

TORONTO ENTOMOLOGISTS ASSOCIATION

September 1971

1971 Fall Meetings

Saturday, October 9, 1971
Royal Ontario Museum
Room 4, 2:00 p.m.

Speaker: J. C. E. Riotte

* This is our first meeting for the Fall Season - please bring in all specimens that require identifying in order that they can be included in your recap for the Seasonal Summary.

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Saturday, November 6, 1971
Royal Ontario Museum
Room 4, 2:00 p.m.

Open House for Members

If you have taken any slides of collecting trips, butterflies or insects, this will be your opportunity to show them.

In order to allow everyone sufficient time, we would appreciate if you would complete the enclosed form and return to R. Michaels.

All forms must be returned by September 30, 1971.

1972 Membership Dues

As one who has helped build the Association's membership, you will be pleased to know that the 1972 dues will remain unchanged despite continuing rises in operating costs.

Through the efforts of many of our members, our membership has doubled in the past year and it is necessary to publish a new membership list for 1972.

With your co-operation, a new membership list will be published January 1972. Attached is your membership application form - we would appreciate if you would renew your membership for 1972, now.

1971 Seasonal Summary

Deadline for the 1971 Seasonal Summary is October 8, 1971.

It is important that all recaps are submitted by October 8. We are currently working on Occasional Publication No. 3 - Checklist of Ontario Lepidoptera and will require as much time as possible for the 1971 Seasonal Summary.

In addition to the summary on butterflies, we will also publish the highlights of moth collecting in Ontario for 1971.

January 1972

TORONTO ENTOMOLOGISTS' ASSOCIATION

MID-WINTER MEETINGS

Saturday, January 15, 1972
Royal Ontario Museum
Room 4, 2:00 p.m.

Speaker: W. Plath Jr.
(Slide Presentation)

* Saturday, February 12, 1972
Royal Ontario Museum
* Room 4, 2:00 p.m.

* *Agenda to be announced at the
January meeting
*

The next Newsletter will be mailed towards the end of February -- please mark the date for the February meeting on your calendar.

1972 Membership Dues

To date, only 45% of our members have paid their membership dues for the coming year. As mentioned in our September Newsletter, a new up-to-date membership list is to be published this month. Unfortunately this can only be done when all membership dues have been paid. We ask all of our members who have not paid their membership dues for this year to do so no later than January 20, 1972.

We are pleased to announce that one of our members, Mr. Jon Maxim, has volunteered to edit our Newsletter for the coming year. Our objective will be to publish a Newsletter, irregardless of size, every two months (6 Newsletters/year).

Deadline for the March Newsletter is February 18, 1972.

Please send all articles, exchange notices, etc. to:

Mr. Jon Maxim,
260 Wellesley Street East,
Apt. 1218,
Toronto 282, Ont.

B A L L O T

At a meeting of the Nominating Committee held on Wednesday, February 16, the following slate of officers was proposed:

PRESIDENT

	Ron Michaels	[]
Other nomination	_____	[]

VICE PRESIDENTS (two to be elected)

	Paul Catling	[]
	William Edmonds	[]
	J.A. Brown	[]
Other nomination	_____	[]

EDITOR

Jon Maxim was requested to fill this position and accepted.

Please check appropriate box/es and/or make alternative nomination/s and return to J.C.E. Riotte, Dept. of Entomology, Royal Ontario Museum, 100 Queens Park, Toronto, Ontario no later than March 24th, 1972.

The Nominating Committee
Dr. A.G. Edmund
Mr. Anker Odum
J.C.E. Riotte

Letter From The Editor

I joined the Toronto Entomologists' Association in the summer of 1971, and was very honoured to be asked if I would like to take over the job of editing the newsletter. Our Association is one of the most active entomology groups that I have come across and I hope that our Newsletter will continue to reflect this. The aim is to publish six newsletters each year that will be both useful and entertaining to our members.

Perhaps the best way to introduce myself is a short history of my entomological activities. I started collecting at the age of 16 while at boarding school in England. My first catch was a group of 72 Meadow Brown butterflies (*Maniola jurtina*) of which I only managed to set two perfectly. (The rest wound up as dissection specimens in a senior biology class.) After my schooling I returned to my home country, Venezuela, and collected Lepidoptera mainly in the interior foothills and valleys of the northern coastal mountains. I had to entrust my collection to my parents due to long absences and am sad to say that they never understood the importance of the paradichlorobenzene and naphthalene, so that my collection consists of a fair selection of unmounted museum beetles (not being a Coleoptera man, I have never classified them). I arrived in Canada in January 1971 and have now given up collecting in favour of insect photography.

I would like to say that the success of the Association and this Newsletter depends, in great measure, upon the participation of the members. Articles, however short, are always welcome (though, please, try to ensure, as far as possible, that they are scientifically accurate - it saves a lot of verification work). There are two notices in this newsletter and I hope you will use this medium to express your entomological "Want Ads" (remember this newsletter does get mailed abroad). These are the contributions that will be most appreciated by me and all the readers of this Newsletter.

In conclusion, I would like to say that I am happy to be with you.

JON MAXIM

TORONTO ENTOMOLOGISTS' ASSOCIATION

Research Request

The Entomology Department of the Royal Ontario Museum is undertaking a project which many of our members can take part in. At our request, Dr. Barr has supplied the following information: -

"Chiracanthium mildei is an introduced, household spider that has probably been established in Ontario cities for some years. Strangely enough, specimens of this spider had never been brought to the Museum for identification before late 1969. Then we were given two at the same time and have received a trickle of others ever since. Dr. Herbert Levi of the Museum of Comparative Zoology, Cambridge, Mass. confirmed the identification and filled in some background on the remarkable spread of this species since it was first recognized in North America in 1949.

We are often called upon for information on household spiders. The discovery of C. mildei suggested the interesting project of compiling a list of those species regularly found in Ontario buildings, together with some idea of how frequently each occurs. This information should be an asset to our general policy of reassuring people that spiders are beneficial invertebrates in the household. None are known (in Ontario) to interact with humans in other than accidental situations, and the rare spider bite is either harmless or only annoying (C. mildei).

Information needed with the specimens for this project is: where collected, what type of building, which room, date and collector's name."

Send all specimens to:

Dr. David Barr
Dept. of Entomology
Royal Ontario Museum
100 Queens Park
Toronto, Ontario.

REMEMBER - DON'T SQUISH THAT SPIDER, TRAP HIM

* * * * *

WANTED - - Papilios, Saturniids, SpHINGids - Any quantity;
Contact: R. Michaels, 53 Duncan Drive, Georgetown,
Ontario.

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TORONTO ENTOMOLOGISTS' ASSOCIATION

1971 SEASONAL SUMMARY

In order that you are able to submit your contribution to the 1971 Seasonal Summary on time, please make sufficient notes after each collecting trip.

ALL RECAPS MUST BE IN NO LATER THAN OCTOBER 8, 1971.

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If you are unable to purchase carbon tetrachloride at your local drugstore, there is a substitute product that is available which is recommended for killing insects - - perchlorethylene.

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PUBLICATIONS

Available from *Publication Distribution Unit
Department of Fisheries and Forestry
344 Wellington, Ottawa, Ontario

Forest Lepidoptera of Ontario
Recorded by the Forest Insect Survey

Volume #1	Volume #2	
Papilionidae to Arctiidae	Nycteolidae	Notodontidae
	Noctuidae	Liparidae

Volume #3	Volume #4	
Lasiocampidae	Microlepidoptera	
Thyatridae	Drepanidae	Geometridae

*Publications are available, at no cost, upon written request.

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DO YOU NEED HEADER LABELS FOR YOUR COLLECTION? If so we can sell you a set for 75¢. ~~At~~ present, we have some spare sets of "The Checklist of Ontario Skippers and Butterflies" (published 1969) which will make excellent header labels for your collection. Place your order early - once stock is depleted, this offer expires.

Send your order to Toronto Entomologists' Association
c/o 53 Duncan Drive,
Georgetown, Ontario.

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TORONTO ENTOMOLOGISTS' ASSOCIATION

Book Section

January 1972

Moths and How To Rear Them
By Paul Villiard

Moths and How To Rear Them is the first modern rearing manual to appear in North America, and fills a real need for the amateur or professional breeder for collection specimens.

The result of nearly nine years of study and effort, this book not only lists many species of world-wide moths, but presents the individual rearing requirements, description of each stage of metamorphosis, photographs of the stages, and a comprehensive catalogue of food plants accepted by the larvae.

Not least in importance is an appendix of photographs of terminal winter twigs of the food plants, making it much easier to identify the plants in the early spring before leafing-out time. Now the breeder can find the correct food plant for forcing buds to feed early larvae.

T.E.A. Price \$8.50

1001 Questions Answered About Insects
By A. B. Klots and E. B. Klots

A fascinating world is revealed in this comprehensive picture of insect life. In addition to answering questions about the natural history of insects and the activities of the group as a whole, the authors discuss many subjects not found in the usual textbooks or field guides.

Included are descriptions of insect origins and classification, structures, distribution and environments, growth and development, senses and communication, behavior, societies and the relationships of insects to plants, animals and man.

T.E.A. Price \$8.50

Butterflies and Moths
By Andre Deutsch

\$15.00

Mimicry in Plants and Animals
By Wolfgang Wickler

\$2.75

A Field Guide To The Insects
By D. J. Borror and R. E. White

\$5.95

Spring Meetings

Saturday, March 11, 1972
Royal Ontario Museum
Room 4 2:00 p.m.

Speaker: Mr. H. Frania
Topic: Slide presentation
of his recent trip to
Mexico.

In addition to the above agenda, we are having a Members' Exhibit. (As requested at our January meeting).

Friday, May 19, 1972
Royal Ontario Museum

Meeting of the Michigan
Entomological Society. See
details below.
This will be the last meeting
of the 1971-72 season.

* * * * *

The MICHIGAN ENTOMOLOGICAL SOCIETY will have its ANNUAL MEETING this year in TORONTO and this will be held at the R.O.M. on FRIDAY, MAY 19th. The deliberations will take place from 9 a.m. in the AUDITORIUM of the PLANETARIUM. LUNCH will be at 12.30 noon in the UPPER CAFETERIA. In the evening, beginning around 6 p.m., there will be a reception in the 3rd floor ROTUNDA together with OPEN HOUSE in the Department of Entomology.

All members of the Toronto Entomologists' Association among whom there are quite a number of Michigan members are cordially invited to participate in this much awaited event.

No special registration is necessary; just make yourselves free for a few hours, even if it is a Friday.

For Saturday two field-trips have been planned, one to St. Williams and the other over the weekend to Chaffeys Locks. More about this later.

J.C.E. Riotte
Chairman Toronto Branch
Michigan Ent. Soc.

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Notices

Exchange - about 20 drawers of modern marine molluscs, mainly from Ecuador and Florida, for a similar quantity of butterflies. I would prefer world-wide Pieridae, Argynninae, Melitaeinae and Satyridae, but will consider general collections. Please reply to Dr. A.G. Edmund, Royal Ontario Museum, 100 Queens Park, Toronto, Ontario. (416) 928-3666.

Notices

Wanted - information on Callosamia promethea occurrence in Ontario in last 5 years. Also re food plants. Buy or exchange for living cocoons of this winter - Quimby Hess (MTEA) Phone (416) 486-8928.

Please send all notices to: Jon Maxim, 260 Wellesley St. E., Apt. 1218, Toronto 282, Ontario.

Deadline for next Newsletter: - Saturday, May 6, 1972.

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Hyalophora columbia in 1971 in Ontario. by Quimby F. Hess

My first columbia capture was a male caught at light near Dorset, Ontario, Haliburton County on June 10, 1964.

Despite much searching in succeeding years in the same area I did not find columbia. Then in 1971, Mr. W.E.H. Munro of Haliburton, Ontario, a high school science teacher and lepidopterist, received a phone call to come to a store at Ingoldsby for a moth. He did so and was excited to find a fresh female columbia near a light which burned all night. He phoned me for advice and I suggested he try for eggs. My friend Bill did just that and the result was a batch of eggs. Forty-four emerged and the baby larvae commenced to feed on tamarack (Larix laricina).

When the young larvae were in their second instar I visited Bill and he gave me 22. I brought them back to my home in Toronto while watching for roadside sources of Larix laricina as close to Toronto as possible. I decided a small bog with larch near Stouffville was satisfactory for obtaining a food source.

At home I prepared an ad hoc rearing arrangement by filling a pail with moistened sand. Into this I inserted larch twigs. I then placed the pot and larch all inside a large polyethylene bag. The small larvae were then carefully placed on the food and the bag closed except for an opening for ventilation. The whole arrangement was then placed at a basement window - slightly out of direct sunlight. Twice a week I went to the small bog for fresh larch and a complete clean-up and change of food plant was made.

In August all of the larvae (except some donated to a fellow-rearer) spun and pupated. In his book - "Moths and How to Rear Them", page 125, Paul Villiard says, quote - "My experience is that columbia cannot be reared indoors on cut food". It is apparent this has not been my experience. Mr. Villiard also states that columbia is found only in Michigan, Maine and Wisconsin. But columbia also occurs in Ontario throughout the Great Lakes - St. Lawrence Forest Region as delineated in "The Forest Trees of Ontario", Dept. of Lands and Forests publication, page 8.

A number of columbia were captured in the Kenora region of Ontario in 1971. I have two captured at light by Peter Hall on June 17 and 18, 1971 in Rushing River Provincial Park, Kenora District.

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Dry Cleaning Butterflies

by Dr. A.G. Edmund

The bodies of most Lepidoptera contain fat, either in the fat bodies and, in the case of females, also in the eggs. During storage and subsequent relaxation this fat can migrate onto the wings, resulting in dull or stained specimens. In some cases the fat can be so abundant that the wings of relaxed specimens cannot be separated. I recently had this experience with a series of Eunica tatila. Rather than discard these rather uncommon specimens I put them directly into a bath of diethyl ether, a well-known fat solvent. I chose this over other solvents since it was compatible with the water in the freshly relaxed specimens. Also it dries completely clean and dry, while the bodies and antennae remained soft and manageable. The specimens spread and dried in the usual way, and no further fat oozed from the bodies.

Following this success, I tried the method on a further twenty specimens representing seven families. These were all grease-stained specimens mounted months or years ago. I simply dunked them, pin, label, and all, in the ether for about 30 seconds, then air-dried them. In every case the grease disappeared and the specimen became clean and fresh-looking.

As far as I have been able to determine, none of the pigments in the Lepidoptera are ether-soluble, and colours of treated specimens seem to be as bright as those of normal individuals. However, it would be wise to label any washed specimen to see if any change becomes visible over a long period of time.

Dry specimens can be degreased in various solvents, such as naphtha, carbon tetrachloride or any of the other chlorinated hydrocarbon solvents. Petroleum ether and trichlorethane are especially suitable. Care should be exercised in the use of ether, naphtha, etc., since they are extremely inflammable.


Entomology and Invertebrate
Zoology Department

Royal Ontario Museum
100 Queen's Park
Toronto 5, Ontario, Canada

Telephone 928-3677
Cables: ROMA-Toronto

April 17, 1972

To all members of the Toronto Entomologists' Association

The Royal Ontario Museum, through the Department of Entomology and Invertebrate Zoology, will be host for the annual meeting of the Michigan Entomological Society on Friday, May 19, 1972

The Department extends an invitation to all members of the Toronto Entomologists' Association to attend the scientific sessions of the meeting, and any of the other associated events. It is our hope that the members of the Toronto group will take advantage of this opportunity to meet our visitors and to discuss matters of mutual interest in entomology with them. Among other things, the Department is holding open-house after the meeting, and following this, arrangements have been made for all those attending to adjourn to the Museum Members' Lounge.

A final programme giving details of the Michigan Society meeting has not reached us yet, but the attached outline may be regarded as final for the associated functions provided by the Museum.

There is no parking available at the Museum, however there are parking lots on the north side of Bloor Street across from the Museum. Entrance to the Museum will be via the main door on Queen's Park Crescent.

Arrangements have been made by the Rev. J.C.E. Riotte for two field trips to be held on Saturday, May 20. Participants have a choice of going either to Chaffeys Locks or to St. Williams. Members of the Toronto Association are invited to attend.

In order to prepare adequately for these events, it is essential that we know in advance how many persons to expect. It would be appreciated if all members of the Toronto Entomologists' Association planning to attend any of these events would fill in the attached form and return it no later than May 1.

Arrangements have been made for any member of the Toronto Entomologists' Association to be admitted to the Museum on May 19 without charge, upon showing this letter to the guard on duty.

The staff of our Department hope to see many members of the Toronto Entomologists' Association on Friday, May 19.

Sincerely,

Glenn B. Wiggins

GBW:ah

Glenn B. Wiggins,
Curator,
Department of Entomology
and Invertebrate Zoology

Meeting of the Michigan Entomological Society
Royal Ontario Museum

19 May 1972

General Outline of Programme

- 10:00 A.M. - Presentation of scientific papers given in Room 4
(off lower rotunda in Museum)
- 12:00 - 1:30 P.M. - Luncheon will be available in the ROM
cafeteria (on 1st floor off Armour Court). Tables
will be reserved and grouped for participants of
the meeting. Participants will select and purchase
their own meal.
- 1:30 P.M. - Further presentation of scientific papers in Room 4.
- 2:50 P.M. - mid-afternoon break; coffee and doughnuts will be
available.
- 3:05 P.M. - SLIDE-FEST - Participants are invited to present
their best slides (35 mm) on biological objects
taken in the field.
- 4:00 P.M. - Field trip discussion.
- 5:00-7:00 P.M. - Open house will be held in the 3rd floor
rotunda by the Department of Entomology and Inverte-
brate Zoology. Light refreshments will be served
and the Department will be open for inspection.
- 7:00-9:00 P.M. - Participants are invited to continue discussions
in the Members' Lounge (access via stairs adjacent
to cafeteria on 1st floor). Drinks may be
purchased at the bar.

The Museum cafeteria will be open until 9:00 P.M. for anyone
wishing to have dinner in the Museum.

TORONTO ENTOMOLOGISTS' ASSOCIATION
NEWS LETTER MAY 1972

Meeting

As mentioned in the March News Letter the last meeting of the 1971-72 season will be in conjunction with the Michigan Entomological Society. All T.E.A. members should have already received an official invitation from the Royal Ontario Museum. Please remember to send back the form attached to the invitation indicating which sessions you will attend.

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Results of Elections

The Election Committee has announced the following officers as elected:

President - Ron Michaels
Vice Presidents - Paul Catling
William Edmonds

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Notices

Wanted - Hairstreaks and elfins, particularly from outside the Toronto area. North Carolina material in exchange including Citheronia, P. palamedes and G. marcellus. Reply to - Mr. J. Bolling Sullivan, 200 Craven Street, Beaufort, N. C., 28516.

T.E.A. Crests - As promised, Toronto Entomologists' Association crests are now available - see order form at the end of this issue.

Please send all notices to: Jon Maxim, 260 Wellesley St. E., Apt. 1218, Toronto 282, Ontario.

Deadline for next Newsletter: Saturday, June 24, 1972.

ON THE FAUNA OF SOME MEXICAN CAVES

Caves are associated with many limestone areas of the world where a suitable climate in the past or at present time has favoured the development of karst topography through differential solution of limestone. A unique mixture of life, both aquatic and terrestrial is found exclusively within caves. These animals are characterized by certain features which set them apart from related species living on the surface. Morphological differences may include depigmentation, loss of eyes, elaborate development of other sensory organs such as large tactile hairs on beetles and extensive lateral line systems in cavefish, or an increase or decrease in the number of segments of the body appendages. Biological changes could include an increase or reduction in the number and length of immature stages, fewer progeny per female, and an increased developmental time for the egg within the female. As Vandell (1965) has pointed out, none of these features belong to cave animals alone, but it is the incorporation of most of these features in one species that makes the cave animal unique¹.

The climate in caves is fairly stable, a given part of a cave showing only small fluctuations in conditions. Humidity is generally high and the temperature corresponds roughly to the yearly average temperature of the surrounding countryside. No green plants can survive in caves, thus no phytophagous groups of invertebrates are found there. Such non-hexapod arthropods as Arachnida and Crustacea have a larger representation of omnivorous and carnivorous forms than the insects, and these approach or exceed the insects in both the number of individuals and of families, genera etc. represented in cave faunas.

The animals one finds in caves can be put in one of three categories. Trogloniles can complete their life cycle underground but exhibit no adaptations and can also survive outside of caves. Troglonenes are animals having part of their life cycle underground. Finally, Troglobites are the true cave animals. They exhibit modifications and cannot survive outside the cave environment.²

As one moves from temperate to tropical areas the proportion of true cave animals to trogloniles decreases until in the tropics although a rich cave fauna exists, it consists entirely of trogloniles which can be found in moist, dark habitat on the surface. This is consistent as Barr (1966) shows with the theory that the terrestrial cave fauna consists of relics of a fauna adapted to cool, humid boreal forest that occurred extensively on karst in the United States, Europe, Japan, New Zealand and at high altitudes in Mexico during the Pleistocene glaciations. The interglacials brought warm, dry weather, these forests disappeared from most of the above area, and so did most of the associated fauna. A few species took refuge in caves and the descendants of these presumably make up the present-day cave fauna.³

1. See Vandell (1965) for an account of the morphology, physiology, and biology of cavernicoles.
2. Taken from the introduction by Barr (1960).
3. See Barr (1960) and Barr (1966).

In the last forty years it has been found that Mexico has some of the largest and deepest cave systems in North America. The Sotano de San Agustin in Oaxaca state is over 1700 feet deep. The entrance pit of the Sotano de las Golondrinas in San Luis Potosi has a free drop of 1306 feet.⁴ Associated with the Mexican caves is a rich fauna, mostly trogophiles, but true cave animals do exist. Having been on several caving trips to the Appalachians in West Virginia, I eagerly joined a McMaster University Caving and Climbing Club group that left for Mexico during the mid-semester break at Christmas 1971-72 to explore and survey caves. We spent the time in an area of north-eastern Mexico in the states of Tamaulipas and San Luis Potosi. I shall describe some aspects of two cave systems, their fauna and the flora and insect fauna of the surrounding areas.

Our first camp was at the village of Los Sabinos, Tamaulipas state, situated in poor tropical deciduous forest. It was the dry season, and many trees had little foliage. The canopy is low and broken, and many plants are leathery or armed with spines. Lepidoptera were numerous both in individuals and species. Hemiptera were also conspicuous. However, most of the insect orders such as the Coleoptera, Diptera and Hymenoptera (except for the ants) seemed to be scarce.⁵

A string of large, spectacular and only partially explored caves occur east of the village. The Sotano del Tigre drains a large arroyo which has cut a canyon about seventy feet deep leading to the cave. Thus three sides of the cave entrance are surrounded by dissected walls. The arroyo acts as a trough collecting cool, moist air. In keeping with this, I found, near the entrance drop of the cave, some families of moisture loving Coleoptera (Carabidae and Staphylinidae) which were poorly represented in the drier countryside. The entrance drop totalled 300 feet interrupted by a ledge that had developed into a deep, water-filled plunge pool at 180 feet. Vertical descents are done either on a rope or on aluminium wire ladders. The latter is a popular method in Europe but is limited in North America to drops of less than about 100 feet, thus this pit was done by rappelling on a rope (best learned with expert help).

The floor of the large chamber at the bottom was covered in a thick layer of black silt. There were many beetles here of the species found in the arroyo immediately around the entrance. In addition, some of the remarkable Arachnida characteristic of cool, damp, dark tropical habitats were on the moist flowstone walls and under debris. Many of the Arachnids had greatly elongated legs, and enlarged, curved mouthparts armed with spines and teeth. Among these there were some spider-like Amblypygi with inch long darkly pigmented bodies and elongated legs giving them a total span of 3 inches. These were often seen sitting in crevices on walls as their bodies are flattened, and a touch would send them scurrying in any convenient direction. Also present was a species of the order Phalangida, orange coloured, $1\frac{1}{2}$ inches in span, resembling the daddy-long legs "spider" which belongs to the same order, but the former had greatly swollen chelicera and spiny elaborate palps. Another Arachnid belonged

4. Figures taken from Russel and Raines (1967).
5. Classification of Arachnida and Insecta following Brues, Melander and Carpenter (1954). Crustacea classified using Pratt (1951). Beetles further identified with Arnett (1963).

to the family Schizomidae. Pale yellow, about one eighth inches long, I found it only under rotting debris. Along with spiders, the above Arachnids occurred throughout the lowland cave. The spiders were depigmented, with tiny bodies and elongated legs, the total span rarely exceeding 1/2 inch. White eyeless Collembola also occurred throughout the cave.

A walk along a horizontal passage brought us to a small thirty foot sloping drop which was rigged with a ladder. The rock was of smooth, moist flowstone. Here I observed a translucent isopod resembling a common family of flattened pillbugs found in most gardens, in its multisegmented oval body, each segment carrying a pair of appendages, but the latter has a hard, dark integument. The cave isopod belongs to the family Trichioniscidae and I saw many examples of the species throughout wet portions of the cave. Essentially an aquatic animal, in the high humidity it readily entered and left pools of water without effect. At the base of the drop was a small, shallow pool in which swam a blind cavefish of the genus Anoptichthys. Two inches long, eyeless, pink and flattened laterally, it moved through the water slowly, changing direction frequently. Where there were extensive pools of water (there is a side passage which requires swimming), amazing numbers of this fish up to five inches long occurred. These picked at our clothing as we waded through the water. The passage dropped steeply and we scrambled down over beautiful rimstone pools, flowstone formations, and boulders. In pockets of water between the rocks, I found large specimens of a crustacean belonging to a marine family, the Circolanidae. Eyeless, white, convex dorsally and two inches long, these are believed to be remnants of a fauna inhabiting shallow seas which covered the area during Tertiary pluvials.⁶ The passage levelled out and in the roof high above us we could hear bats. Small pools here were filled with a black viscous fluid which I was told was the excreta of vampire bats. There was much clay covering the floor here and a few patches of organic flood debris. Amid the leaves and rotting twigs, I found representatives of the Coleopterous families Staphylinidae, Leptodiridae, and Histeridae. Only a tiny species of the last family had any unusual modifications, it being eyeless, partially depigmented, with rather slender legs and strongly reduced striae on the wing covers. I do not know if it is a troglobite.

A rappel of 90 feet put us in a large room. A passage to the left took one through several waist deep pools, each having a large population of blindfish. The passage roof was low and here and from several spots hung sticky threads made by a fly larvae which feeds upon insects that become entangled in the threads. The right-hand passage led up into a crawlway covered with dry granular pellets of bat guano. Small isopods of the family Porcellioniscidae occurred here. White and strongly convex, these had a tough integument, perhaps reflecting the drier conditions of their habitat. They retain small pigmented eyes and possibly occur on the surface. A crawl of fifty feet led into a passage housing a bat colony.

6. From "Cave Biology of the Sierra de El Abra" in Russel and Raines (1967).

Roosting bats, spaced a few inches apart hung from the walls. The bats were easily disturbed and in a few seconds the passage was filled with the whirr of bat wings and their high pitched cries. In those close quarters several collided with cavers. The air temperature was very high here as was the ammonia concentration and the slightest exertion resulted in great gasps for air. The flames from our carbide lamps flickered and yellowed. Yet life was abundant and brown millipeds, many four or five inches long crawled about on the guano. Phalangida, ticks, a species of Pseudoscorpion, along with the Amblypygi found elsewhere in the cave were here. Most exciting was a species of the very rare and exotic Arachnid order, the Ricinulei. The species of this group look somewhat like ticks and reach a great abundance in some Mexican caves but are otherwise known from only a handful of specimens in the tropical areas of the world. These were red or pale yellow (immature?), had a spa up to three-eighths of an inch, moved with a slow deliberate gait, the elongate first pair of legs tapping the floor in front of them. Large cockroaches and blind white Thysanura of the family Nicoletiidae also were found here, but the animals on guano are considered to be adapted to the special conditions of bat colonies and are not classified as true cave animals.

The trip out of the cave, climbing ropes was much more arduous than the descent in and after about fourteen hours underground we came out of the entrance drop. I had seen a rich fauna but probably only the aquatic animals I described above were true cavernicoles. Despite this, the cave is still a rigorous environment for few of the species of beetles in the entrance drop were found further in the cave.

The major goal of our trip was to survey and bottom the Sotano de La Hoya de Salas, located in a high mountain valley at 6000 feet in the Sierra de Guatemala, San Luis Potosi. The west slopes of the valley were covered in dry montane forest of pine, juniper and oak. The east facing slopes were in thorn scrub. The village of Hoya de Salas sits in the middle of the valley at the north end of a shallow lake said to be formed by the plugging of an underground drainage system. The temperature never reached 80, and cooled off considerably at night, a thick layer of dew falling by morning. The montane fauna included a few Lepidoptera (Blues and Fritillaries), while Phalangida, Orthoptera, Hemiptera, and beetles of the family Tenebrionidae were more numerous as were scorpions and leaf-cutting ants. Certainly, the fauna was impoverished as compared to the lowlands.

The Sotano opens at the edge of the village in a spectacular slot 40 feet by 150 feet dropping straight down 280 feet. The cave consists mainly of vertical drops with small sections of horizontal passage separating the drops. The first pitch landed one among the carcasses of several animals from the village. There were also many shrunken and dying leopard frogs which had probably been washed in during the rainy season. The passage was quite dry, but I found large eyeless depigmented crickets. I had found similar crickets, in lowland caves but those were deeply pigmented and had functional eyes. Under a rock was a partially depigmented Carabid beetle with reduced eyes, Mexisphodrus profundus considered by Barr (66) to be an incipient troglobite. Large opilionids (harvestmen) were abundant but these showed no modifications toward life in the

cave and I found large congregations of them in shady damp spots in the valley. Lower levels of the cave were progressively wetter and I found partially depigmented millipedes, isopods of the family Trichioniscidae and eyeless depigmented Celledobola, the latter congregating on the thin surface film of tiny pools which accumulated among flowstone concretions at the 530 foot level of the cave. Tiny white spiders occurred on the walls throughout the cave. Unlike the terrestrial creatures inhabiting lowland caves, most of the invertebrates of this Sotano probably could not survive in the dry habitat outside this cave and the Sotano could easily be considered an island, isolated from similar cool, humid habitat by miles of arid countryside. In this isolation several of the terrestrial animals had or are evolving into troglobites. Barr (66) feels that true terrestrial troglobites in Mexico only occur at high altitudes and certainly I did not find any terrestrial animals at low altitudes that I could say were troglobites. The lowland caves were much richer in number of species and individuals of animals but I did not descend deep enough (900 feet) into the high altitude cave to be able to see and compare an extensive aquatic habitat. Mexico is proving to have one of the most interesting cave faunas in the world and I was most happy to be able to observe a small fraction of it.

Henry Frania

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Books

The Moths of America North of Mexico

The first publication of MANM, Fascicle 21: Sphigoidea, has been distributed to subscribers. The tentative publication schedule for 1972 is:

March 1972: Fascicle 20, Part 2A, Saturniidae I (Citheroniinae, Hemileucinae, in part). by D.C. Ferguson. Approximately 160 pages, 11 plates.

Prepublication/subscription price: \$32.50

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June 1972: Fascicle 20, Part 2B, Saturniidae II (Hemileucinae, in part and Saturniinae), by D.C. Ferguson. Approximately 160 pages, 11 plates, with a preliminary section of 8 pages comprising title page and contents for Fascicle 20, Part 2, to be supplied free.

Prepublication/subscription price: \$32.50

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September 1972: Fascicle 10A, Pyralidae (Scopariinae and Nymphulinae), by E.G. Munroe.

December 1972: Fascicle 20, Part I, Bombycoidea (excluding Saturniidae, i.e. Lasiocampidae, Mimallonidae, Eupterotidae), by J.G. Franclemont.

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OF MORPHO BUTTERFLIES AND THINGS IN A TROPICAL RAIN FOREST OF GUYANA, SOUTH AMERICA

I had left the Canadian winter at Toronto on February 2nd, 1971 at 9:45 a.m. Snow on the big jet's wings flew off as we headed out, down the runway and up. Later, after landing at Barbados and changing aircraft at Trinidad, I arrived at Georgetown, Guyana that evening at 7:30 p.m. As I stepped off the plane the moist soft tropical air wafted over me. It was dark and after the interminable line-ups at the Timehri airport I was on my way to my hotel in Georgetown, 25 miles to the north.

Next morning after a good breakfast I stepped into a Georgetown street in the city's centre, to meet an already warm humid day. Across the street purple martins were raising a fuss around a favourite roosting place. I wondered if they summered in Ontario.

After I changed some money at a bank, my forester friend came up and we went to his office to make further arrangements for the study trip to the rain forest area we had selected - the Bartica Forest Reserve. This Reserve is virgin high rain forest and is located off the Potaro road 24 miles south from Bartica, a town at the confluence of the Essequibo and Cuyuni Rivers.

A red-barred black long-winged heliconid (Heliconius melpomene) flutters down in front of me and a swing of the net captures it. A bluish skipper (Pythonides jovianus) settles across the road on a leaf. I take it. In the meantime Moses catches a brown-barred heliconid (Heliconius ethilla) and a hairstreak (Thecla species).

We are on our way, the Landrover and us labouring over the sections of the road which are overlain with large chunks of broken rock to prevent washouts. The sun has been out for three-quarters of an hour but now another cloud bank moves in and a new downpour begins. We close the air vents and the humidity and heat suddenly closes over us. Moses gives an exclamation, the Landrover stops. He has sighted a Morpho clinging to a branch. We get out, grab our nets and walk cautiously towards the place. My net has the longest handle and the Morpho is spotted just within it's reach. Cautiously I move the net towards the insect. A swing and I have it. It is a Morpho menelaus and the first I have ever collected. The brilliant blue of its upper wing surfaces contrasts with the warm brown of the under surfaces and explains why it seems to disappear into the vegetation when resting.

The road is now on a long down slope. Blue morphos appear to our rear and ahead. We are out with our nets and swinging. I catch one as it flies past. It is my second Morpho achilles since my arrival in Guyana. Then I get another. There is another. It settles on a leaf. It is added to my collection. We are close to a bridge. There is a small river not far below flowing strongly past the luxuriant vegetation. It seems to be a magnet for the big Morpho achilles, a butterfly with darkish wings with a broad blue bar running transversely across the upper side of the fore and hind wings.

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And so it went as species after species is added to the collection. Wineperu is just ahead now. The forest drops away from the road and becomes brush land. The first building appears and then a large ball field to the left surrounded by a single tier of small weather-stained houses. The field is full of butterflies common in open area in the tropics. Included are the following species most of which were feeding on the white flowers of a low plant or resting on the ground: - Anartia jatrophae (very common), Precis lavinia (very common), Papilio polydamas (two observed, one captured), Papilio thoas (four observed, three captured), and several species of the Pieridae family, including Phoebis sennae, P. philea, P. agarithe and P. statira. We leave to return to our camp in the Bartica Forest Reserve, arriving just before dark.

People who are not used to the tropics will notice the sudden transition from day to night. There is little afterglo once the sun sets. Our camp is in a hole, 120 feet deep in the rain forest and as a result the transition from light to dark is abrupt.

Our camp is sited on an easy slope just above the bank of a small stream which provides the necessary water. To get to the camp the Amerindians had cut a Landrover-wide track through the forest for 1-1/2 miles off the Bartica-Potaro Road. The Arawak Indian crew from Bartica had set-up two camps separated by a pile of slash. They sleep and rest in hammocks under a big green tarpaulin stretched over the necessary pole structure. The ground is covered by a second green tarp and a drainage ditch on each side drains away the water. They cook and eat under a second tarpaulin nearby where a cook fire, Indian-style, smolders or flames. My set-up on the other side of the pile of slash is a tent for sleeping and equipment and a tarpaulin roof nearby over a cooking and dining area. Mike Chan, a Chinese-Indian, does my cooking and camp chores. By the third day the canned meat we depended on for protein intake has already pauled. That was when we started on a bush meat diet supplied by one of the Arawaks who found and shot a young deer, (Dama virginianus) and later an agouti.

On the fourth day at camp I wake up as usual to the terrifying roar of the howling monkey (Alouatta sp.) troupe whose territory came to within maybe a half mile of our camp. The natives call them baboons. Sun-up is at a quarter to seven and the local cicadas, or 6 o'clock flies as they are called by the Indians, have commenced their shrill crying. By 7:10 a.m. I have been down to the creek and back and the cicadas are silent. Mike has been rattling dishes for a half four and breakfast is ready. As we eat, the nearby bird population can be heard as usual but not seen. Toucans bark in the distance, parrots caucus, and a pair of flycatchers call monotonously.

Moses comes over with his net and jar and we start out on the day's collecting. This time we decide to walk a trail through the forest to a clearing further down the creek about a mile. It is dim under the heavy canopy but even here there are butterflies.

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We collect ghost-like Pierella and Callitaera and other smaller species. There is a snorting and crashing nearby as an agouti takes flight.

We work fast. A lull and I look across the valley. Over it, a moist blue sky flecked with white puffy clouds arches. Down near where I think the creek should be, a great blue Morpho butterfly flies out of the greenery and circles erratically back into the protective cover. My eyes catch a yellow brown flash high up on my right. As I turn a great sun-coloured butterfly glides down from the trees into the clearing and on down the valley until it is below me. It is the huge Sun Morpho (Morpho hecuba). As it is borne on the air currents the huge wings seem motionless yet the insect makes jerky up and down movements. Later we capture one which lands in our camp clearing. It dropped down from the trees possibly to get clear of the annoyance of a darting dragonfly or a bird.

Next morning we prepare to set out as many baited traps and baits as our materials permit. Alec Boyan, the head Arawak, and I take machetes, bait and traps, nets and jars and start off on a freshly cut trail leading to a flat bottomland beside the creek. The virgin rain forest closes over us. The huge flaring butts of the Morabukea (Mora) trees are the most prominent feature of the area we have selected. They obviously favour a bottomland site. Where the creek makes a U-turn we commence clearing away the underbrush. We watch for snakes. The day before the Arawaks out cutting trail had just missed stepping on a fer-de-lance, a very poisonous snake. There are more about but luckily they are of a retiring nature in daylight. The brushing-out completed, I hang up the traps with the special banana bait and Alec ties up pieces of ripe banana about 30 feet apart. Later, I place more along the trail. Within two days the baits are attracting Caligo sp. (Owl Butterflies), Morpho achilles and deidamia, Opsiphanes sp., Bia sp., Euptychia sp., Prepona sp., Catonephele sp., Nessaea sp., as well as several species of moths and even beetles.

The results anticipated when I was planning the trip to the Bartica Forest Reserve met expectations in some respects but also held surprises. During the 18 day stay in Guyana, the apparent scarcity of swallowtail butterflies (Papilio sp.) was a surprise. Other than Papilio thoas (4), polydamas (2), Parides neophilus parianus (3) and a Papilio androgeus, observed at Wineperu, no others were seen. This included Georgetown, Bartica, Wineperu and the Bartica Forest Reserve. A second surprise was the absence of moths around lights at Georgetown, at Bartica, and at our camp. A few were observed in daylight near night lights at Wineperu. These included a Geometrid and a Saturnid (Automeris sp.) One of my bait traps captured several species of the Noctuidae. Other than collecting some day-flying moths, that was the extent of the observed moth population. Another surprise was the beautiful day-flying moth - Urania leilus. During the whole stay, only three were seen of which one came to light at Bartica and was collected.

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In the vicinity of our camp small whitish butterflies, such as Nymphidium sp. and Leucidia brephos were in fair numbers as well as various Heliconiinae, Hesperiidae (Skippers), Dismorphia and Theclinae (Hairstreaks). Several blue Anaea of one species were observed in one place around a tree. One was collected. Only one Megalura sp., i.e. peleus - was collected from a sunny leaf beside the trail while the same situation attracted several Victorina steneles with four being collected.

by Q.F.Hess

PARTIAL LIST OF LEPIDOPTERA COLLECTED IN GUAYANA, SOUTH AMERICA, AT BARTICA, BARTICA FOREST RESERVE AND WINEPERU, DURING FEBRUARY 1971, BY Q.F. HESS OF TORONTO

PAPILIONIDAE: Battus polydamas group
Papilio thoas
Parides neophilus 1m 1f

PIERIDAE: Eurema agave 1m 2f
Eurema venusta
Leucidia brephos 1m 1f
Phoebis argante 2m 3f
Phoebis sennae (marcellinae) 1m
Phoebia statira 1m

NYMPHALIDAE:

DANAINAE: Leucothyris aegle

SATYRINAE: Callitaeraphilis ap.
Euptychia batesii thalessa
Pierella astyoche 2m 1f
Pierella iamia 1m 2f
Pierella lena 2m

NYMPHALINAE:

HELICONIINI: Agraulis vanillae 1m Heliconius flavescens 2m
Colaenis iulia 2m 1f Heliconius melpomene 2m
Dryadula phaetusa 1m 2f

MELITAEINI: Phyciodes liriopoe fragilis 1m

NYMPHALIDAE: cont.

NYMPHALINI: Anartia amathea Nessaea obrinus 1m 2f
Anartia jatrophe 1m 1f Junonia lavinia
Catonephele acontius 1m 2f
Catonephele orites 1m
Metamophra stelenes 1m

LIMENITINI: Limenitis (Adelpha) cytherea 1m 1f
Marpesia peleus 1m

CHARAXINAE: Anaea morvus 1f
Prepona meander 2m

MORPHINAE: Morpho amzonicus 1m
Morpho deidamia 1m
Morpho hecuba 1m
Morpho menelaus 1m
Morpho rhetenor 1m

BRASSOLINAE: Caligo sp.
Caligo sp.
Opsiphanes quitena

LYCAENIDAE:

RIODININAE: Biactorion sp. 1m
Cremna actoris meleagris
Diophthalma hyphea
Eurybia dardus 1m 1f
Helicopsis cupido
Mesosemia croesus 1m
Nymphidium azanoides
Nymphidium menalcus cachrus
Stalachtis phaedusa exul