

NOTES ON THE ODONATA OF MAURITIUS.

1. THE GENUS *HEMICORDULIA* SELYS.

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THE late Mr. J. E. H. Roberts delegated to me the task of reporting on a series of collections of Odonata made by Mr. J. Vinson in the island of Mauritius. As further collecting is being carried out by Mr. Vinson and more material continues to reach me I have decided to act on Mr. Roberts' suggestion and to deal with individual genera in a series of short papers, instead of reporting on the collections as a whole. A discussion of the Odonate fauna of Mauritius will form the subject of a final and longer paper.

This first paper deals with the genus *Hemicordulia* Selys, a dominant one in the family COARCTATAE, probably on account of the strong migratory tendencies of some of its species and their very wide distribution. The genus is essentially a Papuan one, but one species at least, *H. asiatica* Selys, has extended into continental Asia and spread right across to the Western Ghats of India and Ceylon. Two others, concerning which there is good evidence to show that they are local descendants of *H. asiatica*, are found in the Mascarene islands and Madagascar, viz. *H. virens* (Rambur) reported only from Mauritius, and *H. similis* (Rambur) from Madagascar and the Seychelles: in all probability *H. similis* will also be found to occur in Mauritius. Both sexes of *H. similis* have been described somewhat imperfectly, but only the female of *H. virens* was known hitherto. Recently Mr. Vinson has taken both sexes of this rare insect and so it is now possible to complete the descriptions. Species of *Hemicordulia* breed in still waters, weedy ponds, lakes or even marshes being preferred, but I have found that in the absence of these, *H. asiatica* will take to breeding in the deep still pools of rivers, as in the Annamalia Hills of south-west India. This species breeds at altitudes varying from 3000 to 7500 ft. in the Nilgiri and Palmi Hills, S. India, but *H. virens* and *H. similis* both breed at much lower levels. The descriptions of these two species follows.

Hemicordulia similis (Rambur).

Corthalia similis Rambur, 1842, *Invs. Néerops*: 147 (Desur. ♀).
Hemicordulia ? *similis* Selys, 1869, *Pollen* and Van Dam, *Madagascar Invs.*: 23.
Hemicordulia ? *similis* Selys, 1871, *Bull. Acad. Belg.* (3) 31: 252.
Hemicordulia ? *similis* Kirby, 1890, *Cat. Odon.*: 47.
Hemicordulia delicata Martin, 1896, *Mém. Soc. zool. France* 6: 105.
Hemicordulia similis Martin (pars), 1906, *Cat. Coll. Selys, Cordulines*: 14.

Male.—Abdomen 32-36 mm. Hind wing 30-32 mm.

Head: labrum olivaceous, labrum and epistome uniform brownish yellow or the base of labrum may be darker; frons in front and laterally bright citron yellow, the upper surface and vertex brilliant metallic peacock blue, occiput brown, eyes probably blue or

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green during life. Prothorax pale brown, the anterior collar yellow. Synthorax reddish brown, the upper half of dorsum metallic peacock-blue, mesepimeron bright citron yellow enclosed broadly by brilliant metallic peacock-blue, the mesepimeron similar but the metallic colour deficient posteriorly and above or there is only a slight metallic reflex posteriorly. The space between the metallic ovals narrowly citron yellow above, reddish brown below. Yellow beneath with a dark transverse line posteriorly. Legs very long and very slim, black, the anterior femora alone ferruginous or ochreous. Wings hyaline; pterostigma blackish brown, very small, barely 1.25 mm. in length; 7 antenodals and 6 or 6 postnodals in forewings, 5 antenodals and 7 postnodals in the hind; discoidal cell in hindwing usually slightly proximal of arculus; 16 or 17 cells in anal loop; membrane short, white. Abdomen dark esely black or with a violaceous reflex on dorsum, this expanding on to sides at the jugal sutures and again at apical ends of segments 3 to 5 and at apical ends only of 6 to 9 and enclosing elongated ventro-lateral spots of bright ochreous; beneath, ochreous with black annules at the junction of segments. Segments 1 and 2 broadly yellow laterally, the latter segment with a narrow black ventro-lateral stripe with metallic blue reflex. Anal appendages and valve of segment 10 black; superior at least three times as long as segment 10, cylindrical, with only a single outward convexity which is limited to the basal half of appendage, which is thereafter directed straight posteriorly and the two appendages, in this portion, rather closely apposed and strictly parallel. Inferior nearly of the same length, about one sixth shorter and with the apex curved up abruptly, as in *H. virens*.

Female.—Abdomen 35 mm. Hind wing 31 mm.

Coloured and marked exactly similar to the male. Wings, in the teneral stage at least, hyaline, uncoloured save at the extreme base, where amber rays extend in the subcostal and cubital spaces to as far as the first antenodal and to the end of membrane in the hind wing. The end of the abdomen stouter and shorter than in *H. virens*, the genital valve at least three-fourths the length of segment 9, its base prolonged end with an angulated ridge basally; its apex very narrowly bitid and for only about one-fifth the length of valve; apical border of segment 9 strongly convex, not advanced at its medial part, as in *H. virens*. Anal appendages fusiform cylindrical, slightly longer than segments 9 and 10 taken together.

Habitat: MADAGASCAR; Ambohimungam, 4 pairs, 4.xii.46, collected by Prof. J. Milloet, to whom I am indebted for one pair. All, unfortunately, are rather teneral, so that it is impossible to say if the wings will develop any amber tinting later on in life. Rambur's holotype female is in the Selysian collection along with 4 males; I have not seen these latter, but from Martin's account in the *Cat. Coll. Selys*, it would appear that they are made up of large and small specimens, the former probably *H. virens*, the latter *H. similis*. A male in the Ris collection, presented to him by Martin, belongs to the small series and is correctly described by Ris as *H. similis*. This is evident from the description of the lateral ochreous markings on segments 4 and 5, their obsolete or narrow character being due to the encroachment of the dorsal black on the sides at the jugal suture as well as at the apical end of segments; the length of the abdomen is also given as only 30 mm., which is correct for *H. similis*, but not for *H. virens*. *H. similis* is a much more distinctive species than *H. virens* and it is easily distinguished both from that species and from *H. asiatica*. Its smaller size, the brightly contrasted yellow and green metallic markings on the sides of the thorax, the lower nodal index and lastly the parallel condition of the apical portions of the anal appendages of the male easily serve to separate that sex, whilst the striking character of the elongated genital valve renders confusion of the females impossible.

PROC. R. ENT. SOC. LOND. (B) 18. Pts. 7-8. (AUG. 1949.)

Hemicordulia virens (Rambur).

Cordulia virens Rambur, 1842, *Ins. Neotrop.*: 147 (Descr. ♀).
Hemicordulia ? *virens* Selys, 1809, *Pollen and Van. Dier. Madagascar. Ins.*: 23.
Hemicordulia ? *virens* Selys, 1871, *Bull. Acad. Belg.* (3) 31: 253.
Hemicordulia ? *virens* Selys, 1874, *Bull. Acad. Belg.* (3) 37: 18.
Hemicordulia virens Kirby, 1890, *Cat. Odon.*: 47.
Hemicordulia virens Martin, 1906, *Cat. Coll. Selys, Cordulines*: 14.

Male.—Abdomen 38–38 mm. Hind wing 35 mm.
 Head: labrum dull yellow, labrum bright ochraceous, epistoma brownish yellow, frons and vertex brilliant emerald green metallic, the lower border of frons marginated narrowly with ochraceous, occiput brown; eyes most certainly emerald green during life. Prothorax brown, posterior lobe evenly rounded, depressed. Synthorax pale yellowish brown or dull ochraceous, the upper third of dorsum, a diffuse area on the upper half of humeral suture and the upper anterior half of metepimeron brilliant emerald green metallic; the mesepimeron also has a golden or coppery metallic reflex over its lower half in certain lights. The whole thorax coated with fine short downy hair, especially thick on dorsum. Legs very long and slender, black, the anterior femora, the extensor surface of the middle femora and the bases of the hind bright ferruginous. Wings hyaline, the extreme base of hind tinted with amber, membranous brown, its base white; pterostigma blackish brown, very short, covering less than 1 cell; 8 antenodals in forewings, 6 in hind, 6 postnodals in forewing, 8–9 in the hind, 18–19 cells in the anal loop, 3 cells in subtriangle, the rest of the venation closely similar to that of *H. asiatica* Selys. Abdomen steely or bronzed black on dorsum black of dorsum on segments 4 to 8 extending on to sides rather broadly at the apical ends so as to interrupt what would otherwise be a continuous lateral yellow stripe; beneath ochraceous, the apical black extending diffusely on to venter on segments 4 to 7. Segments 9 and 10 entirely black. Anal appendages black; superior at least three times as long as segment 10, cylindrical and very sinuous, with a double convexity outwards, the apices gradually tapered and a little obtuse; inferior about one-fifth shorter, an elongated triangular structure with its extreme apex sharply upturned.

Female.—Abdomen 38 mm. Hind wing 34 mm.
 Coloured and marked exactly similar to the male. Wings deeply tinted with amber throughout, but more deeply so in the subcostal and cubital spaces of fore wings and to as far posteriorly as the end of membrane in the hindwings to about the level of the 1st antenodal and half way to discoidal cell. Anal appendages black, about as long as the combined length of segments 9 and 10, cylindrical and fusiform, tapering both basally and apically, the apices slightly obtuse. Genital valves short and deeply bifid, but not quite to base, about half the length of segment 9, the apical border of which is markedly crenate and produced medially.

Habitat: MAURITIUS; Moka, 2 ♂, 6. xii. 45 and 10. xii. 46; 2 ♀, 30. vi. 45 and 20. xii. 46, all coll. J. Vinson. The June female is fully adult, with deeply tinted wings, all others are subadult, but one male approaching aduledge. The holotype female is in the Hope collection, Oxford, and there is another female in the Paris Museum collection, formerly in the Martin collection. The male described above was hitherto unknown and appears to have been confused with that of *H. similis*, its near relative, from which it is distinguished by its larger size and more robust build, the male by its sinuous anal appendages and higher nodal index; the female by the latter character and by the short genital valve which is only half the length of segment 9 and more deeply bifid. Very little separates this species from *H. asiatica* Selys; the anal appendages are perhaps rather longer and more sinuous and the wings always bear some colour-

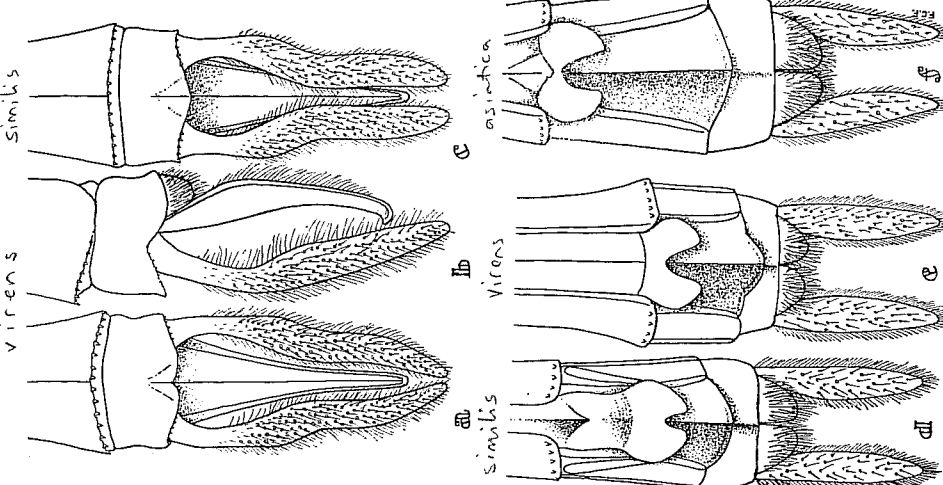


FIG. 1.—(a) Anal appendages of *Hemicordulia virens* (Rambur), dorsal aspect. (b) Right lateral aspect of same. (c) The same of *Hemicordulia similis* (Rambur), dorsal aspect. (d) Female genitalia of *Hemicordulia similis*. (e) The same of *H. virens*. (f) The same of *Hemicordulia asiatica* Selys.

ing, at least at the base, whereas there is never any trace of this in the males of *H. asiatica*; the females of the latter species have the genital valve still shorter and bifold almost to the base. The venation and colouring are identical in the two species, but the female of *H. virens* always has rather extensive colouring of the wings, in striking contrast to the colourless or almost colourless wings of female *H. asiatica*. Thus whilst it might be difficult to differentiate between the males of the two species, especially if at all teneral, there is never any difficulty in separating the females.

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CONTENTS

FRASER, Lt.-Col. F. C., I.M.S. (Retd.), F.R.E.S. PAGE
The *Zygoptera* of Mauritius (Order Odonata) 135-146, 3 figs.



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