University of California, Riverside No. 37, Winter 2014

Friends of the Entomology Research Museum

Newsletter

Editor: D. Yanega; Proofing Editors: G. Ballmer, K. Ribardo

FERM: Friends of the Entomology Research Museum is a UCR campus sponsored support group whose membership is open to students, faculty, staff, and the general public. Annual dues are ten dollars. Membership privileges include the annual meeting, newsletter, and other occasional meetings and events including field trips and lectures by entomologists and other naturalists.

Newsletters Online!

Back issues of the FERM newsletter are now available for online viewing! They can be accessed at the following URL:

http://entmuseum.ucr.edu/join_us_ferm.htm

The FERM Newsletter is published annually and contains articles written by FERM members. If you would like to submit an article, please send it as a Word or RTF file using one of the following two methods: (1) an attachment via email to the editor (see below) or (2) a hard copy version on disk. Submissions will be published in the order they are received in accordance with space availability and relevancy to the FERM general readership. If you have questions please contact the FERM Newsletter editor, Doug Yanega: dyanega@ucr.edu

FERM ANNUAL MEETING
Sat., February 8, 6 PM

The 2014 Annual FERM meeting and Potluck Dinner will be held on February 8th, a Saturday, at the U.C.R. Entomology Bldg. foyer and large conference room, on the ground floor.

Setup starts at 5:00pm

Dinner at 6:00

Lecture at 7:00

What to bring: something for yourself and 3 others. FERM will provide cups, plates, utensils, some snacks, and drinks.

This year's Meeting will be headlined by **Dr. Michael Wall**, from the San Diego Natural History Museum. The title for the talk will be:

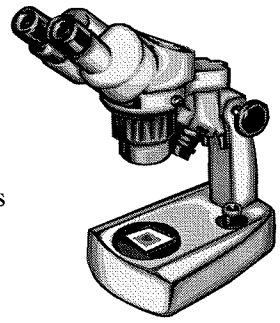
"Buggin' Out in Baja California"

Dr. Wall is the head of the Entomology Department at the San Diego Natural History Museum. He studied botany at Auburn University and Entomology at the University of Connecticut. Historically his interests have focused on the Heteroptera (true bugs) but he has recently been focusing on Baja California planthoppers. His lab at the SDNHM is currently working up several terrestrial invertebrate surveys in southern California and Baja California.

This meeting will also see the changing of the FERM officers, along with our usual activities. Naturally, we expect to have some diverse and interesting discussions before and after the presentation. See you all there!

NEWS FROM THE MUSEUM

by Doug Yanega, Senior Museum Scientist



As is typical, a lot has happened since the last newsletter. Our big bee databasing grant has expired, and with it we lost the services of Keve Ribardo, who did an outstanding job helping with curation, as well as day-to-day help with the running of the Museum and FERM (and we want to wish him well in the future!). There's a slim chance we might get some money to do additional databasing out of a newly-submitted NSF proposal, but that's a long while in the future, assuming it even passes review. What has been done so far is all available online as part of the Discover Life website dataset.

There has been a large amount of assistant activity over the past year. Cole Watson (though no longer a student) was working to sort our miscellaneous backlog to Order, and also spent a considerable effort on the databasing of an extremely large donation (over 40 drawers) of desert insect survey vouchers from Gordon Pratt, as well as labeling of over 10,000 specimens from the unlabeled backlog. Cole took some time to go to Forestry school, and recently came back to do some volunteer work. Jee Park (a student) was working part-time dehydrating ethanol samples using HMDS, and then point-mounting the resulting specimens. She mounted well over 10,000 specimens, nearly all of which have been labeled. She has been succeeded just recently by Andy Duong, who is doing a fantastic job so far, and we hope to be able to keep him on the payroll for a while.

We awarded a FERM Curator grant to Michael Orr, a student from Utah State who is revising and describing bees in the genus Anthophora, one of the most diverse bee genera in the New World; he identified all of our specimens, and found several new species among them. We also very recently have welcomed back Adriean Mayor, a former UCR grad student (working under John Pinto in the early '80s) who has now retired and hopes to do some major revisionary work with melyrid beetles. He's spending the winter back in SoCal, and has been coming in every day as a volunteer curator and plowing through our melyrid collection, which he says may be the best in the world for the US fauna. The ERM has also recently begun the process of incorporating portions of an enormous set of insect survey voucher specimens from various projects in Dr. Rick Redak's lab at UCR, comprising tens of thousands of vials of insects and other arthropods sorted to morphospecies.

The Museum's regular database has grown considerably as a result of all this activity (including the bee grant, which includes many records of specimens that do not belong to us); we now have some 472,000 records. Unfortunately, the coming field season promises to be poor, given the ongoing drought, so we may not be adding a lot of material over the next year. As usual, some of this (and other) news has appeared on the FERM FaceBook page over the past year, and I'd like to encourage FERM members who have not already done so, to track that page down (admittedly not an easy trick, but if nothing else, you can contact myself or another FERM officer/member to get the link) and give us a Like!

2013 in Review

By Gene Drake

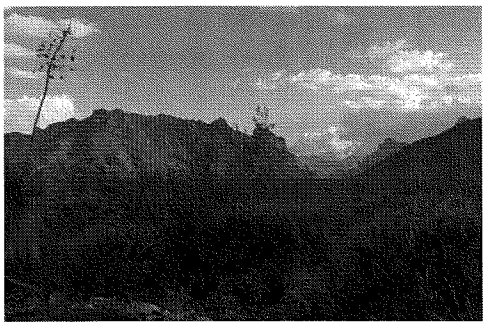
The year 2013 has essentially passed, and will be entered into the history books. I trust that everyone was able to get in some enjoyable field time earlier this year. As Entomologists most of us enjoy time spent rolling rocks, chopping apart rotten stumps or sampling stream bottoms. We are driven by the possibility of a new insect specimen from an unusual habitat helping to document a species distribution or a new species of totally unknown distribution.

This last Spring FERM members, lead by Doug Yanega, traveled to Joshua Tree National Park to help document the diverse fauna of an area that has been largely closed to insect collection for over 75 years. In the prior 2 years insect specimens collected from the park have been archived in the UCR Entomological Museum. In 2013 there were two excursions, the insects collected were to be archived in the ERM for the first, and the Museum at U.C. Santa Barbara for the second. Several of the mountain tops in the park would qualify as "Islands in the Sky". Pinyon pines and Great Basin juniper actually grow in Joshua Tree National Park surrounded by classic lower elevation Mojave Desert vegetation.

In late February and early March your author found himself buried in the bottom of Silverado Creek in Orange County in pursuit of mature nymphs of the Winter emerging stonefly *Calileuctra dobryi*. Their populations are endemic to several streams flowing into the Los Angeles basin, though Silverado Creek appears to have the strongest population. After 5 years of collecting directed at capturing nature *Calileuctra* nymphs it's obvious that the species has some sort of diapause mechanism which allows it to survive drought years. Other Leuctrids have shown a similar adaptation to dry habitats. *Zealeuctra* in Texas has a diapausing egg which has been demonstrated to hatch after 4 years of drought conditions created in the laboratory. Every three days rain or shine a pilgrimage was made to Silverado to look for additional *Calileuctra* nymphs. As part of each trip I had to explain that I was not looking for gold or silver (there are people that think the only reason for wallowing in cold water in mid winter would be to gain fabulous riches). It is hard to explain that we wallow in cold water for the simple enjoyment of the science of Entomology.

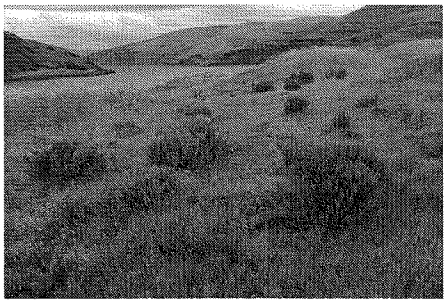
Bill Stark of Mississippi College is preparing the electron microscope images of the nymphal *Calileuctra* head capsule, mouth parts and appendages to document characters useful in the identification of this species in local waters. Bill and I are trying to get our paper finished this year; and time is running out rather quickly. One of Bill's students is doing electron micrographs of the *Calileuctra* adults for another publication. The next question is where do the early nymphal instars hang out? The nymphs spent 11 months of the year in the hyporheal zone; functionally buried in the sand and gravel below the normal stream bottom feeding on plant detritus trapped in the spaces between stone particles. This is a remarkable species. The project is not done till the paper work is finished!

Getting Away From It All
by Judith Herreid



Being from Wyoming, the least populated state in the country, you become pretty comfortable in a rural setting. Needless to say, moving to California in August of 2012 was an adjustment. Although I've enjoyed being in the Sunshine State immensely, the sheer number of people, traffic and lack of wide open spaces left me feeling out of my element. After a while an escape from the urban lifestyle was just what I needed, and I was afforded that luxury with a month long research and learning escapade to the Southwestern Research Station in the summer of 2013. The Southwestern Research Station (SWRS) is nestled in the Chiricahua Mountains in the southeastern corner of Arizona. If you find yourself here you'll be lacking cell phone service, paved roads and gas stations. This research station makes up for all those slight inconveniences with a great working environment for researchers and beautiful views of the Chiricahua Mountains. If you have a chance to visit this research station take advantage of it. I'm very glad that I did.

My research involves the wasp genus *Orasema*, which is parasitic on ant larvae. For that reason, during the first weeks at SWRS I took a course that would broaden my knowledge of ant anatomy, taxonomy, and ecology. The Ants of the Southwest taught me how to identifyant genera in the field, dissect out delicate chemical glands, and excavate their nests. I even created my own ant reference collection. The course allowed me to learn a lot and meet great people, as well. After two weeks of learning all I could about ants, my time at the station was still far from over. I had two more weeks of time to devote to personal collecting and research. My research consisted of driving my two wheel drive car on muddy dirt roads it had no business being on to collect sweep samples of *Orasema* during the day. At night I spent time baiting and collecting adult ants that *Orasema* parasitize. Collecting at night in this area proved interesting. It not only made for a tired undergraduate helper but allowed us to find sleeping rattlesnakes and be questioned by border patrol agents on multiple nights. Even though we had to deal with the muddy roads, rattlesnakes, and border patrol, the field work I was able to do there proved beneficial to my research.



The past summer at SWRS was anything but uneventful but it still allowed me to "get away from it all" for awhile. I was able to meet new people, learn a lot about ants and conduct valuable field work. This trip would not have been possible without the help and support from my P.I. John Heraty, my lab mates, and my undergraduate researcher, Scott Heacox. I'm looking forward to returning next summer for more field work and new adventures.

Orasema (Hymenoptera: Eucharitidae)
by Austin Baker

Ants are one of the most abundant and widespread groups of animals in the world. They have evolved a larval life stage that is immobile and dependent on the adults for care, so it makes sense that a diverse assortment of carnivorous and parasitic arthropods have evolved to exploit these succulent sacks of sustenance. Many of these very interesting strategies are not well understood beyond the use of physical and chemical mimicry to confuse the ants. Among the most interesting (and least understood) of the masters of myrmecophilous misdirection are parasitic wasps in the genus *Orasema*. These beautiful blue-green wasps have a distribution ranging across the New World and into the Australasian and Afrotropical regions. Using a specialized ovipositor, females deposit eggs into incisions in plant tissue like flower buds, or scattered on leaves, often in association with extrafloral nectaries. Eggs develop into mobile first-instar larvae, termed planidia, which are less than 0.11 mm in length. These planidia are phoretic on either the ant host or immature thrips (ant prey) and get carried back into the ant nest. Once in the nest, they attach to the ant larvae and continue their development as non-mobile endoparasites until the ant pupates, when they become ectoparasites. The wasp finishes its development within the nest and uses chemical mimicry to successfully exit as an adult. This chemical mimicry (cuticular hydrocarbons) allows the wasp to live among the ants unmolested, but after a few days the chemical profile deteriorates and the ants attack the wasps. Because of the difficulty in observing these occurrences in nature and recreating them in the laboratory, many questions remain unanswered. How do they detect their hosts? How host-specific are the different *Orasema* species? Do *Orasema* offer any potential for biological control of invasive ant species? Hopefully these questions and more will be answered with an increased amount of observational data (soon to be collected!)

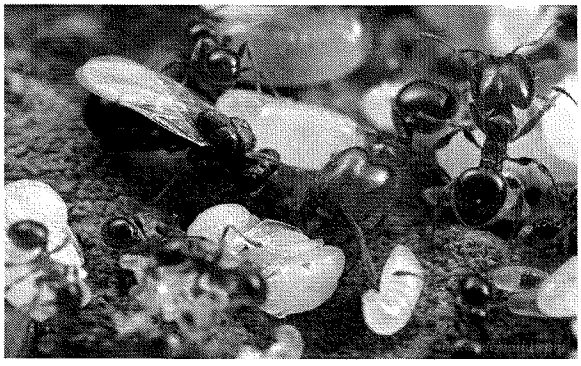


Photo by Alex Wild ©

Digging into the memory-record of a living fossil: recollections on the early years working in the Entomology Research Museum (ERM)

by Saul Isaac Frommer

Many, save other fossils, who currently are associated with the ERM will have no recollection of the early times or the origin of the Museum. The former and original Entomology Building was razed in 2010. Visions and fond memories of it remain only in the minds of old timers like me.

It was in mid July of 1961 that I arrived in Riverside after a long drive across this great country which began in the place of my birth, The Bronx, NY. On that day I recall there wasn't a room to be had in local motels since many auto racing fans had arrived to attend the races at the Riverside International Raceway. That, like the perfume of citrus in the air, is no longer the visitor's experience in Riverside. I found lodging in a hotel that seemed to be transitioning into an apartment building and reported for duty the next day to Dr. Lauren David Anderson, a Kansan by birth, who had attended KU as I did and as did Dr. Doug Yanega, the ERM's current collection manager.

In my first three years at UCR I worked on the chironomid midge project which involved researchers from both the Dept. of Entomology as well as the Dept. of Biological Control (they were separate departments back then). A museum to house the various entomological collections in the two departments had been formalized by Dr. Evert Schlinger in 1962 and was certainly in its infancy in 1964. Dr..Peter Rauch (now retired), then a student working on the midge project with me and playing badminton with Ev, suggested that I should speak to Dr. Schlinger about getting a permanent position curating the collections. At the time I asked Peter whether this was something Ev had suggested or whether it was his idea. He admitted that it was his idea, but that I should nevertheless apply. I of course did. Still, I had been under contract to work another year with Dr. Anderson, but he and the Department made it possible for me to make the change. At the same time, Jack C. Hall, also among the badminton players, who worked in the Dept. of Biological Control, joined the Museum effort and was to curate those parts of the collection of special interest to Biological Control staff. Since Jack was a student of the Bombyliidae (Diptera) he maintained a large collection of these flies as well, the majority of which he had himself collected.

The collections were scattered on three floors, the basement (which I referred to it as the bowels of the building), and the two floors above. My own office for most of my tenure was in one of the basement rooms. Initially, I inhabited what I half-jokingly called *La Cueva* (the cave). It was a wee space. Take that literally, a really heavy individual would have had difficulty entering it. I had been offered a larger room, but felt that others might covet a large room and that I would be safe in this excuse for an office. Oddly enough I was quite happy in it, surrounded by the insect treasures I might be working on. The room had been a darkroom for the well known natural history photographer, Kenneth Middleham. Yes, there was a time when the departments shared a photographer as well as their own glassblower and carpenter. The latter two each had their own shop. After all, in the early days much of the experimental equipment for research was designed and made right on location. The main or first floor, and second floor hallways, as well as rooms of some of the staff, served to store parts of the insect collection. Researchers such as Dr. Paul DeBach and Harold Compere, and P.H. Timberlake cared for portions of the collection. Years later Drs. Goeden, Legner, and Ian Moore maintained research collections. All of these collections were ultimately incorporated into the general collection. From my very first day as curator, I realized that much work would be required to get all of the subsections integrated into one entity. At the time I retired in 1998 all of the old subsections were integrated into one whole. Dr. Anderson had over the years developed a fine collection of immature stages of insects and with the help of Henry (Hank) Nakakihara maintained that collection even in retirement. For decades after his retirement, Timberlake's collection, a diverse and well-identified general collection which included an exceptionally fine representation of bees, was maintained separately by him and later with the help of Mr. Hall. In those days I always felt that the Museum was more a concept rather than a physical entity that one might point to as one can presently do. I gave it an informal name: *The UCR Entomological Teaching and Research Collection*. Ultimately this name, although an accurate description of the collection, was deemed too long a name for posting on the present museum building and *Entomology Research Museum* became its official name.

What follows are some recollections of what working in the collection was like for me:

In the early days the Museum didn't have a fixed budget. Requests for the purchase of needed items such as insect pins, cabinets, and museum drawers were made directly to the department. If funds were still available at the end of the fiscal year I might expect to get as much as $2,000 which could be used for a "high end" purchase such as a cabinet equipped with museum drawers and unit trays. Nevertheless, the Museum always seemed able to count on the Department of Entomology if critical supplies were needed.

Digging into the memory-record of a living fossil (ctd).

Museum correspondence was handwritten or typed by me, then given to a secretary assigned to me, and since that secretary would be assigned to more than one individual, such correspondence and loan forms might take some time before it was ready to be mailed. This changed considerably once computers came on the scene, but the Museum didn't get its own computer for quite some time. During the very initial two years of the Museum's existence, loan records such as there were, appeared on a single sheet of paper with a short handwritten note penned by Ev Schlinger.

Those early days were ones where records of taxa were kept on 3" X 5" cards in wood and metal cabinets similar to library cards. It was a time when the Bio-Agricultural Library stored and put on loan separate reprints of scientific articles. If you needed to see an article that could not be found in the agricultural library or your own, you made a request for it through interlibrary loans. One can still do this. Since more often than not a copy of your requested article rather than a full textbook or a journal issue arrived, it was deemed a boon since it meant that you could retain the copy at no direct cost. Student reprint libraries grew by this means and copying machines were widely used to build individual libraries. The Internet as a means of publishing scientific papers or reading them was a long time in coming and in many instances has replaced the need for obtaining hard copies.

Specimen labels were often very general in form. Township and range might be used, but I never saw longitude or latitude recorded. Presently the presence of township or range seems ridiculous while longitude and latitude records are generally de rigueur. General fill-in labels could be ordered from companies or full labels were written by hand using india-ink and a crow quill pen, though araneologists would often type their labels. I developed a request card for labels. When enough requests were gathered from all those needing labels for their work, not necessarily for specimens held by the museum, enough to justify a printing, a master sheet was typed and brought to Printing & Reprographics and custom printed for us by photo-offset. I cut our labels making use of a cutting machine I managed to buy used from P&R. It was able to cut through many stacked sheets in an instant. It was one of the most valuable tools in those days. I bought it for about $300 from P&R. For a long time individuals came to the museum to cut through bound texts. The museum label cutter saw a lot of action.

The Museum provided information and assistance to department staff, students, the public in general, and from time to time to physicians. Over the years many requests for programs were made by local school teachers and were granted. Some were provided at the school making the request, but the greatest number involved visitors to on campus. I became known through the grade-school-grapevine as the guy who eats insects. The Museum always was represented at insect fairs. Parents would often bring their children seeking advice regarding the assembly of a collection that the child's teacher had assigned as a project for the child. It mattered not whether it was in the dead of winter when insects were not as easily obtained.

Then as now the media made requests for information regarding insects, spiders, or scorpions. When the film *Arachnophobia* appeared on the silver screen my phone ran off the hook. It seems that my attempts to satisfy telephone requests from the public showed signs of obsession. One example should suffice to drive home the point. I received a call from a mother concerned with her child's safety, a child who crawled on the same floor as a scorpion that had been seen to crawl. The message asked that I please call back. I tried doing so assuming the caller had phoned from a local phone. It turned out that she hadn't and so I tried what seemed like an endless list of telephone zone numbers before I stumbled on the right one. I was abundantly blessed by the mother and all others thought me daffy when they learned of the incident. I can understand their coming to that conclusion.

Sometimes foolish requests were made. I was asked to pose with a tarantula for a UC campus publication. I reported to the campus photographer with a tarantula in a jar and he snapped many a shot of me and the beast. There was a really great one where the tarantula's leg touched my hand, all reminiscent of Michelangelo's painting showing God touching the hand of man. It wasn't used! Then I was asked to tell him the name of my pet. I replied that I had given this spider no pet name because it wasn't a pet. So many entreaties were made that I finally provided one: *Faccia Bella* (Italian for pretty face). That satisfied him and did justice to tarantulas which so many want to say are ugly. In a letter written to me by one reader she stated "How true." I knew that my thoughts were understood by at least one individual.

Student help was assigned to the Museum irregularly. I received help from knowledgeable students such as Greg Ballmer and David Hawks, both of whom went on in later years to become members of the Department. There were also instances where Dr. Schlinger might have funds for curatorial purposes. All such help was much appreciated.

Digging into the memory-record of a living fossil (ctd).

Specimens collected by some staff and by student enthusiasts made their way into our collection. Although building the collection by means of field trips of my own was part of my job description, most of the collecting I did was carried out during times when I and my wife were on vacation. Vacation time turned into collection time for us. I remember a graduate student once saying that if he had my job he would be in the field all the time. I replied that I certainly would enjoy such work, but if I were in the field most of the time there would be no one doing all the other work necessary to build this collection nor to serve the scientific community. It seems that that consideration had escaped him.

Requests for materials were always made by entomologists working at other institutions, but I had a policy which I jokingly referred to as *looking for trouble*. By that I meant that I would write to systematists encouraging them to examine materials in our holdings. Once I received a reply stating that enough specimens were already examined in a particular study and no more were needed. On that occasion I wrote back something like "You are morally obliged not to pass up this opportunity to see materials from the west coast and perhaps Mexico that we can offer you. If you want to insure that you have done the best job in sampling the fauna, which other constraints keep you from doing, then please include our material in your study." Badgered this way the good man agreed to my sending him the material. Later, I am proud to say, he thanked me for being so persistent since our collection did indeed hold a number of treasures he otherwise would have missed. So you might say I was looking for trouble for all the good reasons.

Ev Schlinger and Mike Irwin, then his graduate student (now retired although still very active after a very full career), had begun collecting prior to 1970 at the P.L. Boyd Deep Canyon Research Center (Deep Canyon) a 2,469 hectare (6,102 acre) reserve located on the western edge of the Colorado Desert in the Coachella Valley about 115 km (ca. 71 miles) east of Riverside. These two human insect-vacuums began what is now one of the best collections of insects from a desert locale. I began collecting there in the early '70s and later Dr. John D. Pinto, who replaced Ev [see below], and I conducted a Malaise trap survey of insects in Deep Canyon over a ten year period. Entomologists as well as scientists in other biological disciplines have benefitted from this survey. This remarkable location, now with much improved facilities, still beckons. But I no longer scramble easily over canyon boulders while outfitted for various means of collection in temperatures in the 90s or higher at age 79. Hate to admit it.

When Ev Schlinger decided to take the position of department chairman at UC Berkeley, we lost a great enthusiast for systematic entomology and for the Museum, but we gained another excellent entomologist, John Pinto, mentioned above. To this day, in retirement, John is making contributions to our collection as well as to the study of insect systematics. It was a pleasure to work under him for 12 of the 37 years I worked at UCR.

When Ev left I realized that there was no one around to deal with spider inquiries. Ev had a special interest in spiders since the flies he worked with, the Acroceridae, parasitize spiders. I realized that there would be no one around to respond to spider-related inquires and so I began to teach myself how to recognize families. If I went that far then why not build a spider collection as well. Later, a grad student, now Dr. Devin Carroll, cut his araneological teeth on our collection and even later, Rick Vetter rekindled his interest in spiders and helped enlarge the collection of spiders. Rick developed a special interest in spiders of medical importance, especially the recluse spiders, and has become quite an authority on the subject.

Since spiders were now part of the our collection why not other arachnids as well? And how about Myriapoda? Add 'em!

The new building now housing UCR's large and ever growing insect collections was dedicated on March 30, 1994. It took some 12 years to go from a dream to reality. It might interest FERM members to learn that it all began one afternoon when Greg Ballmer, known as well to his friends as "Groad," came to my office and asked whether I had plans for the collection should there occur an earthquake. I actually didn't, but promised look into it and pronto. I was sufficiently naive at the time to think that I could directly go to then chancellor Rivera, to ask him what his thoughts on the matter were for UCR, without first bringing this to the attention of the Department. As a matter of fact a rumor that I had done so, even though I hadn't, did surface. I was gently brought up to date on Department policy. I never got to speaking with the chancellor especially since a short time after Greg left, Robert Wagner, now retired from the department and enjoying retirement in the state of Washington, came in to my office. I mentioned Greg's concern and Bob immediately started speaking about a modular super earthquake-proof building that could be gussied up on its exterior to look like the Taj Mahal if so desired. By the next morning he had drawn up a general architectural schema. He pointed out that when he was still at UCLA he had designed something similar. All this was brought to the attention of the chairman and others and the ball started its slow roll which lasted 12 years. In the end the building that was built was of a standard construction. Someone once told me that a building such as the type Bob had suggested actually exists on campus but is well disguised just as Bob said they can be.

Digging into the memory-record of a living fossil (ctd).

Once the collection was housed in the new building it was decided that it would have an official director as well as a budget and this position was fulfilled by Dr. Serguei V. Triapitsyn. Serguei and I knew each other prior to his becoming director and we had become good friends. After he became museum director we worked together for several years before my retirement in 1998. Currently I am able to visit the ERM and work whenever I can get to Riverside, but I do most of my work from my home on the Santa Rosa Plateau where I am currently using a Malaise trap provided by Mike Irwin. That trap is capable of keeping this fossil busy 24/7 if left to its own devices. My wife and I live in the California chaparral. In the first year attending this Malaise I trapped many insects never heretofore seen by me, even several specimens of an order or sub-order depending on your way of thinking, the Strepsiptera, which I had neither collected nor seen prior to this time.

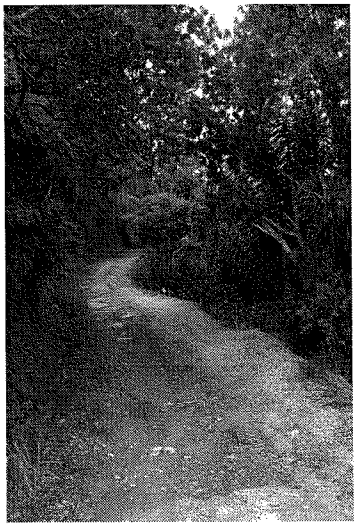
Although I cannot list here all of my dear friends who have helped me over the years in my duties as curator and who have provided the ERM with much in the way of valuable specimens, I want to express my heartfelt thanks to the following very special people (in alphabetical order): Lauren David Anderson (deceased), Gregory Roddick Ballmer, Jack Clayton Hall (deceased), David Charles Hawks, Michael Edwin Irwin, Henry (Hank) Nakakihara, John Darwin Pinto, and Evert Irving Schlinger. And a special thanks to Peter Anton Rauch who encouraged me to approach Ev about work in his fledgling museum.

The professor who played an initial and vital role in my professional life by his encouragement and help, not to mention his example, the late and famous lepidopterist Alexander Barrett Klots, always said that entomologists are more than a group of people studying insects, they are a fraternity of enthusiastic scientists. It has been my general experience that Professor Klots really hit the nail squarely on the head. Because of my friends in science and in life, the 37 years spent in the Department of Entomology which include my 34 years as curator of a fine collection has provided me with great happiness and the privilege of, in some small way, being a part of this fascinating branch of science: entomology.

Getting my feet wet

by Austin Baker

When I was applying for graduate school, I didn't imagine the first meeting with my professor being a week long collecting trip, nor did I foresee myself traveling internationally within the first two weeks of moving to California. I consider myself fortunate to be wrong in both those regards. I met my PI, Dr. John Heraty, for the first time over recruitment but didn't see him again until he invited me on a five day collecting trip to Moscow, Idaho. When I agreed to join him, I thought to myself, for better or for worse at least I will get to know my new boss quite well (turns out it was for the better). He flew up from California, and I drove from Oregon to meet him at the University of Idaho.



When I arrived in Moscow I was greeted by John and our very gracious host James "Ding" Johnson. In our five days collecting there, we only had dry weather for the first two, and between the three of us collecting, we got a grand total of one specimen of our target species. During the rain, John and I spent most of our time at the pubs experiencing the local culture (a.k.a. beer). Even though from a collecting standpoint our trip was unsuccessful, from a gettin-to-know-ya standpoint it was a smashing success. It mentally prepared me (to a certain extent) for the upcoming two week trip to the Caribbean with myself, John, and another professor from the department, Dr. Christiane Weirauch.

Approximately two weeks after I moved to California, we left for Trinidad in the West Indies. This trip was a lot more work but a lot more fun as well. It was a bit of a culture shock to ride with John on the opposite side of the frighteningly narrow and dilapidated roads, and understanding the thick local Caribbean accent was not trivial. On the bright side we ate some amazing food, drank some beer, and saw some incredible scenery, and we even caught some insects, too. One of the things that stuck with me the most was the physical feeling of being there. It felt like jumping into a pool with all of your clothes on, then getting out and climbing up hill in a steam room filled with plants and mosquitoes; paradise. It really was getting my feet (and the rest of me) quite wet. Despite the sweat and bug bites, however, there was a huge feeling of gratification. This was the first time that I caught specimens in the family of organisms that I would be working on in graduate school, and I had to work my butt off to get them. Our daily schedule went something like this: pan traps, peanut butter bait cards, pan traps, sweet netting, driving, pan traps, pan traps. I filled in the little down time we had with fun activities like: spot the non-existent larvae on the leaves. All joking aside, it was a great introduction to doing field work, and I would go back and do it all again in a heartbeat.

These trips tested my mettle as a field biologist and made me immediately passionate about my future research. We have several more trips planned in the coming years that I'm very excited about. I couldn't think of a better way to introduce a new graduate student to field work than by making them go sweat somewhere tropical.

Field Season Fun

by Michael Forthman

This year, I had the opportunity to go on several international trips for research on millipede assassin bugs. My first field expedition of the year occurred in early Spring in Honduras. Dr. Christiane Weirauch, Dr. Jason Mottern, and I collected at Misoco Reserve, Uyuca Reserve, La Muralla National Park, Zamorano, and Celaque National Park, sometimes under the supervision of armed military guards! At all times did we feel safe, and the people were incredibly friendly! Perhaps the most diverse place we visited was Celaque, near La Gracias. After 18 days, I narrowly escaped defeat and collected a single millipede assassin bug, *Rhiginia bimaculata*, during light trapping. Despite the hot, humid weather; long, steep hikes; the Highway to Hell; blood-thirsty tabanids; pan traps; my neck being utricated by a lep larva; and poor collecting luck, it was a wonderful opportunity to see incredible diversity, biologically and culturally.

In late summer, I, along with Dr. Christiane Weirauch, Dr. John Heraty, and Ph.D. Student Eric Gordon, went to Cameroon for 2 ½ weeks. My focus was, again, to collect millipede assassin bugs. This time more than one specimen. After a few days organizing our expedition in the capital city Yaounde, we set off for Mount Cameroon and Korup National Park. Every day, every hour, it was wet! There may have been half a day of pure sunlight at most. But, rain or shine, we spent our time collecting assassin bugs, litter bugs, and parasitic wasps. I had no luck in Mount Cameroon despite the abundance of huge millipedes – prey my assassin bugs eat. Once we got to Korup National Park, I collected over 30 specimens from two species, *Centraspis ducalis* and *Ectrichodia* sp. Despite all the rain, pan traps, frequent lack of bath water, getting stuck in the mud, and getting urticated on my chest by lep larvae in two instances, I enjoyed my experience with the people, food, and villages. And as an interesting side-note: the Chief of Mundemba wanted me to marry his daughter! No kidding!!!

On our way back to the US from Cameroon, I made a week-long stop in the United Kingdom to examine millipede assassin bugs at the British Museum of Natural History. Coming back from Cameroon, I was not surprised that it rained every day in London. It actually made working in the dark, cold attic of the entomology collection quite homey. I was able to sort and identify material, document morphological features of extremely rare species, and image some type specimens. I spent long hours at the museum! But the nice thing about London is, although restaurants close earlier than in the US – and it took a long time to find food in the evenings – the pubs stay open much longer!

RECENT PUBLICATIONS BY FERM MEMBERS:

Triapitsyn, S.V. 2013. Review of *Gonatocerus* (Hymenoptera: Mymaridae) in the Palaearctic region, with notes on extralimital distributions. Zootaxa 3644: 1-178.

Triapitsyn, S.V. 2013. Genus *Gonatocerus* Nees ab Esenbeck, 1834 (Hymenoptera: Mymaridae) in the Nearctic region: taxonomic notes and descriptions of three new species. Russian Ent. Journal 22: 211-222.

Triapitsyn, S.V. 2013. A new genus and two new species of Mymaridae (Hymenoptera: Chalcidoidea) from Chile. Russian Ent. Journal 22: 223-226.

Yanega, D. 2013. The status of Cockerell's Bumblebee, *Bombus (Pyrobombus) cockerelli* Franklin, 1913 (Hymenoptera: Apidae). Southwestern Entomologist 38: 517-522.

Where are the bees?

by Greg Ballmer and Doug Yanega

The bees are dying! The bees are dying!. We have all heard the dire reports of European Honey Bee (*Apis mellifera*) colonies dying off from a mysterious ailment dubbed Colony Collapse Disorder (CCD). Individual commercial apiarists (bee keepers) have reported colony losses as high as 80% in recent years in the US and in some European countries, but the phenomenon is not necessarily new. Mass die-offs of honey bee colonies have been reported occasionally in various locations at least since the late 19th Century, and most especially in the 1960s and 1970s. While multiple causes have been implicated for past events, the intensity and wide-spread occurrence of recent die-offs suggest that there may be new causative factors, or a new disorder altogether, or both. The practical result for the public at large is higher prices for honey and higher production costs for fruits, such as almonds and melons, which depend on honey bee pollination services.

The symptoms of CCD, as historically defined, include apparently abandoned colonies in spite of intact honey stores and capped brood cells, the absence of a queen, and absence of dead workers. It seems that the entire colony simply abandons the nest site. The problem is this: there is more than one reason that workers from a colony can disappear while away from the hive, and it could be something as mundane as a devious kid with a fly swatter sitting near a colony entrance and killing every bee that passes by as a practical joke. As such, the term "CCD", while it originally referred to a fairly well-defined syndrome, has been broadened in definition to the point where it has come to mean "anything that kills worker honey bees", and this is very confusing, akin to finding out that smoking causes lung cancer and then publishing a paper that says "Smoking causes colon cancer". Although no single cause of CCD has been definitively determined (and indeed is unlikely to, since it is obviously not a single disease or disorder), several factors have been advanced singly and in combination. These include parasites, pathogens, pesticides, reduced food supplies, poor weather, and in-breeding. Obviously, some of these things (e.g., neonicotinoid pesticides) did not exist in the 1960s and 1970s, so past occurrences of CCD must have some other explanation(s).

Chief among the parasites is the Varroa mite (*Varroa destructor*), which by itself may cause bee mortality, but also is a vector of deadly Israeli Acute Bee Paralysis virus (IABP). IABP causes paralysis in bees, which are then unable to return to the hive. The invertebrate iridescent virus (IIV6) has also been implicated and, in combination with the microsporidian fungus *Nosema ceranae*, is reported to be 100% fatal. *Nosema ceranae,* by itself, is not always fatal to bees, but may weaken it, thereby increasing vulnerability to other debilitating agents, such as IIV6 and pesticides.

A recently recognized internal honey bee parasite is a small phorid fly (*Apocephalus borealis*), whose larva causes the bee to become disoriented (sometimes flying and attracted to lights at night) before killing the host. Infected bees usually die away from the hive, thus producing the same symptoms as CCD.

Honey bees may be affected adversely by several pesticides normally used to control agricultural pests, and even antibiotics and miticides used by apiarists to treat their own bee colonies. Many broad-spectrum insecticides, including organophosphates (*e.g.* Orthene and Parathion), carbamates (*e.g.* Sevin and Temick), and chlorinated hydrocarbons (*e.g.* DDT and Chlordane), which are highly toxic to honey bees, have been banned outright for several years or severely restricted in their commercial uses. These chemicals have been replaced by more narrowly target-specific insecticides (generally much less toxic to vertebrates), which may yet adversely affect honey bees and other beneficial insects. Chief among the new insecticides is a class known as neonicotinoids (*e.g.* clothianidin, imidacloprid, and thiamethoxam) - synthetic compounds based on the chemical structure and toxic properties of nicotine. This class of insecticides is popular in much of the agricultural community because of toxicity to insect pests at very low doses, longevity in the field, and ability to be absorbed and translocated throughout the crop plant. This last property allows the chemicals to be applied by direct injection into the soil root zone, in irrigation water, or as a seed treatment prior to planting; when applied in accordance with legal protocols, there is little chance of environmental contamination such as may be associated with aerial sprays. Reported large scale bee mortality events due to neonicotinoids are generally the result of misapplication. Nonetheless, some neonicotinoids and other commercial pesticides have been found in trace amounts (normally below levels toxic to honey bees) in honey and pollen. Although the cumulative long-term effects of low-dose (sublethal) neonicotinoid exposure on honey bees are not known, an immediate effect is reduced resistance to pathogens. Thus, low dose exposure to such pesticides, in combination with parasites and pathogens, could contribute to CCD.

The ongoing reduction of genetic diversity in commercial bee colonies may also contribute to the severity of CCD. Commercial apiarists generally replace old colony queens with young queens from relatively few sources. The replacement queens are bred for qualities such as fecundity and mild temperament, but not necessarily for increased resistance to parasites, pathogens, and pesticides. As a result, commercial honey bee colonies are generally similarly susceptible to those potential mortality factors. Fortunately, our native flora is not dependent on honey bees for pollination. Around 1600 species of wild native bees inhabit California and have been providing free pollination services since long before immigrants introduced the European honey bee. Some native bee species, especially leaf-cutters (*Megachile*) and bumblebees (*Bombus*), are more efficient than honey bees at pollinating native leguminous crops such as beans, clover, and alfalfa. Similarly, specialist squash bees (*Peponapis*) are especially adapted to pollinating cucurbits, such as melons, pumpkins, and squash. But due to prevalent cultural practices, such as large-scale monocultures, planting of non-native crops (e.g., almonds), frequent soil disturbance, and pesticide applications, populations of native bees may be largely excluded from commercial agricultural fields. Because the majority of native bee species construct solitary nests in soil, modified cultural practices, including provision of undisturbed hedgerows or other soil nesting site refugia, could amplify the value of native bees in commercial agriculture, though mostly for native crops.

Got an idea for a FERM article???

More than ever, we need YOUR contributions for the FERM newsletter! Remember, this newsletter won't have much in it unless we have material from you folks that we can publish. Feel free to send in photos, articles, websites, recent publications related to insects and even stories about how the ERM has assisted you in your bug-related endeavors. We're especially looking for travelogues of collecting trips abroad, especially if you can give a talk to a FERM meeting—we'd really like to go back to having more than one meeting per year!! Send them to dyanega@ucr.edu, preferably as attachments (not in email text). Additional information is on the front page. THANKS!

Renew Your Membership and/or Join FERM.

While we realize that you have not been hearing much from us (it's been extremely hard to convince people to contribute articles for the newsletter, and even our FaceBook page has seen little activity), we've been careful - as always - not to spend anything we don't need to, and the good news is we have enough money to support curation/collection grants again. Money donated to FERM will get put to good use, and is greatly appreciated.

To those of you who have been kind enough to contribute your dues recently, we are very grateful, and for the rest of you we include below the usual dues renewal form, which we hope you'll send in soon. Thanks very much!

Friends of the Entomology Research Museum
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Photo by G. R. Ballmer ©

Eulichas (Coleoptera: Eulichadidae)

Forest stream beetles are members of the uncommon family Eulichadidae, which has a curious distribution in Asia and North America. About a dozen species of *Eulichas* occur in Southeast Asia, while a single North American species occurs in California. The California species, *Stenocolus scutellaris*, occurs in low-to-mid elevations in the central Sierra Nevada but is very rarely collected. The *Eulichas* specimen illustrated here was found in the mountains of northeastern Lao PDR; other *Eulichas* species have been described from Vietnam, Thailand, and Malaysia. Adult eulichadids resemble click beetles (Elateridae) in general appearance and were once placed in the family Ptilodactylidae (and to which they are related, in the superfamily Byrrhoidea). Eulichadid larvae are aquatic and occur under rocks or other debris in streams, where they feed on detritus. While adult *Eulichas* are often attracted to lights at night, *Stenocolus scutellaris* adults are not attracted to lights, but can be found on steam-side vegetation.