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# A REVISION OF THE AUSTRALIAN GYRINIDAE.

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Determination of Australian Gyrinidae is difficult. Publications on this family are very scattered and nowhere is there a comprehensive paper on this fauna. There are two handbooks on Australian insects,<sup>1</sup> but in both the Gyrinidae are treated only cursorily. In the Catalogue of the Described Coleoptera of Australia by George Masters (*Proc. Linn. Soc. N.S.W.*, Vol. 10, 1885) nearly all species named up to that time are registered, but without critical selection, and several species are recorded more than once under different names, even in different genera. In the *Coleopterorum Catalogus*, Pars 21, 1910, Ahlwarth repeats many of these mistakes, as at that time the complicated synonymy of several Australian species was not settled in a satisfactory manner.

In order to relieve this situation, I intended to make a study of the Australian species of Gyrinidae many years ago, and my request for material was answered generously by the Australian museums, which placed at my disposal the specimens of the family represented in their collections. Unfortunately, the material assembled at that time was not sufficient, and I was forced to delay my task until 1938, when, through the kindness of Dr. P. J. Darlington, junior, I received for study a very numerous collection of Australian Gyrinidae captured by him during the Harvard Expedition, 1931-1932, now in the Museum of Comparative Zoology at Harvard College, Cambridge (Massachusetts).

This material, augmented by supplementary series from other collections, allowed me to undertake a thorough revision of the Australian representatives of the family, the accomplishment of which was again delayed, as war arose, and could be finished only now despite many difficulties.

The present paper comprises all species of the family known to occur on the Australian continent and the adjacent islands, except those which are recorded from these countries evidently in error. The keys will enable the student to make correct determinations of genera and species, and every species is furnished with, I believe, a rather complete bibliography, by which I hope all synonymic questions will be settled in a satisfactory manner. All records of Australian Gyrinidae, which came to my knowledge, are recorded, thus illustrating the distribution of the different species, and in an appendix are discussed zoogeographical and phylogenetical questions in connexion with the Australian gyrinid fauna.

The author makes acknowledgments to all those by whose assistance he was enabled to make this study, especially to Dr. P. J. Darlington, jr., of the Harvard College at Cambridge, Massachusetts, for the specimens collected during his trip to Australia in 1931-1932. Moreover, I am greatly obliged to the authorities of the Queensland Museum at Brisbane, the Australian Museum and the Macleay Museum at Sydney, the South Australian Museum at Adelaide, the British Museum in London, the Naturhistoriska Riksmuseum at Stockholm, the Deutsches Entomologisches Institut at Blücherhof, and many others for loan of material and other kindnesses. I am especially indebted to Prof. Richter and Dr. Elli Franz, of the Senckenberg Museum at Frankfurt-on-Maine, for preservation of my collection, as without their intervention the latter would have been probably lost by the events of the war, in which case I would have been prevented from further study of the family.

<sup>1</sup>Froggatt, W. W.: Australian Insects. Sydney, 1907.

Tillyard, R. J.: The Insects of Australia and New Zealand. Sydney, 1926.

*Key to Australian Subfamilies and Genera.*

1. Suture of elytra with a small border. Length<sup>1</sup> 4 to 6.5 mm. (Gyrininae.) ..... 2  
 2. Length 4 to 4.5 mm. Sides not bordered with yellow ..... *Gyrinus*  
 2'. Length 5.5 to 6.5 mm. Sides bordered with yellow ..... *Aulonogyrus*  
 1'. Suture of elytra not bordered. Length more than 6.5 mm. (Enhydrinae.) ..... 3  
 3. Scutellum visible ..... *Macrogyrus*  
 3'. Scutellum invisible ..... *Dineutus*

Genus *Gyrinus* Linn., 1767.<sup>2</sup>

Size 3.5 to 8 mm., most of the species measuring about 5 mm. Dorsal eye anterior to ventral eye. Pronotum marked by an impressed and mostly punctate line along the lateral portion of the anterior margin, by a more or less impressed transversal groove on the disc, and by an oblique lateral groove on both sides of the posterior portion. Bordered with yellow only exceptionally. Propygidium not or only slightly trilobed. Anterior legs slender and but scarcely modified.

This genus, represented in Australia practically only by one species,<sup>3</sup> has a world-wide distribution. The most specialized species live in the Neotropic region, whence 2 subgenera are recorded (*Neogyrinus* Hatch 9, *Oreogyrinus* Ochs 16 species). The most numerous is the Holarctic group (Nearctic 44, Eurasian 18, East-Asiatic 9 species, including the subgenus *Gyrinulus* Zaitzev). The Australian representative belongs to the Gondwana group (Ethiopic 9, Madagascan 4, Indo-Australian and Pacific 8 species).

*Gyrinus convexiusculus* Macleay.

*Gyrinus nitidulus* Aubé, 1838, Spec. Col., 6, 700 (partim); Motsch., 1861, Bull. Soc. Imp. Moscou, 34, 109.

*convexiusculus* Macleay, 1873, Trans. Ent. Soc. N. S. Wales, 2, 128.

*huttoni* Pascoe, 1877, Ann. Mag. Nat. Hist., (4) 19, 141; Broun, 1880, Man. N. Zeal. Col., p. 76.

*simoni* Rég., 1883, Ann. Soc. Ent. France, (6) 3, 163.

*convexiusculus* Rég., 1883, Ann. Soc. Ent. France, (6) 3, 166, pl. 6, f. 88; Fauvel, 1883, Rev. Ent., 2, 349; Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 474.

*simoni* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 474.

*convexiusculus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.

*huttoni* Rég., 1886, Ann. Soc. Ent. France, (6) 6, 257, 271.

<sup>1</sup>All measurements are taken from anterior margin of labrum to the tip of elytra, not including the protruding portion of abdomen.

<sup>2</sup>*Gyrinus* was first mentioned by Linnaeus in 1733 in ed. 1 of his *Systema Naturae*, referring to the insect which is regarded now as the type of the genus and of the family. In 1758, however, in the 10th edition, which is the base of modern nomenclature, the author placed this animal in the genus *Dytiscus*, and in ed. 12, 1767, he reestablished the genus *Gyrinus*. Meantime, in 1762, the latter was perfectly described by Geoffroy in his "Histoire abrégée des insectes qui se trouvent aux environs de Paris". However, this author did not use binominal nomenclature in this publication, which is ineffective according to the Rules of Nomenclature. Recently (*Ann. Mag. nat. Hist.*, ser. 11, vol. 12, 1945, p. 110, J. Balfour-Browne is inclined to ascribe the authorship of *Gyrinus* to O. F. Müller, who in his doubtlessly binominal publication of 1764 (*Fauna Insectorum Fridrichsdalina*) gives a recapitulation of the classification of Geoffroy, and cites *Gyrinus* on p. XVII, Nr. 50, accompanied by a short diagnosis. I was ready to follow the opinion of Mr. J. Balfour-Browne when Mr. Per Brinck, a very ardent Swedish entomologist, drew my attention to the fact that in the main part of Müller's publication there is to be read on p. 19, Nr. 193: "*Dytiscus natator* ovatus glaber, antennis capite brevioribus obtusis", from which it seems that Müller himself disowned a generic separation of *Gyrinus*. In this case the mentioning of *Gyrinus* by Müller on p. XVII is to be regarded as a simple citation without the intention of confirming a genus, wherefrom results that *Gyrinus* Linn., 1767, would be the first exact quotation of the genus.

<sup>3</sup>In older publications several species are recorded as *Gyrinus*, which are now placed in other genera established later on, viz.: *Aulonogyrus strigosus*, *Macrogyrus oblongus*, *Macrogyrus striolatus*, *Dineutus australis*.

- convexiusculus* Sév., 1889, Ann. Soc. Ent. Belge, 33, 162.  
*huttoni* Sév., 1889, Ann. Soc. Ent. Belge, 33, 164.  
*simoni* Sév., 1889, Ann. Soc. Ent. Belge, 33, 167.  
*convexiusculus* Sév., 1890, Bull. Soc. Ent. Belge, 34, 194.  
*simoni* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 678, 743.  
*convexiusculus* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 743.  
*huttoni* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 745.  
*convexiusculus* Fauvel, 1903, Rev. Ent., 22, 254; Jacobs, 1905, Käfer Russl., p. 438; Rég., 1907, Ann. Soc. Ent. France, 76, 169, 171.  
*simoni* Rég., 1907, Ann. Soc. Ent. France, 76, 169.  
*convexiusculus* Zaitzev, 1908, Rev. Russe Ent., 7, (1907), 242; Ahlw., 1910, Col. Cat., 21, 18.  
*simoni* Ahlw., 1910, Col. Cat., 21, 24.  
*convexiusculus* Mjög., 1916, Ark. Zool., 10, 9.  
*simoni* Mjög., 1916, Ark. Zool., 10, 9.  
*convexiusculus* Zimmerm., 1917, Ent. Mitt., 6, 163; Peschet, 1923, Opusc. Inst. Sci. Saigon, 1, 7; Ochs, 1924, Ent. Bl., 20, 229; Winkler, 1924, Cat. Col. Pal., 2, 239.  
*huttoni* Till., 1926, Ins. Austral. N. Zeal., 194.  
*convexiusculus* Ochs, 1926, Ent. Z. Ffm., 40, 114; Ochs, 1927, Suppl. Ent., 15, 115, 121; Ochs, 1928, Ent. Bl., 24, 42; Ochs, 1929, Ent. Bl., 25, 197; Ochs, 1929, Rec. Ind. Mus., 31, 241, 246, 248; Ochs, 1930, Cat. Ind. Ins., 19, 5; Ochs, 1931, Arch. Hydrobiol., Suppl. 8, 462, 464, 466, 477, 478, 481; Ochs, 1931, Lingnan Sci. J., 7, (1929), 716; Wu, 1932, Peking Natur. Hist. Bull., 6, 65; Cheo, 1933, Peking Natur. Hist. Bull., 7, 317; Cheo, 1934, Peking Natur. Hist. Bull., 8, 212, 218, pl. 2, f. 7, 28; Ochs, 1935, Rev. Ent., 5, 125; Bertr., 1935, Arch. Hydrobiol., Suppl. 14, 218, pl. 3 f. 1; Ochs, 1940, Ark. Zool., 32 A, Nr. 14, 3; Corbet, 1945, Entomologist, p. 2; J. Balf.-Browne, 1945, Entomologist, p. 3.

Length 3.5 to 4.75 mm. Oval, somewhat elongate, attenuated to both ends, rather convex. Upper surface shining, black, bronzed laterally; beneath black, last abdominal segment darkly rufous, epipleura more or less and legs rufescent. Elytral apex somewhat obliquely truncate, slightly convex, exterior angle obtuse, broadly rounded, almost obliterated, sutural angle almost rectangular, also rounded. Serial punctures on the elytra fine near the suture and strongly reduced towards the apex, the outer ones larger and more deeply impressed. Side margin of elytra moderately broad, nearly parallel from base to apex. Aedeagus of the male gradually narrowing from the base towards the middle, distal half nearly parallel, tip rounded.

Type locality is Gayndah on the Burnett River in Queensland. I have seen specimens from Cairns, Brisbane and Sydney. The species is widely distributed and was recorded from Ceylon, India, Tibet (?), S. China, Sumatra, Java (?), New Zealand and New Caledonia.

Although there is some variability among the specimens from different localities, I was not able to find a racial or even a specific difference. Of the Australian specimens, those from Cairns are the smallest, the largest specimens in my collection being those collected near Sydney.

Régimbart, in his monograph, has mentioned a second Australian species, *G. simoni*, which, according to his description, would be larger than *G. convexiusculus*, less convex and more attenuated to both ends. Moreover, the epipleura are said to be more distinctly reddish, the two last abdominal segments brightly red beneath, elytra more distinctly truncate, their outer angle less rounded, outer stria punctures less impressed, lateral margin narrower and reaching the middle of truncature.

All these characters were found to be variable in large series of *G. convexiusculus* to a certain degree, from which I believe that *G. simoni* cannot be considered a distinct species. A specimen in the collection of the Deutsches Entomologisches Institut at Dahlem, near Berlin, which corresponded very well with the description of *G. simoni*, did, however, not appear to represent a distinct species when compared with *G. convexiusculus*. Another specimen seen, belonging to the Hamburg Museum (ancient collection Godeffroy) and determined by Régimbart himself as *G. simoni*, was more convex than *G. convexiusculus* generally, with totally dark epipleura, from which it appears that even the author was not able to distinguish with certainty his own species. Some specimens in my collection, which I had received from an Australian museum, labelled Queensland, Sandgate 3.8.1913 (H. Pottinger), might belong as well to *G. convexiusculus* as to *G. simoni*, so I am inclined to consider the latter only a synonym of the former.

#### *Gyrinus sericeolimbatus* Rég.

This species is not yet recorded from Australia, but having a similar distribution to *G. convexiusculus* and having been collected in Papua, Rawlinson Range, it might possibly occur also somewhere in N.E. Australia. *G. sericeolimbatus* is easily recognizable and can be characterized briefly as follows: Length 3.5 to 4.5 mm., shortly oval, strongly convex, 7th interstice on elytra evidently convex, upper surface strongly alutaceous and therefore of a silky lustre, sides of elytra broadly bronzed.

#### *Gyrinus ahlwarthi*, n. sp.

I add here the description of a new species of *Gyrinus*, which, although not Australian, is very near to *G. convexiusculus*.

♀. Length 4 mm. Oval, slightly elongate, attenuated to both ends, exceptionally convex. Upper surface shining, black with bluish reflections, laterally slightly bronzed; under-surface black, epipleura slightly rufescent, legs and the last two abdominal segments rufous. Elytral apex somewhat obliquely truncate, exterior angle obtuse, slightly rounded, sutural angle almost rectangular, shortly rounded. Serial punctures distant and fine near the suture and strongly reduced towards the apex, outwards more approximate, larger and more strongly impressed; outer interstices strongly convex. Side margin very narrow, nearly parallel from base to apex.

Type locality.—Dutch New Guinea, Samberi, 25.vi.1910 (Moszkowski, Nr. 38).

Type.—One ♀ in the Zool. Museum of the University of Berlin; paratype in my collection. The specimens were labelled by Ahlwarth and marked by him as representing a new species.

*G. ahlwarthi* is closely allied to *G. convexiusculus* but specifically different at all events. It is easily to be distinguished by its shorter and much more convex body. The two last abdominal segments are bright red beneath, the upper surface with a bluish hue and the elytra less bronzed laterally.

Even more convex than *G. gestroi* from Japan, which, however, is broader and not so regularly oval and has the outer serial punctures less impressed. Also more convex than *G. nitidulus* (Mauritius and Bourbon), but the side margin of elytra not enlarged and bent upwards posteriorly as in the latter.

#### Genus *Aulonogyrus* Rég., 1883.<sup>1</sup>

Size 4.5 to 10 mm., most of the species measuring about 6 mm. Dorsal eye scarcely anterior to ventral eye. Pronotum smooth. Elytral striae present as deep furrows

<sup>1</sup> The first to use the name *Aulonogyrus* was Motschulsky (1853, Hydrocanth. Russie, p. 9). As his publication is, however, not accompanied by any indication, diagnosis or description, it is a nomen nudum according to the Rules of Nomenclature, and authorship is to be credited to Régimbart, who added to the name a perfect description in part 2 of his Monograph on the Gyrinidae (cf. Balf.-Browne, Ann. Mag. Nat. Hist., ser. 11, vol. 12, 1945, p. 106).

laterally and as finer opaque or metallic lines towards the suture. Frequently bordered with yellow. Propygidium strongly trilobed. Anterior legs slender and scarcely modified.

This genus is certainly of Gondwana origin, as proved by its distribution. Its centre of dispersal is in the Ethiopian region (28 spec.), *A. insularis* was recently described by Mr. Brinck from the island of St. Helena, 2 species are Mediterranean, 4 very developed species are Madagascan, 1 is recorded from Ceylon and S. India, 1 from N. Caledonia, 1 from Australia.

***Aulonogyrus strigosus* (Fabr.).**

*Gyrinus strigosus* Fabr., 1801, Syst. Eleuth., 1, 276; Schönh., 1808, Syn. Ins., 1, 2, p. 39;

Forsberg, 1821, Nov. Act. Upsal., 8, 312.

*Gyrinus striatus* v. *strigosus* Boisd., 1835, Fn. Ent. Oc. Pac. Voy. Astrolabe, 2, 53.

(?) *Gyrinus obliquatus* Macleay, 1873, Trans. Ent. Soc. N. S. Wales, 2, 128.

*Gyrinus strigosus* Rég., 1881, Mém. Soc. Linn. Nord France, p. 110.

*Aulonogyrus strigosus* Rég., 1883, Ann. Soc. Ent. France, (6) 3, 131; Rég., 1884, Ann.

Soc. Ent. France, (6) 3, (1883), 472.

*Gyrinus strigosus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.

(?) *Gyrinus obliquatus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.

*Aulonogyrus strigosus* Sév., 1889, Ann. Soc. Ent. Belge, 33, 160; Rég., 1892, Ann. Soc.

Ent. France, 60, (1891), 741; Rég., 1907, Ann. Soc. Ent. France, 76, 161; Ahlw., 1910,

Col. Cat., 21, 14; Zimmerm., 1917, Ent. Mitt., 6, 142; Mjög., 1916, Ark. Zool., 10, 9, 12;

Peschet, 1917, Ann. Soc. Ent. France, 86, 54; Ochs, 1924, Ent. Bl., 20, 233; Ochs,

1927, Kol. Rdsch., 13, 41.

Length 5.5 to 6.5 mm. Elongate oval, moderately convex. Upper surface with a feeble lustre on the posterior portion of the head and on the disc of pronotum and elytra. Colour of upper surface in most specimens dark blue with violet reflections, exceptionally greenish or black. Clypeus, lateral and posterior margin of the head, two dots between the eyes, a transverse line on the disc of pronotum, suture of elytra, longitudinal striae and apical ellipse on the latter metallic, green to coppery. Side margin of pronotum and elytra yellow, with a narrow dark border exteriorly. Under surface metallic black, mesosternum, last abdominal segment and legs rufous, epipleura yellow. Upper surface strongly reticulate and remotely punctate, this microsculpture being somewhat reduced in the shining portions, stronger in the clypeus and in the lateral portions of pronotum and elytra. The latter with ten longitudinal striae, connected two and two posteriorly, the anterior portion of the four outer ones deeply impressed. Inner seven interstices much broader than the four outer ones, 5 and 7 being the broadest. Truncature of elytra strongly convex, sutural angle broadly rounded, external angle more obtusely so. Aedeagus of the male gradually narrowed from base to apical quarter, the latter very narrow, subparallel, tip rounded; lateral lobes very broad, obliquely truncate apically. In the ♀ the apical margin of the last abdominal segment is notched medially beneath.

*A. strigosus* is strictly limited to Australia and Tasmania. A closely related species, *A. antipodum* Fauvel, is recorded from New Caledonia. In Australia, *A. strigosus* is apparently very common and widely distributed; I have before me the following records:

Victoria: Melbourne; Eltham (H. Pottinger).

New South Wales: Blue Mts. (Taylor); Blue Mts. (G. E. Bryant XII/08); Megalong Valley, 1,000', 20.1.32 (Harv. Exp., Darlington); Blackheath, 3,000', 21.1.32 (id.); Sydney; Norton's Basin, Nepean River, 17.X.1920 (Musgrave); Upper Clarence River; Richmond River.

Queensland: Nat. Park, MacPherson Range, 3,000-4,000', III/1932 (Harv. Exp., Darlington); Brisbane (Hacker, 28.9.24); Christmas Creek, Colosseum XII/1912 (Mjöberg); Evelyne IV/1915 (id.).

S. Australia: Adelaide (Schomb.).

W. Australia: Bridgetown, 8.XI.1931 (Harv. Exp., Darlington); Geraldton, X/1931 (id.).

In Fabricius' description an exact indication of type locality is not given. He mentions only "Habitat in Australasia aquis" and gives the name of the collector "D. Billardiére", who was the naturalist of the expedition of d'Entrecasteaux to Australia and the Pacific archipelago. When I revised the collection of Fabricius about twenty years ago no representative of the Australian species was there, but only a specimen of *A. marginatus*, a large S. African species, with label *G. strigosus*. Doubtless this was the specimen discussed by Suffrian, 1847 (Ent. Ztg. Stettin, 8, 100), and which he believed erroneously to be the true *strigosus*. Likewise the *strigosus* of Aubé (1838, Spec. Col., 6, 719) is not to be referred to the Australian species, being identical with *A. striatus* Fabr. occurring in the Mediterranean. From the description given by Fabricius, if thoroughly studied, the Australian species is, however, evidently capable of being recognized, and there is no doubt that it was correctly interpreted by Régimbart (1881 and 1883, *l.c.*) after Forsberg (1821, *l.c.*) and Boisduval (1835, *l.c.*).

In many collections this species is erroneously named *G. obliquatus*, which determination I refer to Macleay (cf. *l.c.*, 1873) and to Masters (cf. *l.c.*, 1885). The true *obliquatus*, however, is a large insect belonging to the genus *Macrogyrus* and living, as described by Aubé (1838, Spec. Col. 6, 661), in the isle of Timor; it is not liable to occur in Australia anyway (cf. Blackburn, 1901, Trans. Roy. Soc. S. Aust., 25, 127; *ibid.*, 1903, 27, 91).

Mjöberg (1916, *l.c.*) mentioned the fact that the natives of N. Queensland catch swarms of *A. strigosus* by means of their "dillybags", roll them up in leaves, roast them in hot ashes and eat them, calling this food "molkom". I supposed (cf. Ochs, 1924, *l.c.*) that this was for aphrodisiac purposes. A similar use of Gyrinid beetles in Europe is reported by Abel and Gross for Stiria.

#### Genus *Macrogyrus* Rég., 1882.

Size 6.5 to 18 mm. Scutellum visible. Elytral striae generally well impressed, at least laterally (except *Cyclomimus*). Outer portion of metasternum variable in form. Anterior margin of metacoxae convex, reaching the apical end of metaepisternum; end of raised portion of metacoxae pointed. Anterior tarsi of ♂ generally strongly broadened, oval or attenuated anteriorly, beneath with small suckers, the distribution varying in the species; first joint with a particular area of larger or smaller suckers.

In the older authors the Australian species now figuring as *Macrogyrus* are mostly united with *Enhydrus sulcatus*, a large Brazilian species, the genus *Enhydrus* being well distinguished in several respects. Régimbart, while establishing his genus *Macrogyrus*, still included the South American species inhabiting the Andes, which meantime I had separated in the genus *Andogyrus*. The representatives of the genus *Macrogyrus*, as it is understood now, are still very different in size, general aspect and other minor characters, for which reason I separated two subgenera in 1929/1930 (Ent. Bl., 25, 199; 26, 15). Meantime I devoted myself to a special study of the genus as a whole from which results the following classification:

*Key to Subgenera of the Genus Macrogyrus Rég.*

1. Outer portion of metasternum narrow, in form of an elongate triangle, outer border only about half as long as the other ones ..... 2
2. Pronotum and elytra bordered with yellow ..... 3
3. Elytral apex with 2 points on sutural and apical outer angle; middle of truncature not or only scarcely pointed ..... Type, *M. paradoxus* .. Subg. 1. *Orectomimus* Ochs  
Two species in Australia (*paradoxus* Rég., *darlingtoni*, nov.).
- 3'. Elytral apex with 3 points, middle point very distinct .... (to Subg. 2. *Tribolomimus*, nov.)  
One species in Australia (*gouldi* Hope).
- 2'. Pronotum and elytra not bordered with yellow ..... 4
4. Elytra only with 1 point on the outer apical angle, truncature and sutural angle rounded together, convex ..... Type, *M. reichei* .. Subg. 4. *Clarkogyrus*, nov.  
One species in Australia (*reichei* Aubé).
- 4'. Elytral apex with 3 more or less distinct points ..... 5
5. Disc of elytra with several furrows, most of which, if shortened, reach at least half the length of elytra ..... 6
6. Apical 3 points of elytra more or less distinct, never rounded  
Type, *M. reticulatus* .. Subg. 2. *Tribolomimus*, nov.  
One species in the island of Rotti (*convexus* Ochs); 4 species in New Guinea and neighbouring islands (*reticulatus* Rég., *obsoletus* Rég., *ovatus* Ochs, *variegatus* Rég.); also *M. gouldi* Hope from Australia with yellow border, mentioned above.
- 6'. Only the outer of the 3 apical points sharp, the other 2 singularly rounded  
Type, *M. oblongus* .. Subg. 3. *Australogyrus*, nov.  
Three species in Australia (*oblongus* Boisd., *rivularis* Clark, *viridisulcatus* Mjöb.).
- 5'. Longitudinal striae on elytra very short or nearly obliterated. Apical points obliterated or singularly rounded ..... 7
7. Elytra with transverse scratches, alutaceous sculpture consisting of transverse meshes  
Type, *M. leopoldi* .. Subg. 5. *Ballogyrus*, nov.  
One species in N. Guinea (*leopoldi* Ball).
- 7'. Elytra without transverse scratches, alutaceous sculpture consisting of nearly round meshes  
Type, *M. purpurascens* .. Subg. 6. *Cyclomimus* Ochs.  
Two species in N. Guinea and N. Caledonia (*purpurascens* Rég., *caledonicus* Fauvel).
- 1'. Outer portion of metasternum broad, in form of a nearly equilateral triangle ..... 8
8. Elytral apex with 3 more or less distinct points  
Type, *M. australis* .. Subg. 7. *Tribologyrus*, nov.  
Four species in Australia and neighbouring islands (*australis* Brullé, *finschi* Ochs, *elongatus laevis* Ochs, *angustatus* Rég.; 7 species in N. Guinea and neighbouring islands (*albertisi* Rég., *blanchardi* Rég., *elongatus* Rég., *froggatti* Macleay, *oberthüri* Rég., *orthocolobus* Heller, *venator* Boisd.<sup>1</sup>); 3 species in the Sunda Archipelago (*aenescens* Rég., *obliquatus* Aubé, *sumbawae* Rég.).
- 8'. Elytral apex not pointed, exterior apical angle and middle of truncature indistinctly marked at the most ..... 9
9. Smaller, narrower, elytra with 2 longitudinal striae exteriorly  
Type, *M. howitti* .. Subg. 8. *Macrogyrus* J. Balf.-Browne  
One species in Australia and Tasmania (*M. howitti* Clark).
- 9'. Larger, broader, elytra only with 1 lateral stria  
Type, *M. striolatus* .. Subg. 9. *Megalogyrus*, nov.  
One species in Australia (*M. striolatus* Guérin).

Subg. 1. *Orectomimus* Ochs, 1930 (Ent. Bl., 26, 15).

Size 6.5 to 9 mm. Elongate-oval, attenuated to both ends, rather convex. Outer (deeper) portion of metacoxae broader than the inner portion, which adjoins the

<sup>1</sup> *M. venator* is recorded in literature as living in Australia, which seems very doubtful, as I did not find any specimen in the Australian material revised. The few examples existing in ancient collections must have been collected either by the Astrolabe Expedition or by Mr. Macleay, who is cited as author of *Gyrinus venator* in the Catalogue of Dejean (ed. 2, 1833, ed. 3, 1837) as in the description given by Boisduval (1835, Voy. Astrolabe, 2, 51). If really Australian, the insect would certainly have been rediscovered. As this is not the case, I believe it to have a local habitat in some island of the Indonesian or Melanesian archipelago, where no collecting has been done for the last 120 years. *M. venator* has a size of about 12 mm. and a broad oval and rather convex form. Elytral striae 3, transverse scratches very feeble; truncature 3-pointed. Anterior tibiae of ♂ strongly curved inwards, anterior tarsi exceptionally narrow.



metasternum. Prothorax and elytra bordered with yellow. Truncature of elytra oblique, with 2 distinct points at sutural and outer angle, middle of truncature sometimes but scarcely pointed.

*Key to Species.*

1. Smaller (6.5 to 7.5 mm.) and narrower, more attenuated to both ends; very convex. Middle point on truncature of elytra generally absent ..... *M. paradoxus* Rég.
- 1'. Larger (7.5 to 9 mm.) and relatively broader, less attenuated to both ends; rather convex. A weak middle point on truncature of elytra generally present  
*M. darlingtoni*, nov.

**Macrogyrus (Orectomimus) paradoxus** Rég.

*Macrogyrus paradoxus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 455, pl. 12, fig. 64; 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471; Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598; Sév., 1889, Ann. Soc. Ent. Belg., 33, 158; Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 741; Blackb., 1901, Trans. Roy. Soc. S. Aust., 25, 127; Frogg., 1907, Aust. Ins., p. 135 (partim); Rég., 1907, Ann. Soc. Ent. France, 76, 139, 160; Ahlw., 1910, Col. Cat., 21, 11; Mjög., 1916, Ark. Zool., 10, 9, 10.

*Macrogyrus (Orectomimus) paradoxus* Ochs, 1930, Ent. Bl., 26, 14 (partim).

This is the smallest of the genus, measuring only 6.5 to 7.5 mm. in length, and resembles very much an *Orectochilus* by its very narrow and convex body, which is strongly attenuated to both ends. Upper surface shining, chiefly brownish coloured, with a metallic hue, pronotum and elytra with a yellow border, which is broader than the horizontal side margin, longitudinal striae on elytra brass-coloured; underside pale yellow, in some parts rufescent, epipleura still lighter coloured. Upper surface remotely punctured on head and pronotum, with an alutaceous sculpture consisting of nearly round meshes, which become finer, transverse and very elongate on the disc of elytra. The latter with fine transverse striolae and 4 longitudinal striae laterally, the inner ones being nearly totally obliterated. Apical part of the suture slightly roof-shaped, sides of elytra with a strong impression in the posthumeral portion, at least in the ♀. Truncature of elytra oblique, slightly convex, with 2 points at the sutural and the outer angle; only exceptionally with a scarcely marked third point in the middle of truncature. Labrum produced, nearly semicircular. Anterior tibiae of ♂ strongly dilated towards the apex, triangular, apex obliquely truncate, outer apical angle sharp, slightly produced. Anterior tibiae of ♀ less dilated, anterior tarsi subparallel, strongly dilated and attenuated towards the apex in ♂. Genitalia of the latter yellowish, aedeagus but a little shorter than the lateral lobes, rather broad, subparallel, gradually narrowing in apical third, tip rounded, upper surface with a small groove in the basal portion; lateral lobes very slender basally, broadened only in apical third.

The type specimen was a female, labelled "Australia" with no further indication of locality, from the ancient collection of Wehncke, now in the collection of Mr. R. Oberthür. The species is moreover recorded in literature from N. Australia, Port Darwin (Blackburn, 1901, *l.c.*); Australia (Mus. Brussels, ex coll. Frensch) (Rég., 1907, *l.c.*); Adelaide River (Brit. Museum, *vidi!*) (Rég., 1907, *l.c.*); N.W. coast of Australia (Froggatt, 1907, *l.c.*); Kimberley, Noonkanbah (Mus. Stockholm, *vidi!*) (Mjög., 1916, *l.c.*); Cape York Penins., not far from Alice River (Mjög., 1916, *l.c.*). I did see further specimens from N.W. Australia (Aust. Mus. and Macleay Mus.), in one of which the middle of truncature is slightly pointed; Victoria, probably in N. Australia (Mus. Dresden); N. Australia, Katherine, Manbulloo Station, 19.7.1929 (I. M. Mackerras and T. G. Campbell, Mus. Cambridge, Mass.). The South Queensland records given by Froggatt, Mjögberg and myself in 1930 (*l.c.*) are probably to be referred to the following species. The specimens collected by Mjögberg in Cape York Peninsula were examined by Dr. Malaise and recognized as belonging to *M. paradoxus*.

**Macrogyrus (Orectomimus) darlingtoni**, n. sp.

*Macrogyrus paradoxus* Frogg., 1907, Aust. Ins., p. 135 (partim).

*M. (Orectomimus) paradoxus* Ochs, 1930, Ent. Bl., 26, 14 (partim).

Very similar to the former, but larger in size (7.5 to 9 mm.), much broader, less compressed and less attenuated to both ends. Upper surface chiefly olive-coloured, with bluish or violet reflections, longitudinal striae of elytra greenish, yellow margin narrower and better limited inwards; under side darker. Microsculpture as in the former, striolae on elytra more evident. Apical portion of suture not roof-shaped, lateral impression only superficially marked, truncature generally with an obtuse point in its midst. Labrum less produced. Anterior tibiae of ♂ a little broader than in *M. paradoxus*, exterior apical angle more prominent, anterior tarsi longer and more attenuated towards the apex. Aedeagus darker coloured, otherwise not very different in shape.

*Type Locality*.—Queensland, Atherton Tableland; Ravenshoe, 3,000 ft., April, 1932 (Darlington).

Type ♂ and allotype ♀ in the collection of the Harvard University, Inst. of Comparative Zoology, Cambridge (Mass.); several paratypes in my collection.

The distribution of *M. paradoxus* apparently extends from the northern part of Western Australia to Cape York Peninsula. *M. darlingtoni*, closely allied but certainly specifically distinct, seems to succeed *M. paradoxus* in more southerly districts of Queensland.

Besides the typical specimens I have before me a small number of specimens collected in South Queensland: Brisbane, March, 1932 (Darlington), which are a little smaller in size (7.5 to 8.5 mm.) and differ also by having the yellow side margin broader and the truncature of elytra less angulate. These characters, by which a certain resemblance to *M. paradoxus* is produced, are still more evident in specimens from Rockhampton formerly received from the Macleay Museum, but in both cases the features of the body and all other characters are as in the typical specimens.

Subg. 2. **Tribolomimus**, nov.

Size 7.5 to 12 mm. Elongate to broadly oval; more or less convex. Bordered with yellow only exceptionally. Longitudinal striae in elytra more or less impressed, varying in number from 3 to 8 in the different species and being sometimes strongly abbreviated. Apex of elytra generally bitruncate, with 3 well-marked points. The specimens which belong to this subgenus have much affinity with those of *Tribologyrus*, but are easily distinguished by the narrow outer portion of metasternum. Represented in Australia only by 1 species, which is the smallest of the subgenus and the only one bordered with yellow as in *Orectomimus*.

**Macrogyrus (Tribolomimus) gouldi** (Hope).

*Dineutes gouldii* Hope, 1842, Ann. Mag. Nat. Hist., 9, 427; Hope, 1842, Proc. Ent. Soc. London, 4, 48.

*D. gouldi* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 426; Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 470; Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 599; Sév., 1889, Ann. Soc. Ent. Belg., 33, 153; Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 739.

*Macrogyrus gouldi* Blackb., 1903, Trans. Roy. Soc. S. Aust., 27, 92; Rég., 1907, Ann. Soc. Ent. France, 76, 139, 160; Ahlw., 1910, Col. Cat., 21, 10; Mjög., 1916, Ark. Zool., 10, 9.

Size 7.5 to 8.5 mm. Elongate-oval, rather convex. Upper surface shining, chiefly brownish coloured, with a metallic hue and varicoloured reflections, longitudinal striae in elytra coppery, side margin of elytra and pronotum yellow; under side rufescent,

epipleura yellow. Punctures on head and pronotum very remote and fine, alutaceous microsculpture of the upper surface consisting of nearly round meshes, which are a little less impressed and slightly elongate on the disc of elytra. The latter with transverse striolae and 4 longitudinal striae laterally, the inner ones being nearly totally obliterated. Sides of elytra with a feeble impression in the posthumeral portion, at least in the ♀. Apex of elytra bitruncate, median angle spinous, sutural and exterior angles forming sharp points. Anterior tibiae not very strongly broadened in the ♂, exterior apical angle sharp, slightly produced. Anterior tarsi subparallel in the ♀, broadly oval in the ♂. The type, which served the author for his short but striking description, was collected in North Australia near Port Essington. Régimbart (1907, l.c.) based his supplementary diagnosis on specimens from Adelaide River, communicated to him by the British Museum. Through the courtesy of the latter I received a female specimen of this series for my collection, from which I took the above-mentioned characters. The male characters are drawn from Régimbart's description. *M. gouldi* resembles very much *M. darlingtoni*, having nearly the same size and features of the body, and bearing also a yellow side margin; it is, however, distinguished at once by the presence of a spine in the middle of truncature.

### Subg. 3. Australogyrus, nov.

Size 11 to 16 mm. Elongate-oval, moderately convex, upper surface rather flat. Longitudinal striae in elytra not abbreviated, only 1 or 2 obliterated near the suture, outer 3-4 canaliculate, the corresponding interstices in form of narrow ribs. Inner portion of truncature more or less deeply concave, outer portion nearly straight, oblique; sutural angle strongly dehiscent and broadly rounded, median angle also rounded, outer angle pointed. Anterior legs in most of the male specimens extremely elongated, sometimes longer than the body; in this case the tibiae, which are very slender basally and broadened only in about the apical third, are strongly curved inwards, the femora are equally curved in inverse sense, having a deep channel on the anterior side, the borders of which are strongly serrulate. Anterior tarsi of ♂ basally about as wide as the apex of tibiae, gradually narrowing towards the apex; under surface of apical joint partially smooth, first joint with a particular area of large round suckers. Aedeagus shorter than the lateral lobes, rather subparallel, tip rounded; lateral lobes strongly curved in apical half.

There are only 3 species in this subgenus, which is apparently confined to the Australian continent.

#### Key to Species and Subspecies.

1. Only 1 longitudinal stria near the suture of elytra obliterated; 3 outer striae canaliculate 2
2. Upper surface chiefly olive-coloured, longitudinal striae on elytra greenish, well marked 3
3. The 6th interstice on elytra anteriorly about half as wide as the interstices 3-5, more than twice as wide as interstices 7 and 8 ..... 4
4. Length 12.5 to 14 mm. Oblong-oval, rather broad ..... *M. oblongus oblongus* Boisd.
- 4'. Length 11 to 13 mm. Body narrower and more parallel ..... *M. oblongus opacior* Blackb.
- 3'. The 6th interstice on elytra much narrower than the interstices 3-5, scarcely wider than 7 and 8 ..... *M. oblongus latior* Clark.
- 2'. Upper surface chiefly brownish in colour, inner striae on elytra only superficially marked, the outer ones coppery ..... *M. rivularis* Clark.
- 1'. Two longitudinal striae near the suture of elytra obliterated; 4 outer striae canaliculate  
*M. viridisulcatus* Mjöb.

### Macrogyrus (Australogyrus) oblongus oblongus (Boisd.).

*Gyrinus oblongus* Boisd. 1835, Fn. Ent. Océan Pacif., Voy. Astrolabe, 2, 52.

*Enhydrus oblongus* Aubé, 1838, Spec. Col., 6, 653; (?) Lacord., 1854, Hist. Nat. Ins., 1, 438; (?) Redtenb., 1868, Reise Novara, Zool. 2, I A, 1, 23.

*Macrogyrus rivularis* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 450, pl. 12, f. 61; Rég., 1883, Ann. Soc. Ent. France, (6) 3, 123, pl. 6, f. 67; Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.

(?) *Enhydrus oblongus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.

*Macrogyrus oblongus* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 671, 741 (partim); (?) Masters, 1896, Proc. Linn. Soc. N. S. Wales, 21, 698 (partim); Rég., 1907, Ann. Soc. Ent. France, 76, 139.

*Macrogyrus canaliculatus* Froggatt, 1907, Aust. Ins., p. 135.

*Macrogyrus oblongus* Ahlw., 1910, Col. Cat., 21, 11 (partim); Zimmerm., 1917, Ent. Mitt., 6, 142; Ochs, 1924, Ent. Bl., 20, 238 (partim); Ochs, 1934, Mitt. Schweiz. Ent. Ges., 16, 100.

Size 12.5–14 mm. Elongate-oval, moderately convex, flattened above. Upper surface chiefly olive-coloured, with bluish, in certain places on head and pronotum also coppery or violet reflections; elytral striae greenish. Under surface dark-brown to black, natatorial and sometimes anterior legs rufescent. Upper surface with a strong alutaceous sculpture, consisting chiefly of nearly round meshes, which become slightly transverse in some places. The front is wrinkled, and there exists moreover a fine puncturation on the upper surface, very dense on the labrum and diminishing gradually backwards. Interstices of elytra with oblique, curved scratches. First longitudinal stria near the suture of elytra nearly completely obliterated, striae 2–4 very narrow, 5 a little wider at least basally, 6–8 channelled. Interstices 1 and 2 united by the want of first stria and therefore twice as wide as interstices 3–5, which are nearly equal in width, interstice 6 only half as wide as the latter or a little larger, 7–9 are narrow ribs at least at basal half. Side margin of elytra strongly enlarged behind the humeral portion, still more strongly so in large male specimens, and having in the latter a little swelling in the place where the knee of anterior legs is inserted beneath; tip of side margin pointed. Middle and sutural angle of truncature rounded, concavity of inner portion moderate. Anterior margin of anterior tibiae obliquely truncate in both sexes, outer apical angle obtuse, a little more rounded in ♂. Aedeagus of the latter rufescent, subparallel, basally a little wider, sometimes attenuated in middle of length, basal third channelled, apical portion carinate, tip truncate with rounded angles. Lateral lobes infusate, except at base and apex, strongly enlarged and curved inwards apically; tip obliquely truncate, interior apical angle acute, exterior angle rounded.

Widely distributed in eastern Australia and apparently a rather common and also very variable insect. The type specimen from the ancient collection of Dejean, now belonging to Mr. Oberthür, is labelled "Nova Hollandia", without further exact indication of locality. It was studied by Régimbart (*l.c.*, 1891, 671) and said to be equal to specimens from Sydney, from which I have drawn the above description. Specimens from the following localities are of the same kind:

N. S. Wales: Sydney (Harv. Exp., Darlington, Mus. Cambridge, Mass.), (Lea, Macleay Mus.), and (Staudinger vend.); Parramatta (Mus. Pretoria, Coll. Ochs, Staudinger vend.); Cooma (Handschin, Mus. Basel); Hornsby, 21.8.31 (Harv. Exp., Darlington, Mus. Cambridge, Mass.); Jannali, near Sydney (*id.*); Pipers Flats (Macleay Mus.); Hunter River (*ibid.*); Gosford (F. A. A. Skuse, Aust. Mus.); Upp. Chichester Riv., Blue Gum Knob, 28.9.21 (A. Musgrave, Aust. Mus.); Salisbury, 1,050 ft., 12–15.2.32 (Harv. Exp., Darlington, Mus. Cambridge, Mass.); National Park, 22.8.32 (*id.*); Blue Mts., Megalong Valley, 1,000 ft., 18.1.32 (*id.*); Blackheath, 3,000 ft., 21.1.32 (*id.*); Mt. Wilson, 3,500 ft., I.1932 (*id.*); The Dorrigo, 3,000 ft., 17.2.32 (*id.*).

S. Queensland: Nat. Park, McPherson Range, 3–4,000 ft., III.1932 (*id.*).

**Macrogyrus (Australogyrus) oblongus latior (Clark).**

*Macrogyrus opacior* Blackburn, 1901, Trans. Roy. Soc. S. Aust., 25, 127; Rég., 1907, Ann. Soc. Ent. France, 76, 159; Ahlw., 1910, Col. Cat., 21, 11.

Specimens in several small series seen, collected in Victoria, are smaller in size, measuring but 11–12, exceptionally up to 13 mm. in length. Side margin of elytra less broadened behind the humeral portion, wherefrom results a more parallel and relatively more elongate form of the body. In the ♀ the anterior margin of anterior tibiae is nearly straightly truncate, outer apical angle acute.

These main characters agree very well with those indicated by the Rev. Thomas Blackburn for his *M. opacior*, except colour and sculpture, in which the specimens before me do not differ from the nominal form, which they equal also in all other characters. Apparently the type of Blackburn was a rufinotic dull specimen, such specimens being often subject to some alteration in sculpture, for which reason these characters—opaque reddish-brown elytra, lack of striae between the sulci and the suture, substitution of scratches by elevated lines—are of minor importance. In the larger males of this subspecies the anterior legs are also elongated and curved. A small ♂, measuring only about 11 mm., has very short anterior legs with nearly straight tibiae; the latter have but a very short basal attenuation and are gradually and rather strongly widened towards the apex, which is obliquely truncate as a rule, but with the exterior angle more acute, thus approaching the feature in ♀. In *oblongus oblongus* the anterior tibiae of small males are less different from those of large males with elongate legs.

The specimens which I refer to *M. opacior* Blackb. are labelled "Victoria" and belong to the collections of the American Museum (Edw. Coll.), Mus. Cambridge, Mass., Mus. Berlin, and Mus. Hamburg (Melbourne). The type of Blackburn came from Mt. Macedon, collected by Kershaw. The British Museum has a small ♂ from S. Australia (Bakewell), which belongs probably also to *oblongus opacior*.

**Macrogyrus (Australogyrus) oblongus latior (Clark).**

*Enhydrus latior* Clark, 1864, J. Ent., 2, 217.

(?) *Enhydrus oblongus* Macleay, 1873, Trans. Ent. Soc. N. S. Wales, 2, 128.

*Enhydrus latior* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 455.

*Macrogyrus latior* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 472.

*Enhydrus latior* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.

*Macrogyrus latior* Séverin, 1889, Ann. Soc. Ent. Belg., 33, 157.

*Macrogyrus oblongus* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 671, 741 (partim); Rég., 1907, Ann. Soc. Ent. France, 76, 139 (partim); Ahlw., 1910, Col. Cat., 21, 11 (partim).

*Macrogyrus rivularis* Mjög., 1916, Ark. Zool., 10, 10 (partim).

*Macrogyrus oblongus* Ochs, 1924, Ent. Bl., 20, 238 (partim).

(?) *Macrogyrus latior* Tillyard, 1926, Ins. Austral. N. Zeal., p. 193, pl. 17, fig. 16.

There exists in Queensland a third varietal form of this species, which, resembling in all other characters the nominal form, is distinguished from the latter by the sixth interstice on elytra being anteriorly much narrower than interstices 3–5 and hardly wider than ribs 7 and 8.

Clark's types came from Moreton Bay. The Zoolog. Museum of the Univ. of Berlin has a toptype and I have seen specimens from Brisbane (Queensland Mus.); Blackall Range, 13.4.1911 (Wild, *ibid.*); Mt. Tambourine (Pottinger, XII, 1919, Hacker, *ibid.*); Blackall Range and Glen Lamington (Mjöberg, Mus. Stockholm); Mackay (D. S. North, Brit. Mus.).

Rev. Clark, who at first found out the specific difference between his *M. rivularis* and what we name now *M. oblongus*, wished doubtless to establish the latter species by *Enhydrus lator*, his *oblongus* cited at the end of his publication being identical with *M. australis* Brullé. Although in the remarks he adjoins to his description there are mentioned some characters which do not prove right (apex of elytra more deeply emarginate than in *M. rivularis*, sutural angle not dehiscent), his specimens from Moreton Bay must have been identical with the subspecies I characterize above, and I prefer to retain the name established by Clark instead of creating a new name and ranging that of Clark among the synonyms of *M. oblongus*.

South of Brisbane the nominal form and ssp. *lator* do apparently overlap, the specimens from MacPherson Range belonging to the former, those from Mt. Tambourine to the latter. Specimens from Murrurundi (Macleay Mus.) and Bunya Mts., 3,500 ft., 26.2.32 (Harv. Univ. Exp., Mus. Cambridge, Mass.) must still be studied to determine whether they belong to *oblongus oblongus* or to ssp. *lator*.

#### Macrogyrus (Australogyrus) rivularis (Clark).

*Enhydrus rivularis* Clark, 1864, J. Ent., 2, 218.

*Macrogyrus longipes* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 452; Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.

*Enhydrus rivularis* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.

*Macrogyrus longipes* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598; Séverin, 1889, Ann. Soc. Ent. Belg., 33, 157.

*Macrogyrus rivularis* Séverin, 1889, Ann. Soc. Ent. Belg., 33, 158.

*Macrogyrus oblongus* var. *rivularis* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 671, 741.

*Macrogyrus oblongus* var. *longipes* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 671, 741.

*Macrogyrus rivularis* Masters, 1896, Proc. Linn. Soc. N. S. Wales, 21, 698.

*Macrogyrus oblongus* var. *rivularis* Rég., 1907, Ann. Soc. Ent. France, 76, 139.

*Macrogyrus oblongus* var. *longipes* Rég., 1907, Ann. Soc. Ent. France, 76, 139.

*Macrogyrus oblongus* var. *rivularis* Ahlw., 1910, Col. Cat., 21, 11.

*Macrogyrus oblongus* var. *longipes* Ahlw., 1910, Col. Cat., 21, 11.

*Macrogyrus oblongus* var. *rivularis* Zimm., 1917, Ent. Mitt., 6, 142.

Size 12 to 16 mm. Very similar to the preceding in general appearance, on the average a little larger in size, females evidently more elongate. Upper surface chiefly brownish coloured, outer sulci on elytra coppery. Inner striae on the latter narrow and but superficially marked, interstices of the latter even. Inner portion of truncature strongly concave, sutural angles very dehiscent. Anterior margin of anterior tibiae less oblique in ♂, nearly horizontal in ♀, exterior apical angle in the latter nearly rectangular. Aedeagus ♂ broader than in *M. oblongus*, basal channel on upper surface very short, longitudinal keel relatively longer.

Through the kindness of the British Museum I possess one of Clark's paratypes, which came from Victoria. Further specimens seen: Victoria, without exact indication of locality (Mus. Berlin, very large examples); Lorne (Mus. Budapest); Ferntree Gully, 9.3.1918 (Pottinger Coll., Queensl. Mus.); N. S. Wales, Mt. Kosciusko, 5-7,000 ft., XII, 1931 (Harv. Univ. Exp., Darlington, Mus. Cambridge, Mass.). There is no doubt that *M. rivularis* is a distinct species, as clearly seen by Clark, and not a varietal form of *M. oblongus*, as believed by Régimhart and later authors.

#### Macrogyrus (Australogyrus) viridisulcatus Mjöberg.

*Macrogyrus viridisulcatus* Mjöberg, 1916, Ark. Zool., 10, 10, fig. 9.

Size 13 to 14 mm. Elongate-oval, somewhat attenuated to both ends, a little more convex than the allied species. Upper surface more richly coloured; under surface

black, apical margin of abdominal segments and legs rufescent. On the elytra 2 longitudinal striae near the suture nearly completely obliterated, striae 3 and 4 broad and strongly impressed, green or coppery, 5-8 channelled. Interstices 1-3 united by the want of striae 1 and 2 and therefore very broad, interstices 4 and 5 narrower than usual on account of the broad striae 3 and 4, interstices 6-9 narrow ribs. Inner portion of truncature but slightly concave. Anterior margin of anterior tibiae slightly obliquely truncate in both sexes, outer angle rounded. Males with elongated anterior legs, aedeagus rufescent, narrower than in *M. oblongus*, also its basal channel, keel more elevated; lateral lobes less infuscate, apex nearly horizontally truncate.

Mjöberg based his description of this well-distinguished species on specimens he had collected at Malanda, Evelyne and Cedar Creek in North Queensland, now in the Stockholm Museum. A series of the same kind was taken by Mr. Darlington in Atherton Tableland: Millaa-Millaa, 2,500 ft., April, 1932 (Harv. Univ. Exp., Mus. Cambridge, Mass.).

#### Subg. 4. *Clarkogyrus*, nov.

Size 10-12 mm. Elongate-oval, moderately convex. Longitudinal striae in elytra not abbreviated, the first near the suture apparently always nearly totally obliterated, the following generally well marked, outer 2 or 3 larger and more deeply impressed, corresponding interstices narrower and more convex. Truncature convex, only 1 point at the end of the side margin of elytra. Anterior legs of ♂ not elongated.

#### *Macrogyrus (Clarkogyrus) reichei* (Aubé).

- Enhydrus reichei* Aubé, 1838, Spec. Col., 6, 654; Lacord., 1854, Hist. Nat. Ins., 1, 438.  
*Enhydrus reichii* Clark, 1864, J. Ent., 2, 216.  
*Enhydrus assimilis* Clark, 1864, J. Ent., 2, 217.  
*Macrogyrus reichei* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 453, pl. 12, fig. 62, 62a, 62b.  
*Enhydrus assimilis* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 455.  
*Macrogyrus reichei* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.  
*Macrogyrus assimilis* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 472.  
*Enhydrus reichei* Mast., 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.  
*Enhydrus assimilis* Mast., 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.  
*Macrogyrus reichei* Sév., 1889, Ann. Soc. Ent. Belg., 33, 158.  
*Macrogyrus assimilis* Sév., 1889, Ann. Soc. Ent. Belg., 33, 157.  
*Macrogyrus reichei* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 671, 741; Masters, 1896, Proc. Linn. Soc. N. S. Wales, 21, 698; Rég., 1907, Ann. Soc. Ent. France, 76, 139; Ahlw., 1910, Col. Cat., 21, 11; Mjöb., 1916, Ark. Zool., 10, 9; Zimmerm., 1917, Ent. Mitt., 6, 142.  
*Macrogyrus latior* Tillyard, 1926, Ins. Austral. N. Zeal., p. 194, pl. 17, fig. 16.

*M. reichei* which is the unique species to represent the subgenus *Clarkogyrus*, resembles very much *M. oblongus* ssp. *opacior* in general aspect, having also nearly the same size, but may be distinguished at once by the convex and not sinuate truncature of elytra. Moreover, the body is a little more attenuated anteriorly in *M. reichei* and the broadest portion approaches the apex; the lateral margins of prothorax and elytra are not absolutely in the same line, and a very slight angle is formed by their conjunction. Upper surface chiefly olive-coloured with blue or violet reflections; under side metallic black, epipleura, last abdominal segments and legs mostly rufescent. Microsculpture as in *M. oblongus*, transverse striolae not curved and less evident. Longitudinal stria 1 in elytra nearly completely obliterated, 2-5 narrow, generally well marked, 6-8 wider, channelled, 6th at least basally. Interstices 1 and 2 united by the want of stria 1 and therefore twice as wide as interstices 3-6, which are nearly equal in width, 7-9 generally narrower and more convex. Anterior tibiae shortly curved

inwards basally, gradually and rather strongly broadened towards the apex, evidently more so in ♂; apical margin nearly horizontally truncate in ♀, exterior angle more or less rounded, very obliquely truncate in ♂, exterior angle obtuse. Anterior tarsi of ♂ as in *Australogyrus*, but a little narrower. Aedeagus very broad, nearly twice as wide as the lateral lobes, shorter than the latter, which are strongly curved inwards.

The type used by Aubé for his description (ex Coll. Reiche, received by Hoffman) was without indication of locality, but is said by Lacordaire (*l.c.*, 1854) to come from Australia, where the insect has been captured meantime in South Australia, Victoria and New South Wales. I have never seen large series of this species, and most of the specimens were imprecisely labelled; the few exact localities given are the following:

South Australia: Adelaide (Brit. Mus., Mus. Berlin and Halle).

Victoria: Eltham, 2.2.18 (Pottinger, Queensl. Mus.).

N. S. Wales: Oberon (F. H. Taylor, Austral. Mus.); Jindabyne, 3,000 ft., III/1889 (Helms, Austral. Mus.); Blue Mts., Megalong Valley, 1,000 ft., 18.1.32 (Darlington, Mus. Cambridge, Mass.).

Apparently this species is subject to variation in a high degree. Some of the specimens are highly flattened above, others more convex. There are specimens with the upper surface very shining, and those in which the colour changes to blue; sometimes the rufescent parts of the under side are more or less darkened. The longitudinal striae on elytra are more strongly impressed in certain examples and the corresponding interstices more convex in this case; also the transverse striolae may be more or less evident. From similar differences Clark derived his *Enhydrus assimilis*, which in my opinion cannot be regarded as a valid species.

(Subg. 5. **Ballogyrus**, nov.)

Not represented in Australia. Characterized by the nearly complete lack of longitudinal striae on elytra and the apical points very obtuse. Based on *M. leopoldi* Ball, 1932 (Mém. Mus. Roy. Hist. Nat. Belg., 4, 4, p. 21, pl. 1, figs. 3 and 4). The insect, shown by the figure, has much affinity in general aspect to *M. striolatus*, which is, however, much larger in size and distinguished by the lateral portion of metasternum forming a large triangle, which is narrow and elongate in *Ballogyrus*.

(Subg. 6. **Cyclomimus** Ochs.)

*Cyclomimus* Ochs, 1929, Ent. Bl., 25, 199.

Also not represented in Australia. The species belonging to this subgenus are the most irregular of the genus. They are remarkable by the total want of striolae on elytra, the longitudinal striae being reduced to nearly obliterated fine lines. The general aspect is *Dineutus*-like; they are, however, true *Macrogyrus* by the presence of scutellum, the feature of anterior legs and of the lateral portion of metasternum, which is narrow and elongate in *Cyclomimus*, always in form of a large triangle in *Dineutus*.

Subg. 7. **Tribologyrus**, nov.

Size 8 to 17 mm., most of the species not exceeding 12 mm. in length. Elongate to broadly oval, more or less convex. Longitudinal striae on elytra varying in number from 3 to 8, being more or less impressed and sometimes strongly abbreviated. Apex of elytra bitruncate, with 3 generally well-marked points or spines.

This subgenus comprises the majority of species of the genus, which may be rather different in general aspect, but have as common characters the large outer portion of metasternum and the bitruncate apex of elytra. Represented in Australia only by 4 species, most of which belong to the smallest and less developed of the subgenus.



*Key to Australian Species.*

1. Microsculpture on the disc of elytra consisting of rather strongly impressed round or slightly elongate meshes.
2. Body oval or moderately elongate, twice as long as wide at the most ..... 3
3. Elytra with 7 longitudinal striae, the inner ones mostly faint, but perceptible at least posteriorly ..... *M. australis* Brullé
- 3'. Elytra with only 4 longitudinal striae, the inner ones nearly completely obliterated ... 4
4. Larger (9 to 10.25 mm.), somewhat elongate, apical points scarcely produced  
*M. finschi* Ochs
- 4'. Smaller (8.5 to 9.25 mm.), regularly oval, apical points more evident generally  
*M. finschi* ssp. *minor*, nov.
- 2'. Body very elongate, more than twice as long as wide ..... 5
5. Upper surface black, with a feeble metallic hue ..... *M. angustatus* Rég.
- 5'. Upper surface brassy ..... *M. angustatus* ssp. *metallescens*, nov.
- 1'. Microsculpture on the disc of elytra consisting of fine, very elongate meshes  
*M. elongatus* ssp. *laevis* Ochs

**Macrogyrus (Tribologyrus) australis (Brullé).**

- Enhydrus australis* Brullé, 1835, Hist. Nat. Ins., 5, II, p. 237, pl. 10, fig. 2.  
*Enhydrus oblongus* Clark, 1864, J. Ent., 2, 219.  
 ? *Enhydrus oblongus* Macleay, 1873, Trans. Ent. Soc. N. S. Wales, 2, 128.  
*Macrogyrus oblongus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 449.  
*Macrogyrus canaliculatus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 450.  
*Macrogyrus simoni* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 447, pl. 12, f. 60.  
*Macrogyrus oblongus* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.  
*Macrogyrus canaliculatus* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.  
*Macrogyrus simoni* Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471.  
 ? *Enhydrus oblongus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.  
*Macrogyrus canaliculatus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.  
*Macrogyrus simoni* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.  
*Macrogyrus oblongus* Sév., 1889, Ann. Soc. Ent. Belg., 33, 158.  
*Macrogyrus canaliculatus* Sév., 1889, Ann. Soc. Ent. Belg., 33, 157.  
*Macrogyrus simoni* Sév., 1889, Ann. Soc. Ent. Belg., 33, 158.  
*Macrogyrus australis* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 670, 741.  
*Macrogyrus australis* var. *canaliculatus* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 670, 741.  
*Macrogyrus simoni* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 741.  
 ? *Macrogyrus oblongus* Frogg., 1907, Austral. Ins., p. 135.  
*Macrogyrus australis* Rég., 1907, Ann. Soc. Ent. France, 76, 139.  
*Macrogyrus australis* var. *canaliculatus* Rég., 1907, Ann. Soc. Ent. France, 76, 139.  
*Macrogyrus simoni* Rég., 1907, Ann. Soc. Ent. France, 76, 139.  
*Macrogyrus australis* Ahlw., 1910, Col. Cat., 21, 10.  
*Macrogyrus australis* var. *canaliculatus* Ahlw., 1910, Col. Cat., 21, 10.  
*Macrogyrus simoni* Ahlw., 1910, Col. Cat., 21, 11.  
*Macrogyrus australis* Mjöb., 1916, Ark. Zool., 10, 9.  
*Macrogyrus simoni* Mjöb., 1916, Ark. Zool., 10, 9.  
*Macrogyrus oblongus* Mjöb., 1916, Ark. Zool., 10, 9, 10.  
*Macrogyrus australis* Zimmerm., 1917, Ent. Mitt., 6, 141; Ochs, 1924, Ent. Bl., 20, 238.  
*Macrogyrus simoni* ? Ochs, 1924, Ent. Bl., 20, 238.

Size 9.5 to 11.5 mm. Oval, somewhat elongate, moderately convex. Upper surface shining on the disc, olive-coloured, with varicoloured reflections, especially on the head and on the sides of pronotum, longitudinal striae on elytra green or coppery; under side dark brown, epipleura, abdomen and legs rufescent. Upper surface with an alutaceous sculpture consisting of nearly round meshes, labrum and sides of the head punctate, elytra with fine transverse striolae and 7 longitudinal striae (the first near the suture being completely obliterated). The inner ones of the latter (1-3) more or less faint,

but perceptible at least posteriorly, 4 and 5 narrow, 4 mostly strongly abbreviated, 6 about twice as wide as 5, 7 about twice as wide as 6 and bifid behind; interstices more or less convex, especially exteriorly. Apex of elytra bitruncate, 3-pointed. Anterior tibiae short, in ♂ strongly broadened from base to apex, exterior apical angle sharp, slightly produced; anterior tarsi elongate-oval and relatively slightly attenuated towards the apex in ♂, subparallel in ♀. Aedeagus nearly as long as the lateral lobes, rather broad subparallel, gradually narrowed in apical third, tip rounded.

The type is labelled "Iles de l'Océanie"; its origin is therefore uncertain. The species seems to be rather common and widely spread in Australia. The following records came to my knowledge:

S. Australia: Port Lincoln (Blackb., 1884, Brit. Mus.); Adelaide (div. collectors, Mus. Dahlem., Berlin, Halle, London).

Victoria: Melton, 15.9.1918 (Pottinger, Queensl. Mus.).

N. S. Wales: Sydney (div. collectors, div. Mus.); Parramatta (Mus. Pretoria); Clarence River (Macleay Mus.); Tamworth (Lea, coll. Guignot).

Queensland: Brisbane (div. collectors, div. Mus.); Moreton Bay (Brit. Mus.); Ipswich (Aust. Mus.); Pine River (Darlington, Mus. Cambridge, Mass.); Burnett River (Aust. Mus.); Rockhampton (Macleay Mus.); Blackall Range, 13-23.4.1911 (Wild, Queensl. Mus.); Townsville (Janson vend., coll. Ochs); Atherton (Mjöberg, Mus. Stockholm); Evelyne (Mjöberg, Mus. Stockholm); Cairns (E. Allen, Queensl. Mus.); Atherton Tableland, L. Barrine, 2,300 ft., April, 1932 (Darlington, Mus. Cambridge, Mass.); Atherton Tableland, Millaa-Millaa, 2,500 ft., April, 1932 (id.).

This species was subject to many misinterpretations, but I think its synonymy as given above will prove right. *M. simoni* is said by its author to have the anterior tarsi  $1\frac{1}{2}$  times as long as the tibiae, which is certainly erroneous; all other characters indicated do not differ from those of *M. australis*, inasmuch as there is a certain degree of variability in the latter, concerning form and convexity of the body, apical points which may be more or less acute, and the longitudinal striae on elytra. *M. canaliculatus* Rég. is based on examples in which the longitudinal striae on elytra are more evident, which is, however, an individual and not a racial character, as there are in the same series specimens which might pass as *canaliculatus* as well as belonging to the nominal form. *M. canaliculatus* and *M. simoni* are therefore, in my opinion, simple synonyms of *M. australis*.

#### Macrogyrus (Tribologyrus) angustatus Rég.

*Macrogyrus angustatus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 448; Rég., 1884, Ann. Soc. Ent. France, (6) 3, 471; Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598; Sév., 1889, Ann. Soc. Ent. Belg., 33, 157; Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 741; Rég., 1907, Ann. Soc. Ent. France, 76, 139; Rég., 1908, in Michaelson and Hartmayer, Fn. S.W. Aust., 1, 8, p. 314; Ahlw., 1910, Col. Cat., 21, 10; Mjöb., 1916, Ark. Zool., 10, 9; Zimm., 1920, Ent. Bl., 16, 232.

Size 9 to 10.5 mm. Smaller than the former, body more elongate, upper surface darker coloured, black with a feeble metallic hue. Elytra with 8 longitudinal striae: 1-5 very faint, but more or less perceptible (also the first near the suture, which is totally obliterated in *M. australis*), 6 narrow, especially behind, 7 a little broader and better perceptible behind, 8 very broad and bifid behind; interstices scarcely convex, also exteriorly. Horizontal part of truncature generally less concave than in *M. australis*, apical points less prominent, especially the exterior one. Anterior tibiae still shorter than in the latter, anterior tarsi of male more attenuated towards the apex. Aedeagus narrower, subparallel, scarcely narrowed only in apical fourth, tip more broadly rounded.

This diagnosis is suitable for Western Australian specimens. Type locality: King George's Sound. Further records are: Salt River (Aust. Mus., Macleay Mus.); Pemberton, Oct., 1931 (Darlington, Harv. Exp., Mus. Cambridge, Mass.); Bridgetown, 8.11.1931 (id.); Margaret River, Oct., 1931 (id.); Boranup, 1-3 Aug., 1905 (Hamb. S.W. Austral. Exp., Stat. 146); Murray R., 23 Sept., 1905 (id., Stat. 134); Serpentine River, 23-25.9.1905 (id., Stat. 132); Jarrahdale, 20 Sept., 1905 (id., Stat. 129); Pinjarrah, Fairbridge Farm, 1 Oct., 1931 (D. C. Swan), from still pools and sides of a running stream; Perth (Hardy, Aust. Mus.); Perth, Darlington, 14 Dec., 1912 (Hardy, Aust. Mus.); Perth, Darling Range, 18 Oct., 1931 (Darlington, Harv. Exp., Mus. Cambridge, Mass.); Mundaring Weir, 22 Nov., 1931 (id.); Geraldton, Oct., 1931 (id.). Régimbart (*l.c.*, 1882, 1884) cites the species from Cape York, which is certainly erroneous.

***M. angustatus metallescens*, nov.**

*Macrogyrus angustatus* Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 670.

Régimbart (*l.c.*, 1891) records the species as captured in N. S. Wales: Paroo and Darling River, and indeed I met in the collections revised a small number of specimens from S.E. Australian localities. As already mentioned by Régimbart, these examples are evidently brass-coloured above, but those studied by me are by no means smaller than those from Western Australia, reaching even 11 mm. in length. Moreover, in the ♂ the anterior tibiae are a little more robust than in the nominal form and the anterior tarsi are more broadly oval and less narrowed towards the apex, nearly as in *M. australis*. The aedeagus is a little narrower than in the nominal form, but of similar shape.

Type, 1 ♂ from Victoria, Bowen, from the ancient collection Godeffroy, formerly received by the Hamburg Museum. The Zoological Museum of the University of Berlin possesses a small series labelled N. S. Wales, and the Entomologisches Institut at Dahlem has some examples from Adelaide from the ancient collection of C. Schaufuss.

***Macrogyrus (Tribologyrus) finschi* Ochs.**

*Macrogyrus finschi* Ochs, 1925, Senckenbergiana, 7, 174.

Size 9 to 10.25 mm. Also very similar to *M. australis*, but a little smaller on the average and somewhat darker coloured above. Meshes of alutaceous sculpture on the disc of elytra slightly elongate. Longitudinal striae nearly entirely obliterated interiorly, only 4 external striae present: 1 very narrow and generally obliterated in apical half, 2 a little broader and better perceptible behind, 3 about twice as large as 2, 4 at least twice as large as 3 and bifid behind. Truncature and anterior tibiae nearly as in *M. australis*; anterior tarsi of ♂ more attenuated towards the apex, aedeagus a little broader, tip more acute.

*Type Locality*.—Torres Strait, Morilug (Dr. O. Finsch, Zool. Museum of the University of Berlin and my collection).

***M. finschi minor*, nov.**

Captured also on the mainland in Cape York Peninsula. These specimens are smaller in size (8.50 to 9.25 mm.) and of less elongate and more regular oval form of the body. Moreover the apical points of truncature are generally more prominent.

*Type Locality*.—Cape York Peninsula, McIlwraith Range, Lankelly Creek, June, 1932 (Darlington, Harv. Exp., Mus. Cambridge, Mass., and in my collection). Further records: Coen, May, 1932 (Darlington, Harv. Exp. Mus. Cambridge, Mass.); Endeavour River (Macleay Mus.).

**Macrogyrus (Tribologyrus) elongatus laevis** Ochs.

*Macrogyrus elongatus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 447 (partim).

*Macrogyrus elongatulus* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 598.

*Macrogyrus elongatus* Sév., 1889, Ann. Soc. Ent. Belg., 33, 157 (partim); Rég., 1892, Ann. Soc. Ent. France, 60, (1891), 670 (partim); Mjög., 1916, Ark. Zool., 10, 9; Ahlw., 1910, Col. Cat., 21, 10 (partim); Ochs, 1925, Senckenbergiana, 7, 175 (partim).

*Macrogyrus elongatus* ssp. *laevis* Ochs, 1929, Ent. Bl., 25, 198.

Size 9 to 10 mm. Oval, somewhat elongate, strongly attenuated to both ends; rather convex, somewhat gibbous in the scutellar region. Upper surface very shining, black, with a brassy hue and varicoloured reflections, especially on the head and on the sides of pronotum, longitudinal striae on elytra coppery; under side rufescent, medially somewhat darker. Alutaceous sculpture of upper surface consisting of strong, nearly round meshes only on the labrum and clypeus and on the sides of the head, pronotum and elytra; on the disc of the latter the meshes are very fine and exceedingly elongate. Elytra with fine transverse striolae and 3 longitudinal striae laterally; side margin very broad, apex of elytra bitruncate, outer and median angle spinous, sutural angle pointed. Anterior tibiae of ♂ short, regularly broadened from base to apex, which is nearly horizontally truncate, exterior angle nearly rectangular; anterior tarsi moderately broadened and strongly attenuated towards the apex. Aedeagus shorter than the lateral lobes, gradually narrowed from base to apex, tip rounded.

*Type Locality*.—N. Queensland, Temple Bay, Olive River (G. H. Wilkens, 1923, British Museum). Further records: Australia (Coll. Wehncke and Mus. Stettin); Cape York (Coll. Régimbart and Mus. Berlin, Daemel coll.); Claudie River, Jan., 1914 (T. A. K., Mus. Cambridge, Mass.); McIlwraith Range, Rocky Scrub and Lankelly Creek, June, 1932 (Darlington, Mus. Cambridge, Mass.).

Subg. 8. **Macrogyrus**, s. str., 1945, J. Balf.-Browne.

Body very elongate, only 2 longitudinal striae on elytra laterally, truncature of elytra convex, not bitruncate, sutural angle rounded, exterior angle obtuse, scarcely marked.

This subgenus, which is founded upon a single species occurring in S.E. Australia and Tasmania, is very similar to certain species of the genus *Andogyrus* which inhabit the Andes of South America, thus intimating ancient relations between the fauna of the latter continent and that of Australia. *Macrogyrus*, however, differs by the presence of transverse striolae on elytra, which are wanting in *Andogyrus*.

**Macrogyrus (s. str.) howitti** (Clark).

*Enhydrus howittii* Clark, 1864, J. Ent., 2, 215.

*Macrogyrus howitti* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 440, pl. 12, fig. 56; Rég., 1884, Ann. Soc. Ent. France, (6) 3, 471.

*Enhydrus howittii* Masters, 1885, Proc. Linn. Soc. N. S. Wales, 10, 597.

*Macrogyrus howitti* Sév., 1889, Ann. Soc. Ent. Belg., 33, 157; Rég., 1892, Ann. Soc. France, 60, (1891), 740; Rég., 1907, Ann. Soc. Ent. France, 76, 139; Ahlw., 1910, Col. Cat., 21, 10; Mjög., 1916, Ark. Zool., 10, 9; Ball, 1932, Mém. Mus. Roy. Hist. Nat. Belg., 4, 4, p. 22, fig. 1b, 2b, pl. 1, fig. 5.

*Macrogyrus (Macrogyrus s. str.) howittii* J. Balf.-Browne 1945, Ann. Mag. Nat. Hist., ser. 11, vol. 12, p. 106.

Size 10.5 to 12 mm. Oval, very elongate; moderately convex. Upper surface very shining, black, with an aeneous hue, in some places with varicoloured reflections, especially on the head, the sides of pronotum and the apical portion of elytra. Lateral longitudinal striae on elytra greenish or purplish, the narrow side margin of pronotum

and elytra green to bluish-green; under side black, epipleura, abdomen and legs rufescent. Labrum densely punctate, upper surface with an alutaceous sculpture consisting of nearly round meshes in the labrum and the sides of the head, pronotum and elytra, becoming a little finer and more elongate on the disc. Elytra with many fine transverse striolae and laterally with two indistinct longitudinal striae, marked by serial punctures; the inner one of these striae generally strongly abbreviated and reaching only about half the length of elytra, in some examples a very short third stria is remarkable at the base anteriorly. Apical portion of elytra with small depressions near the apex of the side margin and near the suture shortly before the truncature. The latter is convex, scarcely angulate in its middle in some examples exceptionally, the sutural angle is rounded, the outer angle but slightly marked. Anterior tibiae of ♂ short, gradually and rather strongly broadened from base to apex, the latter slightly obliquely truncate, exterior angle sharp, produced; anterior tarsi moderately broadened, attenuated towards the apex. Aedeagus a little shorter than the lateral lobes, rather broad, subparallel, strongly attenuated in the middle of its length, apical third gradually narrowed towards the apex, which is broadly rounded; lateral lobes very slender basally, broadened only in apical fourth.

Clark's types were collected at Moreton Bay by himself and Mr. Bakewell. Mjöberg (1916, *l.c.*) cites a specimen captured by himself at Mapleton, Blackall Range. These are the only exact records given in literature for this species. I have seen specimens from Melbourne (ex coll. Zimmermann) and from Scone, N. S. Wales (Australian Museum). Specimens from Tasmania are represented in the collections of the Hamburg Museum, Macleay Museum and American Museum. The Museum of Berlin has a small series from Tasmania, Dunalley (Rev. John Bufton).

#### Subg. 9. *Megalogyrus*, nov.

Size very large, up to 18 mm. More broadly oval than all other Australian species of the genus. Longitudinal striae on elytra reduced to fine lines, only 1 opaque stria laterally. Apex of elytra slightly bitruncate, only the exterior angle pointed.

#### *Macrogyrus* (*Megalogyrus*) *striolatus* (Guérin).

*Gyrinus striolatus* Guérin, 1830, in Duperrey, Voy. Coquille, Zool., 2, 2, p. 62, pl. 1, fig. 20; Boisd., 1835, Fn. Ent. Océan Pacif., 2, 51; Aubé, 1838, Spec. Col., 6, 656; Redtenb., 1868, Reise Novara, Zool., 2, 1, A1, 24.

*Macrogyrus striolatus* Rég., 1882, Ann. Soc. Ent. France, (6) 2, 434; Rég., 1884, Ann. Soc. Ent. France, (6) 3, (1883), 471; Sév., 1889, Ann. Soc. Ent. Belg., 33, 158; Rég., 1892, Ann. Soc. Ent. France, 60, (1891). 740.

*Gyrinus striolatus* Masters, 1896, Proc. Linn. Soc. N. S. Wales, 21, 698.

*Macrogyrus fortissimus* Blackb., 1901, Trans. Roy. Soc. S. Aust., 25, 126.

*Macrogyrus striolatus* Blackb., 1903, Trans. Roy. Soc. S. Aust., 27, 92; Rég., 1907, Ann. Soc. Ent. France, 76, 139, 156; Ahlw., 1910, Col. Cat., 21, 11; Mjöb., 1916, Ark. Zool., 10, 9; Zimmerm., 1917, Ent. Mitt., 6, 140; Tillyard, 1926, Ins. Aust. N. Zeal., p. 194, fig. R.20.

Size 15 to 18 mm., exceptionally only 12 mm. Broadly oval, more attenuated posteriorly than anteriorly, especially in the ♀; rather convex. Upper surface black, with a metallic hue and varicoloured reflections in some places, especially on the head and on the sides of pronotum and elytra; under side black, natatorial legs rufous. Head very shining, pronotum and elytra with a dull lustre. Upper surface with an alutaceous sculpture consisting of nearly round meshes strongly impressed on the sides of pronotum and elytra, less impressed on the disc of the latter, very superficial on the head. Head and disc of pronotum punctate, elytra with numerous fine transverse

striolae and 7 faint longitudinal lines, the most exterior of which is accompanied by an opaque violet stria, reaching about half the length of elytra. Apex of the latter slightly bitruncate, sutural angles scarcely dehiscent, nearly rectangular, shortly rounded, median angle obtuse, exterior angle slightly pointed. Anterior tibiae slightly curved inwards, basal half nearly subparallel, broadened only in apical half, especially more so in the ♂, apex nearly horizontally truncate, exterior angle rectangular in ♀, sharp and produced in ♂; anterior tarsi of the latter broadened and attenuated towards the apex, subparallel in ♀. Aedeagus of the ♂ subparallel, relatively slender, a little shorter and narrower than the apical portion of the lateral lobes, attenuated in the middle of its length, apical third but scarcely narrowed, tip broad, flatly rounded.

*Type Locality*: Port Jackson (N. S. Wales). Blackburn's *fortissimus* was collected in the Blue Mountains (N. S. Wales). Further localities: N. S. Wales: Blue Mts. (F. H. Taylor, Aust. Mus.); Megalong Valley, 1,000 ft., 23.1.32 (Darlington, Harv. Exp. Mus. Cambridge, Mass.); Mt. Wilson, 3,500 ft., Jan., 1932 (ibid.); Wentworth Falls, Jan., 1932 (ibid.); Richmond River, 1909 (Brit. Mus.); Upp. Chichester, Blue Gum Knob, 28.9.21 (A. Musgrave, Aust. Mus.); Barrington Tops, 5,000 ft., 8-9.2.32 (Darlington, Harv. Exp., Mus. Cambridge, Mass.); The Dorrigo, 3,000 ft., Febr., 1932 (ibid.). S. Queensland: Nat. Park, McPherson Range, March, 1932, 3-4,000 ft. (ibid.); Mt. Tambourine (Hacker, Pottinger and other collectors, Queensl. Mus., Mus. Cambridge, Mass.); Brisbane (Queensl. Mus.).

The specimens from different localities vary to a certain degree in size, form of the body and other minor characters, and there are also individual aberrations. Among normal specimens from McPherson Range there was a small female measuring only about 12 mm. in length, having on elytra laterally a second opaque stria, though very narrow and reaching only about half the length of elytra. Moreover, anterior tibiae are less broadened and less curved than is the rule in this specimen.

#### Genus *Dineutus* Macleay, 1825.

Length 6 to 25 mm., the Australian species measuring but 6.5 to 9 mm. Scutellum invisible. Elytral striae faint. Outer portion of the metasternum in form of a large triangle. Anterior margin of metacoxae rather straight, reaching the meta-episternum before its apical end; lateral end of the raised portion of metacoxae obtuse. Anterior tarsi of the male scarcely broadened, subparallel, with a uniform dense brush of bristles beneath.

As in the former genus, the species of *Dineutus* are very different in size and other characters, from which were derived several subgenera (cf. Ochs, 1926, Ent. Z. Frankfurt, 40, 64-66), only two of which are represented in Australia by one species each. The *Dineutini* are distributed all over the world, with the exception of the Palearctic region and the South American continent, having a secondary centre of development, apparently of more recent origin, in New Guinea, whence 5 subgenera (2 endemic) are recorded; the small number of species occurring in Australia is noticeable.

Two species recorded in literature from Australia must be cancelled (cf. Ochs, 1926, Ent. Z. Frankfurt, 40, 192). *D. caliginosus* Rég. (1883, Ann. Soc. Ent. France, (6) 2, 397) is identical with *D. politus* Macleay, which is a common species in Java. By Mr. Peschet, who was able to study the type from the ancient collection of Mr. Wehncke, now in the collection of Mr. R. Oberthür, I was informed that it matches a small dark-coloured female specimen of the latter species. The indication "Australia" on the locality label is evidently erroneous. *D. inflatus* Blackburn (1895, Trans. Roy. Soc. S. Aust., 19, 28) is synonymous with *D. ciliatus* Forsberg (= *vittatus* Germar), as stated by Mr. Gilbert J. Arrow, who studied the type of Blackburn, now in the British Museum. "Victoria", which is given as locality in the description and on the label, is a locality in Mexico, where the species occurs, while Blackburn believed it to be collected in Victoria (Australia).

*Key to Australian Species of Dineutus.*

1. Pronotum and elytra not bordered with yellow. Elytra with a little tooth at the outer apical angle in the male, not toothed but straightly truncate in the female  
*D. (Cyclous) australis* Fabr.
- 1'. Pronotum and elytra bordered with yellow. Outer apical and medial angle of truncature spinous in both sexes ..... Subgenous *Spinodosineutes* Hatch . . . 2
2. Elongate-oval, subparallel. Spines of elytra longer and more acute. Anterior tibiae of the male straight ..... *D. (Spinodosineutes) neohollandicus* Ochs.
- 2'. Less elongate, more broadly oval. Spines of elytra shorter and less acute. Anterior tibiae of the male strongly curved outwards basally . . *D. (Spinodosineutes) neoguineensis* Rég.

**Dineutus (Cyclous) australis (Fabr.).**

- Gyrinus australis* Fabr., 1775, Syst. Ent., 235; Modeer, 1776, Physiogr. Sällsk. Handl., 1, 3, p. 159; Fabr., 1781, Spec. Ins., 1, 298; Fabr., 1787, Mant. Ins., 1, 194; Gmelin, 1788, Syst. Nat., ed. XIII, 4, p. 1611; Fabr. 1792 Ent. Syst. 1, 203; Olivier, 1795, Ent., 3, 41, p. 12, pl. 1, f. 4; Fabr., 1801, Syst. Eleuth., 1, 275.
- Gyrinus rufipes* Fabr., 1801, Syst. Eleuth., 1, 276.
- Gyrinus australis* Schönherr, 1808, Syn. Ins., 1, 2, p. 38.
- Gyrinus rufipes* Schönherr, 1808, Syn. Ins., 1, 2, p. 39.
- Gyrinus australis* Forsberg, 1821, Nova Acta Upsal., 8, 303.
- Gyrinus rufipes* Forsberg, 1821, Nova Acta Upsal., 8, 306.
- Gyrinus dentipennis* Macleay, 1825, Annulosa Javan., ed. I, p. 30.
- Gyrinus limbatus* Macleay, 1825, Annulosa Javan., ed. I, p. 30.
- Gyrinus dentipennis* Macleay, 1833, Annulosa Javan., ed. II, p. 133.
- Gyrinus limbatus* Macleay, 1833, Annulosa Javan., ed. II, p. 133.
- Dineutes australis* Aubé, 1838, Spec. Col., 6, 785.
- Gyrinus iridis* Hope, 1842, Ann. Mag. Nat. Hist., 9, 428.
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Length 6.5 to 9 mm. Oval, ♀ more elongate than the ♂, moderately convex. Disc of upper surface bronzed, shining, sides opaque, with violet, blue or green reflections; under surface black, natatorial tibiae and tarsi rufescent. Upper surface remotely punctate and having an alutaceous sculpture consisting of nearly round meshes. Elytra with a lateral impression, longitudinal striae faint, more strongly impressed towards the sides; elytral apex serrulate. Truncature straight and slightly convex in the female, outer apical angle distinct. In the male the elytral apex is produced, forming an obtuse angle which is broadly rounded, the inner portion of truncature being less oblique and broader than the outer one; the apex of side margin produced in a small spine. Aedeagus slender, as long as the lateral lobes, gradually narrowing from base to apex, tip very narrowly rounded.

*Type Locality*.—In Novae Hollandiae aquis. Apparently the species is rather common and widely distributed in Australia, from where I registered the following data:

Victoria: No exact locality given.

N. S. Wales: Liverpool.

Queensland: Brisbane, Ipswich, Sandgate, Rockhampton, Blackall Range, Mossman, Mitchell River, Port Denison, Townsville, Cairns, Cooktown, Atherton Tableland, Yungaburra, Cedar Creek, Malanda, Bellenden Ker, Herberton, Co6n.

N. Australia: Port Essington, Port Darwin, Burnside, Katherine, Kimberley Dt., Noonkanbah.

W. Australia: Rockingham, Wiluna.

S. Australia: No exact locality given.

Thursday Island; Morilug.

The species is furthermore recorded from Liu-Kiu, Formosa, S. China, Philippine Islands, Celebes, Java, Bali, Lombok, Soemba, Kisser Islands, New Hebrides, New Caledonia, Fiji and Niuafo. There are mentioned some more localities in literature, which are, however, doubtful. This concerns especially the record New Zealand, where *G. convexiusculus* is probably the only representative of the family.



In the series there are sometimes specimens of a dull black colour, which occurs regularly in the metallic species; also rufinotic specimens are frequently to be found. There is a certain variability in the series from the above localities if compared, but the differences are not so important as to consider these forms as racially or even specifically distinct. Only the specimens from Niuafofua showed distinguishing characters of more importance (ssp. *ultimus* m., 1927, Ent. Bl., 23, 34).

Cheo (1934, *l.c.*, pl. 2, fig. 10) gives an illustration of the aedeagus of *D. australis*, which must be erroneous. Also in S. Chinese males (which are a little larger in size, more broadly oval and more gibbous than Australian specimens) the aedeagus is not shorter than the lateral lobes and is not angularly widened in middle of length, as described and drawn by the Chinese author.

***Dineutus (Spinodineutes) neohollandicus* Ochs.**

*Dineutes neo-guineensis* Rég., 1907, Ann. Soc. Ent. France, 76, 151 (partim); Ahlw., 1910, Col. Cat., 21, 7 (partim); Mjöberg, 1916, Ark. Zool., 10, 9; Peschet, 1925, Treubia, 7, 6 (partim).

*Dineutus (Gyrinodineutus) neohollandicus* Ochs, 1926, Ent. Z. Frankfurt, 40, 119, 121, 136, 191; Ochs, 1929, Ent. Bl., 25, 199.

Size 7.5 to 8 mm. Oval, somewhat elongate, a little more attenuated anteriorly; rather convex, depressed behind, a little more so in ♂. Upper surface shining, darkly olive-coloured, with violet reflections; labrum green, clypeus coppery, pronotum and elytra with a yellow margin, accompanied by a dark narrow border exteriorly and a metallic green stripe interiorly. Under side and legs rufescent, epipleura yellow. On the yellow margin of elytra there is a dark metallic green spot in the posthumeral portion, where the knee of anterior legs is inserted beneath, this spot being somewhat larger in the ♂. Elytra slightly compressed exteriorly behind the posthumeral portion, bearing 3 longitudinal striae on the outer portion, striae aeneous to coppery, interstices dark blue to purplish; in the ♀ there is a strongly alutaceous spot at the base of elytra beside the scutellar region. Truncature strongly protruding posteriorly, with an apical spine and a second spine at the end of the exterior margin; in the ♀ the spines are longer and the emargination at the inner side of the outer spine is deeper. Anterior tibiae of ♂ nearly straight, aedeagus shorter than lateral lobes, slender, narrowing gradually from base to apex, somewhat constricted in the middle of length, tip very fine and acute.

My type specimens, bought from Staudinger, are labelled "Australia", without precise indication of locality. Further records are:

N. Australia: Port Darwin (Macleay Museum); Adelaide River (Brit. Mus., sec. Régimbart).

Queensland: Cape York (Dämel, Mus. Berlin); Gregory River (Dr. J. B., Queensl. Mus.); Gordonvale (Illingworth, Queensl. Mus.); Cairns (Queensl. Mus. and Mus. Cambridge, Mass.); Brisbane (Queensl. Mus.).

Victoria (?): (Mus. Dresden).

Régimbart (1907, *l.c.*) believed the specimens from Adelaide River to be identical with *D. neo-guineensis* from N. Guinea (the Buru specimens mentioned by Peschet (1925, *l.c.*) belonging probably to a third species). I did recognize the new Australian species only after most of the specimens mentioned above had passed through my hands without exciting my attention. Therefore it might be possible that both species exist in Australia side by side, although I do not believe it. At all events I joined the characters of both in the key given above, in order to enable students to distinguish these closely allied species.

Considerations about Phylogeny and Zoogeography.

The composition of the gyrid fauna of Australia is very peculiar and seems to allow some conclusions about phylogeny and zoogeography. These themes, relative to the whole family, were discussed by several authors in the last twenty years. Independently, by thorough systematic studies of many years, Dr. F. Guignot<sup>(1)</sup> and myself<sup>(2)</sup> arrived at nearly the same results, stating that the origin of the Gyrinidae took place in the earliest period of the adepagous stock, and that they are by no means direct descendants of the Dytiscidae. Following the example of Leng<sup>(3)</sup> and Tillyard,<sup>(4)</sup> I therefore placed the Gyrinoidea side by side with the Caraboidea in the adepagous suborder.<sup>(5)</sup> Melville H. Hatch,<sup>(6)</sup> in the course of a careful comparative study of the exoskeleton, took almost diametrically opposed views. It must, however, be considered that his investigations were confined to a relatively small number of species, not including the most instructive with regard to intergeneric relationship, and that, therefore, in generalizing, he risked arriving at inaccurate conclusions. Omer-Cooper,<sup>(7)</sup> apparently attributing too much value to the similarity of some dystiscid larvae to those of the Gyrinidae, supports, like Hatch, the direct descent of the latter from Dytiscidae, and both authors cite *Palaeogyrinus strigatus* Schlecht.<sup>(8)</sup> as the link between the two families. Unfortunately, however, this fossil was rediscovered meantime in large number and studied thoroughly by Prof. Statz,<sup>(9)</sup> who concluded that it is doubtless a dytiscid beetle and that it owes its name to the fact that its legs were wrongly restored by the author, as already presumed by Darlington.<sup>(10)</sup> Therefore, so-called *Palaeogyrinus* can no longer be used for proof of descent of the Gyrinidae from Dytiscidae, which theory is also not supported by other fossils. In my opinion, and as formerly expressed by Darlington,<sup>(10)</sup> all fossil Gyrinidae should be thoroughly revised to determine whether they are correctly interpreted as belonging to the family in general, which concerns their relationship to recent genera. For instance, *Dineutus* Heer<sup>(11)</sup> and *Miodineutus* Hatch<sup>(12)</sup> seem very doubtful. According to Heer, these insects had a size of only about 7 to 7.5 mm. (ano excepto); if, therefore, they belong really to *Dineutus*, this would affirm my theory, that the ancestors of now living forms were smaller in size.

In my opinion characters of Gyrinidae are to be valued as follows:

	<i>Primitive.</i>	<i>Derivative.</i>
Size of the body .. .. .	Small.	Large.
Form of the body .. .. .	Moderately elongate.	Very elongate, broadly oval or other peculiar forms.
Convexity .. .. .	Moderate.	Strong.
Alutaceous sculpture of the upper surface .. .. .	Strong.	Fine or absent.
Pubescence of pronotum and elytra .. .. .	Rudimentary.	Entirely absent or more or less perfect.
Colour of upper surface .. .. .	Brown to black or olive-coloured.	Blue, violet, brassy, red patterns.
Colour of under side .. .. .	Rufescent.	Dark metallic or pale yellow.
Side margin .. .. .	Yellow.	Not yellow.
Labrum .. .. .	Transverse.	Prominent.
Pronotum .. .. .	With grooves.	Without grooves.
Scutellum .. .. .	Present.	Wanting.
Elytra .. .. .	With eleven longitudinal striae.	Longitudinal striae reduced in number; abbreviated or more or less obliterated.
Suture of elytra .. .. .	Bordered.	Not bordered.
Truncature of elytra .. .. .	Convex.	Truncate, concave or bitruncate; with points or spines. (In the larger species the latter may be reduced secondarily.)

	<i>Primitive.</i>	<i>Derivative.</i>
Pygidium . . . . .	Flat and short.	Conical, elongate, with a longitudinal row of hairs beneath.
Anterior legs . . . . .	Simple.	More or less modified.
Metacoxae . . . . .	Outer (deeper) portion broader than the inner one.	Inner portion, which adjoins the metasternum, broader than the outer (deeper) one.
Metasternum . . . . .	Outer portion narrow, elongate.	Outer portion broad, in form of an equilateral triangle.

The sum of primitive characters, as enumerated above, constitutes an insect very like *Gyrinus haasi*, which was discovered some years ago by Dr. Fritz Haas in Africa in the vicinity of Lake Moero and embodies very well a primitive gyrid beetle.

The composition of the gyrid fauna of Australia and its relation to other areas is illustrated by the accompanying table; it comprises 17 species in all, 14 of which are endemic, and only 3 have a wider range. (See table on page 197.)

The *Gyrini caudati* (Orectochilinae) are totally wanting in Australia. They are distinguished from the *Gyrini incaudati* (Gyrininae and Enhydrinae) by the feature of the last abdominal segment, which is elongate and of conical form, with a longitudinal row of hairs beneath, thus representing a perfect rudder, inasmuch as it is movable in every sense. Moreover, in this group the upper surface is more or less covered with short hairs, this tomentous covering serving to protect the insect from moisture and therefore favouring its water life. By these acquisitions, accompanied mostly by exquisite streamline shape, this subfamily is evidently the most highly evolved and therefore of more recent origin, which is clearly shown by its distribution. The Orectochilinae are represented by three genera which, without mentioning a few exceptions, are distributed in the following manner: *Orectochilus*, Indo-Malayan; *Gyretes*, Neotropic; and *Orectogyrus*, Ethiopic. This means that this last offshoot of the family had its origin in the southern hemisphere and that its development became active only after the ancient Gondwana continent had been divided into its present parts (Australia, India, Africa and South America). According to the nearly unanimous opinion of the palaeogeographers this Gondwana continent comprised all the recent continents of the southern hemisphere in Mesozoic time and was separated from the then existing continents of the northern hemisphere by a large ocean. It divided itself in Cretaceous time, wherefore the development of the *Gyrini caudati* must have taken place towards the end of the latter period or in early Tertiary. Australia having been separated already in later Jurassic time, the Orectochilinae were therefore prohibited from entry to this territory.

Apparently the Gyrininae are the earliest offshoot of the family. Of these the tribe Gyrinini (genus *Gyrinus*) has a world-wide distribution, but seems to originate from the northern hemisphere, where the genus occurs abundantly, while it is relatively scarcely represented in the southern hemisphere. On the contrary, the tribe Aulonogyrinini (*Aulonogyrus* and *Paragyrynus*) is evidently of Gondwana origin, as proved by its distribution, and the Australian species (*Aulonogyrus strigosus*) is certainly a remnant from ancient times, before Australia became isolated. *Gyrinus convexiusculus*, the only Australian representative of this genus, might have migrated there, as this species spreads very widely, which seems to indicate an increased faculty of change of place, belonging apparently only to certain species of the family. Active migration of these beetles is, however, restrained by the fact that they are very sensitive concerning desiccation and influence of sunlight, which, as proved by experiment, they endure only for a relatively short time. Moreover, the beetles are not able to rest at sea-level, because of the pernicious effect of salt-water, wherefrom results the impossibility of travelling over large distances by air. *G. convexiusculus*, which



occurs also in New Zealand, which it could not reach otherwise in recent time, must therefore have existed in its present form in early Tertiary, when a land-bridge existed connecting Australia and Tasmania to New Zealand, which enabled the insect to pass there.

This land-bridge continued by Antarctica to South America, by which is explained the high degree of affinity of Australian *Macrogyrus* with South American *Andogyrus*. Certainly, and contrary to what is believed by Hatch, the latter and also the South American *Enhydrus*, which are still more developed, must be derived from the former. *Macrogyrus*, and especially its subgenera which are confined to Australia, comprises very primitive species, from which may be concluded that the centre of dispersal of the Enhydrini was situated on the Australian mainland, from where they migrated partly to New Guinea and the Melanesian Archipelago, partly by the Antarctic land-bridge to South America, there giving rise to *Andogyrus* and *Enhydrus*. In the course of its development, *Macrogyrus* finished by producing very different species, by which I was led to the classification given above, the majority of the subgenera there established living in Australia. Of these subgenera 5 are endemic in Australia, 2 are peculiar to the Melanesian offshoot of the genus, and only 2 are represented on the Australian mainland, as well as in New Guinea and the Melanesian archipelago; in the last-mentioned subgenera Australian species are in minority and most of them are evidently primitive.

There are two large groups in the genus *Macrogyrus*, in one of which the narrow outer portion of the metasternum resembles a gyroid feature, while in the second group the outer portion of metasternum is developed analogously to that of *Enhydrus* and *Dineutus*. Within both groups further division was based on the feature of the truncature of the elytra, which seems significant with reference to presumptive evolution of the genus and of the family in general. The apex of the elytra is more or less convex in more primitive species, as for instance in *Gyrinus convexiusculus* and *Aulonogyrus strigosus*. In the course of development there appears a horizontal truncature as in *D. australis* ♀, which may become somewhat oblique in vaulted forms. Probably in connexion with adaptation for life in swift running water, there exists in the family a tendency for formation of points or spines at the end of elytra. There is only one point at the exterior angle in *D. australis* ♂ and also in *Clarkogyrus*, *Macrogyrus*, s. str., and *Megalogyrus*, although strongly reduced in the latter. In *D. neohollandicus* and in *Orectomimus* the sutural angle is also pointed, and in the latter a third point begins to rise in the middle of truncature, which is more or less evident in the other subgenera. Having attained a certain size in the course of evolution, the larger species, if not especially bound to swift-running water, show the tendency of reducing these prominences as well in *Macrogyrus* as in *Dineutus*. In *Australogyrus*, for instance, sutural and medial angles are already reduced, in *Clarkogyrus* they disappeared completely and only the outer angle is kept, the latter being almost totally reduced in *Macrogyrus*, s. str. In *Megalogyrus*, in which the apical points are very reduced, the increase of length is accompanied by a strong progression in width, which occurs in *Enhydrus* and *Dineutus*. Very interesting is the retention of primitive characters (imperfect streamline shape and strong longitudinal striae on elytra) in *Clarkogyrus*, which has a highly evolved truncature, and in *Australogyrus*, despite the beginning of reduction of apical points and of extremely developed anterior legs in the ♂. The most significant species in phylogenetical view is *M. paradoxus*, which, in the form of its body and the shape of metasternum and metacoxae, has much affinity to orectochilin feature, from which I concluded that more primitive ancestors of this species might have been the common prototype of both the enhydrin and the orectochilin stock.

With regard to Australian *Dineutus*, it should be mentioned that *D. neohollandicus* has its nearest ally in New Guinea and that other closely allied species are living in the Indo-Malayan region. For explanation of a possible migration between the two regions it is necessary to go back to Jurassic time. A very peculiar species belonging to the same group (*D. heterandrus* Ochs<sup>(13)</sup>) was discovered some years ago in Bougainville, the characters of which seem to allow the conclusion that from these small yellow-bordered species are to be derived the large, highly developed *Callistodineutus* occurring in the Fiji Islands. For migration there must have been a land-bridge in late Cretaceous time, which also explains the occurrence of *Macrogyrus* and *Aulonogyrus* in New Caledonia and migration of *D. australis* to Fiji and Niuafo. The latter species occurs also in the Indo-Malayan region and probably existed in Jurassic time, when large reptiles ruled over the animal kingdom, and a long while before the evolution of human beings began; certainly a remarkable proof for the stability of germ-plasm.

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