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Welcome to the latest issue of *Fly Times*! As usual, I thank everyone for sending in such interesting articles. I hope you all enjoy reading it as much as I enjoyed putting it together. Please let me encourage all of you to consider contributing articles that may be of interest to the Diptera community for the next issue. *Fly Times* offers a great forum to report on your research activities and to make requests for taxa being studied, as well as to report interesting observations about flies, to discuss new and improved methods, to advertise opportunities for dipterists, to report on or announce meetings relevant to the community, etc., with all the associated digital images you wish to provide. This is also a great place to report on your interesting (and hopefully fruitful) collecting activities! Really anything fly-related is considered. And of course, thanks very much to Chris Borkent for again assembling the list of Diptera citations since the last *Fly Times*!

The electronic version of the *Fly Times* continues to be hosted on the North American Dipterists Society website at http://www.nadsdiptera.org/News/FlyTimes/Flyhome.htm. For this issue, I want to again thank all the contributors for sending me such great articles! Feel free to share your opinions or provide ideas on how to improve the newsletter. Also note, the *Directory of North American Dipterists* is constantly being updated. Please check your current entry and send all corrections (or new entries) to Jim O'Hara – see the form for this on the last page.

Issue No. 60 of the *Fly Times* (my 20th as Editor!) will appear next April. Please send your contributions by email to the editor at stephen.gaimari@cdfa.ca.gov. All contributors for the next *Fly Times* should aim for 10 April 2018 (maybe then I'll get an issue out actually on time!) – but don't worry – I'll send a reminder. And articles after 10 April are OK too!

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Issue 59, available online 27 November 2017

CONTENTS

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NEWS

Life & Glaciers
(Patagonia's untold stories)

R. Isaí Madriz

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Its skin is splitting open down its back. Three pairs of lateral attachment points keep its streamlined body glued to the submerged rock. It will use the glacial raging torrent to its advantage. With the last air in its body, it inflates its thorax to free itself from its pupal skin. It has violated an unbreakable rule of hydrodynamics. There will be consequences. There is no turning back.

The unforgiving torrent violently rips its fragile soft body away, revealing its nature. It is a female.

The trapped air in her thorax will saveher life. Through buoyancy, she reaches the surface and uses her young wings to fly away from the treacherous current.

Resting on an overhanging leaf of the marginal vegetation she completes her transformation by hardening her skin.

Below, others are not so fortunate. Feasting fish engulf the unluckyones that delayed to surface, while small birds swoop down to snatch those in desperate search for cover.

Mature larvae are under attack, they congregate in the swiftest channels, using the force of the current as their only defense. Their six ventral hydraulic suckers that keep them firmly anchored to the submerged rocks are no match for the jaws of hungry fish.

Adulthood is a developmental stage many will not experience.

Our female braves the predators and flies across the river only to be intercepted by a male. The pair search for cover in the riparian vegetation. After copulation, his life cycle is complete. She on the other hand must stay alive and produce eggs.

A few days pass by and she braves the torrent yet again, but this time to lay her eggs. She selects a large rock in the main river channel and begins to anchor her eggs at the waterline. She must hurry. The unpredictable current thrashes her against the rock face as she struggles to hold on, but persists.

At last, all of her eggs are securely attached to the rock, but she remains in place. Prolonged exposure

to the freezing water has dangerously cooled her body. She is unable to take off. The turbulent flow is unforgiving. Unable to hold on any further, she releases her grip and her body is claimed by the very river that witnessed her entire life.

With this action, she culminates a glacial dependent natural cycle that has been developing for millennia, but with the current global environmental threats, for how long will this process be allowed to continue?

This story was originally posted on the National Geographic Voices Blog (https://voices.nationalgeographic.org/2017/10/05/life-glaciers/), as part of the Fulbright-National Geographic Digital Storytelling Fellowship (https://us.fulbrightonline.org/fulbright-nat-geo-fellowship) that the author is performing for nine months.

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Seeking nominees for the C.P. Alexander Award

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The purpose and history of the C.P. Alexander Award were reviewed in the last issue of *Fly Times* (issue 58: 1–2, 2017). The award, which was created "to recognize the greatest living American dipterist", has had two recipients since its inception: Willis ("Bill") Wirth in 1994 and J. Richard ("Dick") Vockeroth in 1997. The award has been without an awardee since Dick's passing in 2012. Given the lack of any formal process in place for this award, Steve Gaimari and I outlined in the last *Fly Times* a possible process by which the next awardee could be chosen and proposed that further discussion of the process could take place during the NADS field meeting in Montana in June.

Participants of the NADS field meeting gathered in the lodge of the Lubrecht Experimental Forest outside Missoula on the evening of June 26th to hear the usual scheduled presentations and to discuss the C.P. Alexander Award. After some debate about the process for selecting the next awardee, the following decisions were agreed upon:

1) A volunteer was not forthcoming to chair the committee. Jim O'Hara, who was leading the discussion, was asked to chair the committee and he accepted.
2) Ten North American dipterists will be invited by the chair to serve on the committee. These members will vote anonymously to select the next awardee from among a short list of nominees. The chair will vote only in the event of a tie.
3) The short list of nominees will be developed by the committee with input from the NADS membership.
4) Names on the short list will not be publicized. This differs fromthe originally proposed process (see *Fly Times* issue 58) that called for nominees to be named, and their accomplishments reviewed, in *Fly Times*. The majority of participants at the meeting felt the names of nominees should be kept confidential.

The C.P. Alexander Award Committee was formed in early September. Invitations were sent preferentially to ten dipterists who were likely to know personally all or most of the nominees (thus bringing a personal perspective into the decision-making process), who would represent broad taxonomic coverage of the Diptera (so as not to favor a particular taxon and hence maybe a particular nominee), and who are or have been active in NADS (e.g., organizing field or conference meetings, attending meetings, involvement in and contribution to *Fly Times* and other Diptera-community resources). The dipterists accepted their invitations, and agreed not to be nominees. Each member will have an anonymous vote and the nominee with the most votes will be the awardee. The following dipterists are gratefully acknowledged for their willingness to serve as members of the C.P. Alexander Award Committee:

Brian Brown, Natural History Museum of Los Angeles County, Los Angeles
Greg Courtney, Iowa State University, Ames
Greg Dahlem, Northern Kentucky University, Highland Heights
Torsten Dikow, Smithsonian Institution, Washington DC
Steve Gaimari, California Department of Food and Agriculture, Sacramento
Riley Nelson, Brigham Young University, Provo

Jade Savage, Bishop's University, Sherbrooke
Brad Sinclair, Canadian Food Inspection Agency, Ottawa
Gary Steck, Florida Department of Agriculture and Consumer Services, Gainesville
Brian Wiegmann, North Carolina State University, Raleigh

Members of the committee are welcome to suggest nominees but we also seek input from the greater dipterological community of NADS. If there is a North American dipterist you would like to nominate for the C.P. Alexander Award, then please send the person's name and contact information to Jim O'Hara or one of the committee members by January 31st, 2018. Any supporting information for the committee to consider should also be included. Information received will be distributed among committee members but will not be publicized. Nominees will be asked if they are willing to be considered for the award. Committee members will then be expected to impartially cast their votes for the "greatest living American dipterist" and "most important and influential member of NADS" based on the accomplishments and impact of each nominee and submissions from members of NADS.

The C.P. Alexander Award recipient will be announced in the next issue of *Fly Times* (issue 60, spring 2018) and the presentation of the award will be scheduled at a later date.

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Management of endangered *Drosophila* in Hawaii

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Hawaii is justly famous for its numerous radiations of endemic insects, especially flies. The biggest is the Drosophilidae, with nearly 600 species described and another 200+ undescribed (though there is now evidence the two lineages, *Drosophila* and *Scaptomyza*, may be derived from separate introductions to the islands). This huge burst of speciation starting from a small founding has made them the subject of many studies of sexual selection, genetics, ecology, and chromosomal evolution, mostly on the large, easily-reared picture wing species.

Unfortunately, many of the studies done in the 1970s can't be replicated now because the species are extinct or nearly so. For example, some of the most interesting papers looked at *Drosophila heteroneura* and *D. silvestris*, sympatric sister species that are strikingly different morphologically but still hybridize in the wild. Mating experiments found differences between populations in how willing they were to hybridize, and to accept mates from other populations of their own species. But now, *D. heteroneura* is reduced to one small population in the southwestern part of Hawaii island, and several of the more distinctive *D. silvestris* populations on the island's west side have been extirpated as well.

There was a lot of attention recently when seven Hawaiian endemic bees were listed as endangered last year. That was good to see, since I had worked on them as well, but as is too often the case, the flies got overshadowed! Thirteen species of *Drosophila* were listed as endangered in 2006, and another was added in 2013. These are still the only listed endangered flies aside from the somewhat notorious Delhi Sands flower-loving fly. One of them was *D. heteroneura*; seven more are from the island of Oahu, where native habitat tends to be smaller, more degraded, and more vulnerable to both sudden events like fires and long-term disruption like climate change.

This is where our program comes in. It's still surprising to some people, but the U.S. Army has had an active natural resources program (https://aec.army.mil/index.php/conserve) for many years, not just in Hawaii but across the U.S. The Army's Oahu Natural Resources Program (https://www.garrison.hawaii.army.mil/sustainability/NaturalResources.aspx) manages endangered species found on Schofield Barracks, Makua Military Reservation, and Kawailoa and Kahuku Training Areas on Oahu. The program started with a staff of two back in 1995 and now has a staff of over 50 under a cooperative agreement with the Pacific Cooperative Studies Unit of the Pacific International Center for High Technology Research. Our staff includes, including three field crews, a greenhouse crew, and 18 specialists handling endangered plants, birds, and insects, and invasive plants, ungulates, rats, invertebrates, and data management. The overarching goal is to support military training on Oahu by mitigating potential damage to endangered species from Army activities (such as a range fire or introduction of new invasives). Much of our work actually takes place on state or private land, which is more accessible and less likely to contain unexploded ordnance.

At present, we manage three endangered flies: *Drosophila montgomeryi*, *D. obatai*, and *D. substenoptera* (one trend that I've noticed is that most of the species named after noted entomologists are extremely rare). All are members of the picture-wing group and breed in rotting bark of native trees, but each has particular habits. *Drosophila montgomeryi* lives in wet-mesic forest and breeds in *Urera glabra* and *U. kaalae* (*opuhe*; Urticaceae); *D. obatai* lives in dry-mesic forest and breeds in

Chrysodracon forbesii and *C. halapepe* (*halapepe*; Asparagaceae); and *D. substenoptera* lives in wet forest and breeds in *Cheirodendron platyphyllum* and *C. trigynum* (*olapa*; Araliaceae). As everyone who has looked for unusual flies is familiar, finding them is difficult. Sometimes they can occur in surprising numbers, and then they can disappear for months at a time. The past two years have been especially difficult, as El Nino-influenced weatherhas changed rainfall and thrown nearly all the insect populations out of whack. Diptera and Hymenoptera are way down from the years before, while Hemiptera are up. Hopefully this coming year will improve as the winter rains arrive, but we'll see!

Figure 1. *Drosophila montgomeryi* performing the courtship dance on a monitoring bait sponge. It's extremely similar to another sympatric species, *D. ambochila*, but in addition to minor differences of color and setation, the male of *D. ambochila* doesn't bend his abdomen under the body during the dance.

Along the way, our work helps the rare non-listed species as well. In the course of surveys, I've rediscovered eight species that hadn't been seen in over 40 years: *D. flexipes*, *D. hemipeza*, *D. kinoole*, *D. neogrimshawi*, *D. paucicilia*, *D. reynoldsiae*, *D. sobrina*, and *D. spaniothrix*. Some were part of the original endangered species listing petition but were dropped because they were considered to be extinct; others are actually more in danger of extinction than some that are legally protected. While these rare species are outside our purview, several co-occur with endangered species we manage (some even using the same host plant), so protecting the area can help multiple species.

But while they can be frustrating, surveys are still the easy part of our work. The hard part is figuring out what to do once we've found a population. Most of our direct management so far has been with *D. montgomeryi*, because it's the most straightforward. It's clearly host-limited (other sympatric species with more abundant hosts are found in greater numbers), and *Urera* is a dioecious tree that hasn't been reproducing well for years, in part because clonal reproduction resulted in stands of all male or all

Figure 2. *Drosophila obatai* (left) and *D. flexipes* (right), another rare species; both were rediscovered between 2011-2013 after not being seen since 1971. The one in the foreground is a male spotted-wing drosophila, *D. suzukii*, which is ubiquitous in Hawaii but not economically harmful here.

female plants (*U. kaalae* is itself endangered and nearly extinct in the wild). We've undertaken outplanting efforts at all sites aimed at not only boosting the numbers in general but creating enough of a critical mass that they're able to recruit on their own in the future. After less than three years, many of the trees are growing fast and we're already seeing seedlings, so hopefully this will continue to improve the habitat.

The others are more tricky. *Drosophila obatai* is also host limited, but it's much more difficult to manage. *Chrysodracon* is also not recruiting much (probably mostly due to rats eating the seeds), but it's incredibly slow growing – plants from seeds I planted in 2014 are only about a foot tall three years later, under optimal conditions (some in the shade or crowded are still barely off the ground). The older trees that the flies breed in are often 30-40 feet tall with trunks 8-20 inches across (sometimes much bigger), and are probably hundreds of years old. Planting some is a start, but it's not much of a solution when several of these old trees die each year. *Drosophila substenoptera* doesn't seem to be host limited at all; *Cheirodendron* trees are fairly abundant, and two other species that live on them are much more common and widespread, so it's not clear what caused it to decline. Predation? Microclimate sensitivity? It's something we need to work on, but our capacity for research is modest, so if you're interested in figuring it out, drop me a line!

Figure 3. *Drosophila substenoptera*, one of several species with an extra crossvein in the wing. For some reason both males and females often walk around with the wings in display position like this, even while feeding. It may be one of the things that makes them more vulnerable to alien predators like yellowjackets.

Figure 4. *Drosophila neogrimshawi*, another extremely rare species rediscovered in my surveys. This is the only individual seen since 1972, and the first since 1917 in the Waianae range. It also has an extra crossvein, but evolved it independently of *D. substenoptera* and its relatives.

When writing for a (mostly) mainland audience like this I often have to remember that, like someone who has been dealing with an insane situation for a long time, you tend to acclimate to it as normal and forget that everyone else sees your situation as the crazy one. That's much the way it is with studying native species in Hawaii, especially on Oahu. When visiting as a tourist rather than a researcher looking for natives, almost no plant, insect, or bird you will see is native. Outside of the Big Island of Hawaii and a couple of relatively remote spots on Maui and Kauai, there's nowhere in driving or short walking distance you can see native forest, not even the iconic ohia lehua (*Metrosideros polymorpha*). Being restricted to particular host plants, the sites where these flies live are small – very small, less than 1 hectare in most cases. *Drosophila montgomeryi* inhabits five forest patches in gulches, the largest of which is about 30 x 100 m; *D. obatai* is found at six groves on steep valley walls, each about 30 m square. Our restoration goal is typically to get 50% native plant cover, and it's hard to reach.

When you've been working in these kinds of places for a while, you get used to it. But these flies really are in pretty perilous condition. The "common" species seem common because they're at your site every time you go, and a few times a year you see more than a dozen of them in a day, versus the "rare" ones you get excited about if you see one every couple of years; but the site itself is a little tiny spot where you have to know just the right place to go. Most are already jammed up against the back walls of gulches; it would only take the slightest shift in rainfall or temperature, or one good-sized landslide, to eliminate them completely. Even when there is more native habitat available, it's often infested with invasive alien ants, which exterminate most native insects in their path. It's a testament to their resilience that these flies been able to hang on so long, often going years without being detected. With a little luck, they'll still be here to colonize the next island when it rises out of the sea.

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Genetic control and evolution of male-specific leg ornaments

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I am writing this note to appeal for help in identifying groups of Diptera that have male-specific foreleg modifications. These groups would be of great interest to me and other developmental geneticists. In addition to general information about such species and genera, I am especially interested in high-resolution images that might suggest the developmental origin of these structures.

Male ornaments and other sex-specific traits present some of the most dramatic examples of evolutionary innovations. An example familiar to many geneticists is the "sex comb" of *Drosophila*. In the genetic model species *D. melanogaster*, the sex comb is a male-specific array of modified mechanosensory bristles that develops at a specific location on the front leg from a group of precursor bristles that are present in both sexes. The sex comb is a clear evolutionary innovation, since it is absent in most species of *Drosophila* and related genera. In species closely related to *D. melanogaster*, this structure shows dramatic diversity in size, position, and morphology – but always remains strictly male-specific. In the last few years, we have understood the genetic control of sex comb development. The new information has changed our views about the origin of sex-specific structures not only in *Drosophila*, but in insects more generally.

Although the mechanisms of sex determination in insects can be drastically different, a key role in sexual dimorphism is played by alternative splicing of mRNA. *Drosophila* has male-heterogametic sex determination where XX individuals are females and XY are males. The primary genetic switch that interprets X chromosome dose is the RNA-binding protein *Sex-lethal* (*Sxl*), which regulates both its own splicing and the splicing of another RNA-binding factor, *transformer* (*tra*); as a result, only females have functional Tra protein. This splicing cascade ends with the transcription factor *doublesex* (*dsx*), which controls sexual differentiation in most somatic tissues. In females, the presence of functional Tra protein causes *dsx* mRNA to be spliced into a female-specific isoform (*dsxF*), while in males the male-specific isoform (*dsxM*) is produced by default. The two *dsx* isoforms have opposite effects: *dsxM* promotes the development of male-specific traits and represses female-specific traits, while *dsxF* promotes female-specific and represses male-specific characters. Sex-specific morphology is ultimately due to the distinct effects of DsxM and DsxF proteins on target gene expression. In other insects, the primary sex determination signals can be as different as mobile genes, haplo-diploidy, or environmental cues, but the downstream system based on the alternative splicing of *dsx* appears to be conserved in all Holometabola.

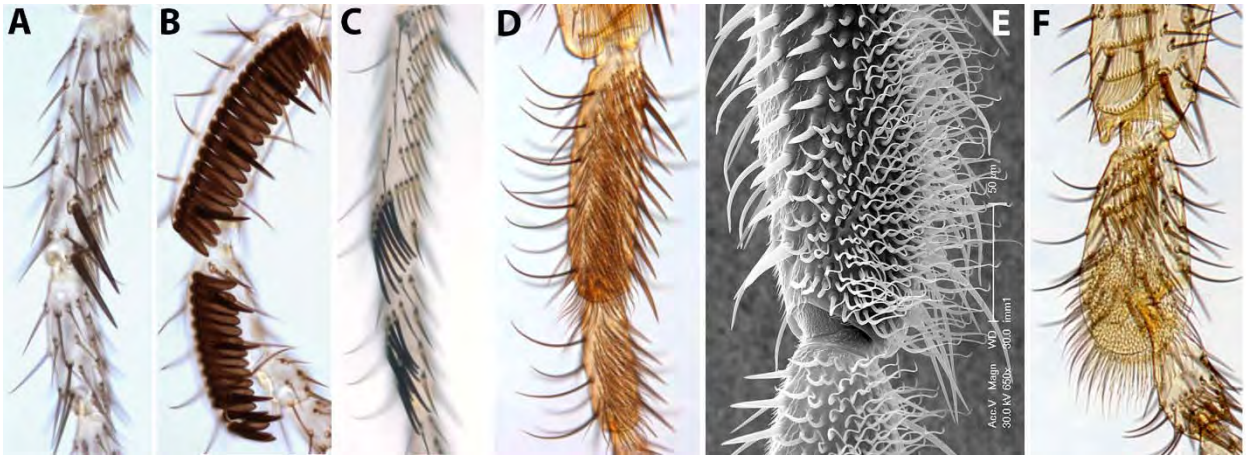
This textbook example of the role of alternative splicing in development has been worked out by *Drosophila* geneticists in the 1970s and early 80s. Until recently, it was believed that the sex determination pathway was active in all cells. Discoveries made in the last few years have overturned this assumption, and reshaped our views of both development and evolution of sex-specific structures. In addition to mRNA splicing, *dsx* turns out to be tightly controlled at the level of transcription. To a first approximation, the *dsx* gene is only transcribed in the cells that need to undergo sex-specific differentiation. In other cells, the upstream part of the sex determination pathway (*Sxl* and *tra*) is present, but its activity is made irrelevant by the absence of the primary *dsx* transcript that could potentially be spliced into a male- or female-specific isoform – therefore, these cells are incapable of

interpreting their sex and remain sexually monomorphic. In effect, both males and females are mosaics of sexually differentiated and sexless cells.

In *Drosophila*, *dsx* is expressed in a small region of the foreleg during late larval and early pupal stages, where it is necessary for sex comb development. In contrast, no *dsx* expression is seen in the second and third legs, which are sexually monomorphic. Artificial expression of *dsx* in other legs, or in other regions of the prothoracic leg, can induce ectopic sex combs at inappropriate locations. Thus, the sex comb is one of the examples of spatially restricted *dsx* expression leading to the formation of a sex-specific morphological structure.

What does this mean for the origin and diversification of male-specific ornaments? Given the central role of *dsx* in sexually dimorphic development, for any sex-specific structure to evolve, *dsx* must be expressed in the cells that give rise to this structure. In tissues that already express *dsx*, sexual dimorphism can evolve with relative ease if *dsx* acquires new target genes. In contrast, if a tissue is ancestrally monomorphic and does not express *dsx*, changes in *dsx* regulation that result in its de novo expression in that tissue must be a necessary first step. In this sense, the origin of new male-specific ornaments should be linked to the evolution of new *dsx* expression domains. Indeed, this mechanism appears to be at work in at least two other groups within Drosophilidae. The *Drosophila immigrans* species group and the genus *Zaprionus* are both distantly related to *D. melanogaster*, and have evolved male-specific foreleg modifications that are very different from the sex comb in their morphology but develop at homologous positions in the front legs. In both cases, the new structures coincide with new domains of *dsx* expression at the pupal stage, which are absent in outgroup species with sexually monomorphic forelegs.

I have very little knowledge of Dipteran morphology outside of Drosophilidae, but even the most cursory familiarity with the literature suggests that many other Diptera have evolved male-specific foreleg modifications, and that structures composed of modified bristles may be especially common. This might be related to the evolution of mating posture: in Diptera with end-to-end mating position, we would expect little evolutionary pressure toward the evolution of male-specific leg structures. In groups where mating occurs with the male on top the female, the male forelegs are more likely to be involved in grasping or stimulating the female, suggesting that sexual selection may lead to the origin of male-specific ornaments in many such groups.



Male-specific foreleg ornaments in Drosophilidae. **A-C**. The male sex combs of *Drosophila eugracilis, D. ficusphila*, and *D. kurseogensis*. **D-E.** The male "sex brush" of *D. immigrans*. **F.** The "pincushion" of *Zaprionus vittiger*. (Image **E** credit: Dr. Gavin Rice, UC Davis).

If you are familiar with Dipteran groups that have sex-specific leg ornaments (and their relatives that don't), please let me know. I will be very grateful for your ideas and images. The figure above shows some examples from Drosophilidae.

More information can be found in the following references, or see the Kopp Lab website (http://kopplab.ucdavis.edu/):

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Book Review:
***Moths, myths, & mosquitoes. The eccentric life of Harrison G. Dyar, Jr*. (by Marc E. Epstein, 2016).**
Oxford University Press, Oxford. xxxii + 325 pp.

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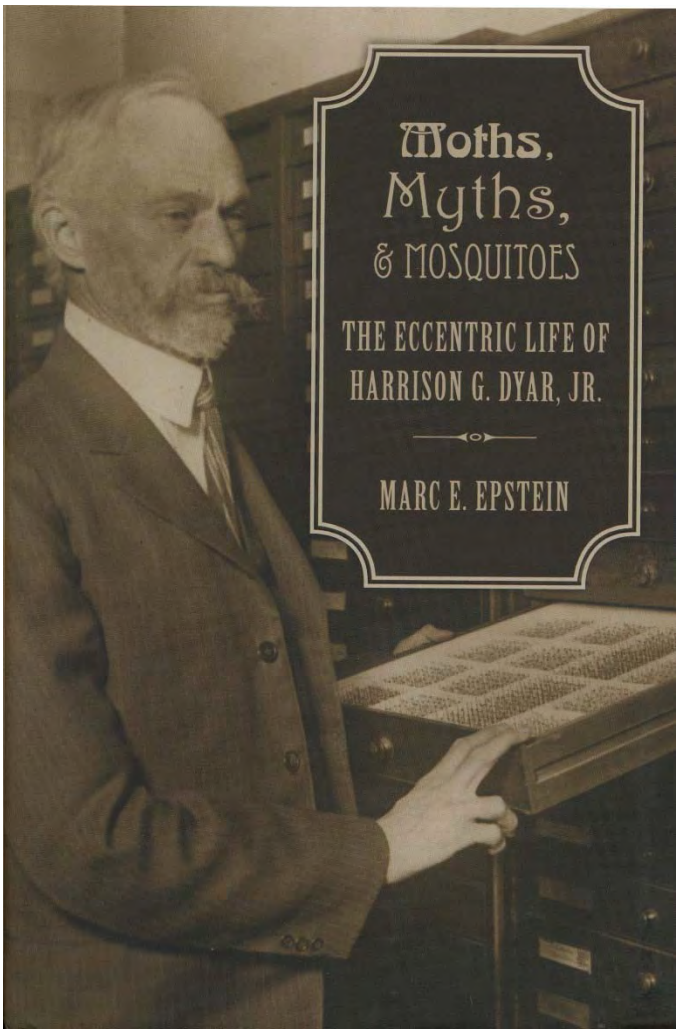

Good biographies are one of the most difficult things to write. They require not only time and money in tracking down source material from obscure places and the utmost of accuracy in verifying those sources, but a lot of detective work as well. Like a detective tracking down a culprit and piecing together bits of evidence to fill out the picture of the crime, a biographer must follow leads wherever s/he finds them in order to fill in gaps of timelines or bits of a story of the person being portrayed. Often these leads result in dead-ends and frustration sets in. Too many dead-ends and a writer may decide to chuck it all.

Marc Epstein's biography of Harrison Gray Dyar is one of the few excellent success stories in biographical writing. Epstein persevered numerous dead-ends and frustration over the many years of compiling the source information necessary to be able to write a comprehensive story of an extremely eccentric individual. What results from those efforts is a detailed study of the life and times of the man, his work, his relationships with colleagues and his familial relations—and the many troubles that followed him in the many arenas of his life. In many ways, Dyar was an entomological Joe Blfsplk of Lil' Abner comics. Colleagues labeled him as cantankerous and failing to smile. Epstein was able to find exceptions to that stereotype.

Dyar was a man of independent financial means for most of his life and, during that glorious time, it allowed him the pleasure of defining his workday, what he wanted to do, and where he wanted to go. But his aggressive and dogmatic personality would always get in the way and caused him much difficulty in working with others. Ultimately, it would lead to his removal in 1917 from his official US Department of Agriculture post, although he would keep his unpaid Honorary Custodian title with the US National Museum. During his last years, and in dire need of funds, he lobbied extensively to regain his USDA position. But, in Dyarian fashion, this too would have a Murphy's Law ending.

Epstein weaves the story of Dyar's work with Lepidoptera with the story of his work with mosquitoes to give a superb portrait of an exceptional mind. Dyar developed a pragmatic method by which to describe the immature stages of insects as they grow and was instrumental in including the life stages of mosquitoes into taxonomic work on the group.

Dyar's name also evokes myths and legends: what about those tunnels he dug between two houses so he could spend time with two families he had at the same time? Well, it turns out, the storyis partly true. Dyar DID enjoy digging tunnels. I leave it to the reader to discover the actual details. But beyond tunnels, Dyar did have a bizarre upbringing of spirituality (his mother was a medium and his aunt participated in séances with Lincoln) and there was his strange involvement with the Baha'i faith.

I heartily recommend this book to anyone interested in discovering the true story of a fringe-personality person the likes of which we will probably never see again. Aside from the biographical information, the book also is an excellent source of historical information of the Bureau of Entomology at the USDA and the relationships among staff there at the time.

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Fly School was Fabulous!

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The first-ever Fly School was a stunning success! The course was organized by the Entomology Department of the Natural History Museum of Los Angeles County and held near Wrightwood, California in June. Twenty-one students from 11 countries participated in the intensive two-week course. Approximately ¾ of the students were PhD candidates and ¼ were collections staff.

The course featured six core instructors, taxonomic experts on the various groups of Diptera, who gave a family-by-family breakdown of the order. Additionally, the students were taught techniques in specimen preparation, fieldwork, methods in illustration, fossil dipterology, molecular systematics, larval study, aquatic dipterology, biogeography, hilltopping, and more! The course was held at Harmony Pines Camp, in the San Gabriel National Monument, an area with several life zones nearby. The unique location allowed students to collect in the Mojave Desert, high-elevation hilltops and subalpine valleys, aquatic environments, and the oak-pine forests near the camp.

Some interesting collections were made during the two weeks, including a new species of *Microsania* "smoke flies" (Platypezidae), specimens of three rare "A"-families (Apsilocephalidae, Apystomyiidae, and Atelestidae), unusual empidoids (*Oreogeton*, microphorine Dolichopodidae, Brachystomatidae), giant flower-loving flies (*Rhaphiomidas*), rodent bots (*Cuterebra*), and many others. In samples brought to Fly School for additional sorting, an extremely rare Afrocamilla

(Camillidae), as well as a possible new genus of Carnoidea (we don't know which family- the instructors were stumped!) were found.

We like to think that all students learned a tremendous amount about Diptera- certainly the instructors did- as well as about each other and the dipterological community. The many hours of lectures, fieldwork, and specimen preparation were supplemented with campfire discussions over s'mores, post-fieldwork barbecues, and a special showing of Cronenburg's "The Fly" one evening (complete with Jiffy Pop, a sensation to many from outside the US!). Fly School concluded with a "graduation" (for students and instructors alike). Instructors were awarded a replica of the Egyptian "golden flies of valor" for their bravery in leading this inaugural course (see the photo of David Grimaldi for these!).

Participants

Fly School Organizer – Emily Hartop

Fly School Instructors –Dr. Dalton Amorim, Dr. Keith Bayless, Dr. Brian V. Brown, Dr. Eliana Buenaventura, Dr. David Grimaldi, Dr. Jeff Skevington.

Guest Instructors – Dr. James Hogue, Dr. Brad Mullens, and Dr. Doug Yanega.

Fly School Participants – Yuchen Ang, Chris Cohen, Ayman Elsayed, Diego Fachin, Lisa Gonzalez, Emily Hartop, Lance Jones, Giar-Ann Kung, Alan Lanford, Xuankun Li, Jon Peder Hjertenes Lindemann, James Lumbers, Katherine Noble, Ronniel Pedales, Thalles Lavinscky Pereira, Gabriela Pirani, Courtney Richenbacher, Erick Rodriguez, Arianna Thomas, Alejandro Vargas, Maria Wong.

Fly School was generously funded by dipterists Dr. F. C. Thompson and Dr. Terry Whitworth, the Smithsonian Institution's Williston Fund, and Diane Naegele (LACM Board of Trustees).

Rumors are already circulating about the next edition of Fly School, hopefully to be held in 2019. Stay tuned! Following is a small selection of photos from the experience:

Hilltopping (photo: Arianna Thomas)

Jeff Skevington and his Jiffy Pop

The lab.

Hunting for *Rhaphiomidas* (Mydidae). (photo: Arianna Thomas).

Sweeping for *Microsania* (Platypezidae).

(Left) David Grimaldi running the Illustration section (Photo: Arianna Thomas).
(Right) Graduation!

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BioBlitzing and blacklighting. How effective are these techniques for assessing biodiversity?

Fenja Brodo

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There is a lovely second growth forest in the Ottawa District that has been the site for four BioBlitzes, three black lighting events (one, in connection with a BioBlitz) and two days of collecting on my own initiative. All eight collecting events were in June (16 June 2006, 9 June 20007, 7 June 2009, 11 June 2010, 15 June 2013, 21 June 2014, 3 June 2016, 3 June 2017). I was only focused on crane flies (Tipuloidea) and have been very surprised at how different my results were from year to year despite the general similarity of the terrain at each collecting event and the fact that I was collecting at more-or-less the same time of the year - mid to late spring. No species was found at all eight collecting events and the two most commonly collected species, *Epiphragma fasciapenne* (Say) (Fig. 2) and *Shannonomyia lenta* (Osten Sacken), both in Limoniidae, were found six times out of eight. Each time that I went to this forest, additional species were added to my list. See Table 1 for my results.

Fig. 1. A view of Larose Forest, Prescott/Russel Counties, Ontario, Canada

The area in question is known as Larose Forest and is about 50 km east of Ottawa. The main block covers roughly 8,000 hectares (18,000 acres) and is a sand plain left behind when the Champlain Sea receded about 9,000 years ago. The terrain is generally flat with only a few small ravines or gullies and has some lovely marshy areas and some swamps. It is drained by both the Ottawa and the South Nation Rivers and smaller tributaries. After glaciation, this area developed a nicemixed forest (Figs. 1, 3 & 7).

Fig. 2 *Epiphragma fasciapenne* (Say) a commonly collected crane fly in Larose Forest.

In the late 18th century the huge White Pines (*Pinus strobus*) were cut for ship masts. Later, areas were cleared for farming. The sandy soils, however, were no good for crops and the removal of tree cover along with man-made fires allowed for erosion. The sandy soil was blown away and the streams dried up or became intermittent. Farms were abandoned.

Subsequently the land was bought up and is managed by the United Counties of Prescott and Russell (UCPR). It was reforested starting in 1928, mostly red pine plantations with a few other coniferous species interspersed, but is now a flourishing mixed forest of softwood and hardwood with a heavy shrub undergrowth and rich herbaceous vegetation. Selective logging occurs, maples are tapped for their syrup, and the land is also used for wildlife and recreational purposes such as hiking, birding, snow shoeing and skiing.

A development proposal for part of the forest spurred the organization of the first BioBlitz on 16 June 2006 to demonstrate the richness of the flora and fauna that would be destroyed if any development went ahead. It was organized by Christine Hanrahan on behalf of the Ottawa Field-Naturalists' Club (OFNC) in cooperation with the then Prescott-Russell Stewardship Council. Amateurs from the OFNC as well as professional biologists and students from Agriculture and Agri-Foods Canada, Canadian

Museum of Nature, Carleton University and the University of Ottawa participated. A second, equally successful BioBlitz was held the following year on 9 June 2007 followed by a third on 11 June 2010 and a fourth on 3 June 2016. Each time the focus was in a different section of Larose Forest. All this was later documented in *Larose Forest, A guide with species lists*, published by the OFNC in 2014. This is a great little book that includes the birds, mammals, plants and a few other categories, but you won't find flies of any kind listed there. However, the database of all organisms found at Larose Forest can be accessed at: http://www.ofnc.ca/conservation/larose/index.php.

Fig. 3 Map of Larose Forest

On the first BioBlitz, 16 June 2006, centered on Concession 8, I concentrated on the wetter and shadier parts of the area, along ditches, in small ponds or depressions and in among the undergrowth of ferns and wild flowers in the woods, collecting from 10:00 a.m.to late in the afternoon. Fifteen species of crane flies were my reward and one, *Eutonia alleni* (Johnston), was new to my collection so I returned the next day in the hopes of finding additional specimens but had no luck. (A specimen of *Eutonia alleni* from the Ottawa District, collected by that amazing collector, Dick Vockeroth, sits in the Canadian National Collection!)

The second BioBlitz in 2007 was held a week earlier, on the 9th of June, in another part of the forest but among similar habitats as the previous year. I netted twelve species, and eight were new to Larose Forest and one, *Nephrotoma punctum* (Loew), was new to the Ottawa District (Table 1, column B).

Fig. 4 (left). Jessica Petersen collecting in Larose Forest.
Fig. 5 (right). One of the sheets at a black lighting event.

On June 7th, 2009, I returned to Larose Forest with Jessica Petersen, who was then a student working on the genus *Euphylidorea*. She needed fresh specimens for DNA work and I knew from my previous collecting that they might be quite abundant there, at this time. Indeed, they were. We only spent about two hours in the middle of a lovely sunny day. Fifteen species of crane flies were collected in that short time and eight proved to be new to this region. (Table 1, column C).

A third BioBlitz was organized in 2010, on 11th June, in another area of the forest. This time, after hand netting for four hours in the afternoon, several of us set up black lights for night collecting. I tallied a mere 13 species, however nine were additions to my list from Larose Forest and three species (*Tipula jacobus* Alexander, *Gonomyia kansensis* Alexander and *Ilisia graphica* Osten Sacken) were additions to the Ottawa District (Table 1, column D). Unfortunately, I did not keep records of which specimens were collected during the day and which at night.

A black lighting evening on the 15th June 2013 was organized by the OFNC in yet another area of the woods. Six white sheets with lights were set up before dusk, about 200 m between sheets. At night fall, the 30 or more participants moved from sheet to sheet marvelling, identifying and photographing the moths and other insects attracted to the sheets while I plucked off the crane flies. It was instructive to see that each sheet attracted a somewhat different community of insects, reason enough to have several sheets strung up along a path. At the end of that very long evening, and after at least a week of working over my specimens, I found that I had collected eighteen species, eight of which were new to this forest (Table 1, column E).

Black Lighting in Larose Forest has become a very popular activity for our Club. Another "Mothing Night" was organized at the Larose Forest on the 21st June 2014. Again, we had six sheets set up but this time two of the sheets employed experimental LED lights created by Jim Rivier, with the financial help of a small research grant from the OFNC. That evening I collected twenty-two species, the most that I had ever tallied so far in a collecting event, and eight of these were additions to Larose Forest (Table 1, column F).

A fourth BioBlitz was organized on 3 June 2016 by the UCPR and Christine Hanrahan, on behalf of the OFNC. I used my net to collect crane flies from noon to around 5:30 p.m. After supper, we set up our sheets and lights some distance away from where I did the day collecting. There were seven sheets in all including two interesting LED creations by Jim Rivier. These seemed to be more successful in attracting insects that the earlier prototypes of 2014 and it was my most successful day of collecting crane flies in this forest. Thirty-nine species of Tipuloidea were caught, eight of which were new to Larose, and two species (*Austrolimnophila unica* (Osten Sacken) and *Limonia indigena* Osten Sacken), were new records for me from the Ottawa District (Table 1, column G). Of the 39 species collected that day, 27 were only collected at lights, six were only collected by hand netting during the day, and twelve were captured both day and night. Usually more species can be collected by lights at night than hand netting during the day. Additional sheets draw in more species so it beats doing this on my own. Some species, however, do not come to lights and so need to be sought using other methods.

Fig. 6 Site where *Phalacrocera tipulina* Osten Sacken was collected.

A "mothing" night was scheduled for 3 June 2017. In anticipation, I came to Larose Forest in mid afternoon and collected in and around a small wetland area (Fig. 5). It was overcast most of the time, cool and breezy, the temperature fluctuated around 66º F and briefly attained 70º F when the sun came out. Only four species were found this time but one of these, *Phalacrocera tipulina* Osten Sacken, was new to my Larose Forest list, making it well worth my time collecting. This is a relatively rare bog species; the larvae feed on *Sphagnum* mosses. The evening event was cancelled because of predicted plunging temperatures.

So far 68 species of crane flies have been collected in Larose Forest, all in early to mid June. By comparison, 231 species are known from the Ottawa District (defined as a 50km radius centered on the Peace Tower on Parliament Hill. This area encompasses the Ottawa valley in the south and a portion of the Canadian Shield across the Ottawa River in Quebec, in the north.)

Fig. 7 *Phalacrocera tipulina* Osten Sacken, female on left and male on right.

Table 1 lists the 68 crane flies collectedon these eight collecting events. It is surprising that 25 species, a little over 1/3, have only been collected once; 27 species were collected twice; 9 species were collected three times; 3 species collected four times; 2 species were collected five and six times respectively. There is little overlap of the species collected from year to year, despite the fact that all collections were made roughly in the same season. Clearly the crane flies comprising the spring fauna of Larose Forest is still poorly known, and nothing at all known about the crane flies that are on the wing later in the season. A 24-hour BioBlitz, or an evening of collecting at lights, provides a limited snapshot of what is actually out there in the forest.

Table 1. List of Crane Flies collected in Larose Forest. Species new to the Ottawa District are in red. Columns:

A = 16 June 2006, BioBlitz, hand netting
B = 9 June 2007, BioBlitz, hand netting
C = 7 June 2009, hand netting
D = 11 June 2010, BioBlitz, hand netting
E = 15 June 2013, black lighting
F = 21 June 2014, black lighting
G = 3 June 2016, BioBlitz, d = day collecting with net; n = night collecting using black lights
H = 3 June 2017.

	Tipulidae	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
1	*Dolichopeza (Oropeza) dorsalis* (Johnson)						F		
2	*Dolichopeza (Oropeza) similis* (Johnson)							Gd	
3	*Dolichopeza (Oropeza) subalbipes* (Johnson)				D		F		

4	*Nephrotoma alterna* (Walker)		B						
5	*Nephrotoma breviorcornis* (Doane)	A	B						
6	*Nephrotoma euceroides* Alexander				D		F		H
7	*Nephrotoma ferruginea* (Fabricius)	A				E		Gn	
8	*Nephrotoma occipitalis* (Loew)							Gn	
9	*Nephrotoma punctum* (Loew)		B						
10	*Tipula (Lindnerina) senega* Alexander	A	B	C	D			Gd,n	
11	*Tipula (Lunatipula) bicornis* Forbes		B			E			
12	*Tipula (Lunatipula) valida* Loew		B			E			
13	*Tipula (Ptere.) entomophthorae* Alexander				D				H
14	*Tipula (Pterelachisus) t. trivittata* Say	A							
15	*Tipula (Schummelia) hermannia* Alexander				D				
16	*Tipula (Vestiplex) longiventris* Loew	A						Gn	
17	*Tipula (Yamatotipula) furca* Walker		B					Gn	
18	*Tipula (Yamatotipula) jacobus* Alexander				D	E			
19	*Tipula (Yamatotipula) strepens* Loew		B						
20	*Tipula (Yamatotipula) tephrocephala* Loew			C				Gd	
	Limoniidae								
21	*Antocha* sp.			C					
22	*Austrolimnophila unica* (Osten Sacken)							Gd	
23	*Cheilotrichia (Empeda) stigmatica* (O.S.)						F	Gn	
24	*Dicranomyia distendens* Lundström							Gn	
25	*Dicranomyia frontalis* (Staeger)	A		C					
26	*Dicranomyia immodesta* Osten Sacken					E	F		
27	*Dicranomyia ponojensis* Lundström			C					
28	*Dicranophragma fuscovarium* (O.S.)			C		E	F	Gd,n	
29	*Elephantomyia westwoodi* Osten Sacken	A				E	F		
30	*Epiphragma fasciapenne* (Say)	A	B	C	D	E		Gd,n	
31	*Erioptera (E.) septemtrionis* Osten Sacken					E	F	Gn	
32	*Erioptera (E.) chlorophylla* group						F		
33	*Erioptera (Mesocyphona) caliptera* Say					E	F	Gn	
34	*Euphylidorea adusta* (Osten Sacken)	A	B	C				Gd,n	
35	*Euphylidorea auripennis* (Alexander)					E	F	Gn	
36	*Euphylidorea platyphallus* (Alexander					E		Gn	
37	*Eutonia alleni* (Johnson)	A							
38	*Geranomyia rostrata* (Say)			C					
39	*Gonomyia bidentata* Alexander	A				E			
40	*Gonomyia currani* Alexander				D				
41	*Gonomyia (G.) subcinerea* Osten Sacken						F	Gn	
42	*Gonomyia (Idiocerodes) kansensis* Alex.				D	E			
43	*Gonomyia (Leiponeura) sulphurella* O.S.		B				F	Gn	
44	*Helius flavipes* (Macquart)			C				Gd,n	
45	*Hoplolabis armata* (Osten Sacken)				D			Gn	
46	*Ilisia graphica* Osten Sacken				D				
47	*Limonia indigena* (Osten Sacken)							Gn	
48	*Metalimnobia immatura* (Osten Sacken)						F		

49	*Metalimnobia solitaria* (Osten Sacken)					E	F	Gd	
50	*Molophilus hirtipennis* (Osten Sacken)				D		F	Gn	
51	*Molophilus pubipennis* (Osten Sacken)					E			
52	*Molophilus* sp.	A					F		
53	*Ormosia affinis* (Lundbeck)	A		C	D		F	Gd,n	
54	*Pilaria quadrata* (Osten Sacken)						F	Gd,n	
55	*Pilaria recondita* (Osten Sacken)	A						Gd	
56	*Pilaria tenuipes* (Say)					E		Gd,n	
57	*Prionolabis rufibasis* (Osten Sacken)		B	C				Gd,n	H
58	*Pseudolimnophila inornata* (Osten Sacken)			C				Gd,n	
59	*Pseudolimnophila luteipennis* (Osten Sacken)			C				G d,n	
60	*Rhipidia fidelis* Osten Sacken							Gn	
61	*Rhipidia maculata* Meigen							Gn	
62	*Shannonomyia lenta* (Osten Sacken)	A		C	D	E	F	Gd,n	
63	*Symplecta cana* (Walker)						F	Gn	
	Pediciidae								
64	*Tricyphona calcar* (Osten Sacken)							Gn	
65	*Tricyphona inconstans* (Osten Sacken)						F		
66	*Tricyphona johnsoni* Alexander				D			G d	
67	*Ula elegans* Osten Sacken						F	G n	
	Cylindrotomidae								
68	*Phalacrocera tipulina* Osten Sacken								H
	Total number of species	**15**	**12**	**15**	**15**	**18**	**22**	**38**	**4**

Out of 68 species:

25 were collected once
27 were collected twice
9 were collected 3 times
3 were collected four times
2 were collected five times
2 were collected six times

231 species in the Ottawa District

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Mycetophilids in northern Nevada

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I am involved in mosquito and blackfly abatement in Northern Nevada. We consistently catch a number of species of Mycetophilidae in the dry ice baited EVS traps (below left) we put out to sample adult mosquito populations, and in 2016 I decided to look into this to try to gain some insight into why they seemed attracted to these traps. I removed all the mycetophilids that I found in all the traps we put out during the 2016 season and grouped them according to number caught, date, and location.

In 2017 I also collected the adults using a Malaise trap (below right) to see what species are present here, and if the catches from this trap are different from those of the EVS traps. The Malaise trap consistently had Mycetophilids in them up through June, when they faded out. I tried rearing the adults out of mushrooms, and frequently found larvae in them, but when I put the mushrooms in a container they quickly turned into a black soup out of which nothing emerged. I tried to get around this by leaving the mushrooms in the ground, instead placing a container over them, such as a bottle, a plastic cup with pinholes in it, a cake tent, etc. The mushrooms remained healthy under these circumstances, but I got no Mycetophilids out of them. I tried putting mushrooms in one of the nets used on the EVS traps - the mushrooms dried up and I got no flies out of them. I put a malaise trap out in a boglike marsh, thinking this might be a promising habitat to catch the adults, but I caught nothing there. Looking for adults in culverts and under bridges also yielded nothing. The only adult I collected outside of traps, and that gave me a biological clue, came when I was dip sampling some water I found in an abandoned animal burrow - when I pulled the dipper out there was a live Mycetophilid adult floating in it.

I feel stymied at present in my efforts to learn more about the biology of these insects. I have a battery operated aspirator now which I intend to use during 2018 in animal burrows and other promising places. Currently I have only the key to genera in the Manual of Nearctic Diptera with which to identify what I catch. I need to find keys to species and become familiar with using them. I don't know anything about identifying mushrooms; that has to change. And I have collected numerous mycetophilids in EVS traps where there were no mushrooms visible anywhere. So the flies must have bred in something else, but what, and how do I find that out? I certainly need to find a way to successfully rear these insects out of the mushrooms I do find - I don't know what that might be at this time.

If anyone has any suggestions on finding mycetophilid larvae and rearing them out to adults, or finding adults I would appreciate hearing them. And I would appreciate any other suggestions that might help me in this.

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HISTORICAL DIPTEROLOGY

Coquillett's Diptera Eponyms. Part I.

Neal L. Evenhuis

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Collectors are the backbone to any collection and taxonomic study. But many have been relegated to obscurity having had their name only appear in label data or acknowledgments. Daniel William Coquillett was mindful of the efforts of others in collecting material for his studies and for the resulting increase in knowledge of a particular group by knowing of the existence of new forms and new records through such collecting and proper identification. Coquillett was thankful for the efforts of those collectors and would honor many of them with patronymics. The following entries of short biographical sketches of the people for whom D.W. Coquillett named new species are presented here in the hopes to furthering the knowledge of these collectors. Some of the people listed here are well-known; others are little-known, or even very obscure. Some were professional entomologists (or would become as such), while others were amateurs. Some were financially independent while others made their living as doctors, dentists, glass workers, brass workers, mine managers, and other various and sundry occupations. There are more than 50 such people who were honored by having species named for them by Coquillett. The resulting biographic material is thus too large for one presentation, so it will be split into two installments.

This Part I deals with those alphabetically from John Merton Aldrich to Walter David Hunter. Part II will contain entries from Charles Willison Johnson to Samuel Wendell Williston and appear in the next issue of *Fly Times*.

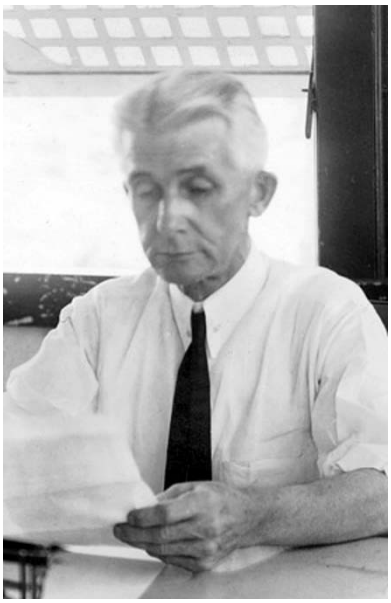
JOHN MERTON ALDRICH (1866–1934)

Psilocephala aldrichii Coquillett, 1893: 227

John Merton Aldrich, son of Levi Orson Aldrich and Mary Moore, was born on 28 January 1866 in the small farming town of Saint Charles, Minnesota, a few miles east of Rochester. When he was 15 years of age, his family moved to South Dakota and continued farming there. He enrolled at the State Agricultural College in Brookings, South Dakota and graduated one year early because the University president was eager to have a graduating class that year. He soon after obtained an M.S. from the same institution. He later went to the University of Kansas where he obtained a second M.S. degree. After returning to teach at the University of Idaho and getting married to Idaho Muscovite Della Zee Smith in 1905, he went to California and received his PhD from Stanford in 1906 during a short sabbatical. His *Catalogue of the Diptera of North America* was submitted as his thesis. He returned to Idaho and continued to teach at the University of Idaho until 1913 when he lost his job under unfortunate circumstances and news of it made it to the pages of *Science*. His dismissal was

recommended by a previous University president who was criticized as incompetent in his position by Aldrich and 4 other professors. The administrator had since moved to Canada, and the recommendation of dismissal was made to a lame duck academic board that ceased to exist immediately after the dismissal of all 5 professors was enacted. As Aldrich was an exceptional biologist and nationally renowned, he was immediately employed in Washington, D.C. by L.O. Howard, who appointed him as Entomological Assistant in the U.S. Bureau of Entomology which led to his *Sarcophaga and Allies in North America* in 1916. In 1919 he was transferred to the U.S. National Museum where he replaced the recently deceased Frederick Knab as Custodian of Diptera, a position he held until his death. During his entomological career, he collected approximately 45,000 specimens from his travels throughout the Western United States, Canada, Alaska, Guatemala, and Europe; and published extensively on various families of Diptera. He maintained membership in a number of professional societies as was President of the Entomological Society of Washington in 1926. After a three-week illness, he died in Washington, D.C. on 27 May 1934.

CHARLES FULLER BAKER (1872–1927)



Acrocera bakeri Coquillett, 1904b: 23
Chaetoclusia bakeri Coquillett, 1904c: 94
Sturmia bakeri Coquillett, 1897: 112

Charles Fuller Baker was born on 22 March 1872 in Lansing Michigan and trained in entomology and botany at the Michigan Agricultural College (now Michigan State University), graduating in 1892. Baker had a passion for all things entomology and, as a student, spent all his money on insect boxes, then proceeded to collect insects until his was larger than the one at the college. From Michigan, he moved on to the Alabama Polytechnic Institute and the Agricultural Experiment Station there. His botany training came in handy when he joined the H.H. Smith Expedition to Colombia in 1898 as its botanist. In 1903, he accepted a position as assistant professor of biology at Pomona College in Claremont, California. While there he started the journal *Invertebrata Pacifica*, which he edited, wrote articles for, and financed out of his own pocket. After short stints in Cuba and Brazil, Baker accepted a professorship in 1912 at the University of the Philippines in Los Baños, where he spent the remainder of his life. He was an extremely popular teacher and generous, giving parts of his salary to impoverished students and to colleagues in Europe who were financially affected by the First World War. He lived a simple life and, for many years, in a small two-room bamboo hut on the outskirts of Los Baños where he tended to his collections and wrote to his numerous correspondents worldwide. He constantly collected and sent specimens to colleagues to help with their studies, some collections of insects for which he prepared exchange lists. He eventually became Dean of the College of Agriculture at the University and continued to build its collections, infrastructure, and reputation. Then in 1926, the University decided to replace their white teachers with Filipinos, which led Baker to seek work elsewhere. The only stumbling block seemed to be his huge collection, for which he invested his life's savings to build. One possible job at the California Academy of Sciences in San Francisco fell through for that very reason. In 1927, things were looking up as he was offered a position at the Hawaii Sugar Planters' Association in Honolulu and he was planning to make the move. However, the many years of collecting and living in the tropics caught up with him and he was hit with a serious attack of chronic amoebic dysentery that hospitalized him in June 1927; within a month he passed away on 21 July 1927. In accordance with his will, his collection went to the Smithsonian Institution.

HERBERT SPENCER BARBER (1882–1950)

Anopheles barberi Coquillett, 1903: 310
Ceratopogon barberi Coquillett, 1901b: 601
Tanypus barberi Coquillett, 1902a: 90

Herbert Spencer Barber was born in Yankton, South Dakota on 12 April 1882. Spencer learned about natural history and insects from his father and was hooked. His education did not extend beyond high school but that did not stop him from following his dream. At 16 years of age, he got a job at the U.S. National Museum as a preparator working with the Schwarz and the Coleoptera collections for $20 per month. A few years later he became employed by the U.S. Department of Agriculture for twice that salary. He remained under there employ for the remainder of his life. Under Schwarz's mentoring, Barber became a superb collector and Barber accompanied him and other museum staff on trips to Guatemala, Arizona, New Mexico, California, Texas, and localities along the Eastern Seaboard. It did not take long for Barber to become well acquainted with the taxonomy of beetles and soon he became the authority on chrysomelids, bruchids, and lampyrids. Schwarz was a great influence on him, would be seen together often, and during his last years (the late 1920s), the aging Schwarz lived with Barber. Barber married co-worker Veronica "Vera" Bedell on 18 March 1913, and the two lived in Washington D.C. until they became separated. They had a daughter and a son, the latter of whom was killed during a kamikaze attack in World War II. Barber maintained memberships in the Coleopterists' Society, the American Association for the Advancement of Science, the Biological Society of Washington, the American Association of Economic Entomologists, the Entomological Society of Washington, and the Washington Field Biologist's Club. The last Club had its meetings on Plummer's Island near Washington, D.C. and he spent much time there studying the beetle fauna. Barber died of heart failure on 1 June 1950 at his sister's home in Washington, D.C.

JONAH TURNER BRAKELEY (1847–1915)

Corethra brakeleyi Coquillett, 1902a: 85

Born in Wilmington, Delaware on 10 January 1847, but lived out the remainder of his life in New Jersey, J. Turner Brakeley, the son of the Rev. John Henry Brakeley, founder and president of the Bordentown Female Seminary, was a man of financial independence. He resided for most of the time at his Lahaway Plantations in New Jersey, while spending time away on business at his Point Breeze mansion in Bordentown, which used to be owned by Joseph Bonaparte, the elder brother of Napoleon Bonaparte. He was primarily a recluse and a devout naturalist with a passion for the area around the cranberry estates of Lahaway. He has no published papers to his name and could have easily become a leading scientist but preferred his discoveries to be given over to those in the profession who could benefit. Through his friendship with entomologist John B. Smith (see Part II), he became a pioneer in the study of mosquitoes and their

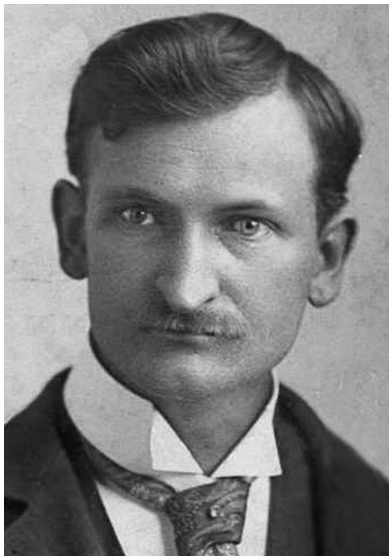
histories, specimens and notes of which were sent to either Smith in New Jersey or to Coquillett at the U.S. National Museum for study and publication. At the request of Smith to develop a method for the study of burrowing insects, Brakeley developed the method of taking plaster casts of burrows of bees and beetles. Brakeley died in Jackson, New Jersey in 1915

AUGUST BUSCK (1870–1944)

Aspidoptera busckii Coquillett, 1899: 335
Drosophila busckii Coquillett, 1901c: 18
Stegomyia busckii Coquillett, 1906: 60

Born in Randers, Denmark on 18 February 1870, August Busck was educated at Ordrup College and the Royal University, Copenhagen. In 1893 he came to the World's Columbian Exhibition in Chicago as a tourist and ended up stayed in America. Initially he resided in West Virginia as a partner in a wholesale florist business. In March 1896 he was appointed assistant entomologist of the USDA replacing the late Theodore Pergande (see Part II) and specialized in microlepidoptera. He was a member of the U.S. Fish Commission Expedition to Puerto Rico in 1898–1899 making a general entomological survey there; investigated the mosquito fauna of the West Indies from Trinidad to Santo Domingo in 1905 under the auspices of the Carnegie Institution of Washington, D.C.; and was a member of the Smithsonian Panama Expedition of 1911–1912, making, at the time, the largest collect of insects from that region. He conducted investigations in Hawai'i and Mexico of the pink bollworm of cotton for the Federal Horticultural Board. He retired in 1940 and shortly thereafter received a Yale Fellowship to travel to the Bishop Museum in Honolulu, Hawai'i to identify the microlepidoptera in that museum. He was recalled to Washington, D.C. in 1942 by the Bureau Entomology and Quarantine where he continued his work on microlepidoptera but, after a lengthy illness, passed away on 7 March 1944.

ANDREW NELSON CAUDELL (1872–1936)



Ceratopogon caudellii Coquillett, 1905: 63

Andrew Nelson Caudell was born on 18 August 1872 in Indianapolis, Indiana. His family moved to Oklahoma in his childhood. While there he had an interest in entomology and collected insects. But it wasn't until taking shelter from a rainstorm in an old building and finding a copy of a Yearbook of the U.S. Department of Agriculture that he decided to embark on it with more diligence, hoping that there was a possibility to identify those insects he had collected earlier. He wrote to Washington, D.C. for help and the Chief of the Division of Insects responded. with that encouragement he enrolled at Oklahoma State College where he was both a student and an assistant there. After graduating, he worked with the gypsy moth program in Massachusetts and in 1898 got a job with the U.S. Department of Agriculture in their Division of Insects. He decided to specialize in Orthoptera and remained employed with the USDA until his death. Caudell was sent on a number of collecting expeditions, mainly with H.G. Dyar, in connection with securing knowledge of the life

histories of Lepidoptera, but Caudell managed to collect Orthoptera and other orders to help with the U.S. National Museum collection. It was a trip to British Columbia that resulted in capturing the *Ceratopogon* to which Coquillett would honor his with an eponym. During his tenure in Washington, Caudell published numerous papers on Orthoptera, but also other orders such as Zoraptera. Although unpublished, he compiled card-indexes of host-plants and literature of Lepidoptera that would be a major reference for many decades. His intense interest in indexing, logic, and order, made him an excellent systematist and a font of information on nomenclature. As a result of the latter,he and Nathan Banks co-authored in 1912 "*The entomological code. A code of nomenclature for use in entomology*." Caudell maintained a number of societal memberships and was president of the Entomological Society of Washington in 1915. He died on 1 March 1936 in Washington, D.C.

FRANK HURLBUT CHITTENDEN (1858–1929)

Paraphyto chittendeni Coquillett, 1895b: 105

Frank Chittenden was born in Cleveland, Ohio on 3November, 1858 and grew up in the small town of Elyria a few miles west. Hi father died when Frank was still a child, so his mother supported herself and her two children by teaching. Chittenden studied entomology at Cornell University and, after graduating in 1881, he worked for a short time at the Brooklyn Museum where he was a co-founder of the Brooklyn Entomological Society and editor of its journal, *Entomologica Americana*. He got a job with the U.S. Department of Entomology in 1891 working under the supervision of L.O. Howard, his former classmate at Cornell. Although he never attended graduate school, his efforts in economic entomology, especially with stored products entomology, garnered him an honorary Doctor of Science Degree in 1904. While at the USDA, he continued his editorial skills by editing the journal *Insect Life* and published "*Insects Injurious to Vegetables*" in 1907, a work that remained a major reference for students and professionals for decades. He continued in the employ of the USDA until his last days. He died in Washington, D.C. on 15 September 1929.

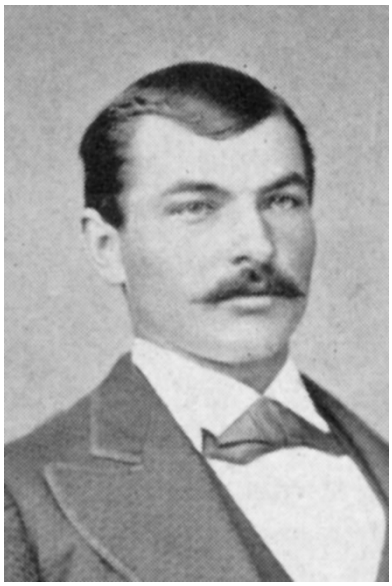
THEODORE DRU ALISON COCKERELL (1866–1948)

Ceratopogon cockerellii Coquillett, 1901b: 603
Gaediopsis cockerellii Coquillett, 1902a: 117
Rhypholophus cockerellii Coquillett, 1901a: 149

Theodor Cockerell was born on 22 August 1866 in Norwood, England (a suburb of London), the son of Sydney Cockerell and Alice Bennett. Cockerell never had formal schooling as a young child but obtained his knowledge of natural history through teachings from his father, immersing himself in books, and going to museums. Instead of attending school, he wandered about in fields and forests observing nature. Soon after his father died when Cockerell was 11, he was taken to the island of Madeira where he made his first scientific discovery, the caterpillar of the Madeiran butterfly *Pyraemis indica occidentalis*. Years later back in London, and while working for flour agents, he developed tuberculosis and was told to move to a drier climate.

He sailed to America, and ended up in Colorado for 3 years. While there, he founded the Colorado Biological Association and began cataloging the fauna and flora of Colorado. After regaining his health, he returned to England to get married and was posted to Jamaica in 1891 where he was curator of the Public Museum in Kingston. When symptoms of tuberculosis reappeared, he switched positions with C.H.T. Townsend and taught at the New Mexico Agricultural College in Las Cruces from 1893–1900. His wife died in 1893 and he remarried in 1900 and moved to Las Vegas to teach at the New Mexico Normal University there. In 1903, he was curator of the museum at Colorado College in Colorado Springs, and in 1904 taught at the University of Colorado at Boulder, where he remained employed until retiring in 1934. During his career, he published more than 3,000 papers on various subjects, mostly on the systematics of bees. Cockerell was not only a traveler in obtaining various jobs, but a widely traveled collector as well, having been to Thailand, Japan, India, Siberia, Australia, Morocco, Africa, Canada, and Honduras, the last when he was 80 years of age. From 1942 until 1947, he spent winters in charge of the Desert Museum in Palm Springs, California. Cockerell was well known for his generosity and encouragement of those less fortunate than he, in both knowledge or resources. With regard to the latter, he helped Townsend with financial difficulties by purchasing parts of his library to keep Townsend going. He spent the last years in Southern California. After several strokes, he died in San Diego, California on 26 January 1958 and is buried in Boulder, Colorado.

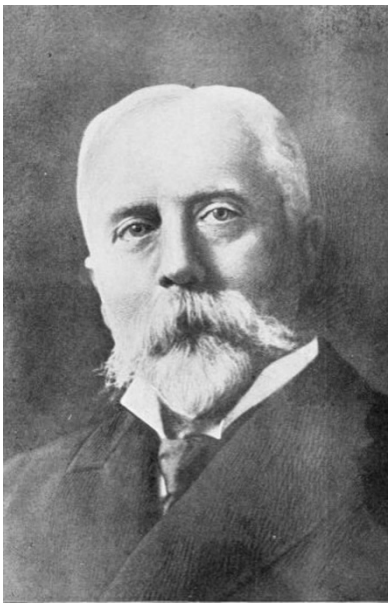
GEORGE COMPÈRE (1858–1928)



Ortalis comperei Coquillett, 1904d: 138

George Compere was born on 8 September 1858 in Davenport, Iowa. Compere did not have any formal educational training, and, by the age of 20, he was in southern California in charge of the old Vejar orchard, in which the citrus trees were infested with black scale. He tried sprays but to no avail. However, after he witnessed the positive effects of biological control of the cottony-cushion scale by the Vedalia beetle he became an advocate of such introductions in mitigating pests in orchards. In 1891, he became horticultural inspector for Los Angeles County and served in that capacity until 1899, when accepted a position of exploratory entomologist (foreign collector). Compere would be sent by the State of California to various points across the globe in search of biological control agents of agriculturally pestiferous insects. In between trips to Hawai'i, South America, Fiji, France, Spain, Java, Queensland, Egypt, Algeria, Singapore, Turkey, Italy, Hong Kong and mainland China, India, and Sri Lanka, he spent a few years employed in Western Australia (until the State of California got funds to continue his explorations). During these travels, his adventures included being attacked by Chinese pirates, overcoming boat guides with murderous intentions, escaping an immense boa constrictor deep in a rainforest, and getting mixed up in the Boxer Rebellion. He was instrumental in 1910 in pressing for regulations to keep the newly recorded Mediterranean fruit fly in Honolulu from entering California. Unfortunately, a case of misidentification of parasites he thought were introduced from China caused the end of his collecting career in 1913 and his position was abolished. He continued for a short time in regulatory work as a federal inspector for quarantine in 1919. He died in San Francisco on 17 May 1928.

ALEXANDER CRAW (1850–1908)



Celatoria crawii Coquillett, 1890: 235

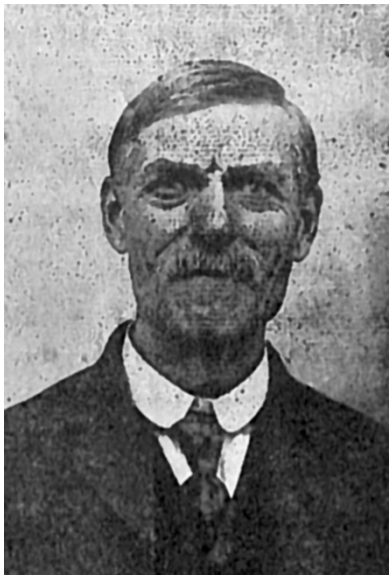
Alexander Craw was born on 3 August 1850 in South Ayrshire, Scotland. His training was in horticulture and he obtained posts at various nurseries involved in propagation. After emigrating to California, he continued work in nurseries and in 1881 became the first Horticultural Commissioner of Los Angles County and was a board member of the State Horticultural Commission (1888–1904). While in charge of the Wolfskill orange groves near downtown Los Angeles, he worked closely with Coquillett during the latter's experimenting with hydrocyanic gas treatments and during the Vedalia beetle episode. Like Coquillett during his time in California, Craw was devoted to economic entomology and wrote works on the destructive insects of California, their control and quarantine. During his term of office, it was said that no new agricultural pests were introduced into the state. In 1904, at the peak of his career when he was the best known entomologist in California, he resigned his post and took a position as Superintendent of Entomology at the Board of Agriculture and Forestry in Hawaii, at a greatly increased salary. His work in Hawaii was establishing means of combatting existing agricultural pests and enforcing quarantine regulations to keep out others. He remained there until early 1908 when he returned to Los Angeles because his deteriorating health demanded a drier climate. He had initially made a slight recovery, but shortly after making the trip from Los Angeles to sister's residence in Ahwahnee, California (just outside Yosemite National Park), he died on 28 June 1908.

JAMES CHAMBERLIN CRAWFORD [**JR**.] (1880–1950)

Pseudacteon crawfordi Coquillett, 1907: 208

Hymenopterist James Chamberlin Crawford (although his father had the same name, he did not use "Jr." in his writings but used it on his passport application in 1903) was born in West Point, Nebraska on 24 August 1880. He attended the University of Nebraska and received his Master's Degree from George Washington University. He was appointed a Special Field Agent for the U.S. Department of Agriculture in Texas dealing with cotton insects. In was in this capacity that he collected and sent to Coquillett the phorid that bears his eponym. In 1908, he replaced William Ashmead at the U.S. National Museum specializing on Hymenoptera. He worked primarily on bees and chalcid wasps. He left in 1919 to pursue personal business interests but returned to entomology in 1923 when he worked at the North Carolina Department of Agriculture at Raleigh. From 1930 to 1940 he returned to quarantine work for the U.S. Bureau of Entomology. There he began an interest in thrips and remained in their employ until a few months before his death. He died in Bethesda, Maryland on 20 December 1950.

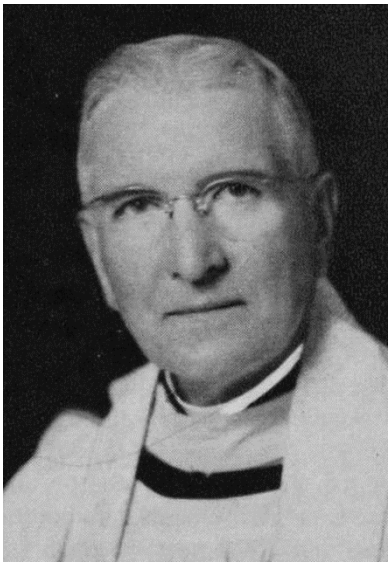
FERDINAND FREDERICK CREVECOEUR (1862–1931)



Sapromyza crevecoeuri Coquillett, 1898b: 278

Ferdinand Crevecoeur was born in Chicago on 23 June 1862, theson of a Belgian-born father and German-born mother. After the death of his father, he and his mother emigrated to rural Kansas where they settled on a homestead five miles north of Onaga. After his mother died, he lived alone and remained at the homestead the remainder of his life where he farmed the land. He had a strong love of natural history and became one of the state's foremost entomologists amassing a substantial collection of insects said by some to have been the largest in the state at the time. His first collection was donated in 1917 to Ottawa University in Ottawa, Kansas and his last collection, along with his library, was purchased by Kansas State University at auction after his death. He died on 14April 1931 at the family homestead in Pottawatomie County, Kansas.

ROLLA PATTESON CURRIE (1875–1960)



Ceratopogon curriei Coquillett, 1905: 62
Culex curriei Coquillett, 1901c: 259
Exorista curriei Coquillett, 1897: 94

Rev. Rolla Patteson Currie was born on 25 March 1875 in Preemption, Illinois, the son of a clergyman. During his childhood he developed an interest in natural history, especially birds. His family initially moved from Illinois to Iowa and then North Dakota. Currie attended the University of North Dakota and graduated with a B.A. degree in 1893 at the age of 18. His father died soon after graduating and he took a job in 1894 with the Smithsonian Institution where he specialized in Odonata. In 1904 he became employed as a U.S. Government Entomologist at the U.S. National Museum where he worked on Neuroptera and Odonata. He also became a member of the Washington Biologists' Field Club the same year. During his work with the federal government he went on expeditions to Liberia and British Columbia. In addition to his taxonomic work, Currie also worked as editor of the department's publications until his retirement in 1945. After retiring from entomology and studying at the Virginia Theological Seminary, he followed in the footsteps of his father and was ordained as an Episcopalian priest in 1946. In 1954 he was awarded an honorary Doctor of Divinity degree by Wesley College in Grand Forks, North Dakota. He fell ill two years later and died on 20 September 1960 and was buried in Grand Forks.

ANSTRUTHER DAVIDSON (1860–1932)

Brachycoma davidsoni Coquillett, 1894b: 172
Sarcophaga davidsoni Coquillett, 1892: 24

Anstruther Davidson was born in Watten, Caithnness, Scotland on 19 February 1860 and was a graduate of the University of Glasgow in 1881. He obtained a medical degree from the same university

in 1887 and emigrated to the United States in 1889 where he initially practiced medicine in Arizona, as the surgeon for the Arizona Copper Company from 1889 to 1890; and then moved to Los Angeles, California where he stayed the remainder of his life. Although being a dermatologist by specialty, Davidson was a naturalist at heart and spent a great deal of his leisure time collecting plants and insects and studying the botany of Southern California including the outlying islands. In 1923 he co-authored the *Flora of Southern California*. He was a fellow of the South California Academy of Sciences (later becoming the Southern California Academy of Sciences) where he had met Coquillett during one of their first meetings in the early 1890s; in the later 1890s he was a founding member of the University Club of Los Angeles. In addition to maintaining memberships in medical societies, he had also been an Associate Professor of Dermatology at the Medical School at the University of California since 1911. Three months after being struck by a car, Davidson died of his injuries on 3 April 1932.

RALPH DUNNING (FL. 1895)

Thryptocera dunningii Coquillett, 1895a: 54

No information could be found on this person except that he collected this fly in Connecticut.

JAMES WILLIAM DUPREE (1842–1906)

Culex dupreei Coquillett, 1904a: 10

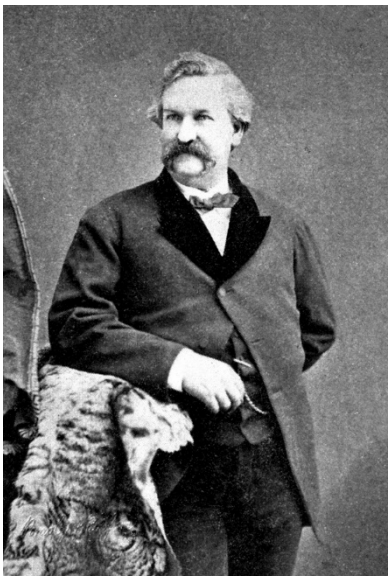
James William Dupree was born on 8 June 1842 in Jackson, Louisiana, the son of James Rives Dupree and Henrietta Johnson. He was educated at Centenary College in Jackson and obtained his medical degree at the New Orleans School of Medicine in 1861. In November 1862, he was appointed as assistant surgeon under General Bragg in the Confederate Army in Tennessee. After the Civil War was over, he returned to his parish in Louisiana to work on his mother's large plantation. In 1867, he moved to Baton Rouge to start up his medical practice. He remained there the rest of his life, attaining the position of Surgeon General for the State of Louisiana. Dupree had a great interest in mosquitoes and the ailments they helped cause and began a study on the life histories of them. He did not live to see the results of his efforts (he died in Baton Rouge on 25 May 1906), but was able to pass on his notes and illustrations to his assistant, Evelyn G. Mitchell. Mitchell, an illustrator and herself eventually becoming a surgeon in her own right, finished his manuscript and published the narrative and illustrations in her book "*Mosquito Life*" in 1907. Mitchell worked closely with Coquillett during the time both were involved on the Central American Mosquito Project with H.G. Dyar and Frederick Knab. Coquillett understood the profound influence Dupree had on Mitchell and respected the amount of work Dupree had put into studying the life histories of so many species of mosquitoes, thus he honored him with the eponym of *Culex dupreei*.

HARRISON GRAY DYAR (1866–1929)

Culex dyari Coquillett, 1902b: 192
Tanypus dyari Coquillett, 1902a: 85

A specialist on Lepidoptera, Dyar was renowned also for his mosquito work. Harrison Gray Dyar, Jr. (since his father of the same name died in 1875 he did not use the "Jr." title in his publications) was born on 14 February 1866 in New York City. His father's fortune made from inventions allowed young Dyar to be financially independent for most of his life. He attended MIT (Massachusetts Institute of Technology) in Boston and graduated with a B.S. degree in chemistry in 1889. From there, he received his Master's and PhD from Columbia University, the latter in 1895. Because of his publications on Lepidoptera and help in identifying many specimens for Howard, L.O. Howard (see below) offered him an unpaid appointment with the Division of Entomology of the USDA In November 1897, he was appointed by the Secretary of the Smithsonian as Honorary Custodian of Lepidoptera at the U.S. National Museum (also unpaid). In 1903 the Carnegie Institution in Washington made a grant to Howard to study and publish on the mosquitoes of North and Central America. Howard put Dyar, Knab (see part II) and Coquillett onto the project. The resulting work (after Coquillett had dropped out), which included detailed taxonomic accounts and association immatures with adults and descriptions of immatures, was a four-volume work entitled "*The mosquitoes of North and Central America*". Dyar continued to publish on Lepidoptera but his mosquito work solidified him as one of the best workers on the subject, aside from F.W. Edwards at the BMNH. Dyar traveled extensively in his study of mosquitoes and of Lepidoptera. Dyar was not an easy person to work with and had been referred to as cantankerous at best and never smiling. He was indeed an eccentric personality, having been accused of digging tunnels between two homes to visit two families he had in Washington, D.C. at the same time. This has been proven to be untrue, but he did dig tunnels! Dyar died on 21 January 1929 in Washington, D.C.

HENRY EDWARDS (1830–1891)



Anthrax edwardsii Coquillett, 1894c: 102

Henry Edwards was born in Hertfordshire, England on 27 August 1830 and, although studied law, had little aptitude for it. Instead, he fell in love with the theater and was so good at it, he gave performances in Australia, and Central and South America. In 1865, he performed onstage in San Francisco and liked the area so much, he decided to stay. He resided in the Bay Area from 1865 to 1877 before traveling back East to appear on stage; and eventually he resided there the remainder of his life. Aside from the theater, Edwards had an avid interest in collecting insects since boyhood, and a special interest in Lepidoptera. He spent most of his leisure time collecting and over the years amassed one of the best collections of Lepidoptera at the time and published a number of papers describing new species. While in California, he became associated with the California Academy of Sciences; and while residing on the East Coast was a

member of the Brooklyn Entomological Society, the Boston Society of Natural History, and the Torrey Botanical Club. In his later years, he spent time in the Catskills hoping to regain his health. He died in New York City on 9 June 1891. His collection of more than 300,000 specimens was acquired by the American Museum of Natural History, which also acquired his voluminous correspondence with numerous entomological colleagues.

GEORGE ALEXANDER EHRMANN (1862–1926)

Aldrichia ehrmannii Coquillett, 1894a: 94

George Ehrmann was born in February 1862 in Hamburg, New York, the son of German-born parents Christian Ehrmann and Christina Schmidt who were farmers. They lived in that eastern New York town for the first eight years of Ehrmann's childhood before moving about 100 miles south to the Pittsburgh area of western Pennsylvania. Trained as a technical glass worker, he had a creative mind and invented a number of appliances to increase the effectiveness of glass works. He also had a long interest in natural history, was self-educated in the subject after public schools, over the years amassing substantial collections of Lepidoptera, Coleoptera, and birds. He spent much of his savings acquiring specimens and literature. His library in 1906 was said to contain over 6,000 titles. He was a founder of the Entomological Society of Western Pennsylvania and made collections from the area in order to assess the fauna from the region. It was one of these specimens collected that was sent to Coquillett, who named the new genus for John Merton Aldrich (see above) and the species for Ehrmann. The species is a rather striking bee fly that occurs throughout Appalachia and I have had the pleasure in collecting it in West Virginia. Unmarried, Ehrmann lived for many years in Charleroi, a town on the Monongahela River south of Pittsburgh, then moved to Pittsburgh where he lived for the last 36 years of his life. He died of cirrhosis of the liver on 30 January 1926. His collections and library were donated to the Carnegie Museum in Pittsburgh after his death.

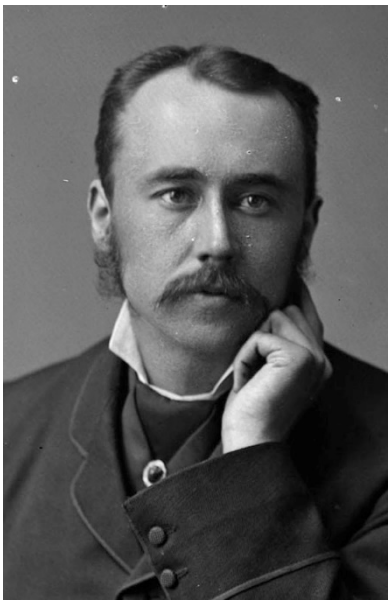
GUSTAVUS AUGUST EISEN (1847–1941)

Anopheles eiseni Coquillett, 1902b: 192

Born in Stockholm on 2 August 1847, Gustav Eisen received his doctoral degree at the University of Uppsala in 1873. He joined an expedition to California sponsored by the Swedish Academy of Sciences the same year and liked the area so much he stayed. He loved exploration and was said to have "explored" the entire state from 1882 to 1900. He made collections in Baja California, Mexico and Guatemala at various times between the years 1880 and 1899. He was associated with the U.S. Department of Agriculture under L.O. Howard between 1910 and 1915. Coquillett, during his years in California from 1883–1893 got to know and respect Eisen, with whom he consulted often about entomological matters. Eisen became a member in 1874 (life member in 1883) of the California Academy of Sciences in San Francisco, where he was curator of

marine invertebrates. Among many notable feats, he introduced avocados and Smyrna figs to the state, and campaigned to save the giant sequoias. He passed away on 29 October 1940 and his ashes were interred at the base of the mountain named after him in Sequoia National Park in California.

JAMES FLETCHER (1852–1908)



Culex fletcheri Coquillett, 1902a: 84

Born in Kent, England on 28 March 1852, James Fletcher was a self-trained naturalist and was involved in economic entomology research in Canada. He was Dominion entomologist and botanist from 1887 to 1908. It was in this capacity that he had sent mosquito specimens to Coquillett for identification, which resulted in *Culex fletcheri* being named for him. Fletcher's interest in entomology would only be seen after a initial period of service in the British Bank of North America in London, eventual transfer to the Montreal Branch in 1874, and as an accounting clerk in the Parliamentary Library. Like Hague Harrington (see below), he was a founding member of the Ottawa Field Naturalist's Club and published on various subjects including botany, beetles, and insect control. He was also a founding member of the American Association of Economic Entomologists and a leader in the study of insect control, the latter where he developed a national reporting system to help control the spread of injurious insects. His expertise in economic entomology and value to Canadian agriculture resulted in him being the first Dominion Entomologist and Botanist and his helping found the Central Experimental Farm in Ottawa (where the Canadian National Insect Collection is now located and recognized as a National Historical Site in 1997). Fletcher died in Montreal on 8 November 1908.

EDWARD HENRY "NED" HARRIMAN (1848–1909)

Ornithodes harrimani Coquillett, 1900: 400

American railroad executive Edward Harriman was born on 20 February 1848 in Hempstead, New York, the son of clergyman Orlando Harriman Sr. An errand runner in New York City as a boy, he was quick to work his way to a job on Wall Street bythe age of 22. After becoming interested in buying and reorganizing bankrupt railroads and selling them for profits, he eventually became president of the Union Pacific Railroad at the age of 50. Harriman's name on this list of eponyms is a result his sponsoring a lavish faunal and floral expedition along the Alaska coastline. The expedition originated as a consequence of his exhaustion from work and his doctor recommending a long vacation. Harriman conceived of a large party of scientists accompanying him while he hunted bears and they surveyed the fauna and flora of the Alaskan wilderness. Prominent scientists such as John Muir, Robert Ridgway, Trevor Kincaid, C.H. Merriam, and Henry Gannet went on the trip, which was aboard a specially fitted 250-foot long steam locomotive. The total count of scientists, writers, servants, packers, guides, taxidermists, rail crew, and family entourage was 126. Harriman died in 1909 before the full expedition's report was finished. The expedition resulted in

14 volumes of scientific results published over a ten-year span (1901–1910). The results of the insect surveys were large enough to occupy two volumes (8 and 9).

WILLIAM HAGUE HARRINGTON (1852–1918)

Exoristoides harringtoni Coquillett, 1902a: 110

Hague Harrington was born in Sydney, Cape Breton, Nova Scotia on 19 April 1852. After private schooling in Cape Breton and at the Sydney Academy, he came to Ottawa in 1870 to work in the Post Office Department and worked his way up through promotions to become Superintendent of the Savings Bank Branch of that department. Although a devoted naturalist, and just as good a botanist as entomologist, those activities were restricted to his spare time. Despite this, he was a founder and active member of the Ottawa Field Naturalist's Club, and its president in 1885. He was particularly active in Hymenoptera but amassed a substantial collection of Coleoptera as well. After 45 years of civil service in the Post Office, he was given superannuation and looked forward to spending time devoted to his love of entomological studies. However, a lingering anemic condition kept him from spending the time he wanted on insects and it gradually undermined his system. After a stroke and paralysis, he did not recover and passed away on 13 March 1918.

JAMES STEWART HINE (1866–1930)

Meigeniella hinei Coquillett, 1902a: 104

Dipterist James S. Hine was born at the family farm in Wauseon, Ohio on 13 June 1866. He was educated in local schools and entered Ohio State University where he received his B.S. degree in 1893. For the remainder of his years, his life would be centered at the University, as a faculty member teaching entomology and administrating the Natural History Division of the Ohio State Natural History and Archeological Museum. His first interest was in Diptera and he collected extensively in that group as well as Coleoptera. His major contributions were monographs on the Tabanidae and Asilidae, but he also wrote papers on Stratiomyidae, Ephydridae, and Syrphidae. In addition to his insect collecting, he was also a collector of books. Having purchased a portion of the C.H.T. Townsend library, he expanded upon it to eventually turn it into a superior Diptera reference library at the time of his death. He died on 22 December 1930 in Columbus, Ohio.

ANDREW DELMAR HOPKINS (1857–1948)

Mycetophila hopkinsii Coquillett, 1895c: 200

Andrew Delmar Hopkins was born on 20 August 1857 in Jackson County, Virginia (now West

Virginia). Although he did not ever have formal college training, Hopkins became one of the foremost entomologists in the country and the first forest entomologist. He was professor of economic entomology at West Virginia University from 1896–1902 and then accepted a job with the USDA Bureau of Entomology in 1902 and became head of the Forest Entomology section when it was established in 1904. During his career observing plant-insect interaction he developed some principles, one of which, the Hopkins Bioclimatic Law has been of use in my collecting flower-visiting flies in North American deserts. It postulates that biological events occur in the spring four days later for each degree of latitude northward, five degrees longitude eastward, or for every 400 feet above the ground. With some exceptions and modifications due to drought or other exacerbating environmental conditions, this principle has worked generally well in estimating flowering times of some desert flowering plants that are visited by Bombyliidae and other pollinators. Hopkins ceased his official work with the government in 1923 but continued his studies on bioclimatics at his farm in West Virginia, publishing his "*Bioclimatics, a science of life and climatic relations*" in 1938. Hopkins died at his home in Parkersburg, West Virginia on 22 September 1948.

GARRY DE NEUVILLE HOUGH (1861–1927)

Sapromyza houghii Coquillett, 1898b: 277

Garry de Neuville Hough was born in Vineyard Haven, Massachusetts on 19 April 1861 and died there on 31 May 1927. In between those events Hough became a well-known physician and surgeon residing and working in New Bedford, Massachusetts. Hough's mother died a few years after he was born. After his father remarried and moved with his new wife to New York, Hough went to live with his maternal grandparents in Tisbury, Massachusetts and was schooled at the Friend's Academy in New Bedford, Massachusetts. During his boyhood days he had an avid interest in entomology, especially breeding and rearing Lepidoptera, which he kept up until he entered Harvard College in January 1878. He obtained a bachelor's degree from Harvard in 1881 and continued his postgraduate education at Bellevue Hospital Medical College in New York where he obtained his medical degree in 1884. During his schooling at Harvard he was a frequent visitor to the insect collections there, at the time under the supervision of Hermann August Hagen. Hough's interest in Diptera, especially cyclorrhaphous Diptera, was sparked in 1894 when he was working as a medical examiner and began studying the flies that were attracted to corpses. He knew that the time of death could be calculated based on the knowledge of the duration of the immature stages of the flies and thus began studying the muscoid and oestroid Diptera that were attracted to those corpses, amassing a collection, accurately identifying, and improving upon the classification of those families. He ceased work on dipterology in 1903 in order to spend more time in his medical practice in New Bedford, where he was chiefly involved in orthopedic surgery. He maintained memberships in the New England Surgical Society and the American Medical Association, and was a fellow in the American College of Surgeons. His entomological collection and

library were sold to the University of Chicago in 1903.

LELAND OSSIAN HOWARD (1857–1950)

Psorophora howardii Coquillett, 1901c: 258

Leland Ossian Howard was born on 11 June 1857 in Rockford, Illinois, the son of a lawyer father, Ossian Gregory Howard and Lucy Dunham Thurber. While he was still a child, the family moved to Ithaca, New York, where he grew up, and enjoying collecting things in the beautiful countryside. Howard was educated at private schools in Ithaca before enrolling at Cornell University there. He initially studied in civil engineering but difficulty in conquering differential calculus caused him to switch over to natural history. There he studied under entomologist J.H. Comstock, who encouraged his interests in natural history and he graduated in 1877, hoping possibly to get into medical school. In 1878, Comstock suggested him as an assistant to C.V. Riley in the U.S. Department of Agriculture in Washington, D.C. Howard liked entomology and thought that it would at least be a paid job until he could find something better. He began work in Washington, D.C. a few years later but Riley put him to work as a clerk, and not an entomologist. Comstock eventually succeeded Riley and Howard worked under him and produced studies toward his thesis for a Master's Degree at Cornell. Howard received his M.S. in 1883. WhenComstock became ill and relocated to Florida for his health, Riley replaced him and kept Howard as his assistant. Howard worked for him until Riley resigned in 1894 and Howard took his position as Chief Entomologist of the U.S. Department of Agriculture. After almost 50 years of service, Howard retired in 1927. During his career, Howard was the single man most responsible for making entomology an important part of the U.S. Department of Agriculture, building it from a Division with only a handful of staff, to a Bureau with several hundred staff and field stations throughout the country. He published numerous papers on insects of medical and agricultural importance, encouraged his staff in every way and gave them the resources they required, and was an excellent spokesperson for applied entomology. He maintained a number of professional societal memberships and was an active member of the Cosmos Club in Washington, D.C. that counted many important scientists, lawyers, literati, and even three U.S. presidents, among its fold. Howard never received a PhD but to honor his significant contributions to medical entomology received honorary doctorates from multiple universities including Georgetown, Rutgers, California, Toronto, and Pittsburgh. After retirement, he moved for a short time to France, but moved back to Bronxville, New York when his eyesight and back began to fail him. He died there on 1 May 1950.

HENRY GUERNSEY HUBBARD (1850–1899)

Henicomyia hubbardii Coquillett, 1898a: 187
Sapromyza hubbardii Coquillett, 1898b: 277

American naturalist, Henry Hubbard was born on 6 May 1850 in

Detroit, Michigan, the son of Bela Hubbard, a founding member of the American Association for the Advancement of Science, and Sara Eliza Baughman. He was educated at private schools in Cambridge, Massachusetts as well as by tutors in Europe. In 1869 he attended Harvard College, working closely with H.A. Hagen, E.A. Schwarz, Louis Agassiz, and visiting dipterist, C.R. Osten Sacken; and graduated from there in 1873. In 1879 he was appointed naturalist to the Geological Survey of Kentucky and made significant contributions to the cave fauna of Mammoth and other caves. In 1881 he was appointed as Special Field Agent of the U.S. Department of Agriculture to study citrus pests in Florida. His efforts results in his "*Insects affecting the orange*" in 1885. He traveled to the West Indies with C.V. Riley in 1894, but his frail health prevented him from spending much more time in the tropics. He moved to the Arizona in 1897 hoping the drier climate would improve things. He and his lifelong friend Schwarz managed to collect together there during his short time in the southwest U.S. Unfortunately, his health did not improve. He returned Detroit in 1898 and died of tuberculosis there on 18 January 1899.

WALTER DAVID HUNTER (1875–1925)

Hermetia hunteri Coquillett, 1909: 212

Hunter was born in Lincoln Nebraska on 14 December 1875 and studied at the University of Nebraska obtaining his bachelor's degree before his twentieth birthday. After graduating he worked at the University on migratory locusts in 1897 and 1898 under Prof. Lawrence Bruner. His work on migratory locusts caught the attention of the U.S. Department of Agriculture and he was appointed in 1901 as a Special Field Agent to study the boll weevil in Texas, which is where the stratiomyid Coquillett described in his honor had originated. As the boll weevil spread in the Southeast United States, Hunter moved his laboratory, eventually settling in Louisiana. His efforts succeeded in exterminating the weevil in Louisiana and brought about its near extinction in Texas. In addition to the boll weevil, Hunter and his associates diversified their studies into ticks and mosquitoes. He excelled in economic entomology and was elected president of the American Association of Economic Entomologists in 1912. He died suddenly in El Paso Texas on 14 October 1925.

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Some reminiscences of Roger Crosskey
(1930– 4th September 2017)

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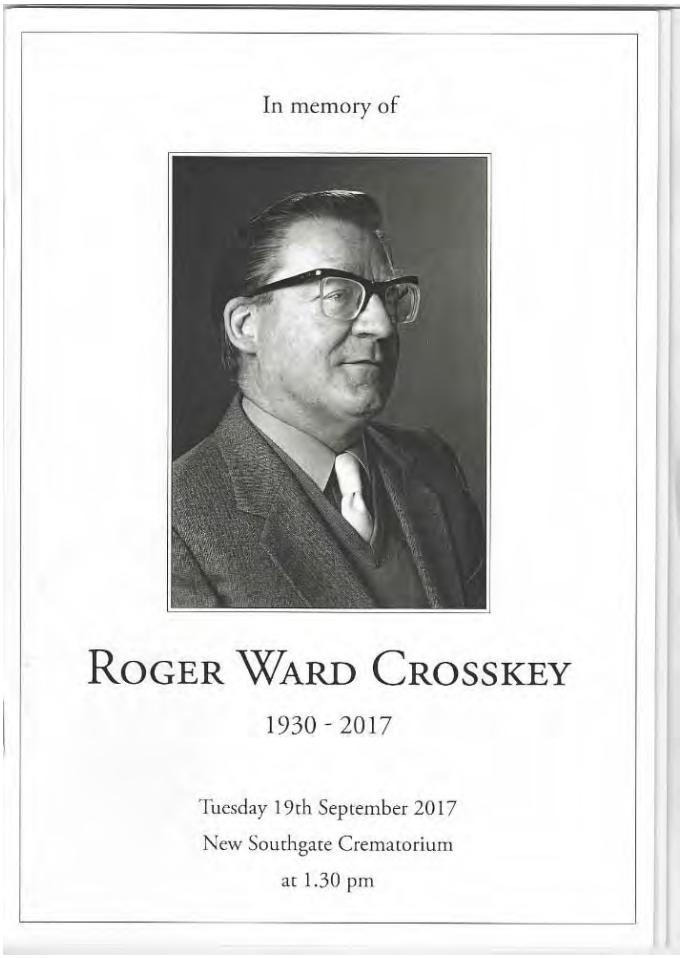
In memory of

ROGER WARD CROSSKEY

1930 - 2017

Tuesday 19th September 2017
New Southgate Crematorium
at 1.30 pm

It may seem unusual for a brash juvenile of the sixties to acknowledge the 'colonial era' entomologist Roger Crosskey who graduated from Imperial College the year I was born as one of his key mentors, but it is true. Roger and I overlapped for more than a decade in the Diptera Section (later Diptera and Medical Insects) of the British Museum (Natural History). Indeed as I recall, I succeeded him as the section head when senior personnel such as Roger were liberated from administration to 'write what they knew' before retirement. Roger, of course, was getting on just fine managing his staff with a light touch while remaining unimpeded as a prolific publisher and world-wide collaborator. It helped that his first drafts of all that he wrote were ready to go to journals without an editor's red pen in sight. Indeed we wondered why he accepted a word processing computer when such impeccably written drafts came straight from his typewriter.

I look back on his influence in several ways. He wrote beautifully and fluently and encouraged others to do so in the politest way, and always spared the time to discuss effective communication. He argued by words and his actions that we 'owed' it to the funders (government / taxpayers) that we should publish what we studied and make it available appropriately and in timely manner. This meant engaging with 'applied' entomology even for taxonomists of the more obscure and taxonomically intransigent of insects. Of course medically significant insects are topical and have a wide audience, as for his co-edited 'Medical Insects and Arachnids" (Chapman and Hall, 1993, revised 2012; with Richard Lane). However to my mind his post-administration magnum opus 'The Natural History of Blackflies' (Wiley, 1990) epitomised the blend of 'applied' and 'theoretical': in total, the natural history of a taxon. Reviewers expressed amazement at the breadth and depth of coverage of all facets of the lives and impacts of these insects. Simuliids were brought up to a par with the Culcidae in the accessible literature. As ever, reviewers and users recognised also the accuracy and thoroughness of the referencing and indexing (aided byhis wife Peggy) that his Museum colleagues had come to expect.

In a highly anticipatory way, Roger made calculations (with the help of entomology librarian Pam Gilbert), for a precursor of scientific citation metrics in approximating the publication rates of those who he considered to be top scientists in their fields. This may have originated from insights gained in his major oversight and chief editorship of the 'Afrotropical Diptera Catalogue'. Whatever the sources, an identified goal of '3-5 primary papers per year' plus book chapters, edited volumes and even complete books – has stayed with me across my career. At that time in the Museum he shared this view with Doug Williams and consecutive Keepers Paul Freeman and Laurence Mound, who also came from applied agronomy / entomology backgrounds and argued and demonstrated such relevance. Not all our colleagues agreed or delivered their research in such a productive and targeted manner as Roger.

Same of Roger's interests in practical issues that influenced me to this day included identification of the 'mihi itch' (self promotion by describing new taxa with little or no justification) and the ratio of genera to species in our two major research groups (tachinids and chironomids) and what this implied regionally and across the globe. These calculations derived from his curiosity about what became called 'biodiversity studies', although undertaken then with especially serious impediments to accessing the underlying data. Further, Roger's rationale for the regional name 'Afrotropical' derived from his dissatisfaction with the then-prevailing match to the whole continent of Africa (i.e. including North Africa) – this name has found almost total acceptance.

Curiously, Roger seemed to me reticent to promote his work on demographics (of humans and simuliids) in the onchocerciasis focus of Nigeria, during the 1950s. I was happy to encounter a recent review (Bump 2014) recognising his (and Peggy's and later John Davis') pioneering groundwork showing that adult control would not affect rates of transmission and making the case that internationally collaborative larviciding would control onchocerciasis. I'd guess that for Roger the studies were no more than the expected duties of a professional entomologist in the colonial service. Humbleness was a Roger 'trademark'.

Roger was an engaged entomologist and generous with his time and advice – he was a Fellow of the Royal Entomological Society and the Royal Society of Tropical Medicine and Hygiene and a council member of the RES for some years. He attended meetings regularly and encouraged others to do so, at a time when not all his colleagues across the road from Queen's Gate felt the same way. His roles in taxonomic issues were the same – he provided an open door for questions and gave sage advice and encouragement to be engaged in nomenclatural issues.

Lastly, I recall also Roger's genuine pleasure in celebrating events within our section – the promotions, the recruitments, and especially in recognition of the completion of projects such as the monumental Afrotropical catalogue. This truly section-wide enterprise involved all of us, especially in the compilation of the massive index in the pre-computer era ! All too often we pass on to the next 'urgent' project without taking a breath and acknowledging everyone involved in finishing the previous one. Not so for Roger, and at such social events we were regaled with humorous, empathetic and affectionate tales from the colonies. All this led an impressionable Peter Cranston to get the entomological travel itch, which continues, as I write from Angola (but its more for bird watching these days). Thank you for being an exemplary mentor Roger.

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Macquart and Meigen collections at the Muséum National d'Histoire Naturelle, Paris

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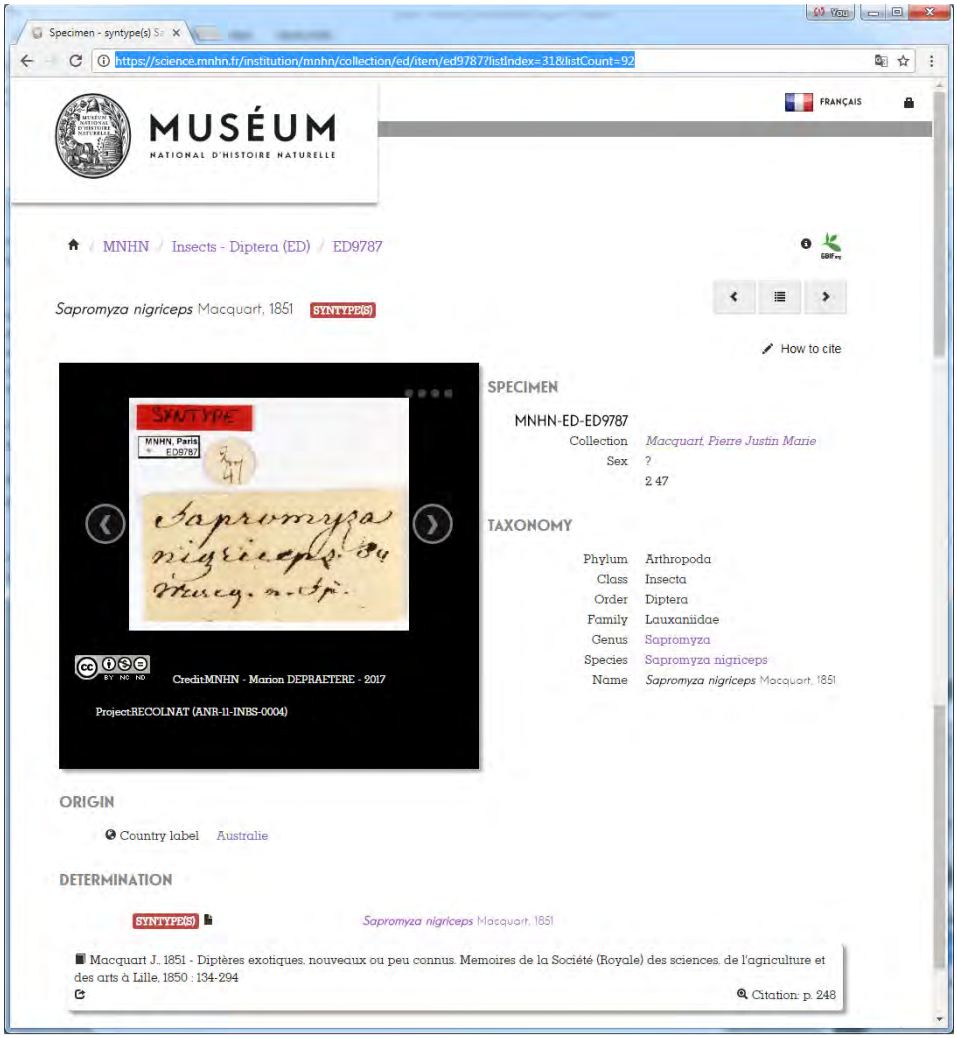
This is just a short note to informeveryone of a great resource I came across! On a recent trip to Paris to visit the Muséum National d'Histoire Naturelle, I was shown a very interesting website by Ernest Delfosse, one of the technicians in the Diptera collection. This website is the searchable database for the Macquart and Meigen collections of Diptera at MNHN, including such things as the Blanchard types in the Macquart collection! Each has a unique specimen number, and a permalink to the record. For primary types (and some secondary types), there are also photographs of the labels and specimens. In addition, current combinations are noted, label data is transcribed, the original description is cited, etc. I'm sure this will be a very useful resource for many dipterists!
https://science.mnhn.fr/institution/mnhn/collection/ed/item/search



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MEETING NEWS

A report from the NADS 2017 Field Meeting at Lubrecht Experimental Forest, western Montana (June 26th–30th)

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The last week of June attracted 26 Dipterists (plus a lichenologist and a writer) to the lush environs of Lubrecht Experimental Forest (about 30 miles east of Missoula, MT), for the 2017 NADS Field Meeting. The meeting was very productive, with collecting excursions to several unique sites and a strong slate of participant presentations.

Figure 1. The participants of the 2017 Field Meeting. Left to right: Juan Manuel Perilla-Lopez, Steve Marshall, Qifei Liu, Daichi Kato, Jon Gelhaus, Greg Dahlem (seated), Andrew Fasbender (standing), Brad Sinclair, Erick Rodriguez, Bruce Sutton, Bill Grogan, Greg Courtney, Zell Smith, Fenja Brodo (front), John Stireman (back), Jim O'Hara, Kevin Moran (front), Jim Hogue (back), Jeff Skevington, Dayse Willkenia (front), Andrew Young (back), Mihaly Foldvari, Lauren Garrett, Mauren Turcatel, Gary Steck. Not pictured: George Alberts, Irwin Brodo, Charlotte Herbert. (credit Irwin Brodo)

Monday the 26th served as a travel day for most participants, though several came into town early. A couple of groups drove along the Garnet Range Road just east of the conference center, which snakes its way into the higher elevations of the Garnet Range, eventually arriving at the Garnet Ghost Town. John Stireman, Jim O'Hara, and Greg Dahlem found Union Peak to be a promising site for hilltopping, and returned to the area on both Tuesday and Wednesday. Monday night officially opened the meeting with Mauren Turcatel providing an overview of the Smithsonian's efforts to establish a collection of Diptera genomes, with a request for participants to collect members of their taxa live for her to preserve in liquid nitrogen for said collection. An overview of the geological and biotic history of western Montana was also given for the group. Finally the night was concluded with a group discussion of how to formalize the process through which the next C.P. Alexander award will be granted.

Figure 2. The Castles Forestry Center at Lubrecht Experimental Forest (credit Greg Dahlem)

On Tuesday most of the participants travelled to the Nature Conservancy's (TNC) Clearwater Blackfoot Project, a 117,000+ acre (47,000+ hectare) tract of former timber company land. The area is in the early stages of forest succession from timber harvesting in the 1980s, with the western portion of the property burned in 2003 by the Mineral-Primm wildfire. We met with Chris Bryant of TNC at the "seven mile" bridge over Gold Creek, where he gave an informative presentation on TNC's work in Montana and the planned restoration of the site. Initial collecting was in the meadows around the bridge (which proved to be productive for crane flies, predacious ceratopogonids and asilids), then moved north to a series of beaver ponds along a side branch of Gold Creek. Late in the day a couple of cars drove towards the Gold Creek trailhead, where the syrphid and pipunculid workers found an extremely productive site consisting of a flowering hillside under an old growth forest.

Figure 3. Oesteroidea workers atop Union Peak. John Stireman, Greg Dahlem, Juan Manuel Perilla-Lopez, Jim O'Hara (credit Jim O'Hara)

Figure 4. Tipuliodea workers along Rock Creek. Qifei Liu, Fenja Brodo, Jon Gelhaus, Jim Hogue, Daichi Kato. (credit Jon Gelhaus)

Wednesday saw the syrphid and pipunculid group joining the oestroid workers for further hilltopping on Union peak and a return to Gold Creek, while the remaining group travelled to Rock Creek, a scenic trout stream which cuts through the middle of the Sapphire Mountains. Despite my fears that flooding earlier in the month would have rendered the first site at Valley of the Moon unproductive, the crane fly workers found a number of taxa, with the highlight being the capture by Daichi Kato of a specimen of an elusive *Protanyderus* (Tanyderidae). After lunch the group split up to explore several of the smaller tributaries to Rock Creek, with the parking lot at Grizzly Creek Trailhead proving to be an magnet bombyliids exploited by Lauren Garrett. Wednesday night ended with Greg Courtney soliciting input on what changes the community would like to see in the general Diptera chapter of the coming fifth edition of *An Introduction to the Aquatic Insects of North America*.

Figure 5. Jim O'Hara and Greg Dahlem at the south fork of Trout Creek along the Heart Lake Trail. (credit Greg Dahlem)

The last full day of collecting (Thursday, June 29th) was the furthest afield. Trout Creek, a tributary of the Clark Fork River in the northern Bitterroot Mountains near Superior, MT (about an hour and a half drive west of Lubrecht), shows very strong Pacific climatic and floral influence. The area has a range of habitats, with the lower portion of the creek densely cloaked in western red cedar, climbing up to subalpine forest and meadows at Hoodoo Pass on the Idaho border. While the previous days were sunny and dry, this third full day of collecting was largely overcast and cool. Desite the suboptimal weather, there were a number of interesting taxa collected. The lower part of Trout Creek and its tributary Windfall Creek provided two species of *Deuterophlebia*, while the Heart Lake Trail and seepages along Trout Creek road had good crane fly collecting. Finally, a large wet meadow along Hoodoo creek just below Hoodoo pass provided more crane flies and a number of syrphids, despite large amounts of snow pack remaining in the shade of the treeline. Thursday night was capped off by a discussion about where the 2019 NADS Field Meeting will be held, and Jeff Skevington generously offered to look into a couple of options that were suggested.

Figure 6. Steve Marshall photographing syrphids along the Heart Creek trail.

Friday the 30th consisted mostly of participants packing up and travelling home or to other destinations, though a group of brave syrphid and pipunculid workers followed me to Bass Creek, which cuts a steep walled canyon in the central Bitterroot range into the Bitterroot Valley. By early afternoon, after some mixed collecting, we parted ways and the meeting officially ended. Overall I enjoyed hosting the meeting, and thank everyone who participated.

As a postscript, though the winter of 2017 was one of the coldest and wettest on record, the summer ended up being one of the hottest and driest. This lead to a particularly bad fire season after the end of the meeting, with large burns near almost all of the areas visited. The Liberty fire burned over 28,000 acres (11,300+ hectares) at the northeastern end of the Nature Conservancy Clearwater Blackfoot lands, burning the beaver dam area and moving through the old growth forest across the National Forest boundary. In the Rock Creek drainage the Goat Creek Fire burned 8,300 acres (3300+ hectares) along the east side of Rock Creek Road between Valley of the Moon and Grizzly Creek (fortunately neither locality was burned). The Sunrise Fire spread over 26,000 acres (10,500+ hectares) to the southeast of Trout Creek and burned the south slope of the drainage, stopping only at the creek.

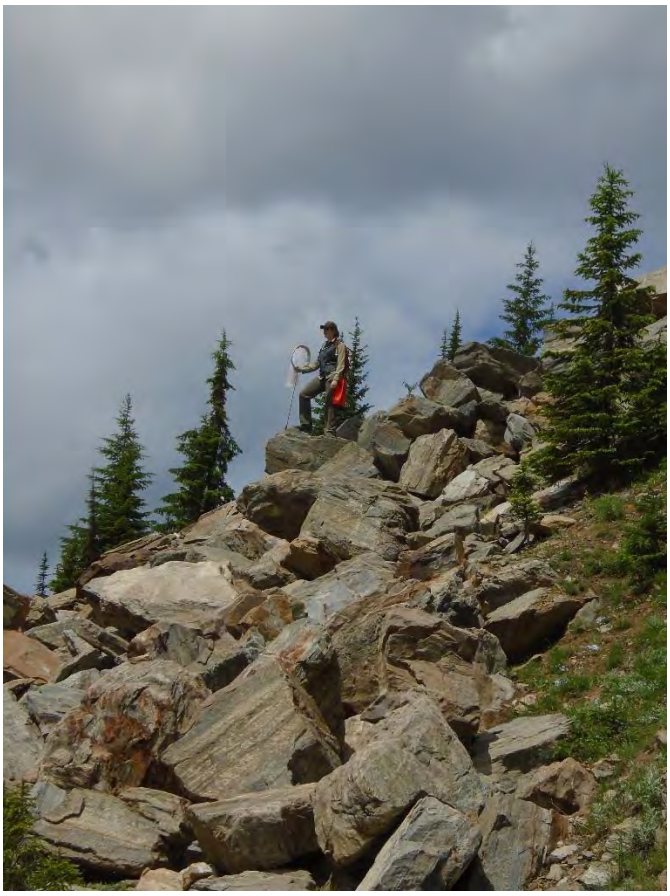

Figure 7. Charlotte Herbert traversing a talus slope at Hoodoo Pass.

Figure 8. Juan Manuel Perilla-Lopez and John Stireman looking into Idaho at Hoodoo Pass.

Fortunately Gray Gulch, Windfall Creek, the Heart Lake Trail and Hoodoo Pass areas were unaffected. Finally, the Lolo Peak fire burned over 56,000 acres (22,000+ hectares) from Lolo Creek south nearly to Bass Creek, where it was stopped only by the arrival of fall rains in mid-September. Of course this emphasizes the importance of fire ecology and the ongoing changes to the landscape of western Montana! That being said, there remain large tracts of undisturbed forest and uncataloged Diptera diversity in the region.

Presentations

Fenja Brodo "Bioblitzing and black lighting in Larose Forest, Ottawa"
Andrew Fasbender "A short natural history of western Montana"
Jon Gelhaus "The beautiful iconic aquatic crane fly *Tipula abdominalis* is actually three species: the intersection of taxonomy, aquatic ecology and citizen science"
Daichi Kato "An introduction to Japanese Diptera and my research on Japanese craneflies."
Steve Marshall "Construction, deconstruction and reconstruction: new keys for the identification of Diptera."
Kevin Moran "Evolution of Hymenoptera mimicry in the subtribe Criorhinina (Syrphidae)"
Juan Manuel Perilla-Lopez "Five new species of the genus *Phytomyptera* (Diptera: Tachinidae)"
Erick Rodriguez "Fruit fly survey in South America: Research facilities and logistics"
Brad Sinclair "Walker's female types of North American *Rhamphomyia"*
Jeff Skevington "Field Guide to the hover flies (Syrphidae) of Northeastern North America"
John Stireman "Tachinid fly parasitoids of the monarch butterfly in Eastern North America"
Mauren Turcatel "Collecting flies in liquid nitrogen for genomic research"
Dayse Willkenia "Taxonomic revision of *Elmohardyia* Rafael (Diptera, Pipunculidae)"
Andrew Young "Australian *Psilota*: a colourful radiation of an enigmatic group of Syrphidae"

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9th International Congress of Dipterology
http://icd9.co.za/
25–30 November, 2018, Windhoek, Namibia

Ashley Kirk-Spriggs, ICD9 chair

National Museum, 36 Aliwal Street
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Following is an extract from the Second Circular (http://icd9.co.za/wp-content/uploads/2017/11/ICD9-Second-circular.pdf) for general interest about the scientific program, and giving relevant dates and information for registration, abstract submission, etc. Please consult the ICD9 website (http://icd9.co.za/) and the Second Circular for more details, including post-Congress tours, travel information, social events, information on accommodations and accompanying persons, and invitations from the Council for the International Congresses of Dipterology and the ICD9 Organizing Committee.

Registration information
Separate online forms for Registration (http://icd9.co.za/registration/) and Abstract submissions (http://icd9.co.za/abstractsubmissions/) are now available on the ICD9 website, and Registration is now open to delegates. Payment should be made at the time of Registration. Note, no registrations or abstract submissions will be allowed after 1 September 2018.

Full registration includes the following: attendance at all sessions and social functions and coffee breaks (except the Congress banquet), hot buffet lunches, a ICD9 congress bag, printed copies of the Programme and Abstracts Volume, a free ICD9 T-shirt and coffee mug and other promotional materials included in the Congress bags.

The Congress formally begins with the Welcome reception at 6:00 pm on Sunday 25 November 2018 and ends at the conclusion of the Closing ceremony on Friday 30 November 2018. Note: no lunch will be provided on Sunday 25 November 2018.

Important dates

Early registration:	20 November 2017 – 28 February 2018
Regular registration:	1 March 2018 – 30 June 2018
Late registration:	1 July 2018 – 1 September 2018.
Student registration:	20 November – 1 September 2018
Accompanying Persons' registration:	20 November – 1 September 2018
Cancellation (75% refund)	up to 28 February 2018
Cancellation (50% refund)	up to 30 June 2018

Registration fees
Registration costs per delegate are indicated below in Namibian dollars (N$), with estimated US dollar (US$) equivalents in parentheses.

Early registration:	N$4200	(±	US$295)
Regular registration:	N$4800	(±	US$337)
Late registration:	N$5200	(±	US$365)
Student registration (*):	N$3800	(±	US$266)
Accompanying Persons registration (**):	N$2000		(± US$140)
Congress banquet (not included)	N$800	(±	US$55)

(*) Students must submit a letter from their supervisor/advisor/head of department on a university letterhead confirming their status as full-time students at the time of registration.
(**) Practicing dipterists do not qualify as "accompanying persons". The registration cost includes hot buffet lunches, attendance at all social functions (except the Congress banquet) and attendance at partners' presentation/s. Day tours for accompanying persons are paid separately.

Notes on registration and abstract submission
Abstracts are required for both oral and poster presentations. They must be submitted online through the Congress website using the "Abstracts submissions" website icon.

Please consult the "Registration guidelines" (http://icd9.co.za/registrationguidelines/) on the Congress website BEFORE registration and abstract submissions. This provides details of how to register and submit abstracts and provides details on how the on-line secure payment system operates.

Please submit your abstracts as soon as possible to allow processing. The deadline for abstract submissions is **1 September 2018**, after which date NO further abstracts can be submitted or considered. This is to allow ample time to edit and print the Abstracts Volume. Note, **only** registered delegates are allowed to submit abstracts. Abstracts submitted from unregistered delegates will be deleted.

Scientific Program
The overall theme of the Congress will be "Afrotropical Dipterology" and specific symposia are included in the scientific programme that have special relevance to African delegates, but the scientific programme also includes other general thematic and taxon-based symposia and poster sessions and all major aspects of dipterology, including systematics, morphology, evolution, biodiversity and conservation, ecology, agriculture and forensics are covered.

Plenary talks (http://icd9.co.za/plenaries/)
1) Unmitigated gallers – specialisation leads to diversification in the Cecidomyiidae
Netta Dorchin
2) The research-casework continuum in forensic dipterology
Martin Hall
3) Resolving the Fly Tree of Life
Michelle Trautwein
4) *Culicoides* as vectors for viruses causing disease in livestock
Rudolf Meiswinkel
5) Phorid fly diversity – frontiers in species richness, structure and behaviour
Brian V. Brown

Banquet Address

Africa and me! – a dipterist's perspective
Martin Hauser

Symposia

Symposium title submissions have now closed! A total of 25 symposia titles will be included in the Programme (see below) and are posted on the official website http://icd9.co.za/symposia-titles/ Symposium Convenors should now begin actively seeking speakers for these. A minimum of six speakers was specified on the website, but fewer can be accommodated in the programme if necessary. Delegates are requested to read the list with care before on-line submission to ensure their talks apply to the most relevant symposium.

Advances in Afrotropical dipterology
Convenors: Burgert S. Muller & Ashley H. Kirk-Spriggs – burgert.muller@nasmus.co.za
Diptera of Madagascar – historical biogeography and biodiversity
Convenors: Mike Irwin & Rin'ha Harin'Hala – meirwin@illinois.edu
Advances in Neotropical dipterology
Convenor: Claudio J.B. de Carvalho – cjbcarva@gmail.com
Flies in time – how fossils change our understanding of Diptera evolution
Convenor: Vladimir Blagoderov – V.Blagoderov@nms.ac.uk
Vectors of human disease, biology and environment
Convenors: Shüné Oliver – shuneo@nicd.ac.za
Veterinary Diptera as vectors of disease
Convenor: Karien Labuschagne – labuschagnek@arc.agric.za
***Tsetse* population dynamics and climate change forecasting**
Convenors: John Terblanche & John Hargrove – jst@sun.ac.za
Forensic dipterology
Convenors: Martin Villet & Kirstin Williams – m.villet@ru.ac.za
Tephritoidea – applied research and taxonomy
Convenors: Minette Karsten, Olivia Reynolds & Marc De Meyer – minettek@sun.ac.za
The importance of Diptera in plant-pollinator networks
Convenor: Kurt Jordaens – kurt.jordaens@africamuseum.be
Diptera interactions with amphibians
Convenor: Gunnar Mikalsen Kvifte – gkvifte@purdue.edu
Biodiversity surveys and conservation of Diptera
Convenor: Marc Pollet – mpollet.doli@gmail.com
Morphological character systems in lower Diptera
Convenor: Gregory Curler – gcurler@gmail.com
Morphological tools, techniques and trees
Convenors: Torsten Dikow & John Hash – hashjm@si.edu
Calyptrate evolution and diversity
Convenors: Pierfilippo Cerretti, Thomas Pape & John Stireman – pierfilippo.cerretti@uniroma1.it
Advances in Diptera phylogenomics
Convenors: Jessica P. Gillung & Keith M. Bayless – jpg.bio@gmail.com
Too many species, too little time: fresh approaches to "open-ended" genera
Convenors: Daniel Bickel & Emily Hartop – dan.bickel@austmus.gov.au
Systematics and ecology of Culicomorpha
Convenors: Leonardo H. Gil-Azevedo & Douglas C. Currie – lhgazevedo@gmail.com

Systematics and ecology of Bibionomorpha
Convenor: Chris Borkent – chris.borkent@gmail.com
Systematics and ecology of Empidoidea
Convenors: Bradley Sinclair & Jeffrey Cumming – bradley.sinclair@inspection.gc.ca
Taxonomy and ecology of Ceratopogonidae
Convenor: Daniel L. Kline – dan.kline@ars.usda.gov
Taxonomy and systematics of lower Brachycera
Convenor: Bryan D. Lessard – bryan.lessard@csiro.au
Taxonomy and phylogeny of Asilidae – honouring 40 years of Afrotropical research by Jason Londt
Convenor: Torsten Dikow – DikowT@si.edu
Systematics and taxonomy of lower Cyclorrhapha
Convenor: Andrew D. Young – adyoung@gmail.com
Developments in acalyptrate dipterology
Convenors: John Ismay, Stephen Gaimari & Barbara Ismay – schultmay@insectsrus.co.uk, stephen.gaimari@cdfa.ca.gov

Competitions (http://icd9.co.za/competitions/)
Prizes and certificates will be presented for:**Best Student Presentation** (and runner up); **Best Student Poster** (and runner up); and **Diptera Photography Competition** (first, second and third prizes). All registered students are automatically entered for student competitions. The Student presentations and posters will be judged by a selection panel of leading dipterists. The Photography competition will be judged by S.A. Marshall and R.S. Copeland and will be judged on composition, originality and clarity.

Congress outreach
Two public lectures in collaboration with ICD9 and the Namibian Scientific Society (http://www.namscience.com.na/), will take place during the Congress at the Safari Conference Centre (light refreshments shall be served after the talks). All delegates and members of the general public are invited to attend these lectures, which will be widely advertised locally.

27 November 2018 (19:30):
Dr George McGavin will speak on "*Bugs in the system – sex, violence and a cast of billions*"

> *Insects are the most diverse and successful group of animals on Earth. They were the first animals to conquer the land and the first to take to the air. As herbivores, carnivores, pollinators and recyclers and as a principal food source, insects are an essential component of every terrestrial and aquatic food chain. But insects also have a dark side. They have changed the short course of human history by killing hundreds of millions of people and destroying their crops. Nevertheless without them the world would be a very different place. To understand life on our planet you need to know what the "bugs in the system" are doing.*

29 November 2018 (19:30):
Prof. Stephen Marshall will speak on "*Bye bye birdie – flywatching is here!*"

> *The study of flies is a critical discipline because of the centrality of dipteran diversity to human and animal health, pollination, crop protection and ecological integrity. The study of flies is also an engaging hobby, now with all of the appeal of bird watching, but offering orders of magnitude more diversity. This talk will delve into the diversity of dipterological delights and discoveries accessible to naturalists with digital cameras.*

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NADS Annual Meeting report

Torsten Dikow

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The annual NADS meeting took place on Tuesday, 7 November 2017 during the Entomological Society of America meeting held in Denver Colorado.

Thirty-four attendees were present for the program including the usual introductions, announcements, and four presentations. Before the presentations started, we celebrated the life and contributions Terry Wheeler (1960–2017) made to NADS and its annual meeting through a minute of silence.

The presentations were kicked off by Jeff Cumming presenting on his research on Dolichopodidae with Scott Brooks (both CNC, Ottawa, ON) entitled, "Children of Dunes: Revision of sand-dwelling flies belonging to *Parathalassius* Mik (Diptera: Dolichopodidae: Parathalassiinae)" followed by a presentation on Dixidae by Kevin Moulton (University of Tennessee, Knoxville, TN) entitled, "Revisionary studies of Nearctic Dixidae: the *Dixa rudis* and *D. fusca* species groups."

Two student presentations followed, one by Even Dankowicz (Brandeis University, Waltham, MA) and Torsten Dikow (USNM, Washington, DC) entitled, "Taxonomic revision of the Oriental mydas-fly genus *Cacatuopyga* Papavero and Wilcox, 1974 (Diptera: Mydidae)", which is a summer research project Even undertook at the Smithsonian, and another one by Chris Cohen (East Carolina University, Greenville, NC) entitled, "Systematics of assassin flies in the subfamily Dioctriinae (Diptera: Asilidae)", which represents part of Chris's dissertation research.

Next annual NADS meeting

The next NADS meeting will take place during the 2018 joint Annual Meeting of the Entomological Society of America, the Entomological Society of Canada, and the Entomological Society of British Columbia in Vancouver, BC (11–14 November 2018).

Since I have organized the annual NADS meeting for a few years now and won't be able to attend the 2018 meeting due to the ICD9 taking place ten days later, **I would like to call for a volunteer (or a group of volunteers) to organize next year's and future meetings.**

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9th International Symposium on Syrphidae (ISS), Curitiba, Paraná, Brazil; 28th August – 1st September 2017

Ximo Mengual

Zoologisches Forschungsmuseum Alexander Koenig, Leibniz-Institut für Biodiversität der Tiere
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The 9th International Symposium on Syrphidae (ISS9) took place in the Hotel La Dolce Vita, between Curitiba and Tijucas do Sul (Paraná, Brazil), and the name of the hotel explains to perfection how the participants felt. Located in a preserved region of rich nature, close to the "Serra do Mar", and surrounded by forest, the venue of the ISS9 offered a relaxing environment for scientific discussions and superb food and drinks to fulfill your energy needs. I thank the organizers, Mirian N. Morales and Luciane Marinoni, not only for the 'smooth' and interesting program, but also for taking care of every single detail to make our stay a truly unforgettable experience in Brazil. I must admit that I really enjoyed my visit to Curitiba, and Luciane and Mirian made me feel like at home.

The program included three days of presentations, talks and poster sessions, with a final excursion to the historical city Morretes on Friday. A total of 41 attendants from 11 countries (Argentina, Belgium, Brazil, Canada, Colombia, Czech Republic, Finland, Germany, Netherlands, Serbia, Spain) came together, and the number and quality of presentations was very high, with 34 talks and 29 posters. After the ISS9, Mirian N. Morales together with 12 colleagues (from Colombia, Czech Republic, Finland, Germany, Serbia) organized a workshop on 'Biology and Systematics of Diptera' at the Federal University of Lavras, in Minas Gerais State, where the students of the Entomology Graduate Program (http://www.ufla.br/ascom/2017/09/05/pesquisadores-internacionais-se-encontram-na-ufla-para-falar-sobre-sistematica-e-biologia-de-insetos/) took part and were encouraged to study Diptera of this region.

(photo credit: Diego Souza)

Tuesday August 29th started with the topic 'Phylogenetics and DNA barcoding' with a very interesting talk by Kevin Moran about the phylogenetic relationships of syrphid genera using multiple genes. Talks on new genes with phylogenetic signal, the use of anchored-hybrid enrichment, and the challenges and future perspective of DNA barcoding followed. We also had time to discover the first records of the bacterial endosymbiont *Wolbachia* in the genus *Merodon* Meigen, 1803 and to say goodbye to the superfamily Syrphoidea based on transcriptomic data. At the end of the first day, the workshop on 'Systematics and Taxonomy' started with an excellent talk about the Neotropical diversity of the Microdontinae, summarized by Menno Reemer, and two more presentations about the taxonomy of *Merodon*, including geometric morphometric analysis of male genitalia.

Wednesday August 30th continued with the workshop on 'Systematics and Taxonomy', with stimulating talks on larval morphology and taxonomic revision of several genera such as *Chrysotoxum* Meigen, 1803 and *Psilota* Meigen, 1822. Just before lunch we were introduced to a new workshop on 'Faunistics, Biogeography, Biodiversity Assessment and Conservation', where we had the opportunity to discuss biogeography, species distribution, citizen-scientists and web-based determinations and faunistic surveys. Personally, I was fascinated by the updates on two field guides about Syrphidae from colleagues in The Netherlands and Canada, and by two captivating plenary talks about divergence time estimation in Syrphidae (Augusto L. Montoya) and the loss of insects' biomass in the last decades in Central Europe (Axel Ssymank). That night we could savor some Brazilian dishes during a special dinner planned by the organizers, including the pinhão (the seeds of *Araucaria angustifolia* (Bertol.) Kuntze) and were pleased with the special visit of Wayne N. Mathis and his beloved wife, Dianne.

The workshop on 'Biology, Ecology, and Integrated Pest Management' took place on Thursday August 31st. The day started with a remarkable plenary talk about syrphids as myiasis agents by Santos Rojo, and presentations on how syrphid larvae can help in the waste management produced by human activities (waste ponds or beer industry by-products) continued enjoying the audience. There was time to introduce a new larval lifestyle (kleptoparasitism) for Syrphidae, to report about pollen from gut contents, and to discuss the role of syrphids as pollinators as well as the role of flower flies in plant-flower visitor networks, among other topics. Finally, there was an invitation to collaborate on creating a database about feeding habits of syrphids as a tool for conservation.

At the end of the first and second day of the ISS9, we had the presentation of the poster contributions. Besides the colorful, sometimes astonishing beautiful, fascinating presentations, we learnedabout how climate may shape differences on wing and male genitalia among cryptic and sibling species, the use of syrphids as crops pollinators in greenhouses, the preimaginal morphology of some genera, the application of DNA barcoding on some groups, the olfactory response of the adults versus the larval prey, and how to useful are flower flies to designate conservation areas or to detect extinction risk.

The overall experience was fantastic and participants took part of a joyful atmosphere to learn, talk and discuss about flower flies. We hope that our experience prompt others to join us in two years (2019) in the Lesvos Island, Greece, where the ISS10 will take place.

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OPPORTUNITIES

S.W. Williston Diptera Research Fund
2017-2018 special ICD9 competition

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The S.W. Williston Diptera Research Fund (http://entomology.si.edu/Diptera_Williston_Fund.htm) is a small Smithsonian Institution administered endowment fund established for the *increase and diffusion of knowledge about Diptera*. To this day, the fund has supported the travel of graduate students and dipterists to the *International Congresses of Dipterology* and to the USNM for collections-based research as well as field work.

S.W. Williston Diptera Research Fund

This year, the Williston Fund will support the attendance of up to 7 graduate students or recently graduated dipterists (graduation in 2017) who are either presenting a poster or oral presentation at ICD9 in Windhoek, Namibia (25–30 November 2018, http://icd9.co.za) with US$2,000 each. This special competition is made possible through the use of our annual endowment funds and the generously provided additional funds by Chris Thompson, the founder of the Williston Fund.

The requirements for application are minimal: contact Torsten Dikow as a representative of the Williston Fund committee with a short summary of why you plan to attend ICD9 and aresearch project you plan to present at the congress.

1. Summarize your research goals into a short proposal in PDF format (1–2 pages maximum)
2. Itemize your budget in the proposal PDF (anticipated transportation costs, per diem costs for lodging and food, and any other items)
3. Attach a current CV

Please send the complete application materials in PDF format to Torsten Dikow by **15 January 2018**. Please note that every awardee will need to comply with the rules of the Smithsonian Institution regarding travel and reimbursements, which require several forms to be filled out prior to any travel.

Please consider donating to this endowment fund to support the increase and diffusion of knowledge about Diptera and particularly the research and travel of a new generation of dipterists.

The Williston Fund is administered by a committee of at least three members, two of whom (the majority) must be systematists actively working on Diptera, and one who must be a scientist affiliated with, but not necessarily employed by, the Smithsonian Institution (for example, a dipterist of the United States Department of Agriculture Systematic Entomology Laboratory (SEL)). The current committee consists of: Allen Norrbom, Gary Hevel, and Torsten Dikow.

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DIPTERA ARE AMAZING!

Tamara Szentiványi (Museum of Zoology, University of Lausanne, Switzerland) submitted the following series of photographs of batflies from South Africa.

The photos are the adult females of *Ascodipteron* sp. (Streblidae), which which live under the skin of bats. They look like larvae and males are barely known.

This photo of an adult, winged Streblidae shows the blood meal that the specimen took from the host before it was collected

Eucampsipoda africana (Nycteribiidae) is a species which parasitize the Egyptian fruit bat. In the bottom photo, you can see the one single larva that develops in the female.

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BOOKS AND PUBLICATIONS

Below we are happy to offer a roundup of recent publications on Diptera in all their interesting facets.

As usual if we have not included a paper that you think should have been here please feel free to pass it along to Chris (chris.borkent@gmail.com) and we will include it in the next issue. Unfortunately the online resources do not always catch everything and are a couple of months behind. We also apologize for the missing diacritics in some author's names, unfortunately this is a product of searching in Zoological Record and Web of Science, where they are removed.

Abdulloh, S., Chutamas, S. and Grootaert, P. 2017. Eight new species of marine dolichopodid flies of *Thinophilus* Wahlberg, 1844 (Diptera: Dolichopodidae) from peninsular Thailand. European Journal of Taxonomy **329**: 1-40.

Alwin-Kownacka, A., Szadziewski, R. and Szwedo, J. 2017. Predatory midges of the tribes Palpomyiini and Sphaeromiini (Diptera: Ceratopogonidae) from the Middle East, with keys and descriptions of new species. European Journal of Taxonomy **318**: 1-30. doi:10.5852/ejt.2017.318.

Ament, D.C. 2017. Phylogeny of Phorinae sensu latu (Diptera: Phoridae) inferred from a morphological analysis with comprehensive taxon sampling and an uncommon method of character coding. Zoological Journal of the Linnean Society **181(1)**: 151-188. doi:10.1093/zoolinnean/zlw023.

Ament, D.C. and dos Santos, T.G. 2017. Taxonomy and first records of two *Megaselia* Rondani species (Diptera: Phoridae) preying upon eggs of *Phyllomedusa iheringii* Boulenger (Anura: Phyllomedusidae). Neotropical Entomology **46(3)**: 289-294.

Ang, Y., Rajaratnam, G., Su, K.F.Y. and Meier R. 2017. Hidden in the urban parks of New York City: *Themira lohmanus*, a new species of Sepsidae described based on morphology, DNA sequences, mating behavior, and reproductive isolation (Sepsidae, Diptera). ZooKeys **698**: 95–111. doi:10.3897/zookeys.698.13411

Araujo Maira, X., Bravo, F. and Barros de Carvalho Claudio, J. 2017. Two new species of *Trichomyia* Haliday 1839 (Diptera, Psychodidae, Trichomyiinae) from the Pantanal of Mato Grosso, Brazil. Revista Brasileira de Entomologia **61(3)**: 203-207.

Atiporn, S., Srisuka, W., Low Van, L., Maleewong, W. and Takaoka, H. 2017. Descriptions of the female and larva of *Simulium* (*Gomphostilbia*) *udomi* (Diptera: Simuliidae) from Thailand, and its transfer to the *Simulium asakoae* species-group. Acta Tropica **172**: 14-19.

Augot, D., Mathieu, B., Hadj-Henni, L., Barriel, V., Mena, S.Z., Smolis, S., Slama, D., Randrianambinintsoa, F.J., Trueba, G., Kaltenbach, M. and others. 2017. Molecular phylogeny of 42 species of *Culicoides* (Diptera, Ceratopogonidae) from three continents. Parasite **24**: 16. doi:10.1051/parasite/2017020.

Azari-Hamidian, S., Norouzi, B. and Noorallahi, A. 2017. *Orthopodomyia pulcripalpis* (Diptera: Culicidae), a genus and species new to the Iranian mosquito fauna, with a review of bionomical information. Zootaxa **4299(1)**: 141-145. doi:10.11646/zootaxa.4299.1.11.

Barahona-Segovia Rodrigo, M., Castillo Tapia, R. and Paninao, M.L. 2017. First record of *Myopa metallica* Camras, 1992 (Diptera: Conopidae: Myopinae) in Northern Chile after 46 years: A case study of the success of citizen science programs. Journal of Insect Biodiversity **5(13)**: 1-8.

Baranov, V., Goral, T. and Ross, A. 2017. A new genus of Buchonomyiinae (Diptera, Chironomidae) from Upper Cretaceous Burmese amber, with the phylogeny of the subfamily revisited. Cretaceous Research **79**: 146-152. doi:10.1016/j.cretres.2017.07.007.

Barrera, C.A., Becker, E.L., Elizalde, L. and Queiroz, J.M. 2017. Parasitoid phorid flies of leaf-cutting ants are negatively affected by loss of forest cover. Entomologia Experimentalis et Applicata **164(1)**: 66-77.

Belle, S., Virgile, B., Lami, A., Musazzi, S. and Dakos, V. 2017. Rising variance and abrupt shifts of subfossil chironomids due to eutrophication in a deep sub-alpine lake. Aquatic Ecology **51(2)**: 307-319.

Bing, X., Attardo, G.M., Vigneron, A., Aksoy, E., Scolari, F., Malacrida, A., Weiss, B.L. and Aksoy, S. 2017. Unravelling the relationship between the tsetse fly and its obligate symbiont Wigglesworthia: transcriptomic and metabolomic landscapes reveal highly integrated physiological networks. Proceedings of the Royal Society Biological Sciences Series B **284(1857)**: 20170360.

Bitusik, P., Dobrikova, D., Pipik, R. and Hamerlik, L. 2017. Relict chironomid communities surviving in the coldest High Tatra Mountain lakes confirmed by a palaeolimnological survey. Biologia **72(8)**: 965-969. doi:10.1515/biolog-2017-0102.

Blank, L., Vasl, A., Schindler, B.Y., Kadas, G.J. and Blaustein, L. 2017. Horizontal and vertical island biogeography of arthropods on green roofs: a review. Urban Ecosystems **20(4)**: 911-917. doi:10.1007/s11252-016-0639-9.

Boontop, Y., Kumaran, N., Schutze, M.K., Clarke, A.R., Cameron, S.L. and Krosch, M.N. 2017. Population structure in *Zeugodacus cucurbitae* (Diptera: Tephritidae) across Thailand and the Thai-Malay peninsula: natural barriers to a great disperser. Biological Journal of the Linnean Society **121(3)**: 540-555. doi:10.1093/biolinnean/blx009.

Brooks, S.E. and Cumming, J.M. 2017. Revision of the Nearctic *Parathalassius* Mik (Diptera: Dolichopodidae: Parathalassiinae), with a review of the world fauna. Zootaxa **4314(1)**: 1-64. doi:10.11646/zootaxa.4314.1.1.

Buenaventura, E. and Pape, T. 2017. Multilocus and multiregional phylogeny reconstruction of the genus *Sarcophaga* (Diptera, Sarcophagidae) (vol 107, pg 619, 2017). Molecular Phylogenetics and Evolution **110**: 151-151. doi:10.1016/j.ympev.2017.01.013.

Busso, J.P., Blanckenhorn, W.U. and Gonzalez-Tokman, D. 2017. Healthier or bigger? Trade-off mediating male dimorphism in the black scavenger fly *Sepsis thoracica* (Diptera: Sepsidae). Ecological Entomology **42(4)**: 517-525. doi:10.1111/een.12413.

Câmara, J.T. and Rafael, J.A. 2017. New species of *Metachela* Coquillett from the Atlantic Forest, Brazil and a key to the Neotropical species (Diptera, Empididae). ZooKeys **714**: 129–140. doi:10.3897/zookeys.714.11503

Camargo, A., Vieira, R., Lima, S. and Chagas, C. 2017. Contribution to the knowledge of the Neotropical species of *Smeryngolaphria* Hermann, 1912 (Diptera: Asilidae: Laphriinae). Zootaxa **4273(1)**: 93-111. doi:10.11646/zootaxa.4273.1.7.

Carey, J.G.J., Williams, C.D. and Gormally, M.J. 2017. Spatiotemporal variation of Diptera changes how we evaluate High Nature Value (HNV) wet grasslands. Biodiversity and Conservation **26(7)**: 1541-1556. doi:10.1007/s10531-017-1314-z.

Carmo, R.F.R., Oliveira, D.L., Barbosa, T.M., Soares, T.F., Souza, J.R.B. and Vasconcelos, S.D. 2017. Visitors versus colonizers: An empirical study on the use of vertebrate carcasses by cecrophagous Diptera in a rainforest fragment. Annals of the Entomological Society of America **110(5)**: 492-500. doi:10.1093/aesa/sax045.

Cazorla, C.G., Cardoso, E.A. and Bauer, M.L.F. 2017. Contributions to the knowledge of predaceous midges of the subgenus *Eukraiohelea* Ingram & Macfie of *Stilobezzia* Kieffer (Diptera: Ceratopogonidae), from Brazil. Zootaxa **4324(3)**: 557-570. doi:10.11646/zootaxa.4324.3.9.

Cerretti, P., Stireman, J.O., Pape, T., O'Hara, J.E., Marinho, M.A.T., Rognes, K. and Grimaldi, D.A. 2017. First fossil of an oestroid fly (Diptera: Calyptratae: Oestroidea) and the dating of oestroid divergences. PLoS ONE **12(8)**: 24. doi:10.1371/journal.pone.0182101.

Chahad-Ehlers, S., Arthur, L.P., Lima, A.L.A., Gesto, J.S.M., Torres, F.R., Peixoto, A.A. and de Brito, R.A. 2017. Expanding the view of Clock and cycle gene evolution in Diptera. Insect Molecular Biology **26(3)**: 317-331.

Chang, Q.Q., Jiang, X.H., Liu, G.P., Li, X.F. and Hou X.H. 2017. A species checklist of the subgenus *Culicoides* (*Avaritia*) in China, with adescription of a new species (Diptera, Ceratopogonidae). ZooKeys **706**: 117–135. doi:10.3897/zookeys.706.13535

Chen, S., Zhang, R. and Ferrington Leonard, C. 2017. Two new species and one new record of the genus *Metriocnemus* van der Wulp (Diptera: Chironomidae: Orthocladiinae) from Mongolia. Zootaxa **4312(3)**: 557-564.

Chesters, D. 2017. Construction of a species-level tree of life for the insects and utility in taxonomic profiling. Systematic Biology **66(3)**: 426-439. doi:10.1093/sysbio/syw099.

Cochet, R.B., Leon, A.O. and Ortiz-Reyes, A. 2017. Behavioral patterns of parasitoid phorids (Diptera: Phoridae) of *Atta colombica* (Hymenoptera: Formicidae). Revista De Biologia Tropical **65(2)**: 461-473.

Cornette, R., Yamamoto, N., Yamamoto, M., Kobayashi, T., Petrova, N.A., Gusev, O., Shimura, S., Kikawada, T., Pemba, D. and Okuda, T. 2017. A new anhydrobiotic midge from Malawi, *Polypedilum pembai* sp n. (Diptera: Chironomidae), closely related to the desiccation tolerant midge, *Polypedilum vanderplanki* Hinton. Systematic Entomology **42(4)**: 814-825. doi:10.1111/syen.12248.

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