# MELISSA

## The Melittologist's Newsletter

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# EDITORIAL COMMENTS

*Melissa* #3 had a longer gestation period than the previous two issues. This delay is hopefully compensated for by the more professional appearance of the newsletter. In the past, *Melissa* text was written on an IBM DOS system using WordStar and then simply printed out on a letter quality printer. For this issue we used WordPerfect word-processing. These DOS files were then transferred to a Macintosh Mac II using DaynaFile external drives and translation software. Final copy was composed on the Mac with the page layout program, Quark XPress and then printed with a QMS-PS 800+ laser printer. The bee in the *Melissa* masthead, drawn by Elaine Hodges, was captured by a scanner, MacScan by New Image Technologies. Everything having to do with file translation to the Macintosh, composition and graphics was expertly handled by George L. Venable, Smithsonian Department of Entomology illustrator. We greatly appreciate his invaluable contributions to this issue.

Please start sending in material for *Melissa* #4. It would help if lengthy contributions were received on disk, preferably written in DOS Word Perfect or any type of Macintosh word-processing. However, we would also gladly accept DOS ASCII text files or the usual hard copy. Another option is BITNET. BITNET is an international mail system which links large computers at educational institutions. The *Melissa* BITNET address is: MNHEN011@SIVM. If you have access to this system, please consider its use for your future *Melissa* correspondence. One final production note: you can now illustrate your contributions with line drawings and/or black and white photographs which can be read through the MacScan scanner.

# "Cease the Opportunity"

by Beth B. Norden

Several months ago a questionnaire/plea for help was sent to *Melissa* readers. I would like to claim wit compelled me to type "cease" instead of "seize". However, I confess that the error (not present in the original draft) was probably Freudian in nature, resulting from the realization that much work would be arriving. This slip affords the perfect opportunity to point out that *Melissa* is created during "spare" time, and that literature citations, news items, reports, changes in personal data, etc., should be submitted throughout the year. *Melissa* will only be as helpful as we **all** make her. Thanks to all who responded (especially those with wit). As Elbert Jaycox (New Mexico State University) pointed out in his response: "It is better to cease the opportunity than to waist it". And yes, Mr. Baker (University Museum, Oxford), in the future every effort will be made to use proper English.

# HURD REPRINTS

Various quantities of some papers written by the late Dr. Paul D. Hurd, Jr. are available on request. Submit the title(s) and date(s) of publication(s) along with the number of reprints desired to: B. Norden, NHB mail stop 105, Smithsonian Institution, Washington, D.C. 20560 USA. If available, the paper(s) will be mailed to you free of charge as soon as possible.

# DIRECTORY

No new entries in this section will be included in *Melissa* #3. A new, updated directory is currently in preparation and will be mailed this summer (1988). If you have had any changes in personal data, or if you know of someone who would like to be included in the directory, please respond post haste. Thank you. The following changes in name, address, or phone number have been brought to our attention. Undoubtedly there are others. Please submit any changes in personal data as soon as possible so that the updated 1988 directory can be as accurate as possible. Thank you.

**Jorge Gonzalez Acereto,** Facultad de Veterinaria, Depto. Apicultura, Apartado Postal #116-D, 97100 MEXICO.

**Hugo Andersson,** 046-109334.

**Bruno Bonelli,** Via Avisio 13, 38033 Cavalese (Trento), ITALY.

**James H. Cane,** Department of Entomology, (205) 826-5006.

**Clarence H. Collison,** (814) 865-4621 ext. 20.

**Heidi E. M. Dobson,** Ecological Research Station, olands Skogsby 6280, S-38600 Farjestaden, SWEDEN. (0485) 38356 or 38158.

**Anne Dollin,** P.O. Box 74, North Richmond, N.S.W. 2754, AUSTRALIA.

**George Eickwort,** (607) 255-2096.

**Richard M. Fisher,** Dept. of Botany and Zoology, Massey University, Palmerston North, NEW ZEALAND.

**Donald R. Frohlich** is not David as previously listed.

**Marco A. Gaiani,** Avenida Miranda 3-69, Bocono, Trujillo 3103, VENEZUELA. 072-51.277.

**V. Haeseler,** FB7 Universitat Oldenburg, Ammerlander-Heerstrasse 67-99, Postfach 2503, WEST GERMANY.

**C. van Heemert,** Research Centre for Insect Pollination and Beekeeping, Ambrosiusweg 1, 5081 NG Hilvarenbeek, THE NETHERLANDS.

**H. R. Hepburn,** Dept. of Zoology & Entomology, Rhodes University, P.O. Box 94, 6140, Grahamstown, SOUTH AFRICA.

**Warwick E. Kerr,** Dept. Biologia, Campus Umuarama, UFU 38400, Uberlundia, NG, BRASIL. 034-232-2000 R243.

**Juan M. Labougle,** Inst. de Biologia (direccion), cd. Universitariae, Appartata Postal 70-233, Mexico 04510 DF, MEXICO. 905-584-2906-0514.

**Terence M. Laverty,** Dept. of Zoology, University of Western Ontario, London, Ontario, CANADA N6A 5B7.

**Russell B. Miller,** (203) 432-5001 or (413) 539-9544.

**Adolfo Molina-Pardo,** Director Tecnico, Programa Reginal para el Manejo y Control de la Abeja Africanizada (Mexico-Centro America-Panama), Organismo Internacional Regional de Sanidad Agropecuaria, Apartado (01)61, San Salvador, EL SALVADOR, C.A. 23-2391, 23-2105, or 23-2452.

**Frank D. Parker,** American Embassy (Costa Rica), PSC Box 496, APO Miami, Florida 34020, USA. 011-506-29-90-28 (29-98-51).

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**D. Sammataro,** Editor, **Cornucopia** (no longer called IAAD/NEWS), 7011 Spieth Road, Medina, Ohio 44256, USA. (216) 722-2021.

**Michael Schwarz,** Department of Zoology, La Trobe University, Bundoora, Vic. 3083, AUSTRALIA.

**Virginia Scott,** (517) 355-4662.

**Thomas D. Seeley,** Section of Neurobiology & Behavior, Cornell University, Ithaca, New York 14853, USA. (607) 255-6574.

**Brian H. Smith,** Arizona Research Labs., Division of Neurobiology, University of Arizona, 603 Gould-Simpson Science Building, Tucson, Arizona 85721, USA.

**Evan A. Sugden,** c/o R. Thorp, Dept. of Entomology, University of California, Davis, California 95616, USA. (916) 752-0475.

**John D. Vandenberg,** USDA-ARS Bee Biology & Systematics Lab., Utah State University, Logan, Utah 84322, USA. (801) 750-2525.

**Adrian van Doorn,** Koppert bv, Veilingweg 17, 2651 BE Berkel en Rodenrijs, THE NETHERLANDS

**Nevin Weaver,** 43 Highland Ave., Lexington, Massachusetts 02173, USA. (617) 862-9225.

**Hoi-sen Yong,** Department of Zoology, University of Malaya, 59100 Kuala Lumpur, MALAYSIA.

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# INDIVIDUAL NEWS ITEMS

**Alberto Horacio Abrahamovich** (Universidad Nacional de La Planta, Buenos Aires, ARGENTINA). **CURRENT PROJECTS:** Systematic and biological studies of South American *Bombus*, especially those from Argentina and neighboring countries. Pollen collecting strategies and pollens collected by *Bombus* and other Apoidea in Argentina. Phoretic relationships between Acarina and the bee genera *Bombus* and *Xylocopa*. Also in progress is a study (initially only involving Argentinian species) concerning the systematics of the tribes Euglossini and Xylocopini.

**Nickolaj Rostislavovich Bogatyzov** (Biological Institute, Siberian Branch, Academy of Sciences, Novosibizsk, USSR). **GENERAL:** "Individual behaviour of the foragers; interrelationship between individuals and species; the structure of species community; the hibernation of queens; nest site selection and the problem of visual and other stimuli with this process; the reliable means of finding of bumblebee nests in nature." **HELP:** "I should be very grateful to receive the reprints on bumblebee ecology, ethology, and biology."

**Jim Cane** (Auburn University, Auburn, Alabama, USA). Jim suggests that if you plan to visit Yellowstone National Park this summer, late June might be good for finding *Nomadopsis* (probably *zebrata* ). Last season while hiking the several miles out to Imperial Geyser, Jim found a dense aggregation amidst low, patchy vegetation, occupying perhaps 80 square meters of the area just beyond the mudpots. He further suggests that on the return walk, an extensive nesting site of large bembicine wasps having dusky-black males ( *Glenostictia* ?) may be seen by taking the path passing Queen's Laundry. He reports that the hum of aerial patrolling for mates was audible many meters distant.

**Connal Eardley** (National Collection of Insects, Pretoria, SOUTH AFRICA). Dr. Eardley writes: "I will be working in the British Museum (Natural History), London, from the 1st-26th February 1988. My present research projects involve systematic revisions of the following groups: the southern African species of the anthophorid genera *Anthophora, Amegilla, Tetralonia , Eucara* , and *Thyreus* (the *Anthophora* manuscript is being written in colaboration with R.W. Brooks of the University of Kansas, USA., and is nearly complete); the anthophorid genus *Pachymelopsis* from subsaharan Africa; the anthophorid subfamily Nomadinae (genera

*Ammobates, Pasitomachthes , Sphecodopsis , Nomada , Epeolus , Pasites , Morgania* , and *Omachthes* ) and the andrenid subfamily Panurginae (genera *Meliturga, Meliturgula, Mermiglossa,* and *Poecilomelitta* ) from subsaharan Africa and the western Indian Ocean islands. Much of the research on these groups has been completed and I will be working on completing the manuscripts when I return from the British Museum. I should be pleased to borrow material of the above mentioned genera, especially *Pachymelopsis* (many of these species were originally placed in *Anthophora* or *Habropoda*), the Nomadinae and the Panurginae from Africa north of South Africa. Should curators of collections be willing to lend limited amounts of material at a time, I will attempt to complete these projects in the order mentioned above and will be happy to borrow the material in this order. I am also busy compiling a catalogue of the Afrotropical Apoidea which I intend to publish in parts. The first part comprises the Xylocopinae and was published in December 1987."

**Catalina Everaert** (Alavaro Oblegon, MEXICO). **GENERAL:** "I'm willing to start working with Mexican Euglossine bees, and also to work on determining Mexican apifauna of tropical and subtropical areas."

**John B. Free** (University College Cardiff, Wales, U.K.). **HELP:** Professor Free is currently revising his book, **Insect Pollination of Crops,** published by Academic Press in 1970, and welcomes any relevant reprints or references (mail to: Bee Research Unit, University College Cardiff, CF1 1XL, Wales, U.K.).

**Marco A. Gaiani** (Avenida Miranda 3-69 Bocono, Trujillo 3103, VENEZUELA). **HELP:** "I would like to stress the need for literature on Neotropical Apoidea (systematics and biology) since here in Venezuela it is a little hard to get some of the old and new literature."

**Terry L. Griswold** (USDA Bee Biology & Systematics Lab., Utah State University, Logan, Utah, USA). **HELP:** Terry wishes information on the location of the following elusive types--*Chelynia melanotricha* Cockerell, *Chelynia pavonina* Cockerell, *Eriades mandibularis* Friese 1922, *Eriades pachyceps* Friese 1922, *Eriades asiaticus* Friese 1921, *Heriades laosella* Cockerell 1929, *Heriades glutinosus* Giraud 1871, *Heriades glomerans* Schletterer 1889, *Chelostoma capitatum* Schletterer 1908, *Megachile sauavida* Cameron 1908, and *Megachile tricarinata* Bingham 1903, *Stelis birkmanni* Cockerell, Thanks.

**Enrique Martinez Hernandez** (Palynology Lab., Institute of Geology U.N.A.M., Covoacan, MEXICO). **GENERAL:** Pollen morphology and its relevance to plant ecology and plant systematics. **CURRENT PROJECTS:** Biologia y ecologia de las abejas de chiapas y su relacion con la abeja africana.

**Mohamed A. Moustafa** (Plant Protection Research Inst., Cairo, EGYPT). **HELP:** "I would like to know more about the influence of pheromones on rearing and management of solitary bees."

**Rosa Maria Murillo** (Patzcuaro, Michoacan 61600, MEXICO). **GENERAL:** Geographical distribution and taxonomy of Meliponinae in Mexico, pollination strategies in natural plant communities. CURRENT PROJECTS: Reconocimiento de la apifauna de la rivera del lago de Patzcuaro, Michoacan, Mexico. **HELP:** Identifications and literature.

**Guiomar Nates Parra** (Universidad Nacional, Bogota, COLOMBIA). **GENERAL:** Actualmente sey jefe del Laboratorie de abejas del Departamento de Biologia de la Universidad Nacional, Bogota, Colombia, en donde se desarrellan varias actividades: 1. Coleccion de abejas de Colombia (coleccion aproximadamente de 10,000 ejemplares). 2. Sistematica, distribucien geografica, habites de nidificacien de Meliponinos. 3. Sistematica, distribucion geografoca, havites de nidificacien de *Bombus*. 4. Abejas africanizadas: comparacien con razas europeas y compertaniento en colmenas KBTH. 5. Palinologia. 6. Cria reinas

*Apis* e inseminacien instrumental. **CURRENT PROJECTS**: Preyecto de investigacion en ejecucien: Pelinizacion en *Gmelina arborea* usando *Apis mellifera* Proyecto en preparacion: Abejas del Oriente Colombiano. **HELP**: Tanto para los proyectos de investigacion como para les manuscritos requerimeos de literatura actualizada. En nustra biblioteca (Dpto. Biologia) es posible encontrar literatura, si acaso, hasta 1982 y no de todo lo que se necesita. Por otro lado, el Laboratorio de Abejas posee una pequena biblioteca especializada, que se ha venido logrando con el auxilio de la U. de Kansas (Dpto. Entomologia), Lab. de Baton Rouge, Institute Smithsoniano, colaboraciones particulares de algunes autores y obencion de fotocopias con recursos personales, lo cual no es muy facil ni frecunete. Nos interesan referencias sobre taconomia de Meliponinos, Euglosins, *Bombus*, *Xylocopa* y Halictidae. Igualmente requerimos servicios de identificacion para los mismos grupos y ademas Anthophoridae. **TRIPS**: Sur de la Sierra de la Macarena (Dpto. del Meta), sitio del cual se tiene poca informacion, en cuanto a insectos se refiere. Preteno regresar para realizar muestreos mas intensivos en el proximo fin de ano. Interior del Dpto. de Cundinamarca, con el objetivo de complementar muestreos, de *Bombus* , Euglosinos y Meliponios.

**Tadeusz Pawlikowski** (Copernicus University, Torun, POLAND). **CURRENT PROJECTS**: "My current projects concern the influence of pine monoculture forest habitat on the foraging behaviour and structure of wild bee communities from central Poland. "**HELP**:"I am seeking literature on wild bee community structure from pine and mixed forest areas."

**Vladimir G. Radchenko** (Academy of Sciences of the Ukr. SSR, Kiev, USSR). **GENERAL**: Evolution and classification of the nests of bees. **CURRENT PROJECTS**: A study of the nesting biology of some solitary and primitively social bees. (South-east Ukraine).

**Anthony Raw** (Universidade de Brasilia, Brasilia, BRAZIL). Tony writes: "I have begun a revision of neotropical *Megachile*. To date I have a list of 560 names applied to spp. in the region of which I guess c. 450 are valid. With the late Professor Mitchell's last publication (1980) there are now 25 subgenera which are entirely neotropical but for a few intrusions into southern USA. I have collected four undescribed species in central Brazil that belong to a new subgenus. I am still not in a position to decide, but suspect Prof. Mitchell's generic treatment is not justifiable so, for the present, I am considering all of these subgenera to be members of *Megachile* s.l. I am compiling a collection of specimens to compare with types and so far have well over 400 species. I have examined some types, but have a long way to go in the work. However, I shall be very happy to identify material from the region."

**Richard W. Rust** (University of Nevada, Reno, Nevada, USA). **HELP**: Dr. Rust "is initiating a systematic revision of the genus *Epeolus* and would like to request loans of specimens for study. All specimens will be returned. The study will start in January 1988 and is expected to take three years. Thanks."

**Dave Roubik** (Smithsonian Tropical Research Institute, Balboa, PANAMA). Dave writes "I have your recent note for ***Melissa*** and have decided to actually respond with some input. I think that the best news was that the SI grant with McGinley was funded fully and ranked very highly (one reviewer called it the top 1 or 2 in recent years). It means that a very strong research base on bee biology and pollination will grow out of the two Mexican biosphere reserves we chose, and it will permit the Mexican researchers working there now, and future broods of bee workers, to go further with evolutionary questions than perhaps

anywhere else in the tropics. Earmarked for special attention are outcrossing services provided by native stingless bees and Africanized honeybees, comparative diet specialization among bees at the two reserves, and long-term study of some of the natural enemies of bees--with the potential to work toward biocontrol of the dread Africanized honeybees. All this is to complement studies by researchers currently working in the large permanent reserves, and to set up permanent bee and pollen reference collections for each of them."

**Roy R. Snelling** (Los Angeles County Museum of Natural History, Los Angeles, California, USA). Roy writes: 1. "I need to see any and all available *Hesperapis* from Mexico, especially from southern areas such as Puebla, Oaxaca, Morelos, etc. I want to try to wrap up the revision in 1988." 2. "I am going to start writing up the Central American *Hylaeus* (so Ayala can do identifications) so will welcome material from that area. There are some very intriguing species in the highlands of Mexico; one Costa Rican species ( *H. titanius* ) is still known only from types collected at San Jose. I've seen types of all named species from this area. While there is considerable new synonymy in my recent paper (1982), there are numerous undescribed species."

**John Vandenberg** (ARS, USDA Bee Biology & Systematics Laboratory, Logan, Utah, USA). John left the Beneficial Insects Laboratory, Beltsville, Maryland in November 1987 to assume the position of Research Leader at the Logan lab. He is currently conducting research on the diseases of wild bees and supervising programs in wild bee biology, pollination ecology, and systematics.

**Bill Wcislo** (University of Kansas, Lawrence, Kansas, USA). Bill writes: "I would be grateful in hearing from any bee workers who have dissected bees, and have any observations on individuals having an abnormal number of ovarioles per ovary. I would also be interested in hearing from those people who have dissected numerous bees, and have never seen individuals with aberrant numbers of ovarioles."

**Paul H. Williams** (British Museum of Natural History, London, ENGLAND). **GENERAL**: "A revision of the systematics and distribution of the bumble bees of the Kashmir Himalaya should be completed in 1988, based on material from three summers of field work." **HELP**: "I would very much appreciate the opportunity to examine more bumble bees from the Himalaya and China, especially from Gansu, Sichuan and Yunnan."

**Peter Wirtz** (Zoologisches Institut, Freiburg, W. GERMANY). **CURRENT PROJECTS**: "Interspecific territoriality and reproductive behaviour of *Anthidium* species." Peter also comments: "Concerning the question of citing observations reported in ***Melissa*** (raised in Newsletter 2 page 2): The publishing and quoting of abstracts (e.g. of talks given somewhere but perhaps never printed because the referees found serious faults) is bad enough. I urge all readers to not quote (except as "personal communication") anything that has been written in informal newsletters that are not even generally available."

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# CONCERN OVER THE BRITISH MUSEUM

By James M. Carpenter and Lynn S. Kimsey
Museum of Comparative Zoology,
Harvard University, Cambridge, Massachusetts

We feel that a number of recent developments at the British Museum (Natural History) should be brought to the attention of *Melissa* readers. This institution has long been the premier one for the study of insect taxonomy, but this status may be imperiled. The Museum has been under financial siege for some years now. The first indication of this was the institution of so-called "bench fees" several years ago. These fees are charges levied on visiting scientists working in the collections. It's true that these fees have been waived for those unable to pay, but workers with access to funding have been asked for the fees. Thus, the institution is attempting to obtain financial support from perhaps the most poorly funded group of scientists. And of course, no major study by taxonomists can be done without consulting the collections of the British Museum. Circumstances now appear to be worsening for the Museum itself. Visitors to the public displays are now charged admission, but this does not seem to be enough. Administrative oversight of the Museum has been transferred to the Office of Arts and Libraries from the Dept. of Education and Science. The intention is for the BM to be eligible for specific project support from the science budget, competition for which the institution was excluded from when it was supported by that budget. In practice little project support has yet eventuated, and of course this whole approach will inevitably circumscribe the amount and type of research done. Funding has been frozen at current levels for three years, with salary increases to come from this fixed amount. As a result, the Museum faces considerable loss in staffing. Presently this is expressed in staff attrition: people who retire or quit are not replaced. Over three years, this has meant a loss of 20% in positions, which in Entomology is a drop from over 90 to about 70. We find this worsening trend alarming. We view this as amounting to an abandonment of international scientific responsibility. We feel the international scientific community should voice distress over this. Right now we would suggest writing to the Minister of State in charge, the Right Honorable Mr. Richard Luce, MP. We urge anyone, particularly our British brethern, with further suggestions or information to send it to the newsletter.

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# *Bombus terrestris* (L.) - - DOES A CHANGE IN ITS USEAGE REALLY SERVE SCIENCE?

By R.P. Macfarlane, Entomology Division,
DSIR, Private Bag, Christchurch, NEW ZEALAND

In New Zealand we have consistently used *Bombus terrestris* (L.) for a hundred years after the successful introduction of four *Bombus* species between 1885 and 1906. Scientists in our country are concerned at the recent divergent useage of *B. terrestris*, the type species of *Bombus*, for different taxonomic entities in Europe.

Loken (1973) brought attention to the problems in the Linnean types, but she

continued to use *B. terrestris* and *B. lucorum* (L.) in the traditional sense for these two sister species. This useage of these species has been followed by most authors since then. Day (1979) designated a lectotype for *B. terrestris* that corresponds to *B. lucorum*. Thus, from a strict application of the law of priority of names, *B. terrestris* auct. (which I refer to as the traditional use) must become *B. audax* (Harris, 1780) and *B. lucorum* auct. must become *B. terrestris* (L., 1758). Such a double name change is unfortunate so Day (1979) and Rasmont (1983) stated that the Commission could or should conserve these names.

In Europe, Alford (1975), Prys-Jones and Corbet (1987) and many others still use *B. terrestris* in the traditional broad sense. However, Williams (1985, 1986) switched over to using *B. audax* for this species. As well, Williams used *B. laevis* for *B. muscorum* auct. so that *B. humilis* auct. becomes *B. muscorum* (L.) by following the same nomenclatural principles. Williams is correct in forcefully drawing attention to the nomenclatural problems of these four species, but I consider changing the useage away from the longstanding and widespread traditional use (Loken 1973, Rasmont 1983) does not serve science well.

With *B. terrestris* the situation is even more complicated, because Rasmont et al. (1986) and Hagen (1986) use *B. terrestris* auct. nec L. in a narrower sense than the traditional one as opposed to *B. cryptorum* (Fabricius) and also *B. lucorum*. Thus a situation has arisen with the use of *B. terrestris*, in which confusion in the taxa is being generated for scientists other than taxonomic specialists.

An outline of my reasons for wishing to conserve *B. terrestris* auct. in the traditional sense is:

1. Commission rulings conserved the Linnaean name for the genus *Bombus* and fixed *B. terrestris* as the type species for the genus. It would be logical to extend the conservation of Linnaeus' names to these four *Bombus* species, which would avoid confusion arising from more than one taxon being involved. Retention of these *Bombus* names would be consistent with the ruling on *Megachile rotundata* Fabricius, 1787 that was concerned with more than one taxon.
2. I have received support for the conservation appeal from eminent researchers that deal with bees from France, Belgium, The United States, Chile, and New Zealand, and only one objection from the United Kingdom.
3. The literature on these four species is confusing enough without compounding the difficulties by letting a gradual or incomplete change in the meaning of the names to occur. Outside of Europe it is not easy to follow or review the literature on these species, because so many languages and different publications present information on them. Scientifically *B. terrestris* and *B. lucorum* are amongst the best known species of bumble bees.
4. Bumble bees are well known insects of economic value. *B. terrestris* is being used for pollination of lucerne and kiwifruit in New Zealand. The potential for more widespread commercial use of *B. terrestris* and *B. lucorum* in pollination of agricultural and horticultural crops is relatively great for bumble bees. They are common, extensive research has shown they are relatively easy to rear on artificial diets, they have large colonies and they are effective pollinators of many crops.
5. If the double name change becomes accepted than thousands of bumble bees in Europe, New Zealand and the larger American collections would need to be relabelled. Given the limited financial resources for research, then the talents of taxonomists would be more profitabily directed towards clarifying the acknowledged problems in distinguishing satisfactory subgenera of *Bombus* (Ito 1983, Macfarlane 1985, Williams 1985), the species of *Bombus* or even other lesser known Hymenoptera.

I would appreciate letters from scientists that I have not contacted, who would be happy to be listed as supporting this appeal. Pekkarinen, Rasmont and Loken have just lodged an appeal to conserve *B. terrestris* auct. *B. lucorum* L., *B. muscorum* auct. and *B. humilis* with The International Commission of Zoological Nomenclature in addition to this notice, so please consider carefully before publishing on these species in a non traditional sense.

ACKNOWLEDGEMENT

My thanks to Dr. T.K. Crosby, curator of the New Zealand Arthropod Collection, for his guidance in preparing this note.

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# BEE CLEANING

By K. W. Cooper
University of California, Riverside

Specimens of bees smeared with resins, oils, nectars or liquids oozed from the crop, that mat hairs and conceal sculpture, are generally poor for study and at times difficult or even impossible to determine. A number of methods have been proposed for cleaning such bees. In my own experience none have been so regularly successful, unsurprisingly perhaps, as the use of dry cleaning solution. It may prove available from a friendly dry cleaner, or can be had from Fisher Scientific, Fair Lawn, New Jersey, 07410, as Stoddard Solvent, #S457-4, at $33.30 per gallon (the least amount vended). First try your dry cleaner as a source, for a quart will last many years.

My experience in dry cleaning bees has been had almost exclusively with megachilids, but there is no obvious reason why Stoddard Solvent used in the manner to be described should not be satisfactory for bees of other families, or indeed for many kinds of insects.

To clean a bee (freshly caught, or even years

after pinning) use soft-haired water colorist's brushes of appropriate sizes, dipped in the solvent, to wet, brush and rebrush the smeared area. Then wipe the damp brush over a dry area of highly absorbent filter paper to draw off the solvent with the contaminants it holds. Repeat until the area is nearly cleaned. Then apply fresh solvent and remove it quickly from the bee by gently and repeatedly pressing the edges of small strips of filter paper over the dampened area until clean and dry. Lightly sweeping damp areas of pubescence with strips of filter paper in a direction opposite to that in which the hairs are matted will, when clean, leave them in their normal orientation. With patience, nearly any specimen can be satisfactorily cleaned with Stoddard Solvent.

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# DUCKE TYPES OF BEES IN THE NATURHISTORISCHES MUSEUM BERN

By Arturo Roig-Alsina, University of Kansas, Lawrence

The types of Neotropical species of Hymenoptera described by Adolph Ducke are preserved in several museums and I have had difficulties keeping track of some of them. Quite a few are in Belem [Nascimento, P.T.R. 1979. Catalogo de tipos entomologicos do Museu Goeldi. Hymenoptera. Bol. Mus. Paraense Emilio Goeldi, Nova Serie, 98:1-18]. Others are in Sao Paulo, Paris, Berlin and Bern. Through the kindness of Dr. H. D. Volkart I obtained a list of the type specimens of bees in Bern that may be of interest for other ***Melissa*** readers. Similar information for other Aculeate Hymenoptera has been sent to Arnold Menke for ***Sphecos***. In the accompanying list "T" means that those specimens bear a hand-written label by Ducke with the indication "type"; the asterisk means that there are specimens not labeled as types but belonging to syntype series. For more information contact Dr. H. D. Volkart, Naturhistorisches Museum Bern, Bernastrasse 15, CH-3005 Bern, Switzerland.

*Acanthopus splendidus* var. *modestior*, female, T; *Ancyloscelis osmioides* *; *Anthidium arenarium*, female, male, T; *Anthidium codoense* *; *Anthidium furcatum*, female, male, T; *Anthrenoides alfkeni*, male, T; *Caenohalictus serripes*, male, T; *Calliopsis turnerae*, female, male, T; *Centris caxiensis*, T, (1); *Centris hyptidis*, female, T; *Centris superba* *; *Centris fulvofasciata*, female, T; *Chacoana schizacantha*, male, T; *Coelioxoides waltheriae*, female, T; *Epicharis unicalcarata*, male, T; *Euglossa azurea*, male, T, (2); *Euglossa bicolor*, male, T; *Euglossa laniventris* *; *Euglossa meliponoides*, male, T; *Euglossa polita*, female, male, T; *Halictanthrena malpighiacearum*, female, T; *Halictus konowi*, female, T; *Halictus osmioides* *; *Halictus postscutellaris*, female, T; *Leiopodus depressiventris*, female, T; *Leiopodus trochantericus*, male, T; *Lithurgus huberi*, male, T; *Lithurgus friesei*, male, T; *Melissa friesei*, female, male, T; *Melissa superba*, male, T; *Nomada tomentifera*, female, male, T; *Nomia cearensis* *; *Oediscelis megalostigma*, female, male, T; *Panurginus alismatis*, female, male, T; *Panurginus decoloratus*, female, male, T; *Podalirius grisescens*, female, male, T; *Podalirius ipomoeae*, male, T; *Psaenythis variabilis*, female, T; *Ptilothrix riparia*, female, male, T; *Rhophitulus friesei*, female, T; *Rhophitulus hyptidis*, female, T; *Tetrapedia huberi*, female, T.

(1) This specimen does not have Ducke's handwritten type indication but bears a printed red label "Type".

(2) This name is missing in the list of species described by Ducke published by Nascimento and Overal [1979. Contribuicoes entomologicas de Adolpho Ducke: Taxonomia e bibliografia. Bol. Mus Paraense Emilio Goeldi, Nova Serie, 95:1-17].

# PUZZLING PERDITA

By Jerome G. Rozen, Jr., and
Ronald J. McGinley
American Musuem of Natural History, New York, and
Smithsonian Institution, Washington, D.C.

This genus of small to tiny panurgine bees is little known outside North America because it ranges only from southern Canada to Central America. But within these limits it is speciose, containing 769 named species and subspecies. Surprisingly similiar to the unrelated *Nomioides* of the Old World, its individuals are often brightly patterned and highly oligolectic, and they have a rapid back-and-forth, *Nomioides*-type flight. They seem to have undergone explosive speciation centered in the southwestern United States and northern Mexico: 216 species and subspecies are recorded from the arid and semiarid regions of southern California and 188 from Arizona. In a recent tally we estimated that 95 species will be found in the vicinity of the Southwestern Research Station, Portal, Arizona (SWRS), that is in an area of two counties. In testing this estimate, Rozen, Beth B. Norden (Smithsonian Institution), and Bryan N. Danforth (University of Kansas) surveyed the *Perdita* fauna in the vicinity of SWRS in August and September, 1987, and recorded 39 species on the wing in an effort that clearly did not recover all of the recorded late summer species. Because the spring *Perdita* fauna is mostly different from that of late summer, our estimates of the total *Perdita* fauna continue to seem reasonable.

*Perdita* is a species flock of broad systematic, behavioral and ecological interest and raises questions that will be addressed by us and by Norden and Danforth: how is it possible for so many closely related species to coexist in such a limited area and what are the speciation processes that have created such a swarm?

* * *

# ???LOST USA LOCALITIES???

By Beth B. Norden
Smithsonian Institution, Washington, D.C.

In the course of wrangling with some rather cryptic locality labels, I called the American Automobile Association for help. They were kind enough to send a very useful list of contacts for obtaining U.S. county maps. I pass on this list and good luck.

- ALABAMA — State of Alabama Hwy. Dept., Bureau of State Planning #110, Montgomery, AL 36602.
- ARIZONA — Dept. of Transportation, Mail Drop 134 A, 206 S. 17th Ave., Phoenix, AZ 85007.
- ARKANSAS — Arkansas St. Hwy. Dept., St. Hwy. Bld., P.O. Box 2261, Little Rock, AR 72203.
- CALIFORNIA — County maps available by request from CSAA or ACSA.
- COLORADO — St. Dept. of Hwys., Planning & Research #212, 4201 E. Arkansas Ave., Denver, CO 80222.
- CONNECTICUT — Ct. Dept. of Transportation, Drawer A, Office of Communications, 24 Wolcott Hill Rd., Wethersfield, CT 06109.
- DELAWARE — Dept. of Hwys. & Transportation, P.O. Box 778, Dover, DE 19901 (Attn. Admin. Manager).
- FLORIDA — Fl. Dept. of Transportation, 605 Suwannee St., Mail Station 12, #27, Tallahassee, FL 32304.
- GEORGIA — Dept. of Transportation, Div. of Planning & Programming, Map Sales Room 10, No. 2 Capitol Square, Atlanta, GA 30334.
- IDAHO — Idaho Dept. of Hwys., P.O. Box 7129, Boise, ID 83707.
- ILLINOIS — Illinois Dept. of Transportation, Rm. 217, Adm. Bld., 2300 S. Dirksen Pkwy., Springfield, IL 62764.

etc.) or on its population biological aspects, without, of course, excluding these topics from more general papers.

The journal is proposed to appear regularly. It will include original articles; invited mini-reviews of special topics; book reviews, and an index of current pollination literature; notices of meetings; a forum on current problems in pollination biology; a column for ideas and hypotheses; an agora for exchange of research material and assistance.

In order to assure a high standard of the articles, each manuscript will be submitted for critical evaluation to independent professional referees selected by the Editorial Committee. The Editorial Board may invite contributions.

Further suggestions by you will be welcome. Furthermore, we would appreciate your listing pollination biologists and others who might be interested and who might not have this circular letter.

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# ICPBR NEWS

By J.N. Tasei
Laboratoire de Zoologie,
INRA, 86600, Lusignan, France

ICPBR is the International Commission for Plant-Bee Relationships. This is the new name of the ICBB (International Commission for Bee Botany) which was founded in 1950.

The Objectives of the Commission are:

1) To promote and coordinate research associated with the relationships between plants and bees of all types in particular with reference to: insect-pollinated plants, foraging behaviour of bees, effects of pollinators' visits on plants, management of protection of pollinating bees, materials collected by bees on plants, products derived from plants and elaborated by bees.

2) To organize meetings, colloquia or symposia related to the above, and to publish and distribute their proceedings.

3) To collaborate closely with national and international institutions interested in the relationships between plants and bees, particularly those whose objectives are to expand scientific knowledge of animal and plant ecology and flora and fauna protection.

The Commission has developed links with IBRA (International Bee Research Association) over many years because of common interests. The IBRA journal "Bee World" is the official organ of the Commission. The ICPBR functions by means of working groups which link together specialists from different parts of the world. The working groups and their leaders are: "Pollen and bees" — Y. Loublier (France); "Pollination"— C. van Heemert (The Netherlands) and S.N. Holm (Denmark); "Honeybees as indicators of pollution"— W. Drescher (W. Germany); "Honey"— G. Ricciardelli d'Albore (Italy); "Nectar"— (leader to be assigned); "Bee protection"— J. Stevenson (U.K.); "Honey dew"— G. Liebig (W. Germany). The Chairman of the ICPBR is S.N. Holm and the Secretary-Treasurer is J.N. Tasei. Names and addresses of the working groups' leaders and any other information about the Commission are available from J.N. Tasei, Laboratoire de Zoologie, 8600 Lusignan, France.

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# A NEW CENTER FOR THE STUDY OF SOCIAL INSECTS

By Harold G. Fowle
Universidade Estadual Paulista "Julio de Mesquita Filho" Instituto de Biociencias, 13500 Rio Claro, SP, Brazil

A Center for the Study of Social Insects has been created here at the Instituto de Biociencias, UNESP, Rio Claro. We presently have 20 faculty members actively engaged in the study of social insects, one of the largest, if not the largest concentration of researchers in the world. A large portion of this group is actively engaged in the field of apiculture, bee genetics, and histology. One of the major goals for the center is to provide an interdisciplinary environment to facilitate our research, as well as to establish and strengthen cooperative research agreements with any person or institution in the world interested in Neotropical social insects, or to provide a "home base" for researchers wishing to work in the Neotropics. Another of our objectives is to strengthen taxonomic shortfalls for the large Neotropic fauna in all groups of social insects, and to do this we will be establishing a museum and training or hiring systematists. Other major weaknesses in South America, such as modelling, pheromonal and venom research, and insect, especially honeybee diseases, are within the scope and goals of the center. Much basic work needs to be done, and many of our goals are also applied, such as pollination studies. Persons interested in establishing contacts or providing suggestions should either contact Osmar Malaspina or myself.

* * *

# IS THERE A NEED FOR AN INTERNATIONAL MELITTOLOGICAL FIELD STATION AND RESEARCH CENTER?

by Stephen L. Buchmann
1418 West Liddell Drive, Tucson, Arizona 85704

Bee researchers have been coming to SE Arizona to collect and study native bees for at least 40 years (beginning with Drs. Linsley and MacSwain from U.C. Berkeley) and even earlier with collecting forays made by Cockerell and Timberlake to the Sonoran desert. Faculty and students alike have made annual forays into areas of southern Arizona, especially around Tucson, Santa Rita and the Chiracahua Mtns., because of the extreme floristic and bee faunistic diversity. With both temperate and subtropical (Sonoran) bee taxa represented in great numbers, there are few areas in the world that can boast so many bee species in such a small geographic area. The area is bee heaven (if you don't believe me just ask Mich, Jerry Rozen or Ron McGinley; or better you visit the place and see for yourself).

According to the February, 1987 *Melissa* Newsletter (#2), there are at least 398 melittologists worldwide conducting basic research on native bees. This represents a very large group (actually an underestimate, because some researchers for various reasons have not participated and do not appear in the directory) presumably conducting research out of motels, tents or generic biological field stations. I propose to you that there is an urgent need to establish a dedicated melittological research center and field station on prime bee real estate in an area, such as SE Arizona where bee diversity is perhaps higher than in any other similar sized area worldwide. Such a station should not only provide inexpensive food and accommodations, but dependable field vehicles and modern lab-

• INDIANA — Marbaugh Engineer, Supply Comp. Inc., 121 W. North St., Indianapolis, IN 46204.
• IOWA — Iowa Dept. of Transportation, Office of Supplies, Ames Storeroom, Ames, IA 50010.
• KANSAS — Bureau of Transportation & Planning, State Office Bld., Topeka, KS 66612.
• KENTUCKY — Dept. of Public Information, Frankfort, KY 40601.
• LOUISIANA — Dept. of Transportation & Development, General Files Unit, P.O. Box 44245, Capitol Station, Baton Rouge, LA 70804.
• MAINE — Dept. of Transportation, Transportation Bld., Div. of Special Service, Augusta, ME 04333.
• MARYLAND — St. Hwy. Administration, Map Distribution Section, 2323 West Joppa Rd., Brooklandville, MD 21022.
• MASSACHUSETTS — Director, Bureau of Transportation, Planning & Development, Ma. Dept. of Public Service, Boston, MA 02114.
• MICHIGAN — County maps can be picked up from the Auto Club of MI.
• MINNESOTA — Mn. Dept. of Transportation, Room B-20, St. Paul, MN 55155.
• MISSISSIPPI — Ms. State Hwy. Dept., Map Sales, P.O. Box 1850, Jackson, MS 39205.
• MISSOURI — Mr. James F. Roberts, Div. of Surveys & Plans Engineer, P.O. Box 1850, Mo. Hwy. & Transportation Dept., Jefferson City, MO 65102.
• MONTANA — State of Mt., Dept. of Hwy., Planning & Research Bureau, Helena, MT 59601.
• NEBRASKA — Ne. Dept. of Roads, Information Section, P.O. Box 94759, Lincoln, NE 68509.
• NEVADA — Nv. State Hwy. Dept., Room 206 Dept. of Transportation, 1263 S. Stewart St., Carson City, NV 89712.
• NEW HAMPSHIRE — N.H. Div. of Economic Development, P.O. Box 856, Concord, NH 03301.
• NEW JERSEY — Each county distributes its own map.

ATLANTIC CO. – Guantee Trust Bld., N.C. & Atlantic Ave., Atlantic City, NJ 08404.

BERGIN CO. – County Engineer, P.O. Box 581, 29 Lindon St., Hackensack, NJ 17602.

CAMDEN CO. – Camden Co. Engineer, Rm. 603, Court House, Camden, NJ 08101.

CAPE MAY CO. – County Engineer, Cape May Court House, Cape May, NJ 08210.

CUMBERLAND CO. – County Engineer, Bridgeton, NJ 08302.

ESSEX CO. – County Engineer's Office, 900 Bloomfield Ave., Verona, NJ 07044.

GLOUCESTER CO. – County Engineer, 1200 N. Dlesea Dr., Clayton, NJ 08312.

HUNTERDON CO. – Office of Co. Engineer, Administration Bldg. ,Flemington, NJ 08822.

MERCER CO. – Co. Administration Building, Dept. of Engineer, P.O. Box 8068, Trenton, NJ 08618.

MIDDLESEX CO. – Middlesex Co. Engineer's Office, P.O. Box 1248, 333 Townsend St., New Brunswick, NJ 08903.

MONMOUTH CO. – County Engineer, Hall of Records, Freehold, NJ 07728.

MORRIS CO. – Board Chosen Freeholders, Court House, Morristown, NJ 07960.

OCEAN CO. – County Engineer, Court House, Toms River, NJ 08753.

PASSAIC CO. – County Engineer, 317 Pennsylvania Ave., Paterson, NJ 07509.

SALEM CO. – Clerk of Board Office, Court House, 92 Market Street, Salem, NJ 08079.

SOMERSET CO. – County Engineer, Co. Administration Building, Somerville, NJ 08876.

UNION CO. – P.O. Box 607, County Engineer, Westfield, NJ 07090.

WARREN CO. – County Engineer, Court House, Belvidere, NJ 07823.

• NEW MEXICO — St. Hwy. Engineer, N.M. State Hwy. Dept., P.O. Box 1149 #B-4, Santa Fe, NM 87501.

• NEW YORK — N.Y. Dept. of Transportation, State Campus Bld. 4, #105, Albany, NY 12232.
• NORTH CAROLINA — Head of Location & Survey Unit, Dept. of Transportation, Div. of Hwy., P.O. Box 25201, Raleigh, NC 27611.
• NORTH DAKOTA — Map Sales, N.D. State Hwy. Dept., Capitol Grounds, Bismark, ND 58505.
• OHIO — Ohio Dept. of Transportation, 25 S. Front St. #B100, Map Sales, Columbus, OH 43216.
• OKLAHOMA — Ok. Dept. of Hwy. & Transportation, 200 NE 21st Street, Oklahoma City, OK 73105.
•OREGON — Dept. of Transportation, Map Distribution Unit, Room 17, Transportation Bld., Salem, OR 97310.
• PENNSYLVANIA — Pa. Dept. of Transportation, Forms & Publications Warehouse, Bld. #33 (H.I.A.), P.O. Box 134, Middletown, PA 17057.
• RHODE ISLAND — Dept. of Economic Development, 7 Jackson Walk Way, Providence, RI 02903.
• SOUTH CAROLINA — S.C. State Hwy. Dept., Drawer 191, Columbia, SC 29202.
• SOUTH DAKOTA — Div. of Tourism, Joe Foss Bld., Pierre, SD 57501.
• TENNESSEE — Dept. of Tourism Development, 505 Fesslers Lane, Nashville, TN 37210.
• TEXAS — State Dept. of Hwys. & Public Transportation, Attn. File D-10, Planning & Research Div., P.O. Box 5051, Austin, TX 78763.
• UTAH — Ut. Dept. of Transportation, Community Relations Div., 4501 S. 2700 West, Salt Lake City, UT 84119.
• VERMONT — Vt. Travel Div. & Transportation Planning Div. & Mapping Section, 61 Elm St., Montpelier, VT 05602.
• VIRGINIA — Va. Dept. of Hwys. & Transportation, 1221 East Broad St., Attn. Map Dept., Richmond, VA 22319.
• WASHINGTON — Dept. of Transportation, Public Trans. & Planning, Attn. Cartographic Section, Hwy. Admin. Bld., Olympia, WA 98504.
• WEST VIRGINIA — W.V. Dept. of Hwys., 1900 Washington St. East, Statewide Planning Div., Charleston, WV 25305.
• WISCONSIN — Dept. of Transportation, Document Sales, P.O. Box 7426, Madison, WI 53707.
• WYOMING — Wy. Travel Commission, I-25 at Etchepere Circle, Cheyenne, WY 82002.

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# JOURNAL OF POLLINATION BIOLOGY

by Gerhard Gottsberger
6300 GEISSEN, Senckenbergstr. 17-21
Bundesrep. Deutchland

At a Special Interest Group Meeting at the XIVth International Botanical Congress in Berlin, July, 1987, the proposal was made to found a new Journal of Pollination Biology. Considerable support for this project was expressed both at the Congress and previously, in response to a circular letter. By pure coincidence the initiative started at a Botanical Congress, but we should like to assert that the Journal is to be identified as a vehicle for communication for all biologists with an interest in pollination biology. A representative spectrum of topics relating to pollination biology in its broadest sense will include, but not be restricted to, floral structure and function, pollinator behaviour and bionomics, phenology, plant- pollinator interrelationships, coadaptation and coevolution, and biotic and abiotic pollen vectors. Emphasis will be on pollination itself, less so on its consequences (compatibility vs. incompatibility, fertilization,

oratory space along with a curated synoptic bee collection and herbarium. It should also have greenhouse facilities and cold rooms, flight rooms, a computer center (micros) and an automatic weather station among other things. It should not be dedicated to full time honey bee research or solving the Africanized bee problem (we already have a lab in Tucson dedicated to basic and applied research on *Apis mellifera*).

There is no dedicated field station anywhere in the world devoted to the study of native bee species (although there is the worlds' first bee/bee flower biotic reserve now established as the Lomas de Barbudal Biological Reserve in the Costa Rican Dry forest of Guanacaste Province; perhaps Dr. Gordon Frankie at U.C. Berkeley can describe his efforts to create this bee reserve in a future ***Melissa*** newsletter). Given the importance of bees as pollinators and their diverse roles in ecological communities, it seems inexcusable that we don't have, or aren't working on the establishment of an international non-*Apis* bee/pollinating research center. You say that bee biologists have been converging and utilizing the excellent AMNH facilities of the Southwestern Research Station (SWRS) for years and why change now. You're quite right and these facilities have admirably served many biologists, not just bee researchers for decades, but I have something different, and definitely larger in mind than SWRS.

First, do enough of you think that such a dedicated bee facility (ideally situated in the middle of 640 acres of prime "bee pasture" built on an upper Bajada somewhere in southern Arizona) is worth the effort? Would enough melittologists and botanists use such a facility? Yes, non-bee people could use it too, but bee researchers would have first priority in scheduling stays and use of equipment. Please write or telephone me with your comments during the next 3-4 months. Do you want it? Is it a worthwhile endeavor to set for ourselves as a long term (5-10 year) goal? It would not come cheaply in terms of either labor or money. The land acquisition alone would probably cost from 0.5 to 1 million dollars, and the labs/living quarters another 2 to 5 million. There is, however, the possibility that a deal could be made with Nature Conservancy to establish such a lab on land that they already own in Arizona.

I am volunteering to act as a repository and clearing house for plans and means to achieve the goal of such a modern laboratory and research/living complex for Arizona during the next 5 to 10 years. This is not, however, a one person project. If you would like to assist me and serve on an organizational committee for the feasibility for such a project, please let me know. I can use your talents and help. If you think this is a waste of time, let me know that too. The important thing to realize is that such a far-fetched and expensive dream can become a reality with enough dedication from the right group of people. Please send me your ideas on what you would like to see for physical facilities and geographic location, if such a melittological center were to be built in the near future.

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# A SWARM OF BEE SPECIALISTS AT THE SOUTHWESTERN RESEARCH STATION

## PORTAL, ARIZONA, USA

by Jerome G. Rozen, Jr.
American Museum of Natural History,
New York, N.Y., U.S.A.

The bee fauna in the vicinity of the Southwestern Research Station (SWRS) in Portal, Arizona, is one of the richest in the world, partly because the area flowers in the

spring (April and May) and again in late summer (August, September and October). Available to all biologists, the Station has been a rewarding study area for many melittologists through the years. Although surrounded by the five life zones of the Chiricahua Mountains, most researchers carry on their activities in the broad valleys between mountain ranges where there are abundant flowering plants from both Sonoran and Chihuahua deserts.

This last summer saw the following researchers at the station: Dr. Stephen L. Buchmann (Carl Hayden Bee Research Center, Tucson, Arizona), Dr. James H. Cane (Auburn University), Mr. Bryan N. Danforth (University of Kansas), Dr. Beth B. Norden (Smithsonian Institution), and Dr. Jerome G. Rozen, Jr. (AMNH). In addition, Dr. Karl V. Krombein (Smithsonian Institution) and Dr. Kenneth W. Cooper (University of California, Riverside) visited the region.

The SWRS offers visiting scientists and their families comfortable living accommodations (including swimming pool), good food, synoptic collections of plants and bees, laboratory facilities and equipment, and a library of reprints pertaining to the local biota.

For information about next season, please write to Jerome G. Rozen, Jr., Department of Entomology, American Museum of Natural History, Central Park West at 79th Street, New York, N.Y. 10024-5192, or to Mr. Wade Sherbrooke, Southwestern Research Station, Portal, Arizona 85632.

* * *

# BRACKENRIDGE FIELD LABORATORY

By John L. Neff, Central Texas Melittological Institute, Austin, Texas, USA

I would like to alert the readers of ***Melissa*** to the existence of the Brackenridge Field Laboratory of the University of Texas. This fenced 60 acre tract is scenically located along the Colorado River within the city limits of Austin, Texas. Both lab facilities and a large experimental garden area are maintained. Although the vegetation is not exactly pristine, BFL does support a rich flora and bee fauna. So far we have recorded over 180 bee species from BFL (of the approximately 220 thus far known from Travis County in which Austin is located). The protected nature of BFL has allowed us to conduct long term studies of the foraging and nesting biology of bee species such as *Diadasia afflicta*, *Exomalopsis birkmanni*, and *Pseudopanurgus rugosus* as well as less intensive studies of many others. Unrestricted collecting is not encouraged since studies of marked nests and females have shown some persistent populations may be quite small. For example, an eight acre portion of the tract has maintained a consistent low density of 8 to 15 nesting females of *Diadasia afflicta* over a 7 year period despite much greater absolute fecundity.

Overloads of honey bees are sometimes a problem for pollination studies at BFL but this problem has diminished recently and may fully abate with the heralded arrival of the africanized bee and the likely diminution of hobby apiaries in the area. A bonus for students of solitary bees is the low abundance of bumble bees until late summer or fall. Local patches of poison ivy, an ever expanding fire ant population and the often toasty Austin climate may be drawbacks for some but BFL offers the chance to study a diverse bee fauna

while retaining easy access to the facilities of a major university and the amenities of a very pleasant city. Individuals interested in visiting BFL are advised to contact the Director, Dr. Larry Gilbert of the Department of Zoology, University of Texas, Austin, Texas 78712, U.S.A.

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## A NEW BIOLOGICAL RESERVE— LOMAS DE BARBUDAL— IN SOUTHERN GUANACASTE PROVINCE OF COSTA RICA

Information provided by Gordon Frankie, University of California, Berkeley

In October 1987, Gordon Frankie sent in a letter saying "I am sending along some new information on the bee reserve. Although it is great for bees (and wasps), we generally regard it as a general-purpose wildlife reserve". A non-profit organization, FRIENDS OF LOMAS BARBUDAL, Inc., has been estab-lished and is committed to fundraising for dry forest conservation, specifically to support Lomas de Barbudal Biological Reserve. In 1987, FRIENDS published a brochure on the Reserve that includes the following information that should be of interest to readers of *Melissa*.

"Lomas de Barbudal Biological Reserve, the most recent addition to the Costa Rican National Park System, represents some 6,000 acres of largely intact lowland dry deciduous forest. Lomas de Barbudal, Palo Verde Wildlife Refuge, and two adjacent subsites to Lomas (now deforested) made up the dry forest site of the early comparative ecosystem study initiated by the Organization for Tropical Studies (OTS). The study developed a wealth of comparative ecological information on low-land wet and dry forests, which has since become an invaluable resource for tropical biology. Since that time, Lomas has been used for field research (and occasional teaching) by numerous individuals whose efforts have produced classic scientific papers, with emphasis on reproductive ecology of flowering plants. Presently, the Reserve and Palo Verde Wildlife Refuge are being used for a new study on the behavior and ecology of the invading Africanized honeybees."Rich with wildlife, "Lomas also supports a myriad of insects and insect relatives, among which the Hymenoptera (bees, wasps, ants) play a major role in the ecological functioning of the Reserve. Bees, for example, are the most important pollinator group for about half of the flowering plants at Lomas and in all of Guanacaste. The solitary bees, in particular, are largely responsible for this occurrence. Early surveys throughout Guanacaste indicated that the Reserve contained an especially rich assortment of bees (about 250 species) and associated nesting microhabitats, a finding which inspired the Reserve."

For a copy of the brochure and more information contact Jutta Frankie, Executive Director, Friends of Lomas Barbudal, Inc., 691 Colusa Ave., Berkeley, California 94707, U.S.A.

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## BEE RESEARCH AT THE UNIVERSITY OF CALGARY

Compiled by Laurence Packer

Currently there are four wild bee biologists (with the emphasis on the wild) working at the University of Calgary, Department of Biological Sciences, 2500 University Drive NW, Calgary, Alberta, T2N 1N4, Canada. Outlines of research being undertaken are as follows.

**Robin Owen.** – One upcoming project of mine is to follow up on some work done by myself and Chris Plowright on the *Bombus melanopygus* coat color dimorphism (1980, J. Hered. 71:241). The bumble bees *B. melanopygus* and *B. edwardsii* are classified as two distinct species, however our genetic analysis indicated that in fact these may be two colour morphs of a single species showing clinal variation. The possibility of intergradation between two good species nevertheless cannot be discounted. I would like to resolve this taxonomic problem and so plan a collection trip to Oregon and California in February and March 1988, to obtain more genetic data as well as specimens for morphological and biochemical comparisons. I will be using a compact, mobile bumble bee rearing system based on the standard Plowright and Jay methods. This will enable me to install queens in nesting boxes whilst "on the road" which is essential if I am to obtain a good number of colonies (at least 60) to work with.

**Laurence Packer.** – I am currently working on: 1) the data collected during 1987 concerning three social sweat bees from Cape Breton Island, Nova Scotia. These were: *Augochlorella striata*, which had an average of one half of a worker in those nests with foundresses that survived long enough to overlap with their daughters, *Lasioglossum* (*Evylaeus*) *comagenense* which was (surprise, surprise) semisocial and *Lasioglossum* (*Evylaeus*) *cinctipes*. Not much data was collected on the latter species because my study aggregation was extirpated, apparently because of unusual weather conditions. With the help of three undergraduate field assistants (Vincent Jessome, Cathy Lockerbie and Blair Sampson) and the financial assistance of the University College of Cape Breton and various government programs, over 450 halictine nests were excavated during the summer. 2) Applying gel electrophoretic techniques to some *Augochlorella* samples under the direction of Robin Owen, my post-doctoral supervisor. 3) I still have the most difficult part of my thesis research to reanalyze and write up for publication - reproductive competition within nests of two populations of *Halictus ligatus*, based upon analyses of ovarian development and oophagy - I find that the latter can be detected by looking at the gut contents of preserved bees.

This Summer I plan to study sweat bee biology here in Alberta. However, the dry soils make me nervous as I suspect the bees will dig unpleasantly deep nests. Working in the usually very damp climate of Cape Breton rather spoilt me - the deepest brood cell I found was less than 15cm beneath the soil surface and so it was easy to excavate a nest in less than ten minutes. I do not relish the thought of having to dig metre deep holes in national parks, roadside verges, urban gardens, etc., and attempting to do so unnoticed by the relevant law enforcement agencies. I would be extremely grateful for information concerning sweat bee aggregations in Alberta or BC.

Taxonomic studies of old world *Evylaeus* are progressing at a barely detectable rate. My long term goals include 1) trying to place social evolution in the group within a phylogenetic framework, 2) find long-term employment, 3) raise a brood of field assistants, currently n=1 and young Rosie (15 months) is surprisingly adept with a bug net and fascinated by bumble bees - hopefully her attraction to these gaudy insects will mature into a deep interest in halictines.

**Marjorie Horne.** – My main research interest is that of plant specificity in the megachilid bees, particulary in the genus *Megachile*. Evidence exists, although incomplete, implying that these leafcutter bees demonstrate plant specificity while foraging for nesting materials or provisions. The degree of specificity found in each foraging task, and whether or not it overlaps between the two

tasks, remains unclear. The co-operation of K.W. Richards at Agriculture Canada in Lethbridge, Alberta and under the supervision of Robin Owen, I have been studying the degree of specificity in the alfalfa leafcutter bee, *M. rotundata*. This appears to be an ideal species for such research as many aspects of its biology have not been studied, and it appears to be the only species of *Megachile* that nests gregariously in pre-existing cavities, thus making it possible to rear and work with a large population under field and laboratory conditions. During the past field season observations of foraging behaviour were made when the bees were provided with a choice of several plant species and when this choice was eliminated. This research was conducted (miraculously I might add) between the seemingly continuous thunderstorms, hailstorms and Lethbridge's famous windstorms. These observations of foraging behavior will continue over my next two field seasons, along with work on how this plant specificity may affect larval growth and survivorship.

**Lawrence Harder.** – My current research focuses on the question "how much of the available pollen does a bee remove during a single flower visit?". I am comparing pollen removal by nectar- and pollen-collecting bumble bees visiting the same plant species, as well as removal from a variety of plant species. These plants (*Erythronium*, Liliaceae; *Aralia*, Araliaceae; *Pedicularis*, Scrophulariaceae; *Aconitum*, Ranunculaceae) differ in floral morphology and in the availability of nectar. With luck (and a particle counter) these experiments will expose some of the influences on the efficiency of pollen collection by bumble bees, and its implications for their choice of pollen sources and the dispersal of pollen to stigmas.

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# BEE NEST EXCAVATORS —

## SAVE YOUR PROVISIONS AND VOUCHER (UNPINNED) BEES!

By Stephen L. Buchmann USDAARS,
Carl Hayden Bee Research Center, Tucson, Arizona

Material is accumulating which will allow detailed regression analyses on the relationship between bee weight and provision weight (all expressed on a dry wt. basis) using scaling theory to examine diverse bee taxa and sizes. From my own excavations/dissections and donations from other melittologists I now have bees and provisions from almost 20 species, but would like to have representatives from at least 50 taxa. If you routinely excavate nests, please save (air dry) pollen provisions which had a live or dead egg or at the most a first instar and store them in separate vials for shipment. Many researchers routinely collect and save pollen provisions to describe their architecture or, far too uncommonly for palynological or chemical analyses. I now ask you to save a few (5-10) intact air-dried provision masses for my proposed study. It is also important to collect and save as unpinned vouchers 5-10 adults of both sexes.

Already examined to date are honey bees, stingless bees, *Centris*, *Anthophora*, *Epicharis*, *Habropoda*, *Xylocopa*, *Ceratina*, *Colletes*, *Diadasia* and *Perdita*. I am especially trying to fill in gaps with species in the Colletidae, Halictidae, Megachilidae and Andrenidae. If you have dried voucher material of complete provisions (their age is not important) in your care, or would like to collect samples next season for this project, please contact me.

Upon receipt the air-dried provisions are oven or vacuum-dessicator dried to a constant weight and their mass recorded. They are next placed into ethanol and dispersed to monad pollen ultrasonically with a cell disrupter probe. This entire sample, or aliquots thereof,

are then processed through a HIAC-ROYCO particle size analyzer and counter giving me the number of pollen grains (and pollen volume) to make a bee of that species. If the provision contains only one pollen type, then often I hand collect pollen from that plant and construct a regression line between fresh or dry pollen weight and pollen grain number. This, in turn, can be used for the bee provisions to factor out the dry wt. (mg.) of bee-added sugar from admixed floral nectar. Since pollen grains vary enormously in their equatorial diameters, therefore volume and energy content, it is important to regress provision dry wt. or pollen volume against bee dry wts. using modern scaling theory practices. If enough provision material is available, chemical analyses (N and protein content, sugar and starch analyses) are often made on intact provision material, hand-collected pollen and feces from larvae feeding upon those foodstuffs.

If you can spare some samples, please help me out. This study is part of a larger research program to determine the nectar and pollen production/hectare of desert plant communities in Arizona and Mexico and their respective harvest and utilization by native bee assemblages and competition for floral resources by feral and managed honey bee colonies. We need to know, but have no database, at the present time for the number of bees that can be produced and maintained (carrying capacity) in diverse plant communities.

# OCCURRENCE OF *XYLOCOPA SONORINA* SMITH IN NEW ZEALAND

By B.J. Donovan
Department of Scientific and Industrial Research, Christchurch, New Zealand

On 17 February 1987, Mr. D. Manson and Dr. R. Baker (Lynfield Plant Protection Centre) collected about 20 male *Xylocopa* from nests in a punky native tree stump in Onehunga, a suburb of the city of Auckland, New Zealand. This is the first record of the occurrence of *Xylocopa* in New Zealand. Specimens were infested with external mites.

Two specimens forwarded to me appeared to be conspecific with two males captured by me in Hawaii on 20 September 1978. Two specimens forwarded by Mr. Manson to Prof. C.D. Michener were identified as *Xylocopa sonorina* Smith, which is established in Hawaii and the Marianas, according to Prof. Michener. Prof. Michener stated that *X. sonorina* has also been recorded from Japan, China, New Guinea, Java and the Philippines but was not established in those places as far as he knew.

The occurrence of only males in New Zealand suggests that perhaps the nesting bee(s) had not been mated. The presence of 20 or so offspring indicates that factors affecting nesting were very suitable. Whether or not the species establishes as a result of what must have been an accidental introduction will be of much interest, partly because of its wood-boring propensities, and partly because of its potential for use as a pollinator.

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# NOTES ON CARPENTER BEES

By Dan Gerling and Abraham Hefetz
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The George S. Wise Faculty of Life Sciences,
Tel Aviv University, Israel

At times one makes biological observations that are insufficient for a regular publication, but may contain new and useful information. We wish to report several such observations.

1. Voltinism in *Xylocopa iris*.-- This species was the subject of several investigations in Europe, including Malyshev (1947), and Bonelli (1966), and was always considered to be univoltine. The bees utilized as nesting substrate dead flowering culms, especially of umbelliferous plants, that became available during the same spring. Nesting started therefore only after the flowers died, i.e., about June or July.

In June 1985 we found in the Lachish region of Israel several *X. iris* nests from which females were emerging and looking for new nest sites. Examination revealed that these nests had been constructed in old over-wintering culms. Thus, under the warmer East Mediterranean climate, *X. iris* appears to be bivoltine.

2. Nectar robbery by *X. pubescens*.-- This species was known to rob nectar from many species excluding *Tecomaria capensis* from which it was only observed to glean nectar following the abscission of the corolla. During August 1983, D. Gerling saw in Tel Katzir (Israel) a female of *X. pubescens* slitting the flower of *T. capensis* and robbing nectar from that plant. Examination of many flowers in the same area did not reveal any additional slit corollas, neither were any slits found during the following examinations of numerous additional corollas throughout the country that were done since.

During the same summer, bees were seen to regularly collect nectar from flowers with partly shed corollas of *Thevetia peruviana* in Ein Yahav (Israel). Occasionally, the bees also slit corrolas as in nectar robbery. However, these were always withered and about to be shed. It is noteworthy that fresh flowers of *T. peruviana* are robbed extensively by *X. sonorina* in Hawaii.

So far it is unclear why *X. pubescens* did not adopt nectar robbery in *T. capensis* since they seem to know the technique and like the nectar. The behavior on *T. peruviana* may be explained by its thick wall and white latex that this plant exudes.

3. Seasonal activity of carpenter bees in Africa.-- Nests of the following carpenter bee species have been examined during March 1984 at Mbita and at Rusinga Island in Eastern Kenya: *X. flavobicincta, X. senior, X. nigrita, X. inconstans,* and *X. flavorufa.* The first two nest in dead culms of Yucca plants and the others in trees. Only the two last species showed some nesting activity whereas the first three seemed to be in reproductive inactivity, as evidenced from the lack of progeny in nests, no pollen collection or storage, and the existence of undeveloped ovaries. The lack of reproductive activity coincides with the dry period, which in that part of the country, lasts from February to late in April.

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# IMPORTANT AND UNSOLVED PROBLEMS IN APIDOLOGY

By R.P. Macfarlane
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Christchurch, New Zealand

As a newer council member of the International Commission for Plant-Bee Relationships and a southern hemisphere representative I appreciated the call in *Melissa* No. 2 for comment on

important and unsolved problems in apidology. Here is a list of some important or relatively unstudied aspects relating to bees.

1. Conduct more rigorous scientific examinations of the correct stocking rate for honey bees on crops and responses in yields for fruit quality. This being aimed at (a) demonstrating more clearly the value of honey bees for pollination of particular crops (b) deriving the most economic use of honey bee colonies (c) indicating if other more effective pollinators should be investigated for crop with high, i.e., about 5 colonies/ha, recommended stocking rates or where other bees have been demonstrated to be much more effective, e.g., *Osmia* in apple pollination in Japan or bumble bee colonies in red clover pollination.

2. Make an integrated investigation of bee forage production and usage by selected bee species, i.e., those needing conservation or that are of economic value. On farmland it is important to choose a limited number of the best flowering species that provide the nectar and pollen for the key pollinators. The best flowering species must be selected on a range of characteristics including the bees floral preferences. There are few comparative studies on the attractiveness of herbaceous crops set out in replicated latin squares as was done by Holm and Hobbs. With long term complimentary bee forage sources such as trees then more attention needs to be paid to the value of the tree for the landowner if the species is to be used extensively and species with long flowering periods and that flower at an early age are valuable attributes that are often not recorded.

3. Continue to investigate the food sources and preferences, nest ecology, natural enemies and pollination effectiveness of secondary (compared to *Apis* and *Megachile rotunda*) bee pollinators of actual (e.g., some *Osmia* and *Bombus* species) or potential (e.g., *Xylocopa, Ceratina*) commercial value. Such studies would be aimed towards improving or initiating management of some species for pollination of specific crops that honey bees do not pollinate so effectively.

4. Investigate more thoroughly the pathogens and means to control them in bee genera of secondary commercial importance. This might even help in a clearer understanding of honey bee diseases when *Bombus* and other Apidae are studied. As well, it is valuable background information for any attempts to bee domestication or if the more important bee species are introduced to new areas.

5. Investigate the nest biochemistry of commercial bee pollinators of secondary importance, e.g., *Megachile rotundata* and *Osmia cornifrons* to determine if nesting can be encouraged with some substances.

6. Investigate the pollination and pollinators of subtropical or tropical crops, which are poorly studied or which could conceivably benefit from improved pollination based on fruit or nut set per flower. Such studies could be worthwhile aid projects for sponsorship by developed nations. Where appropriate, consider introduction of further pollinating species to Pacific Islands or perhaps even temperate areas in the tropical zone that have restricted bee faunas or could benefit form better pollination of introduced legumes.

7. Examine the biology and ecology of enemies of wasps and hornets that adversely affect beekeeping, tourist and urban areas with a view towards rearing the enemies and/or introducing suitable species to much of the Southern Hemisphere, where there are no enemies of *Vespula* or *Polistes*.

8. Publish basic family or bee genera accounts of areas such as Papua New Guinea to New Caledonia, and probably parts of Africa, S.E. Asia and South America for which there are inadequate records for ready identification. The native bee faunas of New Zealand and Australia also are not much better known from available studies published so far.

# THE PUBLICATIONS OF J.D. ALFKEN

By G. van der Zanden Eindhoven, The Netherlands

J.D. Alfken (1862-1945) was one of the greatest European workers on Apidae in the first half of this century. For students of the palearctic Apidae his works are indispensable. Alfken mainly studied and wrote on the palearctic species. Many of his papers deal with material collected in Egypt or in what was then called "Palestine". Also some expeditions to China, Pamir, the Karakorum and to Ethiopia put the collected bees at his disposal. From other regions he handled material from Taiwan, Indonesia and East Africa.

We have complete bibliographies for his contemporaries such as P. Bluthgen and H. Friese, but not for Alfken himself. In 1938 Dr. H. Bischoff published a note (Alhandl. Nat. Ver. Bremen. 30(3/4):7-19) to commemorate the 75th birthday of Alfken, giving a sketch of his career and adding a list of 203 publications up to 1937. As some older papers are missing and as Alfken continued writing practically till the end of life, I think it worth while to give here an account of the rest of his papers. The main body of his collection is in the von Humboldt Museum at Berlin with some type material deposited in other museums, including Senckenberg, Frankfurt/Main.


1890. Beitrage zur Insekten-Fauna der Nordsee-Insel Juist. Verhandl. Ges. deutscher Naturf. und Arzte, Bremen, 63(2):136-142.

—— Mitteilungen uber das Leben einiger Apiden: *Bombus, Andrena, Nomada* und *Osmia*. Idem 63(2):160-161.

1937. Zur Unterscheidung der Bienengattungen *Crocisa* Jur. und *Melecta* Latr. Konowia, 16(2):172-175.

1938. Beitrag zur Kenntnis der Bienenfauna von Mittel-Italien, II. Bologna, X:31-34.

—— Contributi della conoscenze della Fauna entomologica della Sardegna. Mem. Soc. Ent. Ital., XVI:97-114.

—— Ein weiterer Beitrag zur Kenntnis der Bienenfauna von Palastina mit Einschlusz des Sinai-Gebirges. D. Ent. Zeit., Heft 2:418-433.

1939. Zwei neue deutsche *Andrena*-Arten. Mitt. ent. Ver. Bremen:4-6.

—— Zur Synonymie von *Nomada pusilla* Lep. Idem:31.

—— Hym. Apidae in Missione Biolog. nel paese dei Borana. Reale Academia d'Italia, XVII:111-122.

—— Zur Bienenfauna von Bremen. Mitt. ent. Ver. Bremen:6-30.

—— Eine neue *Prosopis*-Art aus Agypten. Bull. Soc. Fouad 1.er d'Entom. (1938):133-134.

—— *Prosopis scutellata* Spin. und ihre Farbungsabanderungen. Veroffentl. D. Kol.und Ubersee-Museum, II(3):272-274.

1940. Deutung des *Anthidium klugi* Lucas. Idem, III(1):32.

—— Versuch, die *Crocisa* (*Nomada*) *scutellaris* F. zu deuten. Idem, III(1):33-36.

—— Zur Kenntnis der *Nomada pusilla* Lep. Sitz. ber. Ges. Naturf. Freunde:241-243.

—— Die Arthropoden fauna von Madeira nach den Ergebnissen der Reise von Prof. O. Lundblad, Juli-Aug. 1935. Arkiv for Zoologie, 32B(4):1-2.

—— *Andrena*-Arten von Rhodos. Boll. Lab. Zool. Gen. agt. Portici, 31:283-294.

—— Neue Coelioxys-Arten von Cypern. Mitt. Munch. Ent. Ges., XXX(3):1058-1059.

1941. Die Insekten des Naturschutzparkes der Luneburgerheide. I. Die Bienen (Apidae). Abh. naturw. Ver. Bremen, 31(4):750-762..

—— Welchen wissenschaftlichen Namen hat die schwarze Mortelbiene zu fuhren?

Munch. Ent. Ges., XXXI(1):89-92.
—— Bickbarn, Kronsbarn. Niedersachs. Jahrb. 1941, Bremen (botanical!) Uber Bienen-Gynander. Veroffentl. D. Kol- und Ubersee-Museum, III(2):198-200.
1942. Die Insekten des Naturschutzparkes der Lune-burgerheide.II. Hymenopteren (ohne Apidae). Abh. naturw. Ver. Bremen, 32(1):222-232.
—— Uber einige von Strand beschriebene Bienen von Kreta und andere Arten von dort. Mitt. D. Ent. Ges., 11(3/4):37-41.
—— Beitrage zur Kenntnis palaarktischer Bienen, 6. Beitrag. Veroffentl. D. Kol- und Ubersee-Museum, III(3) :206-216.
—— Beitrage zur Kenntnis palaarktischer Bienen. 7. Beitrag. Mitt. Munch. Ent. Ges., 32(2):678-681.
1943. Zweiter Beitrag zur Kenntnis der *Andrena rogenhoferi* Mor. Mitt. Munch. Ent. Ges., 33(2/3):597-598.
1944. Uber die Farbungen der *Stelis minima* Schck. Mitt. D. Ent. Ges., 12(2/10):22-23.

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# OPPORTUNITIES FOR SHORT TERM VISITS TO SMITHSONIAN INSTITUTION FACILITIES

By Ronald J. McGinley
Smithsonian Institution, Washington, D.C.

Readers of *Melissa* should be alerted to the availability of monetary awards to study at the National Museum of Natural History in Washington, D.C. (with Ron McGinley) and the Smithsonian Tropical Research Institute in Panama (with David Roubik). Appointments are for scholarly visits to the Institution for research, collaboration, consultation, or participation in seminars. Funding allows for financial support up to a maximum of $2,000 to help defray travel and living expenses of visitors. Additional money is available to applicants from the developing regions of Africa, Asia, the Caribbean, Latin America, and the Middle East for a maximum award of $4,000. Funding is distributed on a quarterly basis each fiscal year (October-December, January-March, April-June, July-September). It is recommended that, if possible, applicants provide alternate dates in a later period in the event funds have been expended in the preferred quarter.

Any student or scholarly investigator not residing or attending school near the Smithsonian facility where he/she wants to visit may apply for consideration under this program. Awards are made on the basis of review and recommendation by Smithsonian research staff and the Assistant Secretary for Research. A short report is requested at the end of the appointment.

Application forms are available from the Office of Fellowships and Grants, Smithsonian Institution, L'Enfant Plaza, Suite 7300, Washington, D.C. 20560, U.S.A. [telephone: 202/287-3271]. Since funding is limited, it is recommended that you submit your application form to the Smithsonian staff member with whom you want to work as far in advance of the starting date as possible.

The Smithsonian also has a very active program for one-year pre- and post-doctoral appointments. For example, the Department of Entomology in Washington, D.C. averages three or four such appointments each year. Senior post-docs are also available for workers who have held a Ph.D. degree for seven years or more. Contact the Office of Fellowships and Grants for further information.

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# CAN YOU REPEL THE AFRICANIZED BEE?

By Elbert R. Jaycox* 5775 Jornada Rd. No., Las Cruces, New Mexico 88001, U.S.A.

"In the December issue of the newsletter, I discussed the possibility of using repellents and tranquilizers to provide some protection from Africanized bees. I recently had a chance to get a closer look at the bees and to see if the idea of repelling them has any merit. For two weeks I helped with a class in Panama where the Africanized bees have been established for several years. Initially, we had only small colonies, nucs, to work with, and they were relatively gentle and quiet. I checked about 25 such colonies without finding any brood diseases to use for the class. Next, we advanced to a small apiary sitting in an open field in the hot sun. These colonies, some of moderate strength, required a lot of smoke as we looked through them, but did not intimidate us until after we completed our manipulations. As we wandered individually and in small groups back to the bus, the bees stayed with us; there were few trees or shrubs, so we were readily visible from the apiary to the bus, less than a quarter mile away. As people took off their protective clothing, several were stung and bees flew into the bus. It was a good lesson for the students.

The next day we got the ultimate test. We worked in an apiary of about 15 colonies neglected by their owner because of illness. They were strong, three-story units, sitting side by side on two long steel stands. In this apiary, and nearby, there were lots of trees and shrubs; nevertheless, we left the bus much farther away than before, almost out of sight from the apiary. Our task was to transfer the bees from their termite-eaten bottoms and lower boxes into some better equipment. Working in teams, the students tore the hives down and replaced all the rotten parts. I inspected for disease. At least two people smoked the bees with a U. S.-style jumbo smoker and a special monster smoker designed for Africanized bees. It requires two hands to puff the smoke, and it quickly tires the operator because of its weight. We used corn cobs, grass, leaves, and cow chips for smoker fuel.

At this point, the bees were hanging in festoons on the hives and flying around us in large numbers. It seemed like an ideal time to learn whether repellent clothing might have an effect on the bees. I put on a hooded jacket of lightweight mesh that was charged with 1.25 fluid ounces of the insect repellent DEET (N-N-Diethyl toluamide). The jacket is an olive- drab color with elasticized cuffs and draw-strings for the waist and hood. Because of the open weave, it looks lighter in color when worn over white coveralls. The jacket is designed for protection from mosquitoes, flies, and gnats.

According to the people nearby, there were fewer bees around me than around others standing near the hives. There were enough bees, however, that I would not have felt secure without the coveralls beneath the treated jacket.

The final demonstration for the class, the standard for newcomers to the land of the Africanized bee, was a colony out of control. We took the lid off a strong colony, previously worked, and watched as the bees rolled and flowed over the front wall of the top hive body. I stood in front of the colony watching the bees bounce off the jacket. They flew so swiftly that odors could not deter them.

On the long walk back to the bus, I expected to see a rapid decrease in the number of bees following me, and I intentionally walked alone to get the maximum effect. Although I may have had fewer bees than others, the bees circled and followed me most of the way back. So much for the big test of DEET and Africanized bees.

Obviously, this was a severe test, too severe to detect differences that may be important in protecting people working near undisturbed colonies of defensive bees. The jacket would be more suitable also if it were white in color. I plan to see if the undyed mesh is available.

Can you repel the Africanized bee? Yes, I still think you can, but not in a disturbed apiary or under similar conditions where the bees are highly alerted and have been so for a period of time. But we need to protect people who must work near colonies in fields and orchards. The bees that come out in small numbers to investigate or attack the humans nearby should respond to repellent chemicals. We need to test DEET and other candidate materials under those conditions." [Any updates or additional information on this topic? Please send in to share with other *Melissa* readers.-- Ron McGinley]

* Reproduced from **The Bee Specialist, The Newsletter on Beekeeping**, with the permission of Elbert R. Jaycox

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# SEPARATES AVAILABLE

By Charles D. Michener
Snow Entomological Museum, University of Kansas

The Snow Entomological Museum, University of Kansas, has for distribution numerous publications on bees by C. D. Michener and former students and associates. Some were published in the University of Kansas Science Bulletin, but many are from other journals. A few formerly unavailable items are now once more available. To avoid the time and expense of making and distributing a list, we suggest the following alternative ordering strategies:

a. Order all available papers on bees (or all those published during certain years).
b. Order all available papers on particular groups or topics.
c. Order particular papers that you think may be available.

Cost: 2 cents per page plus shipping cost; minimum charge $1.00.

Those who, because of currency regulations, cannot pay in dollars may be able to send specimens instead if they would be useful additions to the Kansas collection. Write to inquire about this possibility.

Send requests to: C. D. Michener, Snow Entomological Museum, Snow Hall, University of Kansas, Lawrence, Kansas 66045, U.S.A.

Not Available: Michener, C. D. 1944. Comparative external morphology, phylogeny, and a classification of the bees (Hymenoptera). Bull. Amer. Mus. Nat. Hist., 82:157-326.

Tell your associates interested in other groups (especially Hemiptera, Homoptera, Tipulidae, Mecoptera) of the availability of separates in their fields.

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# MORPHOLOGICAL CHARACTERISTICS OF WINGS AND THEIR USE IN THE BUMBLEBEE

## (BOMBINAE, APOIDEA, HYMENOPTERA) IDENTIFICATION AND CLASSIFICATION

(PRELIMINARY REPORT).

By A. Stevanovic and I. Radovic Institute of Zoology, Faculty of Natural Sciences & Mathematics, Belgrade, YUGOSLAVIA

A high degree of variability and convergent similarity of species within the group of bumblebees (Bombinae) makes it difficult to determine their taxonomic status. In order to improve identification and classification of a certain taxon, the present system of classification of the bumblebees has been tested by using new and newly valued morphological characteristics of wings.

The investigations have been done on females (queens) of 12 bumblebee species. Constancy (and/or variability) of wing characteristics has been studied (a) within a single colony of bumblebees (single nests), (b) in various populations within the same species and (c) among various bumblebee species. Series of 10 individuals have been used. Material has been statistically analysed and then compared. Taxonomic weights of certain morphological characteristics of wings has been pointed out and possible evolutionary relations within a given taxon have been suggested. A contribution of this procedure to up-to-date classification and identification has been discussed. It has been stated that morphology of wings in addition to other characteristics which are at present used for bumblebee identification can give significant additional data.

XVI Meeting of Yugoslav Entomologist. October 9-12, 1986. Vrsac.

# RECENT EVENTS AND TRENDS IN THE BEE COLLECTION AT THE AMERICAN MUSEUM OF NATURAL HISTORY

By Jerome G. Rozen, Jr.
American Museum of Natural History, New York, New York, USA

The assemblage of bees in the American Museum of Natural History (AMNH) has come about through the efforts of many individuals including the following: Herbert F. Schwartz (Research Associate, 1921-1960), Frank E. Lutz (Curator, 1909-1943), Charles D. Michener (Curator and now Research Associate 1942 to present), Marjorie Statham Favreau (part-time Artist, Technician, Scientific Assistant, and Scientific Assistant Emerita 1950-1987), and Jerome G. Rozen, Jr.(Curator, 1960 to present). The collection is worldwide and consists primarily of pinned adults. However, because of interests of Rozen and Favreau in bee biology and immature stages, the Museum has steadily developed a collection of eggs, larvae and pupae, fixed in Kahles and preserved in ethanol (75%). The California Insect Survey and the University of Kansas have deposited on loan basis large parts of their immatures to centralize the curation and availability of such specimens. Rozen continues to urge specialists to deposit immatures at the AMNH if the specialists do not wish to build separate collections.

Several recent events at the AMNH are noteworthy: After years of diligent service Marjorie Favreau departed permanently from the Museum. The thoughtful care and attention she devoted to the entire bee (and Hymenoptera) collection have now been assumed by Scientific Assistant Eric L. Quinter who works under the direction of Rozen.

Special effort is being made to increase the numbers of samples of bee nests and nest components (cells, turrets, burrows, cell closures) for future comparative studies on nest architecture. And as yet another effort, Rozen has begun collecting and preserving in fixative adult bees. Recent studies that he and Byron Alexander (Cornell University) pursued on ovarian anatomy demonstrated differences among taxa of behavioral and phylogenetic significance, and suggest that systematists should more frequently examine the internal anatomy of adult bees. All collections of Hymenoptera are available to specialists on a loan basis.

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# REPORT ON A COLLECTING TRIP TO MICHOACAN

by Terry Griswold, Ricardo Ayala, and Luis Godinez

A collecting trip to the Mexican state of Michoacan made during the last week of October and the first of November proved very profitable, yielding over 6000 specimens of Aculeata. Collecting was done along a transect from the vicinity of Patzcuaro in the Eje Volcanico Trasversal through the Balsas Depression (with a side trip back to the mountains, this time around Uruapan) over the Sierra Madre del Sur and finally along the Pacific Coast west from Playa Azul. This transect provided an opportunity to sample a wide diversity of habitats including pine and oak forests, cloud forest, tropical deciduous and subdeciduous forests, semidesert, and coastal dune communities.

Thanks to major financial support provided by Dr. Stephen H. Bullock, and the use of a vehicle made available by the Chief of the Estación de Biología at Chamela, we were able to maximize collecting. Use of public transportation would be extremely difficult in this area as towns are widely spaced and buses often infrequent. Living costs were very inexpensive throughout and both food and accomodations were excellent at Patzcuaro and Uruapan. The road between Patzcuaro and the Balsas Depression proved much better for collecting than the one down from Uruapan. Not only was there less traffic and more safe places to park the vehicle, but the vegetation was more diverse and much less disturbed.

*Panurginae, Megachilidae,* and *Eucerini* were abundant in all areas, whereas *Colletidae* and *Halictidae* (with the exception of the ubiquitous *Halictus ligatus*) were much less prevalent than we anticipated. We were assisted in the Patzcuaro area by Rosa Murillo, who accompanied us on our collecting trips to nearby sites. The more xeric regions east of Patzcuaro yielded relatively few specimens despite a fair number of composites and legumes in bloom. There were a few good finds, notably *Trachusa* and *Paranthidium* (*Rapanthidium*). The pine and oak forests between Patzcuaro and Ario de Rosales were more productive. Besides common highland groups like *Bombus* and *Andrena,* we were very pleased to find the usually rare *Deltoptila* in good numbers. Other good finds included *Xenopanurgus* and *Paragapostemon,* the latter extremely difficult to catch as they preferred to cruise down the far side of 3 meter deep ditches surrounding corn fields.

Both this area and the transition to more tropical habitats between Ario de Rosales and La Huacana had a wide diversity of

panurgines. Besides *Xenopanurgus*, we collected *Perdita, Calliopsis, Protandrena, Heterosarus, Pterosarus,* and *Pseudopanurgus.* This transitional area proved the best collecting of the trip both in diversity and numbers. Typically Nearctic megachilid genera such as *Stelis, Ashmeadiella, Osmia, Anthocopa,* and *Dianthidium* were present, most represented by undescribed species. *Eucerini* were broadly represented: *Melissodes, Svastra, Peponapis, Xenoglossa, Xenoglossodes, Thygater, Syntrichalonia,* and *Pectinapis.* This area also produced the widest representation of Halictidae: *Augochlora, Augochloropsis, Neocorynura, Habralictus, Temnosoma, Sphecodes, Agapostemon, Evylaeus, Lasioglossum, Dialictus,* and *Halictus.* Here, as elsewhere on the trip, we appeared to be at the tail end of the flowering season. Yet strangely, most of the specimens collected appeared to be freshly emerged, with wings and mandibles in mint condition.

The Balsas was extremely dry and only along a couple of stream margins and on the edge of a reservoir did we find any flowering. Bees were correspondingly restricted but the few collected suggested a more xeric fauna. Groups collected included *Megachile, Chalicodoma* (*Chelostomoides*), *Ashmeadiella, Dianthidium* (*Mecanthidium*), *Calliopsis, Diadasia, Anthophora* (*Micranthophora*), and *Ceratina.* This looked like a very promising area if visited during the flowering season.

Because of time limitations, collecting on the dry eastern side of the Sierra Madre del Sur between Arteaga and Playa Azul were quite similar faunistically to similar areas inland with typical Neotropical groups such as *Trigona* and Euglossinae present. Genera not collected elsewhere were *Mudrosoma, Pseudaugochloropsis, Melissoptila* and *Holcopasites.* We also encountered good numbers of panurgines and an undescribed species of *Trachusa* (*Heteranthidium*) on composites.

The little-developed coastal area west of Playa Azul was another area where we could have used more time. We collected good series of two very large *Perdita, P. acapulcona* and *P. maritima,* on coastal dunes. Other collections included *Anthodioctes, Hypanthidium, Ancyloscelis, Ptilothrix,* and *Exomalopsis.*

Based on this limited sample, a systematic collecting effort in Michoacan along a transect such as the one we followed would be very rewarding.

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# HISTORICAL REVIEW OF THE TRIBE ANTHOPHORINI

by Robert W. Brooks
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**Supraspecific taxa.** The following review deals only with major steps in establishment of the supraspecific taxa and classification. The systematic history of each genus and subgenus is associated with its description and is only mentioned briefly here. Because of the similarity of Habropodini and Anthophorini, most authors have either confused them or regarded them as a single tribe. Therefore the Habropodini are included in the subsequent paragraphs. Complete citations for all references are in Brooks, R. W. 1986. Classification of the Anthophorine bees (Hymenoptera: Anthophorini). Ph.D. Thesis, University of Kansas, Lawrence.

Linneaus described the first anthophorine bee as *Apis retusa* (1758). In the same work he also described *Apis acervorum,* which he first mentioned in 1746 and was thought by subsequent workers to be an anthophorine bee after being misidentified by Fabricius (1775). Not until recently, however, was it discovered that *A. acervorum* probably was a bumble bee (Day, 1979; Loken, 1973). The second genuine

anthophorine species described was *Apis plumipes* Pallas (1772), which is conspecific with the *A. acervorum* of Fabricius and with *A. pilipes* Fabricius (1775). Latreille described the first anthophorine genus, *Podalirius*, in 1802b but this name was suppressed in 1944 by the International Commission on Zoological Nomenclature (ICZN). Latreille proposed *Anthophora* (1803) as a replacement for *Podalirius* on the ground that the latter was preoccupied in plants. *Anthophora* became the type genus for the tribe, subfamily and family. Fabricius named a genus *Megilla* (1805) which originally included species that we now recognize to be in the Hylaeinae (Colletidae), Halictinae and Nomiinae (Halictidae), Melitta (Melittidae), Exomalopsini, Habropodini and Anthophorini (Anthophoridae), and the Bombini (Apidae). The name *Megilla* is now regarded as a junior synonym of *Anthophora* (Michener, 1984).

Latreille (1802b) proposed the group Podalirii based on the genus *Podalirius*. Dahlbom in 1835 placed *Anthophora* in his tribe Anthophorini. Once *Podalirius* was suppressed by the ICZN (Hemming, 1944) to conserve the name *Anthophora*, it was no longer available as the type genus for a higher categorical name and Dahlbom's tribal name became valid. Smith (1854), in his "Catalogue of Hymenopterous Insects in the Collection of the British Museum", was the first to place other genera besides *Anthophora* in the Anthophorini. He described a genus *Habropoda* (=*Habrophora* Smith not Erichson) including two new species and associated *Habropoda* with *Saropoda* Latreille (1809) (=*Heliophila* Klug, 1807), which included eight described and one new species, and *Anthophora* in which he placed 121 species, of which 25 were new. He separated his new genus *Habropoda* from *Anthophora* on the basis of mouthparts and wing venation and was the first to show the importance of these characters in distinguishing these groups. In 1879 he described another new genus, *Pachymelus*, found in southern Africa and Madagascar, and included two new species. He added five new species to *Habropoda* which were later transferred with others by LaBerge and Michener (1963) to a New World genus *Deltoptila*.

Probably Friese's most important entomological contribution was his monographical "Die Bienen Europas" (1897), in which he revised European *Podalirius* and described the new anthophorine genera *Amegilla* and *Paramegilla*.

T. D. A. and W. P. Cockerell described *Anthophoroides* (1901) on the basis of the five-segmented maxillary palpus, a character which proved to be valueless at the subgeneric level. Cockerell described *Pachymelopsis* from Malawi (1905b) distinguishing it from the Malagasy *Pachymelus* by the short paraglossae, scutellum only slightly bituberculate and the clypeus gently convex from lateral view. In the same paper Cockerell recognized *Saropoda* Latreille as a genus, apparently forgetting or not recognizing that it was isogenotypic with the earlier *Heliophila*. He included the type of the European species, *Apis bimaculata* Panzer, and incorrectly included the Australian *Saropoda bombiformis*. Cockerell corrected his and Smith's original error in 1926 by describing the Australian genus *Asaropoda* (now subgenus), for *Saropoda bombiformis* Smith.

In 1943 Sandhouse renamed as *Melea* the *Anthemoessa* of Robertson since it was preoccupied.

Up to 1944 the tribe Anthophorini had contained genera from the present day tribes Exomalopsini, Melitomini and Centridini. In 1944 Michener published his paper on comparative morphology, phylogeny and a classification of bees which became foundational for most future bee studies. This paper included the first modern classification of the Anthophorinae, which is followed by most bee workers at present.

In an important paper Popov (1950)

transferred many species from *Anthophora* into *Amegilla* and named two new subgenera of the latter, *Aframegilla* and *Zonamegilla.*

Lieftinck (1974) revised the Old World *Habropoda.* He segregated the closely related *Elaphropoda* (1966) and *Habrophorula* (1974) which are small, highly derived groups. In three important papers (1944, 1956, 1975) he partially revised Malaysian and Korean *Amegilla,* treating what he called the *Anthophora insularis* group in Malaysia and *Zonamegilla* in Korea. In the 1975 paper he gave the first comprehensive descriptions of *Zonamegilla* and *Amegilla s. str.* Perhaps Lieftinck's most important contribution to the systematics of the Anthophorini was in 1966 when he called attention to the heads, mouthparts, wings, seventh and eighth sterna and genitalia of males of type species of *Anthophora, Emphoropsis, Habropoda* [the elaborate structure of the 7th and 8th sterna of male *Habropoda* was probably first shown by Popov (1948)] *Elaphropoda,* clarifying the limits of these genera.

The last two genera that were described in the Anthophorini were *Anthomegilla* (1976a) and *Solamegilla* (1980) both by Marikovskaya. *Solamegilla* was segregated from *Paramegilla* but is not a natural group.

**Species and subspecies.** Over 90 authors from 1758 to the present have named 1243 species and subspecies in the Anthophorini and Habropodini. Of these, 613 anthophorine and 89 habropodine species are valid (an additional 85 named species of anthophorine bees are unrecognized because the types are lost or destroyed). Apparent loss of types is especially the case for many of the species of Dours, Illiger, Klug, Lepeletier, Walker, and a few of Friese and Hedicke. The period 1860 to 1950 was a time when many new species were added to the Anthophorini. The most noteworthy authors slightly prior and during this period are discussed briefly below in alphabetical order. Most of these workers (except Lieftinck and Popov) recognized two genera, *Anthophora* and *Habropoda.*

In 19 papers Alfken named 29 anthophorine species mainly from the Mediterranean region, a few from China. His most important papers dealt with the Egyptian fauna (1926, 1930, 1938).

Cockerell's papers spanned a period of 56 years (1893-1949) and included at least 187 published works in which he described 241 species and subspecies of anthophorine and habropodine bees. His papers were mostly descriptions or comparisons of small regional faunas and were almost never revisionary in nature. Among Cockerell's more comprehensive works were his and his wife's separation of the New World genera of Anthophorinae (1901), a key to Australian species of *Amegilla* (1905a) and keys to North American Anthophorinae (1906). Cockerell's last paper (1949), compiled by K. Krombein and published posthumously, described five new species and one new subspecies of *Anthophora* from Honduras and Guatemala.

E. T. Cresson published eight papers in which he described 30 species of Anthophora during the period from 1865 to 1887. His most notable anthophorine works were catalogs of North American apoids (1879, 1887) and a partial key to North American *Anthophora* (1869).

Dours' (1869) classic monographic treatise of *Anthophora,* in which he described 62 specimens, most presently unrecognized, was the first comprehensive work on the Anthophorinae. His concept of *Anthophora* was not different than other workers in his time and therefore included almost all anthophorine and habropodine taxa.

Fedtschenko wrote only one paper dealing with *Anthophora* (1872); he described 41 species from Turkestan (Turkmenistan, U.S.S.R.). This important contribution together with those of Morawitz made known the unique fauna of Central Asia. Here

*Paramegilla* has flourished and most of the Anthophorinae studied by these two authors belong to that group. Morawitz, a contemporary of Fedtschenko, gave good descriptions in his papers on anthophorine bees during the period of 1868 to 1895. In fact, the excellent illustrations of terminalia in Fedtschenko's paper, unusual for their time, were drawn by Morawitz. Morawitz published 21 papers which included 56 species of anthophorine bees, many of which were described from single specimens and have not been recognized or perhaps not collected since that time. During this same period (1872-1893) Radoszkowsky was also making known Asian Anthophorinae. In ten papers he described 30 species from China, Iran, and USSR (and one species from Angola).

Friese from 1891 to 1935 worked with anthophorine bees from many parts of the world. In 22 papers he described 119 species and subspecies of *Anthophora* from four continents and New Guinea. His most notable works were his revision of European *Podalirius* (=*Anthophora*) (1897) and African *Anthophora* (1909a). He followed Dalla Torre's (1896) resurrection of the little used but at that time nomenclatorially correct name *Podalirius* for *Anthophora* but quickly returned to the more familiar usage in 1908 in a paper on Argentine bees. He described most of the species of *Anthophora* from South America (1916, 1925).

From 1873 to 1924 Gribodo wrote eight papers dealing in part with *Anthophora* from various parts of the Old World (except for two species of *Centris* which he described as *Anthophora* from Tierra del Fuego, Chile). Oddly enough many of Gribodo's 25 described species of *Anthophora* (including one *Pachymelus*) are rare, and only a few specimens have been collected since their descriptions.

Hedicke, working in Berlin, published on *Anthophora* from 1929 to 1942. In ten papers he described 26 species. His two most notable works were the Hymenoptera section in "Die Tierwelt Mitteleuropas" by Brohmer, Ehrmann and Ulmer (1930) in which he gave a comprehensive key to Middle European species of Anthophorini, and his paper (1931) on new *Anthophora* from the Alai-Pamir Expedition of 1928.

In Lepeletier's classic book "Histoire Naturelle des Insectes Hymenopteres" (1841) he described 41 species of *Anthophora* from Africa, Europe, and India (one from Paraguay). Unfortunately many of his types have been lost or destroyed.

M. A. Lieftinck (1944) published his first paper on anthophorine bees while Head of the Zoological Museum and Laboratory of the Botanic Gardens at Bogor. He continued to publish important papers and monographs on anthophorine bees up to 1983. His seven beautifully illustrated papers in which he described 24 species of *Anthophora, Amegilla, Habropoda,* and *Elaphropoda,* greatly improved knowledge of generic limits within the Anthophorini. Until his death in 1985 he was the foremost authority on Old World anthophorine and habropodine bees.

Pere wrote 11 papers from 1879 to 1911 dealing partly with anthophorine bees, of which he described 27 new species. He made known many of the *Anthophora* of France (1879) but his most noteworthy accomplishment with anthophorine bees was his paper on the bees of Barbary (1895).

Priesner (1957) made the most important contribution to the systematics of Mediterranean Anthophorini through his revision of Egyptian species; he described 28 new species. He divided Egyptian *Anthophora* (which included *Amegilla*) into seven more or less natural species groups.

Rayment was the first to publish a large treatise on Australian Anthophorini. In six papers (1931 to 1951) he described 44 species of *Amegilla* (as *Anthophora*). His most important papers were his revision of Australian *Zonamegilla* (as the Zonata group of *Anthophora,*

1942, 1947) and *Asaropoda* (1951). Unfortunately his papers contain no keys, the subgenera were not clarified and the illustrations were not adequate to separate closely related species. The worth of Rayment's work lies in his making known an otherwise unknown Australian fauna. Michener (1965) made more clear the differences between *Asaropoda* and *Amegilla s. str.* and transferred many Australian species from *Anthophora* to *Amegilla.*

F. Smith in three works described 55 species of anthophorine and a few habropodine bees (1854, 1878, 1879).

In addition to the studies of these 17 major workers, 422 species and subspecies of anthophorine bees were named by 71 workers. Indeed the work that laid the foundation for future revisional studies was shared by many.

**Literature.** The following are noteworthy partial to somewhat complete lists, catalogs, regional revisions or comparative morphology of anthophorine genera and/or species. The most important general papers on the tribe Anthophorini are those of Dalle Torre (1896), Michener (1944), and Lieftinck (1966), though the latter paper was mainly concerned with habropodine bees. Borner (1919) was the first to discuss phylogenetic relationships of the tribe Anthophorini, comparing it to other anthophorid tribes using mouthparts. Cockerell (1924) compared the maxillae of some anthophorine genera. Marikovskaja (1976a-c) discussed anthophorine relationships relying heavily upon genitalic structures. More recently Cane (1979) studied the hind tibiotarsal joint of anthophorine bees demonstrating its possible usefulness in anthophorine systematics, and Michener and Brooks (1984) compared the glossae between the genera of the Anthophorini as well as among the other anthophorid tribes. Important review papers covering the New World fauna include those treating North America by Cockerell (1906), Cresson (1879, 1887), Lutz and Cockerell (1920), Michener (1944), Mitchell (1962); Mexico by Cockerell (1899); the Antilles by Friese (1902), Wolcott (1948), and Alayo Dalmau (1973).

Noteworthy papers encompassing Old World Anthophorini from the Palearctic region are the following: Mongolia (Banaszak, 1984), East Prussia (Alfken, 1913), Asia (Cockerell, 1911; Gussakovskii, 1935; Morawitz, 1880, 1886; Popov, 1967), Germany (Stoeckhert, 1933, 1954), Germany and Hungary (Friese, 1893), Caucasus (Gurvich, 1931; Morawitz, 1876, 1877), Middle Europe (Hedicke, 1930), Turkey (Morawitz, 1894, 1895), European U.S.S.R. (Osychnyuk et al., 1978), Turkmenistan (Ponomareva, 1959, 1960; Popov, 1952), Kazakstan (Ponomareva, 1962, 1967), U.S.S.R. (Ponomareva, 1966), Lower Don U.S.S.R. (Pesenko, 1974), United Kingdom (Saunders, 1896), Mediterranean Region (Alfken, 1935; Zanon, 1925), Egypt (Alfken, 1926, 1930; Priesner, 1957), Spain (Ceballos, 1956), Portugal (Diniz, 1961), France (Perez, 1879), Barbary Coast (Perez, 1895), Algeria (Saunders, 1908). Studies covering the Oriental Region include the Phillipines (Baltazar, 1966), China (Wu, 1941) and Xizang Province (Tibet) (Wu, 1982). Studies on the Ethiopian fauna have been in Liberia and Zaire (Cockerell, 1930a), Africa (Cockerell, 1933b, 1936a, b, 1946a-c; Friese, 1905, 1909a), South Africa (Cockerell, 1933a, 1938), and Madagascar (Saussure, 1891).

# RECENT LITERATURE

by Beth B. Norden,
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Many *Melissa* readers have acknowledged the utility of a "Recent Literature Section". Therefore, I have attempted to pick-up the papers not previously listed for 1986, those appearing in 1987, and Masters and Ph.D. thesis titles from the past year. Papers in press, and those dealing strictly with honey bees have been omitted to conserve space. Again this year, the list was compiled through perusal of the Smithsonian's library, use of the National Agricultural Library's computer-based bibliographic retrieval system, and by the thoughtfulness of a few authors who sent reprints or citations. I am sure that this list (as the last) contains omissions and errors that could have been easily prevented by workers taking a few moments and sending a reprint/citation to: *Melissa* c/o B. Norden, NHB stop 105, Smithsonian Institution, Washington, D.C. 20560 USA. Please help to make our 1988 list as up-to-date as possible. Thank you.

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