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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 and 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 above) 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.

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Cover: *Ladona exusta*, computer graphic from photograph by Jean Held

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

IN THIS ISSUE

Spring seems to be far away right now. Following the "one for me, one for you" theory of modern climatology, in the northeastern US we are "enjoying" an exceptionally cold and snowy winter- just like two years ago.

Spring can't be far away, the calendar tells us. We are looking forward to the first outing of the year - the third annual Southeastern DSA meeting. It will be in Mississippi this year, and those of us from the frozen north will make every effort to be there. Pencil in 5-7 April on your calendar. It will be here before you know it. And the New Brunswick meeting is not far beyond that.

Alvaro Jaramillo sent a fascinating e-mail message about predation by Swainson's Hawks on swarming aeshnid dragonflies in Argentina. This hawk is abundant in the western US during the summer, but I have never seen anything like this in our country.

Jerrell Daigle provides us with another installment of the continuing saga of Hawaiian damselflies. He is proving once again that if you really look for "rare" species, sometimes they are not so rare. But sometimes they are.

Allen Barlow has been very successful in locating a number of "rare" dragonflies in the northern New Jersey area; according to John Michalski he sniffs them out somewhat like a truffle hound. Allen contributes an account of one of the more spectacular but little seen eastern dragonflies: *Cordulegaster erronea*.

I have been doing geological field work in the Caribbean for many years, and for years I have been interested in Caribbean Odonata. Those of you who are experts in lizards and tree frogs (or carabid beetles or terrestrial mollusks) may appreciate some of the arguments for this or that theory of Caribbean biogeography. Imagine the thrill I had recently when these interests converged. The common "species" *Orthemis*

ferruginea is actually three or more species, and they seem to tell a very interesting biogeographic story. Is anyone looking for a neat thesis problem involving DNA and an easily collected species? This Buds for you. . .

For a reason that escapes me there has been a flurry of comments on acetone preservation of colors of Odonata on the Internet. I present some of the comments here.

Sid passes on a list of Odonata that the Odonata Specialist Group is trying to get more data on, with the view of possibly listing some of them as threatened. Sid asks for anyone who is familiar with any of these to contact him. In the next article Sid lists four state records of Odonates found by him in New Mexico last summer.

Rosser Garrison has made a new version of his useful synonymic list of New World Odonata. He is making it available on diskette to any interested persons. Rosser also has contributed a piece on Optical Character Recognition software.

Roy Beckemeyer contributes several short pieces which show the rewards of leafing through the literature. What a great way to spend a rainy Saturday. He is also constructing a cross-reference for ARGIA which will be of considerable value in future years.

Finally, I announce herein the new dues, which are \$15 annually for the New World and \$20 annually for the Old World. There are no postage options - it all goes air mail outside of the US and Mexico anyway and first class closer to home.

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SOUTH-EASTERN MEETING IN APRIL 1996

The third annual Southeastern Regional meeting of the DSA will be held in McComb, Mississippi on 5-7 April 1996 (Easter weekend). The meeting will give folks a chance to look for the

beautiful and elusive *Ophiogomphus australis*. The meeting will be headquartered at the Western Motel (601-684-7654). This motel is convenient to the interstate and several restaurants, and it is moderately priced (\$30 + tax single, \$35 + tax double). There is a restaurant adjacent to the motel that will, hopefully, allow us to use one of their meeting rooms. Everyone will be responsible for their own motel arrangements. Because of the holiday weekend, try to make your reservations as soon as possible. When you call, ask for Stephanie and be sure to mention that you are with "the dragonfly group". If for some reason you cannot get a room at the Western, other area hotels include the Rodeway Inn (601-684-8510), Comfort Inn (601-249-0080), and the Camellian Motel (601-684-3121).

One highlight of this year's meeting will be a workshop on larval rearing techniques that will be led by Ken Tennessen. Ken has been very successful in rearing many species of odonates and has graciously agreed to share his experiences and knowledge with the rest of us.

One of the historic sites for *Ophiogomphus australis* is located less than 20 miles from McComb. Unless we have an unseasonably cold winter/early spring, our meeting time should coincide with the flight period, and I'm sure some folks will want to look for them. There should also be plenty of other southern, early-season species flying by then.

All in all, this promises to be an interesting meeting, and I hope many of you can attend. If you need more information contact Steve or Mary Jane Krotzer, 6010 Woodvale Drive, Helena, Alabama 35080; (205) 663-9606; smjkrotzer@aol.com

See you in McComb!

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NEW BRUNSWICK MEETING

There are no additional developments for this meeting, which was announced in the last ARGIA. Reserve the weekend of 29-30 June for this gathering. We will almost certainly not have evening presentations of slides at this meeting, because the featured bug will be the

new *Neurocordulia*, which is still happily flying at 10 PM Atlantic Daylight Time! Enquiries about lodging, etc., can be made to Paul-Michael Brunelle at 902-422-6490 (remember that he's on Atlantic time). His address is 2460 John St., Halifax, Nova Scotia, B3K 4K7 CANADA.

If you think there is a possibility that you will attend this meeting, please contact Brunelle. He is currently arranging special group rates and needs this information for planning purposes.

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1997 SIO MEETING IN SLOVENIA

Mladen Kotarac

This is the First Announcement of the **XIV. INTERNATIONAL SYMPOSIUM OF ODONATOLOGY** Maribor, Slovenia, July 13-18, 1997. It is organized by the **Slovene Dragonfly Society**

As always the Symposium will deal with all topics of dragonfly research throughout the world

Requests for information should be sent to:

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A home page will be set up in spring 1996.
For general information please try:
<http://www.ijs.si/slo.html>

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REQUEST FOR INFORMATION ON PESTICIDES

Sönke Herdersen, PO Box 4, Dept. of Entomology and Animal Ecology, Lincoln Univ., Canterbury New Zealand requests information on the effect of pesticide

After a delightful swim and delicious repast of wild guavas and passion fruit, I hiked back down to the sunny trail hoping to collect the new species flying over the trailside seepage streams. About a mile from the Hanakapiai River crossing, I slowly rounded a sharp bend. Suddenly, a robust red *Megalagrion* flew up in front of me! In self-defense, I threw my net to my face and somehow caught it! What a lucky catch! It was a fine male of the new *Megalagrion* species! On three separate seeps crossing the trail, I was able to find several more males and females swooping down from the canopy to perch on overhanging vegetation. Mixed in with them were other red species, such as the slender carmine *M. oresitrophum*, red *M. vagabundum* and the giant *M. heterogamias*.

Success! I now have enough specimens to proceed with the description. Essentially, it resembles a larger *M. paludicola* without that species unusually outcurved paraprocts. Also, it may be related to the *M. hawaiiense* complex found on the other younger islands but with different appendages and coloration. I hope to have drafts sent out by New Year's and maybe it will be published in the summer edition of **ODONATOLOGICA**?

What a great way to start this Hawaiian adventure! Now, if I could only find *M. paludicola* in the Alakai Swamp! The next day, I drove to Kokee State Park determined to find them and maybe some *Anax strenuus* at the lookout. As soon as I reached the lookout, I saw an *Anax strenuus* cruising down the road. Quickly, I pulled over, jumped out with my net, and gave chase. It was going away from me but I was gaining on it! All of a sudden, it reversed course and bore down on me like a rocket! I took a little hop off the road and swung furiously at it from behind! Got 'em! One swing, one giant Hawaiian dragonfly!

Now, I was fired up and ready for the trek through the Alakai Swamp! After hiking on the Pihea Trail for about 1.5 miles, I decided to take a breather and explore the sphagnum/bunchgrass seepage areas along the trail. It looked like perfect *Argia bipunctulata* habitat and suddenly, I thought I saw one perching on the bunchgrass! But, it can't be *A. bipunctulata* and besides, this one was red! Folks, after 10 minutes of sidetracking mental deliberations and ramblings, my brain finally screamed, "Catch! Catch! Swing! Swing!"

Instantly, I swooped up the unsuspecting damselfly and with trembling fingers, pulled it out of the net! Briefly, I thought it was the new species but once I saw the strongly outcurved paraprocts, I knew it could only be the swamp fox, *Megalagrion paludicola*! Despite spending some time here, I got only a few more specimens, including an emerging female.

Pressing forward, I finally reached the Alakai Swamp. At once, I spotted many slender *Megalagrion oresitrophum* flying over the dark, tannic bog pools. Even better yet, perched on overhanging grasses were more *M. paludicola*! A few cruising *Anax strenuus* and an overhead white-tailed tropic bird (*Phaethon lepturus dorotheae*) completed this scene of Kauaian paradise!

Back in the States, I conducted some research into *M. paludicola* collection dates. Paratype museum specimen dates ranged from September to November. I am convinced that *M. paludicola* is seasonal and flies in late summer and fall. That is why I did not see it in February and March on my previous trips.

After a couple days of sumptuous luaus, beachcombing, and diving, I was ready to start collecting rare *Megalagrions*. I said aloha to everybody at Gordon's and caught an early morning plane to Oahu. By noon, I was hiking up the narrow Aiea Ridge Trail through montane native fern forest, searching for high-flying *Megalagrion koelense* and the low-flying terrestrial *M. oahuense*. Looking back, I could see Pearl Harbor and the Arizona Memorial in the distance.

After about two miles of hiking, I entered the fern forest and almost at once, a glossy green, black and white female *M. koelense* dropped from the trees and tried to land on my shoulder! Needless, to say, I was startled and my off-balance clumsy swing missed by a foot! She disappeared up into the trees and I never saw her again! However, I was much more alert now and I did catch several females and one male further up the trail perching high on giant ferns.

My heightened state of awareness really made the difference in catching the few *M. oahuense* later on! Got a second! Let me tell you about these dull brown ground-hugging adult *M. oahuense*!! You can't see them! No, you can't!! They look like and

ON THE STATUS OF *CORDULEGASTER ERRONEA* Hagen in Selys, 1878
IN THE STATE OF NEW JERSEY

Allen E. Barlow

10 Belle Court, Budd Lake, New Jersey 07828

As is the case in many states, an intensive inventory of the Odonata of New Jersey has been ongoing for some time. While several species have been added to previous checklists, some have remained on the basis of historical records only. Until quite recently, the occurrence of *Cordulegaster erronea* in New Jersey was known only from a single turn of the century record reported by DAVIS (1913).

The species is apparently equally uncommon in Alabama, New York, Ohio (based on recent DSA publications) and Maryland (ORR pers. comm.). Subsequent to the 1992 New York list the species was collected however in Westchester County (SOLTESZ pers. comm.). According to Sid Dunkle (pers. comm.) he has collected the species at seven localities in the Appalachians of Northern Georgia, two in North Carolina, two in Pennsylvania, and one in Tennessee. A single record was given by GARMAN (1927) for the state of Connecticut (Wallingford 8 June 1911). These sporadic records, many of which are historical would indicate that this is a rare species. I would preliminary suggest however that the species is as uncommon as the habitat it requires. The habitat is often difficult to find and identify properly as it looks quite similar superficially to the seepages preferred by its relatives. The flight season, in New Jersey at least, occurs in the mid summer, a time (in my own experience) when field time slows down until the late season species begin to emerge. Little is apparently known of this elusive species. From the data available I am unsure what the actual flight season is from region to region.

My mid-summer fieldwork for the past three years has been focused on finding and studying habitats supporting this species. Severe drought was experienced during these years which actually aided my survey. Only those streams which maintained an uninterrupted flow of cold water throughout the year were found to support this species. The habitats become easily distinguished therefore by the "oasis" of flowing water and unwilted foliage along the banks. The end of August, which is after the species flight season in New

Jersey, is actually the best time to search for habitats to be visited later as this is usually the driest time of the year.

With the conclusion of this year's fieldwork, it is now understood that this species occupies seven habitats in the Highlands section of Morris County. The habitats found to foster the species are all relatively identical and unique in the realm of seepage type ecosystems. All these streams are small and occur in well forested areas. What defines the *Cordulegaster erronea* habitat from those occupied by its relatives is the water itself and the dynamics of the particular spring feeding it. In New Jersey at least, the species is limited to cold water springs which maintain their flow unabated throughout the year. The stream generally flows at a medium gradient and is free of substantial organic debris. The stream substrate is composed of fine sand and also relatively free of organic matter. Species associated with *C. erronea* are few in these habitats due to the dark forest canopy and the small size of the streams themselves. Populations densities of the species have generally been found to be low also.

The flight season observed to date is July 10 through August 17 although the species certainly emerges earlier. The earliest specimens collected have been fully mature adults patrolling their habitats and as such July 10 would not represent the true beginning of the flight season. All localities surveyed with the exception of a stream in Budd Lake were once part of private or municipal water systems earlier in the century.

Numerous streams in adjacent Sussex and Warren Counties have been surveyed and I am so far disappointed to find this species absent in all cases. Several promising habitats in Stokes State Forest and High Point State Park of Sussex County may yield further populations though. Several streams draining into the Musconetcong River in Warren County require scrutiny as well. Due to its occurrence below the fall line in Alabama and Maryland the species should also be sought here in Hunterdon, Somerset, Mercer, Middlesex, and

Monmouth Counties, all of which lie in the vicinity of our own fall line.

Previously, this magnificent forest species was known from a single male collected 18 July 1910 (Bear Swamp, Ramapo Mountains), a locality now known as Bear Swamp Lake in Bergen County. As part of my survey of Bergen County (1991: ARGIA 3:4) several streams feeding this lake were briefly visited but the species was not encountered. Further survey work is needed there as the habitat conditions appear ideal. Further, my visits were of limited duration.

On August 10, 1992 I visited a small low gradient stream behind the Morris County Fireman's Academy which seemed to fit the typical habitat profile for the species and was rewarded the capture of a single female specimen. This first habitat and all those discovered subsequently have shared many characteristics. This habitat is a tiny cold water, spring-fed seepage which originates at an old spring house foundation. The surrounding forest is young and still broken into decaying farmers paddocks delineated by rusting barbed wire fences. The stream bed is composed of fine sand sediments and is substantially free of organic debris. This feature contrasts sharply with the shared habitat of *Zoraena diastatops* (Selys, 1854) and *Taeniogaster obliqua* (Say, 1839). These species occupy streams of similar small size which are often superficially identical; at a distance. These streams are often stagnant (or dry) in spots and normally composed of a thick substrate of organic debris. *Z. diastatops* is also known to patrol streams not enclosed by forest unlike *C. erronea* which I have so far only found in deep-forest habitats. Comments by Sid Dunkle and Richard Orr would indicate that this species also occupies streams occurring at the edges of forests. I have ruled out several habitats similar to this previously but will now study them with greater care.

Subsequent visits to this locality in 1993 and 1994 have shown that a stable but small population of the species exists here. The stream is apparently shared only by *Calopteryx maculata* (Beauvois, 1805) and *Lanthus vernalis* Carle, 1980 which is seen regularly. On any given visit I have seen no more than 2 adults patrolling the stream and suspect the small size of this stream limits the population density of the species. Patience is

needed as a two hour visit is usually required to see even one adult. Many visits passed without this meager reward.

A second habitat was discovered, largely by accident here in Budd Lake, which lies in western Morris County. A small unnamed tributary to the lake flows conspicuously under a nearby road which I travel often. Upon returning home from the previously discussed locality I realized that this stream was also flowing with full vigor and stopped to have a look. Within moments of reaching the stream a patrolling male was seen and captured. This stream is identical to the previous with the exception that the origin point does not appear to have ever been disturbed. The species has been observed regularly on the lower gradient portions of this stream in subsequent visits between July 10 and August 17. Here, the only other species found have been *Calopteryx maculata*, *Ischnura verticalis* (both quite scarce) and *Lanthus vernalis*.

The largest concentration of localities found to date are in close proximity of Morristown. All populations studied were found to inhabit spring-fed streams once exploited by the now defunct Morris Aqueduct Company. This was the first true water company in Morristown. Founded in 1790 the system worked well for a few years and apparently went completely dry. Later owners expanded and improved the system which operated until 1923. The geology of Mount Kemble and the surrounding foothills is apparently conducive to the numerous permanent spring-fed seepages draining into a deep wooded glacial valley. To find the seepages one simply looks for the expansive beds of "Skunk Cabbage" which proliferate here, sometimes by the acre.

As Morris County is currently undergoing development at an alarming rate, I was relieved to find most of these populations within the Morristown National Historical Park; a region with a long history of disturbance by man. The dense hardwood forests which now shelter these uncommon habitats were clearcut by the Continental Army for shelter and fuel during the Revolutionary War. Of further interest are the extensive remains of the Aqueduct company's pumping facilities which stand at the beginning of all inhabited streams found. The creation of these now mute concrete fountainheads and the vast network of (rusting) pipes must surely have caused substantial habitat degradation at their inception.

This area includes three well separated habitats which I believe represent distinct populations.

Closer to Morristown lies a beautiful seepage filled valley between Hillcrest Avenue and Picatinny Road. This valley is dominated by the now deserted center of the old water company's infrastructure; a large reservoir fed by an elaborate array of dormant pump houses which now give their spring-fed gift without aid of artificial power. The two habitats here are identical to those previously discussed and appear to foster small populations. Interestingly, these streams are red with iron oxide bacteria from the decaying pipes, similar to a habitat in Georgia described to me by Sid Dunkle.

These are all tiny habitats compared to the larger rivers and streams studied more often. The largest habitat surveyed has measured barely one foot wide with a length no greater than 120 feet. The icy cold water of these forest streams must exclude many other organisms which would otherwise be in plenty. The lack of substantial organic substrates would likely exclude many organisms leading to a simplified ecosystem.

The habits of the species are no less interesting than the habitat. I have had limited opportunity to witness *C. erronea* in "numbers" and can draw equally limited conclusions. Two of the populations in the Morristown National Park have large (relative to the other populations studied) densities present though. These large insects are possibly rarely seen because they do not patrol with the regularity seen in their northeast relatives. The species seems to have a preference for the fast running micro waterfalls which often occur along or at the beginning of the seepage. Where a mossy overhang has developed in these waterfalls males are seen to hover for long periods of time waiting for females. A keen eye is needed however. This black and yellow insect is perfectly adapted to blending into the mottled light of the forest gloom. With several hours of watching two to three females are invariably seen ovipositing in the tiny grains of sand below the waterfall. I have seen no clashes between males passing on the main streams. Loud, rustling clashes occur often though when a second male attempts to take up station at an already occupied waterfall overhang.

Many of my preconceptions of this being a fragile species have evaporated. It is certainly a species with very specific requirements. I would surmise

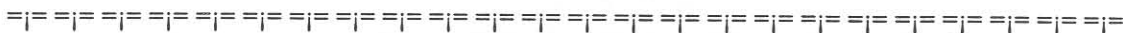
however that it is able to recolonize or colonize habitats relatively fast. I have conducted crude experiments on the effects of siltation on *C. erronea* larvae for two years and have found the species intolerant to increased levels of silt (both gradually and rapidly introduced). The larvae left in a degraded lab environment eventually expired. The time elapsed varied depending on how rapidly the water was degraded. However, larvae so punished by my experiments which were then removed and placed into an undegraded "habitat" were found to recover in most cases and continue their growth. As indicated these tests were conducted crudely but may indicate a tolerance to brief periods of disturbance. More sophisticated experiments would be of value towards better understanding this interesting species.

Fragile or robust, *Cordulegaster erronea* is a very habitat specific animal. Its presence or absence will depend on the availability of these relatively uncommon cold-water streams. With the exception of the three populations found within the Morristown National Historical Park, all other populations are threatened by development and I would therefore consider this a species of concern in New Jersey. Morris County, and those adjacent are currently being developed for residential housing at a frightening rate. Much of the pristine habitat that served as my introduction to this science a mere fifteen years ago are either destroyed or threatened. As stated above, it appears likely that the species is able to recolonize habitats traumatized previously. It is unlikely however that such an animal will have a chance in environments where the streams have been forced into drainage pipes to allow the creation of green lawns. Perhaps many of today's subdivisions will again provide suitable habitat in the distant future.

My observations and conclusions are preliminary at best. I have only studied a small number of populations within a limited geographical area. Based on comments from others, the flight season varies greatly from June through September. Much remains to be learned and I would be interested to hear from other workers who have studied this lovely species. After a mere three years studying *Cordulegaster erronea* I now have more questions than answers. Any comments or information would be gratefully accepted. It is my sincerest hope that the comments included in this account might increase the overall interest in this little seen and lovely species.

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ORTHEMIS FERRUGINEA - AN ADVENTURE IN CARIBBEAN BIOGEOGRAPHY

Nick Donnelly

For years I have tried to combine my interests in Caribbean geology and dragonflies. Biogeography seems like a good places for the disciplines to merge, and I finally seem to have found an excuse for pursuing both interests for a very long time.

One of the abundant and widespread dragonflies from the southern United States southward through the Antilles, Mexico, Central America, and much of South America, is *Orthemis ferruginea*. Within its range almost every tiny mud puddle or pond has at least one male guarding his territory. In fact, the less attractive the puddle, the more likely one is to find this species. Possibly because its preference for unattractive habitats, or possible simply because it is so very common, it tends to be ignored by the collector. However, once again showing the value of collections, it has turned out to be very interesting.

A paper by Jurg DeMarmels (1988, *Rev. Cient. UNET*, 2 (1): 91-111) caught my attention a few years ago. In case you do not scan copies of the *Revista Científica* of the Universidad Nacional Experimental de Táchira, I will fill you in on the details. DeMarmels noted that Karl Buchholz, in an unpublished study of *Orthemis*, had decided that Burmeister's species *O. discolor* was the form found in South America, and that true *ferruginea* was North American. DeMarmels gave a key to

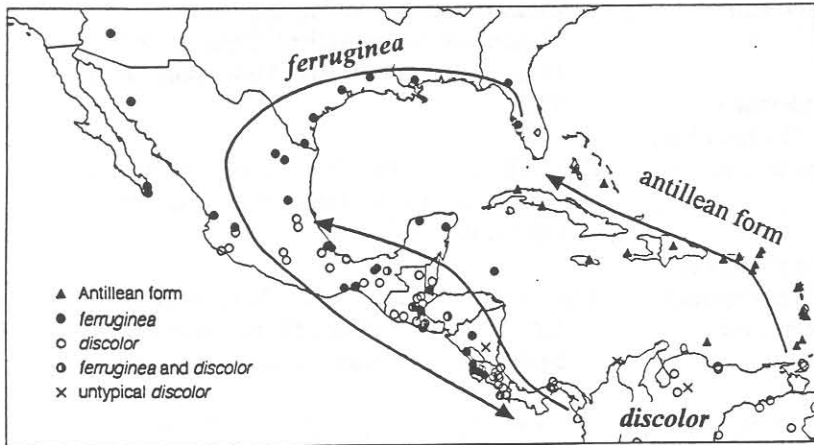
the species (also to the South American *aequilibris* and a few others), in which he showed differences between these two species.

In looking over my own specimens I found that I could divide them into these two species, but I found that the major differences to me were slightly different than those DeMarmels listed. I visited Venezuela briefly in January 1995 and took some of my specimens to Maracay to confirm that I was finding the same two species as he had. He confirmed my diagnosis. He also noted that the Antillean form was something else, but that he had too few specimens for a proper study.

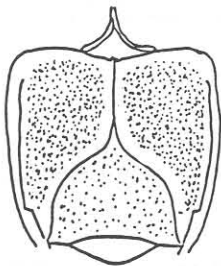
On my return I borrowed specimens from the National Museum and tabulated characters of these and my own specimens. The first, and less interesting, result is the difference among *discolor*, *ferruginea*, and the Antillean forms, which may be one or more species

I can find no structural characters for separating these forms. The thoracic markings are the most generally useful for diagnosing the three forms. For all three forms the thoracic pattern is more distinct in juvenile specimens. Mature male specimens overprint the thoracic pattern with a magenta pigment. The distinctive thoracic patterns can be seen in the lower part of the thorax,

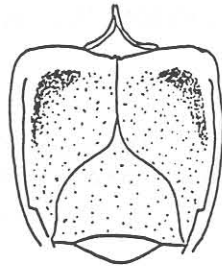
which is usually not obscured by the maturation pigment.



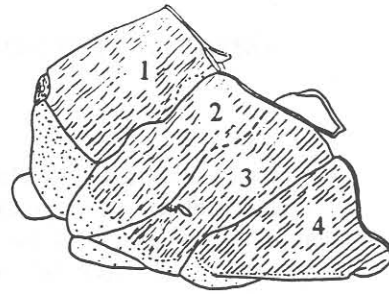
Map of the Caribbean region showing distribution of *Orthemis ferruginea*, *discolor*, and the Antillean form. Arrows show the dispersion directions of *discolor* (through the Antillean form and directly) and of *ferruginea*.



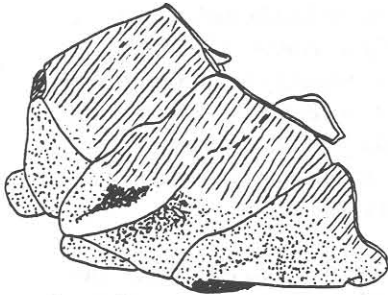
Antillean form,
Andros Is.



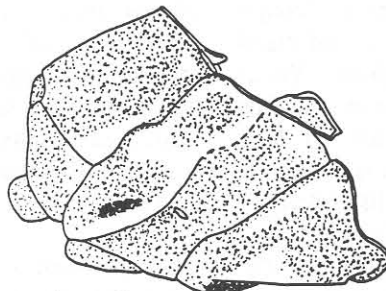
ferruginea,
Matagalpa, Nicaragua



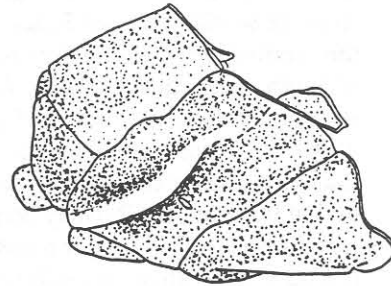
discolor,
Angel Falls, Venezuela



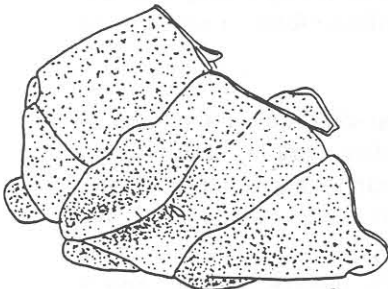
ferruginea,
Matagalpa, Nicaragua



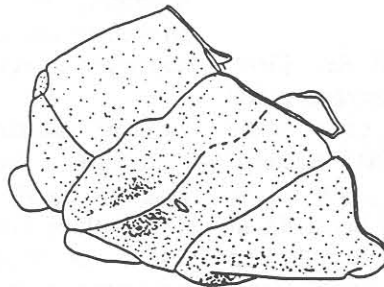
ferruginea,
Suwanee Co. FL



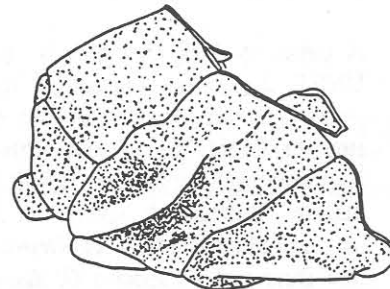
Antillean form,
Andros Is.



Antillean form,
Dominica



Antillean form,
Anegada, British Virgin Is.



Antillean form,
St. Croix, Virgin Is.

Venters of metepimera (top left two figures; note that *discolor* is unmarked) and lateral thoracic patterns (seven figures). Unpatterned *discolor* marked to show sclerites: (1) mesepisternum, (2) mesepimeron, (3) metepisternum, and (4) metepimeron.

venter of thorax	<i>ferruginea</i> grayish yellow; distinct dark marks on ventral-lateral portion of metepisternum	<i>discolor</i> rich orange yellow, including coxae; no dark markings	Antillean form dark grayish yellow, distinct yellow border to sclerites of metepisternal venter forming a central longitudinal pale stripe
sides of thorax; stripes in vicinity of 2nd lateral suture	distinct short dark stripe on lower part of mesepimeron; distinct pale (yellow) stripe along ventral suture; less distinct dark mark on lower front portion of metepimeron	thoracic stripes virtually absent some specimens show pale yellow stripe indistinctly along suture on mesepimeron	dark stripes equally well developed; distinct; framing yellow stripe to form a distinct sandwich.
wing veins	orange	dark	variable
labium	pale	pale in Central America; some banded specimens in South America	generally with broad, dark medial band
female, flange of 8th segment	generally pale	generally dark	variable

Results:

Central American and Mexican *discolor* is quite homogeneous; the South American examples, however, appear to be somewhat heterogeneous, although I have not found any geographic clinal distribution in any of the characters. North American *ferruginea* are quite homogeneous. The Antillean forms are fascinating. Those in the northwest (Cuba, Bahamas, and Jamaica) have orange wing veins and seem closer to *ferruginea*; those in the southern Lesser Antilles have dark wing veins and seem closer to *discolor*. However, the entire Antillean population is heterogeneous and somewhat clinal. The area from the Dominican Republic to Puerto Rico and the Virgin Islands has two distinct forms: a magenta form and a brilliant red form. This "red form" was illustrated in Dunkle's fine little guide to the dragonflies of Florida and the Bahamas, along with typical magenta *ferruginea*. In this central Antillean area there is also some variation in the color pattern of the thoracic venter, with many forms having an additional longitudinal pale stripes flanking the central pale sclerite border, giving three parallel pale yellow stripes.

The most interesting result of my little study was to find that the two species *discolor* and *ferruginea* occur sympatrically from San Luis Potosí, Mexico, south to eastern Costa Rica. In this extensive area there are several localities with the two species side by side, and I can find no overall ecological

separation (such as highland vs. lowland species; swamp vs. marsh species etc.).

The Antillean insular connection between the Americas is fairly ancient - certainly as old as Eocene (about 40 million years) and has enabled many species of animals to move between the two continents along an island chain. South American species with the ability to disperse across no more than fifty miles of ocean would have been able to reach North America at any time for the last 40 million years or perhaps longer. The Central American isthmian gap was much wider (several hundred miles) during most of this time period and effectively deterred terrestrial species from crossing it. The closing of this gap is much younger and its rising can be dated in stages: at 4.2 million years the submerged isthmus had shoaled sufficiently to stop substantial amounts of shallow ocean water from moving across the isthmus. At 3.5 million years the isthmus had shoaled sufficiently so that there were islands along its length, and the more adventuresome mammals such as procyonids (raccoon relatives) made it across an island chain. At 1.9 million years there was a complete dry-land connection resulting in a major interchange of mammals. We know all this, by the way, from a combination of marine geology (biological silica in pelagic marine sediments; stable isotopes in foraminifera tests) and mammalian paleontology. I will be happy to furnish references to readers with an interest in Caribbean biogeography.

I believe *Orthemis discolor* invaded the Antillean islands at a very early time, and reached the United States via the Antillean chain. It appeared to have evolved into a second form - the still unnamed Antillean form. This form has apparently evolved as it invaded islands during a generally northward dispersal. Although there is some unity among the Antillean forms, it may turn out that there are genetic barriers between some of the more distantly located forms, and that there are in fact several species. The northwestern Antillean form is closest to *ferruginea*, which is the version which evolved when the Antillean form reached the North American mainland, probably in Florida.

At some more recent time South American *Orthemis discolor* invaded Central America, moving northward along the newly emerged isthmus. This form met *ferruginea* moving southward through Mexico and Central America. The two forms now exist side by side through a large range (northern Mexico to Costa Rica) but are apparently genetically distinct and do not seem to interbreed. It is even possible that the apparent homogeneity of Central American *discolor* is the result of character displacement.

All of this is, of course, conjecture. The distribution that I have described is well known in several vertebrate groups elsewhere and is referred to as a *Rassenkreis* ("circle of races"). There are good examples in western US amphibians.

The amazing part to me is that there are not lots of other examples from the dragonfly world.

If you have specimens which puzzle you, I would be happy to look them over before writing up a short paper for the **BAO**.

The final word is: don't overlook the common and apparently uninteresting species. They often turn out to be the most interesting.

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ACETONE AND COLORS OF COLLECTED DRAGONFLIES

Following are several commentaries on color preservation gleaned from e-mail messages. Because of the somewhat complex way of forwarding messages, it is possible that I have

attached one person's name to another's observations.

From Bill Mauffray (IORI):

The whole key is drying the Odonate specimen as quickly as possible.

Before acetone, I used to place my newly collected dragonflies in plastic cases in the direct sunlight on my dash board. I would remove from the sunlight before they got crispy. Then I would allow them to air dry in PDB fumes for a few days.

The air drying method worked for most of the greens, browns and yellows as well as powdery pruinose colors like blues and whites. It did not work at all for the blues in *Argia* and other zygops.

The key here is being able to dry the specimens rapidly. In the humid parts of the US and the tropics, the moist air works against this method. You have to use acetone to preserve color patterns here in Florida and in the tropics.

It is true that acetone destroys the eye color, and pruinose colors (if the acetone is not clean). I still hold out the pruinose specimens for air drying.

It would be nice if we could find another substance that would allow for quick drying, color preservation in both eyes and body, and be readily available no matter where you go (acetone is hard to get in some countries).

Terry Morse:

Looking at older, pinned museum odonate specimens, which I presume were air-dried, I can't help but notice that the color preservation appears better than specimens I soak for 24 hrs. in acetone. In some cases, even some eye color remains in the museum specimens.

Is my presumption about the way the old specimens were preserved correct? If air-drying does preserve color better, are there other compelling reasons for preserving in acetone? I am using my specimens as a reference collection and to train naturalists who are not familiar with odonates how to recognize local genera and species. Consequently, good color preservation is important to me.

Everett D. (Tim) Cashatt:

We have been experimenting for some time with using various techniques to preserve color in dragonflies. We rarely submerge our specimens for longer than 8-12 hours in acetone, then air-dry them for a similar period of time under a fume hood with the blower running. Generally we have gotten the best results by killing them with cyanide or ethyl acetate, then vacuum drying them at room temperature in a desiccator with a desiccant such as Drierite.

The freshly killed specimens are placed in envelopes in the desired position and placed in a desiccating chamber. The chamber is then pumped down to about .1 torr and held for about 24 hours. Freshly emerged specimens do not fare well using this technique; abdomens tend to inflate!

Color preservation varies some with the different pigments and in different groups of dragonflies using the vacuum drying, however, it has produced the best general preservation so far, and the specimens can be handled with less chance of breakage.

Nick Donnelly:

For years I relied on warm-air drying, following Williamson. I used light bulbs in hotel rooms, with uneven results. In some cases, there was too much heat, and cuticles (and wings) often developed an iridescent sheen. In other cases (notably India), the meager light bulb available would hardly melt an ice cube, much less dry a bug.

I now use acetone, but would like to find a substitute. I agree that it is valuable in de-greasing specimens, but the color preservation often is not impressive. Green color of gomphids turn yellow, and reds (of *Sympetrum*, for example) and violets (several *Argia*) fade badly. This summer at the New Mexico gathering I obtained a few specimens of greenish *Erpetogomphus lampropeltis natrix* and *E. heterodon* (thank you Ollie and Rosser) and preserved them without acetone. I merely air dried them in a powerful desiccant. The specimens still have a lovely green color, but the remainder of the pattern is less "contrasty" than acetoned specimens.

I never use acetone on teneral specimens. I leave fragile damselflies immersed for only an hour or

so, most other damselflies and small and medium sized dragonflies overnight, and large-bodied dragonflies for 24 or even 36 hours.

I think a major secret of preserving color is to desiccate the specimens after taking them out of acetone. I prefer to use a zeolite desiccant of the 4 angstrom size, which draws down the water vapor pressure far lower than silica gel or Drierite. This zeolite is marketed under than name "molecular sieve" by several chemical companies. If you use it, note that the 4 angstrom size is specific for water; other sizes of channels absorb other vapor species. I use a pellet size of about 1/8 inch. When the dessicant is moist, I micro-wave it to dry it again. Careful - it gets very hot!

I carry nested zip-lock bags in a cardboard box in the trunk of the car. Two nested zip-lock bags seem to contain acetone very well, except on very rough roads (then use three). Another pair of bags holds the dessicant. These items travel well and make a fairly easy job out of carrying specimens. The bugs should remain in the desiccant for enough time for them to dry thoroughly, which can be several hours to a few days. Of course, they also become very brittle!

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ODONATA NEEDING SPECIAL CONSERVATION ATTENTION

Sid Dunkle, Biology Dept., Collin Co. Comm.
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The Odonata Specialist Group of the International Union for the Conservation of Nature met at Essen, Germany, on 20 Aug 1995. The following 19 odonates which are taxonomically isolated or have an unusual biology were selected as needing particular conservation attention. Accordingly, if North American odonatists will supply me with any data available on any of these species in collections within their purview, that will be most appreciated. I will then forward the data to the Odonata Specialist Group.

AMPHIPTERYGIDAE

Rimanella arcana -- Venezuela

CALOPTERYGIDAE

Caliphaea thailandica -- Thailand-Vietnam

- EUPHAEIDAE
Euphaea pahyapi -- Thailand
 HEMIPHLEBIIDAE
Hemiphlebia mirabilis -- SE Australia
 MEGAPODAGRIONIDAE
Coryphagrion grandis -- East Africa
Thaumatoneura inopinata -- Costa Rica/Panama
 PHILOGANGIDAE
Philoganga loringae -- Burma
 PSEUDOSTIGMATIDAE
Mecistogaster amalia -- South America
 COENAGRIONIDAE
Ischnura intermedia -- Turkey area
Megalagrion oahuense -- Hawaii
Mortonagrion hirosei -- Japan
Pseudagrion torridum hulae -- Israel
 EPIOPHLEBIIDAE
Epiophlebia laidlawi -- Himalayas
 NEOPETALIIDAE
Neopetalia punctata -- Chile
 GOMPHIDAE
Burmagomphus sivalikensis -- N India
Ophiogomphus edmundo -- SE United States
 CORDULEGASTRIDAE
Cordulegaster mzymtae -- Caucasus
C. sayi -- SE United States
 CORDULIIDAE
Idomacromia proavita -- W Africa

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NEW RECORDS FOR NEW MEXICO

Sid Dunkle

I finally finished identifying the odonates I collected last summer. The readers of **ARGIA** might like to know that several New Mexico state records were among them. Perhaps other people collected some of these also.

- Argia hinei* -- Eddy Co.
Progomphus obscurus -- Chaves and Guadalupe Cos.
Aeshna persephone -- Catron Co.
Brachymesia gravida -- Chaves Co., 1 male clearly seen but not caught

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**NEW WORLD ODONATA LIST (NWOL)
 AVAILABLE ON DISKETTE**

Rosser Garrison

WHAT IT IS: A synonymic list of the New World Odonata was published as vol.3(2) of **ARGIA** on 15 June 1991. Several nomenclatorial changes and synonymies have taken place and new species have been added since that list was published. Because the list is computerized, I continually update it incorporating changes in the literature. The NWOL represents a complete listing for all described Odonata of North, Middle, and South America. It includes acknowledgments and comments on taxonomic changes different from that recorded in the literature. *Because the list reflects my own opinions, it should not be considered a publication.* After consultation with Nick Donnelly, editor of **ARGIA**, I have decided to offer the NWOL on diskette. The latest version represents incorporation's and changes up to December 1995.

WHERE CAN I GET IT: The NWOL is free of charge and it is not copyrighted. However I ask subscribers to inform me of any errors, omissions, and additions. NWOL is formatted in Word 6.0 for Windows 3.x, but I can convert it to WORD 2.0 for WINDOWS and other word processor formats (including some for the Macintosh) using converters provided with my copy of WORD. However, I make no guarantees as to the translation of formatting. Beware that the user may need to tinker with his copy upon receipt. Because of the large degree of formatting associated with NWOL, I believe it is preferable to distribute this by diskette rather than as an ASCII file over the internet. The latter will not preserve any of the formatting. In order to cover the cost of the 3.5" [note: 5.25" diskette copies are NOT available!] diskette and especially postage, I ask that subscribers send me \$5.00 to cover costs. Foreign orders should include \$7.50 for overseas airmail. You may contact me by e-mail (my address is 74473.736@compuserve.com), but please give me your full address when writing. I will send the list after I have received the cost for postage. Please address all inquires to: Rosser Garrison, 1030 Fondale St., Azusa, CA, 91702, U. S. A.

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OPTICAL CHARACTER RECOGNITION PROGRAMS

Rosser Garrison

OCR (Optical Character Recognition) programs allow you scan printed text and convert the image to a word processor file. Does this sort of thing have applicability in our field? I believe so. For one thing, it means that you don't need to type in a long species description from another source. Yes, you can copy (Xerox) the passage, but remember that you cannot edit this on your word processor because it is not a text file. Many of us believe that the old classic (and now, sadly, out of print) **Manual of the Anisoptera of North America** by Needham and Westfall should be revised. I **OCR**'ed (if one can use this term as a verb!) a page or two from this work and the results were excellent. In the future, I could see some enterprising reviser scan the entire text for editing!

What do you need? You need a computer with enough of the amenities (i.e. hard disk capacity) to do the job, a flatbed scanner (you could save some money with a hand held scanner, but I don't recommend it) and an **OCR** program. Don't forget a printer to print you hard copies. I won't comment on the computer or printer since most of us have our likes and preferences. Just make sure your computer and printer can do the job. Count on having **WINDOWS** for the IBM clones since I don't think that these programs are available for **DOS**. Flatbed scanners come in many configurations and prices. If you ever intend to scan and work with color images, than I strongly urge you to consider a color scanner. I purchased a Hewlett Packard **SCANJET IIcx** (this model had been superseded by another). Street price is about \$750, a bit more expensive than others which sell for around \$500. I purchased an HP because, like their printers, they seem to be the "standard". Gray scale (non color producing) scanners are cheaper. The good thing is that almost all scanners come bundled with **OCR** and drawing programs. True, they represent stripped-down versions, but they do get the job done. And for about \$150 or so, you can legally purchase an upgrade.

I briefly tested two **OCR** programs. I strongly recommend **WORDSCAN 4.0** (formerly owned by Calera Corp., see below) over **OMNIPAGE PRO**

6.0. I tested both programs side by side using a carbon of an old typewritten letter dated from the early seventies. The original also had several typo corrections and a few handwritten corrections and annotations. In short, **WORDSCAN** did a far superior job not only of translating letter characters, but it also more accurately preserved the original formatting. **WORDSCAN** also allows you to edit the translation by allowing you to see magnified pictures of the original document. Thus, you can correct your **OCR**'d document without having to look at the original. **WORDSCAN** also allows you automatically save the scanned file to one of your word processors. Although **WORDSCAN** says that my **OCR**'d files are saved as **WORD 6** files, they really save them as files for **WORD 2**. But this is a minor problem.

WORDSCAN was purchased by **OMNIPAGE** (Caere Corp., 100 Cooper Court, Los Gatos, CA, 95030)) but both the English and international editions of **WORDSCAN 6** are still available from Caere (phone 1-800-736-5737, Ext. 310; FAX: 1-408-655-6071). Normally, **OCR** programs cost a whopping \$600+ when purchased separately or as new, but if you have a previous version (and remember, you will have a version when you get a scanner), a current upgrade will cost about \$150-170.

Notice that I mentioned an international edition earlier? Well, the international edition of **WORDSCAN** will allow you to scan a German or other language document into a text file. The international edition of **WORDSCAN** comes with 13 international recognition language systems (German, French, Italian, U.S. English, [British] English [I, say....!], Danish, Dutch, Norwegian, Swedish, Finnish, Portuguese, Spanish, Brazilian Portuguese) and five user interface language systems (this means you can operate **WORDSCAN** in one of the following five languages: English, German, French, Italian, and Spanish); **OmniPage Pro** apparently sells add-on recognition language systems. Again, I think the international edition of **WORDSCAN 6** (which costs the same as the English version, *but is only* available direct from Caere) is the better deal. Another international **OCR** program is **SCANMASTER** (previously known as **POWERSCAN**) for **WINDOWS** (available from **GLOBALINK, Inc.**, 9302 Lee Hwy, Fairfax, VA, 22031; Telephone: 703-273-5600; toll free: 800-255-5660; FAX: 703-273-

3866) for about \$200. Globalink also sells translation software which, with some work, should allow you to first scan, say, a part of Ris, than translate it into English-automatically. I have the German edition of Power Translator which is a "fast and accurate translation software that speaks [yes, you heard me correctly] German and English...". None of these systems are perfect by any means but they represent a fascinating field for us entomologists who have trouble getting or translating foreign scientific papers into English.

OCR programs are relatively easy to install and they are user-friendly. Not much is required to learn them. If you are seriously interested in incorporating the written Odonate word into your computer, seriously consider purchasing Wordscan 6.0, or one of the other OCR programs.

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"NET" a MEGALAGRION!

Roy Beckemeyer

One of the best Internet World Wide Web entomological Home Pages I have found is the *MEGALAGRION* page of the Bishop Museum. It contains a report titled "Damselies in distress: a review of the conservation status of Hawaiian *Megalagrion* damselies (Odonata: Coenagrionidae)" by Dan Polhemus. Linked to it is an image archive of color photos of adult and immature damselies and various habitat sites. The report includes a table summarizing the historical and current distribution of *Megalagrion* in the Hawaiian Islands. You can reach the site at: <<<http://www.bishop.hawaii.org/bishop/ento/Megalagrion/html/Pages/Mega01.shtm>>>. Link from there to the images or go directly to the image archive at: <<<http://www.bishop.hawaii.org/bishop/ento/Megalagrion/html/Pages/ByNameChoice.html>>>. The author of the pages, Dexter Sear, has built a really informative and well-executed site that should inspire the rest of us to similar endeavors.

[I regret that the very long lines occasioned by these addresses were broken. (ed.)]

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DRAGONFLY ART & ARTIFACTS

Roy Beckemeyer

Adult dragonflies, pretty creatures that they are, have graced many items of apparel, been represented on lampshades, statues, and other art works (I even have a lovely tie with a pattern modeled after that from a Tiffany lampshade). In my dragonfly literature researches, I came across an example of dragonfly nymphs used as design elements. C.H. Kennedy reported in Ann. Ent. Soc. Am. (1943: 190-191, "A dragonfly nymph design on Indian pottery") on a bowl described in a U.S. Navy report on an astronomical expedition during 1849-1852. The bowl was one of a series of Indian antiquities returned with the expedition from Chile and Peru. There were supposedly 13 plates deposited with the Smithsonian Institution. A sketch depicts a plate "...from grave near Cuzco, Peru..." that has 4 zygopterous nymphs facing toward the center of the bowl. Kennedy claims in the article to have never seen nymphs used as design elements before, and asks in the article "...why should a small obscurely colored water insect interest an artist-potter?".

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READING ABOUT THE GOOD OLD DAYS

Roy Beckemeyer

As part of an ongoing effort to build up my Odonata reference library, I recently made copies of some of the University of Michigan Museum of Zoology's Miscellaneous Publications. In so doing, I came across two non-taxonomic reports that I thought were very interesting and that might also prove to be of fairly general interest. Both were written by E. B. Williamson, the talented and prolific Odonatologist.

The first of the reports is in fact Misc. Publ. Number 1, titled "Directions for Collecting and Preserving Specimens of Dragonflies for Museum Purposes" (1916). Among the highlights of this piece are plans for a collecting box made of leather, containing tinned specimen boxes that allowed for collecting envelopes to be stored on edge so as to minimize damage to the specimens -

a clearly well-thought-out tool intended to streamline the collecting of large series of Odonata. (I noticed at the New Mexico DSA Meeting in August that John Abbott of Texas was using an interesting collecting box; I think that it was of his own design. Perhaps he or other DSA members would care to share their solutions to the problem of bringing order to the often chaotic collecting process.) Williamson also covered plans for a tin drying box that used a lamp as the source of warm air. But I recommend this report to you not so much for the (still) useful ideas it contains, but for the insight it provides into the personality of one of the legends of the Odonate world. The passage I liked best in the whole report was one in which Williamson wrapped up his advice on how to collect in the field: "...Remembering, in conclusion, that it has been truly said of the dragonfly collector, 'all things come to him who wades.'" (I really love puns!) [He cited the Bible for this one. (ed.)]

The second report was Number 3, dated 1918, titled: "A Collecting Trip to Colombia, South America". It describes the vagaries of travel in the tropics, and gives insight into the devastation of tropical ecosystems that was even then well underway: "The Rio Santa Gertrudis was a clear stream ten to thirty feet wide, rapid throughout, and with many large waterfalls and rock masses...Along the main stream were only small clumps of forest, but the tree ferns, some thirty feet high, gave some hint of the glory that had been...we followed the stream...for several miles...the abandoned hillsides were covered with rank impenetrable grass and dewberry briars. Apparently the agricultural method in use consisted in clearing the forest, planting to crops...until the soil was exhausted, abandoning it, and making another encroachment on the forest."

A few more selected tidbits of a lighter nature:

"...we encountered a series of long pools or lagoons...Several times in collecting about them I found myself floundering in water over my head...The lagoons themselves were teeming with crocodiles, whose grunting sounded much like that of dogs." (Was he a serious collector, or what?!)

"...In this low vegetation and in adjacent brush, consisting of spiny palms, hooked bamboos, Heliconias and other spiny plants, we found large

numbers of *Metaleptobasis*. Many of these we caught by hand as we wriggled through the brush. Any other mode of progress was impossible, and an insect net was useless under such conditions." (Odonate collectors are obviously real party animals!)

"Our boat was scheduled to leave Puerto Berrio...at four p.m., so we decided to spend the day collecting...We were returning from our collecting about three p. m....when we heard a river boat chugging its way up stream. A hurried dash to the river's bank showed us our boat in midstream, carrying away...all our baggage and supplies, while we stood in our wet clothes in a bamboo thicket on the river's bank and marked her passage...Fortunately, J.W. thought of his revolver, and three shots attracted the attention of the captain, who...picked us up...This incident is related for two purposes, - to show the obliging friendliness of the captain in picking us up, and to record an instance in Latin-American affairs, when, for the only time known, events moved ahead of their schedule. The statement may be received incredulously by other travelers." (How many DSA members have revolvers on their trip list?)

Finally, the last part of the report, a paragraph titled "Common Names of Dragonflies", contains the following:

"Mr. H.L. Tyler, of Barranquilla, told us that as far as he knew *caballito* was the only name in common use in Colombia...Young men traveling with us on one of the river steamers told us that at Medellin dragonflies were commonly called *señoritas*, and at Bogota they were called *matapiojo*. The first part of the latter name means a killer, and the last part an insect the same as or similar to the red bug, - in other words, the red bug killer...in the Department of Antioquia dragonflies were called by the common people *chilcaqua*, from *chiquear*, to reduce, to make less and less, hence to flip or dip out, and from *aqua*, water, the name doubtless tracing back to some early observer of an ovipositing libelluline...one evening...while putting up our day's catch, we asked if the insects were called *caballitos*...a small boy...pointed to a zygopetrous specimen and said "*ceritongo* (*cieratonga*)...several persons questioned were unable to give us the meaning of the word, but one gentleman thought that it was probably derived

from cerar, to shut or block off, and tonga, a current of water." (Aha! A mystery in the making. Do any of our tropical American members or our tropics-tramping North American members have anything to add concerning these or other common names for Odonata they might have come across in Central or South America?)

[In Guatemala everyone calls them "*agujas del diablo*" (devil's darned needle) or simply "*agujas*". The term "*caballitos*" (little horses) is widespread in Latin America. These are both basic European names. I have also heard "*gallitos*" (little roosters, ritz crackers, and probably other meanings). (ed.)]

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REGIONAL DATA INDEX TO ARGIA ARTICLES

Roy Beckemeyer

One of the purposes of the DSA upon its founding was to establish and disseminate regional Odonata distribution data for the Americas. While BAO provides a vehicle for formal publication of regional studies, there are many gems of information in the informal trip and collecting reports in ARGIA. I have often paged through my back issues of ARGIA looking for an article I vaguely recalled having seen that contained a species list for a given site, or described a collecting location, or identified a local contact. I recently devoted a few days to going through ARGIA and summarizing the regional information into a database file. I can now find at a glance the citations for all articles that mentioned "Alabama", for example, or "Fiji" or "New Brunswick". The file is available in the form of a Table of:

Region/Title/Authors/Year/Volume/Number/Pages, and a sorted report, both contained in a MICROSOFT EXCEL 4.0 (WINDOWS version) file titled "geog.xls" (90 Kbytes). I should be able to export the file in to an earlier EXCEL format, as a LOTUS 123 file, a dBASE file, etc., one of which hopefully could be imported into your data base or spreadsheet program and sorted by region, author, or however you wish. I'd be glad to copy the file for you onto either a 5.25 inch, 360Kb or a 3.5 inch, 1.2Mb diskette, if you'll send me the diskette and a dollar for postage and handling. (The regions are mostly states and provinces for the US and Canada, respectively, and country or continent for the rest of the world, with no attempt to be more detailed.) Hopefully, though, the index will prove useful, and would be a starting point for anyone who wishes to put in the time and energy for a more elaborate effort. You can reach me at 957 Perry St., Wichita, KS 67203-3141, Phone: (316- 264 0049), E-Mail: royb@southwind.net.

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NEW DUES FOR DSA

At the New Mexico meeting the Council adopted a new dues structure for the DSA. Because of changes in the postal rate structure we have had to raise the dues, starting in 1996, to \$15 dollars annually for New World members and \$20 for Old World members. There will be no options for postage, and all pieces will go Air Mail outside of the US and Mexico. In the US and Mexico the pieces go first class.

The subscription to the BAO remains \$15.

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CHANGES AND ADDITIONS TO E-MAIL

Allan **Barlow** (Budd Lake NJ)

Sid **Dunkle** (Plano TX)

Carlos **Esquivel** (Heredia, Costa Rica)

Bob **Glotzhober** (Columbus OH)

Steve and Mary Jane **Krotzer** (Helena AL)

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BACK ISSUES OF ARGIA AND THE BAO

The editor is able to provide back issues of ARGIA. Several of the issues will be xeroxed, as original copies of many issues have been exhausted. Please contact T. Donnelly, 2091 Partridge Lane, Binghamton NY 13903. Each of the previous volumes of ARGIA has at least one issue that requires duplication. Because of high mailing and duplicating costs, the back issues cannot be sent at the old price. The present price schedule takes into account the different costs of duplication of each number of ARGIA. In the event that an issue becomes exhausted, then xerox copies will be sent. **Prices do not include postage; see below.**

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