalidae, Pieridae, Saturniidae and Arctiidae. Seiji Ishida, 33 Nakayama-cho, Saga, Ukyo-ku, Kyoto City, JAPAN.

Huge African Lepidoptera collection for sale; over 2000 moths and 5400 butterflies. About 250 types, with complete data, all on pins. Will sell in part or complete, including 120 glass cases. Also, rare books on African Lepidoptera. Ari W. Kampf, Franz Jurgens Strasse 12, Dusseldorf, GERMANY.

Australian Lepidoptera for sale, papered or pinned, perfect specimens, with data, 10¢ each. Write stating needs; Victorian species only offered. Ian Harman, c/o Mrs. A.H. Bisdee, Appletree Cottage, Dorset Road, Croydon, Victoria, AUSTRALIA.

I will pay Lepidopterists' Society dues for foreign (or N. American) collectors in exchange for shipment of butterflies of equal value, or will pay cash direct. Want butterflies from any tropical island, Africa, and Indo-Australia, Central and South America; NOT Europe at present. Also want North American species in quantity, esp. Papilio. Must be first quality, in papers. Want all families but esp. Nymphalidae, Papilionidae, Morphidae, and Saturniid moths; also other large insects. Will advance money to any good collector. Send list and prices in first letter. A. Glanz, Butterfly World Supply House, 289 E. 98th St., Brooklyn 12, New York.

Wanted to buy: Seitz' "Macrolepidoptera of the World" Vols. 1, 9, 13, English translation. George H. Berg, Room 319, Custom House, New Orleans 16, Louisiana.

Austrian hunter and collector (not dealer) in Amazon and Matto Grosso districts of Brazil takes orders for Lepidoptera and other insects, all with full locality and date. Also supplies amphibians, reptiles, and various terrarium animals. Write (in German if possible) to: Walter A. Riffler, Tecnico Zoológico, Caixa Postal 500, Belem, Pará, BRAZIL.



LIVING MATERIAL



The Editors will welcome especially notices for the exchange or sale of Lepidoptera eggs, larvae, and pupae, hoping to revive the old interest in rearing and to re-emphasize the importance of studying the immature stages. Contributors are urged to include accurate locality data with all material sent.

Interested in buying any living saturniid cocoons and about 100 chrysalids of any butterfly. Charles Walcott, Milton Academy, Milton 86, Mass.

Living cocoons and pupae of giant Indian moths for sale. Sent by airmail. U.S. Dept. of Agric. import permits must accompany orders from U.S.A. Remittance must accompany all orders. Probable garden food plants in parentheses: Actias selene (Walnut, Cherry, Hibiscus) - \$0.20; Samia cynthia (Ailanthus) - 0.12; Antheraea edwardsi - 0.50; Loepa katinka (Ivy, Va. Creeper) - 0.20; Antheraea mylitta (oaks) - 0.40; Brahmea wallichi (Ash, Privet, Lilac) - 0.50. Prices in U.S. dollars). Himalayan Butterfly Co., Shillong, Khasi Hills, INDIA.

Wanted to buy: cocoons of U.S.A. Saturniidae, pupae of Sphingidae, Papilio chrysalids, Catocala eggs, Hemileuca maia egg rings. Will exchange best make rust-proof steel pins Nos. 0-7, value \$4.00 per thousand, for cocoons and Coleoptera. Eugene Dluhy, 3912 N. Hamilton, Chicago 18, Illinois.

Professor Wm.T.M. Forbes, of Cornell University, has agreed to present answers to questions submitted by members on any aspect of Lepidoptera study. Questions are to be sent to the editor of the Lep. News.

Q. "Are there venational characters by which the Lepidoptera can be distinguished from all other orders of insects, and especially from the Mecoptera?"

A. Considering possible discovery of fossils this question becomes somewhat arbitrary, since Lepidoptera, Trichoptera, and Mecoptera certainly arose from a common ancestor, which shared the more primitive characters of all three. The primary characters of the Lepidoptera are the fully scaled wings and the epiphysis, both unique in the Insects, though there are fully scaled FORE wings in a few Coleoptera (e.g., Cupes and Anthrenus) and Trichoptera (part of Leptocella). Neither of these features would normally be visible in fossils. Nygmata can normally be seen in fossils and are present in Trichoptera and in almost all Mecoptera, but absent in all Lepidoptera; - but I can't find any in Merope and a loss is never as good a character as a gain of a structure. This leaves the small cell near base of hind wing (cell 2nd A) which is trapezoidal and much larger in primitive Trichoptera, but minute or lanceolate in Lepidoptera when visible; in the Mecoptera which have a developed anal area the pattern is more complex. Secondly the Mecoptera have a considerable number of cross-veins, irregularly arranged, the Lepidoptera a single set, with only one to a cell, like the Trichoptera. And thirdly no Lepidoptera have preserved vein  $M_4$ , while it is present in the fore wing at least in all primitive Mecoptera and Trichoptera - another loss character, and therefore subject to suspicion.

W.T.M.F.



#### RESEARCH REQUESTS

I have begun a revisionary study of the butterflies of the thecline genus Mitoura and need series of specimens of all species as listed in the 1938 McDunnough check list from all parts of their ranges, also preserved early stages and distributional notes. I hope to obtain material by purchase or exchange or if need be, on loan. All material loaned will be returned promptly on completion of the investigation, determined and undamaged, and due acknowledgment will be made on publication. Please write: Dr. J.B. Ziegler, 18 Baltusrol Place, Summit, N.J., U.S.A.

Micropterygidae and Eriocranidae from any part of the world are needed for systematic investigations. Larvae and pupae are most urgently needed, but adults in alcohol (not dry) are also desired. Specimens will be purchased or satisfactory exchange can be arranged.

Contacts are also sought with collectors in all parts of the world who wish to exchange or sell preserved larvae and pupae of all groups. Please write: Dr. C.L. Remington, Osborn Zoological Lab., Yale University, New Haven 11, Conn., U.S.A.

#### NOMINATIONS FOR NEW OFFICERS FOR 1952

"All officers shall be elected by ballot at the annual meeting. The President and all Vice-Presidents shall be elected for the term of one year, and shall be eligible to succeed themselves once. The Secretary and Treasurer shall be elected for the term of two years, and shall be eligible to succeed themselves twice. The six other elective members of the Executive Committee shall be elected for the term of three years; two of them shall be replaced each year, except that at the first election two shall be elected for one year, two for two years, and two for three years; these members shall not be eligible to succeed themselves. Members not attending the annual meeting may vote and be represented by proxy, or may vote for the election of officers and other members of the Executive Committee by mail ballot." (Constitution, Art.V, Sec.1.)

"The President shall appoint a Nominating Committee who shall nominate one candidate for each elective office to be filled for the ensuing year, and a list thereof shall be published in The Lepidopterists' News or mailed to the members at least sixty days before the annual meeting. Additional candidates may be nominated by submission to the Secretary of written nominations signed by not less than ten members." (Constitution, Art.VI, Sec.2.)

The members of the 1951 Nominating Committee are as follows:

Harry K. Glench                      George W. Rawson  
Eugene G. Munroe, Chairman

Dr. Munroe reports that the nominees for vacancies for 1951, unanimously agreed on by all members of the Committee, are the following:

#### OFFICERS

President (term - one year):  
Dr. KARL JORDAN (Great Britain)  
Senior Vice-President (one year):  
Mr. L. PAUL GREY (U.S.A.)  
Vice-President (one year):  
Dr. A. DIAKONOFF (Netherlands)  
Vice-President (one year):  
Dr. R.F. D'ALMEIDA

#### EXECUTIVE COMMITTEE

(three-year term)

Prof. Dr. HARRY FEDERLEY (Finland)  
Dr. ROGER VERITY (Italy)

Ballots containing the names of all nominees will be mailed to all members of the Society in November. IT IS IMPORTANT THAT ALL MEMBERS PARTICIPATE IN THE ELECTION, BY PROMPTLY RETURNING THEIR PROPERLY MARKED BALLOTS TO THE SECRETARY, even should there be only one nominee for each vacant office!

C.L. Remington