

The Lepidopterists' News

THE MONTHLY PERIODICAL OF THE LEPIDOPTERISTS' SOCIETY

c/o Osborn Zoological Laboratory, Yale University, New Haven 11, Connecticut, U.S.A.

Editor - C. L. REMINGTON

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FORMAL ORGANIZATION FOR THE LEPIDOPTERISTS' SOCIETY

The Lepidopterists' Society was founded approximately three years ago, as this issue of the Lep. News goes to press. A set of temporary "Articles of Organization" was formulated (see Lep. News, vol.1: p.2) in which the concluding Article was: "The activities of the SOCIETY shall be handled entirely through the medium of the NEWS and its editors. No meetings are contemplated, and the organization will not require elected officers." The Society has continued on that basis until the present time, although it had quickly become clear that a full-fledged society would be a necessary basis if the News and other activities were to have good prospects for permanence. Further, as long as the planning and work of the Society are concentrated in the hands of as few as two persons, there is a distinct upper limit restraining development.

Discussion from members on the question of formal organization was requested over a year ago and many valued comments resulted.

The process of formally organizing the Lepidopterists' Society has now begun. The editor has asked Mr. Cyril F. dos Passos to prepare a form of Constitution and By-Laws for the Society, and although this task will force him reluctantly to give less time to assembling an important catalogue and check-list, he generously acceded. He is now engaged in refining the document and expects to have a draft ready this spring. It will then be studied and finished by a representative committee. Final ratification will be by vote of the entire membership of the Society. It is hoped that the Constitution will be officially adopted before the end of 1950 and that the election of 1951 officers by mail ballot to the entire membership will take place at the end of 1950.



It is appropriate at least once each year to enumerate the projects of the News and the Society.

1. The annual List of Members provides a geographical directory of names, addresses, and special interests of all members.

2. The Boards of Specialists, for authoritative identification of Lepidoptera and their food-plants and parasites, were arranged to remove the misidentifications which have been a plague in papers on local faunas, life history, biogeography, and biology in the literature on Lepidoptera for many years. (See next page for the present Boards.)

3. The annual Field Season Summary assembles a large body of fresh information on Lepidoptera conditions in North America at the end of each season -- information of great potential value as the record accumulates.

4. The regular News section "Recent Literature on Lepidoptera" is aimed toward the inclusion of every paper on Lepidoptera which is published in any part of the world after 1946. Peter F. Bellinger has made a tremendous contribution toward the completeness of this section. With great care he has examined every issue since January 1, 1947, of several hundred biological periodicals and has abstracted every paper dealing with Lepidoptera not yet covered in the Lep. News. Furthermore, he has for many months been responsible for abstracting such papers in all new issues of these periodicals. The files he has prepared for the Society will make it easy to know in a moment whether any issue of any periodical has been examined. We are seeking at least one regular abstractor in every country with biological publications, but until such coverage is arranged Mr. Bellinger is personally establishing the Recent Literature section as the most complete literature abstracting medium for Lepidoptera that has ever existed. We receive more enthusiastic letters in favor of this section than for any other aspect of the News.

5. The Lep. News has several other recurring features, such as Prof. Forbes' Question and Answer column. As in the past, no new taxonomic material (new species, new descriptions, etc.) will be accepted for the News. It is felt that these should go to the multitude of research periodicals. Usually only solicited articles are desired; it is intended that these be chiefly of a review nature. However, field notes and technique suggestions are welcomed from members IN ALL PARTS OF THE WORLD.

6. An important Society project, "The Nearctic Butterflies", has as its Coordinating Editor F.M. Brown. It is planned as an exhaustive treatment in several volumes of the systematics and biology of North American Rhopalocera. About 70 Society members are now providing data to be used in the volumes.

Subscribers to the Lep. News (including all members) are guaranteed the delivery of every issue. Please check your file of the News to be sure you received the nine issues of Vol. 3. We will forward, at no cost, all numbers not received ONLY IF YOU REQUEST THEM BEFORE 1 JULY 1950.

HOST PLANT IDENTIFICATION

An aspect of Lepidoptera biology of prime importance for knowledge of taxonomy, phylogeny, ecology, and genetics, as well as for economic studies, is the exact identification of host plants on which the larvae feed. Accurate identifications are the only useful ones. Consequently arrangements have been made to provide host plant identifications for all North American workers. Probably members in other parts of the world will find botanists of their nations equally cooperative. North American plants will be identified as follows:

GRASSES John R. Reeder
Osborn Botanical Lab.
Yale University
New Haven 11, Conn.

OTHER PLANTS Ivan M. Johnston
Arnold Arboretum
Jamaica Plain 30, Mass.

Dr. Reeder is a leading authority on grasses. Professor Johnston is not only an outstanding plant taxonomist, but also an enthusiastic lepidopterist. Please write them before sending material and please mention your Lepidopterists' Society membership.

In order to insure ready identification it is essential in collecting the plants to take the following steps:

1.) Preserve the specimen carefully. Flatten and dry it simultaneously either in a standard botanical press or between sheets of newspaper placed in a large book weighted by any heavy weight. Press it for at least one week. The plant may be mailed in folded newspaper, with the package braced against bending by strong cardboard backing on both sides.

2.) Preserve as many parts as possible. Leaves attached to a stalk or twig and the flower are essential for most plant species. The fruit is always helpful, and in grasses the seeding stalk is necessary. If it is small enough, press the whole plant.

3.) Include complete data: locality, date of collection, habitat, and altitude if in mountains.

IDENTIFICATION OF PARASITES

We will be glad to publish in the Lep. News records of all accurately identified parasites whose host is known. Be sure to save carefully all parasites you rear. The following authorities have kindly agreed to identify parasites. We do not yet have a determiner for the minute Chalcid wasps, but these should be saved. (See Lep. News, vol.2: p.53 for descriptions and illustrations.)

ICHNEUMON WASPS (Ichneumonidae) H.K. Townes
North Carolina State College
Raleigh, N.C.

BRACONID WASPS (Braconidae) C.F.W. Muesebeck
Div. of Insect Identification
Bureau of Entomology & Pl. Quar.
Washington 25, D.C.

PARASITIC FLIES (Larvaevoridae) ... C.W. Sabrosky
(same address as Mr. Muesebeck)

BOARD OF SPECIALISTS Vol.IV, nos.1-2

The purpose of the Board is to strive toward a high standard of accuracy in published check-lists, life histories, etc. by providing authoritative identifications of specimens forming the basis of these published papers. The following rules concerning the service were formulated by the Board:

1. No specimens may be sent until the specialist has replied in writing that he is ready to receive them.
2. No specimens will be accepted unless full data (not key numbers) are on each specimen.
3. A series of each species must be spread, mounted on pins; others may be in papers.
4. Wherever possible, at least 3 prs. should be sent.
5. The specialist may, if he chooses, retain a fair sample of each species needed, but not uniques.
6. Return postage should be provided.
7. Specimens must be carefully packed.

NORTH AMERICA:

Pieridae & Boloria ("Brenthis") A.B. Klotz
American Museum of Natural History
New York 24, N.Y.

Satyridae C.F. dos Passos
Washington Corners, Mendham, N.J.

Speyeria ("Argynnis") L.P. Grey
Lincoln, Maine

Theclinae (Hairstreaks & allies) H.K. Clench
1270 Sudbury, Willow Run Village, Mich.

Plebejinae (Blues) V. Nabokov
Cornell University, Ithaca, N.Y.

Hesperiidae (Skippers) A.W. Lindsey
Denison University, Granville, Ohio

Noctuidae & Notodontidae J.G. Franclemont
5829 Little Falls Rd., Arlington, Va.

Catocalinae & Aegeriidae A.E. Brower
5 Hospital St., Augusta, Maine

Tineoid families Annette F. Braun
R.R.13, Box 41C, Cincinnati 30, Ohio

Pyraustinae Eugene Munroe
Division of Entomology
Dept. of Agriculture
Ottawa, Ontario, CANADA

CENTRAL & SOUTH AMERICA:

Hesperiidae E.L. Bell
150-17 Roosevelt Ave., Flushing, L.I., N.Y.

WEST INDIES:

Hesperiidae E.L. Bell
All other Rhopalocera Eugene Munroe

AFRICA:

Lycaenidae H. Stempffer
Lab. d'Entomologie du Muséum
45 bis, rue de Buffon, Paris (5^e), FRANCE

LEAF-MINING LEPIDOPTERA WITH SPECIAL REFERENCE TO METHODS OF REARING

by Annette F. Braun
Cincinnati, Ohio

The leaf-mining habit has developed in many families of that group of Microlepidoptera often referred to as Tineina. Certain Eriocranids (Jugatae) are also leaf-miners. The Cosmopterygidae, Scythridae, Heliozelidae, Elachistidae, Coleophoridae, Gracilariidae, Lyonetiidae, Tischeriidae, and Nepticulidae are the principal leaf-mining families; many if not all of their members are miners for at least part of their larval life. Leaf-miners are also found in the Gelechiidae, Heliodinidae, Yponomeutidae, and others. The leaf-miners are the smallest of the Lepidoptera; some do not exceed 3 mm. in wing expanse.

In response to the unique environmental conditions, i.e., life inside of a leaf, modifications in larval structure have developed. (See Needham, Frost, and Tothill, 1928, for a detailed discussion.) The extreme specialization is found in the Gracilariidae where, in the early instars -- the sap-feeding instars -- there is such flattening and modification of the mouth-parts that the larva is able only to cut through a single layer of cells of the leaf tissue and suck the sap.

The entire larval life may be passed inside of a single mine. Some leaf-miners may make more than one mine. The early larval instars only may be passed in a mine; in the later instars, the larva may feed exposed on the leaf, or within the protection of a characteristically folded or rolled leaf, or may construct a portable case, from which it mines into the leaf tissue. It is not possible here to enumerate all of the variations of mining habits.

With some experience it becomes possible to recognize the genus and often the species from characteristics of the mine. Such characteristics include the form of the mine, whether the loosened epidermis is smooth or wrinkled, the amount of leaf tissue consumed, and the means of disposal of the waste products -- "frass" -- whether retained within the mine or ejected from it.

Where the entire feeding life is spent within the mine, pupation may take place within the mine, either with or without a cocoon; or the larva, when full-fed, may leave the mine and spin a cocoon in a fold of a leaf, in any convenient crevice, or amongst the humus on the ground. Pupation may take place at once or a long dormant period may intervene (in some instances nearly a year) with pupation shortly before the emergence of the imago.

Mining and pupating habits of the species must be taken into consideration if success in rearing the moths is to be attained. Rearing is the only satisfactory method of obtaining a good representation of the leaf-mining Lepidoptera. Many species are rarely seen unless reared.

When the entire larval life is passed in one mine, the leaf must be kept in fresh condition. Such mines should be collected near the end of larval life, and may be placed in jelly glasses with

close-fitting lids (or smaller containers if few mines of a species are found). It is well to preserve specimens of various stages in the development of the mine for future reference. The leaves should not fill more than three-fourths of the container, with not more than one species in a container. A paper bearing a number corresponding to that in the records should be placed in the container; this same number should become a part of the label on the pin of the reared moth. If excessive moisture accumulates, a strand or two of sphagnum will absorb it, and does not encourage the growth of mold. Larvae which leave the mine to pupate often wander considerably, and will drown in a film of moisture on the sides of the container. For those which normally spin in a fold of a leaf or in a crevice, a few fragments of crumpled tissue paper may be provided; for those which spin on the ground a little loose earth, preferably mixed with broken pieces of unincorporated humus should be provided. Use scarcely enough to cover the bottom of the container.

Where the species are miners for only a part -- the earlier instars -- of larval life, the minute larvae must have fresh food available when they leave the mine. This often calls for careful transference to the fresh food. Collection of these early mines and notes on their appearance are necessary for the keeping of accurate data, but for practical rearing purposes it is more advantageous to make notes on the mines and return in a few days or a week to the exact place and collect the larvae in their later stages, when fresh food can be provided without handling and possible injury to the larvae.

Where pupation has taken place at once, the emergence of a considerable proportion of the imagoes may be expected. When pupation is delayed, difficulties arise. The interval between cessation of feeding and pupation may be as great as six or seven months or even more. The problem is to provide sufficient moisture to prevent the dormant larvae from drying up; in the summer generation, the addition of a few drops of water at intervals will suffice, as the period between cessation of feeding and emergence of the imago is approximately two weeks.

Overwintering dormant larvae must be hibernated out-of-doors. I use a box, made of square-mesh galvanized wire, its bottom lined with screen wire to prevent the entrance of earthworms. This is placed on the ground where no sun will strike, and elevated slightly above the ground with a few pebbles. The lids of the jelly glasses are removed and strong unbleached muslin tied securely around their tops; the glasses are then placed INVERTED in the hibernating box. Sufficient moisture will rise inside the glass. The glasses may be brought in when time for emergence approaches and the same procedure followed as in the summer generation. In a few groups, larvae feed again in the spring after a long dormant period. The rearing of these is a special problem.

Most Microlepidoptera emerge in the mid-afternoon or early evening. Several hours at least

should elapse before they are killed. If the rearing jar is opened close to a window pane, many species will fly to the glass and are easily caught by placing over them a small killing vial.

Features of each family will be considered, following the check list sequence (McDunnough, 1939).

COSMOPTERYGIDAE

These are leaf-miners, gall-makers, or external feeders. The mines of Cosmopteryx are blotches of various shapes, and may be found on grasses, sedges, and the leaves of dicotyledonous plants. Their outstanding characteristic is the cleanliness of the mine; most of the leaf tissue is eaten. Pupation is usually outside the mine. The moths are sometimes seen whirling on leaves near the food plant. The mines of Psacaphora are similar to Cosmopteryx in general shape, but in these the frass is retained within the mine and irregularly disposed. Members of the Onagraceae are the favorite food plants. The mines of Chrysopeleia, one species on Quercus (Oak), the other on Ostrya (Ironwood), usually start in the angle between two veins, the margins diverging; the frass disposed in two blackish diverging lines.

EPERMENIIDAE

Most of the species mine leaves of Umbelliferae, making several mines. The cocoon is a coarse open meshwork.

GELECHIIDAE

While comparatively few of the species of this great family are leaf-miners, there is great diversity of habit and character of mine. The mine of Chrysopora lingulacella Clem. is a gradually widening contorted band, with scattered frass. Several species of Aristotelia make blotch mines. The species of Recurvaria may mine needles of conifers, passing from one needle to another, or make blotches, similar to those of Aristotelia, in leaves of dicots; other species are skeletonizers feeding under the protection of a web of silk. The needle-miners begin their development in one year, completing it the next spring; therefore in rearing, mines had best be collected in the spring. In the genus Gnorimoschema are a number of leaf-miners whose work may be recognized by the peculiar mode of disposal of the frass. Their mines begin adjacent to or over the midrib, from thence spreading out over the leaf; at the beginning of the mine, the epidermis is wrinkled and to this gallery the larva retreats to eject the frass at the entrance of mine where it adheres together forming a black curled projection. Several of these species mine leaves of Compositae; a species with similar habits (G. scutellariaeella Cham.) mines leaves of Scutellaria (Skullcap). Other species of Gnorimoschema are gall-makers, of which the very common G. gallaesolidaginis Riley is an example. Most Gelechiidae are easily reared, as they pupate at once after spinning the cocoon.

HELIODINIDAE

One or two instances of unusual larval habits are worthy of mention. The larva of Cycloplasis panicifoliella Clem., a miner in leaves of panic

grass, when full grown, cuts from the upper epidermis of the mine a perfect circle which is folded in half and serves as a pupal chamber. The larvae of Erineda spin a web on the underside of the spore-bearing fronds of ferns, and mine into the sori, eating out the spores. At maturity the larva turns bright red, and spins a double fine white silk cocoon, within which it pupates at once. The moths emerge the following summer at the time the spore-bearing fronds are produced. In drought years, when no spore-bearing fronds develop, the moths do not emerge, but remain in the pupal state until the second summer.

YPONOMEUTIDAE

Larvae of some species of Argyresthia mine in needles of conifers, passing from one needle to another; a few mine in bark or in fruits. They reach maturity in the spring and the mines should be collected before the larvae have deserted them to spin a rather open meshwork or a dense cocoon. These cocoons may sometimes be found on the twigs adjacent to the mine. The imagoes emerge in a week or two.

SCYTHRIDAE

This family is represented in this country by the genus Scythris. Most of the species whose life history is known are leaf-miners. The mines may be recognized by the sheet of silk which is spun from the base of the leaf and beneath which the larva enters the leaf.

HELIOZELIDAE

The mines may be recognized by the oval hole left when the larva cuts out a piece of the mine for a pupal chamber. The upper and lower epidermis are spun together at the margins of the oval which is either attached to some object by two or three silk projections from one end or drops to the ground. The mines themselves are irregular translucent blotches, with the frass crowded toward the beginning of the mine. In some species, the overwintering generation passes the winter in the larval state and should be hibernated out-of-doors.

ELACHISTIDAE

The majority are grass and sedge miners. Mining is usually begun late in one season; the larva is dormant during the winter and resumes feeding early the following spring, often entering a new leaf. Such mines should be collected early in the spring and near the time of maturity, as grass leaves dry up easily, and if kept moist, mold. Pupation takes place outside of the mine, the pupa either in a slight cocoon or attached to a stem by anal end and median girdle, as in the papilios.

COLEOPHORIDAE

This family is represented in North America by perhaps 200 species of the genus Coleophora, many of them undescribed. The genus takes its name -- Coleophora, a case-bearer -- from the habit of the larva of constructing a portable case from pieces of its food plant, or spinning one of silk which may be decorated with particles of the food materi-

Braun: LEAF-MINING LEPIDOPTERA - cont.

als. Many plant families are represented among the food plants. The peculiarities in larval habits make the species of this genus some of the most difficult of all Microlepidoptera to rear. The larvae are miners in leaves or in seeds in the first instar. The mine in a leaf is a very small blotch or a linear track, and the larva lives within this mine as other leaf-miners do. From the end of this mine, the larva cuts its first case, which is attached to a leaf at an angle, usually on the underside; from its mouth the larva mines into the leaf, eating only that tissue which can be reached by extending the thorax and possibly a few abdominal segments out of the case. Many such small mines may be made, always recognizable by the circular hole near their center through which the larva entered the mine. A larger case is cut from a mine, with the small case often remaining attached to its apex. There is great variation in form of cases, but the case of each species is characteristic of the species. Pupation takes place within the case and the imago emerges from its apex.

As a general rule, the larva feeds during the summer, first as miner in a leaf, later as a case-bearer, but passes the winter as a partially grown larva, feeding again in the spring as soon as the leaves of the food plant unfold, and constructing its final case. Growth is completed soon, and the imagoes emerge within a few weeks. This habit makes rearing difficult as it involves carrying the partly grown larva through the winter and then supplying food at the critical time. The undertaking is seldom successful. It is necessary to observe the larvae during the first season, taking notes and keeping examples of the work and cases, then to revisit the locality in the spring and collect the cases.

Those species which at first mine inside of developing seeds construct cases of silk and portions of the floral parts, which are then attached to the seed or seed pod, into which the larva mines. Growth is completed with the ripening of the seeds, but the imagoes do not emerge until the time of flowering of the food plant. The larva remains dormant in the case until a couple of weeks before emergence and therefore the cases should be kept in the hibernating box up to that time. By following this procedure, a fair percentage of moths of the seed-feeding species may be obtained.

GRACILARIIDAE

This is the great family of leaf-miners, and the one with the greatest specialization for this mode of life. All of its members (with one or two exceptions) are miners for at least the first two instars; they never feed exposed. In the genus Gracilaria, a very small mine is made, with leaf tissue eaten just before the larva leaves the mine. Typically, the larva, on leaving the mine, constructs a cone by rolling down the leaf from its tip or from the tip of a lobe; usually three such cones are made, progressively larger (for example, G. packardella Cham. on sugar maple). A close elongate cocoon is spun. Ornix (Callisto, Parornix) mines in the earlier instars, later feeds under the folded margin of a leaf. The mines of Paractopa and Acrocercops

are irregular blotches, sometimes digitate. At first, merely the epidermis is separated (during the sap-feeding instars); later, leaf tissue is consumed in a more or less irregular fashion. Species of these two genera pupate on leaving the mine. The mines of Phyllocnistis and Marmara are long narrow winding tracks; the larvae are sap-feeders. In Marmara the cocoon is spun outside the mine; it may be recognized by the glistening globules on its surface. The species of Phyllocnistis pupate in a slight enlargement at the end of the mine.

The species of Lithocolletis are miners throughout larval life and pupate inside the mine. Two divisions of the genus are recognized: one in which the larva changes to the cylindrical form after the first few instars and becomes a tissue-feeder; the other in which the sap-feeding structure and form is retained throughout all the feeding instars. Mines of the first division, during the sap-feeding instars, are blotches with the thin epidermis of the leaf (usually the lower epidermis) separated from the rest of the leaf tissue. No further increase in area takes place in the tissue-feeding instars; the larva consumes the parenchyma within the mine, which is made "tentiform" by wrinkling of the loosened epidermis. The mines are easily recognized in the later stages, and the leaves will keep long enough for the larvae to complete their growth. Of most species there are two generations a year. The miners of the second division continually increase the extent of the mine, as they are able only to suck the sap as they cut through the cells. It is always the upper epidermis which is separated from the rest of the leaf tissue. Such mines are usually greater in area than those of the first division. No silk is spun during the feeding period; the spinneret develops in the instars just preceding the pupal stage. At this time, in the EARLY SUMMER generation, several strong folds are made in the loosened epidermis; beneath these folds the broadly oval flat cocoon is spun and pupation takes place at once. However, in the OVER-WINTERING generation, no such folds in the epidermis are made; instead, the larva constructs a circular hibernating chamber, just large enough to contain itself. This hibernating chamber is flat on the upper side, convex on the underside of the leaf. Such mines must be placed out-of-doors for the winter before the leaves dry too much.

LYONETIIDAE

The intricate and beautiful cocoons will identify several of the genera. The ribbed cocoons of Bucculatrix; the cocoons of Leucoptera, Proleucoptera and Paraleucoptera consisting of two broad, parallel, white bands connected across the middle, beneath which the cocoon proper is spun; the pupae of Lyonetia suspended in irregularly diverging strands of silk -- all these are characteristic. The species of most of the genera form blotch mines in leaves, sometimes making more than one mine; among these is the cosmopolitan Bedellia somnulenta Zell. on Morning Glory (Ipomoea).

The largest genus is Bucculatrix. With the exception of a few gall-makers, the larvae are leaf-miners at least during the earliest instars, later

feeding exposed. The mines are inconspicuous and the larvae are minute when they begin to feed externally. A jarring of the leaf causes them to drop down on a silk thread. The leaf is eaten in small patches, either upper or lower epidermis remaining intact. Later, the leaves may be skeletonized. The tiny moulting cocoons are unique. Many feed on herbaceous plants. Collecting toward the end of larval life is preferable.

TISCHERIIDAE

The larvae of most are miners in leaves of oaks, Rosaceae and Compositae. The mines are blotches on the upper side of the leaf, gradually expanding, the upper epidermis much wrinkled. Part of the mine is partitioned off and silk-lined as a pupal chamber; in most species pupation takes place at once in both summer and overwintering generations.

NEPTICULIDAE

These are the smallest of the Lepidoptera, some species expanding scarcely 3 mm. The larvae of all, with the exception of a few gall-makers or bark-miners, mine in leaves, chiefly of trees and shrubs. In many species, the long contorted linear mine very gradually increases in breadth; in others, it more or less abruptly enlarges into a blotch. When full-fed, the larva drops to the ground and spins a dense, flat, oval cocoon with projecting margins. It remains in the larval state until a few days before emergence in both summer and overwintering generations. There are at least two generations of most species; mining larvae of the first may be found in early summer, of the second six or eight weeks later. A number of these small mines, in pieces of leaf just large enough to allow for increase in the length of the mine, may be placed in one container. Shell vials, 3/4 to 1 inch in diameter and several inches long, are very useful rearing jars for Nepticulidae. The moths on emergence are active almost at once.

ERICRANIIDAE

This family and the Micropterygidae may be called the Microjugatae in contrast to the Hepialidae, or Macrojugatae. The larvae of Micropterygidae feed on mosses and liverworts, those of the Ericraniidae are leaf-miners. The only American Ericraniid whose life history is known (*Mnemonica auricyanea*) is a miner (of local distribution) in leaves of oaks (*Quercus*) and chestnut (*Castanea*), making in early spring a linear mine enlarging into an inflated blotch. When full-grown, the larva burrows into the ground, spinning a tough cocoon in which it passes the summer, fall and early winter, transforming to a pupa in late winter. The pupa is remarkable in the possession of functional mandibles, by means of which it cuts its way out of the cocoon and digs up through the earth.

The few references given below are only suggestive, as much of the literature of Microlepidoptera consists of scattered papers.

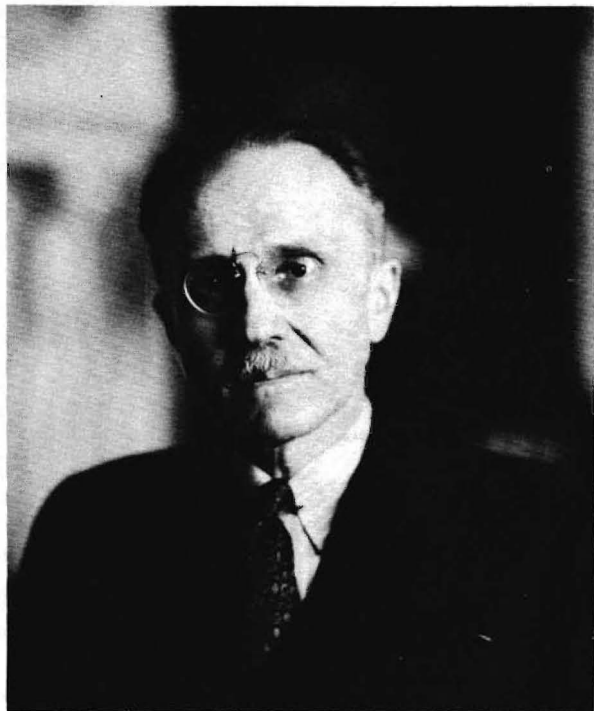
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The SOCIETY OF SYSTEMATIC ZOOLOGY, announced to *Lep. News* readers in vol.2: p.2 (1948), has recently accelerated its activity very considerably. Dr. R.E. Blackwelder, the newly elected Secretary-Treasurer, has just issued News Letter No.2, with a historical sketch of the Society's formation and past business, a summary of current projects, reports, and a directory of members and their specialties. In the two years since its founding, this society has grown to 531 members. A "regular journal for non-descriptive papers" on principles of systematic zoology is under consideration. Unfortunately, the 1949 annual meeting in New York was a breakfast affair held at an inconvenient time and attended by only 42 members. However, the 1950 meeting, to be held with the A.A.A.S. in Cleveland, Ohio, in December, will probably include a symposium on "The Role of Taxonomy in Modern Zoology", and Dr. Blackwelder hopes to arrange a suitable time. All lepidopterists seriously interested in taxonomy should find affiliation with this society worthwhile. Dues are only \$1.00 per year; the *Lep. News* office has membership forms available. Although the S.S.Z. is thus far largely a U.S.A. organization, taxonomists in other countries are welcomed. Among other things, this society if internationalized may well bring about the means of development and best function of the ill-defined and regrettably controversial International Commission on Zoological Nomenclature.





ANDREY AVINOFF (1884-1949)

It is hard to include in a short space all the many-sided accomplishments of the life of Dr. Andrey Avinoff, lepidopterist, museum administrator, and artist. He died on July 16, 1949, in New York. He was born on February 14, 1884, in Tulchin, Poland (then, Russia). His father was Lieutenant-General Nicholas Avinoff. His grandfather Admiral Alexander Avinoff had, as a young ensign, fought with Nelson on his flagship "Victory" at Trafalgar, and received the Order of the Bath. His mother, Alexandra Lukianovitch Avinoff, was the granddaughter of V.I. Panaiieff, who had been an amateur lepidopterist. His older brother, Nicholas, was Minister of the Interior in the Provisional Government following the abdication of Nicholas II. His sister is Elizabeth Shoumatoff, the portrait painter. Dr. Avinoff was not married.

His mother's ancestral home was near Poltava in the Ukraine. It was there, at the age of eight, that he began to collect butterflies. Inspired by a gift of Berg's Butterflies of Europe, he and his tutor captured twenty different species on the first day of collecting. The following year General Avinoff was transferred to Tashkent to command a brigade of sharpshooters. This gave young Andrey the opportunity to collect butterflies in the Tian Shan Mts., which was the origin of his enthusiastic interest in the Lepidoptera of Central Asia. His interest in art had an earlier beginning. He never forgot the

thrill of producing a drawing of some mountains, when he was four years old, in which he first discovered the phenomenon of perspective. A few years later he was making accurate paintings of butterflies, thus combining the two interests which were the dominant factors of his life. This combination was in the tradition of the great entomologists of the past who beautifully illustrated their own works. General Avinoff, who was himself an ardent numismatist, encouraged the two hobbies of his son, not dreaming that they might ever be more than that.

Andrey Avinoff's formal training was in law and government service. He graduated from the University of Moscow in 1905 with the degree of Master of Laws with highest honors. The years immediately following brought a rapid succession of official posts. He served as Assistant Secretary General of the Senate, Gentleman-in-Waiting to the Emperor, member of the staff of the Direction of Ceremonies (the "Protocol") at the court, Honorary District Judge and Marshal of Nobility in the province of Poltava. These duties gave him experience in legal, administrative, and diplomatic affairs which undoubtedly was of great value in his later life as the head of an institution.

During this period, Avinoff's paintings were exhibited by the Moscow Society of Artists, of which he became a member in 1903. He took advantage of the long summer vacations from his official duties to collect butterflies in Pamir in 1908 and again in 1912 in western Tibet. He also sent forty-two other collecting expeditions to arctic and temperate Asia. The combined result of these activities was his great collection of 80,000 Palearctic butterflies. This collection broadly covered the Rhopalocera of the entire Palearctic region, but it was especially complete in Parnassius and Colias, containing some twenty types and paratypes in these two genera not represented elsewhere, including his famous P. auto-creator. In 1917 Avinoff was awarded the gold medal of the Imperial Geographical Society of Russia for his zoogeographical researches. After the Bolshevik revolution of October, 1917, the collection was confiscated. It is now a part of the collection of the Museum of the Academy of Science in Leningrad.

During the World War of 1914, Dr. Avinoff did not join the armed forces, due to bad eyesight, but he served with the Red Cross and was close to the front lines caring for the wounded soldiers. In Lodz, Poland, he and a railroad-station-full of casualties were completely surrounded by the German troops, but they managed to get through on a hospital train. Dr. Avinoff also made two visits to the United States, in 1915 and in 1917, as a purchasing representative for the All-Russian Zemsky Union, a national council of the local self-governing bodies. The second mission was cut short by the Bolshevik coup d'état, and Dr. Avinoff found himself in a foreign land, where he remained, eventually to become an American citizen in 1928. His last official assignment for his former country's former government was at the Versaille Peace Conference where he was a member of the Russian Advisory Delegation under Prince Lvoff.

This break with his native land also marked the end of his legal career, and a concentration on the

pursuits which had formerly ranked only as hobbies. At first he supported himself entirely by his art, through sales at exhibitions and commissions for portraits, illustrations and advertisements. He established a reputation for his command of draftmanship and his versatility of styles and techniques. Soon, however, he responded to the call of science, which then became his principal field of endeavor.

Dr. Avinoff joined the Carnegie Museum in 1924 as Associate Curator of Entomology. He served as Director from 1926 until 1945, when he retired as Director Emeritus. He contributed greatly to the improvement of the Museum's biological collections, to the development of natural habitat groups and other modern methods of display, and to the expansion of the Museum's educational activities. He was also Advisory Professor of Zoology at the University of Pittsburgh since 1928, Chairman of the Committee on Museums of Science under the League of Nations in 1932 and 1934, Trustee of the American Museum of Natural History since 1942, and Vice President of the American Association of Museums since 1945. He was elected a Fellow of the Entomological Society of America in 1939 and First Vice President for the year 1945. He was a member of entomological societies of eleven countries, also of other scientific societies, including the Academy of Science of Madrid since 1933. Other honorary memberships included Sigma Xi, Omicron Delta Kappa, Phi Sigma, and Scabard and Blade. He was a delegate at the International Congresses of Entomology at Ithaca, Paris, Madrid, and Berlin, and a member of the advisory committee of Eighth American Scientific Congress in Washington, 1940. He was a Charter and Sustaining Member of the Lepidopterists' Society. He held honorary degrees of Doctor of Science from the University of Pittsburgh and Doctor of Humane Letters from Washington and Jefferson College.

Dr. Avinoff's personal interest in Palearctic butterflies continued in the New World, and he gradually assembled a new collection of these, smaller but in some respects better than the first one. He also studied and published several papers on New World butterflies, two of them in collaboration with Dr. W.J. Holland. His major new interest, however, was in the Lepidoptera of Jamaica. From 1925 to 1940, he made six personal collecting trips to this island and gathered a collection of 14,000 specimens and about 1,100 species -- over double the number previously recorded. His studies of this material were only partially published before his death, and will be continued by others. The accompanying photograph was taken by the writer in Jamaica just after Dr. Avinoff collected his first specimen of the fabulous Papilio homerus.

During his travels in England and Germany, Dr. Avinoff photographed many type specimens of Lepidoptera in colors, and he advocated systematic exchange of such photographs by museums. He experimented extensively with the laws of butterfly wing patterns as affected by evolution, and developed a highly original theory of this subject involving sections of three-dimensional models. However, his primary interest always remained in the Palearctic group. He wrote: "The question to which I have especially devoted my attention in studying Rhopalocera is their distribution in Central Asia where



several distinct faunistic regions come in close contact and present a complicated inter-penetration ... the western and northwestern boundary of the Tibetan fauna which wedges into the typical Turkestan faunistic region, forming an irregular indented line which had to be carefully investigated." At the time of his death he had nearly completed his major work, a study of the subgenus Karanasa, which is being finished by Dr. Walter Swadner. He had also made a special arrangement with the Third Danish Central Asiatic Expedition to have butterflies collected for him, and received a valuable shipment, including several novelties, from Afghanistan early in 1949.

Simultaneously with his scientific work, Dr. Avinoff continued to develop his ever-growing interest in art. He was Assistant Professor, Fine Arts, at the University of Pittsburgh since 1928, and gave a series of annual lecture courses, mainly on Oriental and Russian art, and Nature in art. He made a special study of the Russian Icons and assembled a personal library on this subject which is the finest outside of Russia. He had a virtually encyclopedic knowledge of arts and handicrafts, both ancient and modern. He was president of the Pittsburgh Chapter of the Archaeological Society of America and for years a member of the jury of the annual exhibition of scholastic art at the Carnegie Institute. His own drawings and paintings were frequently reproduced in local publications. His major artistic works published in book form are The Fall of Atlantis, consisting of nineteen fanciful wash drawings, The Nationality Classrooms of the University of Pittsburgh, and Wild Flowers of Western Pennsylvania and the Upper Ohio Basin, with 200 full size color plates by Dr. Avinoff and text by Dr. C.E. Jennings. Since his retirement, Dr. Avinoff devoted himself more intensively to painting and produced a body of work which overshadows all that he had done before. In this period he produced a series of precise watercolors of one hundred and forty different hybrids of Catt-

AVINOFF BIOGRAPHY - cont.

leaves orchids, also literally hundreds of other paintings, for the most part involving flowers and butterflies, covering the full range of styles from the detailed exuberance of seventh century Dutch, through the various romantic and modern idioms, to a series of flamboyant fantasies and abstractions in a style entirely his own. Many of these paintings were exhibited in one-man shows at Knoedler Galleries, Carnegie Institute, Cranbrook Institute, and elsewhere. Dr. Avinoff was a member of Associated Artists of Pittsburgh, New York Watercolor Society, Grolier Club, and Century Association. In 1948 the American Museum of Natural History appointed him Research Associate in the Department of Forestry and General Botany, in recognition of his studies of flowers.

Prior to his death Dr. Avinoff gave to the Carnegie Museum his two collections of butterflies, the originals of the wildflower paintings, and that considerable part of his entomological library, including 4,000 separates, of which the Museum did not already have copies. These books were a second attempt by Dr. Avinoff. His first entomological library of over 7,000 items was destroyed by the Bolsheviks, except for a single volume of unpublished watercolors of Lepidoptera by John Abbot, which is now at the Carnegie Museum. The Museum is preparing for publication a bibliography of Dr. Avinoff's own scientific and popular writings.

No account of Dr. Avinoff's life would be complete without reference to his extraordinary skills. His near-sightedness was actually an advantage for his particular interests, as he could immediately distinguish the most minute details of a butterfly's pattern or anatomy, while on the other hand he could obtain at one glance a suffused impression of a landscape in its proper proportions of design and color. The skills of his hands were especially noteworthy. He had no difficulty in recording pictorially, in any medium, exactly what he wanted, from the finest details of a miniature to the most uninhibited modernism. Few of the most skillful butterflies could elude the sure yet delicate swing of his net, while in the laboratory he could glue together with unerring accuracy the broken ends of a butterfly's antenna. He was an outstanding amateur classical pianist, specializing in improvisations and paraphrases. Fluent in four languages, he entertained many audiences with his gift for extempore speaking.

A fine tribute to Dr. Avinoff was written in Pitt magazine, Autumn, 1949: "His knowledge had the breadth of the Renaissance gentleman and the accuracy of today. His skills were beyond those of most. And his kindness is unforgettable. As one of Dr. Avinoff's colleagues at the University said recently, 'Every time you met Dr. Avinoff on the street and talked with him you went away with something fresh and new to think about and a deep sense that you had talked with a man of ideas and of great humanity.' "

Nicholas Shoumatoff
Bedford, New York



PERSONALIA

The new editor (Rédacteur en chef) of the Revue française de Lépidoptérologie is M. LOUIS LeCHARLES. M. LeCharles was a member of the Comité de Lecture under the former rédacteur, the late M. Léon Lhomme (see Lep. News 3: p.38; 1949). M. LeCharles is a well-known specialist on French butterflies, Zygaenidae, and Pyralidae. He is a member of the Lepidopterists' Society. Subscriptions to the Revue (900 francs) and the Catalogue des Lépidoptères de France et de Belgique (Macrolépidoptères - 1500 fr.; Microlépidoptères - fascicules 1-5 - 4500 fr.) should now be addressed to him at:
22, Av. de Gobelins, Paris V^e, France.

After a summer of intensive collecting for the Northern Insect Survey at Dawson, Yukon Territory, P.F. BRUGGEMANN has been working this winter at Ottawa on the Survey's butterflies. During the coming summer he will be located by the Survey at Repulse Bay on the northwestern corner of Hudson Bay, in "the land of the little sticks."

E.C. JOHNSTON, of Seattle, Washington, has left for collecting in the Southwest and expects to continue until September.

Prof. G.D. HALE CARPENTER has retired as Hope Professor of entomology, emeritus, at Cambridge University, Cambridge, England. He is continuing actively his research on African mimetic butterflies. The new Hope Professor, Dr. Varley, is not a lepidopterist.

Dr. GEORGE RICHARDS MINOT, of Brookline, Mass., U.S.A., a member of the Lepidopterists' Society, died on 25 February 1950 at the age of 64 years. Dr. Minot had been an enthusiastic amateur lepidopterist as a young man and expected to renew active work following his retirement from the faculty of the Harvard Medical School in Boston. He was a graduate of Harvard College and received his M.D. at the Medical School in 1912. A world-famous man of medicine, Dr. Minot was the director of the Thorndike Memorial Laboratory, Boston City Hospital, for 20 years. He was a specialist in blood physiology and pathology. In 1934 he was co-recipient of the Nobel Prize in medicine. He received honorary degrees from the Universities of Toronto and Edinburgh and the Royal College of Physicians, London, and high honors from several societies, cities, and institutions.



RESEARCH REQUEST

Ova from melanic females of Geometridae from any part of North America are needed for experimental studies. Ova from normal females of the same species are also requested.

Peter F. Bellinger
Osborn Zool. Lab., Yale University
New Haven 11, Conn., U.S.A.

by F. Martin Brown
Colorado Springs, Colorado

Now is the time for all good collectors to overhaul their gear and prepare for the coming season. Our able editor has on several occasions cocked an appraising eye at me and my gear as we have collected together in the Rockies and has asked me to write up my techniques for the Leq. News. Every collector has his own pet ways of doing things. My kit is very simple to gather together and I have found it works well for me in every type of locality from tropics to arctic.

Here are my tools: a net with several extra bags, a pair of "stamp tongs" on a piece of string and tied fast to me so I cannot lose them, a canvas fishing creel with the addition of a long leather thong made fast at the bottom so I can tie it around my waist and prevent the creel from swinging as I swing. In the creel are a half dozen or more of the flat type of tobacco can each with a number painted on it, two hundred or so of the cheapest glassine envelopes, a couple of vials with corks, a pint-size wide-mouthed bottle with absorbent cotton topped with cardboard in the bottom, and about two ounces of carbon tetrachloride. For years my net has been a type of fish-landing net frame that has a jointed bamboo handle, of which I rarely use the second joint. The bags are made of fine silk bobinet -- nylon is better if you can get it. They are deep enough so when I flip them they really close -- a depth of about two and a half times the diameter of the frame. The upper edge is made of tough unbleached muslin and this extends down about four inches -- it saves no end of bags. There is always an argument about color. I use what I can get -- usually white. It gets dirty soon enough! Others prefer grey or green -- not supposed to scare the butterflies! I don't use a killing bottle on my butterflies. I pinch them. The killing jar is toted for moths or whatever else that does not paralyze with a pinch. Always pinch with the wings away from you. Use the tips of your finger nails and be careful, particularly of gravid females. If you are not, you are likely to have a goosy specimen. I deliver the pinch through the net, having cornered the beast first. The stamp-tongs are used to lift the specimen from the net and place it in a glassine envelope. This is then popped into a tobacco can that I carry ready in my upper left shirt pocket. In the can is about a teaspoonful of paradichlorobenzene. I seem to get fewer "stiff" specimens, even of skippers, this way than with a killing jar. I never put into an envelope a specimen that has folded its wings down. These are turned to the proper position with the forceps while the animal is fresh and before it goes into the can.

When I change localities I change cans. By noting the number on the can I keep my localities straight. When I get to my base of operations -- home, cabin, tent -- I put up my "preserves". I do not like glassine envelopes for permanent storage. I make the good old-fashioned paper triangles. I find quite a bit of difference of opinion about the paper for these triangles. There is only one point upon which my friends are in agreement: NEVER USE CELLOPHANE. I like glassine paper because I can

see through it well enough to sort my catch rapidly and it takes ink well. Against it is that the ink, especially rubber-stamp ink, dries slowly and that when you relax the specimens you must be careful about the humidity or the specimen will become wet. Others go to the other extreme and use cheap newsprint. I think it better acting in the relaxing box but otherwise it has these disadvantages: it is opaque and you have to open the triangle to see what is in it (this is very important if you are keeping stuff around in papers for years as I do); the surface takes pencil and rubber-stamping but takes ink poorly. Going back to the paper routine.-- I usually have four sizes of papers already cut: 1" x 3" for small stuff; 1 1/2" x 4 1/2" for Pieridae, small Satyridae and Nymphalidae, large Theclinae and skippers; 2" x 6" for large Satyridae and Nymphalidae; and 3" x 8" for big things like Papilio. I make up a rubber stamp for my localities. For this I use a "Superior Swiftset" outfit. I include the name of the locality that I have used in my notes. This is carefully chosen so anyone who has the specimen and a reasonably good map, such as an oil company road map, can locate it. If I use the name of a stream I state how far it is from a town. I include the county, state, altitude (very important in the mountains) and date. A sample locality might read:

TAPPAN CREEK, 8500 Ft.
6.5 Mi. NW Lake George
Park Co., Colorado
16.vii.49

This might seem a lot to most collectors. Let me assure you it is the minimum for a collector who expects his material to be of use for some purpose other than a "stamp collection" of pretty objects.

After I stamp up enough papers of the right sizes for that material I have at hand I fold the triangles. As I transfer from the field envelopes to the triangles I put my field identification on the triangle with ordinary fountain pen. When I have all of the stuff from a single locality papered I make an impression of the locality label in my field-note book and write up my notes for that locality then turn to the next. It takes a lot of time but if a specimen is worth taking it is worth some pains to get it properly ticketed. Specimens with vague or indefinite data are just as useful as those without any data: NONE AT ALL. When my catch is papered it is transferred to large "powder papers" usually a genus or a family to a single paper. On the outside of this I put the locality and a list of the specimens in the package. Then these are put into a large friction top can with some paradichlorobenzene to await further processing during the winter. Out here there is no need to worry about moulds. In the tropics it's a totally different question, and I suspect that the same is true of some of the wetter parts of our country. There I use a drier after the material has been papered and only put bone-dry specimens into the storage cans.

[Ed. Note: Similar notes, as well as additions to this, are always invited for the News. C.L.R.]

COLLECTING A LITTLE-KNOWN PAPILIO

Douglas C. Ferguson
Nova Scotia Museum of Science
Halifax, Nova Scotia

Ever since reading Dr. McDunnough's original description of Papilio brevicauda bretonensis, I have been determined to collect the butterfly myself, and consequently made visits to the type locality at Baddeck, Cape Breton Island, almost every year since 1942. In late June, 1949, more ambitious and better equipped than previously, I set out accompanied by a museum assistant to make a quick survey of most of Cape Breton's shoreline. First we spent several days poling around the type locality, with the lack of success we had learned to expect. There were other things though, such as Glaucopsyche lygdamus mildredae F.Chern., Boloria myrina terrae-novae Holl., Melitaea harrisii albimontana Avin., and we caught and examined two or three battered Papilio ajax L. (= polyxenes Fab.). Pieris napi oleracea Harr. was past its best, and Lycaeides argyrognomon aster Edw. (= Plebeius scudderii empetri Freem.), like Colias interior laurentina Scud., had barely begun to appear.

So we set out on July 2 to drive around the northern half of the island, via the only road -- the famed Cabot Trail. As we proceeded northward a very few miles past Margaree Harbour, somewhere around Terre Noire, through the bleak treeless landscape so characteristic of French Acadian territory, I spotted two black swallowtails whirling in nuptial flight across the highway. They were rapidly being carried inland across the fields by the strong wind from the Gulf of St. Lawrence. I felt sure they were ajax but just in case, we stopped and got out the nets. The two butterflies were by now out of sight but we soon spotted a couple more, all seemingly coming from the same general direction -- the high cliffs bordering the rugged coast, here scarcely 200 yards from the road. We hastened over a barbed-wire fence and past a hayfield to reach the edge of the cliffs, but I lagged behind to net a few of the many aster flushed from a patch of Empetrum nigrum L. I think that within two minutes my companion, well ahead of me, came racing back, shouting: "It's brevicauda, it's brevicauda!" Sure enough, the butterfly he had in the net WAS BREVI-CAUDA -- a female, in almost perfect condition. We hurried over to the spot where he had taken it and there were several others flying about, but all we caught were tattered. Here was a small patch of the food plant, Scotch Lovage (Ligusticum scoticum L.); scarcely two dozen plants were growing on and around a small stone pile near the very edge of the cliffs. We found ourselves looking down perhaps 100 feet to the pounding surf below, but sat down and began looking for larvae, with immediate success. In less than an hour the cans we carried for larvae contained at least 75 brevicauda caterpillars. There were more, but it was getting late and would soon be time to start the night's moth collecting.

The next day we searched, rather hurriedly, the vicinity of Cheticamp and took two brevicauda adults on roadside flowers (Iris sp.) less than a mile south of the town. There didn't seem to be any Li-

gusticum in the immediate vicinity. Later that day I saw an individual flying over a marshy meadow just back of the beach near Cap Rouge. In this spot L. argyrognomon aster was abundant, and a single G. lygdamus mildredae fell to my net. A few miles back (near the base of Cap Rouge) we had stopped to examine a patch of Ligusticum and couldn't find a trace of larvae or eggs.

From there on we travelled far without further success, through Cape North, Dingwall, Ingonish, Cape Smokey, to St. Ann Bay. Somewhere near Indian River (the villages aren't very well marked) on St. Ann Bay I noted a likely looking sand bar (cobblestone bar would be a better description; it was tough going under foot, and unbelievably hot -- well over 90° F.) separating a freshwater pond from the sea water. We found our way onto it through a churchyard near where the bar joins the mainland at its northern end. Fortunately our efforts were rewarded by a dozen or so very small larvae on a few scattered clumps of Ligusticum. No adults appeared. G. lygdamus mildredae was abundant around patches of Beach Pea (Lathyrus japonicus Willd.), and the tender stem tips were riddled by the larvae of this lycaenid.

On returning to Baddeck we made another search, thinking our powers of observation might have benefited from experience. Our suspicions about this found ample support in the results; namely about three dozen small larvae, the result of scarcely an hour's hunting. A few of these Baddeck larvae were not on the usual Ligusticum but on another large umbel, probably a Heracleum sp. These turned out to be rather dark larvae that later fed on Heracleum, and will probably produce adults of ajax.* The best larva-hunting in the Baddeck area seemed to be near the old home of Alexander Graham Bell, on the shore where the hill called Beinn Breagh meets Baddeck Bay. We found a rather varied growth of sea-shore plants there, which included Scotch Lovage, Convolvulus, Beach Pea and Poison Ivy. Between there and Baddeck we picked up a few more larvae, and found one on a small sand bar in front of the town. We made no attempt to return to the island opposite Baddeck, the actual type locality.

Before leaving Cape Breton Is. we made a second trip to Terre Noire, on July 6, and collected more eggs and larvae at the original patch of Lovage, bringing the total up to over 200. The larvae so infested these plants that I feel certain they would soon have eaten every leaf, and have nothing but death by starvation left, at least those that did not mature very quickly. The early stages present included everything from freshly laid eggs to last instar larvae. July 6th was partly sunny but cold, with a bitter wind sweeping in from the Gulf. As

*One emerged after this was written and is ajax.

we sat on the ground amid the Lovage, scrutinizing each leaf, our hands became numb with the cold, but in spite of the temperature I found a fine pair of adults in copulo resting in a sheltered nook among the rocks. My companion flushed and netted two others, but these proved to be dilapidated specimens. On foot, we covered at least two miles of shore-line in that vicinity, but failed to locate another plant of Ligusticum. In the boggy land behind the cliffs beautifully fresh specimens of Colias interior laurentina, L. argyrognomon aster, and Lycaena epixanthe amictus Scud. would appear and fly about sluggishly in open spots amid the stunted Black Spruces, whenever the sun broke through.

When returning home, we came down the remainder of the west coast of the island, from Margaree Harbour, Inverness Co., to the Strait of Canso, with no further success.

HABITS OF PAPILIO BREVICAUDA

This Papilio is at home on the rugged coasts of the Gulf of St. Lawrence, and bretonensis, at least, is truly a sea-shore butterfly. The food plant grows just above high-tide mark, and as far as we were able to judge, the butterflies do not normally venture far from this zone. Colonies of the host plant are so scattered, that I think the females must habitually follow the coast-line, perhaps covering many miles daily, stopping briefly here and there to oviposit. Their flight is like that of ajax. Except in the mating flight or when frightened, they keep close to the ground, and fly up and down over the brow of the cliffs with such ease that it gives one the impression that they know thoroughly the routes followed. My companion chased one to the edge of the cliffs and all but kept on going. When the weather is severe they take shelter among, and probably under, the rocks, as do the larvae when they leave the plant to pupate. We found one empty pupa case under a stone in such position that the butterfly must have crawled up eight or ten inches through passages in the stone pile to reach the surface. Most were probably much deeper.

EARLY STAGES

The egg is almost globular, smooth, semi-transparent, and when laid is colored like a minute drop of honey that shows the first signs of crystallization. It turns dark and reddish, and finally lead-colored before hatching. The eggs are deposited on any part of the leaf, but mostly upon the upper side. They are fairly conspicuous against the glossy dark-green leaves, as are the larvae. The latter are black on hatching, but when 1/4 inch long or slightly more they develop the usual whitish "saddle". After a later molt they show the bands of the full-grown larva, but remain considerably darker until the final, or perhaps the second last, molt, when they turn a beautiful pale green, with relatively narrow black rings between the segments, and on each segment another black band that bears the yellow spots (these are never orange, as is often the case with ajax). The yellow spots appear never to be surrounded by the black band, but are free and adjacent to the green anteriorly, and occasionally

so posteriorly. A few of the larvae from Baddeck were very dark and might produce ajax. Others from that area were pale, and agreed perfectly with the Terre Noire specimens. The larvae were carefully segregated so that we may be able to interpret the results correctly. They were easily reared, since the host plant grows in a Halifax park.

The chrysalis is very pale brown -- the color of dead grass, with a contrastingly dark lateral area extending from near the wing bases to the cremaster, and other dark markings in the vicinity of the head laterally and ventrally. They are darker and more contrastingly colored than most ajax pupae; some are faintly dusted with green along the outer wing margin, and on the abdomen laterally.

CONCLUDING REMARKS

Having finally observed at first hand the habits and peculiarities of this butterfly, which has so strange a distribution, I feel like re-emphasizing Dr. McDunnough's statement to the effect that brevicauda shows definite qualities that testify to its validity as a species distinct from ajax. Although they fly together in Cape Breton and at Tabusintac, N.B., there is little evidence of interbreeding. However, there is, in the writer's collection, a single tattered female from Baddeck that actually does show an odd mixture of characters, and is a possibly hybrid. This specimen is small for both species, has the hirsuteness and dull orange anal spot of brevicauda; the extent and brightness of the yellow wing-markings is intermediate, and the length of the single remaining tail suggests ajax.

FIELD NOTES

REARING NOTES FROM NOVA SCOTIA.- A larva found on the snow near Halifax on 19 February 1949 produced without further feeding, a Phragmatobia assimilans Wlk. on March 6. A lycaenid larva on Sweet Fern (Myrica asplenifolia L.) at Petite Riviere turned out to be Stymon melinus Hbn. Hemaris thysbe Fab. was bred from Viburnum cassinoides L., Polia assimilis Morr. from Sweet Fern, and Catocala coelebs Grt. from Myrica gale L.

Douglas C. Ferguson
Halifax, N.S., Canada

CATERPILLAR SURVIVES LONG IMMERSION.- During the summer of 1948, while I was raising a few Hemaris diffinis Bdv. larvae, a full grown larva somehow got into the jar of water holding the foodplant. I fished it out of the bottom in a turgid condition (it showed no signs of life), and laid it aside and about an hour later it was crawling around none the worse. It fed no more and completed its transformation. I don't know exactly how long it was submerged but it was at least 45 minutes. Apparently caterpillars do not drown easily.

S.E. Ziemer
Kewaunee, Wisconsin

FIELD NOTES - cont.

LEPIDOPTEROUS LARVAE ASSOCIATED WITH APHIDS.- While studying the life history of Taraka hamada Druce, a carnivorous lycaenid which feeds on the aphid Ceratovacuna (Oregma) japonica Takahashi on bamboo and allied plants, Mr. Toshio Tsuchida found among the aphids some syrphid grubs and lepidopterous caterpillars (Oedematopoda).

On August 14, 1939, in Shui-Nasu, about 180 kilometers north of Tokyo, while collecting aphids for my Taraka larvae, I noticed a strange lepidopterous caterpillar running swiftly away from its cobwebby nest among the clusters of aphids. The caterpillar fed on aphids and pupated in captivity. The pupa was about 10 mm. in length, slender and reddish. It produced a tiny moth with spiny legs.

On July 2, 1942, in a small bamboo thicket in Tokyo I met the same caterpillar for the second time.

Tarō Iwase
Kamakura, Japan



EREBUS AND THYSANIA IN CONNECTICUT.- Records from northern North America of these giant tropical and subtropical noctuids are always of interest, and two recent Connecticut captures are reported here. One of each species was taken in deciduous woods in the same precise locality at moth bait in the evening. Both were wary and had to be netted. The records are:

Erebus odora (Linne'). Greenwich, Conn., 11 July 1941, leg. Paul and Daniel Starrett.

Thysania zenobia (Cramer). Greenwich, Conn., 3 August 1941, leg. Paul and Daniel Starrett.

C.L. Remington
New Haven, Conn.



REARING EUROPEAN LEPIDOPTERA IN OHIO.- A gorgeous, very large ♀ of Endromis versicolora (L.) (Kentish Glory) emerged from her cocoon Dec. 27th, 1949. I think this will be of interest to American rearers of exotic Lepidoptera. On last April 30th, ova of E. versicolora received from Mr. J.B. Smartt of Eire (he received them from Germany) hatched. I fed the larvae white birch. On May 24th, the first larva turned red, evacuated, and began spinning among debris and soil in the bottom of the cage. It finished spinning on May 25th. The last one spun on June 1st. Now the perfect insect has completed the cycle. I also have Agria tau (L.) cocoons (Germany ex-ova, larvae fed on beech) and Dicranula vinula (L.) (Puss Moth) (from Eire ova). Usually my reared moths exceed wild species in size.

Hazel Chase
Galion, Ohio



George Ehle, Lancaster, Pa., reported a fresh ♂ Asterocampa clyton (Bdv. Lec.) apparently attempting to copulate with a worn ♀ A. celtis (Bdv. & Lec.) 17 July 1949.



BUTTERFLY FLYWAYS AND PLAYGROUNDS*.- In Virginia Papilio cressphontes Cram. frequents definite flyways through open woods. These flyways are narrow, 100 to 150 feet wide, but they may be very long. The butterflies course rather rapidly along them with continuous wing beats, from four to six feet above the ground, dodging with surprising dexterity through undergrowth, and passing swiftly and directly across open spaces. This species may be common in a flyway though rarely seen elsewhere. All the flyways I have observed have been near and parallel to the Potomac and Shenandoah rivers and an inlet near Lynnhaven. In the middle of May I found this butterfly common in a narrow flyway along the Shenandoah six miles south of Front Royal. All the individuals were flying northeast, and all caught were males. They were observed only in the morning. Earlier in the season Iphiclides marcellus (Gram.) may be observed in some of these flyways.

The males of Papilio polyxenes Fab. (= ajax auct.) frequent definite playgrounds, usually barren hilltops, especially if crowned by a few trees, flying around them with considerable speed. Similar, though not the same, hilltops are frequented by the males of the species of Thorybes, which fly swiftly back and forth, occasionally pursued by Strymon titus (Fab.). Where no hills are available P. polyxenes will fly back and forth along the edge of a wood. Pyrgus communis (Grote) also uses playgrounds along the borders of woods.

Austin H. Clark
Washington, D.C.

*Other notes on butterfly flyways have appeared in the Lep. News as follows: vol.2, p.92 (Ehrlich); vol.3, p.25 (Klots) and p.62 (Esaki).- Ed.



OBSERVATIONS ON NYMPHALIDAE HIBERNATING ON VANCOUVER ISLAND.- It is a rather remarkable fact, which holds true in this district at least, that nearly all the Nymphalidae which are common in the early spring, are little seen in the late summer or autumn. There are exceptions but these are species which are strongly migratory and very irregular in their appearance. The two species I have in mind are Vanessa cardui L. and Nymphalis californica Bdv. The latter species does not breed here at all, but occasionally appears in large migrating flights, and overwinters on the coast. V. cardui seems to breed and thrive here once established, but disappears for years at a time. This species showed up in numbers in the spring of 1949 after a long absence, and the next generation was conspicuous from July on.

When we consider the species of less marked migratory habits, we get a different picture. Nymphalis milberti Godt. illustrates this fact most clearly. I very occasionally see fresh N. milberti in September; I have no record of seeing them earlier. In the spring they are always common. When I secured larvae of this species and reared them, they completed their metamorphosis in July. Where then, between July and frost, are all these butterflies that show up so abundantly in the spring?

My rearing of Polygonia shows that they mature about the same time as N. milberti. They are some-

what more common in the autumn and I have seen fresh specimens in July. But the strange circumstance is still noticeable, they are much more abundant in the spring. One other species that can be mentioned here is Nymphalis antiopa L. This butterfly is not common here. I have seen them in the spring only, unless I include one found hibernating under bark on a dead stump, in January.

It would be interesting to know whether these observations hold true in other parts of the country. One explanation might be that few larvae mature here, and the survivors are reinforced by spring migrants. The objection to this theory is, of course, that the proper food plants being always plentiful, no reason can be given for the larvae dying off. The more probable answer is aestivation, or what would amount to a dormant period occupying the entire late summer and autumn as well as winter.

Richard Guppy
Wellington, B.C.



NOTES ON MICHIGAN RHOPALOCERA.- 1949 observations on certain species of special interest appear to be worth recording.

Lycaena helleides (Bdv.): Foodplant of a small colony just east of Ypsilanti, Washtenaw County, Polygonum sp., tentatively identified as P. Carey Olney. Although several other Polygonum occur in the region none was observed to provide larval food for helleides.

Strymon caryaevorus McD.: First taken in 1948, this is the first record of the species for Michigan (genitalic determination). Apparently flying with falacer. The two were taken together near Ypsilanti, and collecting was done (a) in small, sunlit, bushy clearings in an oak-hickory wood, where they were seen to perch on leaves generally 1-3 meters above ground, in the sun; (b) on flower heads of Daucus carota L. (Queen Anne's Lace) in the sun, immediately adjacent to the above wood; (c) occasionally on a species of milkweed immediately adjacent to another wood. No field identification of caryaevorus was made, so it is impossible to say whether or not they actually frequented the same spots together.

Asterocampa celtis (Bdv. Lec.): Second generation species observed in the Ypsilanti locality, somewhat past their prime, on 14 August, only in immediate vicinity of an isolated hackberry tree (mostly on and about the leaves of this same tree, and only on the sunlight side).

Poanes massasoit Scud.: A small colony of this species, apparently restricted to an area not much over 25 square meters, was observed (3 July) in a grassy, moist depression some 20 meters from Cavanaugh Lake (Washtenaw County), beside a passing road. Not very abundant: about 10 specimens seen in an hour's search.

Thymelicus lineola (Ochs.): Collecting has extended the known range of this interesting species to western Washtenaw County and northern Lenawee County. In both areas it was far less frequent than in eastern Washtenaw County, and it is suspected that the former areas mark the approximate western limit.

Harry K. Clench
Willow Run Village, Mich.



ON PAPILIO AND DANAUS IN THE NIAGARA PENINSULA.-

Papilio cressphontes Cram. Quite abundant in and around "Rockway" locality, Ontario, in 1939-40-41, feeding on Prickly Ash (Xanthoxylon). Latest larvae collected in October 1940; hatched in May 1941. None were observed from 1945, (year of my military discharge) to 1949.

Papilio philenor Linné. Fairly common until 1947, causing many complaints to owners of Dutchman's Pipe (Aristolochia) vines in St. Catharines. In 1946 I raised nearly 50 larvae and wintered the chrysalids successfully until March 1947. Not one emerged, although the perfectly formed insects remained inside the chrysalids. I peeled off the shell in a number of cases to show people how the butterfly looked prior to hatching. All were perfectly formed but completely dried out. No vines were affected by larvae and only one specimen was seen flying in St. Catharines since 1946.

Papilio marcellus Cram. I have observed one specimen only. It flew by me in April 1946. My net was two miles away.

Danaus plexippus Linné. I have been observing this since 1945 and I can report three items of interest: (a) Third weekend September 1946 - Rockway, Ontario: in moist gully, suspended on wild aster - area approximately 6 feet square - 45 specimens; time and clothing worn at time would not permit closer study; all appeared to be in good condition. (b) Within 100 yards of same spot on continuation of same gully, approximately 600 specimens were seen, suspended from sumac, elm, maple, and other small shrubs; time - third week of August 1949. (c) McNab, Ont.: account by school teacher: "While sitting on front porch of summer cottage about 1 p.m. on Aug. 28, 1949, I was startled to see a huge swarm of 'King Billies' (= Monarchs = Danaus plexippus) appear from nowhere in particular and alight in a huge cluster on the lower branches of a maple not fifty feet from where I was sitting. Since I had never observed anything like it before I continued to watch. Finally all the butterflies seemed to settle down to the extent that unless someone actually knew where to look for them a casual observer would never be aware of their presence. Occasionally, as another Monarch flew within the vicinity, the whole branch became alive with hundreds of wings flapping - giving the branch the appearance of someone shaking it. When the stray joined the group, all became quiet again."

E.G. Bailey
St. Catharines, Ontario



Response to Mr. Shappirio's request for names and addresses of dealers in Lepidoptera, especially outside the U.S.A., has thus far been weak. Such a list will be of great value to many Society members and will be published in the Lep. News. Information is particularly sought on such important pre-war dealers as Staudinger and Bang-Haas. Please jot down on a card all dealers known to you and send it immediately to:

Mr. D.G. Shappirio
4811 17th Street, N.W.
Washington 11, D.C., U.S.A.



COLLECTING IN THE U.S.A. NATIONAL PARKS

Many collectors who are laying plans for the summer may not be aware of the regulations that govern collecting of animal life in the National Parks and Monuments. Some who are familiar with the procedures of past years are not aware of the change instituted by Field Order 768, June 17, 1949, of the National Park Service.

In a nutshell, the requirements now to be met by an applicant for a permit to collect animal life in the areas under the supervision of the National Park Service are these:

1. The collector must be a Federal employee.
2. The collecting must be for the benefit of the Park or for Science.
3. The specimens collected must be deposited in a museum or in the collections of scientific or educational institutions and made available to the public.

Items 2 and 3, above, have always been among the requirements. Unfortunately some of the collectors who were granted permission to collect in the National Parks under the former generous interpretation of the National Park Service Act of 1916 paid little attention to these requirements.

Mr. John E. Doerr, Chief Naturalist for the National Park Service, in a letter dated December 27, 1949, has expressed his opinion to me that the present ruling is not disadvantageous to the Park Service or to research. He states in reply to a specific question: "Insects census work can be undertaken by any Federal employee who possesses the necessary permit which can be issued at the discretion of the superintendent. When a census is necessary and Federal employees cannot undertake the work, qualified specialists may be authorized to conduct the study by their appointment of collaborators without compensation." This is a clear statement that unless the National Park Service deems a census of some particular group of insects -- or any other animal life -- necessary there is little use for you to ask for appointment as a "collaborator without compensation". I am sure that a qualified specialist, working on a particular problem that involves areas under the supervision of the National Park Service, would have little difficulty getting full cooperation from the Service in being appointed "collaborator without compensation".

F. Martin Brown
Fountain Valley School
Colorado Springs, Colo.

The British colony of Sarawak has just issued a pictorial series of postage stamps. The one cent of this new series has as its central design the butterfly *Troides brookiana* - the famous and striking Rajah Brookes' Birdwing originally discovered by A.R. Wallace. The scientific name is given on the stamp.

THE RE-DISCOVERY OF A FRENCH PARNASSIUS

H.E. Woodcock, of Chicago, has sent us an account from his correspondent, M. Henri Stempffer, of Paris, of the rediscovery of a remarkably isolated colony of *Parnassius mnemosyne*. The substance of M. Stempffer's delightful writing follows. The colony was discovered about 40 years ago by an Englishman, Harold Powell, in an isolated meadow of the Sainte Baume range near Saint Cassien, a little hamlet in Provence (S.E. France). The "race" was named *cassiensis* by Siepi. The holotype was apparently lost subsequently and only 2 specimens in the Paris Museum and 1 in the British Museum remained. In spite of many later attempts by Marseillan lepidopterists to collect *cassiensis*, it was considered extinct until June, 1949, when M. Stempffer came upon the very spot "quite by chance". The type locality was not precisely known because of the inexact reference in Siepi's paper. M. Stempffer discovered it after three hours of rather rugged climbing up the Sainte Baume hills through thick growth. The flight area is a natural meadow and a narrow strip of steep slope, in all less than 1 kilometer long and 50 to 200 meters wide. It is at about 1000 meters in altitude and is at the upper edge of the dense forest of Sainte Baume. There is no striking difference between *cassiensis* and the race of *P. mnemosyne* of the Alps, but the isolation of the colony in thoroughly inhospitable surroundings is of exceptional interest. In the Alps and Pyrenees, *P. mnemosyne* flies at fairly high altitudes (1800-2000 m.) in wet meadows. In contrast, *cassiensis* lives at half that altitude and in a much drier environment. During the Glacial Epoch the entire Provence was covered with thick oak-beech-yew forests and wet meadows, and *mnemosyne* must have been widely distributed there. Since then the climate has become warmer and drier, and the forests have been almost entirely lumbered off. Now the Provence appears bare and rocky except on the northern slope of the Sainte Baume range, where a religious shrine has caused the forest to be spared and it has remained unchanged for perhaps a thousand years. The surrounding land keeps *cassiensis* completely isolated from the nearest Alpine colonies of *mnemosyne*, at least 100 kilometers away.

C.L.R.



A CORRECTION

Dr. J.H. McDunnough has kindly called my attention to an error in my note to a paper abstracted by me in the *Lep. News*, vol.3: p.109, #251, respecting the gender of *Malacosoma*. This compound word is not derived from the Latin, as I erroneously supposed, but from the Greek adjective, *malakos* (μαλακος) and noun, *soma* (σωμα). Since *soma* is neuter in Greek, the combination *Malacosoma fragile* is correct. (C.d.P.)

ERRATA: Vol.III: p.94 in Payne, Ohio, notes, substitute "Pale and worn" for "Hibernating" in the sentence: "Hibernating specimens appeared in numbers in early May."

QUESTIONS AND ANSWERS

Q. "Do you believe that 'industrial melanism', as British writers call it, explains dark forms in American moths?"

A. Yes. In this country such forms were very common in the vicinity of Pittsburgh many years before they began to appear in numbers elsewhere. But I cannot explain why industrial areas should cause inheritable melanism.

Q. "I have noticed on specimens of Parnassius cloidius, the species which commonly occurs on Vancouver Island, a peculiar growth attached to the extremity of the abdomen. I have seen this growth on no other species, except that on a specimen of Parnassius mnemosyne from Switzerland I found the same object. From this meagre evidence, it appears to be a peculiarity of the genus Parnassius. The growth resembles nothing so much as a piece of human fingernail, curved so as to grip the abdomen. It does not seem to be attached thereto, and can often be removed without damage to the butterfly. I hope that through the medium of your question and answer department, you can explain the reason for this peculiar growth."

A. This is the 'seal' or sphragis. It is secreted by the male at the end of mating and sets, preventing a second mating. Several other genera of Papilionidae have it, including one or two South American species of Papilio; also the Acraeinae Nymphalidae. It probably exists internally in some other forms where it does not show; but many Lepidoptera can mate repeatedly.



W.T.M. Forbes

THE NOMENCLATURE CONTROVERSY - REBUTTAL

The statement by a group of taxonomists in Washington published in Science was in part presented in the last issue of the Lep. News (vol.3: p.104). Vigorous replies to the criticisms of the Washington group appeared in Science, vol.111: pp.234-238; 3 Mar. 1950, and the substance of them follows.

Francis Hemming, Secretary to the International Commission on Zoological Nomenclature, carefully and in some detail argued: 1) that the Paris actions were in fact preceded by preliminary consultation including extended discussions with the Washington group itself; 2) that the alternates, appointed to replace at a congress non-attending permanent members, have legally as full voting rights as permanent members of the Commission; 3) that it is inadmissible that the control of the Commission by the International Congress of Zoology be reduced to a formality and that the Congress would not "tolerate for an instant such usurpation of its rights"; 4) that the minutes of the Paris meetings will be published soon [have in fact begun to appear - C.L.R.], that the revised text of the code "will be promulgated at the earliest possible date", and that "a reasoned statement" of serious objections will be welcomed for consideration at the next Congress [Copenhagen, 1953].

Mr. Hemming said nothing about the contentions that approval at Paris was given only "in principle" and actual wording left to "a committee of jurists" or that the actions at Paris had not been presented for "prior study and approval by the regular commissioners", nor did he attend to the crucial point of "obfuscations regarding 'mandates from the Congress'".

However, in a very strongly worded letter, Edward Hindle and N.D. Riley, alternates from Great Britain on the Commission at the Paris meetings, presented refutations of the "committee of jurists" point, declaring that a jurist is "more competent" than the commissioners to "translate these decisions and amendments into formal language." They added that it is "nonsense" to say that there is no provision for the Congress to review the work of the Commission, that the regular Commission is "able to review its own work to its heart's content", that the commission attending the Congress is not a "specious substitute" but is actually the same commission which is continually in existence, and that they are sure the opinions expressed by the Washington group are not shared by zoologists in Britain or in any other country.

In a much more tempered letter, Prof. L. di Caporiacco, of Italy, a member of the International Commission, also supported "the capacity of the alternates to fulfill their tasks". He, too, brought out several of the points mentioned by Mr. Hemming and called for publication of the revised rules without delay. Similarly, Henning Lemche and Ragnar Spärck, of Denmark, disagreed with the Washington group and reported that: "In Scandinavia, ... the results obtained at the Paris meeting have been fully accepted and warmly welcomed."

Prof. Pierre Bonnet, of France, also supported the actions in Paris but his letter was not published in Science because of duplication.

A letter by Karl P. Schmidt, for a nomenclature discussion group in Chicago, called for extensive development of the concept of nomina conservanda. Little was said relating specifically to the points of the Washington group.

Prof. J.C. Bradley, one of the U.S.A. regular commissioners who attended the Paris meetings, also contended that more than adequate advanced notice was given by Mr. Hemming, that "the principles adopted were clear" and not likely to be changed by the jurists, that the representation at Paris was international and of high quality and gave unanimous support to all points reported to the Congress. He added that: "The secretary [Hemming] suggested the Washington group await appearance of the minutes before they published anything. It is regrettable that they have not seen fit to do so." The reviewer, on the other hand, believes that it is much better that the fermenting controversy is now in the open where the views of both sides can be carefully studied and fact separated from hearsay or "obfuscating" verbiage. Compromise and agreement seem at last much more hopeful to the writer. Any unbiased reader of these two numbers of Science will probably be impressed by weaknesses and strong points on both sides.



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 eventually that our coverage of the world literature will be virtually complete. It is intended that every paper published since 31 December 1946 will be included. In the first three volumes of the *Lep. News* 886 were listed. Abstracts give all new subspecies and higher categories with generotypes and type localities. Papers of only local interest are merely listed. Papers devoted entirely to economic aspects will be omitted. Reprints are solicited from all publishing members and the many recently received are gratefully acknowledged. Initials of cooperating abstractors are as follows: (P.B.) - P.F. Bellinger; (A.D.) - A. Diakonoff; (C.d.P.) - C.F. dos Passos; (L.G.) - L.A. Gozmány; (G.d.L.) - G. de Lattin; (C.R.) - C.L. Remington; (T.S.) - T. Shirôzu. A complete set of these pages, for clipping and filing, may be obtained for Vol.4 for \$0.50.

1. Agenjo, R., "Nueva especie pirenaica del género *Crambus* F. (Lep. Cramb.)" (In Spanish). *Eos*, vol.23: pp.7-15, 1 pl. 15 May 1947. Describes as new: *C. bolivari*; *C. b.* form *uniformis* (Lérida, Spain). Figures both, as well as the related *C. radiellus* and the genitalia of *bolivari* and *radiellus*. This paper would serve well as a model for all species descriptions. (P.B.)
2. Agenjo, R., "*Euzophora pinguis* (Hw.) no citada de España y de la que es nueva sinonimia *E. nelliella* Rag., plaga del olivo en Nijar (Almería)" (In Spanish). *Eos*, vol.23: pp.33-38, 1 pl. 15 May 1947. Reduces *nelliella* to subspecies of *pinguis*; figures adults and several aspects of genitalia to support action. (P.B.)
3. An Old Moth Hunter, "The Oak Prominents." *Ent. Rec. Journ. Var.*, vol.59: pp.71-75. June 1947.
4. Anonymous, "The Potato Moth (*Gnorimoschema operculella*)." *Agr. Gaz. N.S. Wales*, vol.58: pp.81-84, 6 figs. 1 Feb. 1947.
5. Anonymous, "The Indian Meal Moth (*Plodia interpunctella*)." *Agr. Gaz. N.S. Wales*, vol.58: pp.155-156, 1 fig. 1 Mar. 1947.
6. Anonymous, "The White Cedar Moth (*Lymantria reducta*)." *Agr. Gaz. N.S. Wales*, vol.58: pp.270-271, 1 fig. 1 May 1947.
7. Anonymous, "The Bag Shelter Moth (*Ochrogaster contraria*)." *Agr. Gaz. N.S. Wales*, vol.58: pp.305-307, 4 figs. 1 June 1947.
8. Antram, Chas. B., "*Polyommatus (Lysandra) coridon* aberrations." *Ent. Rec. Journ. Var.*, vol.61: pp. 110-111. Nov. 1949. Records 17 forms captured. (P.B.)
9. Antram, Chas. B., "Collecting at the Canopy or Roof-top of the Forest." *Ent. Rec. Journ. Var.*, vol. 62: pp.11-12. Jan. 1950.
10. Arnett, Ross H., Jr., "Locality Labels." *Coleop. Bull.*, vol.3: pp.85-88. 14 Dec. 1949. Discussion of importance of detailed labels. (C.R.)
11. Baker, W.A., W.G. Bradley, and C.A. Clark, "Biological control of the European Corn Borer in the United States." *U.S.D.A. Tech. Bull.*, no.983: 185 pp., 40 figs. Dec. 1949. Discusses biology of native and imported parasites and importance of disease and known predators. (P.B.)
12. Beard, Raimon L., "Experimental Observations on Coagulation of Insect Hemolymph." *Physiol. Zool.*, vol.23: pp.47-57. Jan. 1950. Experiments done on larvae of Japanese beetle and *Galleria mellonella*. Explanation of the process, which is not comparable to coagulation in vertebrates, is not possible at present. (P.B.)
13. Beebe, William, "Migration of Papilionidae at Rancho Grande, North-central Venezuela." *Zoologica* (N.Y.), vol.34: pp.119-126, 1 pl. 30 Nov. 1949. Detailed records for many months of migration through Portachuelo Pass of 17 spp. of Papilio: *anchises*; *anchisiades*; *agesilaus*; *arcas*; *cleotas*; *erithalion*; *lycochiron*; *pacon*; *polyxenes*; *protesilaus*; *sesostris*; *torquatus*; *belus*; *crassus*; *phaon*; *polydamus*; *thoas*. Plate is photo of all spp. (C.R.)
14. Beirne, Bryan P., "Lepidoptera and 'Honey-dew'." *Ent. Rec. Journ. Var.*, vol.59: pp.25-26. March 1947. Relation between abundance of aphids and scarcity of Lepidoptera suggested. (P.B.)
15. Beirne, Bryan P., "The Effects of Human Activities on the Distribution and Abundance of the Lepidoptera." *Ent. Rec. Journ. Var.*, vol.59: pp.37-42. April 1947. Discusses effects of clearing vegetation, reclamation projects, increase of insectivorous birds, etc. (P.B.)
16. Beirne, Bryan P., "Changes in the Distribution and Abundance of the Lepidoptera." *Ent. Rec. Journ. Var.*, vol.59: pp.65-66. June 1947. Possible causes of 'outbreaks' and role of vegetation changes in altering distribution. (P.B.)
17. Bental, E.E., "Continental *Papilio machaon* reared in England." *Entomologist*, vol.80: pp.41-43. Feb. 1947.
18. Berg, Clifford O., "Limnological Relations of Insects to Plants of the genus *Potamogeton*." *Trans. Am. Micro. Soc.*, vol.68: pp.279-291. Oct. 1949. Discusses the relations of insects reared from 17 spp. of *Potamogeton* to the plants. 4 spp. of *Nymphula* are among the 42 insects discussed. (P.B.)
19. Bird, J.F., "Collecting at Home; Records of a Rainy Season at Clevedon." *Ent. Rec. Journ. Var.*, vol.59: pp.42-45. April 1947.
20. Blair, K.G., "*Cosymbia pupillaria* Hübner (Lep., Sterrhidae) in the Isle of Wight." *Ent. Month. Mag.*, vol.83: pp.29-30. Jan. 1947. Records sp., new to Britain; describes egg, young larva, and adult; food plant: myrtle. Original spelling of name is "*pupillaria*" -- meaningless and probably an error -- but corrected form is preoccupied -- a knotty problem. (P.B.)
21. Bohart, Richard M., "Soil webworms and other lawn pests in California." *Hilgardia*, vol.17: pp.267-308, 20 figs. March 1947. Detailed morphology and biology of *Crambus sperryellus* and *C. bonifatellus*; notes on some other insects. (P.B.)
22. Bourgogne, J., "Remarques sur le genre *Amieta* (sensu lato) et détermination de la position systématique d'*Amieta Ecksteini* Led. (Lep. Psychidae)" (In French). *Bull. Soc. Ent. France*, vol.54: pp. 98-103, 8 figs. July 1949. Discusses *Amieta* and *Amictoides*, with figures of important characters. Places *ecksteini* in *Acanthopsyche*, on the basis of genitalia and other characters (figured). (P.B.)
23. Bourgogne, Jean, "Un type nouveau d'appareil génital femelle chez les Lépidoptères" (In French). *Ann. Soc. Ent. France*, vol.115: pp.69-80, 12 figs. Dec. 1949. Finds two genital apertures in all spp. of Hepialidae studied; the connection between bursa and oviduct is external in European spp. but becomes internal in some others by fusion of the lateral lips of the intergenital area (as found by *Oiticica* in *Trichophasmus*). (P.B.)
24. Bretherton, R.F., "Butterflies near Paris, Geneva, and Anney, 1948." *Ent. Rec. Journ. Var.*, vol.61: pp.97-100. Oct. 1949.
25. Bretherton, R.F., "Spring Butterflies in Bohemia." *Entomologist*, vol.82: pp.254-255. Nov. 1949.
26. Bretherton, R.F., "Butterflies in Var and Basses Alpes, France." *Ent. Rec. Journ. Var.*, vol.61: pp. 121-124. Dec. 1949.

27. Brooks, C. Joslin, "New Subspecies in the Genera *Faunis*, *Aemona*, *Stichopthalma*, and *Enispe*, with Revisional Notes." *Entomologist*, vol. 82: pp. 256-259, 1 fig. Nov. 1949. Describes as new: *F. aerope maseyeffi* (Cochin China); *A. amathusia cochinchensis* (Cochin China); *S. camadeva amydas* (Burma); *S. canadoides* 'form' *hyacynthus* (Assam); *S. howqua iapetus* (Cochin China); *S. neumogeni regulus* (Cochin China); *E. euthymius sychaeus* (Cochin China). Only the wing pattern is described. Several species and subspecies of *Euthymius* are rearranged after a study of the genitalia (figured in part for four forms). (P.B.)
28. Burmann, K., "Interessante Beobachtungen bei nächtlichen Lepidopterenanflügen im Nebel in den Osttalalpen" (In German). *Ent. Zeitschr.*, vol. 59: pp. 129-131, 139-141. 1-15 Dec. 1949. While most of the moths fly to light during the fog-free time, a lot of species (especially *Plusia gamma* and *Agrotis ypsilon*) came during the fog. (G.d.L.)
29. Campbell, J.L., "Macrolepidoptera from Knapdale (Argyllshire)." *Entomologist*, vol. 82: pp. 234-235. Oct. 1949.
30. Caron, J.B., "Een geslaagde kweek van *Agria tau* L." (In Dutch). *Ent. Berichten*, vol. 13: pp. 3-4. 1 Jan. 1950.
31. Carpenter, G.D. Hale, "*Pseudacraea eurytus* (L.) (Lep. Nymphalidae): A study of a polymorphic mimic in various stages of speciation." *Trans. R. Ent. Soc. London*, vol. 100: pp. 71-133, 8 pl., 1 map, 28 figs. 28 July 1949. Gives synonymic history of genus and species; lists and describes all forms. Describes following forms as new: *stavelioides* (Nigeria); *hemixanthe*, *infumata*, *grisea*, *jacksoni* (Uganda); *pondo* (Cape Province). All forms are figured and their distribution given. Both sexes of this species mimic spp. of *Bematistes* (Acraeidae); polymorphism is comparable to that in *Papilio dardanus*. Relationship between mimic and models is discussed, and its bearing on theories of mimicry noted. Unfortunately the models are not figured. (P.B.)
32. Carr, F.M.B., "Notes on Collecting Lepidoptera in 1946." *Entomologist*, vol. 80: pp. 153-158. June 1947.
33. Caspari, Ernst, "Serological differences between *a+a* and *aa* *Ephestia*." *Genetics*, vol. 35: pp. 100-101. 10 Jan. 1950. Abstract only.
34. Classey, E.W., "*Diacrisia lubricipeda* ab. *haggetti* ab. nov. (Lep. Arctiidae)." *Entomologist*, vol. 80: p. 146, 1 fig. June 1947.
35. Chermock, Ralph L., "A generic revision of the *Limentini* of the world." *Cornell Univ. Abs. Theses*, 1947: pp. 251-253. 1949. Abstract; paper is in press in *Am. Mid. Nat.*
36. Cockayne, E.A., "*Abrostola tripartita*, Hufn. and its forms in Britain." *Ent. Rec. Journ. Var.*, vol. 59: pp. 14-15. Feb. 1947.
37. Cockayne, E.A., "*Cosymbia pupillaria*, Huebner, in the Scilly Isles." *Ent. Rec. Journ. Var.*, vol. 59: pp. 55-56. May 1947.
38. Cockayne, E.A., "Two Unrecorded Rarities: *Hadena (Dianthocia) compta*, F., and *Leucania loreyi*, Dup." *Ent. Rec. Journ. Var.*, vol. 59: p. 58. May 1947.
39. Cole, A.C., "Illustrated Keys to the Immature Forms (Exclusive of Egg, Nymphs, and Pupae) of the more Common Orders and Families of Tennessee Insects." *Journ. Tenn. Acad. Sci.*, vol. 22: pp. 28-44, 2 pls. Jan. 1947. Includes keys to larvae of 18 families of Lepidoptera. (P.B.)
40. da Costa Lima, A., "Sobre Endoparasitos de *Thecla basilides* (Lep., Lycaenidae)" (In Portuguese). *An. Acad. Brasil. Cien.*, vol. 19: pp. 277-281, 1 pl. 1947. Describes a new larvaevorid parasite. (P.B.)
41. Curran, C.H., "Clothes Moths." *Natural History*, vol. 58: pp. 325-331, 6 figs. Sept. 1949. Popular account of *Tinea*, *Tineola* and *Trichophaga*. (P.B.)
42. Daniel, F., "Mit welchen Organen nehmen Nachfalter künstliche Lichtquellen wahr? — Eine Erfahrungszusammenstellung mit der Bitte um Bekanntgabe weiterer Beobachtungen" (In German). *Ent. Zeitschr.*, vol. 59: pp. 153-157. 15 Jan. 1950.
43. Darlow, H.M., "Collecting Notes for 1946." *Ent. Rec. Journ. Var.*, vol. 59: pp. 53-55. May 1947.
44. Darlow, H.M., "Observations on the Genus *Euphaedra* Hübn. (Lep. Rhop.) in Sierra Leone." *Entomologist*, vol. 82: pp. 193-200. Sept. 1949.
45. Darlow, H.M., "Observations on the Life Histories of Certain Butterflies of Freetown, Sierra Leone." *Ent. Rec. Journ. Var.*, vol. 61: pp. 126-129. Dec. 1949. More or less complete descriptions of early stages of following spp. (food plant in parentheses): *Mycalesis vulgaris* (grasses); *Charaxes boueti* (bamboo); *Acraea zetes (Modoca palmata)*; *A. terpsichore*; *Papilio democlopus* (citrus trees); *E. pylades*; *Platylesches picarini*; *Coeliades forestan*. (P.B.)
46. Daviault, Lionel, "Notes sur la biologie et les parasites du porte-case du mélèze (*Coleophora laricella* Hbn.) dans la province de Québec" (In French). *Ann. de l'Acfas*, vol. 15: pp. 90-92. 10 Oct. 1949.
47. van Deurs, W., "Nye og sjældne Sommerfugle i 1948" (In Danish). *Ent. Meddelelser*, vol. 25: pp. 327-329. 1 Sept. 1949. New records for Denmark. (P.B.)
48. Doets, C., "Lepidopterologische mededeelingen over 1946-1948" (In Dutch). *Ent. Berichten*, vol. 12: pp. 413-417. 1 Sept. 1949.
49. Eliot, N., "Autumn Decrease of Some Riviera Butterflies and Migrating *Pieris brassicae*." *Entomologist*, vol. 82: pp. 245-250. Nov. 1949.
50. Fearnough, T.D., "Rearing *Argynnis (Issoria) lathonia*." *Ent. Rec. Journ. Var.*, vol. 61: pp. 109-110. Nov. 1949. Records emergence of imago 10 days after hatching of egg! (P.B.)
51. Fletcher, D.S., "Notes on Some European Species of *Selidosema* (Lep. Geometridae)." *Entomologist*, vol. 82: pp. 217-222. Oct. 1949.
52. Fraenkel, G., and K.M. Rudahl, "The structure of insect cuticles." *Proc. R. Soc. London (B)*, vol. 134: pp. 111-143, 33 figs. 7 Jan. 1947. Study of the structure, chemistry and mechanisms of hardening and darkening of cuticle. The latter processes are mainly brought about by addition of phenolic substances derived from tyrosine in blood, though process may be somewhat different in soft, unpigmented cuticles. Experimental work done mostly on *Sarcophaga*, but several Lepidoptera also mentioned. (P.B.)
53. Freeman, H.A., "A New Species of Hairstreak and New Records for the United States." *Field and Laboratory*, vol. 18: pp. 12-15. Jan. 1950. Describes as new *Strymon buchholzi* (Tamaulipas, Mexico). 5 new records for the U.S. (P.B.)
54. Freeman, H.A., "Further observations on *Calpodex evansi* Freeman (Lepidoptera, Rhopalocera, Hesperidae)." *Field and Laboratory*, vol. 18: pp. 15-17, 1 pl. Jan. 1950. Adult figured. (P.B.)
55. Gabriel, A.C., "Notes on the Rhopalocera of Abyssinia." *Proc. R. Ent. Soc. London (B)*, vol. 18: pp. 207-216, 1 pl. 15 Dec. 1949. Describes as new: *Acraea pseudolydia astrigera* ♀ f. *auasa*; *A. guichardi*; *A. safie* ♀ f. *tillini*; *Anthene ianna*; *Lepidochrysops guichardi*; *Papilio dardanus antinorii* ♀ f. *alameitu*; *Euphaedra cooksoni attenuata*. Figures all but the last. Notes on other spp. (P.B.)
56. van Galen, H.G., "Weer een nieuwe Geometride voor Nederland" (In Dutch). *Ent. Berichten*, vol. 12: p. 359. 1 April 1949. *Eupithecia expallidata*. (P.B.)
57. Gerasimov, A.M., "Guseniy Ikukolki Ognevok (Pyralidae Lepidoptera). I." [Larvae and pupae of the pyralids] (In Russian). *Ent. Obozrenie*, vol. 29: pp. 165-181, 7 figs. 1947. Keys to subfamilies and to spp. of Pyralidae. (P.B.)

58. Ghélélovitch, Sabbas, "Deux sporozoaires parasites d'*Ephestia kühniella* Z." (In French). *C. R. Acad. Sci.*, vol.224: pp.685-687. 3 March 1947. Describes *Coelocystis ephestiae* n. gen. and sp.; also records a species of *Nosema*. (P.B.)
59. Goldschmidt, Richard, "The interpretation of the structure of triploid intersexes in *Solenobia*." *Arch. Julius Klaus-Stiftung*, vol.21: pp.269-272. 15 Feb. 1947.
60. Goldschmidt, Richard B., "Phenocopies." *Scientific American*, vol.181: pp.46-49, 2 figs. Oct. 1949. Discussion of morphological changes produced by the environment but simulating mutations. Temperature effects on butterfly wing patterns are briefly considered. (P.B.)
61. Goldschmidt, Richard B., "The Interpretation of the Triploid Intersexes of *Solenobia*." *Experientia*, vol.5: pp.417-425. 15 Nov. 1949. Discusses Seiler's experimental intersexes in *Solenobia*, which he explains on the same basis as *Lymantria* intersexes: development is initially ♂ or ♀, but switches to the opposite sex at some stage, the time of the change determining the nature of the intersex. Compare Seiler's explanation (no.128, below). (P.B.)
62. Gough, H.C., "A Note on the Occurrence in Yorkshire of *Celaena* (= *Apamea*) *secalis* L. (Lep., Caradrinidae), *Opomyza germinationis* L. (Dipt., Opomyzidae) and *Crepidodera ferruginea* Scop. (Col., Chrysomelidae) in Winter Wheat." *Ent. Mon. Mag.*, vol.83: p.130. May 1947.
63. Graham, Marcus W.R. de V., "Feeding Habits of Papilionidae (Lep.)." *Ent. Mon. Mag.*, vol.83: pp.45-47. Feb. 1947. Notes on flight and feeding of adults of Indian spp. (P.B.)
64. Harper, G.W., "Lepidoptera of West Sussex and East Hampshire, 1946." *Ent. Rec. Journ. Var.*, vol. 59: pp.21-25. March 1947.
65. Harrison, J.W. Heslop, "Early Spring Insects on the Isle of Rhum, with Some Remarks on the Woodland Fauna of the Island." *Entomologist*, vol.80: pp.1-4. Jan. 1947.
66. Harrison, J.W. Heslop, "Further Observations on the Lepidoptera of the Scottish Western Isles." *Entomologist*, vol.82: pp.265-268. Dec. 1949.
67. Hemming, Francis, "On the question whether eight generic names in the order Lepidoptera (Class Insecta) commonly accepted as having been first published by Fabricius in 1807 were published by Illiger earlier in the same year." *Bull. Zool. Nomencl.*, vol. 1: pp.260-269. 31 Mar. 1947. Uncertain; to avoid future confusion, proposes that genera involved be placed on Official List: *Apatura* (type *Papilio iris* L.); *Castnia* (*P. icarus* Cram.); *Emesis* (*Hesperia ovipidus* Fabr.); *Helicopsis* (*P. cupido* L.); *Neptis* (*P. aceris* Esper); *Nymphidium* (*P. caricae* L.); *Urania* (*P. leilus* L.). (P.B.)
68. Heqvist, Karl-Johan, "On the Parasites of the Pine Looper-moth (*Bupalus piniarius* L.)" (In Swedish, summaries in Finnish and English). *Ann. Ent. Fennici*, suppl.: pp.88-92. 1949.
69. Hinton, H.E., "A New Classification of Insect Pupae." *Proc. Zool. Soc. London*, vol.116: pp.282-328, 64 figs. Nov. 1946. Classifies pupae as dectitious or adectitious, according to whether the mandibles are functional or not. Discusses pupal modifications in the holometabolous orders. (P.B.)
70. Holik, O., "Über die Artberechtigung von *Satyrus paupera* Alph." (In German). *Entom. Zeitschr.*, vol. 59: pp.70-75, 85-87. 1 Aug., 1 Sept. 1949. S. (recte *Minos*!) *paupera* is a good species and not a race of *dryas* Sc. A detailed discussion of all characteristics, as wing-pattern and ♂ genitalia, is given. Describes as new: ssp. *variegata* and f. *luxurians*. (G.dL.)
71. Hoock, Jean, "La parthenogénèse expérimentale chez *Antheraea mylitta* Drury (Lep. Saturniidae)" (In French). *C. R. Acad. Sci.*, vol.224: pp.501-503. 17 Feb. 1947. Produced by immersing unfertilized eggs in hot Ringer solution, followed by treatment with HCl at time of blastoderm formation. (P.B.)
72. Hovanitz, William, "A Method of Filing Butterflies for the Study of Geographical Variation." *Ann. Ent. Soc. Amer.*, vol.41: pp.48-50, 2 figs. March 1947. Glassine bags useful for filing or for transporting living specimens. (P.B.)
73. Hovanitz, William, "Parallel distribution of gene frequencies in 7 species of *Colias* butterflies." *Anat. Rec.*, vol.105: pp.608-609. Nov. 1949. Abstract.
74. Io Chou, "The Thirty-two Orders of Insects and Their Chinese Nomenclature. A New System of Classification" (In Chinese, English summary). *Ent. Sinica*, vol.2: pp.1-7. 1947. Chinese names based on Latin names of certain 'type genera'. Gives a key (in Chinese) to the orders. (P.B.)
75. Jacobs, S.N.A., "*Blastobasis phycidella*, Zeller (1839) (Lep., Blastobasidae): a Species Hitherto Unrecorded from Great Britain." *Ent. Rec. Journ. Var.*, vol.61: pp.113-114. Nov. 1949.
76. Jaynes, H.A., and P.E. Marucci, "Effect of Artificial Control Practices on the Parasites and Predators of the Codling Moth." *Journ. Econ. Ent.*, vol.40: pp. 9-25. Feb. 1947.
77. Kato, Shizuo, "A Preliminary Report on a Survey of Agricultural Insect Pests in Chahar, Suiyuan and Northern Shansi." *Peking Nat. Hist. Bull.*, vol.18: pp.11-36. Sept. 1949. Gives distribution and food plants of many pest insects, including 33 spp. of Lepidoptera. (P.B.)
78. Kirkpatrick, T.W., "Transport of Insects on the Exterior of an Aircraft." *Nature*, vol.164: pp.60-61. 9 July 1949. Noctuid eggs laid on wing. (P.B.)
79. Koch, M., "*Biston strataria* Hufn. mut. *melanaria*" (In German). *Ent. Zeitschr.*, vol.59: pp.137-139. 15 Dec. 1949. Description of a new melanic form, which is probably a hereditary one. (G.dL.)
80. Kozhantshikov, I.V., "The variability and fertility of *Operophtera brumata* L. and its environmental conditions" (In Russian, English summary). *Isvest. Akad. Nauk SSSR, Ser. Biol.*, 1947: pp.513-537. Study of variability of wing and leg dimensions and fertility under various conditions; all are maximal under optimal conditions. The ecological and evolutionary significance of brachypterism in the ♀♀ is considered. (P.B.)
81. Landsman, H., "Een nieuwe *Lymantride* voor Nederland" (In Dutch). *Ent. Berichten*, vol.12: p.427. 1 Nov. 1949. *Laelia cosnosa*. (P.B.)
82. LaPointe, Marcelle, "Role des facteurs température et humidité relative sur le développement de la Pyrale du maïs (*Pyrausta nubilalis* Hbn.) (1^{ère} partie)" (In French). *Ann. de l'Acfas*, vol.13: pp.95-96. 1947. Abstract.
83. Larsen, Ellinor Bro, "Activity and Daily Rhythm in *Plusia gamma* L. (Lep.)" (In Swedish, summaries in Finnish and English). *Ann. Ent. Fennici*, vol.14, suppl.: pp.154-159, 4 figs. 1949. Effects of light and temperature on activity. (P.B.)
84. de Lattin, G., "Über die Artfrage in der *Hipparchia semele* L.-Gruppe (Vorläufige Mitteilung)" (In German). *Ent. Zeitschr.*, vol.59: pp.113-118, 124-126, 131-132. 1 Nov. - 1 Dec. 1949. On the basis of genital examination of ♂♂ and ♀♀ it is necessary to divide the "species" *semele* into the following 6 good species: *semele* L., *mersina* Strg., *aristaeus* Bon., *maderensis* B.B., *pellucida* Frhst. and *turcmenica* Heydem. A short description of the characteristics is given and the described races are distributed to the different species. (G.dL.)

85. Lederer, G., "Ein Beitrag zur Biologie von *Celerio hippophaes hippophaes* (Esper 1789)" (In German). *Entom. Zeitschr.*, vol.59: pp.65-70, 75-78, 87-88, 100-102. 18 Sept.-1 Oct. 1949. Records of distributions and biology of *C. hippophaes* and *C. niceae*. (G.dL.)
86. Leeds, H.A., "Butterfly collecting in Wood Walton, Hunts., and Royston, Herts., during 1946." *Ent. Rec. Journ. Var.*, vol.59: pp.50-52, 76-79. April, June 1947.
87. Lees, Frank H., "*Trigonophora flammea* (empyrea) in Devon." *Ent. Rec. Journ. Var.*, vol.59: pp.1-2. Jan. 1947.
88. Lempke, B.J., "Trekvlinders in 1948" (In Dutch, English summary). *Ent. Berichten*, vol.12: pp.428-433, 447-452, 4 figs. 1 Nov., 1 Dec. 1949. 20 spp. of migrants recorded. (P.B.)
89. Lempke, B.J., "The Variation of *Philudoria potato-ria*, L." *Ent. Rec. Journ. Var.*, vol.62: pp.1-11. Jan. 1950. Describes as new: *P. p. occidentalis* (Holland); describes briefly 5 other subspecies and 26 'forms', 3 of them new. (P.B.)
90. de Lesse, H., "Contribution à l'étude du genre *Erebia* (Lepid.). Description des armures génitales femelles" (In French). *Rev. franc. Ent.*, vol.16: pp.165-198, 74 figs. 31 Dec. 1949. General account of ♀ genitalia in *Erebia*, followed by individual descriptions for 64 of the 69 spp. (P.B.)
91. de Lesse, H., and P. Viette, "Expéditions polaires françaises (Missions Paul-Emile Victor). Campagne 1949 au Groënland. Zoologie. Première note: Microlepidoptera" (In French). *Ann. Soc. Ent. France*, vol.115: pp.81-92, 14 figs. Dec. 1949. Describes as new *Agonopterix victori* (West Greenland). Describes genitalia of both sexes and early stages of 4 other species also. (P.B.)
92. Lever, R.A.J.W., "Insect Pests of Some Economic Crops in Fiji. No.2." *Bull. Ent. Res.*, vol.38: pp.137-143. 19 May 1947. Lists 77 plants and 10 other materials, with the insects feeding on them, including 23 Lepidoptera. (P.B.)
93. Loritz, Jean, "*Eueretagnotis agathina* Duponchel ab. *cingulata* nov. (Lep. Agrotidae)." *Entomologist*, vol. 80: p.145, 1 fig. June 1947.
94. Lucas, Daniel, "Contribution à la Faune des Lépidoptères de l'Afrique du Nord" (In French). *Bull. Soc. Ent. France*, vol.54: pp.143-144. Nov. 1949. Describes as new: *Stenia bruguieralis* "v." *mauretanica* (Morocco, Tunisia); *Teleia lerovella* (no locality given); *Anarsia durandella* (Tunisia); *Scythris lemarchandella* (Tunisia). No figures, no mention of genitalia, no comparison with other spp. (P.B.)
95. Marsh, J.C.S., "Butterflies of the Hamburg-Lüneberg-Soltau District of Germany." *Entomologist*, vol.82: pp.223-228. Oct. 1949.
96. Matthes, Ernst, "Weitere Beobachtungen zur Biologie der Psychiden" (In German). *Mem. Estud. Mus. Zool. Univ. Coimbra*, no.176: 47 pp., 1 pl., 6 figs. 1947. Describes at length the biology of an undetermined sp. of *Oreopsyche*. (P.B.)
97. Matthes, Ernst, "Zur Fortpflanzungsbiologie eines Schmetterlings (*Fumea crassiorrella* Bruand)" (In German). *Mem. Estud. Mus. Zool. Univ. Coimbra*, no.182: 41 pp., 1 pl. 1947. Life history; reproductive habits described at length. (P.B.)
98. Matthes, Ernst, "*Amicta febratta*. Ein Beitrag zur Morphologie und Biologie der Psychiden" (In German). *Mem. Estud. Mus. Zool. Univ. Coimbra*, no.184: 80 pp., 5 pl., 12 figs. 1947. Comprehensive description of this sp. (P.B.)
99. Millara, Paule, "Contribution à l'étude cytologique et physiologique des leucocytes d'insectes" (In French). *Bull. Biol. France Belg.*, vol.81: pp.129-153, 4 pl. 15 Oct. 1947. 4 spp. of Lepidoptera among those discussed. (P.B.)
100. Mooser, O., "*Sphinx pitzahuac* n.sp." (In Spanish). *Ann. Inst. Biol. Mex.*, vol.18: pp.547-549, 2 figs. 1947. Describes this species as new. Also redescribes *S. libocedrus achotla* on the basis of additional material. Both are figured. (P.B.)
101. Moscardini, Carlo, "Osservazioni morfologico-biologiche su *Dallephila euphorbiae* L." (In Italian). *Atti Soc. Nat. Mat. Modena*, vol.78: pp.210-212. 1947.
102. Murray, Desmond, "*Anaitis plagiata* L." *Ent. Rec. Journ. Var.*, vol.61: pp.87-89. Sept. 1949. Biological notes on this geometrid. (P.B.)
103. Naylor, Leonard E., "House building by the bagworm." *Country Life*, vol.101: pp.330-331, 9 figs. 7 Feb. 1947. Descriptions and figures of larval cases of some Psychidae. (P.B.)
104. Neiswander, C.R., "Variations in the Seasonal History of the European Corn Borer in Ohio." *Journ. Econ. Ent.*, vol.40: pp.407-412, 8 figs. June 1947.
105. Niemierko, W., S.S. Cepelawicz, Z. Kiernik-Zielinska, S. Niemierko, P. Wlodawer, and L. Wojtczak, "A zagadnienie fizjologii mola woskowego (*Galleria mellonella*)" (In Polish). *Acta Biol. Experimentalis*, vol.15, suppl.: pp.38-41. March 1949.
106. Otticia F.º, José, and Charles D. Michener, "Genital variability in a species of moth of the genus *Eacles* (Lepidoptera, Saturniidae)." *Am. Mus. Novitates*, no.1440: 5 pp., 19 figs. 15 Dec. 1949. Describes variation in ♂ genitalia of *E. manuelita*. (P.B.)
107. Olivier, H.R., "Antibiotic Action of an Extract of *Galleria mellonella*." *Nature*, vol.159: p.685. 17 May 1947. Larval extract active against tubercle bacillus. (P.B.)
108. Paclt, Jiří, "On the Gender of the Trivial Names of Two British Butterflies." *Entomologist*, vol.82: pp.275-276. Dec. 1949. States that correct names are *Colias crocea* and *Ochlodes venatum* (names must agree in gender). In a comment by A.C. Townsend it is denied that *Ochlodes* is necessarily neuter. (P.B.)
109. dos Passos, Cyril F., "Notes on two *Incisalia* types (Lepidoptera, Lycaenidae)." *Can. Ent.*, vol. 81: pp.180-181. July 1949. Gives the history of the types of *Incisalia hadros* and *I. henrici solatus*, and designates lectotypes for each, former in U.S.N.M. and latter in Amer. Mus. Nat. Hist. (C.dP.)
110. Patočka, Jan, "Contributions à la connaissance des Lépidoptères minant dans les environs de Prague" (In Czech). *Acta Soc. Ent. Cechosloveniae*, vol.44: p.67. 1 June 1947.
111. Petersen, B., "Die regionale und synökologische Gliederung der Schmetterlingsfauna des jämtländischen Gebirges" (In German). *Ent. Tidskr.*, vol.70: pp.184-231. 5 July, 15 Dec. 1949. See abstract in *Lep. News*, vol.3: p.81, #215. December issue concludes discussion of habitat associations, compares the fauna with that of other regions, deals with the effects of altitude and other biotopical factors, and gives annotated list of spp. (P.B.)
112. Pfaff, G., "Wärmeeuchtversuche" (In German). *Ent. Zeitschr.*, vol.59: pp.118-119. 1 Nov. 1949. The author bred many species, especially those of the high mountains, with good success in a heating-box with a temperature of 25-28° C. and a long exposition to the light. The heating-box was composed of a wooden box which was heated by a 15-20 Watt bulb. (G.dL.)
113. de Puysegur, K., "Note sur un accouplement entre *Zerynthia polyxena-creusa* Meig. et *Z. rumina-medicata* Ill." (In French). *Rev. franc. Lépid.*, vol.11: pp. 10-15. 23 June 1947.
114. Querci, Orazio, "Notes on *Lysandra* of the *coridon* group of species (Lep. Lycaenidae)." *Ent. Rec. Journ. Var.*, vol.59: pp.46-49. April 1947.
115. Querci, Orazio, "The Emergence of a Few Species of Butterflies in Serrania de Cuenca during the year 1928." *Ent. Rec. Journ. Var.*, vol.61: pp.89-91. Sept. 1949.

116. Reiss, H., "Celerio livornica Esp. in Württemberg im Jahre 1946 ein häufiger Schwärmer" (In German). Entom. Zeitschr., vol.59: pp.33-36. 15 June 1949. Report about the unusually numerous occurrence of this southern species in Germany. (G.d.L.)
117. Reiss, H., "Bericht des entomologischen Vereins Stuttgart 1896 e.V." (In German). Entom. Zeitschr., vol.59: pp.78-80, 89-91, 102-104, 109-112, 119-120. 15 Aug.-1 Nov. 1949. Many new records of the lepidopterous fauna of Württemberg. (G.d.L.)
118. Ritcher, P.O., "European Corn Borer in Kentucky." Kentucky Agr. Exp. Sta. Bull., no.502: 23 pp., 18 figs. May 1947.
119. Riley, N.D., "The Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera." Entomologist, vol.83: pp.19-20. Jan. 1950. Accessions. (P.B.)
120. Roepke, W., "Nomenclatorische aantekeningen II" (In Dutch). Ent. Berichten, vol.12: pp.413-417. 1 Sept. 1949. Discusses Lymantria and other questions of nomenclature. (P.B.)
121. Rogsch, O., "Fang eines Zwitters von Agria tau" (In German). Entom. Zeitschr., vol.59: pp.95-96, 1 fig. 15 Sept. 1949. Description and figure of a gy-nander of A. tau. (G.d.L.)
122. Russell, S.G. Castle, "The Oviposition of the Satyrid Pararge megera L." Ent. Rec. Journ. Var., vol. 61: p.87. Sept. 1949.
123. Sanborn, Richard C., and Carroll M. Williams, "Unusual properties of the succinoxidase system in the Cecropia silkworm." Anat. Rec., vol.105: pp.512-513. Nov. 1949. Abstract only. (P.B.)
124. Schmidt, Edward L., and Carroll M. Williams, "Assay for the growth and differentiation hormone of Lepidoptera by the method of tissue culture." Anat. Rec., vol.105: p.487. Nov. 1949. Abstract. (P.B.)
125. Schultz, V.G.M., "Neue Beiträge zur Schmetterlingskunde, Nr.7. Über die ökologischen Ansprüche Noctuidenart Gordyna ochracea Hb. und die Aufzucht ihrer Raupe." Ent. Zeitschr., vol.59: pp.126-128. 15 Nov. 1949. (In German). Records of the food-plants and the breeding methods of the larva of this species. (G.d.L.)
126. Schwarz, R., "Contribution à la Lépidoptérologie de la Tchécoslovaquie" (In Czech, French summary). Acta Soc. Ent. Czechosloveniae, vol.44: pp.67-70. 1 June 1947. Records 8 spp. and 'forms' new to the country. Synonymizes Chamaesphecia stolidiformis f. icteropus under C. palustris. (P.B.)
127. Seiler, J., "Bemerkungen zu Goldschmidt's Interpretation der Intersexen Solenobien" (In German). Arch. Julius Klaus-Stiftung, vol.21: pp.273-275. 15 Feb. 1947.
128. Seiler, J., "Das Intersexualitätsphänomen" (In German). Experientia, vol.5: pp.425-438, 8 figs. 15 Nov. 1949. Summarizes his experiments on Solenobia and gives his explanation of intersex development. Assumes that the ♂ and ♀ determiners in these triploid intersexes are completely balanced; degree of intersexuality is determined very early, by environmental influences, and there is no change from ♂ to ♀ during development. Compare Goldschmidt's explanation (no. 61, above). (P.B.)
129. Sevastopulo, D.G., "Tukdah Diary, September-November 1945." Ent. Rec. Journ. Var., vol.59: pp.4-7, 32-34, 56-58, 91-94. Jan., March, May, July-Aug. 1947. Records of Indian Lepidoptera. (P.B.)
130. Sevastopulo, D.G., "Field Notes from East Africa (2)." Entomologist, vol.82: pp.205-207. Sept. 1949. On the biology of several spp. of Lepidoptera. (P.B.)
131. Sevastopulo, D.G., "Field Notes from East Africa (3)." Entomologist, vol.83: pp.10-13. Jan. 1950.
132. Shaw, J.G., "Parasites of a Bag-Making Pierid, Eucheira socialis in Morelos, Mexico." Journ. Econ. Ent., vol.40: pp.436-437. June 1947.
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140. Stempffer, H., "Description d'un Lycénide nouveau de Madagascar" (In French). Rev. franç. Ent., vol. 14: pp.139-140, 1 fig. 30 June 1947. Describes a new Euchrysops decaryi (Madagascar). Male genitalia figured. (P.B.)
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153. Tozer, G., "Lepidoptera of Midland and Eastern District, 1946." Ent. Rec. Journ. Var., vol.59: pp. 9-12. Feb. 1947.
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159. Viette, P., "Une petite collection de Lépidoptères Hétérocères des îles Mariannes et Fiji" (In French). Bull. Soc. Ent. France, vol.54: pp.135-136. Nov. 1949. Lists spp.; mostly noctuids and pyralids. (P.B.)
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164. Weaver, C.R., "Some Aspects of the Distribution of Larval Parasites of the Oriental Fruit Moth in Ohio." Ohio J. Sci., vol.19: pp.154-159, 1 fig. July 1949. Records 37 spp. of hymenopterous parasites bred from Grapholitha molesta in Ohio, and discusses distribution of the commonest forms. (P.B.)
165. Wightman, A.J., "Noctuae Notes in 1946." Ent. Rec. Journ. Var., vol.59: pp.12-14. Feb. 1947.
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167. Williams, Carroll M., "The prothoracic glands of insects in retrospect and in prospect." Biol. Bull., vol.97: pp.111-114, 2 figs. Aug. 1949. Reproduces Lyonet's (1762) original description and figures of prothoracic glands in caterpillars. Discusses briefly current evidence on distribution of these glands in various insect orders. (P.B.)
168. Wiltshire, E.P., "Addendum to Some More New Records of Lepidoptera from Cyprus, Iraq, and Iran." Ent. Rec. Journ. Var., vol.61: p.97. Oct. 1949.
169. Wishart, Geo., "Further Observations on the Changes Taking Place in the Corn Borer Population in Western Ontario." Can. Ent., vol.79: pp.81-83. May 1947. Reports increase of multivoltine strain. (P.B.)
170. Wittstadt, H., "Über die Lokalrassen des Parnassius apollo im nördlichen Bayern" (In German). Entom. Zeitschr., vol.59: pp.21-25. 15 May 1949. A detailed description of the Franconian P. apollo, which correct name is ssp. melliculus Stich. The names lithographicus, ancile, franconicus, and bajuvaricus are only synonyms. (G.d.L.)
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174. Wynter-Blyth, M.A., "Additions to 'The list of butterflies of the Simla Hills' published in Vol. XII, no.4." Journ. Bombay Nat. Hist. Soc., vol.46: pp.735-736. April 1947.
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Erratum: Vol.3: p.70: no.176 -- Volume number should have been "31".



NOTICES BY MEMBERS

All members may use this column to advertise their offerings and needs in Lepidoptera. There is no cost for this service. Unless withdrawn sooner by the member, each notice will appear in THREE issues.

Wish to exchange JAPANESE LEPIDOPTERA for those of the U.S.A. Have such things as Sasakia c. charonda, Luehdorfia japonica Leech, etc. Hideaki Ogasawara, No. 284, Sugano, Ichikawa, Chiba Pref., JAPAN.

ARIZONA SPECIES NEEDED? Planning collecting trip this summer; will collect on order all families of Lepid. Prepared as desired: alive, pinned, papered.

Can also supply many southwestern species of Lepidoptera, (Rhopalocera, Heterocera), papered or pinned. Also LIVING MATERIAL. Inquiry invited. Frank P. Sala, 1764 Colorado Blvd., Los Angeles 41, Calif.

For sale: 4000 Unit Pinning Trays, balsa pinning bottom, white paper lined throughout, heavy caliber cardboard. Slightly defective. Standard sizes for Cornell or California Drawers. \$1.00/dz. Free sample on request. Cornell and California Academy drawers now available with cabinets. Bio Metal Associates, P.O. Box 346, Beverly Hills, Calif.

Wish to exchange about 200 MANITOBA MOTHS, about 50 species, half named, full data. Desire exotic Rhopalocera, particularly Morpho. What offers for the lot? C.S. Quelch, Transcona, Manitoba, CANADA.

Lepidoptera from Florida and Wisconsin, a lot of over 2000 specimens, about 300 species, pinned and in papers. Want to sell the lot at bargain price. Send for list. Alex K. Wyatt, 5842 N. Kirby Ave., Chicago 30, Illinois.

For exchange: Northwestern Washington moths and butterflies collected last season. Desire Australian or any tropical Lepidoptera. Mrs. Emily Henriksen, Orcas Island, East Sound, Washington.

For sale: Japanese Papilionidae, Pieridae, Nymphalidae, and Sphingidae with all correct data supplied. Listings sent on request. M.W. Osborne, 2100 Price St., Rahway, New Jersey.

Wanted: Papered specimens of Pieris napi, Pieris bryoniae, and Papilio machaon from all parts of the world, particularly from American and Asiatic localities, with full data and in perfect condition. Offered in exchange: Papered Macro-lepidoptera from GERMANY, and, if possible, breeding material. Gerhard Hesselbarth, Hindenburgstr. 13, (23) Diepholz/Hann., GERMANY.

European Parnassiidae in papers (named, full data, perfect condition) for sale or in exchange for North American Papilionidae and Parnassiidae in papers. Dr. W.J. Reinthal, University of Okla., Norman, Okla.

Will exchange good used copy of Holland's MOTH BOOK for copy of revised ed. of BUTTERFLY BOOK in good used condition. L.H. Bridwell, Forestburg, Texas.

For exchange: The Spider Book, revised ed. Comstock; Hand Book of Frogs and Toads, Wright and Wright; The Grasshopper Book, Bronson; also Pennsylvania fossils. Desire Speyeria diana ♀♀ or Papilio ponceanus ♀ or ♂ with data. J.A. Evey, Benson, Illinois.

LIVING MATERIAL

Wish to arrange to obtain living ova, pupae, or cocoons of American Rhopalocera, Saturniidae, Sphingidae, Catocala. Offer in exchange similar material from CZECHOSLOVAKIA, including Saturnia pyri, Thais polyxena, etc. in season, or papered butterflies. V.B. Poláček, ul. Komenského, 601-I., Brandýs nad Labem, CZECHOSLOVAKIA.

Would like to correspond in English or German with collectors interested in exchanging living Lepidoptera material — eggs and pupae. Johannes Reichel, Koenigsberg Krs. Wetzlar (16), GERMANY.

New northern subspecies Eacles imperialis pini for sale, either HIBERNATING PUPAE or male adults. Price of pupae or specimens: 3 for \$1.00, postpaid. Elwyn Lewis, 384 E. Warren St., Flint, Michigan.

Have cocoons of wild Connecticut SAMIA WALKERI ("Cynthia") to exchange for those of other Saturniidae. R.W. Pease, 57 Yale Station, New Haven 11, Conn.

Wanted to buy: rearing material in season — cocoons, pupae or eggs of Rhopalocera, Saturniidae, Sphingidae, Arctiidae and Catocala. Write first quoting prices and naming food plants. Have Austrian pins for sale, best make (Trade Mark "Elephant"), rust-proof, \$4.00 per thousand. Eugene Dluhy, 3912 N. Hamilton Ave., Chicago 18, Illinois.

Available now: GRAELLSIA ISABELLAE (Spanish luna) and other Palearctic fauna pupae. Otto H. Schroeter, 613 Williams St., New London, Conn.

Wanted: chrysalids of any North American PAPILIO in exchange for good European butterflies of Parnassiidae in papers (full data, exact names). Dr. W.J. Reinthal, Univ. of Oklahoma, Norman, Oklahoma.

Cocoons or eggs of all species of American Saturniidae required. Will exchange living or preserved material of BRITISH LEPIDOPTERA and/or INDIAN SATURNIIDAE. Also willing to obtain books or other requirements of American supplier. Currency restrictions prevent cash transactions! Please help if you can. C.F. Rivers, 250 Shepherds Lane, Dartford, Kent, ENGLAND.

Wanted for cash or exchange: living ova or pupae of Papilio machaon (Palearctic), P. glaucus, Platysamia columbia nokomis, for hybridization and sterility experiments. Also need egg masses of Catocala relictata, and 200 living cocoons of Platysamia cecropia. D.P. Frechin, 1504 N. Lafayette, Bremerton, Wash.

Eupackardia (Callosamia) calleta cocoons for exchange. Desire pupae Callosamia angulifera and Asiatic, African and South American Saturniidae. R.L. Halbert, 2446 Cudahy St., Huntington Park, Calif.

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* These two were 1949 members.

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- Minot, George R. (Dr.) Massachusetts.
- Zikán, W. Brazil.

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