SEPTEMBER 1990

SPHECOS 20

A FORUM FOR ACULEATE WASP RESEARCHERS

THE MUD D'AUB SPEAKS

In our last issue I promised an article on Brethes types by Jorge Genise and an essay on aculeate wing venation by Mick Day and Jim Carpenter. Well Jorge's article is here, but the wing thing isn't. However, Mick and Jim promise to get the job done soon.

The absence of a winger print essay is more than compensated for by an intriguing preliminary cladistic analysis of the Sphecidae and Apidae by Byron Alexander - enjoy!

In **Sphecos** 19:19 we made reference to "disturbing news" at the British Museum (N.H.). I have been promised an official statement about what is happening in Hymenoptera in particular, and to the museum in general. So far it has not materialized. I can tell you that the name of the institution has been changed to The Natural History Museum, and that research on aculeates, except the ants, is probably going to be eliminated if hasn1 already. It is a grim time for many in the museum. Hopefully we can present the full story in the next **Sphecos.**

RESEARCH NEWS

Diomedes Quintero Arias (Smithsonian Tropical Research Institute, Tupper Building, APO Miami, Florida 34002-0011) reports: "The book **Insects of Panama and Mesoamerica: Selected Studies** has finally completed all of the review process by Oxford University Press and we hope to see it published before the middle of 1991 (I have been told by some not to be so hopeful)". Also, he has collected two species of ***Miscophus*** in Panama, and hopes to publish a paper on them.

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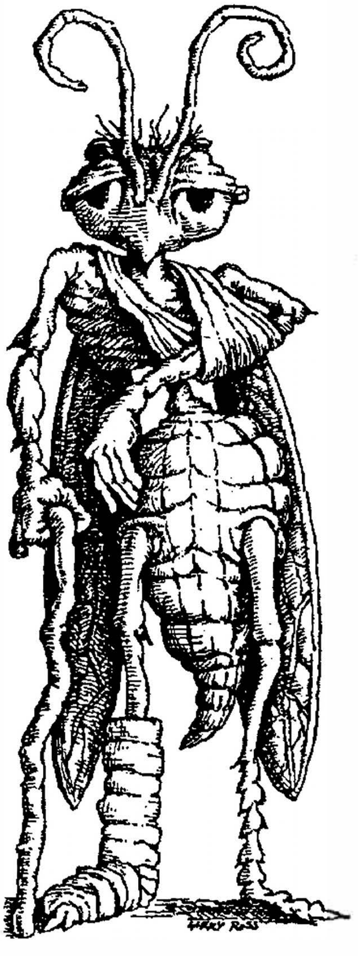

The Mud D'aub

Walter Borsato (Museo Civico di Storia Naturale, Lung. Porta Vittoria, 9, I 37129 Verona, Italy) writes: "I'm a collaborator on the Verona Museum of Storia Naturals, and also a member of the A.I.S.A.S.P. (Associazione Italiana per lo Studio degli Artropodi Sociali e Presociale) Italian section of the International Union for the study of social insects. I'm interested in the systematics of palearctic Vespidae, Eumenidae and Sphecidae. At the present time I'm studying the systematics of palearctic Vespidae (particularly ***Polistes)*** with Prof. Giordani Soika of Venice, and the systematics of Sphecidae with Prof. Severiano F. Gayubo of Salmanca. I have the following papers in press:

1989. Vespidae dei Monti Lessini.
__ Esfecidos palearticos de la coleccion del Museo Civico de Historia Natural ***de*** Verona. (With Prof. Gayubo S.F.)
__ Esfecidos italianos de la coleccion Museo do Verona. (With Prof. Gayubo S.F. and Prof. Osella G.).
1990. Prima segnalazione per l'Italia del genre ***Alastorynerus*** (Hym. Eumenidae)."

Rollin E. Coville (6201 Tehama Ave., Richmond, Calif. 94804) has been working in private industry as a computer expert. He says he is "terminating all *my* systematic work. I simply do not have the time, resources, or incentive to continue my work on *Trypoxylon.* I am pretty busy now with family life and *my* job of designing and implementing mainframe computer applications and systems for Pacific Bell. This is just working with a different kind of bug.

"A few things I found with *Trypoxylon,* that *may* be useful to pass along to anyone who wishes to study this group in the future are listed below:

1. When examining *Trypoxylon johnsoni,* I found that it was comprised of two broadly sympatric species. The material I am returning to the USNM has male and female specimens of both; one I labeled *johnsoni* and the other *adelphi* (?). I haven, seen the *type* specimens of *johnsoni, adelphi,* or *ornatipes,* so I am uncertain as to their taxonomic status. Someone else may be able to resolve this problem.
2. After looking at thousands of specimens, I have concluded that *aldrichi* and *frigidum* are no more than geographic forms of the same thing. At least, I could never get a handle on any significant differences.
3. The situation with *sculleni* and *pennsylvanicum* was more confusing. To be honest, I have no idea as to how many species are involved (1 to many?). But I am tired of looking at them.
4. There *may* be 3 or 4 species similar to *Trypoxylon timberlakei.*
5. I am uncertain as to the status of *Trypoxylon bridwelli.* I needed more specimens, especially of males.

"That is about it. I do have a lot of notes, etc., on *Trypoxylon,* and will be willing to share that information with anyone who may decide to work on that group in the future."

John Felton (Karel Doormanlaan 197, 2283AM Rijswijk, The Netherlands) reports that little progress has been made on *Mimumesa unicolor/ littoralis* other than establishing that both species occur in southern England: *littoralis* west of Dorset, *unicolor* from Dorset to the east. Recent work has been collaborative: on *Ectemnius* spp. in Kent with Geoff Allen and on *Dolichovespula media* in the SE of England also with Alan Clements among others, while a number of Dutch Hymenopterists pooled their records at the NEV weekend in Zeeland to provide a *very* interesting list. The *Ectemnius* fauna seems to have been fairly stable while the speed of colonization of *D. media* is remarkable. The diversity of the Zeeland, largely dune, fauna is reassuring from a conservation point of view but more studies are needed to put it in perspective. Overall, these studies illustrate a theme that has been developed over a number of years: to seek to monitor changes in distribution and relative abundance in aculeates. This has a value both in demonstrating biological responses to environmental, including climatic, change as well as providing information to develop management techniques.

Literature

Allen, G. W. and J.C. Felton 1989. The occurrence of solitary wasps of the genus *Ectemnius* (Hymenoptera, Sphecidae) in Kent. Trans. Kent Fd. Club 11:33-36.

Allen, G.W., A.N. Clements, et al. 1990. A note on the tree wasp *Dolichovespula media.* Bull. Kent Fd. Club 35:41-43.

Felton, J.C., V. Lefeber, et al. 1990. Aculeates. In: C.J. Zwakhals Ed. (Report of the 144th summer meeting of the Dutch Entomological *Society* in Haamstede). NEV Verenigingsnieuws, Special Issue March 1990 (In Dutch).

Jaboury Ghazoul (Dept. of Biology and Preclinical Medicine, University of St. Andrews, St. Andrews, Fife, KY16 9TS, Scotland, U.K.) tells us: "My research concerns the nesting behaviour and reproductive success of populations of *Mellinus arvensis* and *Ammophila sabulosa* from different latitudes in Britain. I plan to study the thermoregulatory abilities of these wasps and whether this has any influence on behaviour."

Prof. S. F. Gayubo (Facultad de Biologia, Dept. Zoologia, Universidad de Salamanca, 37071 - Salamanca, Spain) has finished a revision of the Palearctic *Palarus* and is currently working on a revision of Palearctic *Nysson.*

Karl Krombein (Dept. of Entomology, Smithsonian Institution, Washington DC, 20560) and Woj Pulawski (California Academy of Sciences, San Francisco, Calif. 94118) have nearly completed their revision of the *Tachysphex* (Sphecidae) of Sri Lanka. It will appear as number XX in Karl's on going series titled "Biosystematic studies of Ceylonese wasps" that have been published in the Smithsonian Contributions to Zoology. Already in press is Karl's part XIX titled "Natural History Notes in Several Families (Hymenoptera: Eumenidae, Vespidae, Pompilidae and Crabronidae)" which treats 40 species, all but one of which are solitary nesters.

Arkady Lelej (Institute of Biology and Pedology, Vladivostok-22, 690022, USSR) reports: "Our laboratory is preparing the first part of the fourth volume of Key to the Insects of the Soviet Far East (In 6 volumes, 12 books). The wasp groups and authors to be included in this book include: Dryinidae (N. Ponomarenko), Embolemidae (S. Belokobylsky), Bethylidae (V. Gorbatovsky), Chrysididae (N. Kurzenko), Sapygidae (N. Kurzenko), Scoliidae (A. Lelej), Pompilidae (A. Lelej), Vespidae (N. Kurzenko), and Sphecidae (V. Kazenas, P. Nemkov, A. Antropov, E. Budrys). Included are more than 600 species of wasps not only from the Soviet Far East but from neighboring territories (Yakutia, Transbaikalia, Irkutsk region and Siberia) and countries (Japan, Korea and China). I think that this book will be of interest not only to USSR entomologists but to specialists in other countries, and *may* be translated into English. The book will be published in 1992. I will keep you informed about this book on a regular basis."

Linda McPheron (Dept. of Entomology, 218 Wellman, Univ. of California, Berkeley, CA 94720) says: "I am a graduate student presently working with Gordon Frankie and I'm beginning to do research on the foraging behavior of *Mischocyttarus flavitarsus.* If anyone else is working on this insect, I would like to hear from them."

Michael Prentice (Dept. of Entomology, 218 Wellman, Univ. of California. Berkeley, CA 94720) writes: "I am a beginning graduate student at U. C. Berkeley and am interested in doing *my* thesis on the relationships of the families of sphecoid wasps and the origin of the Apoidea. I am planning to do both a morphological and molecular cladistic analysis of the tribes and am interested to know if you are aware of other researchers currently working on the higher level systematics of the group and of recent (and not so recent) papers that would be helpful for such research. Howell Daly and I have had success using new morphological characters in re-evaluating the cladistic relationships of the tribes of Apidae and I feel confident that new characters can be found for the relationships within the Sphecoidea, particularly from internal morphological characters."

Christopher K. Starr (Division of Research, National Museum of Natural Science, 1 Kuan Chien Road, Taichung, Taiwan) reports: "I have put together preliminary keys to ***Polistes*** species of a) America north of Mexico, and b) Europe. These keys are to adults only and undoubtedly require further work, but they are ready to be used. In addition, there is an English translation of T.S. Lee's key to the ***Polistes*** of China. If you have immediate use for any of these and are willing to communicate to me any difficulties you find with it, I will be pleased to send a copy. The first two will likely appear in **Sphecos** after they have been criticized and improved."

HELP NEEDED

Tom Mason (Metropolitan Toronto Zoo, P.O. Box 280, West Hill, Ontario M1E 4R5 Canada) writes: "Metro Toronto Zoo has recently become committed to the reduction of pesticides and the increased use of biocontrol. One pest that continues to be a problem, however, is the Australian cockroach, ***Periplaneta australasiae.*** Two types of wasps have been reported as parasitoids of these roaches. They include ***Ampulex compressa*** and members of the ensign wasps (Evaniidae). Does anyone know of any people working with these groups who could be a possible source of supply? We have pavilions up to 1.25 acres in size containing flowering trees and vines reaching 40 feet in height. I do not think adults would have much trouble finding nectar sources. Larval food is everywhere. Please let me know if you can help."

Christopher K. Starr (Division of Research, National Museum of Natural Science, 1 Kuan Chien Road, Taichung, Taiwan) writes: "Sting autotomy is the irretrievable anchoring of the stinger in the victim's skin, so that the venom apparatus is torn from the insect's body as she tries to escape. It is best known in honey bees. In a paper on venom apparatus structure in ***Ropalidia*** I am preparing to cite the few cases known to me of sting autotomy in polistine wasps: ***Brachygastra lecheguana, Epipona tatua, Polybia rejecta, P. simillima, Protopolybia sedula, Ropalidia nigrescens, R. romandi*** and ***Synoeca septentrionalis.*** If any of you can report reliable instances from other species or know of any in the literature, I would be pleased to hear from you. In reporting any personal observations, please indicate whether autotomy followed a volunteer sting (in which the wasp attacked and stung on her own initiative) or an induced sting (in which she was held against the skin)."

NEW ADDRESSES

Shaarina Boyd: 21 Buchanan St, Devenport 9, Auckland, New Zealand.

Mike Crosland: Department of Entomology, University of California, Davis, California 95616.

Braulio Dias: Divisao de Estudos Ambientais, Reserva Ecol6gica do IBGE, C.P. 04-0270, 70.312 Brasilia, DF, Brasil.

C. J. Hamilton: Commonwealth Institute of Entomology, Silwood Park, Buckhurst Road, Ascot, Berks, SL5 7TA, United Kingdom.

David W. Johnson: Department of Entomology, Bldg. 345, University of Florida, Gainesville, Florida 32611.

David McCorquodale: Department of Mathematics and Natural Sciences, University College of Cape Breton, Box 5300, Sydney, Nova Scotia, B1P 6L2, Canada.

Shun'ichi **Makino:** Insect Management Laboratory, Forest Biology Division, Forestry and Forest Products Research Institute, P.O. Box 16, Tsukuba Norin Kenkyu Danchi-Nai, Ibaraki, 305 Japan.

Hal C. Reed: Biology Department, Oral Roberts University, 7777 S. Lewis Ave., Tulsa, Oklahoma 74171.

Wang Min-sheng: Institute of Zoology, Academia Sinica, 7 Zhongguancun Lu, Haitian, Beijing, China.

PERSON ON THE MOVE

Christopher K. Starr has left Georgia and is currently a visiting researcher in the Canadian government's taxonomic unit (Biosystematics Research Centre, Research Branch, Canada Agriculture, Ottawa, Ontario K1A 0C6). He divides his time about equally between sociobiology and systematics of social wasps. If things go according to plan, Chris will move to Taiwan this fall to begin some cooperative projects in the faunistics of social wasps and bees. Address from about the middle of September:

Division of Research
National Museum of Natural Science
1 Kuan Chien Road
Taichung, Taiwan.

MISSING PERSON

A. Adamsky of Chateaudun, France.

NECROLOGY

Dr. Vladimir Polacek died on January 19, 1990.

Henry K. Townes

(January 20, 1913 - May 2, 1990)

After a long illness, the world's foremost authority on the family Ichneumonidae passed away. A proper obituary **will** appear in the next issue of **Sphecos.**

OBITUARY

Edmund J. Kurczewski
September 9, 1902-March 23, 1989

by
Frank E. Kurczewski
(SUNY College of Envir. Sci. &
Forestry, Syracuse, NY 13210)
and
Mark F. O'Brien
(Museum of Zoology, Univ. of
Michigan, Ann Arbor, MI 48109-1079)

Ed Kurczewski was not a career entomologist. He began collecting insects in 1959 at the encouragement of his son, Frank. Upon his retirement from Meadowbrook Dairy, Erie, Pennsylvania in 1965, he spent much of his time intensively collecting insects. Two of his favorite collecting localities were Presque Isle State Park and Wintergreen Gorge Cemetery, both in Erie County, Pennsylvania. Some of his collections at Wintergreen Gorge during the late 1960's included extremely rare dipterans and hymenopterans which have not been collected there since. His preferred collecting site at Wintergreen Gorge was an asphalt roadway leading into the cemetery, where during early morning and late afternoon hours on warm June and July days he collected rare male Tabanidae in numbers.

Kurczewski was an avid and ardent collector. Between the years 1960 and 1986 he hand-collected more than 50,000 insects which have been deposited in the insect museums of Cornell University, Museum of Comparative Zoology, Harvard University, The University of Kansas, National Museum of Natural History and the State University of New York College of Environmental Science and Forestry. He kept no specimens for himself, as his hobby was the thrill of collecting and mounting the specimens, not maintaining a collection. His favorite groups to collect included the Tabanidae (16,000 specimens), Chrysididae (4,500 specimens) and Pompilidae (7,000 specimens). Some of his most exciting collections included long series of the non-biting horsefly, *Stonemyia* rasa, the tiny cleptine, ***Mesitiopterus kahlii,*** which parasitizes the eggs of walking sticks, and the spider wasp *Aporus niger,* which belongs to a genus that hunts trap-door spiders, and a single female of the pompilid *Minagenia congrua,* a genus ordinarily not found at this latitude.

After a good days' collecting, Ed would literally spend several hours mounting and straightening the specimens under a microscope. He took painstaking efforts to mount each insect as "perfectly" as possible. The neatness, organization and rarity of his collections were appreciated by the taxonomists and bionomicists who utilized his specimens in their studies. For these reasons he was honored in 1984 with an amateur entomology award from the Entomological Society of Pennsylvania.

Ed was truly an amateur. He had never taken courses or attended workshops, seminars or conferences. In fact, his formal education extended only through the seventh grade. Nevertheless, he was always more than willing to stop and talk to passersby to explain to them what he was collecting and why. He had to use nicknames for many of the species he observed and collected because he had no formal taxonomic training. In conjunction with others, Ed Kurczewski published 15 scientific papers on predatory wasps and tiger-beetles from Pennsylvania during 1963-1988. Many of these papers would not have been possible without his contribution.

Ed was never in great health for the last 15 years. However, he managed to go out collecting as frequently as possible. His collecting efforts probably kept him in better shape than had he been sedentary, and certainly made his days happier. We should all be so lucky to have a talented collector like Ed. His enthusiasm and keen collecting ability will be sorely missed.

Publications of Edmund J. Kurczewski

1963. An annotated list of digger wasps from Presque Isle State Park, Pennsylvania (Hymenoptera: Aculeata). (with F. E. Kurczewski). Proc. Entomol. Soc. Washington 65:141-149.

1968. Host records for some North American Pompilidae (Hymenoptera) with a discussion of factors in prey selection. (with F. E. Kurczewski). J. Kansas Entomol. Soc. 41 :1-33.

1968. Host records for some North American Pompilidae (Hymenoptera). First Supplement. (with F. E. Kurczewski). J. Kansas Entomol. Soc. 41 :367-382.

1970. The tiger beetles of Presque Isle State Park, Pennsylvania. (with G. C. Gaumer, F. E. Kurczewski). Cicindela 2:4-7.

1970. An annotated list of cuckoo-wasps from Erie County, Pennsylvania (Hymenoptera: Chrysididae). (with F. E. Kurczewski). Proc. Entomol. Soc. Washington 72: 190-201.

1971. Host records for some species of *Tachytes* and other Larrinae. (with F. E. Kurczewski). J. Kansas Entomol. Soc. 44: 131-136.

1971. Host records for some species of Nyssoninae. (with F. E. Kurczewski). J. Kansas Entomol. Soc. 44: 334-337.

1972. Host records for some North American Pompilidae, Second Supplement. Tribe Pepsini. (with F. E. Kurczewski). J. Kansas Entomol. Soc. 45:181-193.

1973. Host records for some North American Pompilidae (Hymenoptera). Third Supplement. Tribe Pompilini. (with F.E. Kurczewski). J. Kansas Entomol. Soc. 46:65-81.

1984. Mating and nesting behavior of *Tachytes intermedius* (Viereck) (Hymenoptera: Sphecidae). (with F. E. Kurczewski). Proc. Entomol. Soc. Washington 86:176-184.

1987. Nest and prey of *Ageniella (Leucophrus) fulgifrons* (Hymenoptera: Pompilidae). (with F. E. Kurczewski). Great Lakes Entomol. 20:75-80.

1987. Northern distribution records for some Nearctic Pompilidae (Hymenoptera). (with F. E. Kurczewski). Great Lakes Entomol. 20:81-84.

1987. Nesting behavior and ecology of *Tachysphex antennatus* (Hymenoptera: Sphecidae). (with F. E. Kurczewski). J. Kansas Entomol. Soc. 60:408-420.

1987. New prey records for species of Nearctic Pompilidae (Hymenoptera). (with F. E. Kurczewski, R. A. Norton). J. Kansas Entomol. Soc. 60: 467-475.

1988. Nesting behavior of *Aporinellus wheeleri* Bequaert and A. *taeniolatus* (Dalla Torre) (Hymenoptera: Pompilidae). (with F. E. Kurczewski, M. G. Spofford). Proc. Entomol. Soc. Washington 90:294-306.

FORUM

Typified Names In Botany

by

Peter F. Yeo

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As a botanist I was interested to read of the present position on typified and untypified (descriptive) names for categories above the rank of family by Curtis W. Sabrosky in **Sphecos 19.**

In botany both typified and untypified names are allowed in these ranks but there has been a strong swing (over perhaps the last 20 years) towards the use of typified names. I would support Sabrosky in hoping that zoologists don, follow suit. The typified name system is logical but troublesome. Apart from having to learn all the endings, I find that in lecturing I easily stumble over the use of the endings, because it is the rest of the name that matters. When reading or listening one has the same problem of noticing when the writer or speaker has changed up or down a rank. Then there is the fact that typified names at high ranks give a false impression • Magnoliopsida suggests something to do with **Magnolia** and Vespida something to do with **Vespa.** True, but the reader has to jog himself/herself and wake up to the fact that what is being talked of is the whole of the Dicotyledones and the whole of the Hymenoptera.

I guess this situation is fairly difficult for students of taxonomy but it must be a good deal worse for non-taxonomists and laymen, who will probably fail to grasp the system.

The Naming and the Number of Suprageneric Taxa

by

George C. Steyskal

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Sphecos 19 contains some very interesting notes on the above subject, some of which deal with Rasnitsyn's proposal to typify the ordinal name Hymenoptera by using as its basonym the genus *Vespa* to form the designation Vespida. There are a few considerations which I believe militate against this.

The typification of a genus by one of its species has resulted in the use of the same name as that of the genus for the subgenus containing the type species. This and the use of a genus name as the basonym of a family name and a subfamily name for taxa containing that genus can hardly be and has not been objected to and are generally accepted. However, the farther we go upward in the hierarchy and backward in phyletic time the more multifarious are the taxa included in names and the less reason there is for typifying them with the name of a genus that did not even exist when the first member of the taxon had evolved. Carrying this ***ad absurdum*** we might suppose that the Mammalia and the Vertebrata should be renamed on the basonym ***Homo*** (Homin-), although ***Pithecus*** or ***Cetus*** would do just as well. Or should we use priority (1758 ?) ?

The International **Code of Zoological Nomenclature** (3rd ed., 1985) disavows regulation of names above the rank of superfamily (and with the latter only with a recommendation), but in zoology at least the names of higher ranks are in large part, perhaps entirely, plural. The best I can make of Vespida is the singular upon which the family name Vespidae is based. These singulars have no standing in nomenclature, but are commonly used at least in several languages in their vernaculars: "a vespid, a hymenopteron, an ichneumonine," etc.

A few words on a closely related subject may not be amiss, viz., names for taxa in addition to those usually recognized for suprageneric taxa. In a recently distributed "sample" (1989, First Dipterists' Conference, Lake Placid, Florida) of a data base in progress for the world Diptera, 10 ranks between order and family are used, formed on basonyms plus the endings -morpha, -formia, -idea, -oidea, and -oinea, as well as several without basonyms. With well over 100 families, we could have nearly the same number of phyletic branchings which somebody will want to name. Where this will stop we fear to guess, but we do venture the opinion that much of this naming serves little or no purpose.

Vespida vs. Hymenoptera

by

E.A. Jarzembowski

(The Booth Museum of Natural History
Dyke Road, Brighton BN1 SAA, U.K.)

Regarding Rasnitsyn's Vespida vs Hymenoptera: surely it's just one more name for the synonymy list. Stability can be maintained if operational classifications are **distinguished** from research programmes.

On carpenter on Rasnitsyn

by

E.A. Jarzembowski

I was interested to read J.M. Carpenter on **A.P.** Rasnitsyn **(Sphecos 19:7),** but caution is needed when apparently equating parsimony with epistemology and reducing palaeontology. Fossils are not poorly preserved other taxa: they are the sole remains of once living species which, in this case, lived and died over a hundred million generations ago, long before the extant species of the same clade. Yet (if studied) fossil taxa are often treated like end members alongside extant taxa in cladograms, dispite a complex geological history as reflected in homoplasy.

What is the confirmation that fossils have been so important in phylogeny for the last half century because of methodological failure in neontology? Surely one should not characterise any group by negative attributes. **A** positive reason for studying fossils is that phylogeny based on extant species alone is simply an interesting **extrapolation.**

More primitive fossils than Rasnitsyn's may have existed but equally well, they ***may*** have not. If the fossil record is so incomplete then why are we not looking for Hymenoptera say, in the Cambrian? Recent insect sampling is not necessarily more complete than fossil sampling because so many species are undescribed and are disappearing along with their habitats. If neontological data is scientifically adequate, why were major extinct insect groups such as those studied by F.M. Carpenter not **predicted?**

Parsimony may be a finer tool than Occam's Razor, but you still need rocks to hone it.

A Rejoinder from Jim Carpenter

Jarzembowski wishes to defend the study of paleontology, but nothing in my contribution can be properly construed as an attack on the field as such. Rather than rebut Jarzembowski in detail, I'll offer one riposte. This is to simply point out that I have recently co-authored a paper, with none other than Alex Rasnitsyn, on Mesozoic Vespidae (Psyche, in press). This describes a new subfamily, among other things, and yes, it containes a cladistic analysis - which enabled the proper placement of the new subfamily.

Some Reaction to the Book Reviews of "A key to the World Species of the Vespinae (Hymenoptera)" with some Further Information on Lee's "New" Species

by

M. E. Archer

(Dept. of Biology, College of Ripon and
York St. John, York Y03 7EX, England)

I am extremely grateful for the useful detailed comments about my key which will be incorporated in a revision one day. I would, however, emphasize that the book is really only a key and not a detailed taxonomic revision of the Vespinae. It is hoped that the key will prove useful particularly as the last such key was written by du Buysson (1904) and much has happened since.

I was criticised for the length of the couplets for the separation of ***Vespula*** from ***Paravespula*** and ***Rugovespula*** from ***Paravespula.*** The couplets are long because of the large number of suitable characters available, many of which are used for the first time or are relatively new. The couplets can be made shorter simply by only using some of the characters! In addition I used the rather informal character of hair colour on the first gastral tergum, which despite the exceptions, is a very good practical character, and surely keys are meant to be very practical things.

I was severly criticised for treating ***Paravespula*** as a genus and thereby recognising five genera in the Vespinae. The problem is how many genera should be recognised within the Vespinae? The answer to this question is complicated by differing opinions about the phylogenetic relationships of the groups within the Vespinae. Carpenter and I seem to agree that there are five basic groups within the Vespinae which for convenience can be called ***Provespa, Vespa, Vespula, Dolichovespula*** and ***Paravespula.*** The recognition of these five basic groups is an important advance on the views of Blüthgen whose grouping of the species would now be seen to be wrong. At present the five groups are usually treated as:

(1) three genera - ***Provespa, Vespa,*** and ***Vespula*** (which includes ***Dolichovespula*** and ***Paravespula).***

(2) four genera - ***Provespa, Vespa, Dolichovespula,*** and ***Vespula*** (which includes ***Paravespula).***

(3) five genera - ***Provespa, Vespa, Dolichovespula, Vespula*** and **Paravespula.**

Carpenter, of course, adopts the four genera solution. I was surprised by Carpenter's solution for I would have expected him, for the sake of economy of words, to have adopted at least the three genera solution. Indeed a return to an older two genera solution might have been expected. The two genera solution for Carpenter would be ***Vespa*** with the rest of ***Vespula.*** The two genera solution for me would be ***Provespa*** and the rest as ***Vespa.*** The reason for this difference of view is because I am not convinced by the phylogenetic relationships that Carpenter has proposed, as noted in Sphecos 11:9-10 and 13:13. To be more controversial I am impressed by the large number of derived characters shown by ***Paravespula*** and if one is persuaded by the theory of evolutionary taxonomy of Mayr I think ***Paravespula*** just has to be given genus status. In the end I adopted the five genera solution because because it gives recognition to the five basic groups and these five groups can be fitted into any tentative scheme of phylogenetic relationships that the investigator favours.

I now have some more information about the nine "new" species of Lee Tiesheng. Chris Starr has been able to obtain an English translation of Lee's two papers (1986). The translation was carried out by Mr. (soon to be Dr.) Yang Zhongqi, to whom very many thanks. The species descriptions are almost entirely colour descriptions and from these descriptions it is not possible to place each of the "new" species in a genus, subgenus or species group. Despite this limitation it is still possible to make the following suggestions:

Vespula hainanensis - almost certainly an island colour form of ***Paravespula flaviceps*** and is very similar to ***P. flaviceps karenkoma.***

V. gracilia - This just looks like the colour form of ***P. flaviceps*** you would expect from south east China which is from where specimens of this "new" species were found.

V. yichunensis - I would question Lee's association of this species with ***P. shidai*** since it seems to fit ***Vespula rufa schrenchii*** very well.

V. hirsuta - Again I would question Lee's association of this species with ***P. shidai*** since it fits ***V. kingdonwardi*** very well.

V. obscura - This one would seem to be like ***V. rufa grahami.***

Dolichovespula stigma - almost certainly *D. sinensis.*

D. nyalamensis - This one was more difficult but a structural character is given so that one can question Lee's association of this species with ***D. media*** and suggest it could be ***D. lama,*** a species of which we know very little.

D. borealis - This one would seem to be a dark colour form of ***D. media,*** a species that varies enormously colourwise.

D. xinjiangensis - This one has given the most trouble and although I would suggest it could be ***D. sylvestris*** a look at some of the structural characters could quickly decide the matter.

In view of these remarks it is essential that the actual specimens be examined. In the meantime a structural description of the specimens would be useful. There ought to be room in the world for a few more new species of Vespinae so hopefully *at* least some of my remarks will prove to be false.

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Comments from the Mud D'aub

To quote Michael,".. keys are meant to be **very** practical things." Long, complicated couplets certainly defeat this premise. The goal of key construction is to make identification easy, and economy of characters is a prime feature of a successful key. Key couplets **are not meant to be descriptions of** all features possessed by an animal. Michael, keys should employ the minimum number of differentiating characters that will guarantee correct identification by the user. The couplets should consist of a few of the most easily seen or appreciated characters.

The recognition of genera is purely subjective regardless of phylogeny. One person will recognize each clade as a genus, while another will use genera only for the most distinctive or divergent groups. The latter person tends to consider the practicality of each genus recognized: does it really convey much useful information and is it easily recognizable? My personal view is that recognition of *Paravespula* as a genus is unwarranted by the facts.

Wasp Lingo

Sphecologist - a wasp worker. Authority: James Carpenter (in lilt.).

A Preliminary Phylogenetic Analysis of Sphecid Wasps and **Bees**

by

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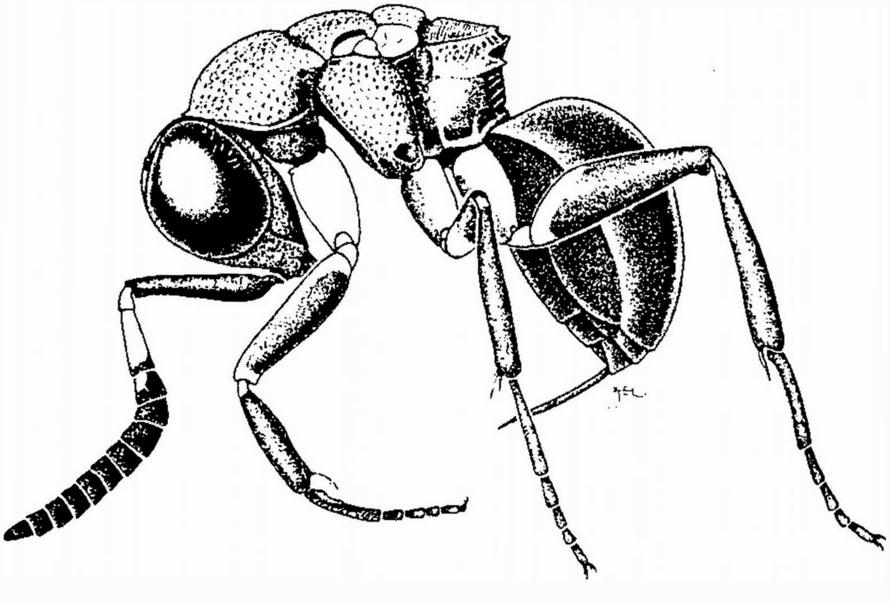
The esteemed editor, founder, and guiding light of this illustrious newsletter has invited me to present a report on the work I have been doing here at the USNM for the past few months. Of course I am honored and eager to cooperate. but I do feel obliged to emphasize that the results I am presenting here are preliminary. Their chief value should be in providing a framework for planning and pursuing more detailed studies of particular character systems and/or taxa in the future.

In the spirit of full disclosure about potential conflicts of intellectual and/or academic interest, I should explain that Howard Evans was my major professor 7 years ago when I earned an **M.S.** degree at Colorado State University, and for the past 8 months I have been working in close association with Arnold Menke. Because of my admiration and respect for these two men, I would rather agree than disagree with them. It is easier for me to assume a detached and objective point of **view** (the proper spirit of scientific inquiry) when evaluating Ole Lomholdt's work (1982), since I do not know him personally. But I find myself in substantial agreement with his conclusions about sphecid relationships. Is this a triumph of the scientific method, or what?

I never intended to undertake a cladistic analysis of all the tribes of sphecid wasps. I just wanted to work out the phylogenetic relationships among the eight species of a relatively obscure (but fascinating) North American genus, *Clypeadon,* in the subfamily (or family) Philanthinae (-idae). It soon became apparent that *Clypeadon,* as currently defined, is a paraphyletic genus in a paraphyletic tribe (Aphilanthopini) in a paraphyletic family (Sphecidae). It was unclear to me whether the Philanthinae as constituted in Bohart and Menke's (1976) classification of the Sphecidae is a monophyletic assemblage. Before I could attempt to analyze the relationships among the species of *Clypeadon,* it was necessary to delineate a monophyletic group that would include the species placed in *Clypeadon,* and to establish the phylogenetic placement of this group relative to other monophyletic assemblages. Thus, the major emphasis of my work has centered upon the philanthine wasps, but it has been necessary to consider all the wasps included in Bohart and Menke's family Sphecidae, as well as the bees. Authorities on nomenclatorial matters have determined that the most appropriate name for this assemblage is Apoidea (Michener, 1986; Gauld and Bolton, 1988). So please keep in mind that Apoidea nowadays means more than just bees. It also includes some wasps ("wasp" is a phylogenetically ambiguous term). Although almost every phylogenetic hypothesis has its detractors, the Apoidea is generally regarded as one of the most strongly supported monophyletic groups within the aculeate Hymenoptera. A thorough summary of the evidence is presented in Brothers (1975), and David Wahl's (1990) contribution to the last issue of Sphecos presents a handy tabulation of the synapomorphies for this lineage. For an alternative opinion, see Boerner (1919) and Lanham (1960, 1988).

Several previous workers have been particularly interested in phylogenetic relationships among sphecid wasps. For my analyses, I have drawn heavily upon the extensive studies of larval



Mahinda saltaror Krombein (Chrysididae: Amiseginae). an egg parasite of walking sticks (Phasmatodea) from South East Asia.

morphology conducted by H.E. Evans and co-workers in the late 1950's and *early* 1960's (with phylogenetic conclusions summarized in Evans, 1959, 1964) and the monumental worldwide generic revision of Bohart and Menke (1976). Although neither of these studies explicitly applied cladistic methods in order to derive the phylogenetic diagrams that are presented, they do contain tables of characters considered to be phylogenetically informative. Furthermore, both Evans and Bohart & Menke provided their assessments of plesiomorphic (= "primitive" or "generalized") and apomorphic (= "specialized") states for these characters. Consequently, the basic elements for a cladistic analysis were already available. Lomholdt (1982) has already provided an explicit Hennigian analysis indicating that the paraphyletic Sphecidae of Bohart and Menke can be *neatly* partitioned into two monophyletic lineages. He proposed the names Sphecidae (= Ampulicinae + Sphecinae of Bohart & Menke) and Larridae (= the rest of the Sphecidae of Bohart & Menke) for these lineages. Lomholdt's Larridae is hypothesized to be the sister group of the bees (which Lomholdt places in a single family, the Apidae). Evans' studies of larval characters figure prominently in Lomholdt's analysis, since the single autapomorphy for Lomholdt's Larridae is a larval character (paired spinnerets) that Evans also emphasized.

Lomholdt's paper is a very important contribution to our understanding of phylogenetic relationships in the Apoidea. Its most serious shortcoming is its vague way of dealing with the formidable problem of high levels of homoplasy within this lineage. Some feeling for the magnitude of this problem can be gained by considering the characters that Lomholdt presents as evidence for his phylogenetic hypothesis. He lists three characters as synapomorphies for Ampulicinae + Sphecinae (his family Sphecidae), but in discussing them he points out that each of them also occurs within the Larridae and/or Apidae. Likewise, the synapomorphies for his Larridae + Apidae are not unique to these two taxa, nor are they universally present within the group. The one autapomorphy for the Larridae appears to be unique to this group and consistently present, but one must remember that this assessment is based upon a small sample of all the species thought to belong to the group (it is a larval character). Two of the five autapomorphies that Lomholdt lists for the Apidae also occur within the Larridae, and one of these characters (the larval galea) varies within the bees. In fairness to Lomholdt, I hasten to point out that he was aware of these patterns of character variation and called attention to them in his paper. He did not try to hide the problem of homoplasy, but neither did he present an explicit discussion of how he decided which shared similarities were homologous and which were convergent.

Now that computer programs for doing parsimony analyses are readily available, it is relatively easy to be more explicit about how distinctions between homology and homoplasy are made for a given data matrix. (There is still enormous potential for ambiguity, or even outright deceit if one were so inclined, since parsimony programs do **not** prescribe how character states are to be defined in the first place.) It is also possible to obtain precise quantitative measures of the level of homoplasy in a data set, although it isn't exactly clear what the wisest use of these numbers might be. I personally do not by any means believe that these new computer methods have made traditional detailed comparative morphological studies obsolete. As I see it, the utility of a quantitative parsimony analysis of the characters presented by Bohart, Evans, Lomholdt, Menke, and others is that it calls attention to patterns of conflict and corroboration among different sets of characters. This forces us to reconsider how character states were originally defined, and it suggests which character systems would be the most appropriate subjects for more detailed comparative morphological study.

Now for some results. I will begin with an evaluation of the characters presented in Evans' analyses of sphecid larvae. In his 1959 paper, he presented a table of 10 characters, and on the facing page he showed "a phylogenetic tree of the major groups of Sphecidae, with primary emphasis on ... three characters" that support three major groupings of subfamilies. Figure 1 shows Evans' tree redrawn as a cladogram in the style that has become

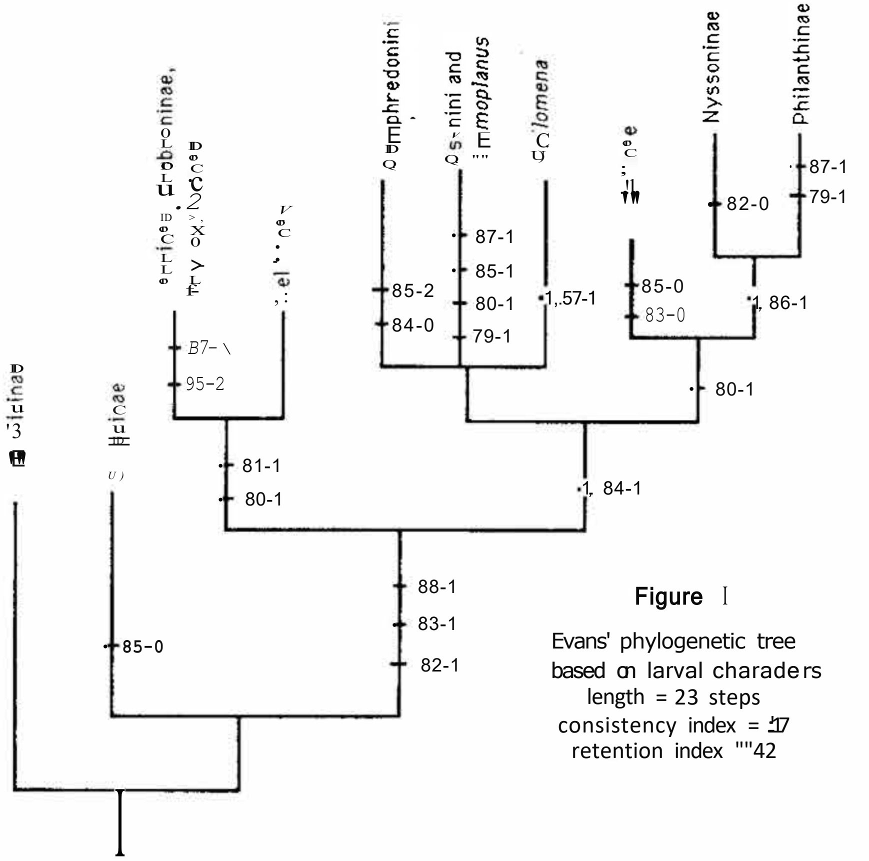


Figure 1

Evans' phylogenetic tree based on larval characters
length = 23 steps
consistency index = .17
retention index = .42

more conventional in recent years (so that it will be easier to compare it with other cladograms). In order to convert Evans' table of character states into a data matrix, it was necessary to go through the numerous descriptions and illustrations of larvae in his publications, supplemented in a few cases (e.g. *Palarus*) by the superb drawings in Grandi's papers (I regret that I cannot readily comprehend the written descriptions in Grandi's papers, because I cannot read Italian). Thus, it is possible that some of my assignments of larval character states to taxa are erroneous. Setting aside this little procedural detail, I can report that there is a single most parsimonious cladogram (Figure 2) for the larval taxa analyzed by Evans. Sphecid afficionados will note that the taxa Larrinae, Crabroninae, and Trypoxyloninae are treated as a single lineage in this analysis (since their larvae received the same codings for all 10 characters), and that the Pemphredoninae are split up in a rather peculiar way. This reflects the pattern of larval character variation noted by Evans and depicted on his phylogenetic tree.

Figure 2 is not the same cladogram as Figure 1. In other words, Evans' phylogenetic tree is not the most parsimonious cladogram for the larval data that I analyzed. One possible explanation already alluded to is that I may not have coded the larval characters the same way that Howard Evans would have. (I am pursuing this matter in correspondence with him right now. He has examined real larvae, whereas I have only looked at pictures and read descriptions, so there is little doubt about whose interpretation should carry the most weight.) However, Evans' discussion of his phylogenetic tree strongly implies that it would not prove to be the most parsimonious (i.e., shortest) tree in an analysis such as mine. He mentions several similarities in the larvae of Philanthinae and the tribe Psenini of the Pemphredoninae, and writes that he "had at first believed that the Psenini might be unrelated to the Pemphredonini and tied in with the philanthine-nyssonine complex." He rejected this hypothesis for two reasons: one genus in the Pemphredonini (*Psenulus*, called *Diodontus* in Evans' paper) contains "an almost perfect mixture of the characters of the Pemphredonini and the more specialized Psenini"; and (unspecified) *adult* characters suggest a close relationship between Pemphredonini and Psenini. Neither of these lines of argument would be reflected in a quantitative parsimony analysis of larval characters at the tribal level. The tribe Pemphredonini was treated as a monophyletic group (although Evans' argument implies that it is not), and characters that varied within the tribe were coded as variable (and assigned a groundplan state by an algorithm that results in the most parsimonious distribution of the character on the most parsimonious cladogram for the entire data set). Adult characters were not dealt with at all in this particular analysis, which only looked at larval characters. Thus Evans chose an interpretation of certain larval characters that would result in a longer tree. Although he did not explain his decision in the same language I have used here (nobody was using such language, at least not in English, in 1959), he knew what he was doing and he explained why he did it. Figure 1 and Figure 2 both require several hypotheses of homoplasy (= convergent evolution or parallelism), although the most parsimonious tree (by definition) requires fewer. The consistency index for the shortest tree (Figure 2) is 57, its retention index is 61, and the tree length is 19 steps. The consistency index for Evans' tree is 47, its retention index is 42, and its length is 23 steps.

At least as noteworthy as the differences between the trees are their similarities. In particular, they both reflect the three major groupings that are emphasized in both published versions of Evans' trees (Evans 1959, 1964). Figures 1 and 2 both show a monophyletic group comprising all sphecid lineages except the Sphecinae and Ampulicinae, and on both trees this grouping is supported by the same three synapomorphies (although two of these synapomorphies are required to undergo reversals on either cladogram). The character on this branch that does not get reversed is the same character emphasized by Evans (and later by Lomholdt): the paired spinnerets. Both cladograms also show Mellininae + Larrinae (including trypoxylines and crabronines) as a monophyletic group, supported by the ventral, preapical placement of the anus. Finally, the two analyses agree in showing that the Astatinae, Nyssoninae, and Philanthinae

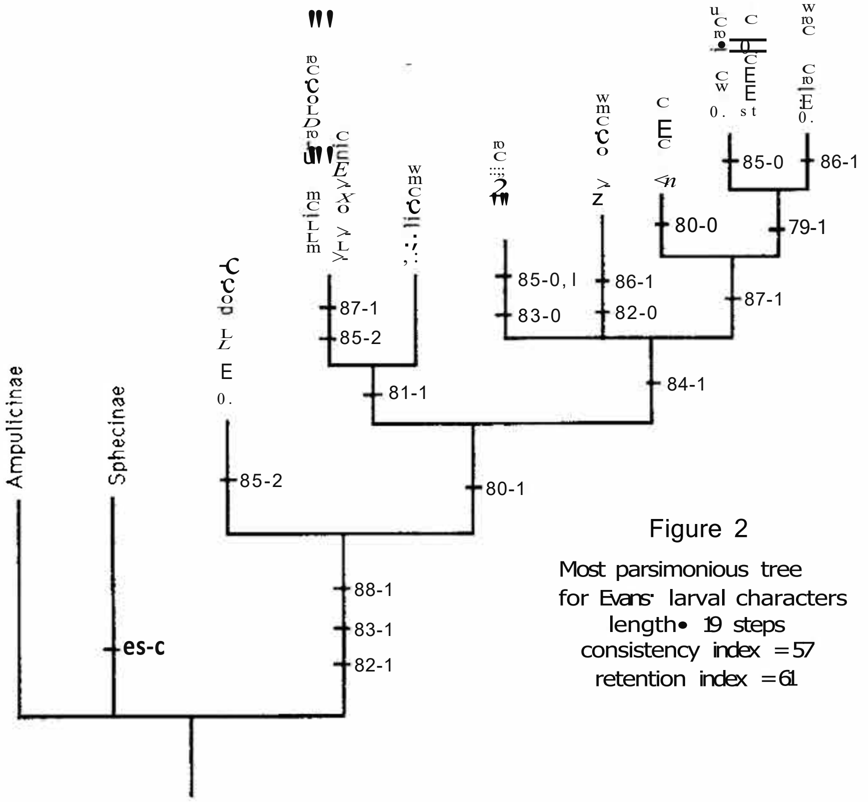


Figure 2

Most parsimonious tree
for Evans' larval characters
length = 19 steps
consistency index = 57
retention index = 61

belong to a monophyletic group, although on the most parsimonious tree this group also includes Psenini, *Ammoplanus,* and *Spilomena* (the latter two genera are currently placed in the Pemphredonini).

From a cladist's point of view, any phylogenetic analysis of the Sphecidae in the broad sense that ignores bees is very questionable, since there is good reason to believe that the Sphecidae is paraphyletic with respect to the bees. In other words, some sphecids are more closely related to bees than they are to other sphecids. This is one of the major messages of Lomholdt's analysis.

What happens if bee larvae are added to the analysis of sphecid larvae, as they should be for a proper cladistic analysis? Confusion reigns. Although the overall level of character conflict is not very different from the analysis for wasps alone (consistency index = 54 for wasps + bees vs. 57 for wasps alone), there are more than 100 equally parsimonious cladograms (I used a fast program, Hennig86, for this analysis; but the computer I was using was rather slow, so it took it an hour or so to find 100 trees. Successive approximations could take half a day. For a preliminary study like this one, I was content to stop at 100 trees.) Successive approximations character weighting doesn't provide much help. There are still more than 100 equally parsimonious trees, and a Nelson consensus tree has almost no resolution. Furthermore, the resolution that is provided (Figure 3) is not a hypothesis that I would ever try to defend. I would advise against making too much of these results. More than anything else, they suggest to me that the rough-and-ready character definitions that seemed to work reasonably well when bees were ignored do not hold up when they are added to the picture. It should not be a severe shock to find that character state definitions such as "mandibles with fewer teeth" and "body with conspicuous projections, either laterally, dorsally, or caudally" will need to be refined. This analysis does highlight one interesting point, which is that there do not appear to be any larval characters to indicate that the bees are monophyletic. Of course, Evans was not looking for such characters, but I made a point of asking Ron McGinley about this (Ron knows bee larvae). and he couldn't think of any, either. There is ample evidence from adult characters that bees are monophyletic, so no cherished taxa are at risk here.

What happens if adult characters are added to the analysis? For example, if Evans is right in arguing that adult characters indicate that the Psenini are more closely related to the Pemphredonini than to the Philanthinae, this should be apparent from a cladistic analysis that includes adult characters. The USNM has an extensive and superbly curated sphecid collection. (This is due to the commendable efforts of A.S. Menke, M. Molineaux, and probably others unknown to me.) Thus it was possible for me to examine adults of every genus, and all but a handful of the species, whose larvae were included in Evans' studies. Bees are represented by a few exemplars from the major lineages. Adult characters were taken primarily from tables, descriptions, and diagnoses in Bohart & Menke's big blue book, as well as some characters from Brothers' analyses. (I have examined adult specimens myself, and not just raided the literature for character descriptions. As a consequence of my examinations, I have slightly modified a few character definitions, but I am basically using Bohart and Menke's characters.) Adult bees and wasps are considerably more morphologically complex than larvae, and they exhibit correspondingly greater morphological variation. Thus, a matrix combining adult and larval characters is very lopsided in favor of adult characters. The analysis I am about to describe had a matrix with 80 adult and 10 larval characters. I have examined the effects of analyzing only adult characters, of deleting characters for which polarity decisions were equivocal, and so on; and I will be happy to share the results of these analyses with anyone who is really interested. I also think it will be most appropriate to present the technical details in a refereed journal (Sphecos is supposed to be a newsletter, after all). Since this report is already very long, I hope it will suffice to simply present the results of the analysis that combined the most information, i.e. both adult and larval characters. Terminal taxa for this analysis were tribes as defined by Bohart & Menke (plus the major lineages of bees). Names attached to these lineages in the figures are only intended to serve as labels, and should not be construed to imply final opinions about the proper

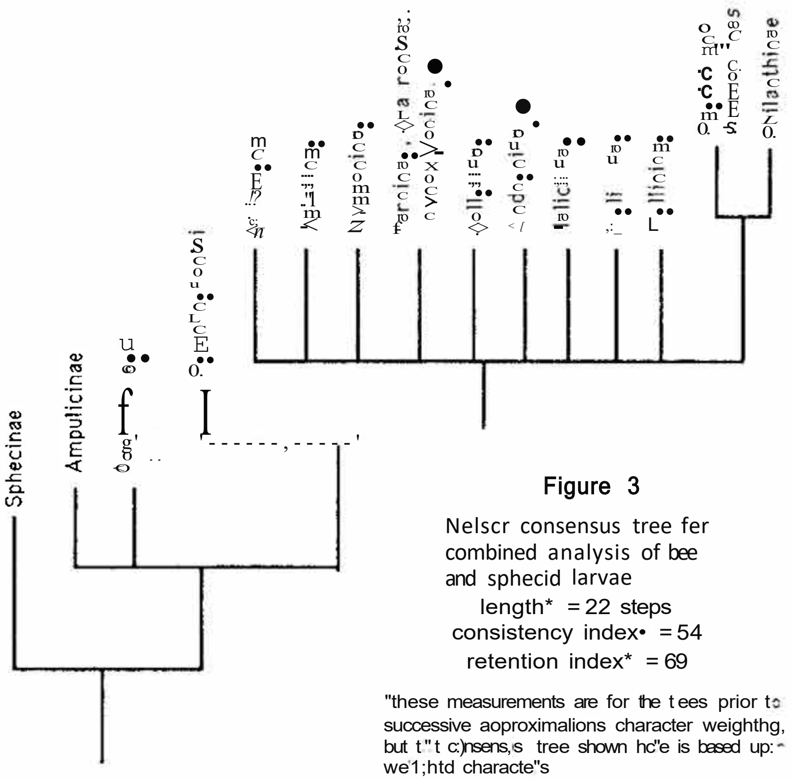


Figure 3

Nelson consensus tree for combined analysis of bee and sphecid larvae

length* = 22 steps

consistency index* = 54

retention index* = 69

*these measurements are for the trees prior to successive approximations character weighting, but the consensus tree shown here is based upon weighted characters

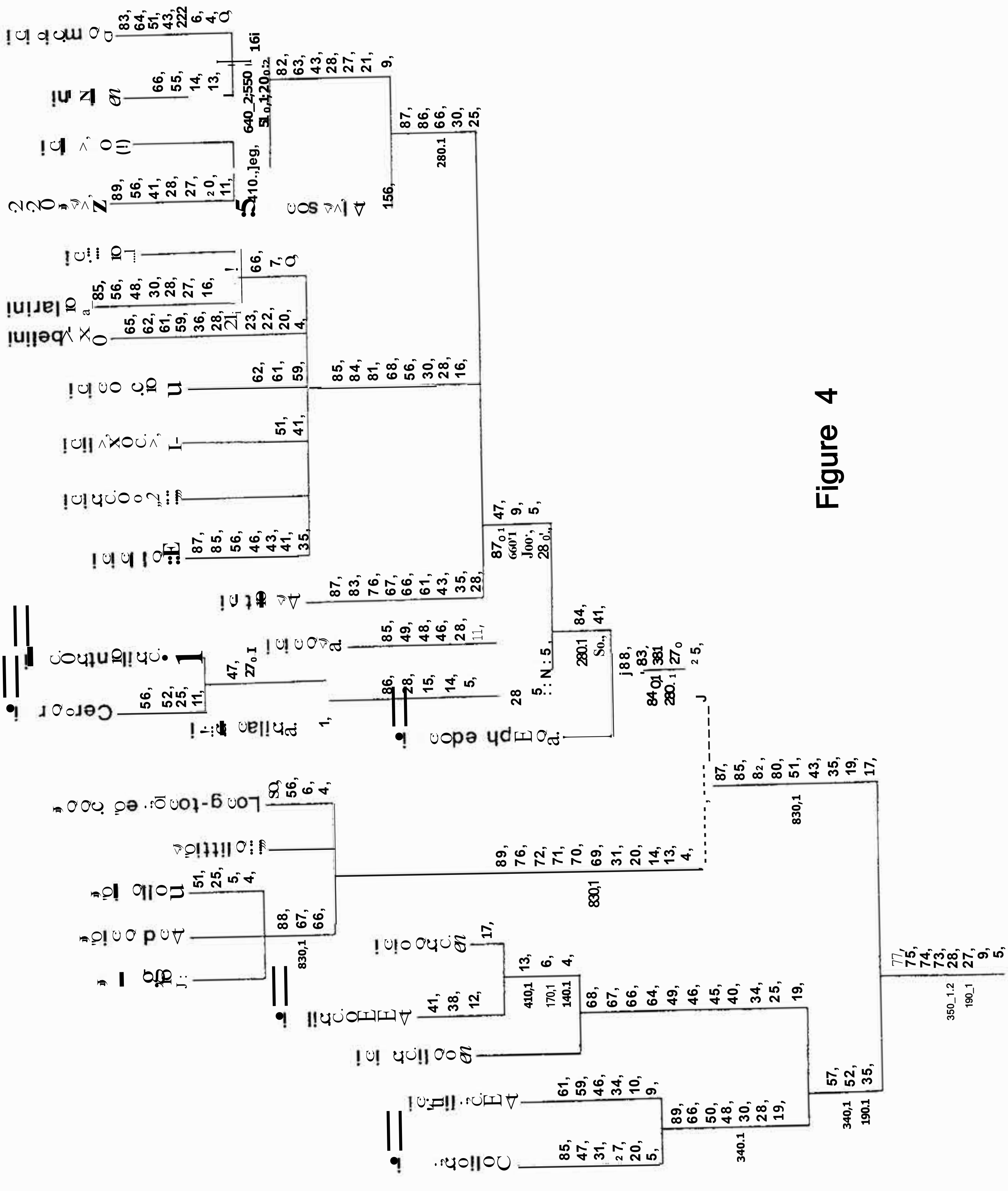


Figure 4

taxonomic rank of these groups. Some tribes (e.g. Gorytini, Sceliphrini, Miscophini,) are apparently paraphyletic.

With all characters weighted equally, there are over 100 equally parsimonious trees. The consistency index is 44, the retention index 65. Successive approximations character weighting could not reduce the number of equally parsimonious trees below 100, but a Nelson consensus tree (Figure 4) shows considerable resolution. In fact, there are only three groups within which relationships are not fully resolved. One is the bees (this will not surprise anybody familiar with bees, and this data set is not intended to sort out relationships within the bees anyway). The largest unresolved clade is an assemblage of tribes corresponding to Bohart & Menke's Larrinae, Crabroninae, and Mellinini. In addition to the unresolved relationships within this clade, it is also one element of an unresolved trichotomy whose other components are the Astatini and a group of tribes corresponding to Bohart and Menke's Nyssoninae (minus the Mellinini). It is particularly noteworthy that Lomholdt's hypothesis of three major clades, which he called Sphecidae, Larridae, and Apidae, is supported by this analysis. (Larval characters are critical to this conclusion. If larval characters are excluded, the bees consistently come out as the sister group of the Philanthinae.) Evans' conclusion that *Mellinus* is closely related to the larrines (rather than the nyssonines, as suggested by Bohart & Menke) is also supported by this analysis. However, the Pemphredoninae does not appear to be a monophyletic group, and the Psenini seems to be the sister group of the Philanthinae (again, this result is strongly influenced by larval characters). I am not very familiar with pemphredonines, so I do not have any strong opinions or informed intuiijions about whether they "ought" to be monophyletic and something is seriously wrong with an analysis implying that they are not. If somebody knows of evidence supporting the monophyly of the Pemphredoninae, perhaps *my* analysis will provoke them into presenting it.

An unfortunate limitation of this study is that it leaves out some of the most interesting and problematic taxa, because their larvae remain undescribed. Given my current interest in philanthines, it was particularly frustrating not to have larvae of *Pseudosco/ia, Odontosphex,* and *Eremiasphecium.* Bohart and Menke have placed each of these genera in its own monotypic tribe within the Philanthinae. Another philanthine genus whose larvae are unknown is *Philanthinus.* My analyses of adult characters indicate that *Pseudosco/ia* is the sister group of *Cerceris* + *Eucerceris* and *Philanthinus* is the sister group of *Phi/anthus* + *Trachypus,* but that *Odontosphex* and *Eremiasphecium* are not closely related to the genera that cluster together as a monophyletic Philanthinae. *Odontosphex* seems to belong among the larrines, and *Eremiasphecium* is difficult to place. Larvae of all these taxa could be very helpful in determining their phylogenetic position. Since both the Philanthinae and the Larrinae have distinctive larval apomorphies, larvae of *Odontosphex* should help determine whether it is a larrine or a philanthine. Similarly, the larvae of *Pseudosco/ia* and *Philanthinus* should share the apomorphies of the philanthine genera whose larvae have been described. Other genera whose phylogenetic placement presents especially vexing problems are *Entomosericus, Xenosphex, Laphyragogus,* and *Heliocausus.* I won't even venture a guess as to what the larvae of the first three genera look like, but I certainly would like to know. One final item for the wish list is *Dinetus,* which Bohart and Menke place in the Astatinae. In my analyses of adult characters, it has never come out as a sister group of Astatini. Evans reports that the larvae of the Astatinae are characterized by two unique features (which could well be autapomorphic), so this is *yet* another case where larval characters could be helpful in elucidating relationships.

I hope that this plea for more larvae will not be misconstrued as implying that the information content of adult characters has been exhausted. Much more can and should be done with adult morphological characters. Figure 4 is a summary of hypotheses of homology and homoplasy, and they all merit more detailed consideration. Admittedly, I doubt that much more insight will be gained from counting midtibial spurs again (although it is worth finding out if it is possible to determine *which* of the two spurs may have been lost in those taxa with only one spur). However, it would certainly be worthwhile to more carefully scrutinize the apparent similarities or differences in characters which were rather crudely defined in this analysis. Prime candidates include the mouthparts, "face" (clypeus, subantennal area, inner margins of compound eyes), tarsi, ocelli, the morphological nightmare of mesothoracic sutures, sulci, and carinae, and the volsellae. We still have a lot to learn, but we do have a fairly solid foundation upon which to build, and specific hypotheses to test. Isn't this the way science is supposed to be?

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CHARACTERS AND CHARACTER STATES SHOWN ON FIGURES 1,2, AND 4

(Terminology based upon Bohart & Menke, 1976)

Character	Character States
0. ocelli	~~0. hemispherical~~, with transparent lens 1. flattened, oval or linear, or reduced to transverse scar
1. inner margin of compound eyes	0. more or less parallel 1. distinctly notched or emarginate
2. facets of compound eye	0. uniform in size throughout 1. some facets much larger than others
3. stipites	0. short and broad 1. long and narrow
4. galea-glossa complex	0. short, broad, flaplike 1. moderately elongated, not flaplike 2. greatly elongated, subtubular (e.g. bembicines) 3. greatly elongated, flattened, closely approximated to modified labial palpi (long-tongued bees)
5. mandibular socket	a.open 1. closed
6. labrum	0. short, much wider than long, usually hidden by clypeus 1. subquadrate, abcut as wide as long 2. much longer than wide, extending well beyond clypeus
7. externoventral tooth or notch on mandible	0. absent 1. present
8. clypeus subdivided by distinct longrtudinal lines	0. no 1. yes
9. shape of clypeus	0. narrowly transverse, overall shape roughly a narrow rectangle 1. with median portion dorsally produced, overall shape roughly trapezoidal 2. sharply rooflike (Ampulicini) 3. swollen (to accomodate retracted proboscis) 4. with median portion ventrally produced, overall shape roughly trapezoidal
10. gular area	0. narrow; hypostomal area close to occipital area 1. broad; hypostomal area broadly separated from occipital area
11. frontal carina	0. absent 1. present, longitudinal 2. present, T-shaped 3. present, as in Dolichurini 4. present, as in Nyssonini
12. frontal sulcus	0. absent 1. present
13. antenna! sockets	0. contacting clypeus, or separated by less than 1/2 diameter of socket 1. separated from clypeus by more than 1/2 diameter of socket
14. delimrted subantennal sclerite	0. absent 1. present (definrtion of Bohart & Menke, 1976; not Michener, 1944)
15. male clypeal brush	0. absent 1. present
16. propleuron	0. not specially modified (may be very long and narrow, as in *Ampu/ex, Trigonopsis,* etc.), posterolateral angle evenly rounded 1. posterolateral margin lamellate, posterolateral angle declivous and set off from rest of propleuron by inner ridge or hump 2. anterior face strongly flattened, somewhat compressed in lateral view, ventral margin and posterolateral angle lamellate
17. prenatal collar	0. broad, not collarlike 1. narrowly transverse, collarlike
18. prenatal lobe	0. in contact with tegula 1. separated from tegula by anterolateral process on scutum, so that scutum directly contacts mesopleuron
19. notauli	0. present, long 1. absent or very short (not extending back to level of tegula)
20. ad median lines of scutum	0. separate, distinct 1. fused into a single median line 2. absent
21. oblique scutal carina	0. absent 1. present
22. scutellum	0. unmodified, without lateral flange 1. with lateral flange overlapping metanoturn 2. a horizontal, straplike band closely appressed to rnetanotum, posterior margin lamellate
23. metanotal squamae	0. absent 1. present
24. pitted transverse basal sulcus on scutellum	0. absent 1. present

Character	Character States
25. episternal sulcus	~~0. present, long~~ (i.e., extending ventrad of scrobal sulcus) 1. short or absent
26. omaulus	0. absent 1. present
27. postspiracular carina	0. present as a narrow, sharp ridge forming vertical anterior wall of subalar fossa 1. as in 0, but a broad, rounded ridge 2. absent, because subalar fossa is absent or separated into distinct anterior and posterior pits
28. subalar line	0. absent or incomplete, but subalar area not reduced in size 1. present, but not greatly expanded into a carinate flange or ridge 2. present as a very prominent carina or flange 3. absent due to reduction of subalar area
29. separation of middle coxae	0. metasternum quadrate or rectangular, more or less on same plane as mesosternum, midcoxae widely separated 1. metasternum distinctly narrowed anteriorly, so midcoxae are nearly contiguous
30. posterior margin of metasternum	0. entire, broadly rounded or truncate 1. distinctly bilobed, lobes subparallel and closely approximated 2. distinctly bilobed, lobes strongly diverging apically (= "Y-shaped metasternum" of Bohart & Menke)
31. precoxal lobes	0. present, delineated by distinct transverse groove from mesosternal apophyseal pit 1. absent, i.e. no transverse groove discernible
32. dorsolateral carina or crest on midcoxae	0. absent 1. present
33. definitive lower metapleural area	0. present 1. absent
34. propodeal sternite	0. absent 1. present
35. propodeal enclosure (= metapostnotum of Brothers 1975)	0. present, U-shaped 1. present, V-shaped 2. absent
36. propodeal mucro	0. absent 1. present
37. lateral propodeal spines or teeth	0. absent 1. present
38. tarsal claw	0. bifid or with subapical teeth or lobes 1. simple
39. plantulae	0. present 1. absent
40. apicoventral setae on hindtarsomere V	0. setiform 1. flattened, bladelike
41. foretarsal rake (female)	0. absent 1. present
42. tarsomeres	0. IV similar to III, V inserted toward apex of IV 1. IV short, V inserted dorsally at base of IV
43. number of midtibial spurs	0. two 1. one
44. apex of hind femur	0. not specially modified 1. truncate, widened 2. with an apical spoonlike process
45. insertion of metasoma (= gaster)	0. between hind coxae 1. after and above hind coxae
46. metasomal petiole	0. absent 1. formed of (metasomal) sternum 1 only 2. formed of sternum 1 and tergum 1
47. metasomal sternum 1	0. simple at base 1. with longitudinal median ridge or paired ridges at base 2. with prominent transverse ridge at base
48. shape of metasomal sternum 2	0. evenly convex, not swollen at base 1. swollen at base, but without a transverse sulcus 2. as in 1, but with a transverse sulcus 3. as in *Palarus* 4. swollen at base, with a transverse sulcus and a median pair of weak prominences bearing tufts of very short, fine setae
49. lateral line or carina on metasomal tergum 1	0. present 1. absent
50. number of visible metasomal segments in males	0. seven 1. fewer than seven
51. female pygidial plate	0. present 1. absent
52. female sternum 6	0. not specially modified, (except for troughlike, more or less vertical side walls in most taxa) 1. elongate, forming an exposed tapering tube through which sting is exserted

Character	Character States
52. ~~female~~ sternum 6 (continued)	2. apically brtid or strongly emarginate
53. apex of female metasoma	0. more or less conical 1. distinctly laterally compressed 2. distinctly dorsoventrally compressed
54. cerci (males)	0. present 1. absent
55. laterobasal spiracular lobes on tergum 7 (males)	0. absent 1. present
56. volsella	0. with distinct, movable digitus and cuspis 1. digitus and cuspis fused, not differentiated 2. absent
57. aedeagal head (= apex of penis valves)	0. without teeth on ventral edge 1. with teeth on ventral edge
58. apex of marginal cell	0. acuminate 1. truncate, broadly rounded
59. number of submarginal cells	0. three 1. two or fewer
60. outer veinlet of 3rd submarginal cell	0. ending near middle of marginal cell, or at least not beyond 3/4 ventral length of cell 1. ending near apex of marginal cell 2. absent
61. outer veinlet of first submarginal cell (vein RS)	0. angled, and with a remnant of first radial cross vein (vein 1r-rs) 1. straight or weakly curved, not appendiculate 2. this section of RS is absent (only two submarginal cells)
62. number of discoidal cells in forewing	0. three 1. two or fewer
63. divergence of forewing media	0. at or after cu-a 1. before cu-a
64. prestigmal length of first submarginal cell	0. less than twice height of cell 1. more than twice height of cell 2. more than three times height of cell
65. submarginal and discoidal cells	0. separate 1. fused
66. jugal lobe	0. small or absent 1. about 1/2 vannal area 2. greater than 3/4 vannal area

Character	Character States
67. hind wing anal vein 2	~~0. present as a (~~very short) tubular vein 1. present as a nebulous or spectral vein 2. absent
68. hind wing anal vein 3	0. pres:ent 1. absent
69. body vestiture including some plumose hairs	a.no 1.yes

Characters 70-78 are based primarily on Brothers 1975, and establish the monophyly of Apoidea and Apidae s.l.)

Character	Character States
70. female tergum 7	0. somewhat exposed, even· Ir sclerotized throughout . retracted and entirely hidden from external view, sclerotization reduced to a short strip across anterior margin 2. sclerotization entirely reduced mesally so that the lateral spiracular plates (hemitergites) are linked by membrane only
71. female hind basitarsus	0. subcylindrical, about as wide as more distal tarsomeres 1. flattened, wider than more distal segments
72. larval provisions	0. arthropods 1. pollen and nectar (or plant oils)
73. posterolateral angle of pronotum -	0. evenly rounded or subacute, reaching tegula 1. reduced dorsally above and slightly anterior to spiracular operculum; operculum forms a highly differentiated prenatal lobe
74. ventral angle of pronotum	0. rounded, not much exceeding level of base of forecoxa 1. greatly produced, almost contacting its counterpart ventrally
75. metapostnotum	0. forming a transverse groove at anterior margin of propodeum (may be greatly attenuated or absent mesally) 1.11reatly enlarged and poster10rly produced mesally, forming a "propodeal enclosure" or "propodeal triangle"
76. hindtibial strigilus	0. absent 1. present
77. hind margin of pronotum	0. pronotum large nearly straight, only very slightly anteriorly arcuate

Character	Character States
77. hind margin of pronotum (continued)	1. pronotum shortened, hind margin strongly concave in a fairly regular and somewhat arcuate parabolic curve (V-shaped) 2. pronotum shortened, hind margin shifted anteriorly over almost its entire width (broadly U-shaped)
78. prosternum	0. forming an approximately uniform plane, not sunken 1. sunken over most of its surface, only a short anterior section visible ventrally

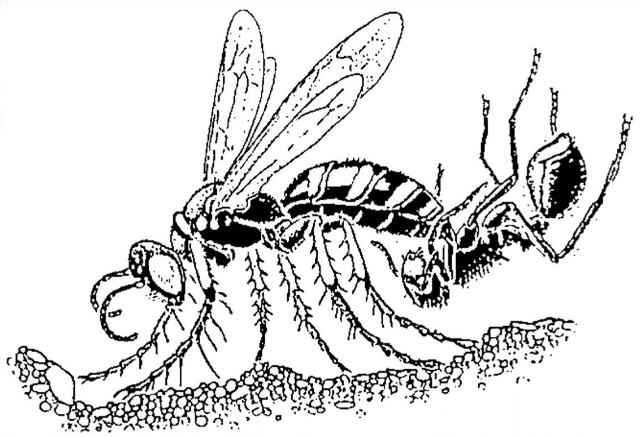
79-88 are larval characters, taken from Evans, 1959

79. integument	0. smooth 1. with abundant setae or dense spinules
80. body shape	0. with more or less even contours 1. with conspicuous projections laterally, dorsally, or caudally
81. position of anus	0. terminal, directed caudad 1. ventral, preapical, directed ventrad
82. opening between atrium	0. armed with a circlet of spines and subatrium of spiracles 1. simple, unarmed
83. parietal bands	0. present, distinct 1. absent (may be faintly indicated)
84. antennal papillae	0. absent 1. present
85. mandibles	0. simple, with 4 or 5 apical teeth 1. with fewer teeth 2. with an apical concavity 3. as in *Mellinus*
86. maxillae	0. directed mesad apically, closely associated with labium and hypopharynx 1. projecting apically as large, free lobes
87. galeae	0. large 1. small (or absent)
88. spinneret	0. a transverse slit 1. with paired openings, each at the end of a projection 2. absent (Colletidae, Andrenidae)

Character	Character States

The following character is an adult character taken from Brothers, 1975)

89. male metasomal sternum 7	0. well developed, not much smaller than S6, clearly visible externally and exposed (not exposed in Psenini. but about same size as S6) 1. reduced and much smaller than S6, but partly exposed 2. greatly reduced, much smaller than S6 and completely hidden by it 3. absent (some Nyssoninae)



A female of *Clypeadon laricinctus* with *Pogonomyrmex* worker in tow.

A FOSSIL INSECT SITE

by

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After 18 years of research and petitioning, the Department of Interior's Bureau of Land Management has set aside and protected 1420 acres of public land in Mineral County, Nevada, for paleontological research. The area, known as Stewart Valley Palontological Site, contains abundant plant and invertebrate fossils in Mid-Miocene shales, 15 million years old. The insect fossils I have seen are very good, as good as, if not better than, those at Florissant. If you are interested in studying these fossils, contact Dr. Harvey I. Scudder, 7409 Hansen Drive, Dublin, CA 94568, phone (415) 828-4995; he organized much of the research and petitioning and is a fellow of the California Academy of Sciences. For further information, contact Vienna Wolder, SLM, Nevada State Office, P.O. Box 12000, Reno, NV 89520, phone (702) 328-6326.

SCIENTIFIC NOTES

Pompilid Wasps of Brackenridge Field Laboratory and of the Greater Austin Area

Compiled by
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Determinations by
Howard E. Evans
(Dept. of Entomology, Colorado State Univ.)
and by
James E. Gillaspy
(Brackenridge Field Lab, Austin, TX)

The University of Texas' Brackenridge Field Laboratory (BFL) encompasses 32 hectares (ca. 88 acres) of woodland (live oak, juniper, pecan, hackberry, etc.) and grassy fields that lie adjacent to the Colorado River. Soils here range from loam to caliche. Situated only 2.5 miles up-river from downtown Austin, BFL supports a rich **aculeate fauna; evidenced, in part, by species lists for eumenines and mutillids (Sphecos** 17:14-15; 18:9-10), but also by the 58 pompilid species listed below. All 74 species listed were taken from within a 30 mi. radius of Austin, although Austin itself accounts for 64 species. Krombein et al., 1979 (**Hymenoptera Catalog**) was referenced for **distributional records and for taxa** arrangement, although I omitted subgen**era to conserve space.**

Only at BFL have spider wasps been collected with any intensity. Sites much less frequently collected included: 1) Pedernales Falls State Park (PFSP), located 30 mi. W Austin, in the Edward's Plateau; 2) Gill Ranch (GR), located 20 mi. SW Austin, at the edge of the Edward's Plateau; 3) Sayersville (Sayers), located 30 mi. E Austin in sand deposits vegetated by post oak; 4) Bastrop State Park (BSP), located ca. 10 mi. S Sayers in piney woods. **Counties represented are as follows:** Travis Co. - BFL, GR; Bastrop Co.- Sayers, BSP; Blanco Co. - PFSP.

Included in this list are four new state records, denoted by an (•) after locality. Howard noted that two of these wasps *(Dipogon iracundus, D. g. graenicher,),* differ a bit from the descriptions, and so perhaps they should be compared to the types. Howard also mentioned that he had been told that *Poeci/opompilus f. f/avopictus* is a synonym of *P. mixtus* F., although he had not studied the matter critically - thus I chose to follow the catalog in this case. Further, the BFL specimens of *P. f. f/avopictus* rep**resent the northernmost record known** to Howard. I find it interesting that *Ageniefla submetallica* is known only from Austin; this wasp was only collected at BFL during this "survey" (1986-89).

Recently, Deyrup et al., 1988 (**Psyche** 95:265-81) reported on the biology of *Aflochares azureus.* In the past 4 years I have seen several females of *A. azureus* , prey searching inside the laboratory at BFL. One female was observed to enter the retreat portion of a web belonging to a *Filistata* spider. Old **cocoons are commonly seen in webs of** *Filistata,* outside and occasionally even inside the laboratory building. I wonder if some females are able to complete their entire life cycle inside the confines of the laboratory building.

Finally, I would like to thank Richard Gill for permission to collect at GR, and David H. Riskind of the Texas Parks and Wildlife Department, for issuing Scientific Study Permits: 21-86, 11-87, 19-88 and 20-89, which allowed the BSP and PFSP collections.

POMPILIO SPECIES AND LOCALITY
(For names preceded by an asterisk, see following article by Menke)

•*chirodamus ferocu/is* (Banks), BFL
•*chirodamus heiligbrodtii* (Cresson), BFL
•*chirodamus maculipennis* (Smith), BFL
Pepsis chrysothemis Lucas, PFSP
Pepsis thisbe Lucas, BFL
Pepsis cerberus Lucas, BFL, GR
Pepsis mildei Stal., BFL, PFSP
Hemipepsis ustulata Dahlbom, BFL, PFSP
Priocnessus nuperus (Cresson), BFL
Entypus fulvicornis (Cresson), BFL, GR
Entypus unifasciatus cressoni (Banks), BFL, GR
•*cryptochei/us attenuatum* Banks, Austin
***Cryptocheifus idoneum birkmanni* Banks, Sayers**
***Cryptocheifus severini* Banks, Austin**
***Priocnemis minorata* Banks, BFL ***
Priocnemis cornica (Say), BFL
•*caticurgus hyalinatus rupex* (Cresson), BFL
Dipogon iracundus Townes , BFL•
Dipogon papago anomalus Dreisbach, BFL
Dipogon g. graenicheriBanks, BFL·
Auplopus adjunctus (Banks), BFL, Sayers
Auplopus c. caerulescens (Dahlbom), BFL
Auplopus m. meflipes (Say), BFL, Sayers
Aup/opus nigreflus (Banks), BFL
Ageniel/a incita (Banks), Austin
Ageniella semitincta (Banks), Austin
Ageniefla arcuata (Banks), BFL, Sayers
Ageniefla f. faceta (Cresson), BFL
***Ageniefla rufescens* (Banks), PFSP•**
Ageniefla accepta (Cresson), BFL, PFSP
Ageniefla conf/icta Banks, BFL
Ageniella submetaflica (Banks), BFL
Ageniella utilis (Cameron), Austin
Aporus conco/or(Smrth), BFL, PFSP
Aporus niger (Cresson), BFL
'Aflaporus rufiventris (Cresson) , BFL
Aflaporus smithianus (Cameron), BFL
Psorthaspsis /uctuosa (Banks), BFL
Psorthaspsis texana (Cresson), BFL
'Psorthaspsis vicina (Cresson), BSP
Evagetes padrinus minuscu/us (Banks), BFL
Evagetes parvus (Cresson), BFL
Agenioideus biedermani (Banks), Austin
Agenioideus birkmanni (Banks), BFL
Sericopompi/us angustatus (Cresson), Sayers
Sericopompilus apica/is (Say), BFL
Episyron b. bigutlatus (Fabricius), BFL
Episyron conterminus posterus (Fox), BFL
Episyron snowi (Viereck), Sayers
Poecilopompilus a. algidus (Smith), BFL, GR
Poeci/opompilus i. interruptus (Say), BFL
Poecilopompilus f. f/avopictus (Smith), BFL
Tachypompilus ferrugineus annexus (Banks), BFL
Anop/ius lepidus atramentarius (Dahlbom), BFL, GR
Anoplius acapulcoensis (Cameron), PFSP
•*Anoplius marginalis* (Banks), Sayers
Anop/ius moestus (Banks), BFL, GR
Anoplius c/ystera (Banks), BFL
Anoplius cylindricus (Cresson), BFL
Anoplius inso/ens (Banks), BFL
Anoplius marginatus (Say), BFL
Anoplius percitus Evans, BFL
Anoplius sp/endens (Dreisbach), BFL, **BSP**
Anoplius subcylindricus (Banks), BFL, PFSP
Anoplius fulgidus (Cresson), GR
Anoplius papago Banks, BFL
•*Pompi/us s. so/onus* (Banks), GR
•*Pompi/us apicatus* Provancher, BFL
Aporineflus medianus Banks, BFL

Aporinellus yucatanensis (Cameron), BFL
Allochares azureus (Cresson), BFL
Paracyphononyx funereus (Lepeletier), BFL
Geropa/es fulvipes Cresson, BFL, Sayers
Geropafes maculata fratema Smith, BFL

Nomenclature of North American Pomplldae

by

Arnold S. Menke

This treatise was prompted by a glance at the list of pompilids in Allan Hook's article on spider wasps in Texas, because it revealed that some names used were out-of-date. Over the past 13 years a number of significant name changes have been proposed in the Pompilidae by M. C. Day (1977, 1979, 1981) and A. Roig (1985, 1989). These, of course, are not reflected in the 1979 Catalog of Hymenoptera In America because they were published too late for inclusion. On the other hand, some species names in the catalog are incorrect because Article 59 (b) of the International Code of Zoological Nomenclature was not always complied with (see either 1964 or 1985 editions). The purpose of this article is to focus attention on some of the changes proposed by Day and Roig, as well as to indicate the correct names for some species in the catalog. The generic names will be discussed first. I am not suggesting that the generic changes noted here are valid or invalid; nor am I including any data on characters of the taxa in question. I think, however, that it is important for all pompilid workers to be aware of the proposals of these two authors. Probably some pompilid specialists will not accept some of the restricted generic concepts of Day and Roig, regarding them as "hair splitting•, but hopefully they will present counter arguments in print (Wasbauer & Kimsey, 1985, already have, see below under *Pompi/us).* The whole concept of how and where one draws the line on taxonomic "splitting" would make excellent fodder for the Forum: at what point do refined taxonomic concepts (ie, raising subgenera to genera, tribes to subfamilies, subfamilies to families, etc.) lose the all important quality of practicality? Or to use the old, familiar saying, when do we lose sight of the forest because of the trees?

Chirodamus Haliday, 1837.
Roig (1985, 1989) restricted the genus to a few species confined to South America. According to Roig, the majority of North American *"Ghirodamus·* actually should be assigned to *Calopompi/us* Ashmead, 1900.

Ga/icurgus Lepeletier, 1845.
This name is properly regarded as a junior homonym of *Ca/icurgus* Brulle, 1833, as explained by *Day* (1979:7). Therefore, Pate's replacement name *Galiadurgus* must be used.

Pompi/us Fabricius, 1798.
Day (1981 :7) restricted *Pompi/us* to a small group of Old Worid species most of which are African. After reading Day's paper it is not clear to me what genus or genera the North American species of *"Pompi/us· sensu lato* belong in, but he evidently regards the subgenus *Arachnospila* Kincaid as a genus with *Ammosphex* and *Anop/ochares* as subgenera. The use of *Arachnospila* as a genus dates back to Priesner (1968), and Day has continued that usage in his papers (see Day, 1979, 1988, for example). The other subgenera of *Pompi/us (Hesperopompi/us, Xenopompilus, Perissopompilus* and *Xerochares)* are discussed by Day (1981), but their status is not clearly resolved. Perhaps Mick will give readers of Spheco some clarification of these taxa. Wasbauer and Kimsey (1985:83) remain unconvinced that the narrower concept of *Pompi/us* and the elevation of *Arachnospila* to genus are justified morphologically.

Generic gender

Cryptochei/us is masculine under the provisions of the Code as pointed out by Day (1979:3). Hence the species name is *attenuatus* Banks, not *attenuatum.* All but one of the species names in the Hymenoptera catalog have neuter endings - they should be changed to masculine.

Species name changes

Ca/iadurgus /asciatellus a/ienatus (Smith), not *hyafinatus alienatus:*
Day (1979:5 & 7) demonstrated that *Sphex hya/inatus* Fabricius, 1793, had been misinterpreted and belonged in the genus *Priocnemis,* not *Caliadurgus.* The first available name for the species listed in the Catalog as *Ca/icurgus hya/inatus a/ienatus* is */asciatellus* Spinola, 1808, as pointed out by Day.

Anop/ius semicinctus (Dahlbom), not *marginalis* Banks:
Day (1977) demonstrated that *Pompi/us semicinctus* Dahlbom, 1843, was a senior synonym of *marginalis* Banks, 1910.

Anoplius nigritus (Dahlbom), not *relativus* (Fox):
Day (1977) demonstrated that *Pompi/is nigritus* Dahlbom, 1843 is a senior synonym of *relativus* Fox, 1893.

The following are the result of adhering to Art. 59 (b) of the Code. All are replacement names proposed by Dalla Torre (1897) in his world catalog of Hymenoptera. His conservative treatment of genera produced quite a lot of homonymy, and he usually proposed new names for the junior homonyms. Some workers have chosen to ignore these names and not follow the Code. Although Dalla Torre replacement names were accepted in some wasp families in the Hymenoptera catalog, those applying to the Pompilidae were not. Likewise, Evans, in his papers on North American Pompilidae, rejected use of Dalla Torre names. My "resurrection· of these names here will doubtless stir up some debate - at least I hope sol

Allaporus minimus (Cresson), not *rufiventris*
Dalla Torre (1897) validly rejected *Aporus rufiventris* Cresson 1872 as a junior secondary homonym (nee Gu8•rin-Meneville, 1838) by proposing the replacement name *rufiventricosus.* Cresson's 1872 name *minimus* has pri•ority however, and must be used for the species.

Psorthaspis bombinator (Dalla Torre), not *vicina*
Dalla Torre (1897) validly rejected *vicina* Cresson 1872 as a junior secondary homonym (nee Lepeletier, 1845) by proposing the replacement name *bombinator.*

Aporinellus unionis (Dalla Torre), not *fasciatus*
Dalla Torre (1897) validly rejected *fasciatus* Smith 1855 as a junior secondary homonym (nee *fasciatus* Fabrici·

us, 1775), by proposing the replacement name *unionis.* Wasbauer & Kimsey (1985) failed to use Dalla Torre's replacement name.

Aporinellus taeniolatus (Dalla Torre), not ***taeniatus***

Dalla Torre (1897) validly rejected *taeniatus* Kohl, 1886 as a junior secondary homonym (nee *taeniatus* Ruthe & Stein, 1857), by proposing the replacement name *taeniolatus.* Wasbauer & Kimsey (1985) rejected use of *taeniolatus* by insinuating that no homonymy existed when Dalla Torre proposed the name: "new name for *taeniatus* Kohl, thought to be preoccupied". Well it was preoccupied at the time Dalla Torre cataloged many species under *Pompi/us,* some of which had been described or assigned elsewhere. Ruthe & Stein described *taeniatus* - I have checked the original description.

The tribe Ageniellini

Day (1979:5-7) included a compilation of all family-group names in Pompilidae. From that list one thing is immediately clear, the proper tribal name for Auplopodini of the 1979 Catalog of Hymenoptera in America is Ageniellini Banks, 1912. It is the oldest name. Auplopodini was proposed by Pate in 1946. Other synonymous tribal names are Macromerini Haupt 1926, and Pseudageniini Bradley 1944.

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Sphecidae of Trinidad
I. Ampuliclnae, Sphecinae and Pemphredoninae

by

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Seven of the eight larger subfamilies currently recognized in the Sphecidae (Bohart & Menke, 1976) occur in Trinidad, West Indies with over 100 species in some 40 genera. The largest subfamily is Larrinae with at least 45 species in eight genera. Well represented are Sphecinae with 18 species in eight genera, Crabroninae whh 16 species in nine genera, and Nyssoninae with 15 species in nine genera. Astatinae are apparently absent. A list is given of the more generalized subfamilies Ampulicinae, Sphecinae and Pemphredoninae. I have examined a male from Trinidad in the collection of Cornell University labelled *Ampulex dubia* Kohl, which agrees well with *A. raptor* F. Smith. Specimens are deposited in the National Museum of Natural History, Washington, DC. I am indebted to Arnold Menke for clarifying the taxonomic status of Sphecinae and for help and advice.

AMPULICINAE

Ampulicini

Ampulex raptorF. Smith, 1856
Ampulex thoracica F. Smith, 1856

SPHECINAE

Sceliphrini

Oynatus nigripes (Westwood), 1832
Podium friesei Kohl, 1902
Podium fumigatum bugabense Cameran, 1888
Podium rufipes Fabricius, 1804
Sceliphron asiaticum (Linnaeus), 1758
Sceliphron fistularium (Dahlbom), 1843
Trigonopsis rufNentris (Fabricius), 1804 (from Vardy 1978)
Trigonopsis vicina (Dalla Torre), 1897
Trigonopsis violascens (Dalla Torre), 1897

Sphecini

Sphex dorsa/is Lepeletier, 1845
Sphex ichneumoneus (Linnaeus), 1758
Sphex melanopus Dahlbom, 1843
Sphex tinctipennis Cameron, 1888
/sodontia cyanipennis (Fabricius), 1793
/sodontia fuscipennis (Fabricius), 1804
Prionyx thomae (Fabricius), 1775

Ammophilini

Eremnophila binodis (Fabricius), 1798
Eremnophila opulenta (Guerin-Meneville), 1838

PEMPHREDONINAE

Psenini

Mimumesa modesta reticu/ata (Malloch), 1933
Pluto smithii (Fox), 1897 (from van Lith 1979)

Pemphredonini

Microstigmus myersiTurner, 1929
Microstigmus theridii Ducke, 1907 (from Richards 1972)

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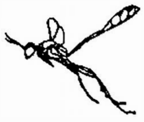

Another Nest-guarding Male of *Pison*

by
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103009 USSR)

Nest-guarding by sphecid males is practically unique to the Trypoxylini, mainly of the subgenus *Trypargilum.* Among the rest of the tribes of Sphecidae only *Dynatus* (Sceliphrini) has a similar behaviour (Kimsey, 1978). But it is also known for the East Palaearctic *Pison strandi* Yasumatsu, 1935 (= *P. ussuriense* Gussakovskij, 1937)(species-group of *P. regale* F. Smith)(Tsuneki, 1970).

During my summer trips to the Far East of the USSR in 1982-1988 I had an opportunity to observe mass nesting of *Pison insigne* Sickmann, 1894 (P. *punctifrons* Shuckard species-group) in cracks between the bricks of the two-story Central Office building of the "Ussurijskij" reservation. During favourable weather I could simultaneously observe nearly a dozen wasps flying near the wall and searching for any convenient place to nest. Of course it was impossible to study the structure of the nests in the wall and I tried to find other places with nests. Occasionally they were discovered in the trunk of an old *Tilia* tree and were described in my 1985 paper. Beginning in 1985 I tried to get prey, larvae and cocoons of this species with the help of artificial trap nests and by 1986 my attempts were successful. One evening before returning to Moscow in September, 1986, I was removing the blocks of trap nests which had been hung in the upper corners of the windows when I discovered that among the occupied nests, two tubes were about half full and that there was a wasp at the entrance of each tube. In the laboratory they were removed and determined to be males of *Pison insigne.* It is known that both females and males of some twig-nesting sphecids spend the night in various suitable cavities including their own nests. That is why in 1987 I specifically observed the process of selecting, provisioning and completing the nest by females of *P. insigne* and the behaviour of their males. The results were very interesting.

Though many females worked without any help from their partners, some males (I observed two such individuals among eight) spent much of the time in the nest hole. When the female with prey or a portion of mud flew to the entrance the male went out, felt her with his antennae, let her pass into the nest and immediately returned to the entrance with his head outside. When the females were absent both males remained in their nests, but sometimes went out and walked along the block. From time to time they left their posts for 1-5 minutes. Males actively guarded their nests against all strangers. One of them made only short rushes, staying inside the nest and loudly buzzing. The reaction of the other male was evidently inadequate to the danger from aliens. I have observed not only active scaring of parasites, but even real "struggles" between the host and an alien of the same species. Naturally, this skirmish was bloodless. At the same time both adversaries were so absorbed in battle that they fell from the nest down to the window sill and flew away only when I picked them up with my fingers.

However, in spite of some very intense guarding, intrusions were not prevented. Parasites (*Trichrysis pellucida* Buysson, *Omalus* sp. (*auratus* l.-group) (Hymenoptera, Chrysididae) and *Amobia signata* Meigen (Diptera, Sarcophagidae, Miltogrammatinae)) were patiently waiting near the blocks and penetrated into the nests during short absences of the males. And if the larva of *Trichrysis* was satisfied with the contents of only one cell, then the larvae of *Amobia* annihilated both posterity and prey in the whole nest, destroying mud partitions between the cells.

After the first tube was completed the first male immediately occupied the next one which he thoroughly examined beforehand. The second male flew away and never returned. Unfortunately, during my observations I did not mark males and females and now I cannot confirm the constancy of pairs in *P. insigne.*

The summer of 1988 was not favourable for my observations because of prolonged rains caused by a typhoon. I could fix only one pair of *P. insigne.* Unfortunately they could not finish their nest because, after two weeks of rain, the female died inside the nest between the prey and the male, which left shortly after the rain ended.

Thus, nest-guarding by males of *Pison* may not be so rare. It is quite possible to expect similar behaviour among related species - *P. regale* F. Smith, *P. atripenne* Gussakovskij, *P. punctifrons* Shuckard, and *P. assimile* Sickmann. Compared to species of *Trypoxylon (Trypargilum)* this behaviour in *Pison* is more weakly developed and is not obligatory. Also, it is difficult to positively determine whether the behaviour of *T. (Trypargilum)* males developed independently.

Literature cited

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Notes on Collections and Aggressive Behavior of *Paravespula germanica* and *Paravespula maculifrons*

by
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The summer and fall of 1988 and 1989 were spent with John E. Gorman collecting yellowjackets located around people's homes and sending the specimens to a pharmaceutical company. *P. maculifrons* (native) and *germanica* (introduced around 1982; see MacDonald and Akre 1984) are the two major species found in Wisconsin. Workers were collected from each nest and records were kept on total worker weights per nest, time of collections and nest locations. Here I present these data and discuss some of the nesting, population and behavior differences between the two species (Table 1.).

These data indicate that *maculifrons* preferred underground nesting sites whereas *germanica* nested more often in houses and buildings. The nesting preferences between the species may

Table 1. Mean worker weight and location of nest sites of *Paravespula germanica* and *P. maculifrons*

	GERMANICA		MACULIFRONS	
Date of Collections (Weekly)	Mean Wt. of Workers/ Nest (Gms)	Location of Nest Sites•	Mean Wt. of Workers/ Nests (Gms)	Location of Nest Sites•
		1988		
9/11-9/17	42	3,3,3		
9/18-9/24	5	2		
9/25-10/1	81	1,3,3		
10/2-10/8	91	1, 1,2,3,3	8	1
10/9-10/16	43	1,3,?	50	3
		1989		
8/12-8/19	43	1, 1,2,2,2	13	1
8/20-8/26	41	1,1,1,2,2, 2,3,3	73	1, 1, 1, 1
8/27-9/2	65	2,3,3,4,4	46	1,1,1,1,1, 1,2,2
9/3-9/9	52	1, 1,1,2	51	1,1,1,1,1, 1, 1
9/10-9/17	121	2,3,3,3	38	1, 1

• 1=ground, 2=building, 3=house, 4=woodpile/log

be responsible for differences in their abundance between 1988 and 1989. The summer of 1988 was drought-stricken in southcentral Wisconsin, and few *maculifrons* nests were collected at this time. Underground nests may be more susceptible to drying out compared to nests situated above ground and in more protected areas.

The weather in 1989 was less severe and both ***germanica*** and ***maculifrons*** fared well. Total worker weights per nest for *germanica*. however, was much higher earlier in the season and late in the season compared to that of **maculifrons.** Warmer nest location temperature early and late in the season may be responsible for the larger populations of *germanica*. Akre *et al.* (1989) noted that german yellowjacket colonies are larger and tend to persist later into the season than their probable competitor *Paravespula pensylvanica* in the Pacific Northwest.

Based on behavior differences alone we were able to tell which species of yellowjacket we were collecting. *P. maculifrons* 'poured out' of their nest when it was disturbed, showed an increased intensity of trying to sting, and was very persistent in following us as we walked away from the nest (in one case for up to 63 m). At *germanica* nest sites we were able to stand close to the nest without our experiencing a 'fight or flee' reaction. In 1989 I received a number of stings from ***maculifrons*** (despite wearing a bee suiit). In 1988 I did not receive any stings.

I thank my husband Gregg Henderson for encouraging me to collect and submit these data.

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MacDonald, J. F. and R. D. Akre, 1984. Range extension and emergence of subterranean nesting by the German yellowjacket, *Paravespula germanica*, in North America (Hymenoptera: Vespidae). Ent. News 95(1):5-8.

Vespula acadica (Sladen) In the Southern Blue Ridge

by

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A male of *Vespula acadica* (Sladen) was collected 9 October 1978 from a low-growing annual composite (Asteraceae) at the Rich and Balsam Lookout off the Blue Ridge Parkway (Jackson County, North Carolina USA) at an elevation of 6053' (ca. 1850 m). Prior to this, I had seen specimens collected in northeastern West Virginia (Lost River State Park, Hardy County; Capon Bridge, Hampshire County), but I am still unaware of any records from the several hundred miles in between these and the North Carolina specimen. On the same plant as the *V. acadica* were many males of *Vespula vulgaris* (L.) and a nest of the latter species was in a roadbank about 20 m away. This site has yielded specimens of *Dolichovespula norvegicoides* (Sladen) and *D. arctica* Rohwer, and is located within the Fraser fir-red spruce forest ***(Abies fraseri* (Pursh) Poiret,** *Pirea rubens* Sargent).

Closely related species include *Vespula vidua* (Saussure) which I have collected on Roan Mountain (Mitchell County, North Carolina) at ca. 1600 m and *V. consobrina* (Saussure) which I have seen on Mount Mitchell (Yancey County, North Carolina), higher than 1850 m, and have collected on other mountains in the area at various elevations up to 1650 m. I have yet to collect or learn of any records for *V. austriaca* (Panzer) south of the two localhies in the New York City vicintty shown by Miller (1961).

I would find it interesting to be informed of any records for *V. acadica* south of Pennsylvania and any new data For *V austriaca* in the eastern United States, and will be happy to identify any specimens.

Labeling Social Wasp Castes

by

Robert S. Jacobson

I'd like to put in my two cents about the value of labelling female social bees and wasps as queens and workers when known. The value of this is obvious in the case of species that are not commonly collected, but I have found that even in the case of widespread and abundant species this can be helpful. For example, the common baldfaced hornet *Do/ichovespu/a maculata* (L.) of North America varies substantially in size such that typical workers in one region may be as large as typical queens in another. Relying on the time of the year may not be of much help, either, as colonies in one region may have well over a hundred workers while those in another area consist only of a queen and rudimentary worker cells; even dijferent elevations in the same region, of course, can produce fairly large differences in stage of development. To complicate matters further, females collected late in the season, especially-from mature colonies, *may* be etther queens or workers. In pinned specimens ovaries dry up, fat deposits dry or decompose (I've never seen a key that asks one to make a distinction based on greasiness!), and behavioral data is lost unless noted in labelling. Without overstating my point I just think it's worth noting a distinction that might be obvious at time of collection but much more difficult to deduce later when one is tryng to study seasonal distributions and life cycles. Display of sting apparatus, as suggested by Archer (1989) in his recent key to Vespinae, could help in separation, but such examination shouldn't be necessary in the majority of cases where the collector could have made the distinction easily.

In the case of "intermediate" females, I'm somewhat inclined to say if it is crawling into every hole in the ground during the spring it's a queen; if it is late in the season and it attacks you when collecting its nest, it's a worker! For any of you having a special interest in this subject, have I a nest series of *Vespu/a. squamosa* (Drury) to show you!

Sphecophaga vesparum, a Parasitoid of some *Vespula* spp., is Established In New Zealand.

by

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The mass release of laboratory reared, overwintering cocoons of the imported ichneneumonid *Sphecophaga vesparum,* was begun during the winter of 1987. From these cocoons it was expected that adults would emerge in spring and summer to seek out and attack wasp nests. In autumn of 1988, two nests of the adventive *Vespu/a vulgaris* at Pelo Bridge (near the north end of the South Island), were found to be infested with parasitoids (Donovan et al. 1989). More parasitoids were released in the same area in winter of 1988, and during the following summer and autumn, 11 nests were recovered wtth parasttoids (Moller et al. 1989).

There were no releases of laboratory reared parasitolds at Pelorus Bridge in winter of 1989. On 15 January 1990, at the same stte, the New Zealand Department of Conservation launched a "War on Wasps", and to publicise it, the Minister of Conservation was filmed by crews as he dug out a randomly-selected wasp nest. Examination of this nest showed that it was under attack by parasitoids, and at least 146 developing wasps had been killed.

The presence of parasitoids was significant, because more than 12 months had elapsed since the most recent release of laboratory reared cocoons. So, after emerging from the released oocoons, parasltoids must have attacked nests and produced overwintering cocoons. After sutvlving the winter, adults must have emerged during the following spring/summer to attack the Minister's nest. This completion of a 12-month cycle means that establishment of parasttoids at Pelorus Bridge can be claimed.

A population of parasitoids recovered from the Minister's nest has now been reared through 8 generations in our laboratory. From this, overwintering cocoons will be field-released in various parts of the country during the coming winter. Our original laboratory culture has now completed 105 generations and 108,400 cocoons have been released. An addttional 60,000 cocoons from this culture shoukf be released during the winter of 1990.

References:

Donovan, B.J., Moller, H., Plunkett, G.M., Read, P.E.C. and Tilley, J.A.V. 1989: Release and recovery of the introduced wasp parasitoid, *Sphecophiaga vesparum vesparum* (Curtis)(Hymenoptera: Ichneumonidae) in New Zealand. New Zealand Journal of Zoology 16:355-364.

Moller, H., Plunkett, G.M., Tilley, J. A.V., Toft, R.J. and Wilson, N.J.1989: The wasp problem on the West Coast: second year research report. Ecology Division Report No. 24, DSIR Nelson, 39 pp.

Key to *Eustenogaster* spp. of the Malay Peninsula (Females)

by

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This key was originally formulated for field use by Jim Carpenter & John Wenzel. *Eustenogaster* are readily distinguished from all other stenogastrines in the area *(Liostenogaster, Metischnogaster* and *Parischnogaster'j* by their large size (forewing length 12-14 mm), predominant black body oolor, with little or no brown or red in dorsal view, and absence of any light marks on the mesoscutum. Although three of the seven species known from the Malay Peninsula (i.e. from the Isthmus of Kra to Singapore) are undescribed, I have examined enough material to be fairly confident that all species are represented in this key.

1. Gastral tergum 2 with a transverse impression behind the midpoint, so that the profile is broken into two curves . . . . sp. G

- Gastral tergum 2 with no such impression, so that the profile is a single smooth curve 2

2. Gastral tergum 6 with a prominent small tooth or spine near the tip; genae not yellow-marked 3

- Gastral tergum 6 with at most a short carina or small, obtuse tubercle near the tip 4

3. Vertex with a pair of small yellow spots near the top of the eyes; a pair of similar spots above the antennal sockets . . . . *micans* (Sauss.)

- Vertex without such spots; space behind ocelli not yellow-marked . . sp. L

4. Lateral areas of pronotum and katepisternum dull, densely punctate; clypeus with a large pentagonal yellow mark; two yellow spots just below antennal sockets; propodeum yellow-marked in lower part only . . . . *fraterna* (Bingham)

- Lateral areas of pronotum and katepisternum at least moderately shiny, sparsely and superticially punctate; frons with a pair of yellow spots above antennal sockets 5

5. Pronotal "neck" usually with a yellow line on each side; supraclypeal area and upper part of clypeus with a broad, vertical black band . . . . *hauxwelli* (Bingham)

- Pronotal "neck" entirely black; vertical black line on supraclypeal area and upper part of clypeus narrow, sometimes evanescent 6

6. Gena entirely black; clypeus and supraclypeal area yellow . . . . sp. C

- Gena with a prominent yellow mark, often extending onto malar space . . . . *calyptodoma* Sak. & Yosh.

Pseudostinging in Stenogastrines

by

Christopher K. Starr

Gregg Henderson (**Sphecos** 19:21) reported significant pain from male *Polistes* pseudostinging, something which I have also experienced from time to time. However, this is quite mild compared to what large eumenines and especially stenogastrines can deliver, on account of their long, sharp parameral spines. When caught in a net, both female and male *Eustenogaster* tend to be uncommonly aggressive, lunging and stinging/pseudostinging at one's hand, and I have been careless enough to be jabbed by each on occasion. Although the female hurts much more, for some types of animals the male's response is probably not entirely a bluff. A curious feature of some *Eustenogsaster* spp. is that most of the individuals one encounters away from the nest are males. It makes biological sense in this case for males to rely less on automimicry than do males of most other aculeates. On the other hand, I have never met a male vespine or bee who could not be handled with impunity.

The Brethes Types of Aculeate Wasps in the MACN Collection

by

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Between 1901 and 1927, Juan Brethes published 77 papers in which he described 893 new species of Hymenoptera. Most of the types were deposited in the Museo Argentina de Ciencias Naturales (MACN) where he worked, building up one of the most important collections of Hymenoptera in South America.

When Brethes died, nobody paid attention to his collection for about fifty years, until M. A. Fritz began to arrange it and made the first alphabetical files.

Brethes used to put a small numbered label on each insect in his collection. He registered each number in a notebook with a determination; a copy of this notebook is at the MACN. The number label is critical for determining the "type" status of Brethes material because he rarely identified specimens with name labels, and his locality labels were usually less complete than information in the original descriptions. Definitive decisions on all "types" will have to be made by specialists after comparison with the original descriptions.

In the following list, species names are given in their original combination without considering subsequent nomenclatural changes and synonyms. A plus sign (+) at the end of an entry indicates that there is typical material in the MACN collection. The absence of a plus sign means that the type has not been found. In some cases such material may simply repose in our collection undetected, or it may have been borrowed without a record. Brethes deposhed some types in other collections and these are cited in parentheses at the end of an entry.

A complete list of Brethes papers on Hymenoptera is given at the end.

Fam. Chrysididae

Chrysis bruchi Brethes, 1902 (+)
Chrysis cha"uana Brethes, 1902 (+)
Chrysis lynchi Brethes. 1902
Chrysis mattogrossensis Brethes, 1902 (+)
Chrysis boutheryi Brethes, 1902 (+)
Chrysis ameghinoi Brethes, 1902 (+)
Chrysiis missioners inermis Brethes, 1902 (Museo de La Plata)
Chrysis missionera Brethes, 1902 (+)
Chrysis schrottkyi Brethes, 1902 (Colecci6n Schrottky)
Chrysis argentina Brethes, 1906 (+)
Chrysis anisitsii Brethes, 1906 (Colecci6n Anisits)(+)
Chrysis acuta Brethes, 1906 (+)
Ellampus (Philoctetes) minutissimus Brethes, 1902 (+)
Holopyga boutheryi Brethes, 1902 (+)
Pamopes boutheryi Brethes, 1902 (+)

Fam. Thynnidae

Elaphroptera rhombica Brethes, 1910 (+)
Elaphroptera vigilii Brethes, 1910 (+)
Elaphroptera santacruciana Brethes, 1910 (+)
Elaphroptera arenaria Brethes, 1910 (+)
Elaphroptera diodon Brethes, 1910 (+)
Elaphroptera bruchii Brethes, 1910 (+)
Elaphroptera verticalis Brethes, 1910 (+)
Elaphroptera patigonica Brethes, 1910 (+)
Elaphroptera 3-dentata Brethes, 1910 (+)
Elaphroptera lara Brethes, 1910 (+)
Elaphroptera impressa Brethes, 1910 (+)
Elaphroptera tornowii Brethes, 1910 (+)
Elaphroptera catamarcensis Brethes, 1910 (+)

Elaphroptera catamarcensis lata Brethes, 1910 (+)
Elaphroptera fasciatella Brethes, 1910 (+)
Elaphroptera erythropoda Brethes, 1910 (+)
Elaphroptera tafiensis Brethes, 1910 (Museo de La Plata)
Elaphroptera tucumana Brethes, 1910 (+)
Elaphroptera melanosoma Brethes, 1910 (+)
Elaphroptera ameghinoi Brethes, 1910 (+)
Elaphroptera paranensis Brethes, 1910 (+)
Elaphroptera mendozana Brethes, 1910 {+)
Elaphroptera rubescens Brethes, 1910 (+)
Elaphroptera paraquayensis Brethes, 1910 (+)
Elaphroptera andina Brethes, 1910 (+)
Elaphroptera clypeicarinata Brethes, 1910 (+)
Elaphroptera luteofasciata Brethes, 1910 (+)

Fam. Myzinidae
Elis compacta Brethes, 1910 (+)
Elis saltensis Brethes, 1910 (+)
Elis tucumana Brethes, 1910 (+)
Elis bifasciata Brethes, 1910
Elis ameghinoi Brethes, 1910 (+)
Elis bruchii Brethes, 1910
Elis tomowii Brethes, 1910 (+)
Elis strigosa Brethes, 1910 (+)
Elis lynchii Brethes, 1913 (+)
Elis hubrichi Brethes, 1913 (+)

Fam. Anthoboscidae
Plesiomorpha a/binervis Brethes, 1913 (+)
Tiphiodes jorgenseni Brethes, 1913 (+)

Fam. Tiphiidae
Protiphia luridipennis Brethes, 1913 (+)
Tiphia saltensis Brethes, 1910 (+)
Tiphia andina **Br8thes, 1910** (+)
Tiphia bonariensis Brethes, 1910 (+)
Tiphia p/atensis Brethes, 1910 (+)
Tiphia fluminensis Brethes, 1910 (+)

Fam. Mutillidae
Sphinctomutilla gallardoi Brethes, 1913

Fam. Scoliidae
Scolia scuttata Brethes, 1910 (+)
Scolia *bruchii* Brethes, 1910 (+)
Scolia *argentina* Brethes, 1910 (+)
Scolia *spegazzini* Brethes, 1910 (+)

Fam. Bradynobaenidae
Bradynobaenus gayi chubutinus Brethes, 1910 (+)

Fam. Formicidae
Azteca lynchiBrethes, 1914
Dorymyrmex tener pallidipes Brethes, 1914
Dorymyrmex gallardoi Brethes, 1914

Fam. Pompilidae
Aporus apicipennis Brethes, 1910 (+)
Notocyphus entrerrianus Brethes, 1924 {+)
Notocyphus jorgenseni Brethes, 1909 (+)
Notocyphus 8-maculatus Brethes, 1913 (+)
Notocyphusrubriventris Brethes, 1909 {+)
Notocyphus unicinctus Brethes, 1913 {+)
Notocyphus prixi Brethes, 1924 (+)
Pepsis abrupta Brethes, 1908 (+)
Pepsis ameghinoi Brethes, 1908 (+)
Pepsis andina Brethes, 1908 {+)
Pepsis andina dilatata Brethes, 1908 {+)
Pepsis anisftsii Brethes, 1908 {+)
Pepsis apollinari Brethes, 1926 {+)
Pepsis apol/onis Brethes, 1908
Pepsis archevaletai Brethes, 1908 {+)
Pepsis aretheas Brethes, 1914 {+)
Pepsis argentina Brethes, 1908 (+)
Pepsis bahiae Brethes, 1914 (Museo de Sao Paul',)
Pepsis bonplandiBrethes, 1914 (+)
Pepsis brasiliensis Brethes, 1908 (+)
Pepsis bruchii Brethes, 1908
Pepsis brumeisteriBrethes, 1908 (+)
Pepsis calypso Brethes, 1908 (+)
Pepsis caridei Brethes, 1908 (+)
Pepsis carinata Brethes, 1914 (Museo de Sao Paulo)
Pepsis chacoana Brethes, 1908 (+)
Pepsis chloe Brethes, 1914 (+)
Pepsis chloroptera Brethes, 1908 (+)
Pepsis chrysothorax Brethes, 1908 (+)
Pepsis clarinensis **BrEtthes, 1908** (+)
Pepsis cleone Brethes, 1914 (+)
Pepsis clypeata Brethes, 1914 (Museo de Sao Paulo)
Pepsis colombica Brethes, 1926 (+)
Pepsis comparata Brethes, 1908 (+)
Pepsis concava Brethes, 1908 (+)
Pepsisconcavajorgenseni Brethes, 1914 (+)
Pepsis copel/oiBrethes, 1914 (+)
Pepsis cordata Brethes, 1914 (+)
Pepsis cordubensis Brethes, 1908 (+)
Pepsis coronaria Brethes, 1914 (Museo de Sao Paulo)
Pepsis cu/ta Brethes, 1908
Pepsis cultrata Brethes, 1908 (+)
Pepsis depressa Brethes, 1908 (+)
Pepsis deuteroleuca venezolana Brethes, 1908
Pepsis dimiatipennis Brethes, 1908
Pepsis discoidalis Brethes, 1914 (+)
Pepsis dorsata Brethes, 1914 (+)
Pepsis dromeda Brethes, 1908 (+)
Pepsis echeve"iai Brethes, 1908 (+)
Pepsis .ephebus Brethes, 1908 (+)
Pepsis equatoriana Brethes, 1914 (Museo de Sao Paulo)
Pepsis erecta Brethes, 1914 (Museo de Sao Paulo)
Pepsis euterpe Brethes, 1908 (+)
Pepsis externa Brethes, 1908 (+)
Pepsis fasciculata Brethes, 1908 (+)
Pepsis fi/iola Brethes, 1914 (+)
Pepsis f/aminia Brethes, 1914 (+)
Pepsis flavilis Brethes, 1908
Pepsis f/uminensis Brethes, 1908 (+)
Pepsis fuscobasalis Brethes, 1908 (+)
Pepsis fuscorubra Brethes, 1914 (Museo de Sao Paulo)
Pepsis gallardoi Brethes, 1908 (+)
Pepsis garbei Brethes, 1914 (Museo de Sao Paulo)
Pepsis guaranitica Brethes, 1908 (+)
Pepsis heterochroa Brethes, 1914 {Museo de Sao Paulo)
Pepsis holmbergi Brethes, 1908 (+)
Pepsis hora Brethes, 1914 (Museo de Sao Paulo)
Pepsis humeralis Brethes, 1914 (Museo de Sao Paulo)
Pepsis ichesi Brethes, 1908
Pepsis iheringi Brethes, 1908
Pepsis impatiens Brethes, 1914 (Museo de Sao Paulo)
Pepsis incompleta Brethes, 1908 (+)
Pepsis indistincta Brethes, 1908
Pepsis itinerata Brethes, 1908 (+)
Pepsis janira Brethes, 1908 (+)
Pepsis juno Brethes, 1908
Pepsis jujuyensis Brethes, 1908 (+)
Pepsis /aetabilis Brethes, 1908
Pepsis /ahillei Brethes, 1908
Pepsis lil/oi Brethes, 1908 (+)
Pepsis limbatella Brethes, 1908 (+)
Pepsis limbatica Brethes, 1914 (Museo de Sao Paulo)
Pepsis luridicomis Brethes, 1926 (+)
Pepsis lynchii Brethes, 1908 (+)
Pepsis meridionalis Brethes, 1914 (+)
Pepsis militaris Brethes, 1914 (Museo de Sao Paulo)
Pepsis mimetica Bre1hes, 1914 (+)
Pepsis minarum Brethes, 1914 (Museo de Sao Paulo)
Pepsis miniata Brethes, 1908 (+)

Pepsis mimetica Brethes, 1914 (+)
Pepsis minarum Brethes, 1914
(Museo de Sao Paulo)
Pepsis miniata Brethes, 1908 (+)

Pepsis mixta Brethes, 1908
Pepsis modesta Brethes, 1908 (+)
Pepsis neutra Brethes, 1908
Pepsis nitocris Brethes, 1908
Pepsis nutrix Brethes, 1914 (+)
Pepsis operosa Brethes, 1908 (+)
Pepsis pacifica Brethes, 1914
(Museo de Sao Paulo)
Pepsis pa/lida Brethes, 1908
Pepsis pampeana Brethes, 1908 (+)
Pepsis patagonica Brethes, 1908 (+)
Pepsis polita Brethes, 1908 (+)
Pepsis prixii Brethes, 1908 (+)
Pepsis pulchra Brethes, 1914
(Museo de Sao Paulo)
Pepsis pygidia/is Brethes, 1908
Pepsis quichua Brethes, 1908 (+)
Pepsis recta Brethes, 1908 (+)
Pepsis richteri Brethes, 1908 (+)
Pepsis robertiBrethes, 1908 (+)
Pepsis sancta-annae Brethes, 1908 (+)
Pepsis sappho Brethes, 1908 (+)
Pepsis schrottkyiBrethes, 1908 (+)
Pepsis selvatica Brethes, 1920 (+)
Pepsis spegazzinii Brethes, 1908 (+)
Pepsis sulcata Brethes, 1908
Pepsis tandilensis Brethes, 1914 (+)
Pepsis terebrans Brethes, 1908 (+)
Pepsis thalia Brethes, 1908 (+)
Pepsis thracis Brethes, 1914
(Museo de Sao Paulo)
Pepsis tornowi Brethes, 1908 (+)
Pepsis transversa Brethes, 1908 (+)
Pepsis tricolor Brethes, 1914 (+)
Pepsis troglodytes Brethes, 1908 (+)
Pepsis vaga Brethes, 1908
Pepsis villosa Brethes, 1908
Pepsis virgo Brethes, 1908 (+)
Pepsis vivida Brethes, 1908 (+)
Pompi/us annuliventris
Brethes, 1909 (+)
Pompi/us arechavaletai Brethes, 1909
(Museo de Montevideo)
Pompi/us iheringiBrethes, 1910
(Museo de Sao Paulo)
Pompi/us platensis Brethes, 1909
(Museo de Montevideo)
Pompi/us primarius Brethes, 191 0
(Museo de Sao Paulo)
Pompi/us vespuccioides
Brethes, 1909 (+)
Psammochares arequipiensis
Brethes, 1924 (+)
Psammochares escomeli
Brethes, 1922 (+)
Psammochares jorgenseni
Brethes, 1913 (+)

Psammochares mesothoracicus
Brethes, 1913 (+)
Psammochares scapulatus
Brethes, 1913 (+)
Sa/ius andinus Brethes, 1913 (+)
Sa/ius apol/inarii Brethes, 1926 (+)
Sa/ius carinatellus Brethes, 1910
(Museo de Sao Paulo)
Salius constrictus Brethes, 1913 - (+)
Sa/ius diffusus Brethes, 191 o
(Museo de Sao Paulo)
Salius edmondii Brethes, 1924 (+)
Sa/ius e,ythrogaster Brethes, 1926 (+)
Salius e,ythropus Brethes, 191 0 (+)
Sa/ius gracilicornis Brethes, 191 o
(Museo de Sao Paulo)
Salius hirsutulus Brethes, 1913 (+)
Salius jorgenseni Brethes, 1913 (+)
Salius limbatus Brethes, 191 0
(Museo de Sao Paulo)
Salius posticatus Brethes, 1909
(Museo de Sao Montevideo)
Sa/ius so/eatus Brethes, 1926 (+)

Fam. Vespidae
Co/oboc/ypeus nigerBrethes, 1926
Trimeria buyssoni Brethes, 1903 (+)
Polistes niger Brethes, 1903
(Colecci6n Schrottky)
Polybia jurinei bonaerense
Brethes, 1903 (Museo de La Plata)

Fam. Eumenidae
Alastor anomalus Brethes, 1903
(Museo de La Plata)
Alastor arcuatus Brethes, 1903
(Colecci6n Schrottky)
Alastor argentinus Brethes, 1903 (+)
Alastor clypeatus Brethes, 1906 (+)
Alastorelongatus Brethes, 1903 (+)
A/astor nitidus Brethes, 1906 (+)
Alastor persimilis Brethes, 1903 (+)
Alastor schrottkyi Brethes, 1903
(Colecci6n Schrottky)
Ctenochilus argentinus Brethes, 1903
Discoe/ius a/bonotatus
Brethes, 1906 (+)
Discoelius andinus Brethes, 1903
(Museo de I a Plata)
***Discoe/ius anistsii* Br8thes, 1906**
(Colecci6n Anisns)
Discoelius argentinus Brethes, 1905 (+)
***Discoelius auritulus* Br8thes, 1903**
(Colecci6n Schrottky)
Discoelius assimilis Brethes, 1903
(Museo de I a Plata)
Discoelius ater Brethes, 1903
(Colecci6n Schrottky)
Discoe/ius caridei Brethes, 1905 (+)
Discoelius cuyanus Brethes, 1903 (+)
Discoe/ius chacoensis
Brethes, 1905 (+)

Discoe/ius fluminensis Brethes, 1903
Discoelius foxii Brethes, 1906
Discoe/ius holmbergii Brethes, 1906
(Colecci6n Escuela Normal)
Discoe/ius lignicola Brethes, 1906 (+)
Discoe/ius /ynchii Brethes, 1905
Discoe/ius nitidus Brethes, 1903
(Colecci6n Autran)
Discoelius pampicola Brethes, 1906
Discoelius paranensis
Brethes, 1903 (+)
Discoe/ius prixii Brethes, 1903
Discoslius spegazzinii
Brethes, 1906 (+)
Eumenes anislsiiBrethes, 1906 (+)
Eumenes autrani Brethes, 1903
(Colecci6n Autran)
Eumenes archevaletae
Brethes, 1903 (+)
Eumenes bertonii Brethes, 1909
Eumenes bonariensis Brethes, 1905
(Colecci6n Autran)
Eumenes flavescens Brethes, 1906 (+)
Eumenes gaullei Brethes, 1920
Eumenes /aevigata Brethes, 1906 (+)
Eumenes magna Brethes, 1903 (+)
Eumenes minuscu/a Brethes, 1906
(Colecci6n Anisns)
Eumenes opifex Brethes, 1909
Eumenes paraguayensis
Brethes, 1906 (+)
Eumenes picturata intermedia
Brethes, 1906 (+)
Eumenes picturata nigromaculata
Brethes, 1906 (+)
Eumenes spegazziniiBrethes, 1905 (+)
Eumenes unicincta Brethes, 1906 (+)
Leontiniel/a argentina Brethes, 1903
Monobia angu/osa cingulata
Brethes, 1903 (+)
Monobia anisitsiiBrethes, 1906 (+)
Monobia carideiBrethes, 1906 (+)
Monobia gaullei Brethes, 1920
Montezumia andina Brethes, 1905 (+)
Montezumia argentina
Brethes, 1905 (+)
Montezumia pedunctulata
Brethes, 1906 (+)
Montezumia holmbergii
Brethes, 1906 (+)
Montezumia bruchii Brethes, 1903 (+)
Montezumia vigiliiBrethes, 1910 (+)
Nortonia alegrensis Brethes, 1924
Nortonia bertoni Brethes, 1924
Nortonia bicincta Brethes, 1920
Odynerus bruchii Brethes, 1903
Odynerus punctatus Brethes, 1903
Odynerus heptagonalis
Brethes, 1903 (+)
Odynerus cuyanus Brethes, 1903 (+)
Odynerus arechavaletae
Brethes, 1903

Odynerus montevidensis Brethes, 1903 (+)
Odynerus acuminatus Brethes, 1903
Odynerus declivus Brethes, 1903 (+)
Odynerus argentinus andinus Brethes, 1903 (+)
Odynerus ameghinoi Brethes, 1903 (+)
Odynerus schrottkyi Brethes, 1903 (Colección Schrottky)
Odynerus patagonus Brethes, 1903
Odynerus saltensis Brethes, 1905 (+)
Odynerus venustus Brethes, 1905 (+)
Odynerus (Ancistrocerus) erythraeus Brethes, 1906 (+)
Odynerus (Ancistrocerus) rufus Brethes, 1906 (Colección Anisits)
Odynerus (Ancistrocerus) fabienii Brethes, 1906
Odynerus (Ancistrocerus) f/avomarginatus Brethes, 1906 (+)
Odynerus (Ancistrocerus) foxii Brethes, 1906
Odynerus (Ancistrocerus) distinguendus Brethes, 1906 (+)
Odynerus (Ancistrocerus) caridei Brethes, 1906 (+)
Odynerus (Ancistrocerus) goyasensis Brethas, 1920
Odynerus (Euancistrocerus) bolivianus Brethes, 1920
Odynerus (Stenancistrocerus) idoneiformis Brethes, 1920
Odynerus (Stenancistrocerus) idoneus Brethes, 1920
Odynerus (Stenancistrocerus) foveolatus Brethes, 1906 (+)
Odynerus (Stenancistrocerus) abditus Brethes, 1906 (+)
Odynerus (Stenancistrocerus) mendozanus Brethes, 1906 (+)
Odynerus (Stenancistrocerus) dallatorrei Brethes, 1906 (+)
Odynerus (Stenancistrocerus) assumptionis Brethes, 1906 (+)
Odynerus (Stenancistrocerus) platensis Brethes, 1906 (+)
Odynerus (Stenancistrocerus) concavus Brethes, 1906
Odynerus (Stenancistrocerus) holmbergii Brethes, 1906
Odynerus (Stenodynerus) anisitsii Brethas, 1906 (+)
Odynerus (Stenodynerus) gamellus Brethes, 1906 (+)
Odynerus (Stenodynerus) bonariensis Brethes, 1906 (+)
Odynerus (Stenodynerus) griseolus Brethes, 1909
Odynerus (Stenodynerus) paraguayensis Brethes, 1909 (+)
Odynerus (Stenancistrocerus) subcyaneus Brethes, 1909
Odynerus (Stenancistrocerus) abactus Brethes, 1909
Odynerus (Hypodynerus) fuscipennis Brethes, 1910
Odynerus(Hypodynerus)jorgenseni Brethes, 1910
Odynerus (Stenodynerus) mendicus Brethes, 1910
Odynerus (Eodynerus) asperatus Brethes, 1913 (+)
Odynerus (Stenodynerus) marii Brethes, 1924 (+)
Pachodynerus validus Brethes, 1906 (+)
Pachodynerus gaullei Brethes, 1920
Pachodynerus punctulatus Brethes, 1920
Pachodynerus serrulatus Brethes, 1920 (+)
Plagiolabra andina Brethes, 1906 (+)
Zethus meronensis Brethes, 1920
Zethus medius Brethes, 1906
Zethus holmbergii Brethas, 1906
Zethus missionus Brethas, 1906 (+)

Fam. Sphecidae

Ammophila brasi/iana Brethes, 1909 (Museo de Montevideo)
Ammophila platensis Brethes, 1909 (Museo de Montevideo)
Ammophila arechavaletai Brethes, 1909 (Museo de Montevideo)
Anacrabro argentinus Brethes, 1913 (+)
Bembex patagonica Brethes, 1913 (+)
Bembex defecta Brllthes, 1909 (Musso de Montevideo)
Cerceris ameghinoi Brethes, 1910
Cerceris andina Brethes, 1910 (+)
Cerceris annulipes Brethes, 1913 (+)
Cerceris antemissa Brethes, 1910 (+)
Cerceris arechavaletai Brethes, 1909 (Museo de Montevideo)
Cerceris argentina Brethes, 1910
Cerceris be/la Brethes, 1910
Cerceris cisandina Brethes, 1913 (+)
Cerceris chacoana Brethes, 1910 (+)
Cerceris decorata Brethes, 1910
Cerceris dichrous Brethas, 1909 (+)
Cerceris divisa Brethas, 1910 (+)
Cerceris duplicata Brethes, 1910 (+)
Cerceris enodans Brethes, 1910
Cerceris exp/eta Brethes, 1910 (+)
Cerceris ferruginea Brethes, 1910 (+)
Cerceris gaul/ei Brethes, 1920
Cerceris jatahyna Brethes, 1920
Cerceris jorgenseni Br8thes, 1913 (+)
Cerceris lynchii Brethes, 1910 (+)
Cerceris lynx Brethes, 1913 (+)
Cerceris megacepha/a Brethes, 1913 (+)
Cerceris mendozana Brethes, 1913 (+)
Cerceris mesopotamica Brethes, 1913 (+)
Cerceris nigra Brethes, 1910 (+)
Cerceris oceanica Brethes, 1920
Cerceris pauxilla Brethes, 1913 (+)
Cerceris pedestris Brethes, 1910 (+)
Cerceris ponderosa Brethes, 1920
Cerceris singularis Brethes, 1910 (+)
Cerceris sororcula Brethes, 1913 (+)
Cerceris spathulifera Brethes, 1913 (+)
Cerceris tibia/is Brethes, 1910 (+)
Cerceris transversa/is Brethes, 1910 (+)
Cerceris vigilii Brethes, 1910 (+)
Crabro (Rhopalum) arechavaletai Brethes, 1909 (+)
Crabro f/avipennis basiflavus Brethes, 1910 (+)
Crabro f/avipennis fumosus Brethes, 1910 (+)
Crabro (Podagritus) erythropus Brethes, 1913 (+)
Crabro (Podagritus) jorgenseni Brethas, 1913 (+)
Crabro (Podagritus) nigriventris Brethes, 1913 (+)
Crabro (Podagritus) pamparum Brethes, 1913 (+)
Gorytes bifasciatus Brethes, 1909 (+)
Gorytes fiebrigi Brethes, 1909 (+)
Gorytes mendozanus Brethes, 1913 (+)
Gorytes pygmaeus Brethes, 1913 (+)
Gorytes unicinctus Brethes, 1913 (+)
Gorytes (Hop/isus) jorgenseni Brethes, 1910 (+)
He/iocausus argentinus Brethes, 1913 (+)
Heliocausus fiebrigi Brethes, 1909 (+)
Heliocausus fraternus Brethes, 1913(+)
Heliacausus jorgenseni Brethes, 1913 (+)
Heliocausus mendozanus Brethes, 1913 (+)
Heliocausus tridens Brelhes, 1913 (+)
Lirosphex jorgenseni Brethes, 1913
Microbembex argentina Brethes, 1913 (+)
Mimesa argentina Brethes, 1910 (+)
Notogonia peruana Brethas, 1924 (+)
Nysson argentinum Brethas, 1913 (+)
Nysson basirufum Brethes, 1913 (+)
Nysson bifasciatum Brethes, 1913 (+)
Oxybe/us agnitus Brethes, 1913 (+)
Oxybelus andinus Brethes, 1913 (+)
Oxybelus argentinus Brethes, 1913 (+)
Oxybe/us decipiens Brethes, 1913 (+)
Oxybelus interruptus Brethes, 1913 (+)
Oxybelus jorgenseni Brethes, 1913 (+)
Oxybelus modestus Brethes, 1913 (+)
Oxybelus pamparum Brethes, 1913 (+)
Oxybelus p/atensis Brethes, 1901

Oxybe/us paraguayensis Brethes, 1909 (+)
Oxybelus tarijensis Brethes, 1913 (+)
Paracerceris tridentifera Brethes, 1913 (+)
PsenjorgenseniBrethes, 1913 (+)
Scapheutes friburgensis Brethes, 1913 (+)
Solierellaplatensis Brethes, 1913 (+)
Sphecius spectabilis nobilis Brethes, 1910 (+)
Sphex herreraiBrethes, 1926 (+)
SphexjorgenseniBrethes, 1913 (+)
Sphex luciati Brethes, 1918 (+)
Sphex mendozanus Brethes, 1909 (+)
Sphex neoxenus melanogaster Brethes, 191 o
Sphex platensis Brethes, 1908 (+)
Sphex striatulus Brethes, 1908 (+)
Sphex subexcisus Brethes, 1908 (+)
Stizus arechavaletai Brethes, 1909 (Museo de Montevideo)
Stizus spegazzinii Brethes, 1909 (+)
Tachysphex mendozanus Brethes, 1913 (+)
Tachysphex jujuyensis Brethes, 1913 (+)
Tachysphex subpetiolatus Brethes, 1909
Tachytes fiebrigi Brethes, 1909 (+)
Tachytes nigricaudus Brethes, 1909 (+)
Tachytes peruanus Brethes,1926 (+)
Trachypus furcatus Brethes, 191 0
Trachypus punctuosus Brethes,1910 (+)
Trachypus spegazzinii Brethes, 191 o (+)
Trypoxy/on annulatum Brethes,1913 (+)
Trypoxylon argentinum Brethes,1910 (+)
Trypoxyfon correntinum Brethes, 1909 (Museo de Montevideo)
Trypoxyfon festivum Brethes, 1913 (+)
Trypoxy/on incognitum Brethes,1913 (+)
Trypoxy/onjorgenseni Brethes, 191 o (+)
Trypoxyfon /ynchi Brethes, 1913 (+)
Trypoxyfon opacum Brethes,1913 (+)
Trypoxylon platense Brethes, 1913 (+)
Trypoxylon tucumanum Brethes,1913 (+)

Brethes papers on Hymenoptera:

[Dates and citations for many of these papers, especially those in Anales del Museo Nacional de Buenos Aires and Revista Chilena de Historia Natural, has been verffied in the original publications. - T. P. Nuhn]

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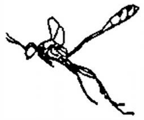

TECHNIQUES

Opening Wasp Mandibles

by

Anthony Harris

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Is there some solution into which sphecids can be collected, which has the effect of automatically opening the mandibles? Wasps caught in most traps have their mandibles closed, and opening them is not only *very* tedious, but frequently causes damage to the specimen.

The following method is, in my experience, the best of the manual methods for opening wasp mandibles.

Specimens are collected into water to which detergent has been added. From this they are transferred to relaxing fluid in which they are left for 24 hours (or longer if it is necessary to store them). The relaxing fluid I use has the following composition:

Ethyl alcohol 95%	265 parts
Water	245 parts
Ethyl acetate	95 parts
Benzene	35 parts

The wasp is removed and the mandibles opened with fine, watch-maker's forceps, the points applied closed, adorally, to each mandible and the forceps allowed to open, by their own spring, taking out the mandibles as they open. The specimen is then placed in alcohol over paper in a tray and the paper taken out and the wasp dried in air. This straightens out the wings. When the mandibles are opened in this way using forceps, they stay open and do not slowly close, as often happens when one uses pins. Many specimens can be treated at the same time using this method. However, it does not seem to work very well for old, set specimens which have been relaxed in the fluid (even after the legs have relaxed). Very often, the head becomes detached, especially with small species such as **Spilomena.**

I therefore wondered whether anyone knew of a solution into which live wasps can be collected which "automatically" opens the mandibles (and does not alter red pigments)?

What is the best way for opening the mandibles of old, set mounted specimens with the mandibles tightly closed?

[What I have always done is simply relax the specimens in a humid camera, generally about 6-7 hours. Then I grasp the critter's head (and body) between left thumb and forefinger under a microscope, and attempt to push the mandibles open with an insect pin held in my right hand (if you are left handed, reverse this). Generally this works for me, even with old material. Occasionally a head pops off, but that is the risk one has to take. On very tiny wasps *my* method won't work (thumb and forefinger just too big!), and I am not sure what the answer is then.

- Editor]

BOOK NEWS

Frederick Ronquist and Goran Nordlander, 1989. **Skeletal morphology of an archaic cynlpold, *lba/la ruf/pes* (Hymenoptera: lballidae).** *Entomologica Scandinavica, Supplement No. 33.* 60 p. Order from: Scandinavian Entomology Ltd., PO Box 24, S-240 17 S. Sandby, Sweden. $20 in U.S. currency plus $5 for shipping.

The authors have described and illustrated the skeletal morphology of the largest cynipoid in considerable detail. Line drawings and some SEM and other photographs clearly show all of the wasps body parts, some broken down into their individual components. Terminology is explained and illustrated, and corresponding terms of other authors are often noted. Anyone interested in the morphology of Hymenoptera and its evolutionary implications will want a copy of this work.

Availability of Cynlpoldea by Weld (1952)

Lewis Weld's privately published book on the cynipoid wasps is a landmark in the taxonomy of these insects, and it has long been out of print and unavailable. However, I have been informed by Robert Lyon that he has had the **Cynipoldea** reprinted. The 351 page book is spiral bound and sells for about $30. Anyone interested in obtaining a copy can contact Lyon at the following address: 2120 Bristow Drive, La Canada Flintridge, California 91011.

Day's Organ

Day's Organ has made the big time! It is included in the new, expanded version (840 p.) of **The Torre-Bueno Glossary of Entomology** published in 1989 by the New York Entomological Society (compiled by S. W. Nichols). The term is attributed to the book **The Hymenoptera** by Gauld & Bolton, but Nichols should have cited **Sphecos** 6:5 because that is where Day's Organ was proposed. Naturally the Mud D'aub is piqued by this oversight.

The new Torre-Bueno glossary should be on the shelf of any taxonomist. It is more than double the size of the previous edition and is crammed with terms and their explanations.

Generic Names In Hymenoptera

Guido Pagliano and Pierluigi Scaramozzino (1990) have just published (see Recent Literature for citation) their comprehensive list of all generic names attributed to the Hymenoptera, both living and fossil. Their list contains about 17,000 names, including synonyms and homonyms. They propose 21 replacement names for junior homonyms discovered during the course of their work on this catalog. Two involve aculeates: *Boffachrysis* n. n. for *Brethesiel/a* Linsenmaier, 1987 (Chrysididae). not Timberlake 1920, and **Hensenia** n. n. for **Prosceliphron** van der Vecht, 1968 (Sphecidae), not Frenguelli, 1946. The validity of *Prosce/iphron* Frenguelli is in doubt, however, under Article 13 of the International Code of Zoological Nomenclature, and **Hensenia** may be an unnecessary new name.

The list of genera is preceded by a "Prospectus of the Families". This is simply a list of the families recognized by the authors, including all subfamilies. They discuss briefly the more recent papers that deal with higher classification, and point out that there is no agreement on the recognition of families. Pagliano and Scaramozzino introduce their own ideas concerning family ranks in their prospectus, even though they do not provide their rationale or evidence for their system. For example, they unite all cynipoid wasps under the single family Cynipidae. This is possibly a reasonable solution since, at least in my experience, the characters used to distinguish various cynipoid "families" rarely hold up under scrutiny (Eucoilidae is one exception). On the other hand, Pagliano and Scaramozzino do not accept the recognition by Brothers (1975) and Gauld & Bolton (1988) of only three superfamilies of Aculeates. They recognize Apoidea and Sphecoidea in sptte of the fact that these are clearly sister groups of a monophyletic line within Hymenoptera. Catalogs, and similar works such as this one by Pagliano and Scaramozzino, are not the proper vehicles for making changes in classification since such actions need to be supported by evidence, and rationales for the changes need to be discussed. I noted one spelling error. Heterogynainae is correct, not Heterogyninae (p. 21).

References erred:

Brothers, D. J., 1975. Phylogeny and classification of the aculeate Hymenoptera, with special reference to the Mutillidae. Univ. of Kansas Sci. Bull. 50:483-648.

Guald, I. D. and B. Bolton, 1988. The Hymenoptera. Oxford Univ. Press, Oxford. 332 p.

A. S. Menke

COLLECTION NEWS

Tsunekl Taiwanese Pomplldae to the Smithsonian

by

Karl Krombeln

Prof. Tsuneki published a monograph of the spider wasps of Taiwan last year (see Spec. Publ. Japan Hymen. Assoc. (35):1-180). He has generously given the Smnhsonian all of the holotypes as well as his own personal collection of Taiwanese Pompilidae.

The Location of the Mulillid Type Specimens Described by Osvaldo Hugo Casal

by

Dlomedes Quintero Arias

(Director, Museo de Invertebrados "G. B. Fairchild", Universidad de Panama, Estafeta Universitaria, Rep. Panama)

The Neotropical Mutillidae had in Osvaldo Hugo Casal a very prolific worker. Born in Buenos Aires on November 1, 1931 (Fmz, M.A. 1972. Revista Soc. Entomol. Argentina, 34:117-118), he had described 17 genera (listed below) and 272 species of Mutillidae (Fritz, 1972) by the time of his death (October 17, 1971). He died a few days before his 40th birthday, after having heart surgery. His heteroclite work record probably reflects the many difficulties then facing most Latin American systematists, and nowadays, in the decade of renewed interest in biodiversity, facing systematists even in wealthy countries. His first paper on mutillids was published in 1957 while he was studying medicine. He received his M.D. in 1960, but instead of going into a more lucratively rewarding medical practice, Casal continued his systematic work and, two years later, began work at the Institute Nacional de Microbiologia (INM), Buenos Aires, not on microbiology but on the systematics of pompilids, mutillids and mosquitoes. Just 10 years later, a few months before his untimely death, Casal resigned his position at the INM and opened a private psychology clinic. It is not clear to me if Casal intended to continue his systematic work on the side. He sold his entire type collection to the American Museum of Natural History (AMNH), New York, "shortly before his death" (Fritz, pers. comm.) but on the other hand, he left uncompleted research begun in 1969 or 1970, on Australian mutillids and on some Nearctic genera. This suggests that he might have been planning to continue systematic work. Fmz (1972) mentioned that Casal left "a last work" (possibly an unpublished manuscript) describing nine new mutillid genera from Australia.

None of the type specimens described by Casal are deposited at the INM (his publications record them as deposned in "colecci6n del autor"), and the whereabouts of this personal collection are not known. Although Casal deposited specimens in several museums that loaned him material (e. g., National Museum of Natural History, University of Minnesota Insect Collection), these collections include only a few of his types.

Thanks to a lead from Arnold Menke, I got in contact with the Fundaci6n Miguel Lillo (Abraham Willink, Curator of Hymenoptera, Institute de Zooligia, Miguel Lillo 251, 4000 San Miguel de Tucuman, Argentina) and also with Casal's close friend during most of his life, Manfredo A. Fmz (INESALT, Casilla Correo 539, 4400 Salta, Argentina). Thanks to Fritz, I corresponded with J. C. Rozen, Curator of Hymenoptera, at the AMNH, and was informed that Casal's mutillid type collection was purchased from him in July 1970. Included are 253 holotypes (just 19 short of the total number of new species described by Casal) and 200 paratypes (plus 1 allotype and 1 metatype).

The transaction with the AMNH did not include additional non-type specimens. After Casal's death, his widow Amelia (to whom Casal dedicated several species and the genus- ***Ephuame/ia***, which he had split off from *Ephuta)* sold the rest of his mutillid reference collection to the Institute Miguel Lillo (Willink, pers. comm.). This transaction consisted of 13 holotypes, more than 50 paratypes, and large numbers of non-type specimens (Willink, pers. comm.). In addition, specimens of eight of Casal's "manuscript species" were included, in the following genera: *Atillum* (1), *Neomutifla* (3), *Timulla* (1), *Sphaeraptha/ma* (2) and *Sphinctopsis* (1).

The location of 25 holotypes deposited outside the AMNH are listed below. (CU = Cornell Universny; IML. Institute Miguel Lillo; MACN = Museo Argentina de Ciencias Naturales; NMNH = National Museum of Natural History - Smithsonian Institution; • = location of type has been verijied, otherwise, deposilory location as indicated in publication by Casal; F = female; M = male.)

(Note: I expected to find a total of 19 holotypes deposited outside of the AMNH but the IML has 13 "holotypes" (Willink, pers. comm.) instead of 7, the number I had estimated as being present there. To clarify this apparent discrepancy, I am now preparing an alphabetical list of names of Casal's mutillid species, detailing location of holotypes. I hope to let you know how to obtain a copy of this list in the next issue of Sphecos. Please stand by.)

•*alazana* 1973, *Sphinctopsis,* F (IML)
•*ame/iae* 1969, *Xystromutilla,* F (IML)
"*bachmanni* 1963, *Darditilla,* F (NMNH)
bergi 1967, *Acrophotopsis,* M (CU)
"*bordona* 1968, *Ephusuarezia,* M (NMNH)
"*cande/a* 1973, *Sphinctopsis,* F (IML)
"*guandaca* 1970, *Dimorphomutilla,* F (IML)
"*guasuncha* 1968, *Ephuta,* M (IML)
'*haywardi 1968, Darditilla,* F (IML)
'*kalma* 1969, *Ephuta,* F (NMNH)
"*krombeini* 1965, *Horcomutilla,* F (NMNH)
'*malincha* 1970, *Chasquitilla,* F (IML)
maraye 1962, *Tal/ium,* F (MACN)
"*mataca* 1969, *Ephuta,* F (NMNH)
matrera 1970, *Gurisita,* F (MACN)
'*matrera* 1973, *Sphinctopsis,* F (IML)
'*moccioi 1970, Dimorphomutilla,* F (IML)
'*mofuche* 1962, *Tallium,* F (IML)
'*montera* 1969, *Xystromutilla,* F (IML)
'*piura* 1970, *Sphinctopsis,* F (NMNH)
•*ruthae* 1971, *Darditilla,* F (IML)
"*sauca* 1969, *Ephuta,* F (NMNH)
'*schajovskoyi* 1970, *Dimorphomutiffa,* F (IML)

- *tayguaya* 1969, *Traumatomutilla,* F (NMNH)
- *turrialba* 1969, *Xystromutilla,* F (NMNH)

Genera described by Casal, arranged alphabetically.
(P = Pseudomethocina; S = Sphaeropthalmina; M • Mutilllinae)
Chasquitilla 1970 S
Darditilla 1965 P
Ephuamelia 1968 M
Ephuchaya 1968 M
Ephuseabra 1968 M
Ephusuarezia 1968 M
Gurisita 1970 P
Horcomutilla 1962 P
Huacotilla 1962 S
Jamaitilla 1965 P
Limaytilla 1964 S
Lynchiatilla 1963 P
Patquiatilla 1962 P
Seabratilla 1963 P
Suareztilla 1968 S
Tobantilla 1964 S
Vianatilla 1962 P

COLLECTING REPORTS

Southeastern Peru 1989

by
Sean O'Donnell
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At the end of my 1989 field season in Costa Rica with Bob Jeanne, I had the great fortune of visiting the forested lowlands of Peru east of the Andes. A serendipitous Madison meeting with Tony Luscombe, vice president of the Peruvian NGO "Association for Ecology and Conservation" (ECCO), led to the opportunity to spend a short period (16 to 23 August) at Cuzco Amazonico, a tourist lodge comprising 10,000 hectares of fairly intact forest. The lodge is located along the Madre de Dies River at 200 M elevation in Southeastern Peru, near the Bolivian border. The purpose of my trip was to investigate the lodge as a potential study site for my PhD work on vespid social behavior.

Tony was very helpful in getting me through the rather imposing and surprisingly cold and grey capital city, Lima. I spent one day at the National Museum of Natural History looking over the collection of vespids with the generous help of Dr. Gerardo Lamas. Peru is arguably the most biologically interesting country in the Western hemisphere; the deplorable state of the museum (obviously a low funding priority for a country on the brink of civil war) and Tony's stories of ubiquitous biological degradation were, to put it mildly, depressing. The museum's few social wasp specimens from the lowlands hinted at aculeate wonders east of the mountains, and it was with great excitement that I boarded the flight over the Andes (awesome!) to Puerto Maldonado, a river town in the jungle and gateway to Madre de Dios Province.

The dry season was well under way when I arrived. It was, in fact, the driest anyone could remember: rain was falling every 16 days rather than every 5 as is usual, and the Madre de Dios River had fallen to its lowest recorded level. No rain fell during my visit. Being in what appeared to be wet forest (huge buttressed trees, many palms.), the crunchy leaf litter and bone dry soil even in low areas came as a surprise. The extreme drought was no doubt hard on insect populations, vespids not excepted. Though I ranged far in understory, riverine, and open habitats, the yield of wasps, and especially active wasp colonies, was low. In spite of my quantitative lack of success, I did turn up a few interesting specimens and observations.

Trees in the lodge clearing produced an abandoned *Chartergus* nest, and an unusual elongated (about 15 X 7 cm) nest with large vertical stripes (unknown genus). These, and all colonies I saw high in trees, were associated with bird nests. The lower vegetation in the clearing only yielded two colonies of *Brachygastra augusti.* This mostly black species has a striking threat display: the wasps rush out on the nest envelope and raise their gasters in unison so the bright yellow undersides are exposed.

Trails leaving the clearing quickly enter dark forest understory. Arboreal ant nests *(Azteca* sp.) were common, though I found no wasp/ant nesting associations. All active wasp colonies I found in the "primary" forest were attached to the undersides of large leaves. *Angiopolybia zischkai* was apparently common; I located two colonies and collected several individual workers. I also collected a colony of *Polybia bistriata* from under a palm leaf. The tiny (5 cm diameter) nest comprised two combs and contained 120 wasps. Yellow-bodied wasps with dark markings were common along forest trails (including *Angiopolybia paraensis, Agelaia fulvofasciata,* and *Polybia* sp. near *minarum).* I was twice fooled into netting excellent mimics of this color pattern: once by a clear-wing moth, and once by a reduviid bug whose painful bite reminded me more of MOiier than Bates.

Searching second-growth and open areas near water yielded only one active colony, a small nest of *Apoica* sp. Abandoned nests from several genera *(Protopolybia, Apoica,* several species of *Polybia, Epipona,* and *Pseudopolybia)* were common, suggesting that the pickings would be less slim in a more favorable season. That wasp hunting along permanent streams in the forest did not prove successful is curious. Perhaps the severity of the drought led to colony failure rather than relocation.

The best vespid collecting technique proved to be netting individual workers along trails near water. The shore of the beautiful oxbow Lake Sandoval, inhabited by large caimans, jacanas, hoatzins, sun bitterns, and other wondrous vertebrates, was especially fruitful. There I nabbed *Mischocyttarus tomentosus, Polybia quadricincta,* the impressive *P. liliacea* and its mimic *Agelaia ornata, A. pallipes, A. fulvofasciata, Brachygastra lecheguana,* and *Pseudochartergus fuscatus.* All were collecting water from wet sand, alongside diverse bees and beautiful butterflies (these, of course, held little interest for me). I also noted a curious single-combed nest, probably *Occipitalia* sp., in a guava tree, but was deterred from collecting any by aggressive workers with an uncanny ability to sting the face of reckless entomologists. Nests of Polistes versicolor were numerous and in several stages of development on buildings near the lake; *Polistes* were otherwise strangely absent.

The area of Peru at and around Cuzco Amazonico is a diversity hotspot for birds, frogs, and apparently ants (see Cover, Tobin and Wilson, "A new biodiversity record", Notes from Underground 4:13). Cuzco Amazonico lodge is comfortable, with lab space, electricity, and running water. Anyone seeking information or advice on working in Peru can contact me; unfortunately, the deteriorating political situation with the Sendero Luminoso growing as a real threat to the country make the prospects of biological research grim indeed for the forseeable future.

Mauritania 1989
by
A.Meehl
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I was a guest of Franco Borgato in Mauritania for three weeks in November and did some interesting collecting there. The area is desert to Sahel [illegible] the neighbourhood of Nouakchott where most of the collecting took place and, quite unexpectedly, proved most interesting. Most of the specimens were sphecids, with a few Scoliidae and Pompilidae, but practically no Vespidae. Bethylids were relatively common. Among the Sphecidae I found many new ones for my collection, mostly desert forms, including at least one form which I have difficulty classifying to the genus level and need to study further, Altogether some 500 insects were prepared. Borgato also did some collecting, but not as actively because of his work. From a seasonal point of view. we had judged well, as it was still quite warm during day time (around 30˚C or more in the shade) and often windy, at times with fairly strong sand winds which made collecting difficult to painful. Only towards the end of my stay there were some unexpected rains and colder weather which spoiled the atmosphere.

Besides the immediate environment of Nouakchott, about 10-15 km inland from the sea, we also were very hopeful about an area we visited along the Senegal river, some 450 km from the capital by road. We had prospected a similar area on the Senagal side of the river about two years back with good success. But this time we fared vary badly. The area had been recently sprayed with a very strong insecticide and the ground was littered with hundreds and thousands of dead locusts, but in the process everything else seems to have been killed and the only insects flying in what looked like a promising area from a vegetation point of view was one *Bombus* (Xylocopa?) and a couple of forlorn and damaged buttertlies. **Nothing else was seen during three days!** What the ecological consequences of such indiscriminate spraying is anybody's guess: apparently the operation had started with insecticides aimed exclusively at the locusts, i.e. plant eating insects, but, once the supply ended, went on with much stronger stuff, as exemplified by the results.

I doni know at this time how much collecting Borgato will be able to do as he is professionally very occupied and is often involved in service travel outside of the country, but I hope to be able to go back sometime this year with the firm intention to also try collecting at some the more remote areas (oasis) inland, though this is far from easy from a logistic point of view. Timing is also a very important, and at times hazardous, consideration. If you have *any* information or suggestions please do not hesitate to communicate.

Parla Canyon: Utah/Arizona
by
Arnold S. Menke

In early May, my son Kurt and I along with three friends, hiked down Paria Canyon, a beautiful red sand slot canyon that snakes along for some 25 miles. The canyon is quite narrow in places (10 feet wide) and the walls are often vertical, rising to over 1600' in some sections. The Paria River originates in Utah and flows southeasterly until it joins the Colorado River at Lee's Ferry below Glen Canyon Dam. The hike is about 37 miles, and is relatively easy since *you* are simply walking downstream, following the river. In many places you have to walk in the river but it is seldom deeper than *your* ankles. It took us 5 days to do the hike, and although insect collecting was not the primary reason for the trip, I managed to bring back a few wasps. and beetles. Many plants were flowering which augmented the magnificent scenery of the sheer canyon walls, but Hymenoptera were not abundant, probably because the season was too early.

I took a single male of *Ammophila unita,* a Great Basin endemic, a male *Podalonia, Steniolia* (or possibly *Glenostictia),* a number of interesting eumenines, *Mischocyttarus flavitarsus, Polistes flavus,* and *Campsomeris.* Cottonwood trees at the lower end of the canyon were festooned with beautiful yellow dayflying scarabs (*Cotalpa subcribrata)* and I brought back nearly 50 of them. Unfortunately, nearly all of them greased up and turned brown!

After hiking the Paria, we drove over to the Coyote Buttes which straddle the Utah/Arizona state line about 8 miles west of Paria Canyon. The Buttes are trailless but are well worth exploring due to the beautiful erosional features. The Buttes are composed largely of fossilized sand dunes and the scenery is so fantastic that a photographer could shoot endless rolls of film here. I took one male *Ammophila* in the *pruinosa* complex, a *Podalonia* and an interesting eumenine. Handle Beetles *(Eleodes caudifera,* of near it) were also taken here. We also searched for and found Cobra Arch between the Buttes and the Paria, Cobra Arch is a slender, rather graceful arch, and well worth the 3 mile hike to see. With our time running out we headed back to Albuquerque, New Mexico, stopping at Monument Valley, the Goosenecks of the San Juan River, and Chaco Canyon National Monument. At the last place we took a different species of Handle Beetle with a short handle.

On the Amazon River East of Iquitos, Peru
by
Arnold Menke & Barbara Awertschenko

On June 23 we left for Iquitos, Peru with David Nickle to assist him with his ongoing Earthwatch program on the katydids of Peru, and to collect Sphecidae, especially *Laffa,* and other Hymenoptera. Arnold was armed with 50 yellow pan traps, and 4 of Lubomir Masner's Malaise traps - his latest design which he regards as up to four times better than the standard Townes trap in terms of specimens captured. Sid Dunkle, of the University of Florida, Gainesville, represented the rest of the "team", "El Sid's" specialty is the Odonata.

We flew from Miami to Iquitos on Faucett Peruvian Airlines. That meant a 4 hour delay in departure time and an incredibly long take off roll down the Miami runway! We were probably overloaded since the plane was jammed with people, and the Peruvians on board were taking home everything but the kitchen sink - anyway the old DC 8 finally left the runway, almost imperceptably, and climbed very slowly into the blackness. A little over 4 hours later we landed at Iquitos "international" airport with dawn almost breaking. We were met there by Peter Jensen, owner of Explorama Tours, the company that runs three different jungle facilities for tourists who want to experience la *Selva* (the jungle) first hand. Our baggage was promptly loaded on the Explorama bus by Jensen's personnel, and we were then taken to the company's Amazon dock facility and transferred to one of their river boats for the 40 km journey downriver to the Explorama Inn. Although all of us were pretty exhausted, the sight of the sun rising on the Amazon was wonderful. Also impressive was the speed of the river's current, probably around 6 knots, and it is due to the tremendous mass of water pushing downriver rather than the rate of elevational change per mile. Supposedly the Amazon only drops three-quarters of an inch every mile!

Explorama Inn was the most comfortable of the three facilities run by Jensen. We were housed in individual cabins with showers (cold!) and toilets. The Inn is the only facility with electric lights. The forest around the Inn is penetrated by a network of trails which we explored for several days. Hymenoptera were not abundant; with our nets we managed only to take a few ***Polistes*** and other social wasps, some male orchid bees (using chemical attractants), a few parasitic wasps, and *Sphex* dorsalis. Several females of the last were nesting in the bare hardened silt pathway near the boat building shed near the dock. At least two species of nocturnal halictid bees of the genus *Megalopta* were taken at lights at night.

Two days later we moved on to Explorama Lodge, the oldest and largest Amazon River facility run by Jensen. It is another 40 kms down the Amazon. Here vistors are housed in buildings divided up into many rooms that contain only beds covered by mosquito netting. Communal showers and toilets are nearby. Kerosene lanterns provide some light at night for forays to the toilet, dinner in the dining hall, and other activities. There is an extensive trail system at the Lodge that gets one into the surrounding forest easily. This trail system is criss-crossed by Indian trails so that you can really get "lost" in a hurry if you don't keep close watch on landmarks.

The most interesting experience for all of us at the Lodge was the first evening meal. When we entered the dining hall in the dim light of kerosene lamps we were amazed to find two adult tapirs standing there! Three year old Nellie and year and a half old Henry. Henry loves to be scratched; he lays on the floor and rolls on his side so that anyone who wants to can entertain him digitally. Eating dinner with a couple of tapirs is an unforgettable experience. Even more fun was an evening trail walk looking for Dave's katydids. Shortly after my team took off with flashlights, Nellie came crashing out of the forest behind us and ended up on our trail. She followed us like a dog for the remainder of our sojourn, some 2 hours. On one particularly steep, slippery, muddy section she started to slide and almost took out all of us - but we managed to side step out of her path! When we returned to camp we went to the boat dock to wash the mud off of our boots. Nellie followed and plunged right into the river. A truly memorable excursion. On that particular night walk one of our party discovered a bunch of *Microstigmus* nests on the underside of the leaves of a bush. On a subsequent night, Arnold collected each one in separate vials in order to get all of the inhabitants. One dark nest proved to be old and abandoned. Another dark colored nest contained 11 adults and several pupae. Six other nests, all apparently younger, contained from 1 to 8 adults each.

The Lodge would be our base camp for the month, and after setting up Dave's lab, and organizing our gear, we left for the farthest facility: Explornapo Camp. This camp is another 80 kms downstream from Iquitos, and from the Lodge it takes about 5 hours by boat to get there. You go down the Amazon to the point where the Napo River joins it and then head up the Napo for several hours. Eventually you reach and enter the Rio Sucusari and come to Explornapo Camp after a few kilometers. Explornapo Camp is the most primitive of the three facilities. Everything is open air except the mattress that you sleep on. These are covered by mosquito netting. Everything is covered by thatched roofs of course, and there are showers and toilets just like those at the Lodge. We especially liked the Camp because it was truly in the forest, and being a small facility it was not bustling with people. The Camp has a nice trail system also, although basically there are only two closely parallel trails. One, however, goes on for miles. About an hours walk out on it you reach a primitive camp for those who really want to endure the jungle with a minimum of comfort. We visited it but did not stay there. We stayed four days at Napo Camp and ran our pan traps and Malaise traps for the first time. They produced quite a bit of material that is still in alcohol and largely unworked, but there are many proctotrupoids, some chalcidoids, and a few sphecids (not to mention homops, beetles, flies, etc). The pan traps were sometimes ravaged by ants, or overrun by termites, and sometimes nearly empty. One styrofoam pan was attacked by leaf cutter ants. They chewed up the edge of the pan completely and you could hear them crunching away - it was hilarious. Maybe they think they can grow fungi on artificial media! Net collecting was poor for Hymenoptera. Arnold took *Liris, Isodontia,* and an unusual mud nest made by a *Trypoxylon,* apparently ***silvestre*** Richards. The nest is tear drop shaped and was built on a hanging plant fiber at the base of a large tree. Before he managed to get the whole thing into a bottle, at least one wasp escaped, but 5 males were still in the nest. Arnold subsequently found another nest in a similar situation and obtained one female and two males. The nest is so large in comparison to the wasp that some sort of communal building may be involved, or it may be the work of several generations. We brought back the nests and associated wasps of course. One *Trigonopsis* turned up in a pan trap but pompilids and *Liris* were the most common aculeates in them. More *Megalopta* were taken at lights.

We returned to the Lodge where we stayed for four days. The traps were set out again with moderately good resuits. A few *Larra* turned up in the Malaise traps along with some eumenines and polybiines. Arnold managed to capture ***Trigonopsis*** and ***Trypoxylon*** with his net but again collecting was poor for wasps. One of the more exciting captures was made while paddling around in a dugout canoe. Arnold spotted a bunch of owl flies (Ascalaphidae) clustered on the end of a pendant branch about 5 feet above the water. This was in the late afternoon. With a lucky swing of his net he managed to bag all 18 of them. They turned out to be ***Cordulecerus maclachlani*** Selys. Four were females. The gregarious roosting behavior of this species was described (Hogue & Penny, 1988) in paper published by Arnold's old college room mate, Charles Hogue, who, as it turned out, was visiting the Lodge with a group from UCLA. He and Arnold yaked about the old days in college and Charlie told him about the owl fly paper.

At the end of the first two weeks our group returned upriver to the Inn so that the first Earthwatch team could go home. We then met the second team there. We set out the Malaise traps and pan traps here for the first time. The Malaise traps produced fairly well but some animal drank dry many of the pan traps! We collected two species of "helicopters" in the forest (giant damsel flies of the family Pseudostigmatidae that breed in tree holes), and managed to take another ***Trigonopsis,*** some sawflies for Dave Smith, various orchid bees, and pompilids. One of the workers at the Inn brought Arnold a large, dead ***Pepsis*** in excellent condition that has brassy setation on the scutum. Colin, we seem to have nothing like it in our collection.

After the arrival of the second Earthwatch group it was back downriver to the Lodge. Arnold spotted ***Sagenista*** (Sphecidae) nesting in the hardpacked forest trail there and managed to capture several, none with prey. After two days we moved on to the Nape camp where we set up the Malaise traps in the forest along with pan traps scattered along the trail. A few ***Larra*** and a lot of ***Uris*** materialized in the pan traps, and Arnold netted a ***Podium,*** but overall few sphecids were taken. A few mutillids were picked up also.

The most exciting experience at Napo was a day trip by boat to a backwater area where the famous Victoria water lily occurred (*Victoria* amazonica). These are truly impressive plants with pads 4 or 5 feet in diameter! The undersurface of the pads, as well as every other part of the plant under water, is covered by large, sharp, unfriendly spines. We had recently read about the discovery of how these water lilies are pollinated (Prance and Arias, 1975), and decided to check it out for ourselves. A newly opened flower was cut in half by machete and sure enough, trapped inside the flower were a bunch of scarab beetles of the genus ***Cyclocephala.*** They looked just like the small, tan colored "june bugs" that Arnold grew up with in Los Angeles. Inside one flower, we found a much larger species of ***Cyclocephala*** similar to ***hardyi*** Endrodi. The pollination story is interesting. The flowers open as the sun goes down and are white. During the night the interior of the flower warms by as much as 11 degrees C. above the air temperature and at the same time emits a strong fruit odor. Scarab beetles, principally ***Cyclocephala,*** are apparently attracted by the scent, and enter the flowers. Towards dawn the flower temperature drops, the fruity scent disappears, and the flower closes. During closure, the stamens come together tightly, trapping the beetles inside. The scarabs feed on starchy tissue within the flower during their captivity. The following day the flower changes from white to lavender or reddish purple. By the afternoon they begin to reopen, and in the early evening the beetles can escape by pushing past the loosened mass of stamens, becoming covered with pollen in the process. They then fly to newly opened white flowers and effect the cross-pollination. ***Cyclocephala hardyi*** Endrodi was the principle pollinator, at least at the Manaus study area of Prance and Arias, but two other species of the genus and one of ***Ligyrus*** were also involved. At our Napo site the small species of ***Cyclocephala*** may be the principal pollinator.

We returned to the Lodge for our last four days there. On the way back we stopped at the small town of Francisco de Orellana, named after the first man to navigate all the way down the Amazon River to the Atlantic (in 1542). The town is situated near the junction of the Napo and Amazon Rivers. There is a monument to the man in the town plaza. Barb, armed with a bag of candy, was quickly swarmed over by a bunch of kids. Great fun! Back at the Lodge we discovered more nests of ***Microstigmus,*** apparently the same species. We set up the Malaise traps in the forest this time and scattered the pan traps along the trail. The Malaise traps did pretty well for a change. Meanwhile Arnold discovered the best possible site for the traps on the last day, there - damn! - Sid told him that he had found a place in the forest on one of the side trails where several large trees had been cut down. We visited it the last day and had some of the best collecting of the trip. Got a stephanid on one log, some ***Podium*** and ***Zethus,*** Nearby was a clearing in the forest that had been used to grow bananas and other things. It too was excellent collecting. Both places would have produced much material with malaise and pan traps! Oh well.

On our penultimate day we returned to the Inn for an overnight before going to Iquitos airport. One of the fellows there brought Arnold another dead ***Pepsis,*** again in excellent condition. It is gigantic and must be one of the largest species in the genus. We collected a polybiine nest in the forest that we had marked on a prior visit. It may be ***Angiopolybia pallens.*** It took two attempts to get the nest. The first time Arnold tried slipping a plastic bag over it, the bag caught on something and the wasps started to emerge like crazy, He dropped the bag and we regrouped. Returning two hours later at dusk we found all the inhabitants inside. This time Arnold deftly slipped the bag over the nest, quickly closed it above the nest, and we had 'em'. Boy what a boiling mess of buzzing wasps! There must have been 500 or more inside. All are now in alcohol and they and the nest are in our collection.

The next day we had only minor problems with Peruvian customs people. Our boxes of pinned insects attracted their attention and they were expecting a bribe for permission to take them out of the country, even though Nickle had a permit from the Peruvian authorities. Dave refused to give in to their initial demand for 60 dollars, and they finally accepted 20 in a plain envelope. So it goes at Iquitos airport.

Looking back on the month we would have to say that for Sphecidae, collecting was poor. Two weeks would have been enough. But the overall experience was great. Dave Nickle had everything well organized and the Explorama people took excellent care of us. We highly recommend the Explorama facilities, especially the Lodge and the Camp, as places to conduct research on tropical creatures. They feed you well, provide you with very satisfactory accommodations and in general go all out to make your stay enjoyable. A guide is assigned to each group or individual, and he makes sure that you get to do whatever it is that interests you, whether it be fishing for piranha (good eating!), taking a canoe trip at night to see the stars, or dolphin watching.

These days Peru is supposed to be a country full of civil unrest and thus dangerous to visitors. But in the Amazonian part of the country, at least in the northeast, everything seems peaceful.

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FAX NUMBERS

Listed here are a few FAX numbers. Send us yours, if you have one, and we will print them in the next Sphecos. Country codes are in parentheses.

Diomedes Quintero Arias. Smithsonian Tropical Research Insttitute, Panama: (507) 62-5942.
D. Christopher Darling, Toronto, Ontario, Canada: (416) 586-5863.
Fred Gess, Grahamstown, South Africa: 25049.
Museum National d'Histoire Naturelle (Entomologie), Paris: (33) 1-40 79 36 99.

BIG BLUE BOOK ERRATA, PART 15

by
A.S. Menke

p. 198, LC, L 20 from bottom: change Schmiedeknecht to Kohl.
p. 212, LC, last L: *cobosi* Giner Mari is a valid species (Beaumont, 1962, EOS 38:37). Its distribution is: nw Africa, Iberian Peninsula, s. France.
p. 367, RC, insert after L 1 as species: *confusus* Alayo, 1968; Cuba.
p. 384. RC, L 32: transfer *nasutus* to genus *Entomognathus* on p. 382 (see Beaumont. 1956:185).
p. 384, RC, L 4 from bottom: delete entire entry •mixtus .... • Unavailable under the Code.
p. 389, LC, insert after L 41 as species: *montanum* (Alayo), 1968 *(Eupli/is);* Cuba (subgenus?).
p. 390, LC, insert after L 20 as species: *soroanum* (Alayo), 1968 *(Eupi/is);* Cuba (subgenus?)
p. 426, LC, insert after L 23 as species: *ferrasi* Alayo, 1968; Cuba (H).
p. 427, RC, insert after L 10 as species: *palustris* Alayo, 1968; Cuba (H).
p. 528, RC, L 17 from bottom: change Pakistan to India.
p. 529, LC, L 14: delete entire entry, *"stenopus ...."*

SPHECOS 19 ERRATA

Jim Carpenter chided me for a boo boo in his Brothers article (Sphecos 19:9-10): "I was disappointed to see that my correction on the fitted length of Brothers' cladogram didn't make it." Sorry, Jimbo. Page 10, right column, line 13 should read 139, not 135.

• Ednor

A SCIENTIFIC NOTE?

An Observation
In which the Unknown Prey
(really Just a Gummy Brown Mass)
of an Unknown Species of ***Pof/stes***
(possibly ***exclamans*** Viereck
(Hymenoptera: Vespidae), A. S.
Menke, personal communication)
was Robbed
when It was Knocked to the Ground
by an Unknown Species of ***Vespu/a***
(possibly ***squamosa*** (Drury)
(but Who Really Knows),
(Hymenoptera: Vespidae),
E. E. Grissell, personal
communication)
during an In-flight Battle
that Lasted Approximately
Twenty Seconds (EDST)
In the Vicinity of Colesville,
Montgomery County, Maryland
on 11 August 1990
at about 11:30 a.m.
on a Relatively Warm, Windless Day

E. E. Grissell[bl], D. R. Miller[2]
and J. Miller

We saw it happen.

Footnotes

1. lead Scientist for Hymenoptera, Orthoptera, Dermaptera. Isoptera, Psocoptera, Embioptera and Zoraptera Research Unit, Systematic Entomology Laboratory, USDA, Museum of Natural History, Washington, DC 20560.
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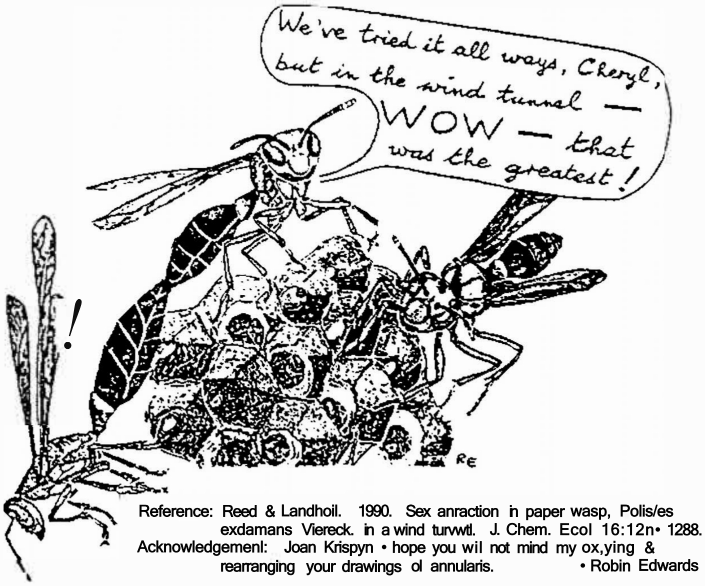

Reference: Reed & Landhoil. 1990. Sex attraction in paper wasp, Polis/es exdamans Viereck. in a wind turvwtl. J. Chem. Ecol 16:12n• 1288.
Acknowledgemenl: Joan Krispyn • hope you will not mind my ox,ying & rearranging your drawings ol annularis. • Robin Edwards

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II *SIMPOS/O DE ZOOLOGIA - 2ND SYMPOSIUM ON* ZOOLOGY

The second Symposium on Zoology will be held in Havana, capital of the Republic of Cuba, on June-18-23, 1991. This event will be a new opportunity for zoologists all over the world to come together and debate the different trends of Zoology in all continents. Papers will be presented in work sessions and posters. The main topics of the Symposium will be: 1. Systematics; 2. Ecology; 3. Ethology; 4. Zoogeography; 5. Anatomy; 6. Paleontology; 7. Population Genetics; 8. Applied Zoology; 9. Medical Zoology; 10. Preservation and better use of natural resources.

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Fourth European Congress of Entomology
XIII. International Symposium
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Giidiillo, 1991

First circular

Dear Colleague,

the Hungarian Entomological Society, the Hungarian National History Museum and the Plant Protection Institute of the Hungarian Academy of Sciences have the pleasure to invite you to a joint entomological event, the Fourth European Congress of Entomology and the XIIJ. Symposium of the Sociatas Internationalis Entomofaunistica Europae-Centralis to be held in *Güdii/15* (Hungary) from the *1st to 6th September,* 1991. The main theme of the event is

INSECTS and their ENVIRONMENT

with the following sub-themes: 1. *New methods in entomology;* 2. *Indication and monitoring;* 3. *Interrelationships between arthropod communities of agrobiotypes and undisturbed areas;* 4. *Recent zoogeographical changes in the Palearctic;* 5. *Entomofaunistics in Central Europe.*

Within the same framework will be organized 6. the *meeting of European Heteropterologists* (Heteuroptera 1991) and *workshops* 7. on *soil arthropods* and 8. on *new entomological cooperation in the new Europe.*

Location of the event (including accommodation): buildings of the Agricultural University in Godollo (about 30 km from Budapest).

Languages of lectures: English for the Congress, German for the Symposium. We do hope this bilingual event can and will promote mutual understanding and cooperation, on personal as well as on scientific level.

The second circular, with a tentative program, will be released by Novenber, 1990.

If you are interested in participating in the event, please fill in the Registration form and return it until 15 September, 1990. Please call the attention of your colleagues to this event.

Budapest, 15 June, 1990.

Dr. Tamas Vdsdrhelyi
Secretary General
of the Organizing Committee

Dr. Gabor Jenser
President
of the Organizing Committee

Organizing Committee ECE/SIEEC
Hungarian Natural History Museum
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H-1088
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FIRST ANNOUNCEMENT FIRST ANNOUNCEMENT FIRST ANNOUNCEMENT

2nd Quadrennial Meeting

International Society of Hymenopterists

August 11-17, 1991

University of Sheffield
Sheffield, England

Scientific Program. The program will include submitted papers and posters on all aspects of Hymenoptera research with ample discussion time after each talk. Also. a few special invited speakers are planned. (Note: the Society will not have a regular meeting at the International Congress of Entomology at Beijing in 1992.)

Accommodation. Single student and a few twin-bedded rooms will be available in Halifax Hall of Residence where all meetings will be held. Hotel accommodation is also available nearby, and the University Biological Sciences building and Sheffield Botanical Gardens are just a few minutes walk away.

Tours. One or two tours of nearby English manor houses and shopping areas will be scheduled. A collecting trip to the nearby spectacular heather moorland of the Peak District National Park (good for Aculeates) will be arranged if interest is expressed. Visits to the British Museum in London can also be arranged.

Second Announcement. A second announcement including a call for papers and more information on registration costs. accommodation costs, paper schedules, etc., will be mailed in mid-1990. If you wish to receive the next announcement, complete the form below and return by May **1, 1990** to:

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