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THE DRAGONFLY SOCIETY OF THE AMERICAS

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ARGIA, the quarterly news journal of the **DSA**, is devoted to non-technical papers and news items relating to nearly every aspect of the study of Odonata and the people who are interested in them. The editor especially welcomes reports of studies in progress, news of forthcoming meetings, commentaries on species, habitat conservation, noteworthy occurrences, personal news items, accounts of meetings and collecting trips, and reviews of technical and non-technical publications. Articles for publication in **ARGIA** should preferably be submitted as hard copy and (if over 500 words) also on floppy disk (3.5" or 5.25"). The editor prefers MS DOS based files, preferably written in WORD, WORD for WINDOWS, WordPerfect, or WordStar. Macintosh WORD disks can be handled. All files should be submitted **unformatted and without paragraph indents**. Each submission should be accompanied by a text (=ASCII) file. Other languages should be submitted only as text (=ASCII) files. Line drawings are acceptable as illustrations.

T. Donnelly (address below) is the interim editor of **ARGIA**.

BULLETIN OF AMERICAN ODONATOLOGY is devoted to studies of Odonata of the New World. This journal considers a wide range of topics for publication, including faunal synopses, behavioral studies, ecological studies, etc. The **BAO** publishes taxonomic studies but will not consider the publication of new names at any taxonomic level. Enquiries and submission of manuscripts should be made to **BAO** editor T. Donnelly, 2091 Partridge Lane, Binghamton NY 13903. Final submissions (after review) should be made on floppy disk, as above, with illustrations in final form and preferably adjusted to final size.

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Membership in the **DSA** is open to any person in any country. Dues for individuals in the US, Canada, or Latin America are \$15 for regular membership and \$20 for contributing membership, payable annually on or before 1 March of membership year. Dues for members in the Old World are \$20. **ARGIA** is mailed Air Mail outside of the US and Mexico, and First Class in those countries.

The **BULLETIN OF AMERICAN ODONATOLOGY** is available by a separate subscription at \$15 for members and \$18.75 for non-members and institutions.

Cover: Dan Soluk and Steve Hummel with a newly netted *Somatochlora hineana*, which is about to be tagged for population studies, at Hine's Emerald Workshop. Photo by Nick Donnelly

ARGIA - The News Journal of the D.S.A.

IN THIS ISSUE

This year started out in the Northeast much like the famous summer of 1816, which was called "the year without a summer". Heavy rains, low temperatures, and perpetual cloudiness made field experiences here very poor. I took three groups of local people out on half-day trips and found myself searching frantically to even have an adult damselfly to show them. The people seemed receptive, but they couldn't have been thrilled about dragonflies when they couldn't see any!

We have two upcoming meetings to report. This year's ADIP meeting is in New Brunswick on 10 November. Presumably they'll be looking at late fall dragonflies, which are all the rage right now. The DSA annual meeting will be in the Hill Country of Texas next July, and I guarantee you won't be wearing your snuggies at that one.

The death of Bernie Counts was a shock to all of us and especially to his friends in Ohio. Bernie came to many DSA meetings, often arriving unexpectedly. He was very enthusiastic and especially loved larval sampling. We will all miss him very much.

The Vancouver Island meeting was a great success, and I was not responsible for the rain that they experienced. Hah! The field trips afterward were also very successful, and the Syd / Sid combination produced not one by two records for *Somatochlora brevicincta* in British Columbia. This is the range-extension-of-the-year.

A workshop held in Connecticut in May is reported here. Apparently they all had so much fun they forgot to send in the account for the previous issue.

One of the most memorable experiences for many of us was the Hine's Emerald workshop in northern Wisconsin in July. We not only saw dozens of these fine bugs, but learned of its very strange habits. One of the most interesting things I have ever witnessed was the pumping of *hineana* larvae out of crayfish burrows in the nearly-dry fens. We all got some insight on why these things are so rare.

Blair leads off our trip-report section with an account of the famous *Somatochlora* swat team visiting Maine. I discuss a far more mundane trip to Churchill, Manitoba, where I got some insight on why there are more dragonflies in the tropics than on the tundra. Bob Behrstock tells of a trip to a west Texas, where springs in this near desert have yielded many good odonate records.

For those of you who have been watching the Olympics, Sid Dunkle tells how he got the gold in Australia. Or was it the bronze? I present an account of my annual Oriental trip, which this year included Hong Kong and a really big snake.

Allen Barlow has been very active in northern New Jersey, so much so that Sussex County now totals 136 species, which is the North American record. Dennis Paulson gives us several new records for Washington and Idaho, and Roy Beckemeyer supplies records for Kansas and Nebraska. Anne Chazal describes occurrences of *Enallagma weewa* in eastern Virginia. I draw attention to the many late records for odonates in the Northeast - was it their late start, or something else? José Ramos Hernández summarizes the many occurrences of the oriental dragonfly *Crocothemis servilia* in Cuba. And Bill Mauffray and chums continue to untangle records for West Virginia, one of the less well known states.

I bring the dot-map project up to date. The current problem is *Lestes*. Your help is needed!

We have not one but two accounts of snakes eating adult dragonflies in this issue. Sid Dunkle reports one, and the other is mentioned in the review of 1999 Ontario Odonata activities. Allen Barlow tells of the other side or the coin: dragonflies eating something else, in this case ants. We had a previous note on this phenomenon; you don't have to catch your dinner on the wing at all!

I continue my biographical series with an account of the career of the late Edmund Walker, one of the giants of entomology of North America.

Roy Beckemeyer's account of going into the field with his "dragonfly dogs" reminds me of the miserable experience I had a few years ago in a marsh in southern Venezuela. It is tough enough to wade all day in deep water, but when you are accompanied by an overly friendly dog that splashes ahead of you just when you are set to pounce on a wary *Erythrodiplox fulva*, then you start contemplating canicide.

The book section is fairly long this time. The big news, of course, is the arrival of Sid Dunkle's attractive book, "Dragonflies Through Binoculars". Everyone has agreed that this book will have a great reception. The Ontario books are pretty impressive, and I urge those in the northeast US and eastern Canada to have a look at them.



The DSA meeting group gathers at Nanaimo

on habitat characteristics of North American Odonata, especially globally rare species. Rob Cannings (Royal British Columbia Museum) asked participants to send him records of dragonflies collected during the meetings and field trips.

On the second day of collecting, Saturday 29 July, we had much better weather and headed north to visit some exciting places. A long convoy of vehicles wound its way up the highway -- but at the town of Coombs, a popular tourist-trap, we stopped to buy some goodies for snacks and lunch. In the lead vehicle that I was in, I was outnumbered by Bill Mauffray (who was driving), Jerrell, Rose and Marge - they all insisted we stop -- the goats on the grass roofs at the market really draw the tourists (including odonatologists) in there! We arrived soon after at a great spot, Hamilton Marsh, where we spent a couple of hours of productive collecting. Collectors and photographers spread out over a large area and managed to see 25 species; *Aeshna canadensis*, *A. interrupta*, *A. palmata*, *A. multicolor*, *Pachydiplax longipennis*, *Sympetrum obtrusum* and *S. occidentale* were abundant. The specialty of the site, *Aeshna tuberculifera* was finally caught. After a lunch there, a sub-group (who wouldn't be traveling on to the Okanagan on

the post-meeting trip) visited Bowser Bog while the rest went west to Summit Lake near Port Alberni. A highlight for the latter group was the forest of thousand-year-old Douglas-firs in Cathedral Grove at Macmillan Provincial Park.

At Bowser Bog we were looking for peatland species not expected at other Nanaimo area sites, although they would be found on the Okanagan trip after the meetings. There, the "Englander", the Florida boys with Marge and Rose, the Californians and myself were treated to ideal conditions in the warm, shallow waters. We were able to observe and collect 24 species including *Aeshna sitchensis*. David Pryce even collected a *Cordulegaster dorsalis* from a tree trunk with his fingers!

The evening meeting got off to a rocky start after a campus security guard was reluctant to cough up some extra slide trays. But with the arguments of many sensible adults and Christine eventually making perfect sense to the poor fellow, finally we were in business. President Mike May went over the new by-laws, which will eventually be published in *Argia* for all to vote on. Jerrell Daigle and Bill Mauffray were appointed to look into the legal incorporation and possible liabilities of the

DSA after their great suggestions sparked Mike to "volunteer" them for the job. It was announced that DSA would be offering grants for research into dragonflies and that information would be provided in Argia. Jerrell gave us his treasury report; the society will have \$8000US in the bank by the end of the year. Honorary Membership in the DSA was discussed and the Executive Committee agreed to study this matter. This was an interesting topic to end the "business" side of the evening, especially when Steve Valley followed showing a few slides from the first ever DSA meeting (Johnson City, 1989). We saw the trimmer tummies and fuller heads of some familiar members. John Abbott had us twitching in our chairs when he rattled off some of the species of dragonflies from central Texas, where next year's DSA meeting will be held. It made British Columbia's fauna seem inconsequential in comparison. John guaranteed us no rain! (Is Nick going though?). The final show went to Rob Cannings who gave us an excellent overview of the dragonflies of British Columbia. He showed many great slides of species from representative families found here. His many maps indicating the wide variety of biogeographical zones found within this vast province gave us some appreciation of how diverse this part of North America truly is. The trip to the Okanagan Valley the next day showed us some of this diversity.

POST-MEETING FIELD TRIP

Rob and Syd Cannings

On Sunday (30 July) morning the crowd dispersed, some heading home via Vancouver or Victoria, others continuing on the field trip to the Okanagan Valley, 250 miles east of Vancouver. The weather was sunny and hot for the rest of the field trips. The 1.5 hour ferry voyage from Nanaimo east to Horseshoe Bay on the Vancouver side of the strait was spectacular, the glaciers of the Coast Range gleaming in the sun. Half the group drove up to Cypress Provincial Park to see a *Tanypteryx hageni* colony, the only one known in Canada. A few burrows, complete with larvae, were found in the mud and moss of a road cut; adults were yet to emerge. Part of the group -- John Abbott, Syd Cannings, Don Miller, and Sid Dunkle - drove east via Rolley Creek in the Fraser River Valley to look for *Octogomphus specularis*. Syd and John managed to shake off the Miller and Dunkle vehicles in the Vancouver suburbs and, by the time Don and Sid found Rolley Creek, all the *Octogomphus* had been caught!

A second group including Rob Cannings, Rex Kenner, Steve and Marcia Hummel, Tim Cashatt, Duncan Cuyler, Dennis Paulson, Kate O'Neal, Molly Hukari, Jim Johnson and Steve Valley headed up the Coquihalla Highway (#5) from Hope, eager to find high altitude species near the summit of Highway 97C on the plateau east of Okanagan Lake. The highlight here among the fens and ponds (some of the latter man-made dugouts for watering cattle) was *Somatochlora hudsonica*; this is the most southerly record of the species in British Columbia. *S. albicincta*, *S. semicircularis* and *S. minor* were also collected, along with *Coenagrion resolutum*, *Aeshna sitchensis* and other species. *S. semicircularis*, a common Cordilleran species, literally swarmed in the Beaked Sedge fens. As sunset lit the hills and big lakes of the Okanagan Valley, everyone headed to the Southwinds Inn at Oliver.

On Monday (31 July), a small group keen to see *S. hudsonica* returned to the area at the summit of Highway 97C; they were not disappointed - *Somatochlora* and *Aeshna* abounded. The main crew visited the bottomlands of the Okanagan River north of Osoyoos. Here the vineyards, orchards and lakes are in startling contrast to the sand and sage covered hills. Along the oxbows and main river channel cruised *Macromia magnifica* and *Ophiogomphus occidentis*. *Erythemis collocata* (a rarity here at the extreme northern limit of its range) swarmed over its favourite pond. Dennis Paulson's sharp eyes picked out a lone *Pachydiplax longipennis*, a common species to the south but a new species to the Interior of British Columbia, and his Hukari net nabbed it soon after! *Libellula forensis* and *L. pulchella* were abundant. In the afternoon, collectors split up and went off in various directions into the pine and fir-clad hills surrounding the valley. Many species, including *Aeshna eremita*, *A. interrupta*, *A. multicolor*, and *Sympetrum costiferum* were recorded. At a dry sedge marsh, Gord Hutchings, Jim Johnson, and Steve Valley found *Sympetrum madidum*, *Lestes dryas*, and a population of *Aeshna constricta*, the latter another common species to the south that is scarce here at its northern outposts.

The last day (1 August) again dawned clear and warm; at 05:00 it was already about 80 degrees F and by 06:30 *Aeshna multicolor* was flying around the motel parking lot (the afternoon temperature in the valley reached about 100 degrees; this is not uncommon for this time of year). But we were heading high in the hills to the northeast to escape the heat and find more northern species. Dick

ecologists, land managers, and other odonatologists.

Paul Burton, a local resident, arranged for us to have our indoor class sessions at the Ephraim Village Hall. Burton spent many hours photographing Hine's emerald at The Ridges Sanctuary at Bailey's Harbor and kindly shared his photo gallery with us during the workshop. During the morning of the first day, Tim Vogt and I attempted to cover very basic information on the general biology and taxonomy of Odonata, including the genus *Somatochlora* for those who needed that background. The first part of this session was mundane to the odonatologists, however, we attempted to keep them interested by involving them in discussions and help with instruction! The weather was overcast during the morning, but favorable for field studies in the afternoon.

For the first afternoon session we convened at The Ridges Sanctuary, made available to us for our studies by Paul Regnier, the director and resident naturalist. The Ridges Sanctuary is a privately funded preserve. It includes a series of Lake Michigan beach ridges forested with mostly black spruce, balsam fir, and white pine. Portions of the ridges are open, wet, and calcareous and support an outstanding assemblage of rare and endangered plants. Swamp conifers occupy some of the swales but others are fen-like. In the fen-like swales, Hine's emerald can be observed feeding along the edges, carrying out territorial patrols, and ovipositing.

Hine's emerald was very cooperative during the afternoon field sessions and was the most common dragonfly at The Ridges Sanctuary. The workshop participants were divided into three groups that rotated among several locations for viewing the adults and habitat. Under federal permits workshop attendees were allowed to participate in mark/recapture studies being conducted by Dan Soluk of the Illinois Natural History Survey and a dedicated graduate student field crew. Forty-six Hine's emerald dragonflies were marked that afternoon. Everyone had an excellent opportunity to see Hine's emerald up-close and personal! In addition to *S. hineana*, *S. williamsoni* and *S. walshii* were also fairly common with an occasional *S. minor*, so participants had the opportunity to test their ability to identify other *Somatochlora* species on-the-fly!

The second day began with informative presentations of the results of larval life history and ecology studies that Dan Soluk and his graduate students have conducted in Door County over the past several years. Of particular interest is the relationship that *S. hineana* larvae have with a crayfish, *Cambarus diogenes*. The larvae, apparently are co-habitators with the crayfish and are able to use the wet burrows as refugia during dry periods and during the winter. Following the larval discussions, Tim Vogt and I led discussions of Hine's emerald adult behavior and distribution illustrated with slides and video from mostly the Illinois sites.

During the afternoon we visited an area along Lime Kiln Road to observe another breeding habitat of *S. hineana*. Many Hine's emeralds were observed flying over the gravel road near the larval habitat. Through the use of a portable, hand operated bilge pump connected to hoses, Soluk's students demonstrated their technique of extracting Hine's emerald larvae from crayfish burrows. We also had the opportunity to see the remote infrared video cameras that Soluk is using to study larval behavior. Bill Smith, Bureau of Endangered Species of the Wisconsin Department of Natural Resources, Madison, led other side field trips to other sites of particular interest to participants.

The third half day involved a discussion of the Hine's Emerald Recovery Plan and conservation. This discussion was led by Cathy Carnes, U.S. Fish and Wildlife Service at Green Bay, Wisconsin, and Dan Soluk with others contributing. Locating additional populations of Hine's emerald dragonfly was identified as a high priority task in the Hine's Emerald Dragonfly Recovery Plan. The final draft of the plan has been forwarded to the government printing office, and we hope that it will be distributed this year.

The sessions and evenings were filled with lively and informative discussions, some over food and drink. Contributions to lively discussions by John Belshe, Nick Donnelly, Karen Frolich, Wayne Gall, George and Phoebe Harp, Blane Heuman, Phillip deMaynadier, Paul McKenzie, Don Miller, Paul Novak, Mark O'Brien, Clark Shiffer, Joe Smentowski, and Jane Walker, to name just a few, were much appreciated and helped to make the whole experience pleasant, interesting, and successful. Some were lucky enough to be invited over to Dan Soluk's field headquarters where we enjoyed the view over the bay from the front yard.

Seeing so many individuals of *S. hineana* in Door Co. raised doubts in the minds of some biologists as to why it was listed. Hine's emerald habitat, based on our present knowledge, is very narrowly defined. In Illinois, those habitats are relatively small, support relatively small populations, and some are in danger of being destroyed. Even Door County has environmental concerns that may eventually impact these fragile, shallow wetlands overlaying the dolomitic limestone bedrock. Commercial development has escalated in recent years resulting in more homes and hotel accommodations that have required the need for better waste disposal. In addition, there are many orchards with associated pesticide runoff.

In my opinion, the de-listing of *S. hineana* can happen only if other stable populations are found, documented, and their habitat protected in other parts of the United States. We hope that we provided the participants with enough information about Hine's emerald dragonfly that they will recognize the species or potential habitat. Under a Federal Permit I will be coordinating survey efforts in the northeastern and mid-western U. S. over the next year. With a central reporting procedure at the Illinois State Museum web site, surveyors will be able to report new populations. Under specific conditions, collecting a voucher specimen of *S. hineana* will be permitted for those listed on our permit, many of which were in attendance at this workshop. For those interested in more information on Hine's emerald dragonfly, the Illinois State Museum web site is: <http://www.museum.state.il.us/research/entomology/hines/mainpage.html>.

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BOG HOPPING AND STREAM SLOSHING IN THE MAINE WOODS

Blair Nikula

Following a successful four-day excursion to north-central Maine in 1999, Jeremiah Trimble, Rick Heil, and I decided a longer return visit was in order. This would provide an opportunity to chase some exciting boreal species while at the same time contributing to the second year of the Maine Dragonfly and Damselfly Survey. So, based in a cabin on the Penobscot River in Howland, we spent the week of 24 June – 1 July, 2000 chasing odonates in a still delightfully wild part of the Northeast. We found 84 species, among which were 19 species of emeralds (Corduliidae), including eight *Somatochloras* and three *Neurocordulias*,

and 17 species of clubtails (Gomphidae), among which were six species of *Ophiogomphus*. Rarest of our finds was a male *Anax longipes* (Comet Darner), a species previously unrecorded from Maine.

First stop on our northward trek was the Sebasticook River in Burnham, a shallow, rather muddy-bottomed river with a few rocky riffles. Odonates were numerous: a steady stream of *Macromia illinoensis* (Illinois River Cruiser) and *Didymops transversa* (Stream Cruiser) cruised up and down the river, often chased by the numerous *Ophiogomphus rupinsulensis* (Rusty Snaketail) males, while *Epitheca princeps* (Prince Baskettails) drifted overhead. Highlight of the 20 species found here were several *Gomphus abbreviatus* (Spine-crowned Clubtail). Males of this small, brightly marked clubtail patrolled a foot or two over the surface of the river, the yellow spots on the sides of the club quite conspicuous during their frequent bouts of hovering.

Late that afternoon, at a stop along the Penobscot River in Greenbush, Rick netted a young male *Gomphus (Gomphurus) vastus* (Cobra Clubtail) (a second *Gomphurus* slipped away). We were later to learn that a few days earlier Michael Veit had seen hundreds of this species emerging along the Penobscot a bit further north in Lincoln. This is a species that previously had been known in Maine only from exuvial records.

The following day was devoted the 1000 Acre Heath, southeast of Lee, and especially the long logging road that runs past the heath. We first discovered this area in August of 1998, when *Somatochlora incurvata* (Incurvate Emerald) were numerous over the small, soupy pools on the bog perimeter. A return visit in June 1999, produced eight species of *Somatochlora*, including the first U.S. record of *S. brevicincta* (Quebec Emerald). We spent two days this year working this emerald-rich area, finding seven species of *Somatochloras*, although overall numbers seemed lower than in 1999 and we failed to find *brevicincta* or *incurvata* this year. We did record numerous *S. franklini* (Delicate Emerald) as well as lesser numbers of *S. kennedyi* (Kennedy's Emerald) and *S. walshii* (Brush-tipped Emerald), and one or two individuals each of *S. elongata* (Ski-tailed Emerald), *S. forcipata* (Forcipate Emerald), *S. minor* (Ocellated Emerald), and *S. williamsoni* (Williamson's Emerald). Hundreds of *Epithecas* (baskettails), comprising all four of the New England species, swarmed over the road. Predominant was *E.*

spinigera (Spiny Baskettail), though *E. canis* (Beaverpond Baskettail), *E. cynosura* (Common Baskettail), and *E. princeps* (Prince Baskettail) were all present in abundance. Sifting through the numerous *Epithecas* for the occasional *Somatochlora* got to be a bit of a nuisance at times! The *Gomphurus* especially often fooled us into thinking they were small *Somatochlores*.

Portions of the road were littered with *Libellula julia* (Chalk-fronted Skimmer) and *Gomphus spicatus* (Dusky Clubtail), with lesser numbers of *G. exilis* (Lancet Clubtail). Rick became quite adept at netting gomphids along the roadside from the car as we drove along, and eventually discovered that just hanging his net out the window for a few minutes would produce a regular catch — trolling for odes! The heath itself, a massive, spectacular bog, was not especially productive, though our foray into the bog was hindered by near gale-force winds. A complex of variably sized pools in the southwestern portion of the bog were very active, but mostly with common Libellulids and Zygoptera. Our best success was in the lee of a small wooded island in the bog where *Somatochlores*, mostly *franklini*, appeared regularly, apparently seeking shelter from the strong winds. Also sheltering in the lee were 3-4 *Pantala hymenaea* (Spot-winged Glider). While trudging through the bog, Jeremiah's sharp eyes detected a partially emerged, but badly deformed, female *S. elongata*.

That evening Jeremiah decided a search for *Neurocordulia* was in order and headed to the Mohawk Rapids on the Penobscot River a few miles upstream from our cabin, while Rick and I opted to remain behind to prepare our specimens. Although quite familiar with Jeremiah's nose for odes, we were nonetheless delighted, though only mildly surprised, when he returned a short while later with not one but two species of *Neurocordulia*! He had found both the newly described *N. michaeli* (Broad-bodied Shadowdragon) and *N. yamaskanensis* (Stygian Shadowdragon) to be abundant over the river.

Our second full day was devoted to the Machias River and vicinity in Washington County. In 1999, Paul Brunelle discovered *Ophiogomphus howei* (Pygmy Snaketail) on the Machias, just north of Route 9, and we were eager to find this elusive little bug. Our search met with quick success. Shortly after locating the sluggish, gravelly bottomed stretch of the river to which Paul had directed us, both Jeremiah and Rick netted males of this

delightful clubtail. Over the next hour or so, we saw several more and Jeremiah netted a female. The males appeared irregularly, seeming to drop down out of the trees for brief bouts of patrolling low over the river where they were very aggressive toward each other as well as the larger *Ophiogomphus aspersus* (Brook Snaketail) males that patrolled the same stretch of river. Rick also netted a male *O. anomalus* (Extra-striped Snaketail) over the river. Other numerous species in the area were *Gomphus adelphus* (Mustached Clubtail), *G. exilis*, *Macromia illinoensis*, and *Helocordulia uhleri* (Uhler's Sundragon). Just downriver, where it was much rockier and more turbulent, we found a couple of *O. mainensis* (Maine Snaketail), the fourth species of *Ophiogomphus* within a hundred yards or so of river!

Salmon Pond, a well-vegetated pond just to the west of the Machias, was teeming with odonates, especially *Leucorrhinia glacialis* (Crimson-ringed Whiteface) and *Enallagma*, *E. aspersum* (Bog Bluet) being the most common, at least along the shore. At least three individual *Aeshnas* cruised the deeper parts of the pond, but eluded capture (and thus identification). As I was engaged in photographing *Leucorrhinias*, Rick suddenly yelled "Big Al!" Sure enough, cruising out over the deeper water was an unmistakable, brilliantly crimson and green behemoth — *Anax longipes* (Comet Darner). We were aware that this was a significant occurrence this far north, but 15 minutes of watching and stalking failed to produce even a swing at the lordly creature. We later learned that the species was unrecorded in Maine, but that Paul Brunelle had also seen (and likewise failed to net) another individual in the southwestern part of the state within a few days of our sighting.

Following a logging road that paralleled the Machias northward, we stopped at the confluence of the West Branch Machias. Here, too, the river was rather sluggish and gravelly bottomed and, sure enough, both *O. howei* and *O. aspersus* were again numerous. Rick also netted another male *O. anomalus* here.

Naturally, a trip to the Mohawk Rapids that evening was a top priority and the *Neurocordulias* did not let us down. The river teemed with them and a couple dozen or more found their way into our nets. Surprising, especially considering the hour, was a male *Gomphus abbreviatus* that Jeremiah netted. In fact, we were impressed with the variety of odonates that were active late into the evening:

another ten polar bears seen from a helicopter, as well as a few caribou.)

One thing I found interesting was the fact that all of these dragonflies were flying at about 58 degrees F (14 C), a temperature at which our wimpy Binghamton bugs would be shivering in the trees.

Actually the birds and plants were pretty interesting. The "best" bird we saw was a golden eagle, which is surprisingly rare up there. Orange-crowned warblers were still feeding young, and rusty blackbirds were singing a very beautiful song. Our nicest seabird was the parasitic jaeger, which treated us to closer views than I have ever had. Thousands of beluga whales in the estuary were a treat that will be long remembered. And, finally, I saw my first northern lights. We haven't marked this place for a return visit, but it was great fun.

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RESULTS OF A BRIEF ODONATE SURVEY AT EAST SANDIA SPRING, REEVES CO., TEXAS, INCLUDING A NEW STATE RECORD OF PAIUTE DANCER (*ARGIA ALBERTA*) KENNEDY, 1918

Robert A. Behrstock

INTRODUCTION- On 16 April 2000, after receiving permission from John Karges to observe and collect odonates at a Nature Conservancy site, I visited East Sandia Spring, a unit of the Sandia Springs Preserve, about one mile east of the town of Balmorhea and adjacent to the small community of Brogado. Here, the Chihuahuan Desert of far western Texas receives about 8 inches of rain per year, and permanent freshwater habitats are in short supply. The spring (located within the 240 acre Harvey Tract that contains both East and West Sandia Springs) is part of the Balmorhea Springs Complex, the largest remaining desert spring system in Texas. Karges estimated the actual extent of the site's aquatic habitat (pools, channel edges, and their vegetated margins) to be less than two acres. Scarce or endangered populations of a pupfish, a mosquitofish, and several scantily distributed invertebrates occur at these springs. (TNC 1997-2000, Karges 1998). To date, no odonatist had surveyed the springs; thus, even a brief visit was bound to produce new information.

I visited the site from 11:20 A.M. - 4:00 P.M., at which point I left to make the first leg of the long drive back to Houston. After my arrival at the spring, the morning temperatures quickly climbed

to the mid-80s; but the afternoon was cooler, due to a thunderstorm and its associated clouds moving in from the southwest. A persistent breeze negated the possibility of successfully photographing insects in the field; indeed some individuals escaped my net when a sudden gust carried them away.

Voucher specimens of most species were collected in order to provide reference specimens for the site, to document regional records, and to avoid potential confrontation with entomologists who fear binocular sightings. Unless indicated otherwise, voucher specimens, indicated below as (V), were sent to John C. Abbott at the Entomology Collection of the University of Texas in Austin.

SPECIES LIST-

Blue-eyed Darner (*Aeshma multicolor*) One male flying over the largest pool. (V).

Common Green Darner (*Anax junius*) Two or three flying over pools.

Gomphid sp. (possibly a Ringtail, *Erpetogomphus*) - a distant fly-by.

Western Pondhawk (*Erythemis collocata*) Two males and one female on pools; female (V).

Comanche Skimmer (*Libellula comanche*) One male in channel through tall sedges.

Flame Skimmer (*Libellula saturata*) Two territorial males over pools.

Desert Whitetail (*Libellula subornata*) Two males at pools; one (V). **FIRST COUNTY RECORD.**

Variable Meadowhawk (*Sympetrum corruptum*) Several at pool edges.

Saddlebags sp. (*Tramea* sp.) A fly-by pair in a copulating wheel should represent either *lacerata* or *onusta*.

Plateau Spreadwing (*Lestes alacer*) About six at pool edge, seemed to appear after 3:00 P.M.; one male and two females (V).

Paiute Dancer (*Argia alberta*) One brown sub-adult male about 20 feet west of channel on tall sedges; specimen to Sid Dunkle, Plano, TX. One blue adult male at a small, open pool surrounded by rushes in a flowing, clear part of the channel exiting the main pools; (V). **FIRST STATE RECORD.**

Variable Dancer (*Argia fumipennis violacea*) Fairly common on ground and at pool edges; one male (V).

Kiowa Dancer (*Argia immunda*) A few at edges of pools; one male (V).

Aztec Dancer (*Argia nahuana*) Several males perched on stems over open portions of channel; one male (V).

Double-striped Bluet (*Enallagma basidens*) Common at water's edge and on emergent

vegetation; many ovipositing in tandem; one male (V).

Familiar Bluet (*Enallagma civile*) Very common at water's edge and on emergent vegetation; many ovipositing in tandem; one male (V).

Mexican Forktail (*Ischnura demorsa*) Scattered individuals at water's edge, both males and pruinescent females; four males and one female (V).

Black-fronted Forktail (*Ischnura denticollis*) At least four in rushes at pool edge; one male (V).

DISCUSSION- The odonates of Balmorhea State Park, located just a short distance to the west of East Sandia Springs, have been the subject of sporadic investigation. Thomas Donnelly collected there 14-15 Sept. 1954, 8-9 June 1956, and 3-4 Aug. 1995, and reported his results to Texas Parks and Wildlife (Donnelly 1995). His species lists, as well as more casual sightings by Bob Honig, Ted Eubanks, and myself (Behrstock 1997) have been incorporated into the species inventory of the Management Plan for Balmorhea State Park (Bryan et al. 1999).

Donnelly's composite list from Balmorhea State Park includes 38 odonates: 25 Anisopterans (one unconfirmed by him) and 13 Zygopterans (Donnelly 1995, Bryan et al. 1999). There were twenty-six species he encountered during six collecting days at the park, but missed by myself at East Sandia Spring: Ringed Darner (*Anax amazili*), Eastern Ringtail (*Erpetogomphus designatus*), Dashed Ringtail (*E. heterodon*), Sulphur-tipped Clubtail (*Gomphus militaris*), Four-striped Leaf-tail (*Phyllogomphoides stigmatus*), Bronzed River Cruiser (*Macromia annulata*), Red-tailed Pennant (*Brachymesia furcata*) (unconfirmed sighting), Pale-faced Clubskimmer (*Brechmorhoga mendax*), Checkered Setwing (*Dythemis fugax*), Black Setwing (*D. nigrescens*), Swift Setwing (*D. velox*), Eastern Pondhawk (*Erythemis simplicicollis*), Widow Skimmer (*Libellula luctuosa*), Twelve-spotted Skimmer (*L. pulchella*), Marl Pennant (*Macrodiplex baiteata*), Roseate Skimmer (*Orthemis ferruginea*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*P. hymenaea*), Filigree Skimmer (*Pseudoleon superbus*), Black Saddlebags (*Tramea lacerata*), American Rubyspot (*Hetaerina americana*), Powdery Dancer (*Argia moesta*), Sooty Dancer (*A. lugens*), Blue-ringed Dancer (*A. sedula*), Leonora's Dancer (*A. leonorae*), and Arroyo Bluet (*Enallagma praevarum*).

My brief investigation turned up 18 species of odonates, nine Anisopterans and nine Zygopterans. Six of these: Western Pondhawk (*Erythemis collocata*), Desert Whitetail (*Libellula subornata*), Plateau Spreadwing (*Lestes alacer*), Paiute Dancer (*Argia alberta*), Variable Dancer (*Argia fumipennis violacea*), and Black-fronted Forktail (*Ischnura denticollis*), were not encountered by Donnelly.

During 1997, Eubanks, Honig, and I noted about 25 species of odonates at Balmorhea State Park and nearby Lake Balmorhea (Behrstock et al. 1997). Several of these were not encountered by Donnelly: Four-spotted Pennant (*Brachymesia gravida*) and Red Saddlebags (*Tramea onusta*) were found at the Lake, and Blue Dasher (*Pachydiplax longipennis*) was seen at the State Park. These species could be attracted to the well-vegetated edges of East Sandia Spring.

Due to the lack of broad, open, flowing channels, East Sandia Spring is not ideal habitat for Bronzed River Cruiser, American Rubyspot, or Powdery and Sooty dancers. Nonetheless, the Rubyspot, Powdery Dancer, and the common Blue-ringed Dancer occur close to the springs in a roadside ditch that carries cold, clear water, and these species may be expected to wander to the springs eventually. Rarities such as Ringed Darner, and Marl Pennant have at least a minor probability of reappearing. Over time, most or all of the remaining species encountered at Balmorhea State Park may be expected to occur at East Sandia Spring. Thus, a potential total of about 42- 44 species for the Spring is not unreasonable. At least 53 odonates are known from Reeves County and several more occur nearby in Jeff Davis County (Abbott 2000); thus, thorough sampling over time could bring the total to 50 or more.

One of my goals in visiting East Sandia Spring was the hope of rediscovering a local population of Leonora's Dancer (*Argia leonorae*). Donnelly collected *leonorae* at nearby Balmorhea State Park in 1954. Leonora Gloyd, who studied the genus *Argia* for half a century, referred to it with the manuscript name *Argia balmorhea*. After her death, Rosser Garrison (1994) described the species, naming it *Argia leonorae* in her honor. Due to habitat modification at the State Park, including removal of much channel vegetation, Donnelly, who did not encounter *leonorae* on his subsequent visits, feared that it had been locally extirpated (Donnelly 1995). Neither this visit to East Sandia Spring, nor several I have made to

Balmorhea State Park during the last several years, have yielded additional individuals of this apparently rare species.

Paiute Dancer (*Argia alberta*) is a widespread western U.S. endemic ranging north to Idaho and Montana, west to Oregon, east to Iowa, Kansas, and Oklahoma, and south to southern California and the Mexican border of SE Arizona. Perhaps its discovery in west Texas was overdue. Desert Whitetail (*Libellula subornata*), found throughout much of the western U.S. has been taken in west Texas in nearby Brewster, Presidio, and Jeff Davis counties. Its presence at a desert oasis in Reeves County is not unexpected.

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FUN IN OZ

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I spent late August to late Dec 1999 in Australia, which the Aussies themselves often call the Land of Oz, since so many things are reversed in Australia from the situation in North America, in particular winter is summer, summer is winter, the north is warm and the south is cold, and the country is about half a day ahead and out of synch. This article is written mostly for North Americans, so others shall have to interpolate. I bought a 1983 station wagon (which deserved a story by itself) and tent-camped from Sydney north to Cape Tribulation, then west to Darwin, then back the same way but more inland, then west to Perth and back to Sydney, all this taking 4 months. Since Australia is about the size of the contiguous 48 U.S. states, this is like driving from Georgia to New York and North Dakota and back, then to Los Angeles and back. The major parts of Australia that I missed were the island of Tasmania, the red desert center, and the Pilbara and Kimberly regions of the northwest, and I would dearly love to see all those someday. I need to mention that I carried a small tape recorder to gather data, and it became very obvious that I would have forgotten nearly half of what I saw without the memory prompt of the recorder. Such a recorder is far quicker than a notebook and pen (until you have to transcribe the data to paper later), and I cannot recommend the use of one in the field too highly.

I found odonate collecting to be extraordinarily difficult in Australia. First, I got there in late winter, and so it took awhile before I saw very many odonates, even by traveling toward the tropical north. Second, by design for tent-camping,

it was the dry season, during which apparently at least some of the odonates do not fly, and of course many temporary habitats were dry. Third, much of Australia is arid, and accessible aquatic habitats were generally scarce and hard to find, especially outside of parks and reserves. At one point, I asked a clerk in a grocery store if there were any flowing rivers nearby. She looked at me like I was out of my mind and said "You want a river with water in it?!" Because of the low population, most rivers did not have fisherman-caused paths along the banks, and the vegetation away from trails was usually very dense. Fourth, it seemed to me that the Australian odonates were warier and faster than most in North America, or maybe my rather fine-meshed net was pushing too much air, or I am slowing down, or whatever. Fifth, dangerous animals inhibited my usual crashing through the weeds and brush. For instance, I did not want to end my career in the jaws of an Estuarine Crocodile, of which I saw quite a few, and so I had to keep back from the shores of murky waters in the tropical north. The single Freshwater Crocodile I saw, which is supposed to be harmless to people, was hissing and eyeing me balefully. "Crocodile Dunkle", I am not! Also, most of the Australian snakes are neurotoxic cobra relatives. I identified 7 species of snakes, and saw a few others, the most dangerous being the Tiger Snake, with a venom 4 times more toxic than that of an Indian Cobra. Of course, the Aussies like Gunther Theischinger run around through the brush in shorts and sneakers. Sixth, my collecting was inhibited by the complicated permitting situation, with separate rules for each state, and for different types of public lands within each state. Rainforest tourism and preservation was such a big commercial deal that no doubt environmentalists, tour operators, and the tourists themselves would cast a jaundiced eye on anyone seen wielding a net in the rainforest areas. Seventh, and not least, was the fact that I wanted to experience as much as I could of all the other neat Australian biota. The trip actually was more a birding trip than an odonate collecting trip. I visited 105 different parks and reserves because I was interested in experiencing unmodified habitats as much as possible. "Unmodified" is a relative term because, for one thing, much of Australia is deliberately burned every year, and in some parks I could not find any rangers because they were out burning down the park! Unexpectedly, though, I found that the best places to see wary wildlife were in the most congested parks, because the large animals were tamer there. I also visited a dozen zoos, botanical gardens, and museums.

Well, to the odonates. I found only a few of the rare species, because I think that even more so than in North America, they are very spotty and local, as Gunther also mentioned to me at the end of my trip. For instance, I did not see any Neopetaliids, Isostictids, Calopterygids, Chlorocyphids, the giant aeshnid *Austrophlebia*, or any of the numerous species of *Austroaeschna*. John Hawking did show me a habitat of *Hemiphlebia mirabilis*, which was a dry sedgy swale that I would never have bothered looking at on my own. *Hemiphlebia* looks and acts like a Sprite (*Nehalennia*), usually appearing bronze colored, but metallic green at a certain angle of lighting. There must be many more habitats for this species out there, but the animal is extremely inconspicuous to say the least. Of the other damselflies, the following can be mentioned: *Agriocnemis* spp. were so tiny that they hardly qualify as Odonata, and were frustrating to try to find, even inside the net, although male *A. argentea* which are entirely pruinose white, do stand out in the grass. The mostly black *Argiocnemis rubescens* perched low in the shade so inconspicuously that I thought it had to be a new species that nobody had ever seen before, but of course I was wrong about that. *Austrocnemis splendida* is a strange damselfly that looks like a spider-legged *Nehalennia* but perches on lily pads with the tip of the abdomen curled upward. *Ischnura heterosticta* was the common "*I. ramburii*" of Australia, while the pruinose gray *I. pruinescens* seemed to be scarce. I saw a mating pair of the multicolored *I. aurora* in which the female was teneral, as Richard Rowe discovered a number of years ago is usual in this species. *Pseudagrion aureofrons*, with its yellow face and front of the thorax, resembles the Caribbean Yellowface *Neoerythromma cultellatum* in both appearance and its habit of flying far out over the water and perching on vegetation distant from shore. The mostly blue *P. microcephalum* is the Australian version of the Familiar Bluet *Enallagma civile*. *Xanthagrion erythroneurum*, which was common at human-stressed habitats, looks like nothing in North America, in its livery of red thorax and blue abdominal tip. The only genus of Threadtails (Protoneuridae) in Australia is *Nososticta*, of which I saw 4 species. The orange and black *N. solida* surprised me by being common at "regular" disturbed streams, more like the Orange Bluet *Enallagma signatum* than a protoneurid. *Austrolestes*, of which I also saw 4 species, are surprising to Yanks as lestids which are NOT Spreadwings, in that they perch with the wings upright like most other damselflies. Lestoidea, of which I found 2 species on rainforest streams, are

pretty dull colored and not very prepossessing, until one realizes that they are classified in a family of their own. *Miniargiolestes minimus* are really charming tiny Megapodagrionids which I encountered in Western Australia. They are bronzy brown with white stigmas, and perch unwarily with their wings out flat on grass blades near or above streams and rivers. I found the large and spectacular metallic green *Synlestes weyersii* of the family Synlestidae at only one place. After flying to a new perch, the wings are held open for a couple of minutes, then closed over the back. The other synlestid I saw was a few *S. tropicus*, of which 2 of 3 females were perched on the long dangling prickly whips of climbing palms. I caught those by hand, after gently hauling down the whips until the insects were within reach. These palms, which scramble up to the forest canopy using their long whips covered with recurved prickles, are also called rattans, wait-a-bit vines, or lawyer vines, and seem to lash out and grab a net, or for that matter any person, that comes anywhere near them. Australia's most spectacular damselflies, though, are the 5 species of *Diphlebia*, classified in Amphipterygidae or in a family of their own, Diphlebiidae. Males, as Dennis Paulson has also noted, look and act like bright blue gomphids, perching with wings spread on rocks in riffles. *D. euphaeoides*, one of the most common stream odonates in northeastern Australia, has black wings in the mature males. Mature and juvenile males, along with the yellow to gray females, all perch together along the streams, the males often side by side. I never actually saw *Diphlebia* mating, and saw a possible courtship only once. So far as I know, nobody has studied the reproductive behavior of *Diphlebia*, something which cries out to be done.

Among the dragonflies, the following come to mind: Gunther showed me a habitat of *Petalura gigantea*, a very dense brushy swamp, where we finally saw one female, the only Petalurid I saw in Australia. We thought that *P. gigantea* was dying out here, and would recolonize someday after the swamp is burned. The Australian version of the Common Green Darner *Anax junius* is *Hemianax papuensis*, by far the most common aeshnid I saw, but brown rather than green, although it oviposits in tandem like *A. junius*. I saw the real *Anax* at several places, but only one came within net reach, and I missed that one. I came across 9 species of *Austrogomphus*, not too spectacular, but with ornate male abdominal appendages. *A. turneri* was exceptional, in that it was brightly colored much like the Eastern Ringtail *Erpetogomphus*

designatus. *Ictinogomphus australis* is a large gomphid that looks like a River Cruiser (*Macromia*) in flight. Like *Anax*, I saw these in several places and had only one swing at one. That time though, I got that sucker! I collected only 2 specimens of synthemistine corduliids, black with yellow markings and metallic green eyes. The first was the only anisopteran I saw on a beautiful small rainforest stream; it was hovering under some overhanging brush along the shallow edge of a riffle and turned out to be the undescribed male of *Eusynthemis tenera*. The other, a more common species *E. nigra*, appeared as a dark blur traveling down a small stream on top of Mt. Lewis, one of the few accessible mountain summits in tropical Australia. I saw several of these go by before it registered on me that they could be odonates instead of some other supersonic insect. There was a notable beautiful marshy pond on top of Mt. Lewis also. This was notable because there were absolutely no odonates there at all! There were some other good-looking habitats in Australia, including some in reserves, that should have been loaded with odonates, but had none, and I have no idea why. The best pond that I found had 20 species of odonates, the best stream had 22. Among other corduliids, the 3 species of *Hemicordulia* that I found were common, and the males both looked and acted like slender Baskettails (*Epiptera*). As usual, the common pond anisopterans were libellulids. The pruinose blue *Crocothemis nigrifrons* fooled me into thinking that it was an *Orthetrum* at first because it looks so unlike the Scarlet Skimmer *C. servilia*. Australia's "Scarlet Skimmer" would have to be the abundant small but bright red *Diplacodes haematodes*. *Macrodiplax cora* is also bright red, quite unlike the black American Marl Pennant *M. balteata*, while *Tholymis tillarga* is pale red, again unlike the brown American Evening Skimmer *T. citrina*. However, it was astounding to see that the pink and blue *Orthetrum migratum* looked just like the American Roseate Skimmer *Orthemis ferruginea*. Likewise, *Rhyothemis graphiptera* has an orange and black wing pattern just like that of the American Halloween Pennant *Celithemis eponina*, although it is more of a flyer/glider than a percher. This latter species was frustrating for me because they looked like they could hardly fly, yet they avoided the hardest and fastest net swings that I could muster again and again. At least some of the *Rhyothemis* species while perching tilt their wings back and forth, left to right, apparently to display the pattern and the iridescence that some have. Finally, I have to mention *Orthetrum caledonicum*, Australia's answer to the abundant

I have to also say something about the vertebrates that I saw, including the Platypus and Spiny Anteater, the Monotremes or egg-laying mammals. Many of the native Marsupials look extraordinarily alike, but I was able to identify about 20 species, including the Koala, Common Wombat, Northern Brown Bandicoot, 3 species of Possums, all 4 large Kangaroos, 5 species of Wallabies, and the smaller Red-necked Pademelon and Musky Rat Kangaroo. Watching a shrew-like Dusky Antechinus snuffling around within a rainforest brushpile was seeing a mammal as a dinosaur would have seen one 65 million years ago. Native Placental mammals that I identified were 5 species of bats, including large spectacular roosts of Flying Fox fruit bats, the New Zealand Fur Seal, and the Australian Sea-lion. Probably unfortunately, I also saw 7 species of introduced mammals which have wrecked so much environmental havoc in Australia, namely Dingoes, Red Foxes, feral House Cats, European Rabbits, Brown Hares, wild Horses, and feral Pigs. I think that the latter, by plowing up seepage areas, as I saw abundantly in rainforest areas, may be drastically reducing the populations of odonates

The birds deserve a story of their own, but who could forget the Cassowary that chased me around the car, the Collared Sparrowhawk that took a bath only 30 feet away, the Brown Falcon that perched on a fence post outside the car window, the Grey Goshawk that Gunther and I flushed from a Ringtail Possum that it had just killed, the Wedge-tailed Eagles eating road-killed Kangaroos, the Emus, the Black Swans, the metallic green Emerald Doves, the urbanized Crested Pigeons, the cackling of the Laughing Kookaburras, the Bowerbirds, and the many kinds of parrots, including the most spectacular of all to my mind, the Red-tailed Black Cockatoo, 2 feet long with a 5 foot wingspread! For the record, I identified 352 species of birds, 47% of the 754 listed for Australia in a popular field guide. Man, do I long to return to the Land of Oz again!

HONG KONG- As I crept gently down the elevated, narrow concrete path, stepping softly so as not to frighten the local wildlife, and carefully so as not to slip off the path into the vines on the side, I saw a discarded dark gray inner tube lying across the path ahead of me. "That's odd", I thought; "what is this doing in a deserted village?" And then it started to move. And move, and move, and move... It was the same king cobra that Keith Wilson had spotted two days previously, and which Graham Reels and I had failed to see because we were walking behind him. "It's at least 3 ½ to 4 meters," was Keith's judgment. [Rule 1: Make a little noise so that the king cobras will quietly move aside. They don't like to be startled.]

Like most Odonatists, we were enchanted by Keith Wilson's book on Hong Kong Odonata. So inspired were we by this book, we decided to plan a trip to Hong Kong as a preliminary to our (nearly) annual trip to Thailand. Keith was able to go out in the field with us for two weekend days, and what days these were. Accompanied by Keith's friend Graham Reels, we set off into the New Territories to sample one of the finest odonate places that Keith had discovered – the deserted village of Sha Lo Tung. Hong Kong lived up to its reputation for gomphids – we found the huge *Gomphidia kelloggi* and *Megalogomphus sommeri*, the slightly smaller *Asiagomphus hainanensis*, and – a startling discovery – a *Merogomphus* much like a large version of *M. parvus* in Thailand. This seemed like a day for large Odonata. *Philoganga vetusta* (a huge damselfly) was perched on a stem over the stream. *Tetracanthagyna waterhousei*, one of the largest aeshnids, was ovipositing in a live tree trunk overhanging the stream.

The aptly named *Lyriothemis elegantissima* (with a brilliant red abdomen) and *Pseudothemis zonata* perched high on vegetation along paths. The beautiful red-spotted damselfly *Prodasineura croconota* and its somber sister, *autumnalis* flew along the streams.

Francolins (grouse like birds) called from the tops of telephone poles. A small green, poisonous viper hung from a vine along the path. We hardly noticed the drenching rain. . .

Later that day Keith took us to a small estuary, where we found *Orthetrum poecilops*, a salt-water dragonfly. We found it behind the mangroves, flying about in the world's ugliest fern; the giant *Acrostichum aureum*, which is a pan-tropical salt-loving plant. This is the only old-world salt-loving odonate that I have seen. A peregrine falcon perched nearby and swooped down several times in search, presumably, of salt-loving birds. A lovely experience.

The next day Keith took us to Ng Tung Chai, a village at the edge of Tai Mo Shan Park, in one of the higher parts of the New Territories. Here we looked for platystictids and other forest damselflies – the sort you catch with your fingers in the thick forest vegetation. It is just as well that we concentrated on Zygoptera. Yesterday's drenching rain had become today's torrential downpour. Happily one can find forest damselflies even under such conditions, and the forest at the park did not disappoint: we found three genera of platystictids;

Drepanosticta hongkongensis, *Protosticta taipokauensis*, and *Sinosticta ogatai*, all Hong Kong specialities. The latter is a peculiar platystictid: rather stout-bodied in this family of very thin damselflies. Also flying about was *Agriomorpha fusca*, which we had previously found in Vietnam: a peculiar forest dwelling megapodagrionid damselfly which holds its wings over its back, like *Burmargiolestes*.

On Monday Keith reported that our rain had been no summer shower. A tropical depression had apparently formed in the Pearl River estuary – which was exactly where we were. I seemed to have carried the "Donnelly Effect" half way around the world!

THAILAND- We moved on to Thailand for another safari with the ever resourceful Brother Amnuay Pinratana and his friend Mr. Somnuk Pichipan, who had been our guides on several previous trips to this enchanted country. This time we headed straight west from Bangkok to Khanchanburi (the province, not the city). But we had to pass through the city first. What had been an charming provincial town in 1980, at whose outskirts unpaved roads led on to the almost deserted province, had become twenty years later a sprawling, crowded, unattractive city which was the nexus of a road network for trucks carrying food and raw materials for the construction of yet more new provincial villages. We did not pause here but sped onward to a remote mountain village of Pi-Lok, where a friend of Brother Amnuay cheerfully hosted us at a luxurious mountain lodge. Alas – the bugs did not quite match the scenery and ambience. We did find *Phaenandrogomphus asthenes* darting swiftly up and down a torrential stream. Ailsa found an *Anisopleura furcata* (a stout bodied Euphaeid with a peculiar bend in the front of the hind wing) that seemed somewhat different from the same species in northern Thailand. There were a few *Indocnemis orang*, a very large platycnemidid damselfly, and *Protosticta curiosa*, a gloriously thin, elongate platystictid damselfly. Nice but not memorable. And it only rained a little bit. This village was nearly on the Burma border; we have been on this border at so many places that we will have to have a trip to Burma sometime in the future.

From Pi-Lok we proceeded to a rural hotel not far from Sangkha Buri. The hotel proved to be quite an experience in itself. From the front of the hotel we had great views of distant, cloud-shrouded mountains and closer views of Black-shouldered

Kites. The prime attraction of the hotel, however, was a tame (is there is such a thing) Great Hornbill – a huge bird that can make you believe that dinosaurs still live. The bird had the disconcerting habit of perching on shoulders and looking for grapes (those are my eyes, dummy!), which the owner fed him. There is no sensation quite like pulling out of a parking lot on the way to a day's outing and discovering that a hornbill is sitting on the roof rack, peering in at you through the window.

We collected at several localities from our base. The first was Nang Kruan, a forested area with a large stream. So keen was our interest that we visited this place on three separate days. Mr. Somnuk started the proceedings with a fine male *Philoganga montana*, a species rarely taken in Thailand. Like the Hong Kong *vetusta*, this is a very large, stout damselfly, but lacks the extensive yellow on the abdomen. Gomphids abounded at this site. A *Burmagomphus arboreus* foolishly landed a few feet from me when I stepped out of the vehicle. *Merogomphus parvus* and *Heliogomphus selysi* were also sitting on the vegetation and Brother Amnuay found a lovely *Macrogomphus kerri*. A nearby roadside stream provided the huge *Gomphidia perakensis*. Now this is a gomphid! It can be spotted from a considerable distance as it menaces all the other odonates in the stream from its perch atop a tall grass stem.

The most interesting find here was the mysterious *Coeliccia* (an elongate clear-winged forest damselfly) that John Michalski had taken a few of in 1993, and which remains undescribed. We took a fine series, with many females, enabling it to finally be described. It is noteworthy for belonging to the group of Borneo species informally known as the *membranipes* complex, which includes another mainland species: *C. octogesima* from peninsular Malaysia and Singapore. All the species of this complex have lovely blue scroll marks on the thorax. Flying with these *Coeliccia* were two congeners: *C. chromothorax*, with its spectacular orange-spotted thorax, and the more modest *C. albicauda*.

We found some beautiful forest flowers along the stream at Nang Kruan. One lovely mint, called Cat's Whiskers, had very long stamens, making it like a large, colorful bottle brush. A member of the Indian pipe family had its large, colorful flower right on the forest floor, with no visible stem. I was especially attracted to a large fungus with a white,

openwork netlike hood (like a tiny insect net) growing in muddy seeps. Ailsa found a Great Barbet, just to complete the day.

Woodland pools were full of the small coenagrionid damselflies *Onychargia atrocyana* and *Mortonagrion arborescens*. Red-bodied libellulids seemed to abound: *Agrionoptera insignis* (widespread in Indonesia and in Southwest Pacific islands, but rare on the mainland), *Amphithemis curvistyla* (a new one for me), *Lathrecista asiatica* and *Crocothemis servilia* were all here.

Another place we visited was Lam Klong Gnu, home of the large chlorocyphid damselfly *Indocypha vittata*. These stout damselflies flew swiftly among bamboo debris along a swift and rather treacherous river. Only the very long net of Mr. Somnuk was capable of reaching them. [Rule 2: get a long net!] On this same, swift river were two species of lovely large damselflies: *Dysphaea dimidiata*, with much less black than Malaysian or Borneo specimens, and the spectacular *D. gloriosa*, with reddish salmon colored wings. A few *Onychogomphus duaricus* flew swiftly above the rapids. Chalk up another one for Mr. Somnuk's long net and quick reflexes.

One of the more interesting localities here was Pu Ye, a Buddhist encampment in the forest. The Buddhists chose well, living amidst a series of travertine waterfalls cascading down the forested mountain slope. A really gigantic dipterocarp tree (called Ta Kien) was festooned at its base with ribbons and had obviously been the object of religious veneration for many years. Just behind this tree was a forest seep with quantities of a *Burmargiolestes* which is probably the same as the northern species *melanothorax*, but which seemed more slender and behaved more timidly (in my estimate) than its northern brethren. Flying in nearby tangles of vegetation was a *Protosticta* that appears to be an undescribed species, and which is one of the longest species in the genus that I have found. Ailsa found a lone specimen of *Protosticta medusa*, with its curious "upside-down" beard-like tuft on the cerci. We also found more of the lovely undescribed *Coeliccia*, and many of the dark *Calicnemia imitans*, a waterfall loving damselfly. On the way out we found a Bat Flower, which is one of the strangest forest flowers I have ever seen. Imagine a nearly black, very large, long-spurred flower growing close to the forest floor. Weird. . .

Throughout the Thailand trip we were rained on every day. How tropical species cope with so much

Conservancy Preserve. The locality is one of the only true muskeg bogs within the state. Males were seen patrolling low over *sphagnum* mats at the waters edge and proved difficult to detect and collect. By comparison, *A. canadensis* (the most numerous *Aeshna* here) flew higher and was more conspicuously colored. While never previously collected in New Jersey, an apparently stable population exists approximately 100 miles northwest in Chenango County, New York (Donnelly, pers. com.).

***Somatochlora forcipata* - Sussex:** One male specimen was collected on the same date at the locality mentioned previously. Other individuals were seen flying high and erratically among spruce trees growing on the fringe of the bog. The occurrence of this species in nearby Monroe County Pennsylvania (Tannersville Bog Preserve) has created great interest in finding it in NW New Jersey for some years.

COUNTY RECORDS- What follows is a brief listing of new county records of species not known; doubtful, or omitted at the time the 1996 list was published. Included also, where appropriate, are comments on the biology and ecology of some species. Supplemental occurrence data for many poorly documented species has been accumulated as well. Publication of this voluminous information will be reserved however for an upcoming report detailing the Odonata of the NJ Highlands and Ridge & Valley physiographic provinces.

***Hetaerina americana* - Sussex/Morris border,** Musconetcong River at CR 605, Allamuchy Mountain SP. This conspicuous species occurs commonly along most of the Musconetcong River. Along the Morris/Sussex border at least it experiences two emergences, one in mid June and another much larger one in mid August.

***Archilestes grandis* - Sussex:** Allamuchy Mountain State Park in Byram Twp. A large population of this interesting species was encountered at a defunct beaver pond along the Sussex Branch Trail approximately .4 miles north of Jefferson Lake. Visits to this pond throughout the year have shown that it supports populations of four *Lestes* species. **Warren:** Upper Yards Creek Reservoir in Blairstown Twp. A large population of this species was discovered by Tom Halliwell in two fishless ponds adjacent to the reservoir on its north end. A subsequent visit on September 27 was rewarded with the observation of some dozen mating pairs and numerous males. This locality and others

adjacent to the reservoir appear to be the product of water seeping from the walls forming its north and south ends. This is a species that is rapidly expanding its range in adjacent Morris County. It is able to utilize a wide array of fishless habitats such as water retention basins, roadside drainage channels and old beaver ponds. This species appears to be quite tolerant of pollution from roadside runoff (e.g. salt, oil).

***Lestes dryas* - Sussex:** Wallkill River NWR, borrow pit and cattail swamp on Scenic Lakes Road. This small species has previously been collected once in Morris County. Despite the presence of numerous suitable habitats in Morris and especially Sussex Counties this species has eluded collectors since its initial discovery. The species small size and habit of perching inconspicuously in grass and emergent plants may account for the paucity of records in this state.

***Lestes inequalis* - Monmouth:** Howell Twp. Rutgers Plant Science Extension Center, town of Adelphia, exuvia (Jennifer Price, leg.).

***Lestes vigilax* - Warren:** I found this species to be the dominant *Lestes* at the White Lake Wildlife Management Area. This is a common and widespread species throughout the state. Its previous absence from the Warren County list is indicative of how poorly studied this county is.

***Enallagma basidens* - Sussex:** Wallkill River NWR. This species was found to be extremely numerous in June at the Bassetts Bridge Fishing/Canoe Access area. The habitat is a complex of wading bird ponds which refuge management had created three years previous. It is interesting to note that in addition to this species, 23 others have been found colonizing this relatively new habitat. Since it's initial discovery in 1982, *E. basidens* has rapidly expanded it's range throughout New Jersey.

***Enallagma carunculatum* - Sussex:** Taken on the family boat while on Lake Hopatcong, Byam Cove, Hopatcong Boro (June 18, 1999). Numerous pairs in tandem landed constantly on our boat making it easy for me to catch a good series. I have subsequently encountered the species in a similar fashion on several parts of the lake. Listed by May and Carle as an uncertain Sussex County record. **Warren:** White Lake Wildlife Management Area in Hardwick Twp. This habitat is interesting as the lake is a 60 acre marl pond with little emergent vegetation. The lakes white limestone substrate

coupled with crystal clear water creates a cerulean color reminiscent of the Caribbean Sea. *E. carunculatum* and the following were the only *Enallagma* species encountered during several visits.

***Enallagma aspersum* – Warren:** Small ponds on the north end of the Yards Creek Reservoir, September 27 2000. This was the only *Enallagma* species discovered at these two ponds perhaps owing to the lateness of season. This is a species which aggressively colonizes new habitats and particularly fishless ones.

***Enallagma civile* – Warren:** White Lake WMA. This species was by no means as numerous at this locality as the previous one but was found sporadically at all parts of the lake. This is another extremely common species in New Jersey. That it has been overlooked in this county for so long is frankly surprising. **Monmouth:** Howell Twp. Rutgers Plant Science Extension Center, town of Adelphia (Jennifer Price, leg.).

***Ischnura hastata* – Warren:** Found in large numbers among sedges bordering the small ponds on the north end of the Upper Yards Creek Reservoir. This is a species found abundantly in the Pine Barrens and until this year was only found sparingly in the north. In addition to this colony, five others have been found in Morris and Sussex counties this year. It is interesting to note that in southern New Jersey this species is a spring emerger while in the north it seems to emerge in late August. **Monmouth:** Howell Twp. Rutgers Plant Science Extension Center, town of Adelphia (Jennifer Price, leg.). Listed as an uncertain record for Monmouth by May and Carle.

***Tachopteryx thoreyi* – Taken in Morris County** at two localities. The first, in Mount Olive Township is a steep calcareous seepage draining into the South Branch of the Raritan River along Flanders - Drakestown Road. Two males were collected June 5, 1999 perching on beech trees adjacent to the seepage. Subsequent visits suggest the population is of moderate size. The second locality lies within Lewis Morris Historical Park in Harding Township south of Morristown. One old individual was observed July 11 of 1994 while I was searching the site (successfully) for *Cordulegaster erronea*. Subsequent visits to this low gradient sunny seepage have shown that it supports a far larger population the previous. Due to the sites location within a remote section of a national park I consider the population relatively secure. Previously

recorded from Bergen and Passaic counties. The Bergen county colony has since been extirpated due to habitat destruction.

***Gomphus abbreviatus* – Morris:** Two adult females taken on June 6 and July 18, 1999 at the Musconetcong River in Mount Olive Township at Continental Road. Also, two teneral males were collected June 1 of this year at the same locality. The species is likely more numerous here than these records indicate. The two female specimens were collected as they rapidly flew down out of the treetops to feed on insects emerging from the river. Several other small gomphines have been seen repeating this behavior. I may have been observing this species or the following. Previously recorded from Hunterdon, Somerset, Sussex, Warren and Mercer (uncertain) Counties.

***Gomphus quadricolor* – Morris:** With the exception of one locality in Somerset County (Lamington River), all previous records for this species have been confined to the Delaware River and its confluence with tributaries. The species was discovered on the Musconetcong River in Mount Olive Township on May 30, 1998 and observed for the next two weeks frequently. This species apparently prefers a shallow, rocky stretch of the river downstream of Continental Road. As many as 10 individuals could be counted on any large streamside shrub along this section of the river. Approximately 120 exuviae were collected along the river among roots and under the Continental Road bridge crossing. Previously recorded from Somerset, Sussex and Warren Counties.

***Aeshna canadensis* – Warren:** Blairstown Twp. Two males were collected September 27 (T. Halliwell and A. Barlow leg.) at a large *Sparganium* marsh on the north side of the Upper Yards Creek Reservoir. This marsh, and an adjacent larger one were both several acres in size and literally choked with *Sparganium*. Also found within these marshes were the largest populations of *A. tuberculifera* I have ever seen. Quite literally dozens of males and copulating pairs of this species were observed at the marshes and along the adjacent Appalachian Trail. In the case of both species, this years field work has resulted in the discovery of many new populations (particularly along the Kittatinny Mountain Range). This suggests the possibility that neither species are as rare as the current NJ Natural Heritage rankings would indicate.

Aeshna constricta – **Sussex:** Stokes SF, Beaver pond at Crigger Rd. Repeated visits to this locality over the past 14 years have yielded only vague sight records of *Aeshna* species. It was gratifying to successfully net two male specimens of this species on 22 August 2000. Several other individuals were closely observed patrolling the shoreline of this large beaver pond. Within days of this discovery, three other significant populations were found elsewhere in Sussex County (Whittingham Wildlife Management Area in Fredon Twp, the Wallkill River NWR in Vernon Twp., and the *Phragmites* marshes near Canal Rd, also in Vernon). The Wallkill population is of interest because two female color morphs (yellow and blue) were present. Yellow form females were consistently perched low in the grasses surrounding the larval habitat making them almost impossible to detect. Blue form females encountered were all in the wheel position copulating. Observing these two color forms within the same population makes me wonder (not for the first time) what purpose these morphs actually serve. This species has been infrequently encountered previously in Bergen, Morris, and Somerset Counties.

Aeshna verticalis – **Passaic:** Bearfort Mountain Natural Area off Rt 513 north, 21 August 2000. During my brief visit, a single male was observed (and netted) flying over a large swamp composed of *Typha* and *Sparganium*. This is a relatively common *Aeshna* in northern New Jersey and is generally the first to colonize newly created aquatic habitats with the appropriate vegetation. The absence of previous records of this species from this county is likely due to a lack of fieldwork more than anything else.

Cordulegaster erronea – **Sussex:** Stokes SF, coldwater seepage at Culver's Gap off Rt 206 north. This is by far the largest colony I have yet encountered. The habitat itself is a complex of three seepages feeding into a larger brook which drains through a hemlock dominated ravine. This habitat was repeatedly visited from 20 July – August 19. During this period a total of 36 males and 6 females were netted and marked. Of this total, only 5 males previously marked were successfully recaptured. This habitat is shared with *Somatochlora walshii* which was observed several times during July and August. Female *S. walshii* were seen ovipositing in the mud along the upper branches of the middle seepage. I have longed assumed that *C. erronea* was a July/August insect in New Jersey. This assumption was erroneous (no pun) as numerous fully mature males were found patrolling two

separate streams on June 20 of this year in Morris County. The species likely emerges therefore the first or second week of June. It is interesting to note that *C. erronea* was found to share habitat with *C. obliqua* at one Morris County site. Males of both species would literally fly by one another with no interaction at all.

Epitheca princeps – **Warren:** Hardwick Twp, White Lake WMA off CR 521. Several individuals were observed and one male was netted flying over the parking area adjacent to the lake on September 5. Why this common and widespread species has remained undocumented in this county until now is a mystery.

Epitheca spinigera – **Morris:** (Burnt Meadow Brook), **Sussex:** (Wallkill River NWR, Mashipicong Pond Nature Conservancy Reserve). This species was previously known from a historical record published by William Davis in 1913. At all three sites where I collected this species, it was found among large feeding swarms of *E. cynosura*. As the two species are indistinguishable while in flight, it seems likely that *E. spinigera* has been overlooked quite easily. One must literally net and carefully examine every *Epitheca* from a swarm, an activity which would not appeal to many people.

Neurocordulia obsoleta – **Morris:** Taken along Sand Shore Road adjacent to Budd Lake throughout June of 1999. I found the species rather numerous flying along the shoreline of the lake as well though the species was more difficult to collect then. I discovered that collecting was simplified when my ears became attuned to the "buzz" made by the wings. Trying to keep my eyes on the beast in the dusky gloom was a exercise in futility. Previously recorded from Sussex and Warren counties.

Somatochlora elongata – **Morris:** Rockaway Township. This species was collected flying over Green Pond Brook as it flows through a large bog at the south end of Green Pond. During my July 11 visit one male was collected but several others were observed over the channel. This locality was by far one of the most treacherous places I have ever visited. This species has been recorded previously from one locality in Sussex County.

Somatochlora linearis – **Sussex:** Sussex Branch Trail, Allamuchy Mountain State Park, Byram Twp. I walk this trail often as it is a wonderful place to observe various gomphid species and *Macromia* as they emerge from the nearby

Pantala flavescens – Sussex: Vernon Township – Wallkill River NWR. Several individuals were encountered swarming with *P. hymenaea* at the wading bird ponds adjacent to the Bassets Bridge Fishing/Canoe Access on 21 August 2000. This species experiences dramatic population fluctuations throughout the highlands and ridge and valley provinces of New Jersey. During 1988 the

Coenagrion interrogatum - WASHINGTON, Ferry Co., Davis Lake, 4550' (48°44.22'N, 118°13.71'W).

13 July 2000, D. R. Paulson & N. Smith. A male and three pairs were collected. They may have been fairly common in sedges on a floating moss mat that was inaccessible at that place, as the three pairs in copula were taken in shrubs in a very short length of lake shore.

Aeshna subarctica - WASHINGTON, Ferry Co., Davis Lake, 4550' (48°44.22'N, 118°13.71'W) 29 August 1999, DRP. One male was collected from among many that appeared to be territorial over a very extensive floating moss mat. I was able to reach the mat, which was separated from shore by an open channel, only at one point on a floating log, but the *Aeshna* were spread all across it and seemed all to be this species (careful study of numerous males with binoculars).

Both of these species were sought at Davis Lake because it matched the description of their habitat preferences, it was the highest-elevation lake that could be reached by automobile in the northern Okanogan region, and both had been taken at Solco Lake, British Columbia, about 80 km to the west-northwest. Both species were known from records in boreal areas of western Montana (Miller, K. B., and D. L. Gustafson, Distribution records of the Odonata of Montana, Bull. Am. Odonat. 3: 75-88, 1996) but nowhere else in the western part of the Lower 48 states.

Nehalennia irene - IDAHO, Boundary Co., large pond 10 mi N US 2 on US 95, 2200' (48°51.72' N, 116°20.18' W), 11 July 2000, DRP. Common in dense tall *Phalaris arundinacea* grass at a large, shallow pond. Two males and a female were preserved, and many tandem pairs were seen, some ovipositing at water level. I had to look well down in the grass to see them, but at one spot there were 4 pairs in a square meter. This pond lacked fish and had a diversity of about twice as many species of Odonata as nearby lakes, in which centrarchid fishes were abundant. I usually see *N. irene* in low sedge beds and considered this an unusual habitat for the species.

Epitheca spinigera - IDAHO, Benewah Co., Lake Benewah, 2200' (47°20.84' N, 116°41.13' W) 10 July 2000, D. R. Paulson & N. Smith. IDAHO, Boundary Co., McArthur Lake, 2200' (48°31.25' N, 116°26.51' W), 11 July 2000, DRP, NS. IDAHO, Boundary Co., Dawson Lake, 3000' (48°46.35' N, 116°14.30' W), 11 July 2000, DRP. IDAHO, Bonner Co., Freeman Lake, 2700', 12 July 2000, DRP. A male specimen was collected at each of these sites, and others were seen at most of them.

The species is apparently fairly common and widespread in the northern panhandle of Idaho.

The most interesting thing about these records is that all four species were common where they were taken. Idaho is a poorly known state, but Washington is probably the best-known western state at this time, and finding these two new species was quite exciting. In all of these cases, an effort to find characteristic habitats right at the periphery of the state for species unknown from the state resulted in successful searches.

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NEW KENTUCKY RECORDS

(e-mail from Ellis Lauder milk)

The 2000 field season has yielded two zygopteran species previously unrecorded from Kentucky. On 23 May 2000, *Enallagma daeckii* (Calvert) was collected from: Fulton County, wetland at KY 94/781 intersection on E side of Little Bayou de Chien, E.L. Lauder milk and R.R. Cicerello. The single male specimen was perched among the roadside vegetation as an imminent thunderstorm approached from the west. On 20 July 2000, one male *Telebasis byersi* Westfall was collected from the leaves of *Saururus cernuus* L. from: Casey County, wetland immediately southwest of the KY 1640/3272 intersection, E.L. Lauder milk and R.R. Cicerello. Two other males were observed at the site on 20 July, but two subsequent visits during the following month did not yield additional observations of this species. Specimens will be deposited in the Kentucky State Nature Preserves Commission Odonata Collection located at 801 Schenkel LN, Frankfort, KY 40601.

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TWO VIRGINIA RECORDS FOR *ENALLAGMA WEEWA*

Anne C. Chazal, Virginia Department of Conservation and Recreation - Division of Natural Heritage, Richmond, Virginia

Enallagma weewa, the Blackwater Bluet, is a southern Coastal Plain damselfly that ranges from Florida northward to New Jersey and west to Louisiana (Dunkle, 1990). Dunkle (1990) reports its habitat as "...slow and shady, often brushy or swampy, parts of streams. Occasionally it is found at lakes."

Sancti-Spiritus Prov.; Mun. de Trinidad: Río Manacal (Sept. 1997); Playa la Boca (Mar. 1997)
 Sancti-Spiritus Prov.; Mun. de Cabaiguán; Río Zaza, Sierra Las Damas (Feb. 1997, Dec. 1998, Oct. 1999); pond near Cabaiguán (Aug. 1999); pond in El Vivero (Sep. 1999); Arroyo Las Vueltas, Jiquima de Peles (Aug. 1997, 1998); Tres Atejes Pond (Aug. and Sep. 1997, Aug. 1998); Arroyo Guayos, near village of Guayos (Jan. 1998)
 Sancti-Spiritus Prov.; Mun. de Sancti-Spiritus; Arroyo Los Limpios, Banao (Mar. 1997); Río Tuinucú (May and Jun. 1997); Tunas de Zaza (Jul. 1997)
 Sancti-Spiritus Prov.; Mun. de Taguasco; Río Zaza, Zaza del Medio (Jan. 1997, Apr. 1998)

The wide distribution and resulting abundance of this species in Cuba, at least in some localities in Sancti-Spiritus Province, suggests that it could have been present prior to 1994, the date of Flint's capture (Flint, 1996). Additionally it is expected in the future to extend throughout the entire island, for it can adapt easily to our natural and artificial aquatic ecosystems.

Acknowledgements: To Dr. Luis F. de Armas (Instituto de Ecología y Sistemática de La Habana, Cuba) for editing the manuscript and offering suggestions. To Dr. Sidney Dunkle, for kindly identifying *Crocothemis servilia*.

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NEW STATE RECORDS OF ODONATA FOR WEST VIRGINIA IN THE COLLECTION OF THE LATE PAUL D. HARWOOD

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Although potentially rich in diversity, the Odonata fauna of West Virginia has not been studied thoroughly and relatively little literature exists concerning the species found in this state. Needham and Westfall (1955) recorded only 20 species of Anisoptera from West Virginia; Kormondy (1960) and Cruden (1962) added 8 and 19 species of Anisoptera, respectively. The most extensive papers are those of Harwood (1971, 1972, 1973, 1974, 1975, 1976, 1979). Most of these were published in *The Redstart*, a state ornithological and natural history journal, and are not widely known to students of Odonata. Cruden (1962) provided records for 27 species of Zygoptera from West Virginia and Harwood (1972, 1973) discussed 11 others; Westfall and May (1996) listed 41 species for the state. Additional scattered records of West Virginia Odonata can be found in the works of Beatty and Beatty (1969), Olson (1972), Johnson (1973, 1974), Carle (1980, 1982, 1983), Donnelly (1987), Czaplak (1998) and Needham et al. (in press), among others. The fauna of Cranesville Swamp, which straddles the Maryland-West Virginia border, was inventoried by Ahrens (1968) and Orr (1998), although these authors did not always indicate which of their records (if any) were confined to one state or the other.

The late Paul D. Harwood (1906-1995; see Donnelly, 1996) assembled perhaps the largest collection of West Virginia Odonata that currently exists. His specimens (ca. 5,000) were donated to the Florida State Collection of Arthropods shortly before his death. Recent cataloguing of Harwood's collection revealed the presence of a number of potential new state records. These specimens were critically examined to confirm their identifications. Although some erroneous or problematic identifications were found, several other records are believed to constitute previously unpublished state records. The following three new state records for West Virginia, none of which was unexpected, were confirmed in the Harwood collection:

Lestes inaequalis - Monroe County (Pond near Bozoo)

Pantala flavescens - Gilmer, Hampshire, Hancock, Mason and Mercer counties

Pantala hymenaea - Barbour and Hancock counties

Harwood's collection also contains specimens of *Aeshna verticalis* from Barbour, Preston and Tucker counties, but these records were never published. The lone specimen of *A. verticalis* recorded by Orr (1998) at Cranesville Swamp was captured in the West Virginia (Preston County) portion of the swamp (R. Orr, pers. comm.), and is thus the first published record for the state. Czaplak (1998) and Orr (1998) published the first West Virginia records for *Ladona julia*, although Harwood had previously collected this species at Cranesville Swamp on June 26, 1976; Sid Dunkle (pers. comm.) has also taken this species in Tucker County. Ahrens (1968) did not record *L. julia* at Cranesville Swamp, but he did find *Libellula flava* (June 9, 1966), a species that eluded Orr (1998). The Harwood collection has specimens of *L. flava* from Boone and Tucker counties. Both Ahrens (1968) and Orr (1998) recorded *Epitheca canis* from Cranesville Swamp, with the latter author noting that it is common and widespread in the swamp; one of us (Tennessee) has also taken this species in Tucker County, West Virginia. Apparently, Harwood never found *E. canis* in West Virginia.

Harwood's papers contain reports for two species of Anisoptera that are apparently not supported by voucher specimens and will not be listed as recorded from West Virginia by Needham et al. (in press). Harwood (1979) reported *Gomphus spicatus* from Pocahontas County on the basis of several males collected the previous year by Raymond Schultz and Robert Lightburn (and presumably identified by Harwood). Our investigation revealed that the Harwood collection contains specimens of *Gomphus quadricolor* from Pleasants and Pocahontas counties that he misidentified as *G. spicatus*. His collection also contains specimens of *G. quadricolor* from Greenbrier and Hampshire counties that he misidentified as *Arigomphus lentulus*. Other specimens (mostly reared) of *G. quadricolor* in Harwood's collection (his determinations have not been checked) are from Braxton, Hardy, Mineral, Pocahontas, Tucker and Wyoming counties. Details of some of these records, plus others for *G. quadricolor* from West Virginia, are given in Harwood (1974).

Harwood (1979) also reported rearing one nymph of *Macromia pacifica* from the North River in Hampshire County and collecting another nymph from the Greenbrier River in Pocahontas County that he assigned to this species. Recent

examination (by Tennessee) of the *Macromia* specimens identified by Harwood as *M. pacifica* revealed that they belong to *M. alleghaniensis*. Harwood (1979) reported *M. alleghaniensis* from Pocahontas County; his collection also contains specimens from Braxton, Gilmer, Hampshire, Hardy, and Wetzel counties.

ACKNOWLEDGMENTS- Brian McDonald provided partial financial support for the cataloguing of the Harwood collection and also supplied copies of several of Harwood's papers. Michelle Faniola assisted with data entry of the collection.

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2 feet high and four feet across. I paid no further attention to these until my return trip on the path. Out of the corner of my eye it seemed that odonates were landing briefly on the anthills and then flying back to the overhanging branches.

Intrigued by this behavior I stopped briefly to observe what was going on. Perched over the mounds were female *Erythemis simplicicollis* and *Plathemis lydia*. Over the next few minutes I observed them to fly down from their perches, land quickly on a mound at which time they would gather an ant (*Formica exsectoides*) and fly back to their perch to devour the ant. After a mere five minutes of observation I realized that these *Formica* ants had become interested in my presence and were swarming up my legs and back. I beat a hasty retreat with the intent of returning the next day clad with high rubber boots.

The following day I returned appropriately armored and found that rubber boots did indeed reduce the amount of interest the ants paid me. I continued to observe the previous two species feeding on these ant colonies. At any given time no more than two odonates were observed at a given mound. Also, and perhaps of greatest interest was that at no time on this day or on twelve subsequent visits were males ever observed utilizing these ants as prey. In addition to the previously listed odonates I have also observed *Pachydiplax longipennis* (females again) displaying the same behavior. This last species observation is of great interest since (as emphasized by Mike May) *Pachydiplax* is not normally a ground percher while the other two species normally are.

I will continue monitoring this *Formica* colony and others to gain more knowledge about this behavior. I encourage others to visit any local colonies of these ants and see what you can learn. Bring your rubber boots!

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HISTORY OF AMERICAN ODONATA STUDIES - EDMUND M. WALKER

Nick Donnelly

Edmund Walker (1877 - 1869) is not only the most important figure in the history of Canadian odonatology, but he is also a towering figure in the entire history of North American Odonata. He was a man rarely described by other than superlative terms, and he shaped the careers of countless entomologists, both north and south of the border.

He wrote an autobiographical sketch in the commemorative volume of the Canadian Entomological Society (Centennial of Entomology in Canada, 1863- 1963. A tribute to Edmund M. Walker. Contribution no. 69, Life Sciences, Royal Ontario Museum, University of Toronto, 1966). I have drawn heavily on this sketch for this biography.

Walker was born into a prosperous family in Windsor, Ontario, in 1877. As a youth he was fascinated by natural history and also by drawing. He notes that his "greatest pleasure was drawing, which I began to practise before I was three years old." Walker's love of drawing was an important part of his life. Later in life he produced Christmas cards with water-color drawings of woodlands, cottages, and other parts of his life. I have included in this account a whimsical pen and ink sketch recalling how Fr. Adrien Robert once extricated him from a Quebec Bog.

His grandfather and father both were enthusiastic fossil collectors. His father had told him of the pleasure he derived from reading Darwin's "Origin of Species" when it first appeared, for it gave him a context in which to appreciate the fossils that he collected.

At age thirteen his father built a cottage on DeGrassi Point, on Lake Simcoe. He recounts with palpable fascination the experience of seeing an emergence of *Hexagenia* mayflies, and watching their second emergence. Fascinated by this, he endeavored to learn as many insect orders as he could. During this and the following summers he became an enthusiastic collector of butterflies and other insects. Walker dwells at this point in the narrative on the assistance and encouragement given him by his father and also by others, notably Dr. William Brodie, a "dentist by profession but a naturalist and philosopher by temperament. He was an elderly Scotsman, kindly and helpful to young men and boys in whom he perceived a genuine interest in nature. . ."

Living in Toronto (then a city of 100,000), he spent much of his time collecting insects, enjoying especially the opportunities provided by electric street lights. He became especially interested in the Orthoptera (in the old, broad sense of the term), and later became a notable specialist in that order. Entering the University of Toronto in 1896, he enrolled in the Natural Science course. The summer following his freshman year he was invited to accompany a party of scientists traveling to the

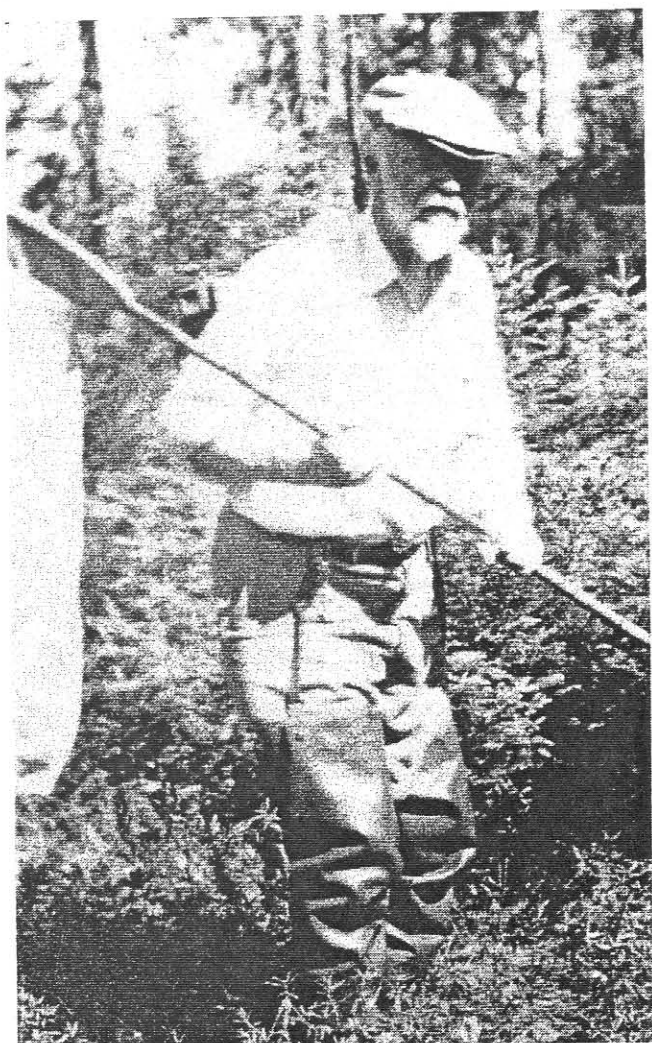


Photo of Edmund Walker courtesy of his grandson, Conrad Heidenrich

west coast in a chartered train. This introduction to the Rocky Mountains and the western interior of Canada cemented his interest in Orthoptera and indeed all insects. He returned to the Rockies on several occasions and in 1913 made what he considered the most exciting find of his life: the discovery of the orthopteran *Grylloblatta*, now placed in its own order as a very primitive orthopteroid.

When he graduated from the University, he decided to continue on for a Medical degree, which he received three years later. Although he received an appointment as an intern, his interest in medicine was not sufficient for this career, and he returned to biology, studying further at Toronto and in Berlin. Early in 1906 he was appointed a lecturer in invertebrate zoology at the University of Toronto,

and he remained attached to this university for the remainder of his career. Bruce Falls (who had been a student of Walker) recently told me of the popularity of his classes, of his great sense of humor, and of his habit of making cartoon drawings of his colleagues.

Walker does not record the beginning of his interest in Odonata. His first paper was published in 1904 – the description of the larva of *Arigomphus furcifer*. In 1907 he described his first new odonate, *Somatochlora williamsoni*.

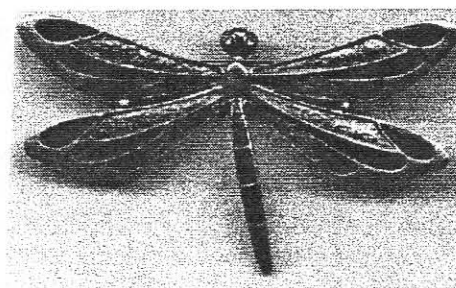
One of his most important studies was also one of his earliest. Up to that time, most *Aeshna* species in the northeastern part of North America were attributed to Say's two species *verticalis* and *constricta*. Selys had described *clepsydra*, and Scudder *eremita*, but these two were often confused with each other and with other species. Walker redefined the older species and added several new ones: *canadensis*, *tuberculifera*, *interrupta*, *subarctica*, *umbrosa*, and three taxa now treated as subspecies of *interrupta*: *interna*, *lineata*, and *nevadensis*. It is difficult from the vantage point of a century's experience how profound this revision was. Walker followed this with his seminal monograph on the "North American Dragon-flies of the genus *Aeshna*" (1912), whose beautiful color plates were financed by a donation from his father, who was chairman of the Board of Governors of the University.

From the time of the appearance of his first Odonata paper, the bulk of his publications were of this order, although he continued to publish on his favorite insect, *Grylloblatta*. His major works were a monograph on *Somatochlora* (1925), a series of papers on larvae of several genera (including generic treatments of *Lestes*, *Leucorrhinia*, *Sympetrum*, *Stylurus*, and *Ophiogomphus*), a series of papers on the odonate faunas of the various provinces, and, finally, his monumental "The Odonata of Canada and Alaska" (1953, 1958, and (posthumously) 1975, completed by Philip Corbet). Other frequently cited papers include a revision of *Sympetrum semicinctum* and *occidentale* (1951), a revision of the *Lestes disjunctus* complex (1952), a thoughtful phylogenetic study of North American *Gomphus sensu lato* (1957), and the generic status of *Tetragoneuria* and *Epicordulia* (1966).

In 1952 I began a correspondence with Walker that continued for several years. In 1953 one of my most enjoyable experiences was spending the day

A section titled "Dragonflies and aviation" quoted R.J. Tillyard's comments on dragonflies as models for airplanes, from "The Biology of Dragonflies," that I had overlooked until now. On p. 336 of Tillyard's book he states: "The Dragonfly has unconsciously rendered one very great service to mankind, by providing in itself the natural model for the modern airplane. As long ago as 1883, Aman suggested that the Dragonfly would serve as a suitable model for a flying machine...One of the first French monoplanes to be manufactured on a large scale was called the 'Demoiselle,' thus commemorating Aman's original idea...A study of the different effects on flight...suggested by various parts of the Dragonfly's wing...might even suggest a solution for 'hovering' on simpler lines than anything yet attained."

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Book review by **Ken Tennessen**, Florence, AL.

The rest of the book is arranged into two main sections, the species accounts and the color plates. The species accounts take up the bulk of the book (over 200 pages), and include identifying characteristics and how they vary, and which other species have similar characteristics (those that could be mistaken through binoculars for the

[illegible]

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ARGIA

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Binghamton, New York

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