

ON THE MALE GENITALIA OF SOME ROBBER-FLIES BELONGING
TO THE SUBFAMILY ASILINAE. [DIPTERA.]

BY G. H. HARDY.

(With twelve Text-figures.)

A study of the male genital forceps of Australian Robberflies belonging to the subgenus *Asilus* has been undertaken for the purpose of establishing a satisfactory method of identifying the described species. A further species with extraordinarily developed male genitalia is described as new.

This opportunity is taken to publish a figure of the male genitalia of *Promachus doddi* Ricardo, which belongs to a genus containing several closely allied species.

Genus *PROMACHUS* Loew.

Obs.—This genus is very scantily represented in the various collections in Australia, and the specimens available for study do not readily conform to the descriptions already published. There are six names representing six supposedly distinct species and the only named specimen in the collections under revision is *P. doddi* Ricardo, which was identified by Miss Ricardo.



Text-fig.1. The male genitalia of *Promachus doddi* Ricardo, seen dorsally. (x 14).

PROMACHUS DODDI Ricardo. (Text-fig. 1).

Promachus doddi, Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 415.

Description.—A male specimen identified by Miss Ricardo has the genitalia quite distinct from that of other species examined in the collections under revision. It contains a pair of widely separated upper forceps, each branch of which is conspicuously kidney-shaped. Seen dorsally, in the centre there are two flat, partly overlapping appendages which are undoubtedly the lamellae. Further parts of the genital organs, usually covered by the forceps, are exposed in this species. The upper forceps apically have a number of long thick bristles, and there are three short bristles on the inner side, directed towards the median line but not meeting. The whole surface is covered with hairs which become stronger apically and merge into bristles.

Obs.—In Mr. F. H. Taylor's collection there are two specimens of this species and one, from which the above description is taken, was identified by Miss Ricardo. Two other species in the same collection are unidentified.

Genus *ASILUS* Linnaeus.

Obs.—White has given a key to the genera of the subfamily *Asilinae*,* and in it the forceps of the male genitalia of the genus *Asilus* are stated to be globular. This character is typical of only a few Australian species and the remainder have male genitalia of remarkably diverse forms. The description "large, brightly coloured species" will also only apply to a few as a number are sombre coloured, and they range in size down to species no bigger than some belonging to the group *Neoitamus*.

The material upon which the following study is based consists of the collections in the Australian and Macleay Museums, the writer's collection which contains species from Western Australia, Tasmania and New South Wales, the specimens from Queensland collected by Mr. F. H. Taylor, and finally a very valuable collection made by Dr. E. W. Ferguson containing species that occur around Sydney and identified by comparison with specimens in the British Museum.

Asilus regius Jaennicke, and *Asilus aureus* White have not been recognised in the above collections.

Characters.—The genus *Asilus* contains two subgenera in Australia. The subgenus *Neoaratus* is represented by one species, *N. hercules* Wiedemann, and is distinguished by the male having the costal border of the wings inflated, and, in addition, each branch of the upper forceps of the male genitalia is bifid. The subgenus *Asilus* contains species without the costal inflation, and the upper forceps of the male genitalia are of various shapes, with or without a process, but not bifid in the known species.

Key to the species of subgenus *Asilus*

1. The forceps of the male genitalia set wide apart and exposing other parts of the genital organs 2.
- The forceps of the male genitalia concealing the other parts of the genital organs 3.
2. The branches of the upper forceps containing an apical process on which is situated a branching appendix. *genitalis*, n.sp.

* Proc. Roy. Soc. Tas., 1917, p. 88.

- The branches of the upper forceps containing an apical process without an appendix *rubrithorax*.
3. The upper forceps attenuated apically 4.
The upper forceps not attenuated apically 6.
4. The attenuated portion of each branch of the upper forceps distinctly forms a process *ferrugineiventris*.
The attenuated portion of the upper forceps forms a continuation of the basal portion and does not form a process. 5.
5. The upper forceps constricted subapically *pelago*.
The upper forceps not constricted subapically but tapering more or less uniformly to the apex. *malleolus, inglorius* and *rufigenis*.
6. The upper forceps ending in a minute projection and each branch of the upper and lower forceps containing three subapical bristles on the ventral side. *blasio*.

The upper forceps more or less rounded and without bristles.

murinus, sydneyensis and *alcetas*.

ASILUS GENITALIS, n.sp. (Text-fig. 2.)

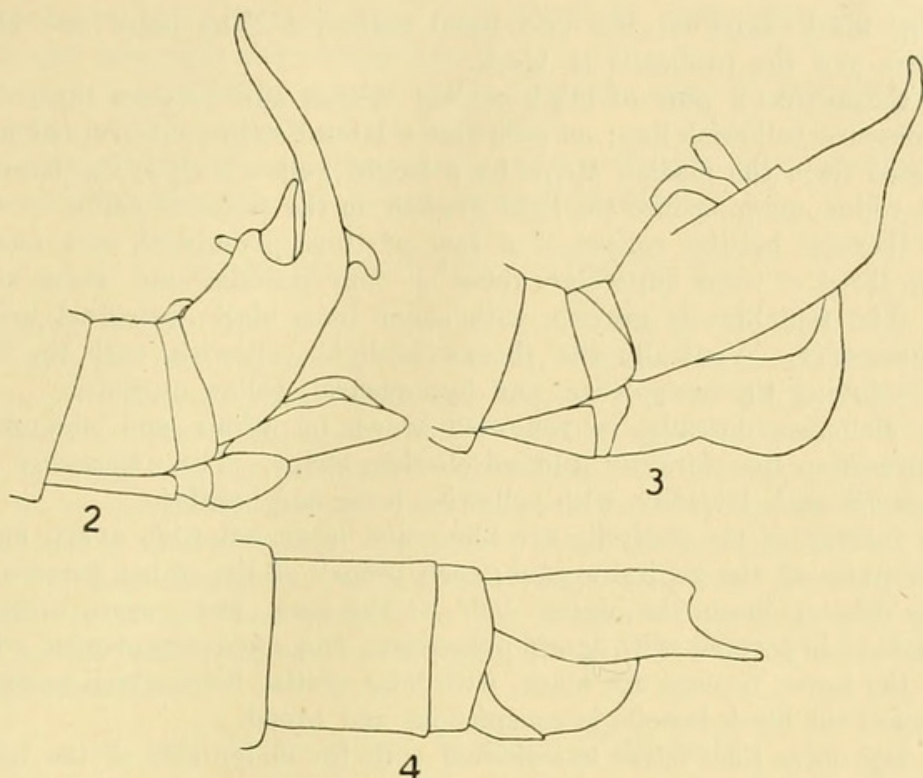
Description.—♂. The head is covered with light yellowish tomentum; the moustache of the same colour contains bristly hairs in the centre; the beard, the bristles and hairs of the occiput are also the same colour; there are a few, reddish, short hairs on the tubercle containing the ocelli. The palpi are deep reddish-yellow, with similarly coloured hairs which, apically, are bristle-like. The antennae are missing in the holotype and partly damaged in one paratype, but in the second paratype they are reddish-yellow, with similarly coloured hairs on the two basal joints. The proboscis is also reddish-yellow but is strongly stained black on the apical half; the hairs are light yellowish.

The thorax has a mixed yellowish and reddish-yellow ground colour, and contains two black median stripes, and an interrupted lateral stripe on each side. Dorsally, the bristles and hairs on the pronotum are yellowish, and on the remainder of the thorax black. The dorsal thoracic bristles consist of two presutural and one anterior to these, three superalar, four postalar and three or four dorsocentral. The scutellum is similar in ground colour to that of the thorax and contains four, black, marginal bristles, but in one of the paratypes there are six reddish bristles on the apical margin. Ventrally the thorax is whitish with very sparse whitish hairs. The metapleural bristles are strong and yellow, and the hypopleural bristles are weak and whitish.

The abdomen, dorsally, is reddish-yellow with similarly coloured pubescence and whitish, bristly, lateral hairs. Ventrally, the abdomen is unicoloured with the under side of the thorax.

The genital organs are very large and the forceps are set wide apart exposing other parts which are hidden in most species of the genus. The lower half of each branch of the upper forceps is produced apically into a very long process which curves upwards, and, near the base of this, there is a short appendix which branches towards the median line and is directed downwards. The lower forceps are short, and the apical prong can be seen diverted so that it points towards the base. The lamella is broad and short, and issues from a two-pronged appendage, the apices of which can be seen between the process and the basal portion of the upper forceps.

The legs have their coxae whitish with yellow hairs and bristles. The pulvilli are yellow and the claws are reddish basally and black apically; the



Text-fig.2. The male genitalia of *Asilus genitilis*, n.sp., seen laterally. (x 6).

Text-fig.3. The male genitalia of *Asilus rubrithorax* Macquart, seen laterally. (x 6).

Text-fig.4. The male genitalia of *Asilus ferrugineiventris* Macquart, seen laterally. (x 14).

remainder of the legs are reddish yellow with similarly coloured bristles. The anterior femora are without spines; the intermediate femora have two rows of spines on the anterior side, one ventral row, one subapical and two median spines on the posterior side; the posterior femora have two rows of bristles on the anterior side, one ventral row and a number of subapical spines.

The wings are hyaline with a slight yellowish tinge.

The female is unknown.

Length, 36 mm.

Hab.—Queensland. Two specimens are without labels; the specimen in the Macleay Museum is from Cairns.

Type.—The holotype male, in the Australian Museum, was presented by Mr. F. H. Taylor. A paratype is in Mr. Taylor's collection and a second paratype is in the Macleay Museum.

ASILUS RUBRITHORAX Macquart. (Text-fig 3.)

Asilus rubrithorax, Macquart, Dipt. Exot., i. (2), 1838, p. 143; Walker, List Dipt. Brit. Mus., vii., suppl. 3, 1855, pp. 729 and 735; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 441.

Description.—Two specimens, identified from the description only, are somewhat similar in appearance to *Asilus murinus* Macquart, larger in build and distinctly different in the male genitalia.

♂. The head is light yellowish; the moustache consists of some black hairs, below which there are much longer bristly white hairs. The hair on the vertex and a little of the hair on the occiput is black; the hair on the remainder of the head, including the beard, is light yellowish or white. The antennae are black,

containing black hairs on the two basal segments. The palpi are black with black hairs and the proboscis is black.

The thorax has a pair of black median stripes and between them there is a slightly obscure yellowish line; on each side a lateral stripe, interrupted anteriorly, is separated from the median stripe by a bright yellow stripe; the lateral border is bright yellow merging into the light greyish on the postalar callus.

The thoracic bristles consist of a row of three presutural with one anterior to these, three or four superalar, three or four postalar and about six dorso-central. The scutellum is greyish, with about four, black, marginal bristles and black pubescence. Ventrally the thorax is light yellowish, with the hairs and bristles, including the metapleural and hypopleural, yellow or white.

The abdomen, dorsally, is yellowish brown in colour and obscurely black along the median line forming a broad obsolete stripe. The pubescence is mostly black but yellowish laterally, with yellowish hairs and bristles.

The forceps of the genitalia are black and large, set wide apart, and expose the other parts of the genital organs; each branch of the upper forceps contains a process issuing from the upper half at the apex and curves upwards; the whole surface is covered with black pubescence and some conspicuous white pubescence; the lower forceps are black, with long whitish hairs which become bristly at the apex; the black lamella is conspicuous and broad.

The legs have their coxae unicoloured with the under side of the thorax, and contain long whitish hairs and bristles; the femora are red with a black stripe on the anterior side; the tibiae are red with black at the apices; the tarsi are black; the claws are red at the base and black at the apex; the pulvilli are yellow. The pubescence is mostly yellowish on the femora and tibiae, and black on the tarsi. There are some long, black, bristly hairs on the anterior femora which are spineless; the intermediate femora contain two rows of spines on the anterior side, one ventral row and one row on the posterior side; the posterior femora contain two rows of spines on the anterior side and a few subapical spines.

Length of male, 30 mm.

Hab.—New South Wales: Hampton, near Rydal—one male specimen collected by Dr. R. J. Tillyard during January, 1918. There is also a male specimen in the Macleay Museum, with the genitalia distorted, from Walcha; the label indicates the month "November," but the year of capture is not specified.

ASILUS FERRUGINEIVENTRIS Macquart. (Text-fig. 4.)

Asilus ferrugineiventris, Macquart, Dipt. Exot., suppl. 4, 1850, p. 92, Pl. ix, fig. 1.

Asilus hyagnis, Walker, Ins. Saund. Dipt., 1851, p. 139; Walker, List Dipt. Brit.

Mus., vii., suppl. 3, 1855, pp. 730 and 739; Ricardo, Ann. Mag. Nat.

Hist., (8), xi., 1913, p. 445.

Synonymy.—The description of *A. ferrugineiventris* Macquart conforms to specimens of *A. hyagnis* Walker in all essential points.

Status.—Although the synonymy is given here with the writer's convictions, the identity of the species with *A. hyagnis* Walker is accepted upon the evidence that Mr. Taylor sent to Miss Ricardo some specimens from a long series collected in Queensland and these were identified as *A. hyagnis* Walker. In consequence, the specimens retained were labelled as such and were subsequently examined by the writer. The retained specimens belong to only one species and a male was selected for inclusion in the collection of the Australian Museum. A

second specimen, taken near Sydney, was found to agree with the Queensland specimens and also with the descriptions.

Description.—A straight process issues from the apex of each branch of the upper forceps of the genitalia at the lower half.

Hab.—New South Wales, Queensland and two female specimens in the Macleay Museum from King George Sound, Western Australia.

ASILUS PELAGO Walker. (Text-fig. 5.)

Asilus pelago, Walker, List. Dipt. Brit. Mus., ii., 1849, p. 419; and vii., suppl. 3, 1855, pp. 729, 731, and 735; Schiner, Verh. z.-b. Ges. Wien, xvii., 1867, p. 400; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 443.

Description.—The attenuated portion of the upper forceps of the male genitalia is short, slightly constricted subapically, and broadly rounded at the apex; it is conspicuously deflected from the considerably arched basal portion; the whole area is covered with a vestiture of short bristly appearance.

Hab.—Western Australia: one male and one female from Perth; South Australia: two males and four females in the Macleay Museum probably belong here, but neither male specimen has the genitalia in sufficiently good condition for positive determination.

ASILUS MALLEOLUS Walker. (Text-fig. 6.)

Asilus malleolus, Walker, List Dipt. Brit. Mus., ii., 1849, p. 418; and vii., suppl. 3, 1855, pp. 729, 732 and 736.

Asilus discutiens, Walker, Ins. Saund. Dipt., 1851, p. 135; Walker, List Dipt. Brit. Mus. vii., suppl. 3, 1855, pp. 729 and 736; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 445; White, Proc. Roy. Soc. Tas., 1916, p. 182.

Asilus unilineatus, Macquart, MS. name.

Synonymy.—The above synonymy is accepted on the authority of Miss Ricardo. *A. malleolus* Walker takes precedence over *A. discutiens* Walker, under which name the species has been well known hitherto.

Description.—The upper forceps of the male genitalia are attenuated and curve downwards; on the dorsal surface of the genitalia there is a hump which partly conceals the lamella.

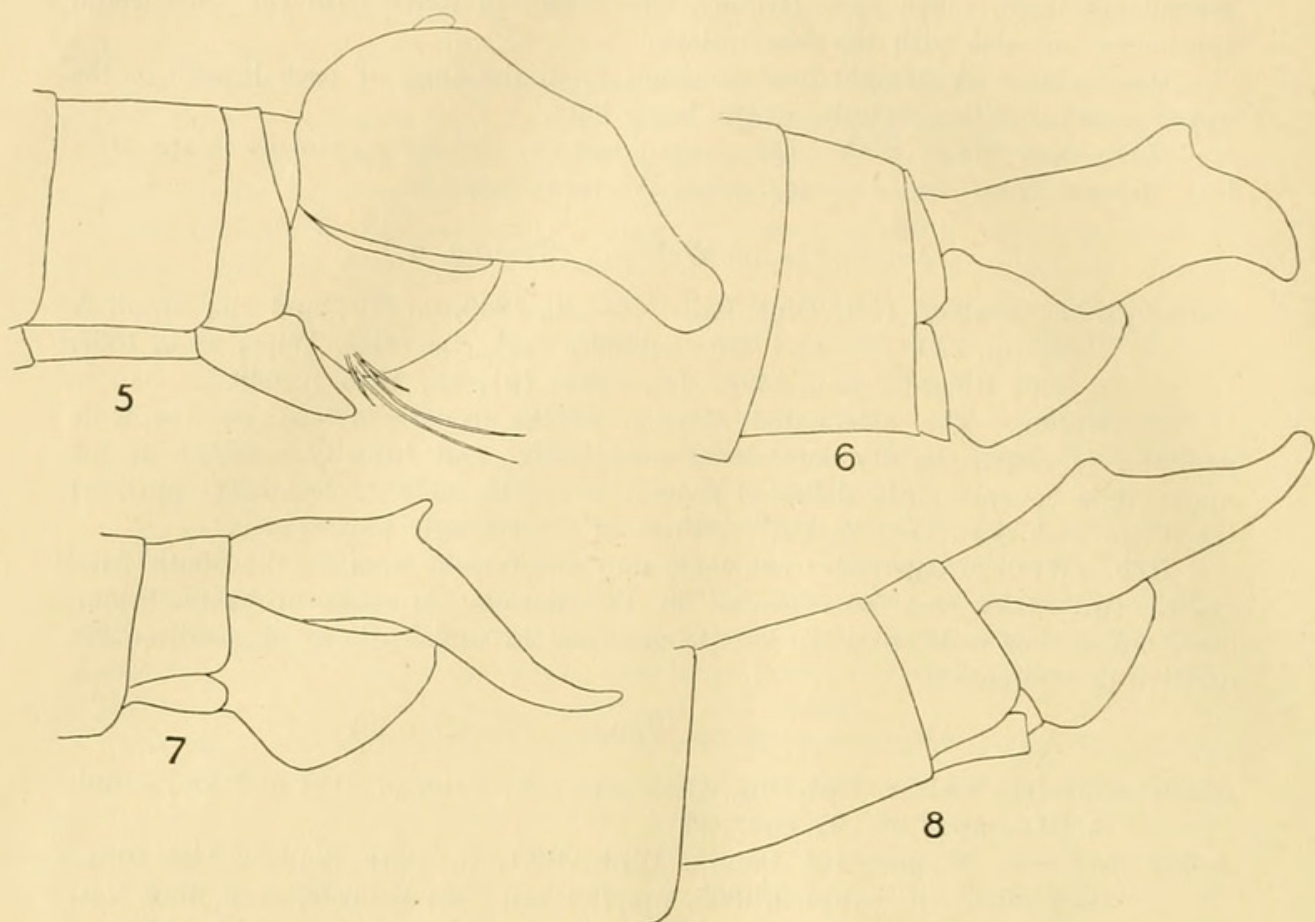
Hab.—New South Wales. Miss Ricardo reports the species from "Van Dieman's Land" which locality is usually taken to be Tasmania; there is, however, a "Van Dieman" marked on some old maps in the north of Australia, and this may be the locality of the many species recorded from Tasmania but only known from the northern half of Australia.

ASILUS INGLORIUS Macleay. (Text-fig. 7.)

Asilus inglorius, Macleay, in King's Narr. Surv. Austr., ii., 1837, p. 467; Wiedemann, Auss. Zweifl. Ins., ii., 1830, p. 644; Walker, List Dipt. Brit. Mus., ii., 1849, p. 423; and vii., suppl. 3, 1855, pp. 730, 734 and 738; Schiner, Verh. z.-b. Ges. Wien, xvi., 1866, p. 690; Schiner, Reise Novara, Dipt., 1868, p. 183; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 439.

Asilus amycla, Walker, List Dipt. Brit. Mus., ii., 1849, p. 423 (♀); and vii., suppl. 3, 1855, pp. 730, 734 and 741.

Asilus centho, Walker, *Ibid.*, ii., 1849, p. 431 (♀); and vii., suppl. 3, 1855, pp. 730, 733 and 740.



Text-fig.5. The male genitalia of *Asilus pelago* Walker, seen laterally. (x 14).

Text-fig.6. The male genitalia of *Asilus malleolus* Walker, seen laterally. (x 14).

Text-fig.7. The male genitalia of *Asilus inglorius* Macleay, seen laterally. (x 14).

Text-fig.8. The male genitalia of *Asilus rufiventris* Macquart, seen laterally. (x 14).

Asilus planus, Walker, *Ibid.*, vii., suppl. 3, 1855, pp. 730 and 741 (♀).

Asilus sericeiventris, Macquart, MS. name.

Synonymy.—The above synonymy is given on the authority of Miss Ricardo, who accepts Schiner's authority for the identification of *Asilus inglorius* Macleay.

The species referred here is the only known form to which Macleay's description can be applied.

Description.—The upper forceps of the male genitalia are long, slender and attenuated apically; the attenuated portion is deflected basally and then curves back to the horizontal line at the apex. A hump at half the length on the dorsal surface partly conceals the lamella.

Hab.—Queensland, New South Wales, Victoria, South Australia and Western Australia. These States are represented by specimens in the Australian and Macleay Museums.

ASILUS RUFIVENTRIS Macquart. (Text-fig. 8.)

Asilus rufiventris, Macquart, *Dipt. Exot.*, i., (2), 1838, p. 144; Walker, *List Dipt.*

Brit. Mus., vii., suppl. 3, 1855, pp. 730 and 739; Ricardo, *Ann. Mag.*

Nat. Hist., (8), xi., 1913, p. 442.

Asilus alligans, Walker, *Ibid.*, vii., suppl. 3, 1855, pp. 730, 734 and 740.

Synonymy.—The description of *A. alligans* Walker conforms to *A. rufiventris* Macquart, and therefore the name is placed here as a synonym of that species. Miss Ricardo states that the type is lost.

Description.—Each branch of the upper forceps of the male genitalia has an attenuated apex which curves upwards apically; a hump on the dorsal surface of the genitalia, at half the length, partly conceals the lamella.

Hab.—Queensland, New South Wales, Victoria and South Australia.

ASILUS BLASIO Walker. (Text-fig. 9.)

Asilus blasio, Walker, List Dipt. Brit. Mus., ii., 1849, p. 441; and vii., suppl. 3, 1855, pp. 730, 731 and 738; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 444.

Status.—The species was described from Western Australia, but Miss Ricardo redescribed it from a Victorian specimen as the type is very old and worn. It is possible that the specimen described by Miss Ricardo is closely allied to, but distinct from, Walker's species. A series from New South Wales is also referable here and is used for the study of the genitalia. A male specimen from Perth, Western Australia, differs in the genitalia by having the dorsal digitate process missing; the specimen has its genitalia broken on one side but the other side appears to be complete, as a line of fracture cannot be traced; nevertheless, it is advisable to keep these specimens under one specific name until the differences in the male genitalia can be confirmed with new material from Western Australia.

Description.—The upper forceps of the male genitalia are more or less elliptical in shape. Each branch of the upper and lower forceps contains a minute projection at the extreme apex, and three conspicuous subapical bristles on the ventral side. On the dorsal edge of the upper forceps there is a digitate process situated at about three-quarters the length, which, however, is missing in the specimen from Western Australia; this specimen is also very much brighter than those from New South Wales.

Hab.—Western Australia: Perth, one male specimen; New South Wales: Blue Mountains, Blackheath, a series of each sex collected during November, 1919; Victoria: Dandenong Ranges (Ricardo).

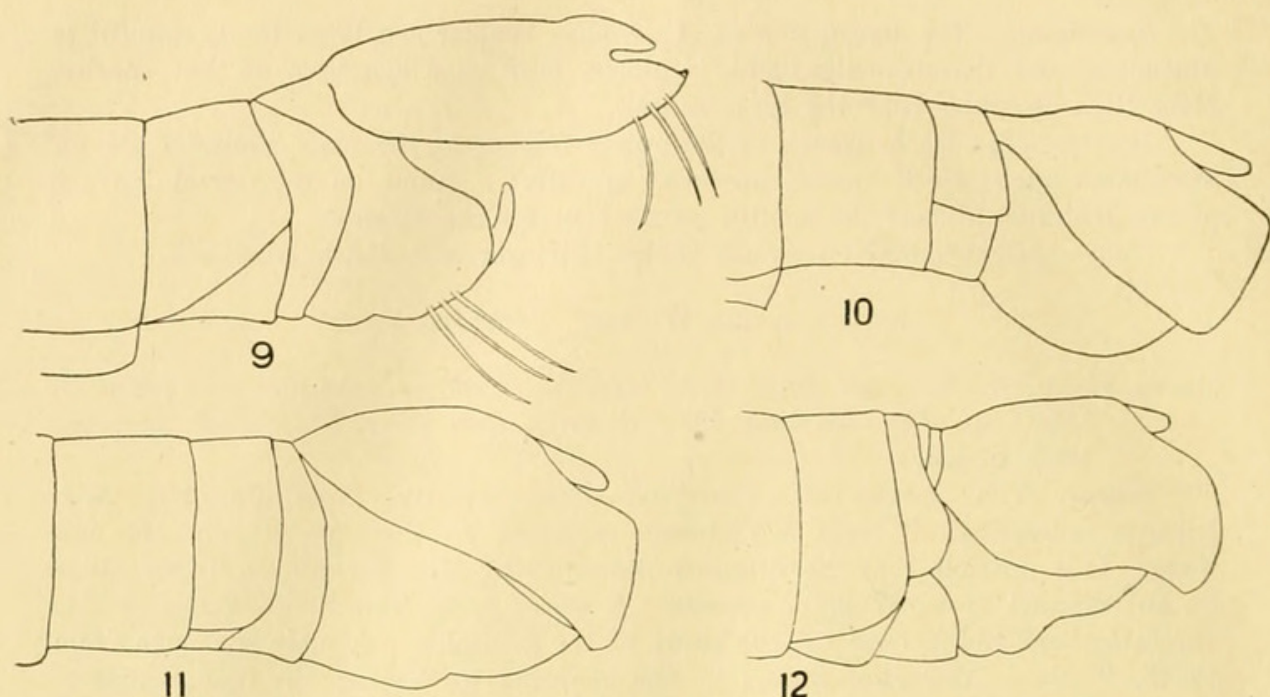
ASILUS MURINUS Macquart. (Text-fig. 10.)

Asilus murinus, Macquart, Dipt. Exot., i., (2), 1838, p. 144; Walker, List Dipt. Brit. Mus., vii., suppl. 3, 1855, pp. 729 and 736; Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 440.

Asilus murinus, var. Macquart, *ibid.*, suppl. 2, 1847, p. 45.

Description.—The shape of the male genitalia is more or less globular, a little smaller in proportion to but scarcely differing from that of *A. sydneyensis* Macquart. The Tasmanian *A. alcetas* Walker also contains similar shaped genitalia and, moreover, there does not appear to be any structural difference between the three species.

A. murinus Macquart is a dingy coloured species, whilst *A. sydneyensis* Macquart is brighter and has a reddish tinge on the abdomen; they are both from New South Wales. *A. alcetas* Walker from Tasmania, is similar to *A. murinus* Macquart, and much smaller in size.



Text-fig.9. The male genitalia of *Asilus blasio* Walker, seen laterally. (x 14).

Text-fig.10. The male genitalia of *Asilus murinus* Macquart, seen laterally. (x 14).

Text-fig.11. The male genitalia of *Asilus sydneyensis* Macquart, seen laterally. (x 14).

Text-fig.12. The male genitalia of *Asilus alcetas* Walker, seen laterally. (x 14).

ASILUS SYDNEYENSIS Macquart. (Text-fig. 11.)

Asilus nigritarsis, Macquart, Hist. Nat. Dipt., i., 1834, p. 304 (preoccupied); Walker, List Dipt. Brit. Mus., vii., suppl. 3, 1855, pp. 729 and 736; v.d. Wulp, Cat. Dipt. S.Af., 1896, p. 93.

Asilus sydneyensis Macquart, Dipt. Exot., i., (2), 1838, p. 144; Walker, *ibid.*, ii., 1849, p. 425; and vii., suppl. 3, 1855, pp. 730 and 739.

Itamus sydneyensis, Schiner, Novara Reise, Dipt., 1868, p. 189.

Neoitamus sydneyensis, Kertész., Cat. Dipt., iv., 1909, p. 294.

Asilus sydneyensis, Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 442; White, Proc. Roy. Soc. Tas., 1916, p. 182.

Asilus jacksonii, Macquart, Dipt. Exot., i., (2), 1838, p. 145; Walker, *ibid.*, ii., 1849, p. 451; and vii., suppl. 3, 1855, pp. 730, 733 and 740.

Asilus tasmaniae Macquart, Dipt. Exot., i., (2), 1838, p. 145; Walker, *ibid.*, vii., suppl. 3, 1855, pp. 729 and 735.

Aratus? tasmaniae, v.d. Wulp., Term. Fuz., xxi (1), 1898, p. 237.

Asilus amythaon, Walker, *ibid.*, ii., 1849, p. 423.

Asilus maso, Walker, *ibid.*, ii., 1849, p. 424.

Synonymy.—The name *Asilus nigritarsis* was used by Wiedemann in 1821 for *Dasypogon* (now *Mallophora*) *nigritarsis* Fabricius from America. The synonymy is given on the authority of Schiner and Miss Ricardo.

Description.—The shape of the male genitalia is more or less globular and similar to but larger than that of *A. murinus* Macquart, under which species further particulars will be found.

Hab.—New South Wales. In the collections under revision the specimens with locality labels are invariably from New South Wales. The Tasmanian records are evidently incorrect.

ASILUS ALCETAS Walker. (Text-fig. 12.)

Asilus alcetas, Walker, List Dipt. Brit. Mus., ii., 1849, p. 425; and vii., suppl. 3, 1855, pp. 729, 732, and 736.

Itamus alcetas, Schiner, Verh. z.-b. Ges. Wien., xvii., 1867, p. 408.

Neoitamus alcetas, Kertész, Cat. Dipt., iv., 1909, p. 290.

Asilus alcetas, Ricardo, Ann. Mag. Nat. Hist., (8), xi., 1913, p. 447; White. Proc. Roy. Soc. Tas., 1916, p. 181.

Asilus trachalus, Walker, Ins. Saund. Dipt. 1851, p. 143; Walker, List Dipt. Brit. Mus., vii., suppl. 3, 1855, pp. 730 and 738.

Synonymy.—The synonymy is given on the authority of Miss Ricardo, who states that the species referred by Schiner to the genus *Itamus*, now *Neoitamus*, must be an altogether different species from the type. Although this is probably correct, there is not sufficient information in the description to allow Schiner's species to be identified with any known species of *Neoitamus* and, moreover, *Asilus alcetas* Walker has a very striking resemblance to *Neoitamus*.

Description.—The shape of the male genitalia is more or less globular and similar to that of *A. murinus* Macquart, under which further particulars are given.

Hab.—Tasmania: Mount Arthur, one male and one female collected by Mr. F. M. Littler, to whom the writer is indebted for these specimens now in the collection of the Australian Museum. This is the only species of the genus definitely known from the State.



Hardy, George Hudleston Hurlstone. 1920. "On the male genitalia of some robber-flies belonging to the subfamily Asilinae [Diptera]." *Proceedings of the Linnean Society of New South Wales* 45, 250–259.

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