Some Trinidad Dragonflies that can be Identified on the Wing.

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When the idea for this article was first proposed to me, it was suggested that I write and illustrate an article describing all known species of Trinidad dragonflies and damselflies (order Odonata). It was immediately apparent, as I quickly explained, that such an article would indeed be a book by itself, as my recent collecting experience suggests that there are at least 120 species, and perhaps as many as 150, in Trinidad alone!

Furthermore, many Odonata can only be specifically identified by examining their wing venation and, ultimately, their genitalia. In fact, I am currently in the process of writing just such a key to the species, but, sadly, this sort of work does not lend itself easily to the scope of the average "weekend naturalist" as a certain level of background knowledge is understood to be a prerequisite to its use. Nonetheless, the collection, observation, and study of dragonflies and damselflies can be an enjoyable and fascinating addition to any nature walk or bird-watching outing and , as many of the finest locations for bird-watching and botanical excursions are also great places to see dragonflies, the "slow hours" of the one interest may easily be taken up with the other (as any odonatist will tell you).

So, 120 species is just too many to cover in the space of this article. It then came to pass that, by thumbing through the spoils of my recent collecting trips in Trinidad and by the painstaking elimination of several personal favorites, I have selected twenty-five species of dragonflies to represent the much broader range of local species. The selected types, it is hoped, represent (in a general way) the range of sizes, colour patterns and forms found in this group. In addition, I have mainly chosen those species that are likely to be seen in the course of otherwise unrelated outings (for instance a trip to Fishing Pond or the Aripo Savanna looking for birds or plants). Also included are a few species that, because of their conspicuous or unusual design, will be certain to attract attention should they cross one's path. Finally, one or two have been chosen in the interest of scientific completeness, in case they are found (and recognized as not conforming to any of the more common families).

Before we get under way, let us settle a central question: What characterizes the Odonata? First of all, because they are insects, they all have the body divided into three segments - the head, the thorax, and the abdomen. The head of a dragonfly is dominated by the two, huge compund eyes. The somewhat triangular area in front of these, which may be termed the face for our purposes, has, at its lower surface, the mouthparts of the insect, and, at its uppermost surface (the vertex, the point at the top of the head in front of where, in dragonflies, the eyes meet), the three simple eyes or ocelli and the antennae. The antennae of Odonata are short, fine and very simple. Unlike many of the moths, whose great feathery antennae relate to them all the complexities of mate-seeking and food location, the antennae of the Odonata are relegated to very minor status. The great sensory organs of the Odonata are their huge, magnificent compound eyes. It is because the Odonata are so visually oriented that they are so splendidly coloured and are capable of partaking in such agressive territoriality and vivid mating behavior.

The thorax of Odonata is, for all purposes, a box full of flight muscles. The two pairs of wings are attached on top, to the rear of the thorax, while the three pairs of legs are placed underneath and far to the front of the thorax. These legs are nearly useless for walking; instead, they are armed with numerous long spines which, in combination with the legs themselves, create a large "basket" in which to trap flying prey. The prey of Odonata consists largely of mosquitoes, flies, midges and occasionally bees, butterflies and even other dragonflies! One can see from the illustrations which follow that the size of the legs increases from front to back, i.e. the hind pair are the longest, the front pair the shortest. This arrangement makes it possible for a dragonfly to remain horizontal even when it is holding onto a vertical reed or stem.

The abdomen of Odonata, apart from containing the digestive organs, contains the reproductive organs. The egg-laying device of the female, or ovipositor, is located under the last abdominal segment, the tenth. (All adult Odonate have ten abdominal segments. In the course of species identifications, one often has to look for features on specific abdominal segments, and it is often easier to count backwards from the tenth segment to locate, let us say, the seventh, than it is to properly find the seventh segment if one starts counting from the first. This is because the first two or three abdominal segments are somewhat "squashed together"). Like the females, male odonates have the genitalia on segment number ten, but they also have a second sexual apparatus on segment number two. This condition is unique to the Odonata, and all male odonates, without exception, possess two sets of sexual equipment. The set on abdominal segment two is known as the genital hamules; the set on abdominal segment ten is usually referred to as the male abdominal appendages.

In mating, the male transfers his sperm from segment ten to segment two by simply bending his abdomen around and underneath. When he locates a receptive female, he clasps her, using his abdominal appendages, behind her head. She then bends her abdomen around and underneath to join with his gential hamules on his segment number two. This position is the commonly see "mating dance" of dragonflies. Once the female is laying, it is a common sight to see the male still holding her behind the head while she dips her abdomen into the water. Mated pairs collected in this condition are termed "in tandem", or labelled simply "mated pair". This is a significant mark in a collection of Odonata as many female damselflies cannot be determined without the male to the species and collecting a mated pair is the only recognized "sure way" to know which female is which. A final word on the abdomen of the Odonata: Oftentimes odonates will be seen to posses brilliant or conspicuously patterned abdomens. These are usually the males of the species and the colours carry a message: "This is my territory! You Stay Out!" Dragonflies are tirelessly territorial and much can be learned by careful and patient observations of their behaviour. There is much work yet

to be done in this area and anybody interested in animal behavior can still add much to the present knowledge of the field. Caution must always be exercised, however, not to draw conclusions too quickly and to avoid anthropomorphism.

Now that we know something of the structure of the Odonata how then are we to divide up Trinidad's one-hundred and twenty or so species? Firstly, into two broad suborders, the Anisoptera (dragonflies) and the Zygoptera (damselflies). Of the two, the Anisoptera are characterized, in most cases, by their larger compound eyes that meet at the top of the head, by their stronger flight, usually flying clear of pond vegetation (and, in fact, by their greater independence as adults from their aquatic environments) and, in general, by their larger size. Once in the hand, it will also be seen that the front and hind wings of the Anisoptera are dissimilar; that is, the hind pair is broader than the front pair. The hind pair is never the same size or smaller than the front pair. By contrast, the Zygoptera, without exception, have the compound eyes widely separated, and both pairs of wings are alike, with the hind pair occasionally somewhat smaller than the front pair. In addition, Zygoptera are much more bound to the aquatic environments (ponds, swamps, marshes, rivers, ditches, etc.) that they, as all odonates, grew up in. All Odonata spend their nymphal stages under water (with few exceptions), but, of the two, the Zygoptera are much less likely to stray from these habitats as adults, keeping close to the pond vegetation. Most Zygoptera are rather smaller than most Anisoptera, though this is not always the case.

Although the intent of this article is to aid in the field identification of Odonata on the wing, I offer here the following advice for those who wish to extend their interest to the collecting of specimens. The identification of most odonata requires the taking of specimens. Knowledge must first be gained of the wing venation and abdominal appendages and, finally, the genitalia of the various genera and species. The complexities of this area of study are such that many of the genera have entire works devoted to them alone, and, in many cases, the arrangement and even the validity of species is by no means settled as yet! Therefore, it is impossible to correctly identify most of the species simply by knowing that one is large and green while another is small and powder-blue with black wing bases. This sort of descriptive work may be sufficient in a relatively small or sparse area (such a Jamaica, as described by F.C. Whitehouse in 1943), but by no means will it suffice for a richly diverse country like Trinidad! For those interested, a list of useful works is given at the end of this article.

The collection of adult Odonata requires a few pieces of equipment, most of which can be made at home, though some have no homemade substitute. For collecting, a net consisting of a netbag of fine yet sturdy cloth attached to a pole not less than three feet long is essential. (We're talking about a standard "butterfly net".) Many collectors sew a nylon net-bag to a rim made out of a metal coat-hanger bent into a circle which is then attached to some lightweight (but strong!) handle, such as a wooden pole, aluminium rod, or a stick of bamboo. A two-inch wide band of heavy material, such a muslin, sewn over the netting around the wire rim will keep the net in better condition for a longer period of time. Specimens, once caught, will need to be killed and any alcohol, if strong enough, will suffice to do the job. I prefer to carry a box strapped over the shoulder that contains enough envelopes to hold my captives alive until I get them home. Specimens are put singly into each half of a folded envelope with the wings closed over their backs. The envelopes need not be sealed, just closed and folded in half lengthwise.

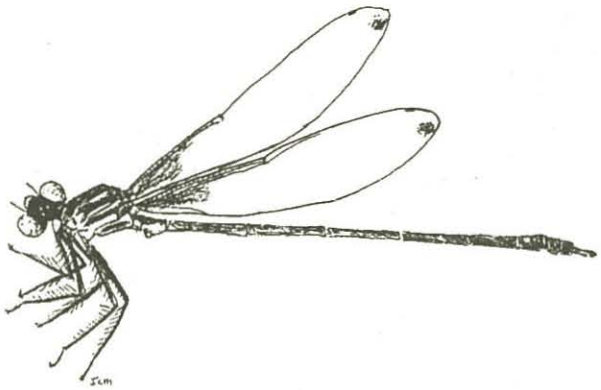
My preferred killing agent is acetone, which not only works quickly but will, if specimens are left in it overnight, preserve the beautiful colours of the body which otherwise fade to a dull brown. (Sadly, nothing has ever been found which will preserve the brilliant colours of the eyes). After the specimens are taken from the killing solution, they should be left to dry (for only a few minutes) with the wings over the back, not spread in the manner of butterflies, if they are to be studied in earnest. Dragonflies should be kept in separate envelopes with information stating where and when they were captured written on the outside. (Clear cellophane envelopes, designed specifically for dragonfly collectors, are available from Amercian supply houses. With these, a standard index card is inserted behind the specimen and all data can be written on to the card). Mated pairs should be kept together. Collecting data is the most important element in your collection! Without this information, even the most precious specimen becomes useless as a scientific reference.

A pair of bent-tipped forceps is most useful, especially with the many smaller species, and as experience and continuing interest may develop, a dissecting microscope will be needed for many determinations. This last piece of equipment is, of course, the toughest to obtain but I have never owned one, and access to one has always been available to me upon request from local museums or universities and schools once my need has been explained. The microscope will not be necessary for the average enthusiast; However, persons keeping any insect specimens must take care to keep their specimens in some container that will prevent light, dust, and insect pests from destroying their collection. I have found out the hard way that any dead insect left unprotected, even for one night, will fall prey to thousands of Trinidadian ants in short order! (Trinidad is often referred to by Western Entomologists as "one, large anthill"). Tupperware or other air-tight plastic containers will do just fine. A few moth-balls or moth-flakes in the container will keep out other insect pests as well as mould.

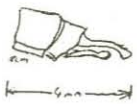
Finally, having said these words on the collection of specimens, let us now proceed to the twenty-five selected species of Trinidad Odonata.

Part One: Zygoptera

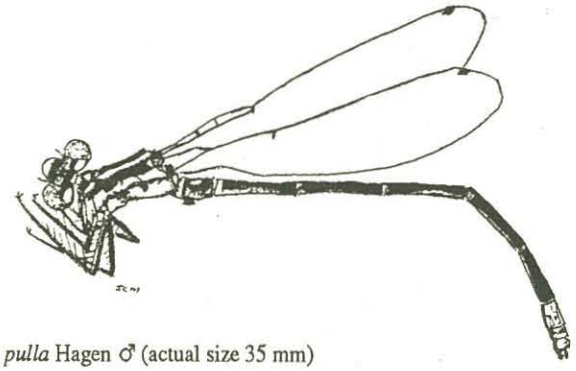
Number 1: *Hetaerina macropus* Selys - In naming plants and animals, biologists use the system of Latin names in which the first name denotes the genus, the second name denotes the species, (and successive names may denote subspecies, forms, varieties, etc.) and all are followed by the describer's name. In this species, the third name is a shorthand version of the odonatist Baron de Selys Longchamps. *H. macropus* is one of only two species in Trinidad belonging to the zygopteran family Calopterygidae which are characterized by, among other things, the many crossveins along the front margin of the wing between the wing base and what is called the nodus. (The nodus is shown as the sharp notch midway along the wing's leading edge. The black "rectangle" toward the wing tip is known as the stigma. In doing these illustrations, I chose to eliminate all but the most essential wing veins from my pictures as the venation of odonates is so complex that to draw all veins in all species would be both terribly time-consuming and not as



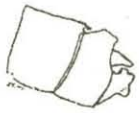
Hetaerina macropus f.*occisa* Selys ♂ (actual length 48 mm)



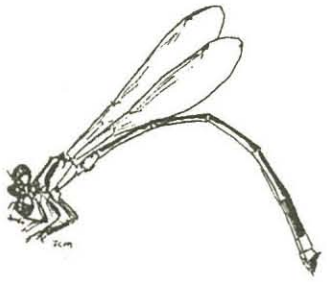
Abd. seg. 9 & 10 & male abdominal appendages (actual length 4 mm)



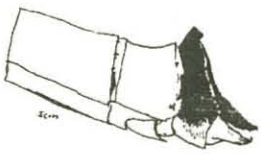
Argia pulla Hagen ♂ (actual size 35 mm)



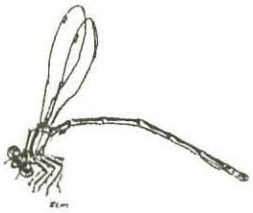
Abd. seg. 9 & 10 & male abdominal appendages (actual size <2mm) (drawn without colour pattern)



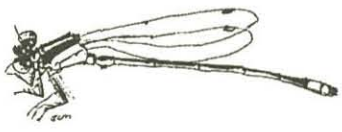
Acanthagrion luteum Racenis ♂ (actual length 36 mm)



Abd. seg. 8,9,10 & male abdominal appendages (actual length 3.5 mm)



Ischrura capriola Selys ♂ (actual length 22 mm)



Ischnura ramburi Selys (var. *credula* Calvert) ♂ (actual length 29 mm)

Abd. seg. 8,9,10 & male abdominal appendages (actual length 2.5 mm)

Abd. seg. 8,9,10 & male abdominal appendages (actual length 3 mm)

accurate as we might like. Let me also point out that I have drawn all twenty-five species to the same scale.)

H. macropus and its near relative, *H. caja,* will at once be distinguished from all other Trinidad Zygoptera by their larger size (46-50 mm) and by the conspicuous blood red patch at the base of each wing (shown with shading in my illustration). In *macropus* there is also a brownish-red spot at the tip of each of the four wings. In *caja* there is a clear red spot at the tips of the hind wings only. Note the enlarged drawing of the male appendages, which will also serve to separate this family from most other damselflies in the same size range. The damselflies of this genus live in and along quick, rocky rivers at higher elevations, such as the Arima, Guanapo, Quare and Rincon.

Number 2: *Argia pulla* Hagen - This damselfly belongs to the largest, by far, of the zygopteran families, the Coenagrionidae. This family can be distinguished from the last by the far fewer crossveins along the leading wing margin; whereas this area of the wing may resemble "train tracks" in *H. macropus*, in the present family there are but three or four corssveins in total. *Argia pulla* is one member of a very large genus of damselflies with dozens of species in the Americas, all characterized by the very long, slender and numerous spines on their legs. When a Coenagrionid damselfly is at hand and it bears long spines such as these on the legs, there is no doubt that it belongs to the genus *Argia*. In *A. pulla*, all of the "white parts" in my drawing are bright, electric blue in the living insect. In Trinidad, *pulla* can be distinguished from any other blue *Argia* by the blue tip to the abdomen. A second common blue species, *A. translata*, has no blue on the tip and the male appendages differ from those illustrated. In quick montane rivers, such as the Guanapo and the Arima above Simla, can be found a brilliantly metallic copper *Argia*; this is *A. orichalcea*.

Number 3: *Acanthagrion luteum* Racenis - This damselfly is certain to be noticed when it crosses one's path on account of its beautiful colouration which is bright yellow-orange (in the white areas of my drawing) with segments eight and nine bright, sky blue. the male appendages at once distinguish it from its near relatives in Trinidad. An all-blue damselfy with appendages like these is *A. kennedii and* a greenish species like this is likely to be *A. vidua*. So far, there are only three species of this genus known to inhabit Trinidad but I suspect others will turn up. They belong to the Coenagrionidae.

Number 4: *Ischnura capreola* Selys - This tiny dameselfly is certainly the smallest odonate in Trinidad, and possibly in the world. Keeping close to the grasses and reeds, these little fellows are bright, clear green, with neon blue on the tip of the abdomen. Deceptively hard to catch, they fly very low, near the surface of the pond, and they are often glimpsed while holding on to a female of the species. The females come in two colour forms, one being much like the male illustrated, the other having no black stripes on the thorax. This second type is known as var. *citrine*. These coenagrionids, like the preceding species, prefer still water with lots of vegetation. *I. capreola* is seen most anywhere its habitat requirements are being met and I have taken them at Fishing Pond, Aripo Savanna, Nariva Swamp, and in great numbers at the Sewage Ponds at Laventille. This last location, although smelling quite high, is one of Trinidad's great odonate habitats.

Number 5: *Ischnura ramburi* Calvert - Looking very much like an outsized *I. capreola,* this species will also be found in similar habitats throughout Trinidad. One feature of this species is that there are up to three distinct colour forms of the female! Thus one form is green and blue like the males (homeochromatic), one orange and one "olive" (both called heterochromatic).

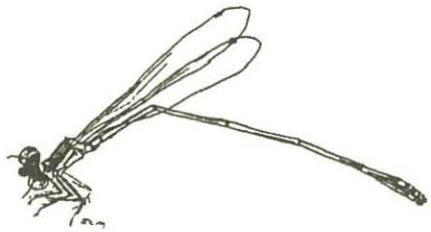
Number 6: *Protoneura amatoria* Calvert - This damselfly belongs to a somewhat smaller family, the Protoneuridae, which are characterized by very narrow wings and often by the very long, narrow abdomen, which tends to resemble a "sewing machine needle". There are two genera of the Protoneuridae in Trinidad, the other being the genus *Neoneura*, which are somewhat shorter and stouter. Of the two known Trinidad species of *Protoneura* (both uncommon), by far the commoner is *P. amatoria*. This remarkable damselfly is metallic, blood red (wherever I have left it white in my drawing), with fiery red-orange eyes in the living insect. They fly low, close to the water, in slow-moving woodland streams where the male/female pairs may be seen depositing eggs in floating mats of wood and leaves. I have caught this species and its realtive (the red and white *P. tenuis* - a real rarity!) only along a tributary of the Rio Grande River in Matura near the Toco Main Road. I have seen a few *amatoria* at the Hollis Reservoir as well.

Number 7: *Lestes mediorufus* Calvert (a new record for the island) - This is one of a very few Trinidad members of the family Lestidae, the "spread-winged Damselflies". They can be distinguished from the Coenagrionidae by the way in which they hold their wings open while at rest. Coenagrionids always rest with the wings closed over their backs. This species, which is light blue in the paler areas and olive green and brick red in the shaded parts, is found in the Aripo Savanna among the reeds that grow in the large, shallow puddles alongside the dirt road that crosses the reserve.

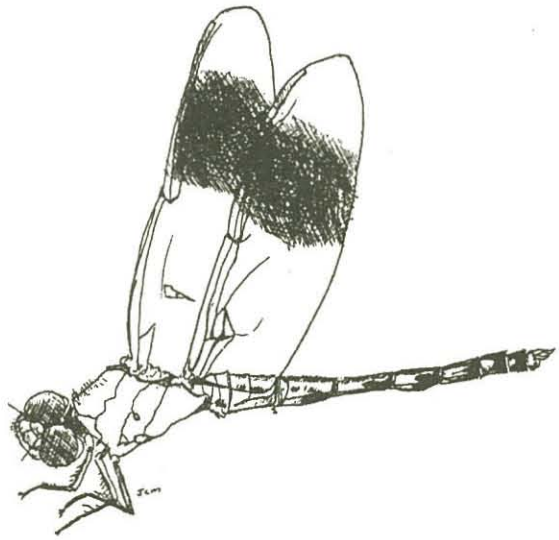
Number 8: (not illustrated) : *Mecistogaster ornatus* Rambur - This Damselfly, too large to illustrate here, is among the very largest of all Odonata and certainly the largest damselfly in Trinidad. It reaches a body length of 95 mm and is therefore easily distinguished from other Zygoptera. It belongs to the numerically small family Pseudostigmatidae that are all characterized by lacking a "true" stigma, which is a single black cell near the tip of each wing in all other Odonata. In the present family, it is replaced by a multi-celled coloured patch that is much larger than any "true" stigma. In *M. ornatus*, it is bright orange in the female while in the male it is yellow on the upper side and nearly black below. (This gives the wing tips the effect of "aircraft lights" when the insect is flying, and it makes the insects difficult to follow visually). *M. ornatus* is a species of the deep forest and one that is not necessarily found close to bodies of water as the nymphs spend their developmental stages in the water that accumulates in bromeliads.

Part Two : Anisoptera

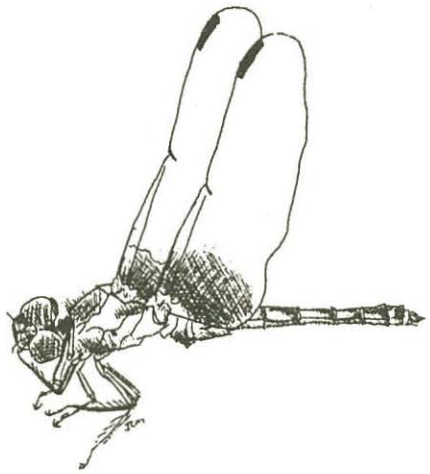
Number 9 : *Erythrodiplax umbrata* Brauer - Perhaps one of the most commonly seen of all Trinidad odonates, this dragonfly may be found almost anywhere, near or far away from water. The body is a light olive green, the wings being clear with the distinctive black or brown (sometimes very faint) band crossing just past the nodus and before the stigma. A huge genus, *Erythrodiplax* contains no less than eight species in Trinidad and dozens in the Americas altogether. Of all



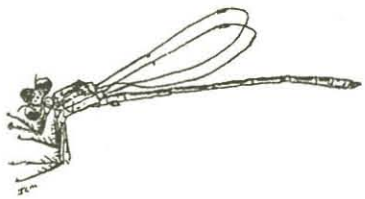
Protoneura amatoria Calvert ♂ (actual length 38 mm)



Erythrodiplax umbrata Brauer ♂ (actual length 45 mm)

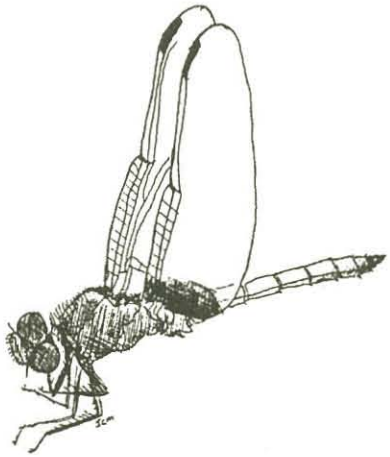


Erythrodiplax fervida Evidson ♂ (actual length 35 mm)

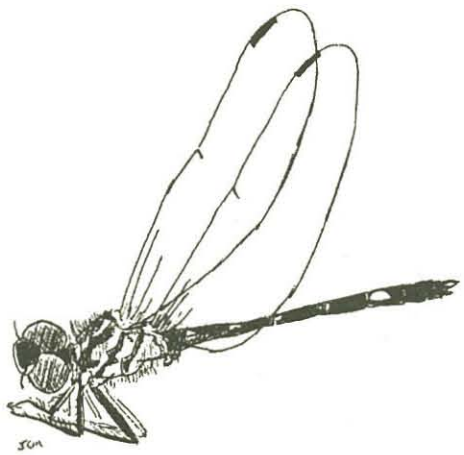


Lestes mediorufus Calvert ♂ (actual length 29 mm)

Abd. seg. 9 & 10 male abdominal appendages (actual length 3 mm)



Erythrodiplax connata fusca Calv. ♂ (actual length 33 mm)



Micrathyria didyma Calv. ♂ (actual length 39 mm)

Trinidad *Erythrodiplax, umbrata* is by far the largest and the only one with such a band on the wings. The genus belongs to the largest anisopteran family, the Libellulidae. No other local dragonfly has similar markings on the wings.

Number 10: *Erythrodiplax connata fusca* Calvert - Another frequently seen species this little fellow, when fully mature, is rich black all over with the abdomen a light, powder blue, nearly white. This powdered look is termed pruinosity and is in fact a waxy secretion that increases with age in many odonate species. The wing bases are black. Females (which usually must be caught with the males to be certain of identification) are lighter brown all over with but a little rich yellow colouring at the wing bases. This species lives in a wide variety of habitats across Trinidad.

Number 11: *Erythrodiplax fervida* Erichson - This medium-sized dragonfly can be found in many areas where the water is marshy or ponds are allowed to stand permanently, such as the Sewage Ponds at Laventille. The body is generally orange-brown and the wing bases are washed in clear orange-red. A similar species, *E. famula famula*, is found in the Aripo Savanna where *fervida* apparently does not occur.

Number 12: *Micrathyria didyma* Calvert - Another species common at the Sewage Ponds, it is but one of several species of *Micrathyria* found in Trinidad, although easily the most common. The pale areas of the body are olive green and the pale spot on the seventh abdominal segment is light yellow. The pattern of the darker bands on the thorax is specific to this species. The frons (the large, blunt facial area in front of the eyes) is metallic violet when viewed from the top. It takes a bit more experience to separate the other species of this genus but, if compared with this series of drawings, they should all be readily identifiable as belonging to *Micrathyria.*

Number 13: *Dythemis multipunctata* Kirby - This species can be distinguished from the preceding species by the differing thoracic pattern of stripes, by the greater amount of abdominal marking and by a metallic-blue sheen all over the thorax. The frons is metallic violet as in the preceding species. This species is not uncommon over swift, rocky montane rivers where it flies busily back and forth, defending its territory against conspecific males. When at rest on the tip of a branch, it holds the wings downward and raises its abdomen nearly to the vertical. A close relative, with a brown instead of a metallic frons, is *D. sterilis,* which is somewhat larger and often has smokey-looking wings.

Number 14: *Erythemis plebeja* Burmeister - This insect, like all of the preceding dragonflies, is in the family Libellulidae. It is larger than the others already discussed and is rich, velvety black all over with black wing bases. It has a distinctly "fuzzy" look to it and prefers ponds, ditches and slow-moving rivers in low country. It is not likely to be confused with any other local species.

Number 15: *Erythemis peruviana* Kirby - Slightly smaller than the last species, this one can be identified by the solid black thorax and bright, red abdomen in the males (the females are rich brown with a darker thorax) and the light yellow line that runs down the back of the thorax. Wing bases are deep brownish black. This species likes still water and can be found at the Sewage Ponds and Nariva Swamp among other places.

Number 16: *Orthemis ferruginea* Kirby - This has to rate as one of the most familiar dragonflies in Trinidad. Whenever people first learn of my interest in "Battymamsels" or "Zings", they can be counted on to ask, "Have you seen that large red one?" The striped pattern in my illustration is that of the young male. In this form, the bands are rich brown, while the pale areas between them are yellow, the abdomen yellow-brown. With age, the entire insect becomes bright purple-pink with a trace of pinkish wax over the body. This is the colour pattern that is most familiar to the "average Trini" where these insects are noticed flying over drainage ditches and, generally, wherever there is water - even over rain barrels! As the insect gets even older, the thorax becomes almost black while the abdomen becomes even deeper blood red. The females retain the pattern of the illustration all their lives, but the abdomen is widely dilated on segments seven, eight, and nine, looking like "flaps".

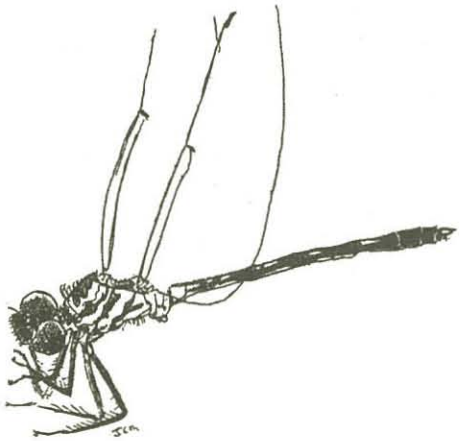
Number 17: *Orthemis concolor* Ris - The same length as the previous species, *O. concolor* is much leaner, with the abdomen black with a fine yellow line down the middle. The thorax is chestnut brown and yellow, with the chestnut colour predominating as the insect gets older. I have found this species at the Sewage Ponds at Laventille and in the Drain Nine area of Caroni Swamp.

Number 18: *Uracis fastigiata* Hagen - This is a genus of river dragonflies and I have caught them only in forest areas. The body is light green-grey with black markings and the wings tips each bear a dark brown band. Illustrated is the female, showing her quite large ovipositor projecting well beyond the apex of the abdomen. This is characteristic of the genus *Uracis*, which has only one other Trinidad species, *U. imbuta. Imbuta* may be distinguished from *fastigiata* by its smaller size, its relatively shorter ovipositor and by the near total absence of the brown markings on the wings.

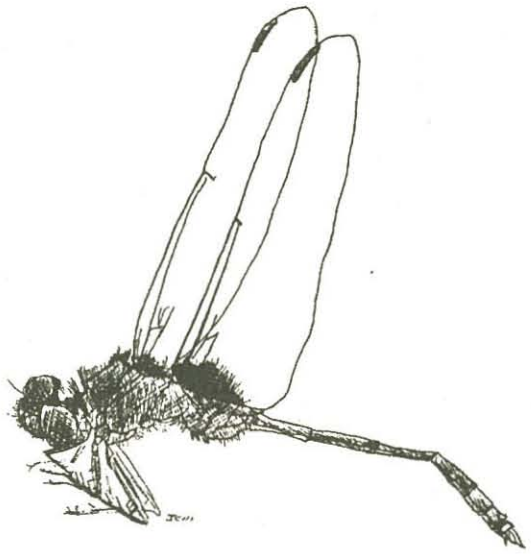
Number 19: *Perithemis mooma* Kirby - The female is illustrated. *Perithemis* is a confusing genus of tiny amber-coloured dragonflies that distinguish themselves at first glance. The males of all species have the wings deep amber-orange throughout, while the females have their wings mostly clear with various patterns of amber or brown spots and dashes. In this genus, it is therefore the females that are more important in species identification. *P. mooma* is a greatly variable form, however, and is largely determined by details of its wing venation and leg colouration. Nonetheless, *P. mooma* is so very common that any *Perithemis* caught in a populated area may be taken as *mooma* until an opportunity for further analysis presents itself. The body is light tan in colour.

Number 20: *Perithemis thais* Ris - This dragonfly is so small, that it's even rather tiny for a *Perithemis*! In this species, both sexes have the amber ground colour throughout the wings, as well as the darker spots. They will, at once, distinguish this species from any other in the genus. I have taken this species only down in Chatham on the Icacos Penninsula. (Note, in this illustration, that the head of the specimen is turned toward the reader, affording a view of the mouthparts below the eyes.)

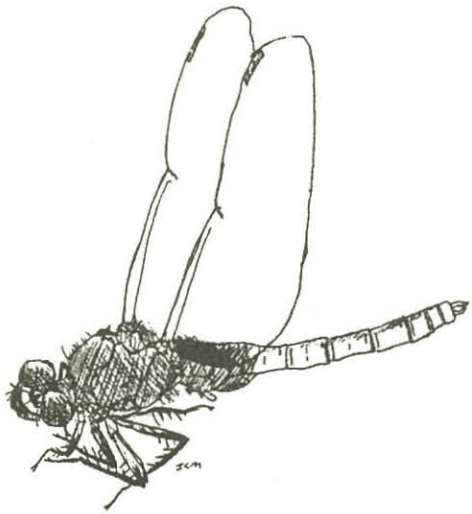
Number 21: *Miathyria marcella* Carpenter (a new record for the island) - This species prefers to fly in great "swarms", rarely landing by day, hawking midges at such places as the Sewage Ponds and Drain Nine, Caroni Swamp. I find it in mixed swarms with *Pantala flavescens* and *Tramea calverti.*



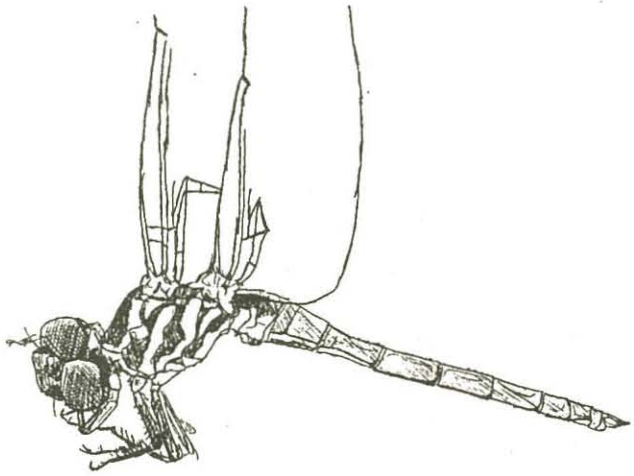
Dythemis multipunctata Kirby ♂ (actual length 38 mm)



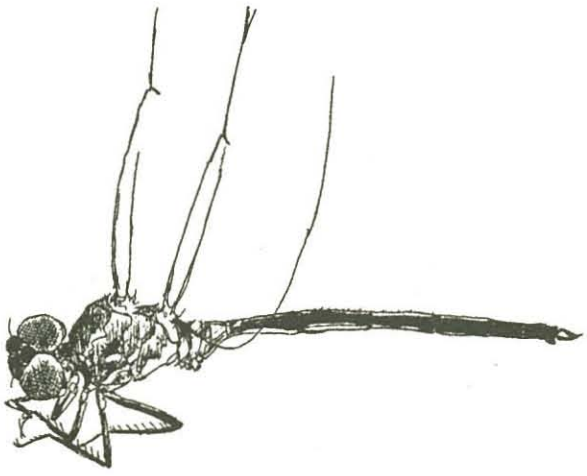
Erythemis plebeja Burmeister ♂ (actual length 47 mm)



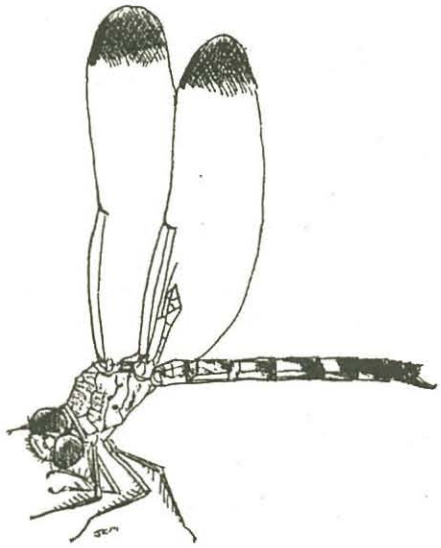
Erythemis peruviana Kirby ♂ (actual length 38 mm)



Orthemis ferruginea Kirby ♂ (actual length 52 mm)



Orthemis concolor Ris ♂ (actual length 49 mm)



Uracis fastigiata Hagen ♀ (actual length 37 mm)

The thorax is dark plum purple, the abdomen is yellow and black and the wing veins are yellow. The wings bases are dark brown, nearly black. The frons is deep metallic purple. The only other species in the genus is *M. simplex,* which is smaller, and deep red throughout with reddish wings bases. The only species that *marcella* might be confused with when on the wing is the less common *Tauriphila* australis which has black wing veins. *T. australis* has recently become a new species record for Trinidad.

Number 22: *Pantala flavescens* Hagen - Perhaps the most cosmopolitan species of dragonfly in the world, I have collected this one bask home in New Jersy, USA, and have specimens from the Philippines as well! This species flies in equal numbers with *Miathyria marcella,* creating swarms of hundreds and hundreds of individuals, rarely landing (though perching somewhat more frequently than do *M. marcella*). The body colour is a beautiful arrangement of yellow, tan, white, and black, but the overall look while on the wing is that of fiery orange. There is some clear yellow at the bases of the hind wings. Only one other species to this genus is known from the island, and this is *P. hymenea.* It can be distinguished from *flavescens* in that it possesses a round brown spot at the base of each hind wing. According to several writers, this spot is discernible even when the insect is on the wing.

Number 23: *Tramea calverti* Muttkowski - this genus of large and robust dragonflies can be distinguished from other genera by the dark irregular marks at the base of each hind wing. This is the signature of the genus *Tramea. T. claverti* differs from most other Trinidad members of the genus in the possession of two white diagonal bands across the sides of the thorax. The frons is a metallic, reddish-purple in colour. This species flies in the great mixed swarms of *Pantala flavescens* and *Miathyria marcella* that I have seen at Drain Nine and at the Sewage Ponds, but there are always only two or three individuals of *Tramea* for the hundreds of the others. I have also caught this species at Nariva Swamp and at Mount Tabor on the trail leading uphill from Mount St. Benedict. During the Petit Careme, this species may be seen flying in vast swarms in lowland populated areas such as St. Augustine.

Number 24: *Triacanthagyna septima* Selys - Let me take the time to explain that I have had to leave out one major family of dragonflies, the Gomphidae. There are no fewer than four known species in Trinidad, yet they are so scarecely collected that, at the time of writing, I had not one to illustrate. Gomphids may at once be distinguished from all other Anisoptera by the fact that their eyes are widely separated, as in the Zygoptera. This trait is found in no other family.

The present insect belongs to the family Aeschnidae, a group of large to giant-sized, strong-flying dragonflies, many of which fly only at dusk and more still that keep to the deep woods, flying along dry stream beds and so forth. Note the absolutely huge compound eyes which meet for some distance along a seam at the top of the head. The genus *Triacanthagyna* is made up of crepuscular predators, flying so late in the evening that it is often nearly impossible to follow them with the eye! I have caught several over the fish ponds at Simla around 6:30 p.m. and many have been caught as they flew into houses at night attracted by the lights. The specimen illustrated was collected just this way by a friend of the author, on the Eastern Main Road in San Juan. The body is tan and the thorax has two large pale green patches. Most individuals caught in the evening are females, and most of these (as in the illustration) have had their abdominal appendages broken off. Intact, these appear as two long, plate-like flaps, flattened and twisted, and rounded at the tips. They may be nearly as long as the combined lengths of segments eight, nine and ten. The other species in the genus require special resources to separate. A related genus, *Gynacantha,* is made up of several species that are much larger, and one species, *G. membranalis,* has wings that, in many specimens, are almost black throughout.

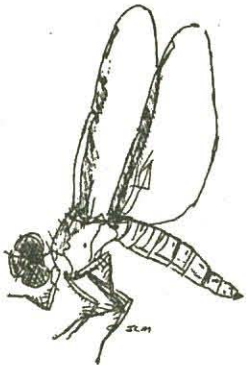
Number 25: (not illustrated) : *Staurophlebia reticulata* obscura Walker - With this ominous name comes an ominous insect. The largest of Trinidad dragonflies, it is far too big to illustrate here. It is enormous, robust and powerful of flight. The thorax is dark green, the abdomen is brownish purple, the wings are clear throughout. That and its size (95 mm or so) should prove sufficient for identification should this creature be encountered. Another very large species, but a bright lime green throughout, is *Coryphaeshna viriditas.* A species with body colours similar to *reticulata,* only smaller, would most likely be *Anax amazili. Amazili* is encounterd somewhat regularly hanging around light fixtures in the late evening, as I have seen them many times at UWI. *S. reticulata* may be encountered flying low over sluggish creeks, coursing up and down for long distances throughout the day. They have been reported following dry stream beds, laying their eggs in wet clay.

This, of course, barely scratches the surface of the odonate fauna of Trinidad. With a species list of 120 and growing (I think I have added at least 12 species to the list in three months), there is till plenty of work to be done. Areas that could repay some serious study include Trinity Hills, all of Icacos Peninsula, Chaguaramas and the Central Range. In fact, any place in Trinidad could do with additional collecting, provided that specimens are taken only as they will be useful for study. Overcollecting could be hazardous to isolated populations and good habitats should always be protected from trampling feet. Trinidad has a wealth of faunistic diversity and its people must appreciate that and do what they can to preserve and understand it. Within these limits, sensible collecting with detailed collection data can be invaluable in understanding the diversity and complexity of Trinidad's ecosystems.

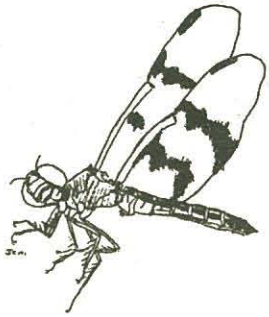
For those who would pursue the collection and identification of the Odonata, there is a fine collection, supplied by K.W. Knopf, at CIBC in St. Augustine, and I have deposited a second collection at the Department of Zoology at the University of the West Indies, St. Augustine. Access to either collection should be available upon request. For further reading, to learn the structure and identification of the Odonata of Trinidad, the following list is recommended and I think, essential:

• Borror, DeLong & Triplehorn's An Introduction to the Study of Insects, 5th Ed. 1981, Sandlers.
This book includes a chapter describing the various terms used in odonate studies and a brief key to the various families as well as a word or two on collecting technique.

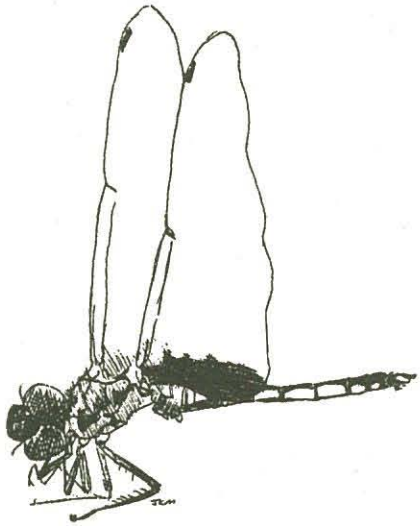
• Philip P. Calvert's volume on the Odonata (Neuroptera) in the 1908 masterwork , Biologia Centrali-Americana.
This work is hard to obtain but the Zoology Dept at UWI now has a photocopy in their library. It is indispensible to the identification of tropical American Odonata.



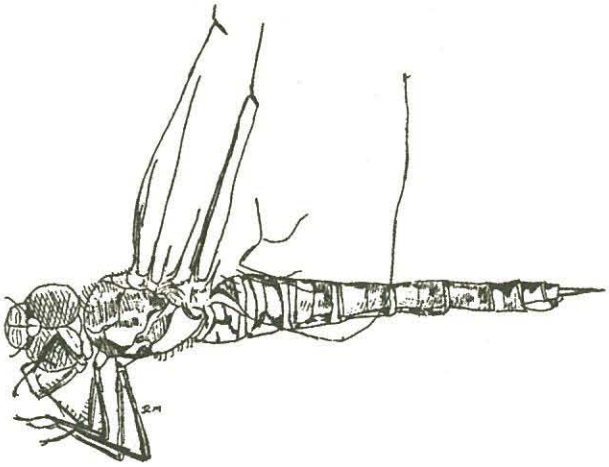
Penthemis mooma Kirby ♀ (actual length 23 mm)



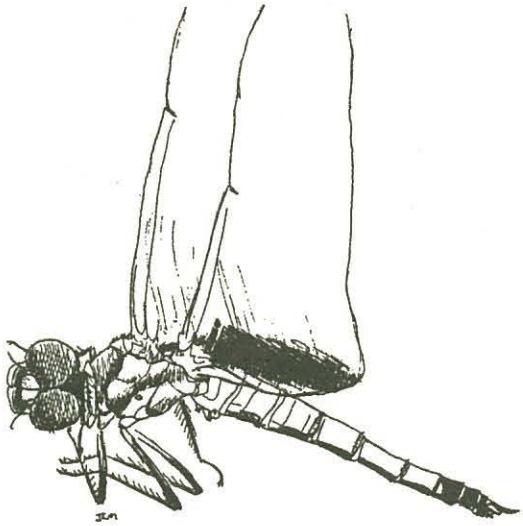
Perithemis thais Riz ♂ (actual length 21 mm)



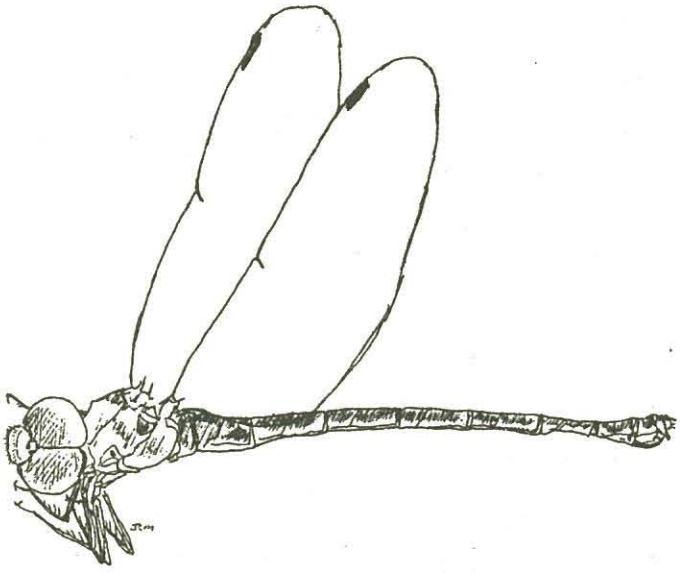
Miathyria marcella ♂ Carpenter (actual length 35 mm)



Pantala flavescens Hagen ♀ (actual length 50 mm)



Tramea calverti Muttkowski ♀ (actual length 44 mm)



Triacanthagyna septima Selys ♀ (actual length 58 mm) without appendages which are usually broken off

• D.C. Geijskes' The Dragonfly Fauna of Trinidad, British West Indies, 1932, 'S Rijks Mus. Nat. Hist, Vol 14, No. 4.
Until last year, this was the most thorough and up-to-date work devoted to Trinidad's dragonfly fauna. Very useful, but does not contain keys to determine the species.

• Needham & Westfall's Dragonflies of North America.
Although obviously devoted to the North American species, this book also covers most of the West Indies. Besides that, its instructive chapters on structure, life cycle and collecting and rearing of Odonata prove their worth over and over again. A great book.

• F. C. Whitehouse's Dragonflies of Jamaica, 1943, Bulletin of the Institute of Jamaica - Science series, No. 3.
This is a much less technical work but effective nonetheless in aiding in the identification of certain species. Enjoyable reading and a good introduction to the study. UWI has several copies in the central library and in the Zoology Dept library.

• I will soon have my own book ready for publication by the Zoology Department of UWI, to be available shortly. It is intended to be the most up-to-date, inclusive and instructive guide available on the Odonata of Trinidad. The book contains all the information needed to identify all known species on the island. It will be approximately 150 pages long with five plates of line drawings. Proceeds will go to the Department of Zoology.

• In addition to the above list, the Department of Zoology at UWI should also have most of the papers that I have used in my recent work.