

A SURVEY OF THE ADULT ANISOPTEROUS DRAGONFLIES OF THE CENTRAL GULF COAST REGION

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INTRODUCTION

This study of Odonata began while the writer attended Tulane University during the summer of 1932. Until June, 1934, the investigation was continued in New Orleans and vicinity. Additional collecting trips were taken to Grand Isle and Cat Island in the Mississippi Sound, to localities on both sides of the Mississippi River with the most distant being sixty miles below New Orleans, to Lake Pontchartrain, and along the Mississippi Sound as far as Biloxi, Mississippi. The writer has examined and identified specimens in the collections of Tulane University, the Southern Biological Supply Company, the Louisiana State Museum, and the Normal School in New Orleans. From September, 1934, to May, 1935, collections and observations were made in the vicinity of Tuscaloosa, Alabama, and these are included in this paper because the writer believes that stray individuals from other localities may occasionally be found in the Gulf Coast area. During 1935 and 1936 collecting was extended along the Gulf Coast from Biloxi eastward to the Mobile River, completing the field work on the area covered in this paper.

These dragonflies are of three types: (1) the species of the Gulf Coast area found frequently enough to warrant descriptions as to habits and habitats, (2) species found in the Gulf Coast area, but which were rare, and (3) those species from Tuscaloosa, Alabama, and vicinity, which have not been found in the Gulf Coast area. For the last two groups, the dates of collection and the localities from which the specimens were taken are given, but such data are not presented for the first group since these species may always be found in these habitats during the seasonal range peculiar to each of them.

The purpose of this study is four-fold: (1) to determine and record the species of dragonflies found within the stated areas, (2) observe and describe their habitats, (3) to construct a key for their identification, and (4) to elicit the cooperation of dragonfly students of the area who may be interested in the eventual preparation of a monograph for the region.

The author has examined all available bibliographies of Odonata, but found no reference to papers or parts of papers dealing with the Central Gulf Coast area. Byers, in his monograph, "A Contribution to the Knowledge of Florida Odonata," states: "Yet, over this array

of regional papers, one looks in vain for titles on the dragonflies of the extreme southeastern United States, i. e., Southern Georgia, Florida, and Southern Alabama."

Many persons have aided materially in the collecting and mounting of specimens used as the basis of this paper, and the author wishes to express his grateful appreciation of this assistance. Thanks are especially due to Dr. E. S. Hathaway of Tulane University for friendly advice, the loan of specimens, materials, and literature, and for his very helpful criticism of this paper. The writer is also indebted to Dr. H. P. Loding of Mobile, Alabama, for collecting specimens and for advice and criticism, and to Tulane University, the Southern Biological Supply Company, the Louisiana State Museum, and the Normal School in New Orleans for the loan of specimens.

KEY TO ADULT ANISOPTERA

The following key was constructed for the purpose of presenting a simplified index to the adult dragonflies of the Central Gulf Coast area, and to give to the beginning student an insight into the systematic relationships of the species discussed. Various persons have used this key and, wherever needed, have given very helpful suggestions as to changes in form or description. The author is very grateful for these suggestions, and will welcome any further change that might be suggested by readers.

- A. Triangles about equally distant from arculus in fore and hind wings, and similarly shaped Family **AESCHNIDAE**
- B. Stigma without a brace vein at its inner end. Subfamily **CORDULEGASTERINAE**
- C. Represented by a single genus in N. A. fauna. Genus **Cordulegaster**
- D. A single pair of lateral spots on each segment; abdomen less than 60 mm. in length; eyes not contiguous. *C. diastatops* (7)
- BB. Stigma with a brace vein at its inner end.
- C. Fore wing with anal vein apparently forked before the triangle; stigma narrow, longer than 8 mm. Subfamily **PETALURINAE**
- D. Thorax yellow, striped with black. Genus **Tachopteryx**
- E. A single species. *T. thoreyi* (1)
- CC. Anal vein of fore wing extends direct to hind angle of triangle.
- D. Eyes widely separated on top of head. Subfamily **GOMPHINAE**
- DD. Eyes contiguous in median dorsal part of head. Subfamily **AESCHNINAE**
- E. Both sectors of arculus clearly arising from above middle of arculus Genus **Anax**
- F. Top of frons with a black spot surrounded by blue; expanse 105 mm. *A. junius* (2)
- EE. Both sectors of arculus clearly arising from below middle of arculus. Genus **Nasiaeschna**
- F. A single species. *N. penthacantha* (5)
- EEE. Sectors of arculus arising at or near middle of arculus.
- F. Radial Sector apparently unbranched; 2 cross veins under stigma. Genus **Oplonaeschna**
- G. A single species. *O. armata* (3)

- FF. Radial sector forked; 3 or more cross veins under stigma.
 G. Radial sector separated from radial supplement at fork of sector by two rows of cells.... Genus **Epiaeschna**
 H. A single species.....*E. heros* (6)
- GG. Radial sector separated from radial supplement at fork of sector by more than two rows of cells.....
 Genus **Coryphaeschna**
 H. Dorsum of thorax brown with green stripes.....
*C. ingens* (4)
- AA. Triangle nearer arculus in hind wing than in fore wing, and of different shape Family LIBELLULIDAE
- B. Anal loop compact, little longer than wide, the bordering basal portion of vein Cu_2 straight, included cells not in two rows and not separated by a distinct bisector or mid rib..... Subfamily MACROMIINAE
- C. Eyes meeting on anterior median surface of head only; occiput of dorsal surface of head larger than the vertex.... Genus **Didymops**
 D. Basal antenodal cells of both wings brown....*D. transversa* (8)
- CC. Eyes contiguous for a considerable length on dorsal surface of head; occiput of dorsal surface of head much smaller than vertex..... Genus **Macromia**
 D. Pale stripe on front of thorax obsolete; yellow ring on second abdominal segment divided dorsally and laterally, thus forming two pairs of yellow spots.....*M. illinoensis* (9)
- BB. Anal loop elongate, becoming foot-shaped, divided lengthwise into two rows of cells by a bisector or mid rib.
- C. Anal loop somewhat foot-shaped but with little development of the toe; males with auricles on sides of second abdominal segment, and with adjacent inner margin of hind wing notched.....
 Subfamily CORDULIINAE
- D. Hind wing with 4-5 antenodal cross veins; veins M_4 and Cu_1 of fore wing convergent to wing margin; wings with large basal spots only..... Genus **Tetragoneuria**
 E. Frons generally with no T-spot above; hind wing triangle generally with no cross veins.....*T. cynosura* (10)
- CC. Anal loop distinctly foot-shaped with a well developed toe; males without auricles on second abdominal segment, and inner margin of hind wing rounded..... Subfamily LIBELLULINAE
- D. Matched antenodals 12 or more..... Tribe LIBELLUNINI
- E. Sectors of arculus stalked beyond arculus; bridge cross veins of fore wing one or absent..... Genus **Orthemis**
 F. A single species.....*O. ferruginea* (14)
- EE. Sectors of arculus separate almost from arculus; bridge cross veins of fore wing more than one (usually 3).
 F. Postnodal cross veins of hind wing 12 or less; color pattern of wings of sexes different. Genus **Plathemis**
 G. Males with a median cross band on wings of uniform brown color.....*P. lydia* (15)
- FF. Postnodal cross veins of hind wings generally 13 or more; color pattern of wings of sexes similar.....
 Genus **Libellula**
 G. A nodal spot present which covers at least half width of wing.
 H. Stigma reddish-brown; less than 6 R_1 - M_1 cross veins between nodus and proximal end of stigma of fore wing....*L. semifasciata* (19)

- HH. Stigma black; more than 6 (usually 10)
 R_1 - M_1 cross veins between nodus and proximal
end of stigma of fore wing.. *L. pulchella* (20)
- GG. No nodal spot present, or if present does not cover
one-half width of wing.
- H. Base of wings with no dark brownish-black
streaks; entire wing surface tinged with yellow
or red..... *L. auripennis* (16)
- HH. Base of wings with one or two brownish-
black streaks; yellow or red color, if present,
restricted to anterior half of wings.
- I. Stigma bicolored white and black.....
..... *L. cyanea* (17)
- II. Stigma not bicolored white and black.
- J. Anterior half of wings yellow-tipped;
no black spot at nodus. *L. flavida* (18)
- JJ. Anterior half of wings with no yellow-
red color; a black spot covering
nodus *L. vibrans* (21)
- DD. Matched antenodals less than 12.
- E. Bisector of anal loop deflecting on angle of less than 30° at
ankle Tribe **CELITHEMINI**
- F. One to three cross veins present in triangle of fore wing;
fore wing triangle with anterior (front) side one-half
as long as proximal (inner) side.. Genus **Celithemis**
- G. Wing membrane yellow, no brown band beyond
stigma *C. eponina* (12)
- GG. Wing membrane hyaline, a brown band beyond
stigma..... *C. fasciata* (13)
- FF. No cross veins present in triangle of fore wing; fore
wing triangle with anterior (front) side as long as
proximal (inner) side..... Genus **Perithemis**
- G. A single species..... *P. domitia* (11)
- EE. Bisector of anal loop deflecting on angle of 30-50° at ankle.
- F. Vein A_2 of hind wing gently curved at base; ends of
stigma parallel..... Tribe **SYMPETRINI**
- G. A long veinless space proximal and posterior to
stigma..... Genus **Pachydiplax**
- H. A single species..... *P. longipennis* (22)
- GG. No such veinless space present.
- H. Vein Cu_1 of hind wing rising from distal
(outer) side of triangle. Genus **Mesothemis**
- I. Wings hyaline, abdomen stout.....
..... *M. simplicicollis* (28)
- HH. Vein Cu_1 of hind wing arising from posterior
(hind) angle of triangle.
- I. Base of vein A_2 of hind wing situated
distal to anal crossing.....
..... Genus **Erythrodiplax**
- J. Four to five cross veins between veins
 Cu_2 and A_1 at posterior edge of hind
wing; wing expanse more than 50
mm..... *E. bernice* (26)
- JJ. Two to three cross veins between
veins Cu_2 and A_1 at posterior edge
of hind wing; wing expanse less than
45 mm..... *E. minuscula* (27)

- II. Base of vein A_2 of hind wing opposite anal crossing.
 - J. Antenodals of fore wing generally 10 or more; in our species stigma light yellow or white... Genus **Cannacria**
 - K. Only one species in North America.....*C. gravida* (25)
 - JJ. Antenodals of fore wing 9 or fewer; stigma red or reddish-brown..... Genus **Sympetrum**
 - K. A median encircling ridge on fourth abdominal segment; fore wing antenodals 7; sides of thorax with two white stripes.....*S. corruptum* (23)
 - KK. No median encircling ridge on fourth abdominal segment; fore wing antenodals 8-9; no white markings on sides of thorax; distal surface of each abdominal segment black.....*S. ambiguum* (24)
- FF. Vein A_2 of hind wing straight at its base for a distance of several mm.; ends of stigma not parallel..... Tribe **TRAMEINI**
- G. Vein M_2 evenly contoured..... Genus **Tramea**
- H. Abdomen blackish with a pale reddish spot on seventh segment.....*T. lacrata* (31)
- HH. Abdomen reddish with last two segments black.
 - I. Clear spot in brown of hind wing (at brown band of hind wing not covering space between upper sector of arculus and vein R and M).....*T. onusta* (32)
 - II. Clear spot in brown of hind wing very much narrower than brown; brown band of hind wing covering upper sector of arculus, vein R and M, and space between these veins.....*T. carolina* (33)
- GG. Vein M_2 undulate..... Genus **Pantala**
- H. Hind wing with a large brown spot in basal area.....*P. hymenea* (29)
- HH. Hind wing hyaline or tinged with yellow in basal area, but no brown spot present.....*P. flavescens* (30)

RECORDS AND OBSERVATIONS

SYSTEMATIC LIST OF ANISOPTERA DESCRIBED

AESCHNIDAE

PETALURINAE

1. *Tachopteryx thoreyi* Hagen*
2. *Anax junius* Drury
3. *Oplonaeschna armata* Hagen
4. *Coryphaeschna ingens* Rambur

*Species marked with an asterisk are not Gulf forms, but are from middle Alabama.

5. *Nasiaeschna penthacantha* Rambur
6. *Epiaeschna heros* Fabricius

CORDULEGASTERINAE

7. *Cordulegaster diastatops* Selys*

LIBELLULIDAE

MACROMIINAE

8. *Didymops transversa* Say*
9. *Macromia illinoiensis* Williamson*

CORDULINAE

10. *Tetragoneuria synsura* Say

LIBELLULINAE

CELITHEMINI

11. *Perithemis domitia* Drury
12. *Celithemis eponina* Drury
13. *Celithemis fasciata* Kirby
14. *Orthemis ferruginea* Fabricius
15. *Plathemis lydia* Drury
16. *Libellula auripennis* Burmeister
17. *Libellula cyanae* Fabricius*
18. *Libellula flavida* Rambur*
19. *Libellula semifasciata* Burmeister*
20. *Libellula pulchella* Drury
21. *Libellula vibrans* Fabricius

SYMPETRINI

22. *Pachydiplax longipennis* Burmeister
23. *Sympetrum corruptum* Hagen
24. *Sympetrum ambiguum* Rambur
25. *Cannacria gravida* Colvert
26. *Eythrodiplax bernice* Drury
27. *Erythrodiplax minuscula* Rambur
28. *Mesothemis simplicicollis* Say

TRAMEINI

29. *Pantala hymenea* Say
30. *Pantala flavescens* Fabricius
31. *Tramea lacerata* Hagen
32. *Tramea onustra* Hagen
33. *Tramea carolina* Linneus

SPECIES NOT INCLUDED IN THE KEY, BUT LISTED IN THE
LOUISIANA STATE MUSEUM

- Tetragoneuria spinigera* Say; no data with specimens.
Nannothemis bella Ulher; no data.
Ladona exusta Say; no data.
Libellula incesta Hagen; no data.
Libellula axillena Westwood; no data.
Leucorhinia intacta Hagen; do data.

ECOLOGICAL AREAS

The author recognizes that the only definite means of discovering the distribution of Odonata is through the study of their nymphs. Such a study is being conducted at the present time, but it is yet too early

in the investigation for the statement of definite results. However, the author believes that complete records should be kept of the adults, since this is necessary for the study of life histories.

In this study eight types of habitats found in the Gulf Coast area were recognized: (1) salt marsh,¹ (2) brackish marsh, (3) brackish swamp, (4) fresh-water marsh, (5) fresh-water swamp, (6) open fields of fresh water, (7) woodlands, and (8) grassy or overgrown fields.

Since the adult dragonflies are strong fliers and tend to move from one locality to another, it was found advisable to limit investigations to three habitats: salt water areas, brackish areas, and the fresh water areas (including the surrounding woodlands, grassy and overgrown fields). By this means it was possible more readily to determine whether the species seemed to prefer any one of these conditions.

NOTES ON DISTRIBUTION AND HABITATS

1. *Tachopteryx thoreyi*. Five specimens were taken from near Tuscaloosa, Alabama, during the spring of 1935. These preferred the shady woodlands but frequently flew over a large pond where they chased *Plathemis lydia*, and oviposited.

2-6. *Aeschninae*. The "darners" were found in all of the habitats probably due to their large and sturdy size which enabled them to fly far and fast. They were scattered and never in great abundance in any single habitat. During the day the "darners" flew at considerable heights, at or above the upper branches of the taller trees, where they perched, but at dusk when the flies, gnats, and other small insects swarmed near the ground, they darted down into the swarms, seized their prey, and returned to the higher branches of nearby trees to perch and eat. Only one specimen of *Oplonaeschna armata* has been taken so far.

7. *Cordulegaster diastatops*. One specimen was taken in a woodland about ten miles from Tuscaloosa, on the highway to Birmingham, Alabama, May 19, 1935.

8-9. *Didymops transversa* and *Macromia illinoiensis*. One specimen of each was captured at Thompson's Lake, seven miles from Tuscaloosa, May 22, 1935. They were caught while flying near the edge of the water where they had been perching on tall grass. Several nymphs of *Didymops transversa* were taken at the same place.

10. *Tetragoneuria cynosura*. The most common dragonfly observed near Tuscaloosa and Birmingham, Alabama, during the spring of 1935. In open grassy fields, *T. cynosura* were observed flying, probably moving from one pond to another. At these ponds or small lakes they flew swiftly back and forth along the edge of the water, or were found perching on the tall waterside grasses. Very few females

¹This writer defines a "marsh" as a grassland with standing water, and a "swamp" as a forest under water.

were seen and only males were taken in our collection. The nymphs of *Tetragoneuria* (probably *T. cynosura*) were seen in almost every dip of the net.

11. *Perithemis domitia*. Found near bodies of slowly-moving fresh water only, where they flew about over the middle of the body of water, mating and ovipositing. They momentarily perched on low overhanging limbs or on grass growing at the water's edge on in the water. Specimens have been taken by the author from Pearl River in Louisiana, and from an enlarged overflow ditch near Toulminville, Alabama. Their seasonal range seemed to be short, as specimens were captured only during July and August.

12-13. *Celithemis eponina* and *C. fasciata*. Both species were found together in or near fresh and brackish areas, usually marshland, with *C. eponina* being by far the more common species. They flew rapidly about and perched on the tops of canes. During the middle of the summer along the Bayou Savage Road (U. S. 90) leading into New Orleans, and along the roadway of the Mobile Bay Bridge, almost every cane in the vast patches bordering these highways would have a *C. eponina* perching on it. In its resting or perching position, *C. eponina* held its front pair of wings vertically over the body and its hind pair of wings horizontally (this being the normal position of both pairs of dragonfly wings when at rest). This peculiar characteristic made them easily identified in the field. The seasonal range was from the latter part of May or early June to early fall.

14. *Orthemis ferruginea*. Appeared during the latter part of the summer, and was found only around fresh-water bodies or the surrounding woodlands and fields. They were quite agile, flew from their perches at one's approach and very seldom returned to the same place.

15. *Palthemis lydia*. Found near fresh-water bodies, but often ranged long distances into the surrounding woodlands and fields. These, next to *Tramea carolina*, were the most difficult to capture. An individual would perch quietly until one approached within several feet, then would dart off, fly rapidly about, approach the perch just left, and usually alight there again. They appeared early in April and lasted until October.

16. *Libellula auripennis*. This was the most common and the most widely distributed of the species found in the Gulf Coast region. The adults were found from the most salty conditions to the least and from the flats and marshes to the forests and swamps. *L. auripennis* appeared early in the spring and was one of the last species to disappear during the fall. From July to August in the vicinity of New Orleans (over the fresh and brackish areas within twenty or thirty miles), they congregated in vast swarms, and even penetrated into the city in clouds. These swarms were easily detected from a distance by the numerous birds darting after the dragonflies. At such times nearly all species of birds present in the surrounding vicinity

would catch and eat *L. auripennis*, when under normal conditions dragonflies form little or no part of their diet. The author noticed that in the midst of these swarms there were no mosquitos, gnats, flies, or other small insects.

17. *Libellula cyanea*. Six specimens were taken in grassy fields near woodlands seven miles from Tuscaloosa, Alabama, May 8, 1935.

18. *Libellula flavida*. One specimen was captured with *L. cyanea* near Tuscaloosa, May 8, 1935.

19. *Libellula semifasciata*. These were found in grassy fields which approached forests. Several specimens were taken while they were perching on tall canes near Tuscaloosa, May 19, 1935. This species resembled *Celithemis eponina* in its flight and in that it perched on canes. One individual was captured in the city of Mobile, Alabama, July 14, 1936.

20. *Libellula pulchella*. Five specimens were taken while they were flying over and ovipositing in a drainage ditch near Mobile, during July of 1934. These were the only individuals seen, and no other data are available.

21. *Libellula vibrans*. They were found with *L. auripennis* in all habitats. *L. vibrans* preferred shady regions and was found there in greatest abundance, while *L. auripennis* was noticed more frequently in open spaces. They seemed to be the most sluggish of the Libellulids of the Gulf Coast area. One could approach within several inches of them before they slowly moved away, frequently returning to the same perch.

22. *Pachydiplax longipennis*. This species had the same range as *Libellula auripennis*, being found in every habitat. They were very common during the summer months but never reached the abundance noticed in *L. auripennis*. *P. longipennis* was a very hardy species, its seasonal appearance ranged from early spring to October, and in mild weather individuals have been captured about the native palmetto and other such sheltered places as late as early November. It perched on anything that it could find. In the perching position the abdomen was held in the air at a 45° angle to the thorax, and the wings were in most cases brought forward over the body, making a similar angle in relation to its long axis. The author recently has noticed a larger variety of *P. longipennis*, but at present there is insufficient data to explain this variation. The normal *P. longipennis* has a body length of 38 mm. and a wing expanse of 64 mm., while the larger variety has a body length of 55 mm. and an expanse of 84 mm. The coloration of the two is identical, and size is the only differentiating feature.

23. *Sympetrum corruptum*. A sturdy flier, found in or near woodlands or overgrown fields surrounding bodies of fresh water. This species appeared as early as April and lasted throughout the summer; it was never, however, found in any great abundance. They were often to be seen in company with *Orthemis ferruginea* and *Pantala flavescens* in open sunny fields.

24. *Sympetrum ambiguum*. A shade-loving species which appeared in late summer and lasted until the first frost of winter. *S. ambiguum* was found in shallow streams or ponds or over their dried beds where overhanging trees formed a continual shade. The males flew slowly over the tops of the weeds in these shaded areas, frequently perching for short periods of time. The brown-splotted female darted rapidly about attracting the males. The author has frequently seen five or six males attending one female. Finally one would clasp the female and fly rapidly away. Copulation took place while the pair were flying or while perching at irregular intervals. No ovipositing has been observed by the author.

25. *Cannacia grvida*. This beautiful dragonfly was found in the brackish and fresh-water areas, usually perching on canes or water-lilies. At certain times during the summer large numbers were observed in the brackish marshes, but more often among the other species present, *C. grvida* ranked fourth or fifth in abundance. Its seasonal range corresponded to that of *Celithemis eponina* with which it was quite often found. The author has noticed *C. grvida* perching on driftwood in Mobile Bay, but deemed this a case of wandering from its normal habitats.

26. *Erythrodiplax bernice*. If any adult Odonata could be definitely said to be limited to one habitat, *E. bernice* was the particular one. In all the collections, I found this species only where there was considerable salinity, predominately in salt marshes. *E. bernice* was seen flying over salt marshes or water and perching on the grasses throughout the coastal area. These assumed a resting position similar to *Pachydiplax longipennis* when perching on large objects, but when on sedges and tall grasses they perched normally. *E. bernice* appeared as early as April and was found until October or November.

27. *Erythrodiplax minuscula*. The only specimens taken of this species were from Cat Island in the Mississippi Sound during the spring of 1933. Records show that they were found in the grassy strips, either dry or marshy.

28. *Mesothemis simplicicollis*. The "green jacket" was found in all of the habitats, but was more common in brackish areas. It appeared in early April and disappeared in October, when the weather was mild, and somewhat earlier when there were cold snaps. *M. simplicicollis* perched on bare ground, low branches, grass, or brush, where it waited to prey on smaller insects. I have found individuals devouring other *M. simplicicollis*, and in one case, even the larger *Libellula auripennis*.

29. *Pantala hymenea*. A single specimen was collected in Mobile, Alabama, September, 1935.

30. *Pantala flavescens*. A common species of the late summer and fall. They were found around bodies of fresh water, forest lands, open grassy fields, and occasionally were taken in brackish water

areas. *P. flavescens* was a sturdy flier, and perched only at irregular intervals for a short time.

31. *Tramea lacerata*. Several individuals were collected from the vicinity of Mobile during the summer of 1935. These and other specimens collected during 1934 were found together with *T. carolina*.

32. *Tramea onustra*. The author has but a single record of this species, one from Mobile, Alabama, September, 1935.

33. *Tramea carolina*. This was the commonest species of this genus in the Gulf Coast area. *T. carolina* was found in every habitat but in greatest numbers in brackish areas where, with *Celithemis*

TABLE 1

Relative abundance of Central Gulf Coast dragonflies

SPECIES	SALT AREAS	BRACKISH AREAS	FRESH WATER AREAS
<i>Anax junius</i>	2	2	2
<i>Coryphaeschna ingens</i>	2	2	2
<i>Nasiaeschna penthalacantha</i>	1-2	1-2	1-2
<i>Epiaeschna heros</i>	1-2	1-2	1-2
<i>Perithemis domita</i>	0	0	2
<i>Celithemis eponina</i>	0	2-3	2-3
<i>Celithemis fasciata</i>	0	1	1
<i>Orthemis ferruginea</i>	0	0	2
<i>Plathemis lydia</i>	0	0	2
<i>Libellula auripennis</i>	3	3	3
<i>Libellula vibrans</i>	3	3	3
<i>Pachydiplax longipennis</i>	3	3	3
<i>Sympetrum corruptum</i>	0	0	1-2
<i>Sympetrum ambiguum</i>	0	0	1-2
<i>Cannacria gravida</i>	0	2-3	2
<i>Erythrodiplax bernice</i>	3	0	0
<i>Mesothemis simplicicollis</i>	3	3	3
<i>Pantala flavescens</i>	0	0-1	2
<i>Tramea lacerata</i>	1	1	1
<i>Tramea carolina</i>	2-3	2-3	2-3

eponina and *Cannacria gravida*, it perched on the canes. When approached, *T. carolina* would fly rapidly away, then return to its perch, fly slowly around and, if the observer made no motion, would relight. The author has watched individuals perform these movements as many as five times before moving to another perch. This species, and other Trameids observed, moved forward in flight by means of a regular series of upward spurts and downward glidings. The individual beat his wings several times swiftly, which propelled him forward, then, losing momentum, he glided earthward, upon which he again beat his wings and spurred forward. When frightened they darted rapidly upward and forward until out of danger, and then flew in the manner described above. This peculiarity of flight,

combined with the distinguishing reddish-brown spot on the hind wings, made *T. carolina* easily recognized in the field.

SUMMARY

The distribution notes show that although twenty-five species have been found in the Gulf Coast area between New Orleans, Louisiana, and Mobile, Alabama, only twenty species have been observed frequently enough to be limited to definite ecological habitats. In order to recapitulate the distribution of these species, Table 1 has been prepared to indicate the relative abundance of the forms from the Gulf Coast area.

The species are listed in the left-hand column, and in the three columns tabulating abundance in salt areas, brackish areas, and fresh areas, the numbers 1, 2, and 3 are used to indicate the relative abundance of the individual species in the following manner:

1. A more or less rare form, occasionally seen in the area indicated.
2. Common, but never reaching a great abundance.
3. Very common, large numbers always seen.

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