



JUNE 1996

# SPHECOS 30

A FORUM FOR ACULEATE WASP RESEARCHERS

COLOR BY NANCY

## Final Issue!

(under the editorship of Arnold S. Menke)

No kidding folks, this is it. **Sphecos 30** brings to a close my 17-year editorship. I gave fair warning in **Sphecos 28** of my impending retirement and the need for someone to take over the production of this newsletter. As of mid 1995 no one had volunteered, so I discussed the matter with potential editors at the Hymenoptera Conference in Davis, California, in August 1995. Each one I talked with had valid reasons for declining the editorship. So, for the time being, this is the last issue of **Sphecos**.

When I started **Sphecos** in 1979 I thought a newsletter on aculeate wasps would kindle better communication among wasp workers of the world, and keep each of us aware of what others were doing, thereby promoting help and cooperation as much as possible. Judging by the comments I continually receive from readers, I think these goals have been fully realized. **Sphecos** is eagerly read by many. Thus, this is a very sad day for me.

Why am I stepping down? There are several reasons. When I retire September 30, Nancy and I will move to Bisbee, Arizona, where we purchased a home two years ago. I will no longer have access to the library facilities of the Smith-

sonian. Thus, keeping up with current literature will not be easy. Also, I will no longer have use of free mailing of **Sphecos** by my employer, the USDA (I estimate that it costs the USDA about \$1000 to mail 630 copies of one issue). Thirdly, and perhaps most importantly, the first year of my retirement Nancy and I will be very busy getting settled in our new home. We will have many things to do. Conceivably I could work with a new editor by continuing to receive material submitted for inclusion in the newsletter, and keep it organized. But beyond that, I will be too busy to do more.

Some of you will say, why can't Terry Nuhn take over? Terry is a technician and he works part time for 5 different scientists. When I retire, Terry's work schedule will be reorganized to give the 4 remaining people more of his time. He will not be in a position to do any-

thing with **Sphecos**, as much as he might like to.

Ideally the editor should be affiliated with an institution with a good library because keeping up with current literature is a vital part of **Sphecos**. Without access to current publications in entomology, an editor would have a difficult time compiling lists of current literature. I suppose the editorship could be a joint effort by two people, one of whom had library access. Such partnerships are already in place for some of our sister newsletters in Hymenoptera. Let's hope that someone will volunteer to keep **Sphecos** alive.

Paying for reproduction of the newsletter no longer seems to be a problem. Issue 29 depleted all of our **Sphecos** money, although, since last August, a total of \$2400 has been donated by various readers, some of whom have been very generous. Issue 30 will have used up at least a third of this money, so if someone does offer to take over the editorship, they will have some funds available for future issues, as well as mailing costs, if not covered by their institution.

I am proud of **Sphecos** and it has been a rewarding 17 years. Terry Nuhn

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### Thoughts on Sphecos

I have been involved in the production of **Sphecos** since issue 8 – that's twelve years ago! In the intervening years I feel like I've become part of the aculeate wasp community, even though my own research interests involve ants. I have been proud to serve with **Sphecos**, helping to bring together aculeate workers with the news, e-mail addresses and other items we have published. I've had the opportunity to meet some of you or to make friends over the Internet. Without **Sphecos**, I won't be able to keep up with most of you anymore, and I think that many of our readers may feel a bit more isolated without us. I hope someone revives **Sphecos** and carries on our work. And maybe if they do, they can send me a copy.

**Terry Nuhn**  
Assistant editor



### RESEARCH NEWS

**Eduardas Budrys** (Institute of Ecology, Akademijos 2, Vilnius LT-2600, Lithuania) reports, "Right now I am continuing to work on the *Diodontus* revision, in particular the part which will be published as "*Diodontus* of the Iberian peninsula" with **Dr. S. F. Gayubo**. There are at least 5 new species of this genus from this part of Europe, the most thoroughly researched part of the world!"

**Paige Carithers** (331 Funchess Hall, Auburn Univ., Auburn Alabama 36849-3414. carittp@mail.auburn.edu) writes, "I am a graduate student at Auburn University in Alabama. I am currently working with *Isodontia mexicana* where it nests in the tubular leaves of pitcher plants. I also have a parasitoid wasp emerging from some of the *Isodontia* pupae which Dr. Robert Matthews (Univ. of Georgia) has provisionally identified as some sort of pteromalid."

**Julio Cesae Rodrigues Fontenelle** (Laboratorio de Ecologia e Comportamento de Insetos, Depto. Biologia Geral, Inst. Ciências Biológicas, Univ. Federal de Minas Gerais, Caixa Postal 2486, Cep 30.161-970, Belo Horizonte

M.G., Brasil) writes, "I'm a Msc. Ecology and Management of Wild Life student starting my research on the wasp *Rubrica nasuta* with special regard to its prey. This is part of a long term project on wasps and bees under the supervision of Dr. R. P. Martins at the university's ecological station."

**Jean Leclercq** (rue de Bois-de-Breux 190, B 4020 Jupille, Belgium) celebrated his 75th year on April 26. His revision of *Eupiloides* has just been published, and one on *Anacrabro* is in press. Also to appear soon is his paper on the Australian *Rhopalum*, and Jean has submitted a paper for publication on the African and Asian *Entomognathus*. Currently Jean is busy with the Asian species of *Ectemnius*, subgenus *Cameronitus*.

**Arnold Menke** (1429 Franklin Street, Bisbee, Arizona 85603 – after September, 1996) has several papers in press: *Claves ilustradas para las subfamilias, tribus y géneros de esfécidos neotropicales* (in collaboration with **Fernando Fernández**, includes an English version); The *Ammophilini* of Costa Rica, an identification guide; Phenology of ammophiline wasps in a premontane wet forest in Costa Rica (with **Frank Parker**); A new *Ammoplanus* from San Clemente I., California; and Neotropical *Mellinus*: a review. In addition, **Arnold and Woj Pulawski** are completing their manuscript titled "A review of the palearctic *Spheg* of the *flavipennis* group". Progress has been made on Arnold's Revision of the New World *Ammophila* but the completion of this humongous project will have to be done at the **Ammophila Research Institute** in Bisbee, Arizona.

**Enrico Negrisol** (Via Conselvana 192, 35020 Maserà (PD) Italy) recently started work on a PhD. He originally wanted to go to the University of Kansas but was unable to get a scholarship. So he applied to Padua University instead. There was a fierce public competition for only 6 PhD thesis slots in evolutionary biology, but out of 65 applications, Enrico came in third! It is difficult to obtain a thesis position in systematics, so he was forced to temporarily switch to another field. He is sequencing the molecule of extracellular hemoglobin of a marine worm (Polychaeta), and part of his work will be to produce a cladistic analysis based on the hemoglobin sequences combined with morphological characters.

In April of 1995, his father died of a stroke at only 62. Enrico was deeply affected and his research was temporarily interrupted. But in late summer, he took an intensive course in systematic biology at Reading University (near London) organized by the European Community, where he studied techniques of cladistic analysis.

Meanwhile, he has been trying to complete a manuscript on the sphecid wasps of Italy with **Guido Pagliano**. They were expecting to finish it by the end of 1995 and publish it this year. They have been working on this project since 1991.

All of these activities have left Enrico little time to work on his *Liris* revision but he hopes to finish it in 1997. He says he loves these wasps and has worked through over one third of the material he has on loan.

**Colin Vardy** (Yarina, Springwell Lane, Harefield, Middx. UB9 6PG U.K.) is working on a multi-part revision of the genus *Pepsis* (Pompilidae) and is nearly ready to submit Part 1 for publication. He says, "Part 2 is also complete except for slight amendments. Included in it were 2 males without females (both from southeast Brazil); as one of these species was not very distinct from a described species, despite there being two specimens of it, I was not entirely happy about it. Southeast Brazil has emerged as the area of much of the highest endemism for this genus in the whole neotropical area; several of these endemics are new to Science and most are rare in collections. I had been told that there was extensive material in the Museu Nacional in Rio de Janeiro which I had not been able to get by post, and this was the only collection likely to contain the missing sexes. All these facts together made us decide to sport the money and go there.

"We found two more males of the 'doubtful' species, plus a female; and the 'missing' female of the other species, too. A further male without female (belonging to a subsequent part of the publication) has remained without female, but it is very distinct. However, I found a further two males, each representing a new species.....! Fortunately, they are both very distinctive and fall in parts subsequent to part 2. As for these other parts, before going to Brazil I completed all the figures as well as taxonomy and descriptions. The phylogenetics is proving a real headache as

tônia purchased his collection. The Fritz Plaumann Entomological Museum was founded with the help of the state of Santa Catarina and Germany. It was inaugurated October 23, 1988 when he was 86 years old. Visiting entomologists will find a laboratory there in which they can work.

Since 1971 Fritz received many honors (see 1991 paper cited above). About 160 species of insects, one frog, six genera and one subfamily were named in his honor.

He published only three papers:

1937. Beiträge zur Lepidopterenfauna von Sta. Catharina, Sud Brasilien. Ent. Rundsch. 55:169-171.
1937. Über das Sammeln im Brasilianischen Urwald. Koleop. Rundsch. 23:236-243; 1938 – 24:7-13; 1940 – Revta. Ent. Rio de Janeiro 11:909-920.
1954. A new waterstrider from Brazil (Hemiptera, Veliidae). Dusenja 4:414-416 (with C. J. Drake)

In 1949 he published the book *Die Entstehung des Lebens* (The Origin of Life) in which he gave his views on this subject.

Entomology has lost one of the grand collectors, who now joins others like J. F. Zikán, Ricardo von Diringshofen and Julius Arp.

**Hitoshi Nomura**

1924. The economy of Germany after the First World War was not good and the country was in recession. The Plaumann's had been prosperous merchants, but because of the postwar hardships, they decided to try a new life in distant, unknown Brasil. So they arrived with young Fritz who had an eagerness to explore and learn about his new land. Music, literature, sports, and entomology were passions that Fritz had to set aside because they were absent in his primitive new homeland. He did not lose his heart, however, because he soon discovered the wonders of the forest, and here he developed his major passion, entomology. Almost immediately he explored the fields and forests of Seara in search of insects, cataloging them and trying to find new species. Music and his other passions were not forgotten. Fritz devoted time to each of them to complete his education and improve his spirit.

1925. At the age of 22, Fritz Plaumann began life in earnest in Brasil. He was a photographer, professor and writer, all of this as a means of survival. But ultimately, entomology and the world needed Fritz Plaumann. The world did not seem so large to Fritz, and he corresponded with many people from many of the countries around the world in an effort to increase his knowledge.

1954. This was a happy year for Fritz. He married Clarissa, a German with whom he had corresponded, and they hoped for a happy life in Brazil. However, the isolation of Nova Teutônia was more than she could bear, and Clarissa returned to Germany. She left Fritz alone with his insects. His love of nature and entomology was greater than any other. Fritz' loneliness was softened by Gisela and Edeltraudt. Both of them dedicated their love to Fritz as well as his work. We do not know what strange forces cause a man to dedicate his entire life and love to one work, but Fritz dedicated each minute of his life to entomology and to the study of nature. His desire for knowledge was so great that nothing escaped his eyes and his thoughts. Thus he studied mineralogy, climatology, botany, and other fields of human knowledge.

1994. On the 22nd of September at 9:45 AM Fritz left us, his life dedicated to nature finished. 92 years of study, 92 years of work, and above everything else, 92 years dedicated to humanity.

**Edeltraudt Pierozan**



**Alessandro Mochi**  
(1920-1995)

Alessandro Mochi died tragically during a collecting trip in Africa with Woj Pulawski (see below). An obituary in Italian by Pier Luigi Scaramozzino appeared in *Hy-Men* 6, pages 6-8 (1995). He kindly provided an English translation for *Sphecoc*. Sandro, as he was known to his friends, was a true gentleman in every respect and I was fortunate to have met him briefly during a visit to the Smithsonian many years ago. He was a great collector and built up a meticulously prepared collection. His wasp collection has been placed in

the Museo Regionale de Scienze Naturali in Torino, Italy. – editor

**Alessandro Mochi**  
(April 23, 1920 – April 6, 1995)

It was under an African sky at Lusaka (Zambia) that Alessandro breathed his last at the age of 75 on 6 April 1995 under circumstances that even now are not entirely clear. He was in Zambia with Wojciech J. Pulawski, a fellow entomologist from the California Academy of Sciences, for what he himself had called the last of his entomological hunts. His intention, in fact, was to devote the future to rearranging his collection of Aculeata and publishing the many observations of these Hymenoptera that he had accumulated since his childhood.

Mochi was born at Cairo in 1920 and lived in Egypt until 1938. During the war he served with the Allies in Italy and took a degree in medicine at Rome. From 1949 to 1979, he worked for the WHO (World Health Organization) and travelled with his family to many developing countries: Egypt, Syria, Turkey, Cameroon, Congo, Ethiopia, Kenya, Somalia, Sudan, North Yemen, Myanmar, Philippines and Jamaica. After his retirement, he continued to work as a consultant in public health plans and projects, and journeyed throughout the Third World.

In his teens, Alessandro collected insects of every kind in Egypt, especially the Aculeata. He got to know Alfieri, Keeper of the Royal Entomology Museum in Cairo, and Efflatoun Bey, an entomologist at the Egyptian Ministry of Agriculture.

He drew this love of entomology from his father Alberto, who took him, together with his wife Antonia and their Nubian driver Abu, out to collect Hymenoptera on the outskirts of Cairo. These insect hunts, of course, were confined to Spring Sundays from April to June and others in Autumn, when the wind was not blowing from the desert and there were no commitments in the way of studying and preparing for examinations. The burning summer heat was enough to banish any thought of going out into the desert to collect insects under the midday sun. The family's excursions also included trips to some of the lesser known and harder to reach oases. There was an "expedition" to Rhodes, where Alberto went to work in the summer of 1933, while other summer holidays were

Sandro to Lusaka, and tried to put him on the first available flight to Rome. The reservation was made for the evening of 4 April, but Sandro was not allowed to board the plane because he was in a wheelchair, and we lacked a medical certificate stating that he was able to fly, an airline requirement for wheelchair passengers (a requirement for which we had had no advance warning). We returned to the hotel and the following day I made flight reservations for the next flight, April 6. With the hotel manager's help, I found a good doctor who came to the hotel, examined Sandro carefully, diagnosed dehydration, predicted that the patient would be walking by the next day, and signed the required medical form for British Airways ("prognosis for travel: fair to good"). Unfortunately, Sandro's condition worsened during the night, apparently a consequence of a previously undiagnosed diabetic condition. With the help of the Italian Embassy, he was taken to the University Teaching Hospital the morning of April 6, where he passed away that afternoon. Sandro's death was a great tragedy for his family, and I lost a dear friend and collecting companion.

I first met Sandro on the Paris-Abijan plane in 1991. When preparing for my trip to the Ivory Coast, I wrote to him about my plans, and he expressed an interest in accompanying me. Having him with me was very fortunate because of his experience in tropical countries. Since that first trip, we have collected wasps together in Senegal (1991), Egypt and Mauritania (1993), and Madagascar (1994). The trip to Zambia was our sixth joint expedition.

Sandro was a very able, gentle, and cultured man. He was a medical doctor by training, and worked for the World Health Organization throughout his career. His responsibilities included public health and he traveled extensively all over the world supervising medical programs, helping build hospitals, and the like. His interest in entomology was inherited from his father, Alberto Mochi, who was a medical doctor in Cairo, Egypt (where Sandro was born), and who published several important papers on the Sphecidae of Egypt. After retiring from medicine, Sandro finally found enough time for entomology. On one of our trips, as we collected somewhere in the bush in the Ivory Coast, he told me "this is what I wanted to do

all my life". He was able to rebuild his father's collection of aculeates that had become dispersed after World War II. He knew sphecids quite well, although he published practically nothing on them. His gift of languages never stopped impressing me. In addition to his native Italian, he spoke English, French, German, and Arabic, all of them very well. When in Egypt in 1993, I witnessed his conversations with local people a few times. They would ask him "Enta Saudi?" (are you a Saudi?). They did not take him for a European because of his command of the language.

Sandro was also quite generous. The following example illustrates this well: we were driving east toward Nakhl on the Sinai Peninsula, and a soldier stopped us at an isolated control post. After a few routine questions he asked for water (it was very hot that day, and he had had nothing to drink). We did not have any spare water with us, but after collecting, Sandro drove to the city, bought an extra bottle of water, and handed it to the soldier on our way back. Sandro was equally generous with his entomological colleagues, sharing his experience and providing valuable material for study.

I shall miss him dearly.



## HELP NEEDED

I am in the process of describing new species of *Mischocyttarus* (Vespidae) and would like to hear from anyone who has borrowed the following specimens recorded by O.W. Richards in his *Social Wasps of the Americas* and deposited in the collection of The Natural History Museum (London). They are: the male of *M. naumanni* Richards and three males of a species close to *M. dimorphus* Zikan; all collected by Naumann at Limoncocha in Ecuador. I would also like to know the whereabouts of the unusual nest of *Agelaia* (= *Stelopolybia*) *cajennensis* (F) from Colombia which I described in a note in *Sphecos* 11.

**Martin Cooper**  
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## Information of *Pseudepipona herrichii*

I am currently researching the autecology of the eumenid wasp *Pseudepipona herrichii* at its only known locality in England, with a view to producing management guidelines to ensure the survival of this species at this locality (where it is currently abundant!) and to re-introduce it to other localities nearby. I am searching for information on the modern distribution and status of the wasp throughout its range, together with any bionomic information which is available.

I have been able to confirm most of the information given in G. M. Spooner's 1934 paper, including the nature of its prey, a Tortricid moth associated with all three species of heather present (*Erica cinerea*, *E. tetrad* and *Cabana vulgaris*). I am of the opinion that the population size of the wasp is limited by the availability of suitable bare ground patches. These are of a sandy clay nature and close to areas of open water or very damp heath. The wasp generally avoids the dry sandy heath. The wasps can be found drinking at the wet *Sphagnum* moss and the prey density seems to be higher in areas of wet heath, both factors which may explain the association of the nesting sites with wet areas.

I would be very grateful for any comments which readers can make upon this species.

**Mike Edwards**

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## Field Sites in Africa

I am a graduate student interested in studying the genetic structure of colonies of African wasps, particularly *Polybioides* sp. My advisors, Joan Strassmann and Dave Queller have developed microsatellite DNA markers in several other species of wasps and I intend to use them in my research as well.

I am posting this message to ask for assistance in my search for a suitable field site in equatorial Africa at which to collect 20 to 40 *Polybioides* colonies. I would appreciate any leads that you could provide regarding potential locations and I am also looking for specific information regarding the Lamto field station in Cote d'Ivoire. From what I have heard, it is a good location logisti-

dent they must be *Polistes* – but with too much yellow! We should only have *Polistes fuscatus* here. The markings appeared quite similar to a couple of Tunisian specimens of *P. dominulus* which Bob Jacobson (at Greer Labs) had previously sent me. I sent my Maine specimens off to him, and he did identify them as *P. dominulus* not yet reported in this state. Our latitude is 43°28". The female specimen, as can be seen from the drawings is rather dark.

Two more *P. dominulus* were collected on 13 August at the same site, and one more on 20 August.

On 2 September, while collecting at a large stand of Japanese knotweed (*Polygonum*), yet another specimen was taken. This site is about 1200 to 1500 feet from the first collecting area. One might suspect that this individual could have originated from a separate nest than the others.

Many thanks to Bob Jacobson for the samples and the identification.

## SCIENTIFIC NOTES

### An Interesting Hunting Tactic of *Stictia punctata* (Fabr.) and Other Observations on the Hunting Behavior of Bembicini Wasps (Sphecidae: Nyssoninae)

by

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During the summer of 1987 I spent my vacation at a small beach village, Arraial d'Ajuda, about 10 km south of Porto Seguro, in Bahia State, Brasil. At various sites at that locality, I observed the hunting behavior of a number of species of Bembicini. During my daily walk to or from the beach I often stopped to watch these wasps hunting. Many times I observed individuals of

*Rubrica nasuta*, *Stictia punctata*, *S. signata* and *Bicyrtes* sp. hovering above and in front of garbage and intermittently throwing themselves towards the flies on the debris. They maintained a good distance from the garbage, 1.5 or more meters, hovering at about 1 to 1.5m above the ground, diving directly at anything that moved that was the size of a fly; when unsuccessful they frequently returned to the same "hovering aerial space". They are so fast that sometimes it seems that they would catch flies in wind. It was curious to see the way the wasps shared the aerial space around the garbage. On some days I could see 10 or more wasps flying around the same "hunting field", each one hovering in its own aerial space. As a rule, the wasps attacked any flying insect that approached their aerial space, including other wasps. I also noted that the first action for a wasp after arriving was to take up one particular aerial space and to remain there until she left for her nest or was displaced by another wasp.

Besides those behaviors, I observed a very interesting hunting tactic exhibited by some females of *Stictia punctata* that really amazed me. During my walks along the seashore, I had lunch on the beach in hut-like bars with wooden tables placed directly over the sand. Besides tourists, those paradisiacal places were visited by hungry *Muscomorpha* looking for small bits of fried shrimp or fish that eventually dropped off the table. The Bembicini in the neighborhood (various species of *Rubrica*, *Microbembex*, *Bicyrtes* and *Stictia*) were well acquainted with these tables and the surroundings were visited by flies. On one sunny afternoon, between 13:00 and 14:00 hours, I was lazily tasting some fried shrimp when I noted a loudly buzzing wasp flying in a very peculiar way around a table just in front of me. She flew facing the table and moved laterally, left and right, always hovering below the upper surface of the table. At intervals, she would quickly rise above the table surface and promptly return below it. When she detected a fly on the table, she immediately backed down and flew to a point closest to her prospective prey, doing so below the upper surface of the table and out of view of the fly. Reaching the closest point to the fly, she quickly rose above the table, dove straight at the fly, grasped it with her legs and flew away carrying her prey.

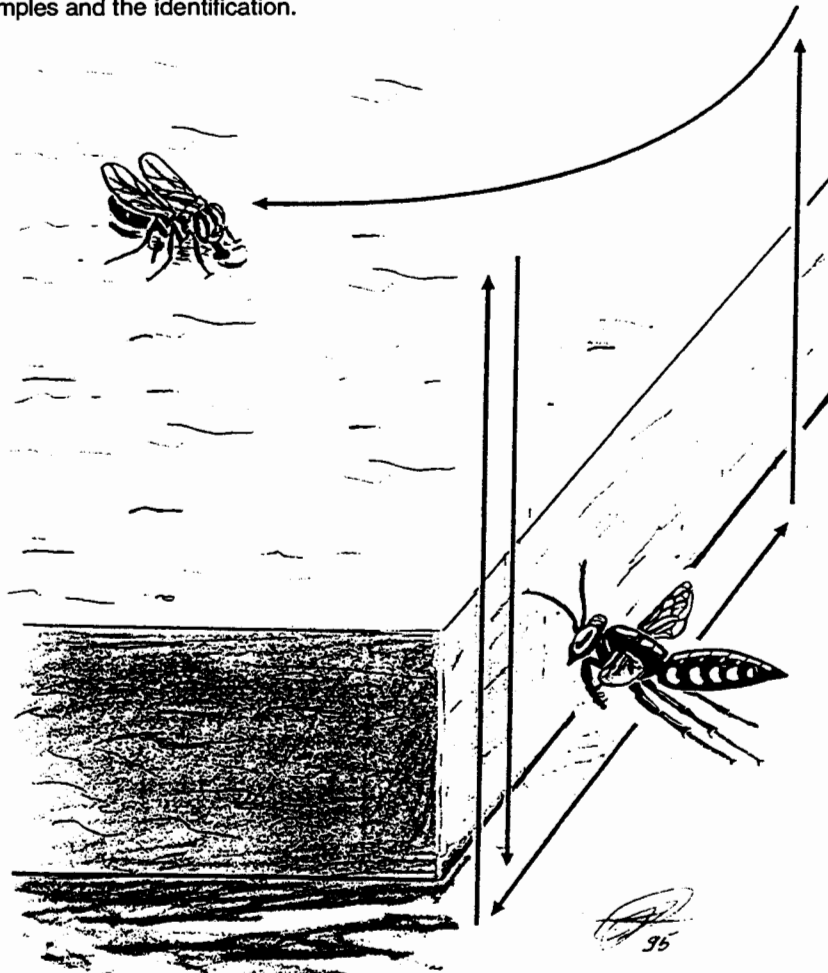


Fig. 1. Schematic illustration of the hunting tactics of *Stictia punctata*. The arrows represent the approximate movements of the wasp.

### New Records of Vespid Wasps from the Carolinas and Kentucky

by  
Robert S. Jacobson

P.O. Box 2164, Lenoir, NC 28645

*Dolichovespula norvegicoides* (Sladen): SOUTH CAROLINA: Sassafras Mountain, 1 male. To the best of my knowledge this is a new state record.

*Vespula acadica* (Sladen): NORTH CAROLINA: Carvers Gap vicinity near Roan Mountain, 4 queens on flowers of *Vaccinium*. This is only the second record from the state (see *Sphecos* 20:21-22 for other records from the Richland Balsam Lookout). Because the new record is only some 300 meters from the Tennessee state line, where similar vegetation at the same elevation occurs, its presence there is a virtual certainty although my searching hasn't yet been fruitful.

*Vespula consobrina* (Saussure): KENTUCKY: Harlan County, summit of Black Mountain; numerous queens visiting flowers of *Vaccinium* (25.v.1996).

### Some Newly Recognized Holarctic Species of Sphecidae

by  
A.S. Menke

Modern studies of the New and Old World fauna's have revealed the presence of holarctic species in some genera. This has resulted in the synonymy of some North American names under European ones. To bring these to the attention of North American workers, I have listed some of these changes below. The *Crossocerus* information comes from Bitsch and Leclercq, 1993, *Hyménoptères Sphecidae d'Europe Occidentale*, vol. 1. Faune de France 79:1-325. The *Pemphredon* names are from Dollfuss, 1995, *Linzer biol. Beitr.* 27:905-1019.

*Crossocerus leucostoma* (Linnaeus), 1758 (*Sphex*); widespread in palearctic, transcontinental in Canada and the northern U.S.

*cinctipes* Provancher, 1882 (*Blepharipus*); synonymized by B&L 1993, including synonyms listed by B&M 1976.

*Crossocerus nigrinus* (Lepeletier & Brullé), 1835 (*Blepharipus*); widespread palearctic, transcontinental

in North America  
*nigricornis* Provancher, 1888, (*Blepharipus*), synonymized by B&L 1993.

*Crossocerus tarsatus* (Shuckard), 1837 (*Crabro*); widespread in palearctic, transcontinental in North America.

*planipes* Fox, 1895 (*Crabro*), synonymized by B&L 1993 including synonyms listed by B&M 1976.

*Pemphredon lugubris* (Fabricius), 1793 (*Crabro*); palearctic and transcontinental in North America  
*concolor* Say, 1824, synonymy by Dollfuss, 1995 including synonyms listed by B&M 1976.

*Pemphredon rugifer* (Dahlbom), 1844 (*Cemonus*); palearctic and eastern U.S.

*bipartior* Fox, 1892, synonymy by Dollfuss, 1995 including synonym listed by B&M 1976.

### *Sphecius spectabilis* (Taschenberg) in Colombia

by  
A. S. Menke

Records of the single South American species of *Sphecius* are few. *S. spectabilis* was described from "Brazilia" by Taschenberg (1875), although Handlirsch (1889:464) inexplicably said the type locality was Santiago del Estero in Argentina. Handlirsch also had material from Paraguay. A single male of this wasp from Bolivia is in the National Museum of Natural History in Washington D.C. The locality on the label is undecipherable. Brèthes (1910:281) described the variety *nobilis* from Chacras de Coria, Mendoza Prov., Argentina; the status of this taxon is unclear at present.

During his recent visit in Washington, Fernando Fernández brought a female of this wasp collected in Colombia at Gaviotas in Dpto. Vichada. This is in the Orinoco Basin of eastern Colombia. This record extends the distribution of *spectabilis* considerably northward and suggests that the species is probably widespread in South America, at least at lower elevations along the eastern side of the Andes, although uncommonly collected.

*Sphecius spectabilis* is largely black but terga I-II of the gaster have large yellow maculations laterally. The clypeus and pronotal lobe are also yellow maculated. Taschenberg's material also

had yellow on the scutellum and metanotum. Brèthes' variety *nobilis* was based on material with reduced yellow: the scutellum was black (as in the Bolivian and Colombian specimens I have seen). It is likely that the degree of yellow maculation varies.

Brèthes, J., 1910. Himenópteros Argentinos. *Anal. Mus. Nac. Buenos Aires* 20:205-316.

Handlirsch, A., 1889. Monographie der mit *Nysson* und *Bembex* verwandten Grabwespen IV. *Sitzungsber. kais. Adad. Wiss. Wien, Math.-Naturw. Classe* 98:440-517.

Taschenberg, E., 1875. *Nyssonidae und Crabronidae des zoologischen Museums der hiesigen Universität.* *Zeitschr. Ges. Naturwiss. Halle* 45:359-409.

### Mutillidae of Paraguay

by  
Diomedes Quintero A.

and  
Roberto A. Cambra T.

Museo de Invertebrados G. B. Fairchild, Estafeta Universitaria, Universidad de Panamá, Panamá, PANAMÁ

Paraguay is a landlocked republic, divided into two sections by the Paraguay river: a western region (Region Occidental, Chaco), 246,925 km<sup>2</sup>, sparsely populated and occupying 60.7% of the surface of the country, and an eastern region (Region Oriental), with 159,827 km<sup>2</sup>, and more than 97% of the population of the country. The vegetation and land usage of these two distinctly different ecosystems has been reviewed (see references, under Paraguay). In addition to the recent headline news about political unrest in Paraguay, we have read in the news about the strong polemic between environmentalists and business entrepreneurs concerning the radical plan to link two landlocked countries (Bolivia and Paraguay) via an Atlantic waterway expansion project ("Hidrovia" in Spanish), a 2,000 mile waterway connecting ports of Argentina, Bolivia, Paraguay and the west Brazilian town of Caceres. Large parts of the Paraguayan Oriental forests are being cut down rapidly, under the ever increasing pressures of urban and agricultural development. We know very little about many of the insect groups from Paraguay and, if the present trend

## SPHAEROPHTHALMINAE

- Atillum captiosum* Mickel, 1943 1F (R)  
*Atillum hirsutum* Mickel, 1943 3F (D)  
*Atillum mitratum* Mickel, 1943 M  
 \**Atillum ornamentum* Mickel, 1943 1F (B)  
*Atillum stygium* Mickel, 1943 M F  
 \**Cenhalomutilla albicalcaris* Mickel, 1960 11F (D)  
 \**Cenhalomutilla confluenta* Mickel, 1960 1F (D)  
*Cenhalomutilla distincta* Mickel, 1960 5F (D), (I)  
 \**Darditilla ameliae* (Casal), 1968 2F (H)  
 \**Darditilla aurolineata* (André), 1907 3F (D)  
 \**Darditilla buonae* (Casal), 1968 2F (D)  
 \**Darditilla delpontei* (Casal), 1968 9F (H), (I), (N)  
 \**Darditilla hepperi* (Casal), 1968 1F (I)  
 \**Darditilla infantilis* (Burmeister), 1875 3F (H), (N)  
 \**Darditilla maurii* (Casal), 1968 1F (D)  
 \**Darditilla mita* (Casal), 1968 8F (D)  
*Darditilla vianai* (Casal), 1968 14F (D), (H)  
*Hoplocrates monacha* (Gerstaecker), 1874 3F (H)  
*Hoplomutilla limata* (André), 1906 F  
*Hoplomutilla myops flavimyops* Mickel, 1939 F  
*Hoplomutilla spinosa* (Swederus), 1787 1F (P)  
*Hoplomutilla triumphans* Mickel, 1939 F  
 \*\**Horcomutilla glabriceps* (André), 1908 1F (D)  
 \*\**Horcomutilla piala* Casal, 1970 1F (E)  
 \*\**Horcomutilla ypae* Fritz, 1992 2F (S), (T)  
*Leucospilomutilla staurogastra* Suárez, 1973 F  
*Lophomutilla obscura* Fritz & Pagliano, 1993 2F (H)  
 \*\**Lophostigma seabrai* Casal, 1963 2F (U), (V)  
 \*\**Lynchiatilla hoplites* (Gerstaecker), 1874 3F (N)  
*Pertyella aguaz* Fritz, 1990 F  
*Pertyella guarani* Fritz & Pagliano, 1993 F  
*Pertyella uzai* Fritz, 1990 1F (U)  
 \**Pertyella yarrowi* Casal, 1967 1F (F)  
*Pertyella* sp. 1M (I)  
 \**Pseudomethoca* (=Sphinctopsis) *candela* (Casal), 1973 1F (U)  
 \**Pseudomethoca* (=Sphinctopsis) *cerasina* (Gerstaecker), 1874 3F (D)  
 \**Pseudomethoca credula* (Cresson), 1902 2F (F)  
 \**Pseudomethoca* (=Sphinctopsis) *ichila* (Casal), 1970 13F (K), (N), (I)  
*Pseudomethoca vera* (Cresson), 1902 F

- Pseudomethoca* spp. (7 different morpho-species) 1F, 18M (H), (P), (Q), (F), (E), (X)  
*Ptilomutilla pennata* André, 1905 F  
*Scaptodactyla gracilescens* (Smith), 1879 M  
*Sphaerophthalma* (*Photopsis*) *paraguayensis* (André), 1901 2M (C). NEW COMBINATION from *Mutilla* (*Photopsis*) *paraguayensis* André  
*Sphaerophthalma* (*Photopsis*) spp. (2 morpho-species) 2M (G), (Y)  
*Suarezitilla bimaculata* (André), 1906 2M (I)  
*Suarezitilla calcycina* (Gerstaecker), 1874 F  
*Suarezitilla centrolineata* (André), 1906 F  
 \**Suarezitilla leucotaenia* (E. Lynch-Arribalzaga), 1878 7F (D), (I)  
 \**Tallium disjunctum* (Gerstaecker), 1874 5F (H), (I)  
*Tallium empyreum* (Gerstaecker), 1874 42F (D), (H), (I), (N)  
 \**Tallium precarium* Suárez, 1960 2M (I)  
 \**Tallium puelche* Casal, 1962 3F (D)  
*Tallium sordidulum* (Smith), 1879 M  
 \**Tallium tenebrosum* (Gerstaecker), 1874 10M (P), (S), (F)  
 \**Tallium torresi* Casal, 1962 1F (E)  
 \**Tallium ulape* Casal, 1962 4F (I)  
 \**Traumatomutilla bispiculata* André, 1907 1F (D)  
*Traumatomutilla bivittata rubroquittata* André, 1901 F  
 \**Traumatomutilla borba* (Cresson), 1902 4F (I)  
 \**Traumatomutilla bruchi* André, 1908 2F (D)  
*Traumatomutilla caipira* Casal, 1969 F  
 \**Traumatomutilla caneta* (Cresson), 1902 3M (I), (P)  
*Traumatomutilla chasca* Casal, 1969 F  
*Traumatomutilla chilca* Casal, 1969 1F (P)  
*Traumatomutilla duplicata* (Gerstaecker), 1874 F  
 \**Traumatomutilla funesta* ? (Gerstaecker), 1874 3M (I)  
*Traumatomutilla graphica* (Gerstaecker), 1874 1F (P)  
 \**Traumatomutilla gurisa* Casal, 1969 5F (D)  
*Traumatomutilla immaculiceps* André, 1901 11F (I)  
 \**Traumatomutilla miniata* (Gerstaecker), 1874 2F (D)  
*Traumatomutilla moesta* (Gerstaecker), 1874 F  
*Traumatomutilla parallela* (Klug), 1821 F  
*Traumatomutilla quadrum* (Klug), 1821 F  
 \**Traumatomutilla sancta* (Gerstaecker), 1874 1F (I)

- \**Traumatomutilla taboca* ? (Cresson), 1902 1M (Q)  
 \**Traumatomutilla trochantera* (Gerstaecker), 1874 2F (P)  
*Traumatomutilla vitelligera* {Gerstaecker}, 1874 F  
*Traumatomutilla* spp. (17 different morpho-species) 44F, 6M (D), (H), (I), (K), (N), (O), (P), (B), (T), (U), (A), (X)  
 \*\**Xystromutilla comigera* (Cresson), 1902 1F (J)  
 \*\**Xystromutilla krombeini* Suárez, 1960 1F (D)  
 \*\**Xystromutilla montera* Casal, 1969 1F (D)

## MUTILLINAE

- \**Ephuta capuera* Casal, 1968 1F (U)  
*Ephuta charrasca* Casal, 1968 M  
*Ephuta cingulifera* (André), 1908 M  
 \**Ephuta guampa* ? Casal, 1968 2M (K)  
 \**Ephuta indaiala* Casal, 1969 1F (H)  
 \**Ephuta mampa* Casal, 1968 1M (H)  
 \**Ephuta rubrocincta* Mickel, 1952 1M (L)  
*Ephuta sayana* Casal, 1968 2M (P)  
 \**Ephuta umbratica* (Gerstaecker), 1874 1F (N)  
*Ephuta* spp. (5 different morpho-species) 12F, 6M  
*Timulla bilineatella* Mickel, 1938 1F (A)  
*Timulla daucia* Mickel, 1938 F  
*Timulla eris* Mickel, 1938 F  
 \**Timulla exclamationis* (Cresson), 1902 1F (N)  
*Timulla fiebrigi* Mickel, 1938 1F (S)  
*Timulla galatea* Mickel, 1938 F  
 \**Timulla lineoloides* Mickel, 1938 1F (K)  
*Timulla manni* Mickel, 1938 1F (F)  
*Timulla nasica* Mickel, 1938 1M (P)  
*Timulla pyrene* Mickel, 1938 M, F  
 \**Timulla rufiventris* (Klug), 1821 1M (H)  
*Timulla scoparia* (Gerstaecker), 1874 3F, M (H), (I), (P)  
 \**Timulla spiniclypeata* Mickel, 1938 5F (K), (N)  
 \**Timulla spoliatrix* Mickel, 1938 1M (S)  
*Timulla sulcata* Mickel, 1938  
 \**Timulla togatula* ? Mickel, 1938 2M (X)

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 André, E. 1910. Liste des Mutillides recueillis par M. le Prof. J. D. Anisits au Paraguay, Zool. jahrb. abyt syst. 29: 229—230.

*Crossocerus nigritus* (Lepeletier & Brullé)  
*Crossocerus ovalis* Lepeletier & Brullé  
*Crossocerus podagricus* (v.d. Linden)  
*Crossocerus pusillus* (Lepeletier & Brullé)  
*Crossocerus quadrimaculatus* (F.)  
*Crossocerus tarsatus* (Shuckard)  
*Crossocerus vagabundus* (Panzer)  
*Crossocerus walkeri* (Shuckard)  
*Crossocerus wesmaeli* (v.d. Linden)  
*Crabro cribrarius* (L.)  
*Crabro maeklini* A. Morawitz  
*Crabro peltarius* (Schreber)  
*Crabro scutellatus* (Scheven)  
*Lestica alata* (Panzer)  
*Lestica clypeata* (Schreber)  
*Lestica subterranea* (F.)  
*Ectemnius cavifrons* (Thomson)  
*Ectemnius cephalotes* (Oliver)  
*Ectemnius continuus* (F.)  
*Ectemnius dives* (Lepeletier & Brullé)  
*Ectemnius fossorius* (L.)  
*Ectemnius guttatus* (v.d. Linden)  
*Ectemnius lapidarius* (Panzer)  
*Ectemnius meridionalis* (A. Costa)  
*Ectemnius rubicola* (Dufour & Perris)  
*Ectemnius ruficornis* (Zett.)  
*Ectemnius rugifer* (Dahlbom)  
*Ectemnius sexcinctus* (F.)  
*Ectemnius spinipes* (A. Morawitz)  
*Mellinus arvensis* (L.)  
*Mellinus crabroneus* (Thunberg)  
*Alysson jaroslavensis* Kokujev  
*Alysson spinosus* (Panzer)  
*Didineis clavimana* (Gussakovskij)  
*Didineis wuestneii* Handlirsch  
*Nysson dimidiatus* Jurine  
*Nysson interruptus* (F.)  
*Nysson maculosus* (Gmelin)

*Nysson spinosus* (J. Forster)  
*Nysson quadriguttatus* Gerst  
*Nysson trimaculatus* (Rossi)  
*Brachystegus scalaris* (Illiger)  
*Argogorytes fargei* (Shuckard)  
*Argogorytes mystaceus* (L.)  
*Harpactus elegans* (Lepeletier)  
*Harpactus laevis* (Latreille)  
*Harpactus lunatus* (Dahlbom)  
*Harpactus moravicus* (Snoflak)  
*Harpactus tumidus* (Panzer)  
*Gorytes albidulus* (Lepeletier)  
*Gorytes fallax* Handlirsch  
*Gorytes laticinctus* (Lepeletier)  
*Gorytes procrustes* Handlirsch  
*Gorytes quadrifasciatus* (Panzer)  
*Gorytes quinquecinctus* (F.)  
*Gorytes quinquefasciatus* (Panzer)  
*Lestiphorus bicinctus* (Rossi)  
*Bembecinus tridens* (F.)  
*Bembex rostrata* (L.)  
*Philanthus coronatus* (Thunberg)  
*Philanthus triangulum* (F.)  
*Philanthus venustus* (Rossi)  
*Cerceris albofasciata* (Rossi)  
*Cerceris angustirostris* Shestakov  
*Cerceris arenaia* (L.)  
*Cerceris eryngii* Marquet  
*Cerceris flavescens* Schletterer  
*Cerceris flavilabris* (F.)  
*Cerceris hortivaga* Kohl  
*Cerceris interrupta* (Panzer)  
*Cerceris quadricincta* (Panzer)  
*Cerceris quadrifasciata* (Panzer)  
*Cerceris quinquefasciata* (Rossi)  
*Cerceris rubida* (Jurine)  
*Cerceris ruficornis* (F.)  
*Cerceris rybyensis* (L.)  
*Cerceris sabulosa* (Panzer)  
*Cerceris somotorensis* Balthasar

## COLLECTING REPORTS

Collecting in southern California,  
 Arizona, southern Nevada,  
 1995-style.

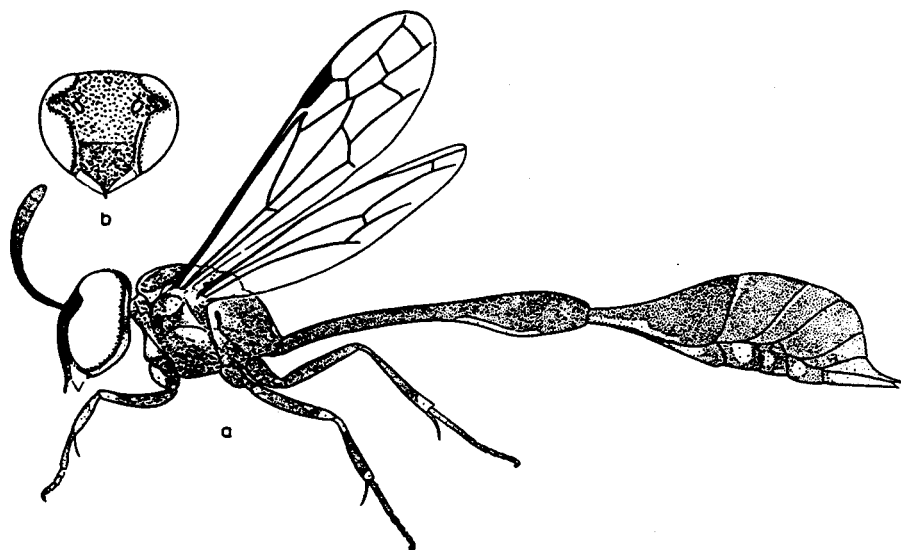
by

Roy R. Snelling

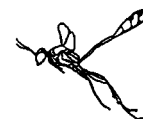
Natural History Museum of L. A. Co.,  
 900 Exposition Blvd.,  
 Los Angeles, California 90007

In a single word: awful! Plenty of rain, should have been good. But, at the critical period, Feb.-May, unseasonal storms rolled across the desert, usually just a few days apart. They brought rain and wind. Many flowers bloomed, inspired no doubt, by the few warm days between storms. The Aculeata, on the other hand, seemed to know that something was not as it should be and didn't bother to show up. In mid-June, on another trip, my first night out I got rained on. Not a lot, but enough to be miserable. Three days later it was worse! Wet, cold, windy. I did luck-out and collect a few females of *Euparagia boregoensis* for Volker Mauss to rip apart. I just hope he appreciates what I went through to get them.

Ever the optimist, however, I am leaving tomorrow (20 Aug.) for southern Arizona, mainly to collect a presently undescribed species of *Hesperapis* (a really cute little critter) on prostrate *Euphorbia* (now *Chamaesyce*) in the Willcox area of Arizona. Even though that is a bee (or fuzzy wasp, if you care to look at it that way), I would expect to collect other things on the *Chamaesyce* as well, as part of the on-going project my son and I initiated a couple of years ago. This year, even the *Chamaesyce* collecting at our primary site in the Mojave Desert generated poor collecting. As an example, the first year, the little mutillid, *Lomachaeta hicksi* Mickel, was common and we got plenty of material of both sexes. This year, I found a few females, not a single male. About the only thing that seemed to be unchanged, was the chrysidids: they remained plentiful this year. So far, we have about 90 species of aculeates at the primary site most of which seem to be regular associates of the *Chamaesyce*. I'll be interested in seeing what results I get at a couple of sites in Arizona.



*Parischnogaster mellyi* (Saussure) (Vespidae)





Bill had never been to Death Valley so we headed there next. Enroute we took in Ash Meadows, Nevada, an area of interesting hot springs, endemic fish and water bugs. Crystal Pool was as beautiful as ever. Mid July is extremely hot in Death Valley with temperatures commonly 110° F and above. In the old days, the park was essentially closed in summer because of the heat, but nowadays there are as many people in the valley in the summer as in winter, in fact probably more. The reason is the tremendous increase in foreign visitors to the US. Just about everyone we met was speaking German, French, Japanese or some other language. After taking in Bad Water, which is 280 feet below sea level, we headed west out of the valley and camped in the Panamint Mountains at Mahogany Flat, a favorite place of Nancy's and mine. The site is misnamed. It is not flat. You are on the ridge of the Panamints with tremendous views of Death Valley below to the east, and the Sierras to the west. The next day the three of us hiked to the top of Telescope Peak (11049'), a 14 mile roundtrip. It was a grueling day hike, but the views from the peak were terrific which made it all worthwhile. There were even small patches of snow near the summit.

Our next target was the lunar landscape of the White Mountains along the California-Nevada border. Here I hoped to collect *Ammophila* and other wasps at altitudes of 10-11,000'. We camped at Grandview as usual. Snow was much in evidence unlike previous visits, an indication of the heavy snowfall the previous winter. Best collecting proved to be at Crooked Creek at an elevation of 10,000'. With both Nancy and Bill using nets, we managed to capture nearly 100 *Ammophila*, as well as a lot of *Podalonia* and other wasps. The *Ammophila* were nearly all males, an indication that even in late July, the season was still early. The *Ammophila* were mostly the ubiquitous *azteca*, but a few specimens of what may prove to be *sylvestris* Kirkbride were taken, as well as *stangei* and *mediata*. We visited the high altitude field station that the Univ. of California operates at Crooked Creek. It is a brand new facility (by that I mean it's an old station with a new building) that offers accommodations to scientists with valid reasons to stay. They charge a nominal daily fee which includes room and board. It is a very nice set up. I can

provide particulars should anyone want to do some high altitude work in the White Mtns. White Mt. itself is only a few feet lower than Mt. Whitney in the nearby Sierra's (Whitney is nearly 14,500'). The Whites are in the rain shadow of the Sierra's and offer quite a different type of habitat, one that is home to the famous Bristle Cone pines, the oldest living things on earth.

Over the next few days we drove via a very circuitous route to Davis, California, to attend the 3rd Conference of the International Society of Hymenopterists. We visited Mono Lake, the ghost town of Bodie, traversed Yosemite Nat. Park, visited the town of Angels Camp, then drove back across the Sierra via Ebbitts Pass, ending up in Reno, Nevada. From there we headed north to Lassen National Park. Snow pack there was still 20 feet deep in places and lakes were still frozen! From there we headed west to the Pacific Coast where we drove south through the coastal redwoods. Just before we reached Davis, Bill flew to Atlanta because of an illness in his family.

The 5-day Hymenoptera bash at Davis was the best meeting I have ever attended, probably because everyone was a hymenopterist and there was much in common to talk about. There were some very fine presentations, and I met several young sphecid workers for the first time. Some of the waspers I remember talking to during the conference were Eduardas Budrys, Gabe Melo, Marius Wasbauer, Denis Brothers, Mike Prentice, Terry Griswold, Al Hook, Alex Rasnitsyn, Woj Pulawski, Paul Hanson, Don Manley, Rogério Martins, Michael Ohl, Volker Mauss, Jim Carpenter, Justin Schmidt, and Byron Alexander.

After the conference was over, Nancy and I headed back to Arizona for several days of collecting along the Mexican border. In general collecting was very poor in southern Arizona because of draught. Rains had been few and far between – unusual for August. Collecting along the Ajo-Tucson road was frustratingly poor. We visited Kitt Peak Observatory at the north end of the Baboquivari Mts., a range that is little collected. This area is on Indian land and they have established a beautiful picnic ground at 7,000 feet with modern flush toilets, water, etc., but no overnight is camping allowed unfortunately. There was plenty of *Eriogonum* in bloom but no *Ammophila*.

Nancy and I drove from Tucson southwest to Arivaca, and then eastward over the dirt road leading to Sycamore Canyon and eventually Nogales. Here I must relate the most traumatic part of the entire trip. We reached Sycamore Canyon, parked, collected a while and then started walking down canyon, collecting along the way. This canyon is broad, has a stream, lots of flowers, and if you go 5 miles or so, you reach the Mexican border. We went about a mile before deciding to turn back. Collecting was disappointing. No *Ammophila* to be seen. On the way back we stopped at a narrow side canyon, the only one that had any water. While Nancy tried collecting on some flowers, I wandered up this little canyon a short distance and found no wasps. I turned around and went back to the main canyon, and continued on upstream toward the car. At this point I must tell you that Nancy is an intense, patient collector and consequently, she is slow moving. I usually end up ahead of her and wait for her to catch up. I got to the car about 2:15 PM, drank some water, ate some food and waited. No Nancy. So at about 2:40 I grabbed a liter of water and headed down stream again, expecting to run into her, no doubt dehydrated. Well, I ended up going all the way to where we had stopped and found no trace of Nancy! I returned to the car expecting to see her there, but no Nancy. I was worried. I made two more round trips down canyon, yelling out her name, looking in all the willow thickets, but still no Nancy. I searched the little side canyon where I had left her, but found a fence across it a short distance up and figured that she would not have climbed over it, especially since we had not had to climb any fences going down Sycamore Canyon. Back at the car at 4 o'clock I was frantic. I decided that I had to get help. So I left our remaining water, a sleeping bag, a tent, and a note telling her that I had gone to get help. It was about 10 miles over a winding dirt mountain road to the nearest settlement, Peña Blanca Lake. After going about a half mile I came to a side road to a ranch. I went down it thinking someone there might have a telephone. The rancher had no phone (too isolated) or radio. He suggested that I go on to Peña Blanca Lake while he took his dog and went to Sycamore to look for Nancy. I sped off for PB Lake, arriving about 5 PM. The manager of the resort called

tains. This road HAD to go somewhere. If I could just find a paved road I would wait there until a car came along. As I rounded a turn, 100 yards ahead I saw an old water tank sitting in the middle of a fenced area – the first signs of civilization.

My trail had become a grassy road, but still no sign of inhabitants. Thinking of a helicopter rescue the next day, I wrote a large “HELP” on the tank and drew an arrow pointing the direction I was headed. The road started showing some use and dropped sharply in to a heavily wooded area. Suddenly, off in the distance I thought I heard a car door slam. I yelled out “Arnold!” and started running towards the sound. A car engine started and my heart stopped. I frantically cried, “Oh please, don’t leave me! I’m lost!” To my relief, someone yelled, “I know you are!” It was a stranger’s voice. How the heck did he know I was lost! At that moment I heard the sweetest sound you can imagine – Am’s voice. I fairly flew down the hill, yelling to him all the time. “Oh, Honey, I was so lost!” Finally, through the dusk, I saw him crossing a dry creek bed. We were both running to each other. As he grabbed me, I just collapsed. We were both crying. A few seconds later I saw some figures coming out of the bush. I asked Am who they were. He said, “Honey, we’ve made a lot of new friends here today”. It was Officer Rodriguez of the Santa Cruz County Sheriff’s Department. Following him was a young in-training paramedic and his girlfriend. On his truck radio he’d heard the sheriff’s report about my being lost. Thinking he might be needed, they too headed for Sycamore Canyon. Finally, there was Rich, the fellow and his dog, that Am had met at the ranch. His was the voice I’d heard. Things moved quickly then. I was given a brief examination of vital signs and pronounced OK except for a rapid pulse and some dehydration. A bottle of cool Evian water was produced from the sheriff’s cooler – best tasting water I’ve ever had!

It had been quite an ordeal for all of us. I can assure you, I will continue collecting, but from now on, will occasionally peek out from under my hat to pay closer attention to my surroundings. Now we return to Am’s trip report.

The next day, after we recovered from Nancy’s adventure, we continued on to Nogales, visited the Sheriff to pay our

respects, and then took a dirt road eastward toward Bisbee. This road roughly parallels the border and traverses some great collecting areas. We stopped 6 miles east of Nogales and collected several species of *Ammophila* in a sandy area next to the Santa Cruz River, but all were common taxa. We tried various spots farther along the road but mostly they were disappointing in terms of *Ammophila*. One site, 11 miles east of Nogales, called, amazingly, Sycamore Canyon, looked especially great, but again was disappointing. This location is where *A. bella* Menke was collected some years ago by Robin Thorp, a Mexican species previously unrecorded in the U.S. I had hoped to take more specimens. Farther along we did collect *Ammophila placida* in the beautiful San Raphael Valley, but it is also a common species.

Operating out of Bisbee, we collected for several days at a number of areas that have been productive in past years. I was especially trying to collect the unknown female of *imitator* Menke, males of which have been collected at several places along the border. We tried collecting at the known *imitator* sites but found only *Ammophila pruinoso*, *cleopatra* and *breviceps*, all common species. We went as far as Guadalupe Canyon in the extreme southeastern corner of Arizona. In a wet year this should be a terrific collecting area. We took *Ammophila breviceps* and some crabronines. Collecting at Slaughter Ranch, east of Douglas on the Geronimo Trail, was equally disappointing. The most diversified collecting was at a sand pit about 2 and a half miles east of Douglas, where we captured a variety of Hymenoptera. We eventually tried our luck in Carr Canyon in the Huachuca Mts. The road in Carr Canyon takes you to the crest of the range at about 7,000’, but collecting was poor at all elevations.

We returned to Washington, leaving our car at our Bisbee home. Then in early October we flew back to Arizona, picked up our car, and headed for Reno, Nevada to attend the annual meeting of the Southern Pacific Historical Society, a railroad group. Enroute, we collected at various places. Near Pahrump, Nevada we managed to take quite a few *Ammophila*, most specimens belonging to an as yet undescribed species in the *pruinosa* complex. We continued on, visiting Ash Meadows again. There we visited Point-of-Rocks Spring. Collect-

ing in Ash Meadows was poor. That evening we stayed at the Amaragosa Hotel in Death Valley Junction. What a wonderful experience that was. Death Valley Junction is nearly a ghost town now, although it flourished early in this century when it was a railroad town. Death Valley Junction consists of a restored opera house and hotel. Marta Becket is responsible for the restoration efforts, and she performs in the opera house during the winter. In the summer the hotel is the only thing going in town. Staying in it is a real treat. The only noise is an occasional car that passes by. Wild horses and asses are occasional visitors. Marta is quite a talented lady, and has decorated each room differently. We were in the “Jezebel” room, complete with red satin sheets and red light bulbs.

From DVJ we drove west into Death Valley and took the north road up the valley past Ubehebe Crater. At that point it becomes a dirt road. If you follow it, you eventually come out at the town of Big Pine in Owens Valley. The scenery along this isolated drive is at times outstanding. You pass Little and Big Sand Springs, cross the Last Chance Range, Eureka Valley, and Joshua Flats (a valley with thousands of Joshua trees), before dropping down out of the Inyo Mountains to Big Pine. We explored old mines and collected a few *Ammophila* here and there. Recently Death Valley National Monument became a National Park. The Park includes a lot more land than the old monument did.

We spent a night in the town of Lee Vining, our room overlooking Mono Lake – quite a vista. The next day we got into Nevada, and collected west of Fort Churchill along the Carson River. This was a wonderful collecting area and 5 or 6 species of *Ammophila* were taken, along with other wasps. That was essentially our last collecting of the trip. We visited the famous mining town of Virginia City and ended up in Reno for the railroad meeting. To begin our trip back to Maryland, we drove east on highway 50 (the “loneliest highway in North America”), across Nevada to Ely, where we were lucky to see Nevada Northern 40 (a steam locomotive) actually running. From there we zipped up to Logan, Utah and enjoyed a visit with Frank Parker. Then began the long drive back to Maryland. In Wyoming we chanced upon another steam engine in operation, the Union Pacific Challeng-

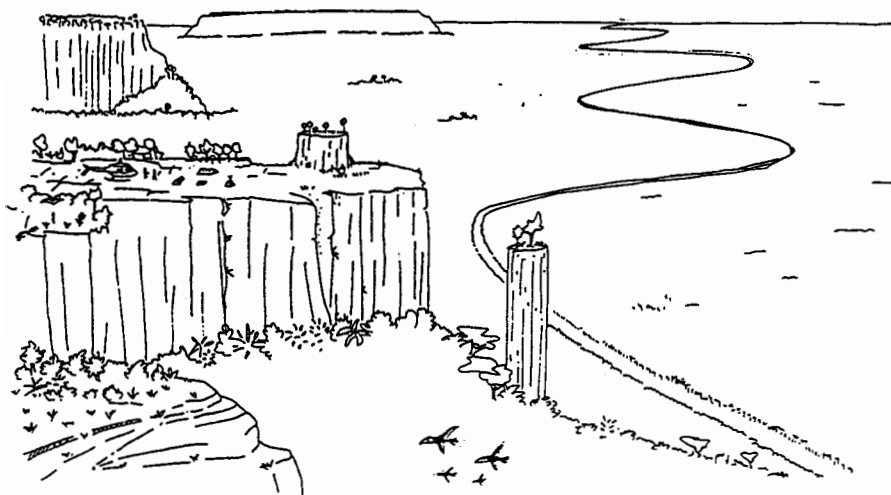


Fig. 3. Panorámica del campamento en la primera meseta. Al fondo otras mesetas y el Rio Ajajú en medio de la selva (Esquemático).

atterizando, está llena de gente, vacas, perros, pájaros y cualquier cosa rara. Los aviones llegan y despegan casi continuamente, hasta 30 vuelos diarios. Esto es demasiado para un pueblo de estas regiones, pero es una prueba directa de la exitosa economía de la coca. Los precios en Miraflores son, obviamente, altísimos: un almuerzo puede valer unos 8 dólares. Se calcula que un 70% de las mujeres son prostitutas. Muchas de ellas provienen de diferentes lugares del país, atraídas por la posibilidad de hacer mucho dinero en poco tiempo. La zona, como tantas otras de la región, tiene problemas de orden público. Se encuentran allí militares, paramilitares, guerrilleros, colonos e indígenas en una mezcla explosiva que gira en torno a la explotación de la coca.

Recientemente (agosto de 1995) Miraflores fue arrasada por un ataque guerrillero que destruyó gran parte del pueblo, incluyendo el hospital y la iglesia. Ante las pocas garantías de vida, la mayoría de la gente está evacuando, desesperadamente, el lugar.

Desde Miraflores ha de tomarse un helicóptero para viajar a cualquiera de las mesetas del parque. El uso de helicópteros es costoso, y se supone que debe existir un previo contrato con cualquier compañía que preste servicios con estos aparatos. Sin helicóptero, podría viajar por tierra y por canoas, remontando ríos, trochas y caños. El viaje es muy largo (entre 20 y 50 días) aunque muy interesante, pues se puede conocer el bosque húmedo del Alto Apaporis, río que mucho más abajo viene a de-

sembocar en el Caquetá, cerca a la frontera con el Brasil.

Los claros naturales de las partes altas de las mesetas hacen fácil el aterrizaje del helicóptero, y facilitan el acampar. Hay abundancia de fuentes de agua gracias a una infinidad de caños y riachuelos con agua ferruginosa, rica en hierro y por supuesto sin contaminación.

#### Paisajes y micropaisajes

El entorno de la serranía del Chiribiquete y sus macizas rocas rompen la aparente monotonía de la selva lluviosa con paisajes muy diferentes y con sus propias condiciones climáticas y ecológicas. Las mismas planicies y rocas están rodeadas por selvas bajas húmedas, con condiciones de clima y comunidades bióticas similares a la de la selva de la cuenca. Estos son los bosques bajos que rodean la serranía. Muchas planicies tienen flancos que descienden suavemente hasta la selva baja, formando bosques de ladera que presentan una gradación altitudinal y posiblemente climática. Entre las planicies se forman valles de diferentes amplitudes y pendientes asociadas a ríos y caños que descienden de las cimas de las rocas. Las partes superiores de la serranía forman dos grandes paisajes, uno de bosques altos, asociados a bordes de rocas y formaciones acuosas, y otro de grandes extensiones de areniscas y roca expuesta con vegetación rala y esparcida. Igualmente, estas partes altas están ricamente regadas por caños, riachuelos y reservorios acuosos de aguas ácidas y oscuras, pobremente habitadas.

Las planicies también poseen "mini-mesetas" que pueden favorecer en sus cimas, laderas y grietas micropaisajes con condiciones particulares de clima ("microclimas") y probablemente con comunidades de flora y fauna muy propias. Estos micropaisajes pueden formar verdaderos oasis en estas planicies.

#### Las plantas y sus formas de vida

Aunque las expediciones arrojan resultados necesariamente preliminares en el estudio florístico de la región, existen ya unos resultados parciales que pueden dar una primera idea sobre como se las arreglan las plantas para vivir en estos medios severos.

Los botánicos han diferenciado unas 600 especies de vegetales, dato que habla de una relativa riqueza de la flora de la serranía, el doble de los afloramientos rocosos de Aracua y el séxtuple del cerro de Aracá en el Brazil.

En general, los botánicos han distinguido varios paisajes de acuerdo a sus comunidades vegetales:

—Comunidades pioneras en suelo arenoso. Soportando fuertes cambios en la temperatura y gran pobreza de nutrientes, en un medio extremadamente hostil como la roca expuesta, crecen plantas verdaderamente pioneras y adaptadas, como la *Vellozia*.

—Bosque de porte bajo, con predominancia de *Bonnetia*, *Tepuianthus* y *Licania*. Este bosque es dominante en las planicies.

—Matorral (pastizal) de *Bonettia* y *Digitaria* formando parches definidos.

—Bosque maduro de *Tachigalia*, *Gauteria* y *Micrandria*. Este es un bosque de gran porte en las laderas.

—Bosque de orilla de río, con algunas combretáceas, briófitos y *Ficus*. Este bosque tiene apariencia de el altoandino.

—Bosque de leguminosas y *Micrandria*, en apariencia a los de las terrazas altas no inundables del Amazonas.

—Bosque de pantano con *Euterpe* y *Rapatea*.

—Bosque bajo de *Calophyllum* y *Protium*, en zonas planas y suelos profundos.

#### Los animales y sus planteamientos

La impresión general de los zoólogos sobre las colecciones y observaciones hechas en las dos excursiones es de una fauna más bien pobre y poco visible. Aunque ciertamente que

dos. Las hormigas, además de ser tan numerosas, están metidas en todas partes, en continuo movimiento, en permanente agitación. Hay casi 10000 especies de hormigas conocidas en el mundo, comprendiendo multitud de formas, desde voraces carnívoras hasta pacíficas agricultoras. Las extensas selvas que rodean las serranías del Chiribiquete seguramente albergan ricas poblaciones de hormigas, pero ... ¿Que pasa en el Chiribiquete? Las observaciones parciales parecen indicar que solo ciertos grupos han podido conquistar estas catedrales rocosas.

Las planicies abiertas y secas sostienen hormigas capaces de soportar ambientes calientes y con pobres recursos. Bajo ardientes días bajo el sol algunas se atreven a recorrer las ardientes rocas en busca de semillas o

cualquier otro fragmento de vegetal o animal que pueda servirles de alimento. No es tarea fácil, pues además de la energía gastada en buscar alimento, deben competir con otras hormigas y aves, y escabullirse de algunos enemigos. Aunque estos insectos no la pasan bien, saben como defenderse.

Como es tan difícil conseguir una miga de alimento en pleno día, otras hormigas han optado por la oscuridad. En la fresca noche ciertos grupos de hormigas explotan eficazmente las ricas gotas de néctar que exudan algunas plantas; al llegar el nuevo día con su aplastante calor, aguardan escondidas y en quietud la llegada de la fría noche.

Los bosques ralos de bonetias que alternan como parches los calurosos claros son otro ambiente que han con-

quistado otras hormigas, como las agresivas *Azteca*, famosas por sus asociaciones benéficas con plantas como los yarumos. Las hormigas de estos bosques son un poco diferentes, más ajustadas a hábitats arbóreos que a calcinados suelos.

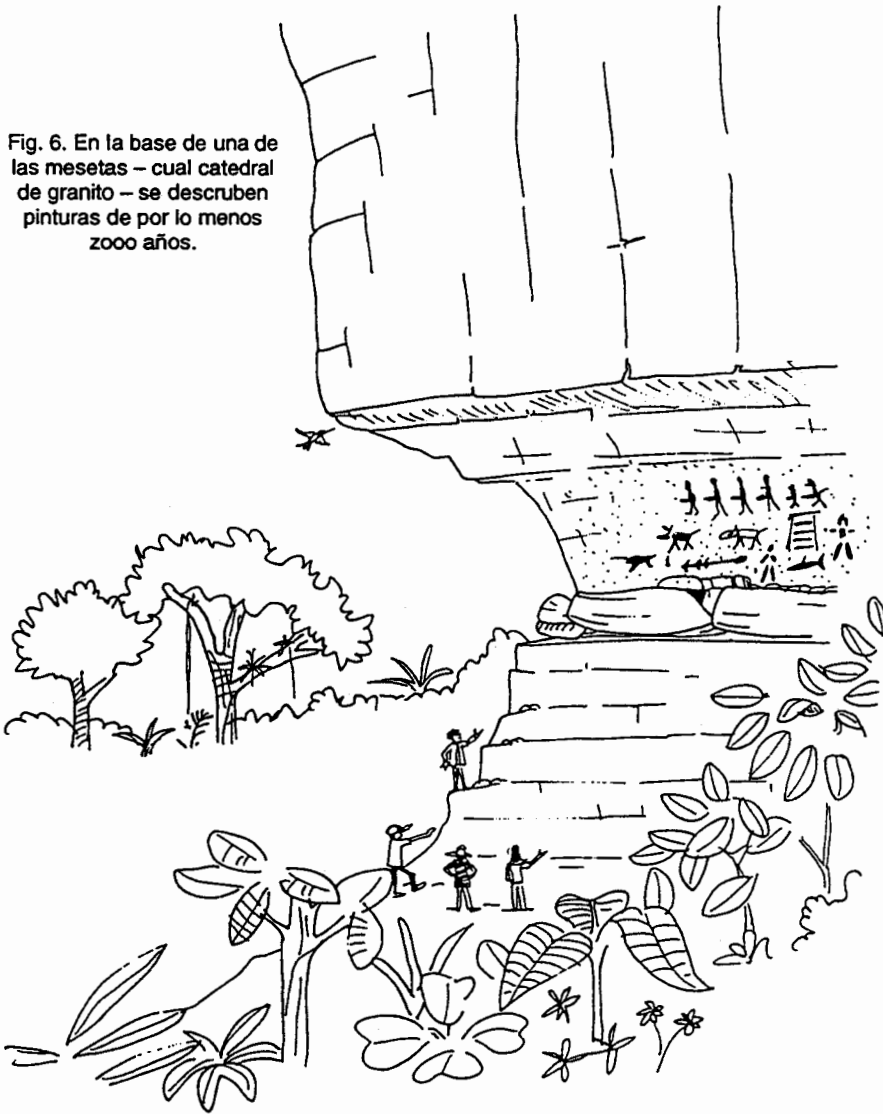
Los bosques de gran porte que se encuentran en las laderas y valles interplanicies ofrecen condiciones húmedas y más benignas. Aquí nos encontramos con hormigas más espectaculares, como las hormigas congas (*Paraponera clavata*), gigantes carnívoras que prosperan en nuestras selvas desde tiempos arcaicos, grandes y oportunistas congongas (*Camponotus sericeiventris*) y también las impresionantes legiones de impetuosas nómadas (*Eciton* spp).

Estas hormigas, llamadas una vez como los "hunos y tártaros" del reino animal, forman fabulosos ejércitos de beligerantes obreras y soldados bien armados de falanges y dardos. Gracias a un sofisticado sistema químico de comunicación, exploran afanosamente cada palmo de suelo y de vegetación baja, despedazando insectos, arañas, escorpiones, y atacando lagartijas, serpientes y cualquier otro pequeño vertebrado que no escape a estas hordas.

Probablemente muchos ambientes de las islas rocosas de la Serranía del Chiribiquete no sean los más propicios para muchas especies de hormigas, pero algunas de éstas se las han arreglado bien para colonizar "islotos" benignos y aprovechar eficazmente los escasos recursos de las planicies.

Las mariposas son relativamente escasas (en comparación con las selvas húmedas bajas) pero presentan aspectos interesantes, según el profesor Gonzalo Andrade. Por ejemplo, esta fauna posee componentes de otras regiones (amazónica, orinocense, andina) mostrando una heterogeneidad geográfica como la de otros grupos (aves). A pesar de su poca diversidad, estos insectos deben enfrentar importantes problemas para su subsistencia; fuertes vientos, agudos cambios de temperatura, escasez de sales y otros nutrientes, etc. Al parecer la fauna de una planicie particular puede tener una composición diferente a otra vecina. Aunque la lepidopterofauna sea escasa lo interesante es como se las arreglan sus representantes para sobrevivir; cierta hermosa mariposa azul, por ejemplo, posee ciertos ganchos o anclas que le permiten

Fig. 6. En la base de una de las mesetas - cual catedral de granito - se descubren pinturas de por lo menos 2000 años.



Dr. A. Kaltenbach, Vienna, in 1989; and then in 1989, 1992 and 1993 identified collections of micro-hymenoptera from Dr. J. T. Huber, Canadian National Collection of Insects (CNC), Ottawa, Canada, who visited Oman in February 1986 and has given me much encouragement. A representative collection of mosquitos (Diptera: Culicidae) came from R. Irving-Bell in 1991. Other visitors included J.C. Deeming, National Museum of Wales, Cardiff, UK, who set out the reference collection of Diptera and Hemiptera in 1990 and 1992. In this period we also set up reference collections of Lepidoptera, Thysanura, ants and some other groups.

More recently, many sphecid specimens were identified and others donated by K. M. Guichard in 1994; he had visited the Sultanate in 1976 and 1977 (see Profile in *Sphecos* 4: 7). Dr. W. Schneider visited in 1994 to set out the collection of Odonata, and Dr. M. W. Balkenohl revised our large collection of Coleoptera in October 1995. A recent acquisition is a collection of insects (including 30 Aculeate Hymenoptera) by Dr. Michael Gillett, United Arab Emirates University, Al Ain, Abu Dhabi, from nearby Oman since 1993.

Many smaller collections of Hymenoptera have been made over the years – and continue to be made – by residents and visitors. Some specimens are mounted and retained unidentified, but most of the small specimens are sent to J. T. Huber at CNC, where they are currently being examined by him, and by several other specialists such as J. LaSalle (Eulophidae), L. Masner (Platygastroidea), J. Sharkey (braconids), and D. Wahl (Ichneumonidae); material is also in the care of Dr. D. J. Brothers (South Africa) and Dr. L. Kimsey (California). Other names on det labels on Museum specimens include C. van Achterberg, Z. Boucek, J. C. Deeming, A. T. Fynnmore, G. Gibson, J. S. Noyes, A. Polaszek, W. J. Pulawski, and H. Townes. With their excellent support and that of the collectors the collection of parasitic and Aculeate Hymenoptera now occupies eight drawers, two of which are for Sphecidae.

A list of species of the parasitic and Aculeate Hymenoptera of Oman has been prepared by me; based on the Collection and on published accounts it was edited by John Huber, Woj Pulawski and Arnold Menke. This is ***Oman Natural History Museum Check-list***

**No. 5** (8 pp. including a brief bibliography). Nearly 600 species are listed, of which sphecids number 185 species of 58 genera. However, actual specimens of sphecids held total only 100 examples of 51 species.

Although the ONHM Collection is small, it is a start! Our aim is to develop it into a national reference collection, as for other groups. It is clear that there is great scope for further collecting in the Sultanate. The fauna is surprisingly rich, with many species which are rare in collections. For instance, males of the rare genus of sphecids, *Heterogyna*, are often collected at light, but no females have been found. Like others, this small Museum is constrained by lack of time, expertise and funds, and of specialists with time to help determine the collections. Our work is publicised in a free leaflet, which has led to further interest among the public, and to help by Omanis and volunteer Friends of the Museum in processing collections for study. Any reader who wishes to consult the Collection, or who would be interested in accepting groups for determination and return – or who wishes to visit Oman to collect more, is invited to write to: The Director, Natural History Museum, at the above address or fax 968.602735.

#### The Collection of Arnaldo de Winkelried Bertoni

by

**Bolívar R. Garcete Barrett**

Museo Nacional de Historia Natural del Paraguay, Sucursal 1 Campus, Ciudad Universitaria, Central XI, San Lorenzo PARAGUAY

Arnaldo de Winkelried Bertoni, born in Switzerland, belonged to a great family dedicated to science. His father, the naturalist Moises Santiago Bertoni, founded Colonia Guillermo Tell, afterwards called Puerto Bertoni, on the Paraguayan side of the River Parana, in the middle of the jungle. This site is now called the Monumento Científico Moises S. Bertoni. Here Winkelried, under the influence of his father, took great interest in zoology, resulting in a museum of zoology with an important collection. In Puerto Bertoni he published a number of works on birds, reptiles, mammals, and insects of Paraguay. Among the insects he had a special love for aculeate Hymenoptera, and this is reflect-

ed in his collections and papers, dating from 1910 to 1934. These concern faunistic studies and biology of various groups and the description of a number of species, mainly Eumeninae (Vespidae), but also Polistinae, Masarinae, Sphecinae and Trigonalidae.

Around the 30's he moved to Asuncion to work with the Ministry of Agriculture, bringing a part of his collection and eventually depositing it in the basement of the Banco Agricola (now Banco de Fomento) where Winkelried had his last office. That collection was said to be there after his death and had been considered lost by most foreign entomologists.

The story is not clear, but recently Blanca Barrios of the Museo Nacional de Historia Natural del Paraguay (MNHNP) discovered that the Instituto Agronomico Nacional (IAN) in Caacupe had a collection of A. W. Bertoni's. He asked for and obtained this collection for the MNHNP. Early this year I asked Siemens Bertoni, Winkelried's nephew and Director of the MNHNP at that time, to investigate what happened to the collection in the Banco de Fomento. He found that the collection was no longer there and nobody knew where it was. Suspicions then fell on the Ministry of Agriculture. Was it possible that the IAN collection was the one from Banco de Fomento that was missing? That suspicion has in part been confirmed by me because the MNHNP collection now contains types of most, and possibly and hopefully all, of the species of Vespidae described by Winkelried. However, it may be that Winkelried Bertoni himself gave this collection to people in the IAN.

On the other hand, Puerto Bertoni still has its museum and there are still wasps there, as well as other insects, deteriorating because of the poor condition of the building and the climate of the place itself.

It is very fortunate that in the MNHNP the vespid collection is in good shape, but I hope to unify the whole collection, deposit it here and begin to study it with the help of anyone else who is interested. But there are some difficulties: people in the Ministry of Agriculture show no real understanding of the importance of museum work and have little interest in moving the Bertoni collection to a national museum where it would be available to the scientific community. Because of this we have a

the desired position for later mounting at this stage. A certain amount of manipulation can be carried out after acetone saturation and before drying, but the final position has more or less been determined at this point. Alternatively the specimen can be micro-pinned and double mounted (the synthetic "poly-porous" silicon strip is not affected by acetone) or card mounted prior to placement in acetone vapour. I have used both water soluble glue and shellac gel (with little success) for card mounting. The adhesive must be allowed to dry sufficiently before placement in the acetone environment, so that the properties of the glue are not affected. Water soluble glue turns opaque and shellac gel loses its adherence properties. The latter is presumably as a result of the alcohol in the gel being replaced by the acetone and affecting the resultant bond. It is absolutely critical to achieve a balance between the glue drying sufficiently and the specimen remaining sufficiently wet to prevent any collapsing prior to acetone treatment. This sounds as if it involves much fussing, but with a bit of experimentation it is not difficult to get the timing right. I find that the ease of handling mounted specimens outweighs the disadvantages involved with gluing the specimen first.

The specimens are left for a minimum of three hours in the acetone jar, although no ill effects arise if they are left overnight, before removal and placement under a desk lamp (close to the bulb) for at least half an hour. A 60-watt bulb provides sufficient heat to speed dry the volatile acetone, leaving the specimens in a well preserved and uncollapsed state. With this method, good results can be achieved quickly and at low cost without requiring access to freeze drying or critical point drying equipment.

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#### Another Method of Drying Chalcidoids

by

David P. Cowan

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I am afraid that I am not well plugged into the network of chalcid workers and the methods I write about here may be old hat to most. The distortion of dried chalcid specimens is of course a well known problem, especially for specimens collected into alcohol. From what I have learned in the literature, the solution to this is critical point drying, which requires fairly expensive equipment and, I am informed by some, can be dangerous. For years, our electron microscope technician has been preparing small arthropods by aldehyde fixation, dehydration to 100% alcohol, and then through hexamethyldisilazane (HMDS). The HMDS is allowed to evaporate leaving specimens that show no collapse.

I have adapted this method to specimens that I collected into 95% ethyl alcohol with a Malaise trap. The results, I think, have been good and work well not only for chalcids but any soft bodied insects including braconids, Diptera, aphids etc. I remove the desired specimens from the trap jar, rinse in clean 95% alcohol, transfer them to 100% alcohol, change this once, and then transfer them through two baths of HMDS. I then allow the HMDS to evaporate and this leaves the specimens ready for mounting on cards or points. The specimens are of course brittle and must be handled with care.

HMDS is nasty stuff and must be handled with great caution: no contact with the skin, and no breathing fumes. Always work under a hood. This chemical is not exorbitantly priced and only small amounts are needed for a sample of several dozen insects. HMDS is available from Polysciences, Inc. Warrington, PA 18976 (1-800-523-2575), Catalog # 00692.

[Some additional information and literature concerning this subject was given by Bryan V. Brown in *Fly Times* No. 11, Oct. 1993 and we reprint this here as a supplement to David's note above.]



#### A Further Chemical Alternative to Critical-point-drying for Preparing Small (Or Large) Flies

by

Bryan V. Brown

Previously, I wrote about the use of Peldri II as a chemical alternative to critical-point-drying (CPD) (Brown, 1990). Using Peldri II for specimen preparation has the advantage of not requiring expensive equipment and huge canisters of CO<sub>2</sub>, but the chemical is somewhat expensive and requires some equipment, i.e. a hot plate.

Recently I came across a material that seems to overcome all the drawbacks of Peldri II. This chemical, called hexamethyldisilazane (HMDS) is readily available and cheap, costing \$18.00/250g, versus \$58.00/250g for Peldri II. No heating or cooling is needed for using HMDS: one merely dehydrates specimens to 100% alcohol, then do two soaks of 1/2 hour in pure HMDS (i.e. change the HMDS once). I use small vials for the soaks. After the second soaking, I pour the HMDS and flies into shallow depressions or small dishes, and allow the liquid to evaporate under a fume hood. Specimens come out exactly like CPD prepared specimens, ready for SEM or for general mounting for the collection. Other users agree, finding that HMDS is just as or more effective than CPD for producing perfect specimens of various tissues (Adams et al., 1987; Nation, 1983). Note for larger samples (for instance, 50 small flies at once), I recommend an extra change of HMDS.

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[The HMDS method described in the last to articles has been experimented

Draft's plan is either necessary or desirable, and it adds complexity."

Others have voiced similar sentiments in the *Bull. Zool. Nomencl.* cited above. Personally I think abandoning gender concord for species names is unnecessary. Can you imagine trying to remember, and keep straight in your mind, species names in a genus that may end in -a, -us, -um, etc.?



## NEW BOOKS

*The Hymenoptera of Costa Rica.* Edited by Paul E. Hanson and Ian D. Gauld. (1995). Oxford University Press, Oxford. xx+893 p. \$265.

For about a decade, Paul Hanson, Ian Gauld, and their colleagues operated many Malaise traps at about 40 different sites scattered over the entire country from sea level to 3000 meters. The tremendous quantities of insects taken in these traps (estimated at 4.5 million) provided the database from which the diversity of Costa Rican Hymenoptera could be measured and described. This was not the only source of faunal information, however. The fast growing collection of the Instituto Nacional de Biodiversidad de Costa Rica (INBio) was also utilized, as were other collections. *The Hymenoptera of Costa Rica* is the result. The authors estimate that 17,000-20,000 species of Hymenoptera occur in Costa Rica, 70% of which are undescribed.

The major portion of the book is devoted to family treatments written by various specialists, but the first 150 pages or so of this nearly 900 page book includes discussions of the geography, climate, and hymenopterous fauna of Costa Rica; an extensive section on the biology of Hymenoptera; the economic importance of Hymenoptera; a lengthy and well illustrated morphology section; and an overview of the evolution, classification and identification of the order. A glossary and extensive references section conclude the book.

The morphology chapter is excellent and the authors have attempted to standardize terms, but certain groups still have their "pet" terms, particularly for parts of the thorax and wings. Polymor-

phism and functional morphology are discussed at length, the latter dealing with oviposition and adaptations for nest building. This chapter concludes with a good discussion of larval morphology.

Chapter 5 on evolution, classification and identification provides a nice overview of current ideas on phylogeny of suborders and superfamilies. Because of demonstrated paraphyly in Symphyta and Parasitica, the traditional major divisions Symphyta and Apocrita and the subdivisions Parasitica and Aculeata are abandoned in favor of a superfamily-based system. Unresolved problem areas at the subfamily level are discussed. Only three superfamilies of aculeates are recognized (Chrysoidea, Vespoidea and Apoidea), which is in agreement with modern cladistic analyses of this section of the Hymenoptera. Family classification is likewise up-to-date with discussions of differing modern opinions and unresolved problems. Four families are recognized in a new classification of Cynipoidea, and Vespidae is used sensu Carpenter (including Eumeninae and Masarinae). The treatment of Apoidea (including Sphecoidae) includes two families: Sphecidae and Apidae but with the cautionary note that Sphecidae is paraphyletic and doubtless will be split into at least two families eventually, a point with which I concur. Interestingly, the reduction of bee families to one, Apidae, is based on the premise that recognition of 9 or more bee families is "disproportionately high in comparison to other Hymenoptera". I agree with this thinking, and wonder why chalcid workers have not used it to reduce "doids" to one family instead of the 21 used in *Hymenoptera of Costa Rica*. In the authors' defense, they do indicate that some "doid" families are paraphyletic, and say "there are undoubtedly too many families of Chalcidoidea, and eventually [their] number will . . . be reduced." Chapter 5 concludes with illustrated keys to superfamilies based on winged adults, and a separate key to families of brachypterous and apterous adults.

Chapters 6-18 treat various major groups (i.e., superfamily or similar grouping) of Hymenoptera, each authored by specialists. Treatment styles vary from chapter to chapter, but most contain well illustrated keys to families, subfamilies, tribes, and sometimes genera of Costa Rica (keys include a few species in Scoliidae). In lieu of generic keys,

genera are often treated with short statements that may include characteristics, biology, distribution, numbers of species, etc. Habitus drawings show general appearance of taxa in each family. Usually each family treatment includes a discussion of the Costa Rican fauna of the group, as well as notation of useful taxonomic papers, a summation of biology and economic importance.

Chapter 10 on Cynipoidea by Nigel Fergusson presents a new family classification derived from his Ph.D. thesis. Four families are recognized: Cynipidae, Iballiidae (including Liopterinae and Austrocynipinae), Figitidae (including Charipinae, Eucoilinae), and Himalocynipidae, a monotypic Old World family. The cladistic analysis that resulted in this arrangement resides in Fergusson's as yet unpublished thesis, and hopefully it will be in print soon, for what is presented here is a framework without much substantiation. This is made all the more urgent by the publication in 1995 of Ronquist's own "Phylogeny and early evolution of the Cynipoidea" in *Syst. Ent.* Interestingly, Ronquist also reduces the number of families, but there are differences from Fergusson's arrangement. Curiously no mention is made under Iballiidae of Ronquist and Nordlander's 1989 extensive morphology paper on *Iballia*, nor is the revision of the family by Zhiwei and Nordlander, 1994, cited. The latter may have appeared too late for inclusion.

Chapter 13 covers Chrysoidea. Of note is new synonymy in Bethyloidea by Finnermore and Gauld: *Apenesia* is a junior synonym of *Pristocera*. I could find no discussion of this, just "syn.n." (p. 477). Gordh and Móczár's world bethylid catalog of 1990 is not cited. Chapter 14 contains families of Vespoidea other than Vespidae, and, unfortunately, much needed keys to genera of Pompilidae and Mutillidae are not provided.

Chapter 18 by Terry Griswold, Frank Parker and Paul Hanson treats the bees, and, as mentioned above, is remarkable for the recognition of a single family, Apidae. Keys here are to subfamilies only, and it is unfortunate that the 1994 book *The Bee Genera of North and Central America* by Michener, McGinley and Danforth is not cited since it includes keys to genera in Spanish and English. Perhaps it appeared too late for inclusion.

To sum up, *The Hymenoptera of Costa Rica* contains a tremendous amount

logical Nomenclature, its various leaders, and the development of various editions of the modern Code now in use. Pictures and photographs of important personages are included.

**Arnold Menke**

*Iconography of Forest Insects in Hunan China*. 1992. 1473 p. Hymenoptera sections edited by Wu Yanru (in Chinese with brief statements in English). Bethyloidea and Chrysididae on page 1297; Scoliidae, p. 1297-1301 by Wang Jinhan; Vespoidea, p. 1321-1331, by Li Tie-sheng; Sphecoidea, p. 1331-1335, by Zhou Qin Wu Yan-ru.

This is essentially a pictorial conceptus of insects in Hunan Province. In the aculeates, each species is represented by a dorsal or lateral habitus drawing, but for westemers, that ends its usefulness because the text is in Chinese except for the scientific names. I found occasional misspellings of these names, and their authors.

**Arnold Menke**

*Brethern of the Net, American Entomology, 1840-1880*. W. Conner Sorensen. (1995). University of Alabama Press, Tuscaloosa, Alabama 335487-0380. xvi+357 p. \$59.95.

I have only glanced through this book but it appears to be a very interesting and scholarly treatise. I quote from the dustjacket: "Sorensen asks how it came about that, within the span of forty years, the American entomological community developed from a few gentlemen naturalists with primary links to Europe to a thriving scientific community exercising world leadership in entomological science. By the 1880's the entomologists constituted the largest single group of American zoologists and the largest group of ecologists in the world. While rooted in the British natural history tradition, these individuals developed a distinctive American style of entomological investigation focusing on insect pests that threaten crop production in a market-oriented agriculture. Based primarily on the correspondence of American entomologists, *Brethern of the Net* draws together information from diverse sources to illuminate an important chapter in the history of American science. The book's real strength is that it is a marvelous compendium of information about the careers and issues of

many little-known American men and women interested in entomological musings. Sorensen is at his best in discussing scientific concepts – he has made himself a master of the relevant sciences, and it shows. His discussions of the nomenclature problem, the theory of evolution, the type concept, and the notion of the balance of nature are outstanding."

**Arnold Menke**

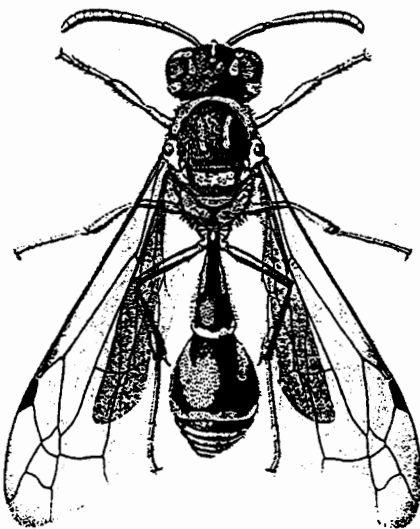


## PUBLICATION NOTICE

My revision of the world *Gastrosericus* was published on 23 October 1995 as California Academy of Sciences Memoir No. 18. To my regret, I have received only five free copies, and I apologize for not being able to send copies to all persons and institutions that provided material for study or helped in any other way.

The revision can be ordered from the Scientific Publications, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118, USA, at the price of \$40 plus \$3.25 for shipping and handling (as high as it is, the price of \$40 represents only the production costs). Checks should be issued to California Academy of Sciences.

**Wojciech J. Pulawski**



*Flavoleptus flavobalteatus* (Cameron)  
(Eumenidae)

## ERRATA ON THE REVISED EDITION OF THE YELLOWJACKETS OF AMERICA NORTH OF MEXICO BY AKRE, ET AL.

The specimens purported in the revised handbook on yellowjackets to be Mexican *Vespula squamosa* lacking thoracic stripes came to my attention only after the book was already in the hands of the publisher. Unfortunately, examination showed these specimens not to be *squamosa* but simply a somewhat melanistic variant of *maculifrons*. I have yet to see any *squamosa* lacking these stripes.

**Robert S. Jacobson**  
P.O. Box 2164,  
Lenoir, NC 28645



## BIG BLUE BOOK ERRATA Installment 24 (Final)

- p. 39, LC, L 23 from bottom: change 1881a to 1880a.
- p. 39, RC, L 35: 1922 is correct, not 1921b. Change 1921 to 1922 on L 36.
- p. 53, LC, L 10: 1936c is correct, not 1937a.
- p. 53, RC, L 16: 1900 is correct, not 1899.
- p. 115, RC, L 27: delete "new synonym by Menke". Ducke 1901 established this synonymy.
- p. 116, LC, L 33: lectotype may be illegal because type locality was Port-au-Prince, Haiti.
- p. 123, RC, L3 from bottom: *clavigera* Smith, 1856, should be removed from synonymy here and transferred to the *Sphex* checklist, p. 114, LC, as a species from Australia.
- p. 127, LC, L 3 from bottom: *mandarinus* is correct.
- p. 133, RC, L 8 from bottom: *albopictinatus* is correct.
- p. 134, LC, L 13-14 from bottom: delete entry. Eversmann did not describe *subfuscatus* as a new species.
- p. 134, LC, L 31-34: The proper name for this species is *chilensis* (Spinola). Lepeletier's species was *chiliensis*, thus Spinola's name was not a junior homonym. Transfer



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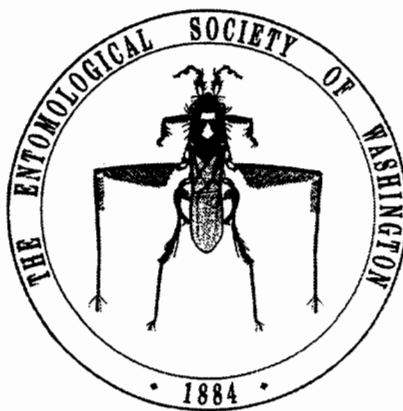
B. B. Norden

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To be published by the end of the year:

- Vol. 57.** Gauld, I. The Ichneumonidae (Hymenoptera) of Costa Rica, 2.
- Vol. 58.** Yu, D.S. and K. Horstmann. Catalogue of world Ichneumonidae (Hymenoptera).

Forthcoming *Memoirs* title:

Yang, L., & J.C. Morse. The Leptoceridae (Trichoptera) of China.

The following *Contributions* will be out this year, released as separate numbers of vol. 29:

- Revision of the Nearctic species of the *arcuata* group of the genus *Tenthredo* with notes on the higher classification of the Tenthredinini (Hymenoptera, Symphyta, Tenthredinidae), by H. Goulet.
- A revision of the genus *Chaetocnema* of America north of Mexico (Coleoptera: Chrysomelidae), by Richard E. White.
- A review of the world genera of Trigonoderini (Hymenoptera: Chalcidoidea, Pteromalidae), by S.L. Heyden.

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**EINLADUNG**  
zur  
**2. HYMENOPTEROLOGEN-TAGUNG**  
STUTTGART  
vom 4. bis 6. Oktober  
1996

Nach dem großen Erfolg der ersten Stuttgarter Hymenopterologentagung findet im Oktober 1996 eine zweite Tagung in Stuttgart statt. Sie soll wieder in den Räumen des Staatlichen Museums für Naturkunde, am Löwentor, stattfinden. Das Museum ist von Stuttgart-Hauptbahnhof mit den S-Bahnlinien 4, 5 und 6 in ca. 5 Minuten erreichbar (Haltestelle: Nordbahnhof).

**Hinweise zu den Vorträgen  
und Postern**

● Thematischer Schwerpunkt der wissenschaftlichen Beiträge sollen wieder die **Aculeata** sein. Darüber hinaus sind aber auch Beiträge zum Themenbereich **“Hymenoptera allgemein”** erwünscht.

Fachrichtungen:

Systematik, Taxonomie, Phylogenetik, Funktionsmorphologie, Co-Evolution, Ethologie, Ökologie, Faunistik, Biologische Vielfalt, Artengefährdung - Artenschutz etc.

● Die **Vortragszeit** sollte 20 Minuten nicht überschreiten, damit ausreichend Zeit für Diskussionen bleibt.

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Zu überweisen an: Dr. Till Osten

Kennwort: “Hymenopterologen-Tagung 1996”

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