

# AUSTRALIAN DUNG BEETLES OF THE SUB-FAMILY COPRIDES

By ARTHUR M. LEA, F.E.S., ENTOMOLOGIST, S.A. MUSEUM

Plates vi-ix.

IN comparison with other parts of the world Australia has but few Coprides, mostly below the average size of those occurring elsewhere; the largest species, *Aulacopris reichei*, seldom reaching a body-length of an inch and a quarter. This, however, is only to be expected considering the dearth of large indigenous mammals. Dung beetles of several kinds have multiplied with the distribution of the cow and horse, and many European species have been introduced, especially in the Aphodiides and Staphylinidae.

Some of our genera are of exceptional interest, such as *Macropocopris*, species of which live in the fur about the anal region of marsupials, and have developed extremely powerful claws; one species, *M. symbioticus*, has been found in the cloaca of a wallaby. Dr. J. F. Illingworth informed me that *Pedaria geminata* habitually uses, for its own young, dung-balls formed by other species of Coprides.

The following is a list of the species previously recorded as occurring in Australia, synonyms being printed in italics:

|   |   |
|---|---|
| <p>Actinophorus leei Shipp.<br/>Aulacopris reichei White.<br/>Canthosoma castelnaui Har. (<i>Cephalodesmus</i>).<br/>    <i>macleayi</i> Har. (<i>Cephalodesmus</i>).<br/>    <i>mastersi</i> Mael.<br/>    <i>Homodesmus haroldi</i> Sharp.<br/>    <i>planus</i> Sharp (<i>Homodesmus</i>).<br/>Catharsius australiae Shipp.<br/>    <i>tricornutus</i> Felsehe.<br/>Cephalodesmus armiger Westw.<br/>    <i>cornutus</i> Mael.<br/>    <i>laticollis</i> Pase.<br/>    <i>minor</i> Blackb.<br/>    <i>quadridens</i> Mael.<br/>Copraecus hemisphaericus Guer.</p> | <p>Coptodaetyla baileyi Blackb.<br/>    <i>acuticeps</i> Felsehe.<br/>    <i>ducalis</i> Blackb.<br/>    <i>glabricollis</i> Hope.<br/>    <i>monstrosa</i> Felsehe.<br/>    <i>subaenea</i> Har.<br/>Epilissus globulus Mael.<br/>    <i>niger</i> Lansb.<br/>    <i>ustulatus</i> Lansb.<br/>Labroma horrens Sharp.<br/>    <i>Menthophilus tuberculatus</i><br/>    Waterh.<br/>Macropocopris carmodensis Blackb.<br/>    (<i>Onthophagus</i>).<br/>    <i>kingi</i> Har (<i>Onthophagus</i>).<br/>    <i>O. muticus</i> Mael.</p> |
|---|---|

- parvus Blanch (*Oonthophagus*).  
     *O. inermis* Mael.  
     *O. submuticus* Blackb.  
 prehensilis Arrow.  
 symbioticus Arrow.  
*Minthophilus carinatus* Reiche.  
     *hollandiae* Boi.  
     subnleatus Sharp.  
*Monoplistes haroldi* Lansb.  
*Oonthophagus acuticeps* Mael.  
     *adelaidae* Hope.  
     *hostilis* Har.  
     *anisocerus* Er.  
         *euprocoviridis* Blanch.  
         *fuliginosus* Er.  
     *asper* Mael.  
         *patruelis* Har.  
     *atrox* Har.  
         *quinquetuberculatus* Mael.  
         *palmerstoni* Blackb.  
         *pugnacior* Blackb.  
         *sloanei* Blackb.  
     *anrocoviridanus* Blackb.  
     *auritus* Er.  
         *cereus* Hope.  
         *micans* Sturm.  
         *umbraculatus* H. & J.  
     *australis* Guer.  
         *capella* Boi (nec Kirby).  
     *bicornis* Mael.  
     *bipustulatus* Fabr.  
     *blackburni* Shipp.  
         *nitidior* Blackb.  
     *blackwoodensis* Blackb.  
     *capella* Kirby.  
     *captiosus* Har.  
     *carteri* Blackb.  
     *comperei* Blackb.  
     *consentaneus* Har.  
         *granulatus* Mael.  
     *conspicuus* Mael.  
         *bovilli* Blackb., var.  
     *cowleyi* Blackb.  
     *crochi* Har.  
     *cruciger* Mael.  
     *cuniculus* Mael.  
     *declivis* Har.  
         *deseetus* Mael., var.  
     *devexus* Mael.  
     *discolor* Hope.  
     *dumbrelli* Blackb.  
     *dunningi* Har.  
     *emarginatus* Mael.  
     *erichsoni* Hope.  
     *evanidus* Har.  
     *fabricii* Waterh.  
     *ferox* Har.  
         *inaequalis* Dej.  
         *mniszeechi* Har.  
     *fissiceps* Mael.  
     *fitzroyensis* Blackb.  
     *fletcheri* Blackb.  
     *frenchi* Blackb.  
     *freaticeps* Masters.  
         *froygatti* Mael.  
         *furcatus* Mael.  
         *lobicollis* Mael., var.  
     *geelongensis* Blackb.  
     *glabratus* Hope.  
     *granulatus* Boh.  
     *granum* Lansb.  
     *haagi* Har.  
     *helmsi* Blackb.  
     *henleyensis* Blackb.  
     *humator* Shipp.  
         *humeralis* Mael.

- howitti Blackb.  
 incanus Mael.  
 incornutus Mael.  
 integriceps Mael.  
 jubatus Har.  
     *duboulayi* Waterh.  
 koebelei Blackb.  
 laminatus Mael.  
     *cowleyi* Blackb.  
     *pugnar* Har.  
 latro Har.  
 leai Blackb.  
 lucidicollis Boh.  
 macleayi Blackb.  
 macrocephalus Kirby.  
 margaretensis Blackb.  
 mastersi Mael.  
 minusculus Mael.  
 murchisoni Blackb.  
 mutatus Har.  
     *hirculus* Er.  
 muticus Mael.  
 nanus Waterh.  
 negatorius Blackb.  
 nodulifer Har.  
     *divaricatus* Mael.  
 ocelliger Har.  
 parallelicornis Mael.  
 pentacanthus Har.  
     *quadridentatus* Hope.  
 perpilosus Mael.  
 pexatus Har.  
 picipennis Hope.  
 planicollis Har.  
 pontilis Blackb.  
 posticus Er.  
     *flavolineatus* Blanch.  
 promptus Har.  
 pronus Er.  
 propinquus Mael.  
 purpureicollis Mael.  
 quadripustulatus Fabr.  
 queenslandicus Blackb.  
 rubescens Mael.  
 rubicundulus Mael.  
 rubrimaculatus Mael.  
     *decurio* Lansb.  
 ruficapra Waterh.  
 rufosignatus Mael.  
 rognus Kirby.  
 salebrosus Mael.  
 schmeltzi Har.  
 subocelliger Blackb.  
 sydneyensis Blackb.  
 tabellicornis Mael.  
 tamworthi Blackb.  
 thoreyi Har.  
 tweedensis Blackb.  
 victoriensis Blackb.  
     *jungi* Blackb.  
 vilis Har.  
 villosus Mael.  
 viridiobseurus Blanch.  
 walteri Mael.  
 zietzi Blackb.  
 Panelus bidentatus Wilson.  
     *pygmaeus* Mael. (*Temnoplectron*).  
     *arthuri* Blackb.  
 Pedaria geminata Mael. (*Aphodius*).  
 Platyphymatia aeneopicea Waterh.  
     *calcarata* Mael.  
     *squalida* Mael.  
     *tuberculata* Lansb.  
 Temnoplectron diversicolle Blackb.  
     *laeve* Waterh.  
     *lucidum* Mael.  
     *occidentale* Mael.

|                             |                             |
|-----------------------------|-----------------------------|
| politulum Macl.             | hollandiae Fab.             |
| rotundum Westw.             | <i>novachollandiae</i> Boi. |
| tibiale Macl.               | picens Hope.                |
| Tesserodon angulatus Westw. | variolosus Macl.            |
| gestroi Lansb.              | Thyregis kershawi Blackb.   |

**CANTHONOSOMA MACLEAYI Har. (Cephalodesmius), 1868.**

*Canthonosoma mastersi* Macl., 1871.

*Homodesmius haroldi* Sharp, 1873.

Plate vi, figs. 1, 2.

Macleay described the front legs of *Canthonosoma* as without tarsi, and this is the case with most of the specimens of *C. mastersi* before me, but this is certainly due to wear or accident, as on one co-type the right tarsus is present, on another both are present; the front tibiae often have the appearance as of being worn down, and the projection on each side of the median notch of the clypeus also diminishes in size with usage; on worn specimens the bronzy gloss disappears and most of the setae of the upper-surface. Two specimens before me are from Rockhampton, and agree with the description of *Homodesmius haroldi*, which I can only regard as a synonym; the species, however, was first described as *Cephalodesmius macleayi*.

**CANTHONOSOMA CASTELNAUI Har. (Cephalodesmius).**

Plate vi, figs. 3, 4.

Two females from Pine Mountain (Queensland) were labelled in the Simson collection as *Cephalodesmius castelnaui*, and apparently correctly so. Several males from Capella (Queensland) differ from them in having the sides (epipleurae) of the elytra so compressed that from above each elytron appears to be bounded by a strongly elevated and rather narrow ridge. The small shining tubercles on the prothorax are more conspicuous than on the female, and the metasternum has an obtuse tubercle in front.

**CANTHONOSOMA PLANUM Sharp (Homodesmius).**

This species<sup>(1)</sup> was not recorded in Masters' Catalogue, and evidently also

(1) Sharp, Rev. et Mag. Zool., 1873, p. 37.

belongs to *Canthonosoma*.

**COPRAECUS HEMISPHAERICUS** Guer.

Plate vi, fig. 5.

I have not seen the original description of this species, but the figure given in Cuvier's *Animal Kingdom* (2) shows two spines on each of the middle and hind tibiae, although on figure 3a only one spine is shown; Reiche (3) described and figured the tibiae as unispinose, and his figure is considerably narrower than that of Westwood's. (4) The species is a very rare one, and no locality, other than "Australia," has been noted for it; but there are now before me three specimens varying in length from 13 to 16 mm., from East Kimberley and Broome. The species may be readily distinguished by the elytra; each of these has six, moderately elevated, shining interstices, with a row of setiferous punctures on each side (but the setae appear to be easily abraded); the middle tibiae are bispinose, the hind ones unispinose; on the male only there is a curved process at the apex of the hind tibiae.

The species is probably congeneric with *Canthonosoma macleayi*, from which the male differs in having the surface less opaque, elytral interstices shining, hind tibiae with an apical hook, and metasternum non-tuberculate.

**TESSERODON VARIOLOSUS** Macl.

Two specimens from Groote Eylandt appear to represent a variety of this species; they are smaller (4.5–4.75 mm.) than usual, and have the elytral interstices slightly elevated posteriorly.

**TESSERODON INTRICATUS** sp. nov.

♂ Black, antennae palpi and tarsi reddish, club flavous. Under-surface and legs rather sparsely clothed, upper-surface with very short setae.

Head with crowded and fairly large asperate punctures. Clypeus with two conspicuous median projections, and two smaller submedian ones, separated by notches. Prothorax more than twice as wide as the median length, front angles produced and rounded, hind ones obtuse; with crowded longitudinal punctures, many of which are confluent. Elytra with sides rounded and evenly continuous with those of prothorax, with narrow geminate striae, interstices wide, elevated and shining in middle, with a row of large but shallow setiferous punctures on each side. Metasternum with large squamose punctures, sparser in middle than on sides. Front tibiae stout and strongly tridentate, hind ones rather thin, with an inner apical hook. Length, 5.5–6 mm.

(2) London edition, 1832, xiv, pl. xlv, fig. 3.

(3) Reiche, *Ann. Soc. Ent. Fr.*, 1842, p. 72, pl. v, fig. 2.

(4) Westwood, *Trans. Ent. Soc.* iv, pl. viii, fig. 3.

♀ Differs in having the hind tibiae without an apical hook, and the teeth of the front ones somewhat larger.

*Hab.* Northern Territory: Groote Eylandt (N. B. Tindale). Type, I. 15426.

Like *T. gestroi* on a greatly reduced scale, but the prothoracic punctures are narrower and the middle of each interstice more distinctly elevated; on *T. variolosus* they are scarcely separately convex. The rows of setae on the elytra are short, pale, and slope backwards.

### MONOPLISTES.

The species here referred to *Monoplistes* in general resemble small specimens of *Temnoplectron*, but have the claws unarmed, although somewhat thickened at the base. They all have the middle and hind tibiae strongly curved, and each with a long apical spur that at first glance appears to be part of the tibia itself. The pygidium near its summit is traversed by a narrow deep line.

#### MONOPLISTES CURVIPES sp. nov.

♂ Black, highly polished; antennae, palpi, and tarsi more or less reddish.

Head gently convex, with rather small punctures, becoming larger and denser on sides; front with six acute teeth, the two median ones longer than the others, and the notch between them deeper. Prothorax widely transverse, front angles strongly produced and very acute, sides widely dilated to near base, and then slightly narrowed to base, median line well defined near base, but disappearing before middle; with a wide shallow sub-basal depression near each side; punctures sparse and minute, but becoming larger and more numerous, although not crowded on sides, a row of large ones at extreme base. Elytra closely embracing prothorax, base strongly incurved; with slightly impressed but distinct striae containing small, distant punctures. Flanks of sterna with rather dense, asperate punctures. Front tibiae long, thin, strongly curved, with two small and fairly large acute teeth; middle and hind tibiae moderately curved and each with a long spur, continuing the curve. Length, 6-7.5 mm.

♀ Differs in having the head smaller, prothorax longer, more evenly convex, sides strongly but almost evenly rounded, sublateral foveae smaller but deeper, front tibiae much shorter, less strongly curved, more dilated at apex, notched on inner side near base, and the other tibiae shorter.

*Hab.* Queensland: Mulgrave and Little Mulgrave Rivers (H. Hacker), Cairns district (A. M. Lea). Type, I. 3719.

There is a swelling near the base of each claw, but as it is not at all acute the species was referred to *Monoplistes* rather than to *Temnoplectron*, to which at

first it appears to belong; the male resembles *T. tibiale*, but in that species the claws are acutely dentate and the tibial spurs are very different. On three specimens the legs are entirely reddish, probably from immaturity. The sides of the prothorax are more conspicuously dilated to near the base on one male than on another, and are notably upturned before narrowing to the base.

### MONOPLISTES PHANOPHILUS sp. nov.

Black, highly polished; antennae, palpi, and tarsi pale reddish.

Head slightly convex and with small and rather sparse punctures between eyes, becoming larger and more numerous but scarcely crowded on sides; front with six teeth, of which the median ones are fairly long, acute, and separated by a deep notch, the others are much smaller and separated by shallow notches. Prothorax about twice as wide as the median length, sides parallel on basal half, then oblique to apex, where the angles are acute; with small and numerous but not dense, sharply defined punctures, and a row of somewhat larger ones at base; sublateral foveae vaguely defined. Elytra closely applied to prothorax, sides gently rounded; with narrow striae, containing rather small, distant punctures; interstices with very small punctures. Metasternum with large but shallow subreticulate punctures on sides, minute ones in middle. Front femora stout and moderately dentate; front tibiae rather strongly curved, dilated, and with a strong tooth at outer apex and two small ones near it, distinctly notched near inner base; other tibiae distinctly curved, and each with a long terminal spur. Length, 5–5.25 mm.

*Hab.* Queensland: Gordonvale and Cairns, at lights (Dr. J. F. Illingworth). Type, I. 15429.

Smaller than *M. curvipes*, from the female of which it differs in the prothorax with sides partly parallel, with somewhat larger punctures, and less distinct sublateral foveae, and front tibiae with inner basal notch more conspicuous. Of four specimens taken by Dr. Illingworth, two have the front tibiae somewhat longer and thinner than the others, but not to such a striking extent as on *M. curvipes*, so they are possibly all females. Two specimens from the Simson collection from Bowen (Queensland) differ in having the punctures on the head somewhat denser and coarser, and the punctures in the elytral striae slightly larger. Another from the Northern Territory (from Dr. Bovill in the Blackburn collection) has punctures on the head similar to those on the Bowen specimens, but those in the elytral striae are smaller; the notch at the inner base of its front tibiae is preceded by a conspicuous tubercle, that on the other specimens appears more as the sudden termination of a ridge. This specimen, by its number in Blackburn's note-book, was doubtfully identified as

*M. haroldi*, but it is considerably larger than the type of that species (3 mm.) and the head is not "*sat fortiter granulato*."

Var.? A. Fourteen specimens without locality labels (but probably from the Northern Territory, and two of them bearing Blackburn's No. 7279) have punctures as in the Bowen specimens, but are less shining, and the elytra are shagreened and opaque; if this condition is natural they probably represent an undescribed species.

Var.? B. Six specimens similarly pinned to A (and two also bearing Blackburn's No. 7279) are structurally similar, but the elytra are not shagreened or opaque; their sides, from front of head to tips of elytra, are obscurely reddish, but to a variable extent.

### MONOPLISTES TROPICUS sp. nov.

Black, highly polished, legs obscurely reddish, antennae, palpi, and tarsi paler, club infuscated.

Head gently convex and with minute punctures between eyes, larger and more numerous, but not crowded, ones on sides; front with six acute teeth, of which the median ones are longer and more acute than the others. Prothorax more than twice as wide as the median length, sides very narrowly margined, admost parallel on basal two-thirds, then oblique to apex, where the angles are slightly produced but very acute; with minute but sharply defined punctures, and a row of larger ones at base. Elytra closely applied to prothorax; with narrow but well defined striae, containing small distant punctures, interstices feebly separately convex, and with scarcely visible punctures. Metasternum with dense and rather large punctures on sides, becoming very minute in middle. Front femora moderately dentate; front tibiae moderately curved, apex dilated, with three acute outer teeth, the apical one much larger than the others, notched near inner base; hind tibiae moderately curved, and each with a long terminal spur. Length, 3.5-4 mm.

*Hab.* Queensland: Cairns district (F. P. Dodd and A. M. Lea). Type, I. 15435.

A briefly oblong-elliptic species, smaller than *M. phanophilus*, and elytral striae more deeply impressed, with the interstices feebly separately convex. The larger specimen has much less acute tibial teeth than the type (which was taken from a sticky seed of *Pisonia brunoniana*), but this may be due to abrasion. Two specimens from Wyndham (J. Clark from W. Crawshaw) appear to belong to the species, but have the punctures in the elytral striae slightly larger and closer together, and the punctures on the interstices rather sharply defined, although very minute.



**EPILISSUS USTULATUS** Lansb.

Five specimens, from Cairns and the Little Mulgrave River, probably belong to this species; four of them have the shoulders conspicuously paler than the adjacent parts; of these four, two have the apical sides and epipleurae also pale, of these two, one is mostly blackish, the other mostly castaneous; the fifth specimen has the entire upper-surface dark piceous-brown. They all differ from the description, however, in having the club of the antennae partly infuscated, and the front tibiae acutely bidentate outwardly, but there is a blunt tooth at the inner apex. If correctly identified the species should be transferred to *Panelus*.

**PANELUS BIDENTATUS** Wilson.

Three specimens, taken from rotting leaves at Ourimbah and National Park (New South Wales), and Mount Tambourine (Queensland), structurally agree with the type, but they all differ somewhat in colour. On the National Park specimen the pale humeral and subapical spots on each elytron are enlarged and connected along the side; on the Ourimbah one the pale parts of each elytron are further enlarged to cover most of the surface, leaving only a moderate infuscation about the scutellum, the head and prothorax are also almost entirely pale; on the Mount Tambourine specimen the prothorax and elytra are entirely dark.

**PANELUS PISONIAE** sp. nov.

Pale flavo-castaneous, highly polished, extreme base and suture of elytra very narrowly black, club infuscated.

Head gently convex and with minute punctures between eyes, a subtriangular projection on each side of a deep medioapical notch. Prothorax more than twice as wide as the median length, sides on basal two-thirds subparallel, then oblique to apex, where the angles are acute; punctures minute, but a row of slightly larger ones at extreme base. Elytra closely applied to prothorax; striae faintly impressed, interstices with minute punctures. Front tibiae bidentate externally, the apical tooth larger than the other. Length, 2–2.5 mm.

*Hab.* Northern Queensland (Blackburn's collection), Cairns district, taken in abundance from sticky seeds of *Pisonia brunoniana* (F. P. Dodd). Type, I. 15432.

The pale colour and feeble elytral striation at once distinguish this species from *P. pygmaeus*; the persistently smaller size and paler colour from *P. bidentatus*. On most specimens there appears to be a large infuscated spot near the apex of each elytron, but this is entirely due to the apical fold of the wings showing through. On most specimens the elytral striae are very feeble and traceable only near base, but on some of the smaller ones they are fairly distinct, and contain small, distant punctures.

**LABROMA HORRENS Sharp.**<sup>(5)</sup>*Menthophilus tuberculatus* Waterh.<sup>(6)</sup>.

Plate vi, fig. 6.

These names were founded upon one species; apparently *L. horrens* has precedence.

**AULACOPRIS REICHEI White.**

Plate vi, figs. 8, 9.

This is the largest, finest, and one of the rarest dung beetles in Australia. Single specimens have been taken in Queensland, New South Wales, and Victoria, but Mr. Edgar R. Waite obtained two specimens in the Yessabah caves on the Macleay River; they had formed sixteen bat-dung balls of the size of walnuts, each containing a larva or pupa (in one instance an egg). After being exhibited at a meeting of the Linnean Society of New South Wales<sup>(7)</sup> some of them were reared to maturity in the Australian Museum.

**MERODONTUS CALCARATUS MacL.**

Plate vi, fig. 11.

The small and narrow eyes of this species are shining and scarcely visibly faceted, each is flat and surrounded by a slightly elevated margin, so that it appears to be slightly concave. The tooth on the hind femora is twice as large on some specimens as on others.

**COPTODACTYLA BAILEYI Blackb.**

I concur with Blackburn's opinion that *C. baileyi* is distinct from *C. glabricollis*.

**COPTODACTYLA DUCALIS Blackb.***C. acuticeps* Felsche.

Plate vi, figs. 10, 11.

Felsche considered that *C. ducalis* also was a synonym of *C. glabricollis*; only the female was known to Blackburn, but it is abundantly distinct from *glabricollis*; the male was described by Felsche himself as *C. acuticeps*.

(5)Sharp, Rev. et Mag. Zool., 1873, p. 263.

(6)Waterhouse, Ent. Mo. Mag., Jan., 1874, p. 176.

(7)Proc. Linn. Soc. N. S. Wales, 1898, p. 803.

**ONTHOPHAGUS.**

Specimens of the Australian species of *Onthophagus* known to Blackburn are before me, with the exception of *O. bipustulatus*, *O. carmodensis*, and *O. helmsi*. I have carefully tried to follow his grouping of the species, but am unable to do so, even his Group 1, consisting of a few large species, appears to be scarcely distinguishable, by the basal edging of the pronotum alone, from some members of other groups, as many of these have the marginal edging even throughout, although not so highly elevated as on those he referred to Group 1. The species of Group 4 might well be distributed between those of all groups, except 1. The difference between a flat or feebly convex base and one very faintly concave is so slight that it can seldom be of much use, so that I follow Arrow, who considered that "The supposed difference in the prothoracic margin is illusory." Blackburn considered that tables based largely on male characters are not desirable, but they have at least the advantage of enabling many species to be quickly identified, thus serving at least one of the main uses of a table. Probably had he used the facets of the eyes, for the primary divisions, the tables would have been more satisfactory, even although they apparently alter on some specimens on drying, their true nature is generally at once evident if they are viewed from oblique directions; the clypeal suture could also have been used to a greater extent, although with some species it varies sexually.

**ONTHOPHAGUS AUSTRALIS Guer.**

Plate viii, figs. 31–33.

The whole upper-surface of fresh specimens of this species has a curious satiny gloss; the interocular horns and ridge of the male vary considerably.

**ONTHOPHAGUS MASTERSI Macl.**

Plate viii, figs. 34, 35.

In Blackburn's table this species is separated from *O. australis* by being "Black, not at all metallic"; but on the male the prothorax has sometimes an obscure metallic-green gloss; structurally it is extremely close to some forms of *O. australis*.

**ONTHOPHAGUS MACROCEPHALUS Kirby.**

Plate viii, figs. 36, 37.

The cephalic horn on the male of this species sometimes extends almost to the elytra, but it is usually much shorter.

**ONTHOPHAGUS LAMINATUS** Macl.

Plate vii, figs. 12-20.

In commenting on *O. quinquetuberculatus*, Blackburn<sup>(8)</sup> considered the name was probably a synonym of *O. atrox*. If Macleay rightly mated the specimens standing as types (and this certainly appears to be the case), the male is a specimen of the species Blackburn identified as *O. atrox*, with the punctures of the prothorax less coarse than usual, and with its median prominence more produced and narrower at the tip than usual; the head and elytra being in exact agreement. The female agrees with specimens identified by Blackburn as *O. pugnar*.

As with many other species of the genus, the sexes may differ strongly, or approach each other so closely that from external observation of the upper-surface it is difficult to decide as to the sex of an individual. A freshly matured specimen is often much more polished than an old one, and with age the clothing (Blackburn relied upon this in *O. atrox*) is apt to become abraded, tibial teeth, and projections on the head (especially the front ones used for shovelling), and prothorax to become blunted, etc.

I believe that but few of the names treated as distinct in Blackburn's Group 2, up to and inclusive of *O. pugnacior*, can be maintained, and that the character, "The basal gutter of the pronotum dilated hindward in the middle," as against "not dilated hindward," to be quite worthless; the differences there are slight, only of degree, and liable to individual rather than specific variation, and the other characters used are mostly of degree. Blackburn partly relied upon the erenulations of the front tibiae of *O. cowleyi* as a useful distinguishing feature from those of *O. laminatus*, but on two of the specimens he had as *O. laminatus*, and bearing the same number (1424), one specimen has respectively eight and nine on the front tibiae, and the other five and six; on *O. cowleyi* they were noted as six or seven. The punctures of the prothorax are decidedly variable, but the elytra are always fine shagreened and with small scattered punctures; the striae are also but little liable to variation.

From the specimens in the South Australian Museum, being those examined by Blackburn, with the exception of a few specimens (only the type of *O. palmerstoni* was known to him, but I have carefully examined his description of that form), it appears probable that the synonymy is as follows:

**laminatus**, Macl., 1863 (*pugnar*, Har., 1868; *cowleyi*, Blackb., 1903).

**atrox**, Har., 1867 (*quinquetuberculatus*, Macl., 1871; *palmerstoni*, Blackb., 1903; *sloanci*, Blackb., 1903; *pugnacior*, Blackb., 1903).

With the distinct possibility that all the names should be regarded as

---

(8)Trans. Roy. Soc. S. Aust., 1903, p. 274.

synonymous, with *laminatus* (certainly not the most abundant form) having priority. There are also many other forms before me that differ slightly from the various forms known to Blackburn, but it does not appear desirable to name them, even as varieties.

### ONTHOPHAGUS FURCATICEPS Masters.

*O. furcatus* Macl., n. pr.

*O. froggatti* Macl.

*O. lobicollis* Macl., var.

Plate ix, figs. 61–63.

The types of *O. furciceps* and of *O. froggatti* differ slightly in colour, but on placing them side by side a few years ago I could find no structural differences. The female differs from the male in having the clypeus coarsely sculptured, the inter-ocular carina elevated into a short wide triangle on each side, the prothorax with a bilobed protuberance in front (very variable in size), on each side of which is a deep cavity, and the front tibiae shorter and stouter; the prothorax has a gloss varying from greenish to purplish.

A specimen that was compared with the type of *O. lobicollis* and agreed well with it has the apical segment of the abdomen not at all narrowed in its middle, so is evidently a female<sup>(9)</sup>; the remarkable development of the prothoracic process appears to be an exaggeration of that of the female of *O. furciceps*, of which it should be regarded as a variety.

### ONTHOPHAGUS WALTERI Macl.

Plate ix, figs. 64, 65.

On the female of this species the interocular ridge is gently convex throughout, on the male it is elevated on each side near the eye and vanishes in the middle; the prothoracic processes vary in size on the male, and on the female have a worn-down appearance. On the male the two apical segments of abdomen are strongly narrowed to the middle, the apical one almost vanishing there.

### ONTHOPHAGUS FISSICEPS Macl.

Plate vii, figs. 21, 22.

Six specimens from Wyndham (three of each sex) evidently belong to this species, but they are all smaller (10–12 mm.) than the type (6 lines). The facets of the eyes are distinct, and in Blackburn's table the species would be referred to

---

(9) Arrow, Ann. and Mag. Nat. Hist., Oct., 1920, p. 435.

Group 3, near *O. capella*, although it is nearer to *O. erichsoni*, but the prothorax has the median projections more divergent in the male, the punctures coarsely rugose, the head with a strongly arched line between the eyes, and the clypeus notched. The female differs from the male in having the carina between the eyes narrowly elevated and less curved, the space between it and the clypeal suture with denser and larger punctures, the clypeus less notched, prothorax with median projections replaced by a ridge (emarginate in its middle, somewhat as on *O. pugnae*), and the front tibiae much shorter. From the female of *O. erichsoni* it differs in the coarser prothoracic and cephalic punctures, and by the interocular ridge being less elevated in the middle. It is probable that the type of *O. integriceps* (noted by Macleay as a male) is really a female of *O. fissiceps*.

### ONTHOPHAGUS CUNICULUS Macl.

Plate ix, figs. 66, 67.

The head and prothorax of this species are sometimes coppery-purple; the metallic part of the head usually terminates at the clypeal suture in the female, slightly beyond it in the male.

### ONTHOPHAGUS CONSPICUUS Macl.

Plate viii, figs. 38, 39.

On an occasional specimen of this species the head and prothorax (except the basal gutter) are of a bronzy-purple, and the elytra purplish-green.

### ONTHOPHAGUS NODULIFER Har.

Plate viii, figs. 40, 41.

The males of this species vary greatly in the processes of the head and prothorax. The various forms before me are as follows:

1. Cephalic horns thin, strongly curved, each distinctly longer than the head is wide; clypeus almost evenly arched in front, prothoracic protuberance beginning as a median carina and projecting forwards over a medio-apical cavity.

Var. *divaricatus* Macl. Gayndah (Queensland).

2. As 1, but prothoracic protuberance considerably reduced in size and blunt. The typical form. Rockhampton (Queensland).

3. Cephalic horns much shorter and stouter, scarcely one-third as long as the head is wide; clypeus with two feeble projections in front; prothoracic protuberance an obtuse tubercle capping a slight hollow. Emerald (Queensland).

4. As 3, but clypeus evenly arched except for a slight incurvature in middle. Northern Queensland.

5. Interocular ridge arched forwards, but its sides not elevated into horns or tubercles, clypeus evenly arched, except that its middle is truncated; prothoracic protuberance very feeble, no depression in front of it. Bowen (Queensland).

6. As 5, but clypeus with two projections in front. Connexion Island (Northern Territory) and Derby (North-western Australia).

All these forms have the eyes large, without distinct facets, clypeal carina almost evenly arched backwards with the middle slightly elevated, prothorax with shallow but not very small punctures, distinct on the feebly-armed specimens, tending to obliteration on the strongly-armed ones, with margins distinct throughout, and elytra shagreened and opaque.

### **ONTHOPHAGUS DUNNINGI Har.**

Plate ix, figs. 68, 69.

A rare species, which appears to live solely in agaric fungi; the horns on the head and prothorax of the male vary considerably in length.

### **ONTHOPHAGUS HAAGI Har.**

Plate viii, figs. 42–44.

A very distinct species, but varies greatly in size; on the female the interocular ridge is sometimes moderately elevated and interrupted in middle, sometimes strongly elevated and almost even throughout, on others with a conspicuous process (almost a horn) on each side of it; the horn on the head of the male varies in length, but its summit is always distinctly bifid.

### **ONTHOPHAGUS FEROX Har.**

Plate vii, figs 23, 24.

On some specimens of this species the cephalic horn is little more than a short conical tubercle, on others it is much longer and rises well above the level of the pronotum; the prothoracic horns also vary greatly in length and acuteness.

### **ONTHOPHAGUS PENTACANTHUS Har.**

Plate vii, figs. 25, 26.

The median processes of the prothorax and the cephalic horn of this species vary in much the same way as do those of *O. ferox*.

**ONTHOPHAGUS PROMPTUS Har.**

The type of this species was almost certainly a female. Specimens of both sexes were taken on Grootte Eylandt, and others before me are from Darwin and Cape York. The male differs from the female in having the clypeus not transversely vermiculate, but with fairly dense and rather shallow punctures, the prothorax wider, somewhat retuse in front and apical segment of abdomen incurved to middle; the lateral margins of the prothorax are distinct, but the base appears to be immarginate, unless separated from the elytra, when a very feeble margin may be seen. The eyes are narrow and with distinct facets. In general appearance the species resembles *O. margaretensis* on a large scale, but the female differs from the type (a female) of that species in having the clypeus truncated in front, the interocular ridge less abruptly elevated and somewhat sinuous, prothorax with smaller punctures, and median line well defined on at least the basal half, instead of but feebly defined and close to the base only.

**ONTHOPHAGUS PLANICOLLIS Har.**

Plate ix, fig. 70.

A specimen from Moa or Banks Island (near the original locality, Somerset) evidently belongs to this species, as its elytra have the alternate interstices elevated and with rows of granules, but these granules and the large punctures on the head and prothorax are each supplied with a stiff upright seta: no setae were mentioned in the description before me (a written copy of the original one), so that probably the type was abraded.

**ONTHOPHAGUS ANISOCERUS Er.**

*O. fuliginosus* Er.

Plate viii, figs. 45-47.

In his table Blackburn separated these forms by the crenulations of the elytra, "distinctly punctiform" in *O. anisocerus* and "not punctiform" in *O. fuliginosus*, but the specimens from his collection (now in the South Australian Museum) do not warrant specific separation. Erichson apparently relied upon the differences in colour and in the cephalic horns, but these are all variable, the lateral horns are twice as long on some Tasmanian specimens as on others, and the median process varies from feebly elevated and scarcely double to strongly elevated and conspicuously bifid, so that I cannot regard *O. fuliginosus* as deserving even of a varietal name. Two males, from the Queensland National Park, have the lateral horns longer than usual, with the median process in the form of a



long-based Y; another male, taken with them, has the process represented by a feeble node only.

### **ONTHOPHAGUS PRONUS Er.**

Plate vii, fig. 27.

This species varies considerably in size. On some males the prothoracic horn projects beyond the head, on others it terminates short of the clypeus.

### **ONTHOPHAGUS TWEEDENSIS Blackb.**

Plate viii, figs. 48, 49.

Of three males of this species before me (from Stradbroke Island) each has the elevation between the cephalic horns trilobed and the suture greenish. The female (three from Stradbroke Island and one from Bribie Island) differs from the male in having denser and coarser punctures on the head, no horns between the eyes, but a feeble ridge curved backwards, the prothorax with coarser punctures and scarcely retuse in front, and the front tibiae shorter, with stouter teeth.

### **ONTHOPHAGUS HENLEYENSIS Blackb.**

A specimen from Yilgarn, unfortunately without antennae or tarsi, possibly belongs to this species, but differs from some typical specimens in having the prothorax conspicuously greenish, less convex, with smaller punctures and a distinct medio-apical depression.

### **ONTHOPHAGUS BOVILLI Blackb.**

Plate viii, fig. 50.

The type of *O. bovilli* has the apical segment of abdomen not at all narrowed in the middle, so it is a female, as suspected by Blackburn; it is much less metallic than is usual in *O. conspicuus*, but both sexes of that species vary considerably in colours and structure, and I can only regard the type in question as a rather dingy female of it.

### **ONTHOPHAGUS VICTORIENSIS Blackb.**

*O. jungi* Blackb.

Plate viii, figs. 51, 52.

The type of *O. victoriensis* is represented in the South Australian Museum by a fragment (its head and prothorax are missing). It belongs to the species subsequently named *O. jungi*, and of which Mr. J. C. Goudie mounted sexes on one card from Birchip, Victoria.

**ONTHOPHAGUS TAMWORTHI** Blackb.

Of this species two specimens, sexes, were known to Blackburn. The male is now in the British Museum, but the female is before me; they were both badly abraded and dull, and were described as "*supra glaber . . . minus nitidus, coriaceus.*" Two specimens from Collarenebri (New South Wales) quite evidently belong to the species: they have the prothorax shining and the upper-surface conspicuously clothed; on the prothorax the hairs are erect, fairly dense, and in parts almost as long as the distance between the cephalic carinae, but they are absent from the slightly depressed median space; there are fairly numerous hairs on the head, except behind the interocular ridge (the ridge on the male, as viewed from behind, appears to be moderately arched forwards, and rather acutely and evenly elevated); on the elytra the hairs are sparser and less erect, and from behind appear in two regular rows on each interstice. The male, from Collarenebri, is 6 mm., the female 5 mm.; the female has an obscure purplish gloss, instead of an obscure greenish one.

**ONTHOPHAGUS LEAI** Blackb.

Plate vii, figs. 28, 29.

The interocular ridge on this species varies considerably; it is usually about two or three times as wide as high, with the top even, but the middle of the ridge is often triangularly elevated; on one specimen from Bathurst (New South Wales) the ridge is much higher than usual, with its summit conspicuously trifold. The prothoracic horns project forward much as on *O. ferox*, but are wider and flatter. Specimens are often attracted to lights.

**ONTHOPHAGUS COMPEREI** Blackb.

Plate viii, figs. 53-56.

The cephalic horns on the males of this species vary considerably in size: on some they are subconical, rather short, and almost simple; on one specimen they are long, curve inwards at the summit, and are slightly dentate, both internally and externally.

**ONTHOPHAGUS HOPLOCERUS** sp. nov.

Plate viii, figs. 57, 58.

♂ Black, antennae and tarsi reddish, club paler. Under-surface and legs with rusty-red hairs.

Head wide, sides behind clypeal suture slightly dilated, and then strongly narrowed to base; two rather narrow and almost vertical horns between eyes,

each horn near an eye and with a strong tooth at its inner basal third, between the two horns a rather narrow notched elevation, slightly higher than the teeth of the horns; between the horns and the clypeal suture with sparse and small punctures, elsewhere with dense and fairly coarse ones. Clypeus moderately elevated and almost truncated in front, thence strongly dilated and with a slight incurvature to near base, the sides for a short basal space almost parallel, suture carinated and trisinate, the median sinus wider than the others combined. Eyes very narrow, with distinct facets. Prothorax wide, front portion retuse, with a slight median swelling; with fairly large, dense, and sharply defined punctures, smaller and sparser on parts of the retuse portion than elsewhere, sides considerably dilated near middle, where they are wider than elytra, front angles moderately acute, hind ones widely rounded off, margins narrow and distinct throughout; lateral foveae rather large and with distinct punctures; median line shallow, but distinct on basal half. Elytra shagreened and opaque; striae very narrow, shining, and with distant punctures; interstices with small, subobsolete punctures, becoming larger but still shallow on sides. Pygidium with sharply defined punctures, slightly smaller than on prothorax. Metasternum with large and small irregularly distributed punctures. Length, 10.5–11.5 mm.

♀ Differs in having the head smaller, with the sides from the widest part (level with the front of the eyes) obliquely decreasing, with a slightly rounded outline to the front of the clypeus, which is much less elevated, the punctures on the clypeus are coarser and mostly confluent, the space between it and the interocular ridge has coarse and dense punctures, and the ridge is shining, almost impunctate, and but feebly elevated; the prothorax is less dilated on the sides and scarcely retuse in front, the elytra are less opaque, and with larger punctures, and the front legs are shorter, with wider tibiae and stouter teeth.

*Hab.* Victoria: Alps (H. W. Davey). Type, I. 15394.

Readily distinguished from all other species known to me, except *O. comperei* and *O. victoriensis*, by the horn near each eye of the male being compound; on some males of the former species the horn is dentate outwardly as well as inwardly, and its head is without the conspicuous notched median process; on the male of the latter species there is a small conical projection between the horns, the clypeus is deeply notched in front, and the elytra are very different. The head of the male, at first glance, has a curiously angular appearance, almost octagonal. In describing the shape of the eyes of this and other species their upper surface is referred to; the lower parts of all the species I have examined are large and convex, more or less globular.

Mr. F. E. Wilson has recently taken (at Lakes Entrance, Victoria) three specimens that appear to belong to the species; a female agrees perfectly with

one taken by Mr. Davey, but two males have the horns greatly reduced in size, still nearer vertical, and with the tooth on each smaller, although quite distinct; the median elevation is reduced to appear as two almost equilaterally triangular processes joined at the base, rather than a single bifid elevation.

**ONTHOPHAGUS MAMILLATUS** sp. nov.

Plate ix, fig. 71.

♂ Black, subopaque; antennae, palpi, and tarsi dull reddish, club paler. Under-surface and legs with more or less rusty-red hair.

Head rather large, sides behind clypeal suture slightly dilated and then strongly narrowed; interocular ridge narrow and with three small prominences, of which the median one is the largest; between the ridge and the clypeal suture polished and with smaller punctures than elsewhere. Clypeus with sides strongly narrowed and slightly incurved from base to apex, which is gently rounded and strongly upcurved; hind suture carinated, the median portion straight and wider than the combined width of the sides; with fairly dense and sharply defined punctures at apex and sides separated by vermiculate ridges. Eyes rather narrow, facets fairly distinct. Prothorax rather large, front portion retuse; with two fairly acute processes rather close together at apical third, a shallow median line from between them to base; sides strongly dilated, front angles obtusely pointed, hind ones very wide; margins and marginal gutter distinct throughout, but enfeebled about hind angles; punctures rather sharply defined only about lateral foveae, where they are of moderate size, elsewhere although not minute they are very ill-defined, and completely vanish in some parts. Elytra shagreened, with small and indistinct punctures; striae very narrow, shining, and with distant punctures. Pygidium shagreened, and with rather feebly defined punctures. Metasternum with dense, asperate punctures on sides, becoming sparser and more sharply defined about middle. Apical segment of abdomen strongly narrowed to middle. Length, 10-13 mm.

♀ Differs in having the head smaller, with the sides narrowed from nearer the base, clypeus with vermiculate ridges throughout (except on the elevated margins), prothoracic tubercles smaller, apical segment of abdomen very slightly narrowed in middle, and front tibiae slightly shorter, with wider teeth.

*Hab.* Queensland: Mount Tambourine (H. Hacker, H. Pottinger, and A. M. Lea). Type, I. 3750.

The prothoracic processes of the two males appear rather acute from above, but from the sides they are seen to be flattened, with the front edge almost vertical; when seen from behind each appears to overhang a space halfway between the median elevation of the interocular ridge, and one of the side ones. Of seven

females, two large ones have the prothoracic tubercles as large as on the males, although more obtuse, five small ones have them smaller and more obtuse; the large females also have the interocular elevations longer and more acute than on the males, the median one appearing as a short horn about half the length of the clypeus. The two large females have the appearance, in comparison with all the others, of being males, but the shape of the apical segment of the abdomen renders it certain that they are females, and that the two smaller ones are males. The elytra are somewhat as on *O. macrocephalus*, *O. declivis*, and *O. schmeltzi*, but the head and prothorax are very different from those of those species, or of any other before me.

**ONTHOPHAGUS ANCHOMMATUS** sp. nov.

Plate ix, fig. 72.

♂ Black, shining, parts of head and of legs obscurely reddish, antennae, palpi and tarsi paler, club and several of the preceding joints flavous. Under-surface and legs with hairs varying from almost white to rusty-red.

Head with rather sparse but sharply defined punctures on basal half, interocular ridge narrowly elevated in middle, each side elevated into a rather wide subtriangular horn. Clypeus with suture strongly trisinate, the median sinus strongly carinated, arched forwards, and wider than the others combined, sides in front of suture subparallel for a short distance, then strongly incurved to apex, which is gently rounded and strongly elevated; punctures rather sparse in middle and more numerous on sides. Eyes very narrow and with distinct facets. Prothorax slightly wider than elytra, a wide median process, widely triangular in front, overhanging head, a vague median line on basal half; apex and sides narrowly margined, base depressed and immarginate; punctures dense, rather large, and sharply defined, densest of all on apex of process. Elytra with narrow striae, interstices moderately convex and with fairly large sharply defined punctures, denser on sides than elsewhere. Metasternum with fairly large and dense punctures on sides, becoming sparser and mixed with small ones in middle. Apical segment of abdomen very narrow in middle; pygidium with large, crowded punctures. Length, 7.5–8.5 mm.

♀ Differs in having the head smaller, the interocular ridge with a wide triangular elevation in middle, as well as with short lateral horns; clypeus smaller, apex less strongly upturned (although more strongly than is usual in females of the genus), with dense punctures, mostly transversely confluent (or vermiculate); prothorax with median process almost straight in front, not overhanging head, and narrowed to its base, apical segment of abdomen scarcely narrowed in middle, and front tibiae shorter and wider with wider teeth.

*Hab.* Queensland: Brisbane, in November and January (H. Hacker). Type, in Queensland Museum; cotype, I. 15400, in South Australian Museum.

An isolated species, at first glance approaching *O. latro*, but head and prothorax very different. The clypeus of the male is so strongly elevated in front than if the elevated part were bent backwards it would touch the middle of the suture. The cotype male has the medio-apical process of the prothorax intermediate in shape between that of the type male and its female.

### ONTHOPHAGUS TRICAVICOLLIS sp. nov.

Plate ix, figs. 73, 74.

♂ Black, shining; head, except clypeus, and prothorax, except projecting parts, coppery-green; antennae, palpi, and tarsi obscurely reddish; club and some of the preceding joints flavous. Under-surface and legs with more or less rusty-red hair.

Head rather large, sides angularly dilated in middle, between clypeal suture and interocular ridge, with small and sparse, but sharply defined punctures, becoming larger on sides, behind the ridge almost impunctate; ridge narrow, near each eye briefly subtriangularly elevated. Clypeus with suture carinated and very feebly sinuous, sides strongly obliquely narrowed to apex, which is strongly elevated and almost truncated; with sparse and minute punctures in middle, becoming larger and more numerous but not dense on sides. Eyes rather narrow and with distinct facets. Prothorax large, distinctly wider than head: a large trilobed mass in front, the lobes rounded on their upper parts, almost vertical in front, and not at all greenish; a large excavation between them and each side, the excavation with an overhanging subconical tubercle near the lateral fovea, which opens in front into the excavation; front angles distinctly produced but truncated; sides narrowly margined and with a narrow gutter, base almost immarginate; median line very feeble; with fairly numerous and rather feeble punctures, more sharply defined about the lateral foveae than elsewhere, and absent from most of the excavated parts. Elytra with narrow striae, interstices moderately convex, with fairly numerous and small but distinct punctures. Metasternum opaque and with fairly dense punctures, except in middle, which is shining and with a few large and some very small ones. Three apical segments of abdomen narrowed in middle; pygidium subopaque and with irregular punctures. Front tibiae long. Length, 9–12 mm.

♀ Differs in having the head smaller, less dilated in middle, interocular ridge evenly elevated throughout, many distinct but small punctures behind it, clypeus smaller, less elevated in front, and closely transversely vermiculate; prothorax with four small dark tubercles at summit of the frontal slope, the two

median ones more distant from each other than from the others, the space between them and the apex scarcely depressed, but slightly excavated in front between them and the others, the excavated parts almost impunctate, elsewhere with more distinct punctures than on the male; apical segment of abdomen scarcely narrowed in middle and front tibiae considerably shorter, with wider teeth.

*Hab.* Queensland: Coen River (W. D. Dodd), Mulgrave River (H. Hacker), Cairns (A. M. Lea), Bowen (Ang. Simson). Type, I. 3775.

In many respects like *O. conspicuus*, but the elytra are not at all metallic and not smoothly shagreened; on the male the clypeus is much less notched in front than on that species, the median projections of the prothorax look very different from in front, the front angles are truncated, and the front legs are considerably longer. The middle of the metasternum usually has a distinct greenish gloss, and there is usually a faint greenish gloss on the abdomen and legs. The clypeal suture, when seen directly from above, appears almost straight throughout. In addition to the fairly sharp punctures on the elytra, there are others more or less obliquely conjoined, giving the appearance of briefly oblique strigosities. One male has the prothorax with rather larger punctures than usual, and with a small fovea near the middle of its base, its clypeal suture is also more distinctly sinuous than on the other males, although it is not trisinate. On females in good condition the interocular and clypeal ridges have a golden gloss.

### ONTHOPHAGUS BICAVICOLLIS sp. nov.

Plate viii, fig. 59.

♂ Black; head (except front of clypeus) and prothorax bright metallic green, some of the elevated parts coppery; elytra and pygidium purplish, in some lights greenish, parts of legs obscurely diluted with red, antennae flavous; pygidium and under-surface sparsely clothed, upper-surface glabrous.

Head strongly dilated in front of eyes; with fairly large and dense (sometimes confluent) punctures between clypeal suture and interocular ridge, the ridge feebly elevated and strongly arched forwards, behind it with rather sparse and small punctures. Clypeus with suture carinated throughout, the carina oblique on sides, the median part four times as wide as each of the lateral parts; sides with margins rapidly rising to apex, strongly elevated and slightly incurved at middle; punctures at base more transversely confluent than behind the suture, becoming small and sparse in front. Eyes narrow, with distinct facets. Prothorax wide, sides strongly rounded, front angles strongly produced and somewhat sinuous, hind ones rounded off; a large excavation on each side of apex, each excavation with a subtriangular tubercle overhanging its base, and inwards with

an obtuse ridge (the space between the two ridges gently concave); with large, coarse punctures on sides, smaller and sparser, but still large, elsewhere, but absent from the excavations; median line rather wide and shallow; gutters fairly deep on sides, shallow at base. Elytra deeply and narrowly striated, the interstices separately distinctly convex, and with large punctures, usually with an oblique or transverse impression. Metasternum shagreened, and with rather small, asperate punctures on sides, middle shining and with small punctures, but with a few large ones near coxae. Two apical segments of abdomen strongly narrowed to middle; pygidium with large and small punctures intermixed. Front tibiae long, thin, and strongly arched near apex. Length, 11 mm.

*Hab.* Northern Territory: thirty miles east of Darwin (G. F. Hill). Type, I. 15501.

By its strongly narrowed apical segments of abdomen, and long front legs, the type certainly appears to be a male, although the projections and excavations of the pronotum approach those of some females of *O. conspicuus*, and some allied species; the elytra, however, are very different from those of *O. conspicuus*; from *O. tricavicollis* it differs in the feeble interocular elevation, and considerably larger and sparser elytral punctures; the shape of the prothorax and its punctures seem intermediate between those of the sexes of the latter species. Seen directly from above, the prothorax appears to have two small tubercles and two larger obtuse ones, the distance between the latter being equal to that between the eyes; viewed from behind, so that the head just disappears, the front appears to be 5-sinuate, the median sinus twice the width of each of the intermediate ones, and these much wider than the lateral ones.

### ONTHOPHAGUS SPISSICOLLIS sp. nov.

Plate ix, fig. 75.

♀ Black, subopaque, in parts with a bronzy gloss; basal joints of antennae, parts of palpi and of tarsi obscurely reddish. Under-surface and legs with hairs varying from almost white to dark brown; head and most of prothorax with short, dense, upright, brownish setae; elytra with paler, shorter, and sloping setae, confined to one or two rows on each interstice.

Head wide, densely and coarsely punctate and subvermiculate, except behind interocular ridge, this acute in middle and strongly elevated at each side, but not horned; sides moderately elevated, slightly incurved at clypeal suture, and conspicuously produced on each side of a deep apical notch; clypeal suture trisinate, finely carinated, the median portion feebly arched forward, and slightly elevated in middle. Eyes very narrow, facets distinct. Prothorax with front angles obtusely produced, margins distinct throughout, but slightly higher



on sides than elsewhere; with a feeble, obtusely pointed ridge in middle, about one-fifth from apex; with dense and coarse punctures, the intervening spaces with small punctures, a shagreened space without distinct punctures along middle from near the subapical ridge to base, and continued along each side at base, and on the side to near the sublateral fovea, each of these rather narrow and deep. Elytra with narrow, shining, geminate striae, with distant punctures, the interstices finely shagreened and with small, distant, setiferous punctures. Metasternum with irregularly distributed punctures of rather large size, with some small ones scattered about. Apical segment of abdomen not narrowed in middle; pygidium shagreened and feebly punctate. Length, 6–7 mm.

*Hab.* Western Australia: Beverley (F. H. du Boulay), Mount Barker (S. Maesorley). Type, I. 3774.

With the general appearance of the female of *O. adclaidae*, but differs in the interocular elevation, clypeal suture, prothorax with shagreened base and part of median line, medio-frontal prominence, etc.; in some respects it seems nearer to the female of *O. haagi*, but the elytra are without the conspicuous irregular series of elongated subgranular elevations of that species. On the prothorax, head, and elytral suture of the type the bronzy gloss is very conspicuous, but on the second specimen it is but slightly in evidence.

### ONTHOPHAGUS VARIANUS sp. nov.

Plate ix, fig. 76.

♀ Black, shining; antennae, palpi, tarsi, and front coxae reddish, club paler; head (except clypeus) and prothorax coppery-green, elytra at base and sides reddish. Under-surface and legs with whitish and reddish hairs, sides of elytra with a few setae.

Head with sides angularly dilated in middle, interocular ridge in the form of a strong and almost evenly elevated carina; between it and clypeal suture with sharply defined punctures, of moderate size but not very dense, becoming denser on sides. Clypeus with sides but feebly elevated, apex almost truncate, surface densely transversely vermiculate; suture carinated and trisinate, median sinus very feebly arched, about three-fifths of the total. Eyes very narrow, facets distinct. Prothorax large, sides strongly dilated, front angles (as seen from directly above) almost rectangular, margins and gutters distinct on sides, less distinct on apex and feeble at base; apical third with two large hollows, surmounted by three obtuse processes; parts of the hollows with large and fairly dense punctures, somewhat similar punctures on sides, rest of the surface with sparse and small punctures, and very minute ones; median line fairly distinct on basal half, sublateral foveae rather large. Elytra with narrow striae containing

distant punctures, these also partially impressed on the interstices at each side of a stria, interstices elsewhere with sparse and small punctures, but becoming larger on sides. Metasternum with dense and rather large punctures on sides, with a few large ones and minute ones elsewhere. Apical segment of abdomen not narrowed in middle; pygidium with rather coarse, crowded punctures. Length, 8.25 mm.

*Hab.* Queensland: Bowen (Ang. Simson). Type, I. 15410.

A beautiful species, the size of *O. rufosignatus*, but the red parts of elytra basal and lateral instead of apical, and the prothorax not at all reddish; *O. rubrimaculatus* is a much smaller species, with shagreened elytra, etc. The reddish parts of the elytra are wide at the base, widest of all on the shoulders, and narrowed on the sides to the apex; from some points of view they appear to form an irregular M. The prothorax appears to be scooped out, and with a few setae on each side of the middle in front, with the processes at the summit of the scooped-out parts not specially elevated or produced.

#### **ONTHOPHAGUS FLAVOAPICALIS** sp. nov.

♂ Black, shining, most parts with a distinct bronzy gloss, antennae, palpi, and tarsi reddish, club flavous; elytra with flavous mottlings about base and apex, or on apex only. Under-surface and legs rather sparsely clothed, a few sub-marginal setae on elytra.

Head with interocular ridge very feebly elevated and slightly curved; space between it and clypeal suture with rather sparse and small, but sharply defined punctures. Clypeus with crowded punctures, sides rather lightly elevated, apex distinctly notched, suture with median part almost straight, distinctly earinated, and equal to the two side parts. Eyes rather narrow, facets distinct. Prothorax with sides strongly and almost evenly rounded, front angles subacutely produced, hind ones widely rounded; sides very finely margined, apex still more finely, base not at all; median line feebly traceable at base and again near apex; punctures of small or medium size, and sharply defined, but not crowded, smaller and sparser in middle near apex than elsewhere; sublateral foveae rather small. Elytra with rather narrow geminate striae, with transverse distant punctures, interstices separately convex, faintly rugulose, with fairly numerous and rather small punctures, not very deep but quite distinct and becoming rather coarse on sides. Metasternum with fairly dense and large punctures, becoming sparser and mixed with small ones in middle. Apical segment of abdomen distinctly narrowed in middle; pygidium with dense and fairly large punctures. Length, 5-6 mm.

♀ Differs in having the interocular ridge even less distinct, prothorax smaller, less convex in front, and without trace of a median line except at extreme base, and apical segment of abdomen less narrowed in middle.

*Hab.* Western Australia: Geraldton (J. Clark). Type, I. 15415.

With the general appearance of *O. blackwoodensis* and *O. pontilis*, but head of male unarmed, *O. incornutus* has very different punctures on prothorax and elytra, etc.; *O. macleayi*, which is similarly coloured, is larger and with the sculpture of head and elytra different. The bronzy gloss is very faint on the elytra, and on two females the gloss there is slightly greenish. Each of the five specimens before me has distinct markings at the apex of elytra; on two of these the base is immaculate, on two (one of each sex) there is a spot inwards of each shoulder, and on the other (a small female) there is an obscure spot at the base of most of the interstices.

### ONTHOPHAGUS CRIBRICOLLIS sp. nov.

Plate ix, fig. 77.

♂ Black, palpi and parts of tarsi reddish, antennae flavous, head (except clypens and elevated parts, which are bronzy) and prothorax dark metallic green. Under-surface and legs sparsely hairy.

Head with dense, moderately large and sharply defined punctures, becoming transversely confluent or vermiculate on clypens; interocular ridge wide, acute and even on top, but the sides abrupt, punctures behind ridge sparser than elsewhere; sides conspicuously angulate. Clypens with oblique slightly elevated sides, apex strongly elevated and slightly notched, suture carinated throughout, median two-thirds almost straight. Eyes narrow, with distinct facets. Prothorax large, sides strongly rounded, front angles rather acute and produced slightly outwards, margins rather narrow throughout, with four obtuse elevations across middle about one-fourth from apex; punctures large and crowded, but nearly all round and sharply defined. Elytra with narrow striae containing distant transverse punctures, interstices shagreened and opaque, with small subobsolete punctures, becoming more distinct on sides. Metasternum with rather small and irregularly distributed punctures. Abdomen with apical segment strongly narrowed to middle. Front tibiae elongate. Length, 8 mm.

*Hab.* Northern Territory: Daly River (H. Wesselman). Type, I. 15419.

Apparently nearer to *O. conspicuus* than to any other species, but the opaque black elytra and coarse punctures of prothorax and head should be distinctive, even if the prothoracic tubercles should be variable, as they certainly are on that species. I know of no Australian species (except several of the *O. pentacanthus* group, in which in parts they are larger) with coarser punctures on the pro-

thorax; on *O. haagi* they are even denser, but are not as large; on *O. rugosus* the prothorax is much rougher, but the roughness is due to irregular elevations; on the present species it is due to punctures. The medio-frontal elevations of the prothorax are very feeble, especially the two median ones, which appear to be little more than irregular ridges between a few punctures; the median line is invisible from above, but from in front the prothorax appears to be vaguely depressed along the middle. In some lights, parts of the under-surface have a faint greenish or purplish gloss.

### ONTHOPHAGUS CLYPEALIS sp. nov.

Plate ix, fig. 78.

♂ Black, shining, in parts with a slight bronzy gloss, antennae, palpi, and tarsi reddish, club paler. Under-surface, legs, pygidium, sides and apex of prothorax, and parts of head, with rusty-red hairs; elytra with a row of shorter and paler subdepressed hairs or setae on each interstice.

Head moderately large, with a rather short, subconical, and somewhat sloping horn near each eye; between the horns and the clypeal suture distinctly concave, and with rather small but distinct punctures. Clypeus with fairly numerous sharply defined punctures of moderate size, with larger setiferous ones scattered about; sides evenly rounded and slightly margined, the margins moderately elevated, becoming more elevated and almost truncate in front; suture trisinate, median sinus carinated, arched forwards, and about once and one-third the width of each of the others, which are oblique. Eyes narrow, with distinct facets. Prothorax rather wide, front slightly retuse and with a feeble median lobe, sides and apex finely margined, base not; with rather sparse, sharply defined punctures, small in middle, and larger, but not coarse, elsewhere; median line vaguely defined. Elytra with narrow, geminate striae, containing rather distant, transverse punctures; interstices with irregular rows of fairly large, distant punctures. Metasternum with rather large, sharply defined punctures; near the coxae mixed with some smaller ones. Apical segment of abdomen distinctly narrowed to middle; pygidium with rather large and sparse punctures. Length, 7–8 mm.

♀ Differs in having the interocular horns reduced to slight prominences, connected by a feeble ridge, the concave space shallower and with coarser punctures; clypeus slightly notched in front, with denser punctures, its suture more elevated in middle; prothorax not retuse in front, without trace of a feeble median lobe, hairs not continuous across apex, and apical segment of abdomen not narrowed in middle.

*Hab.* Northern Territory: Groote Eylandt (N. B. Tindale). Type, I. 15399. I know of no closely allied species; the cephalic horns are placed somewhat

as on *O. mutatus*, but the space between them is conspicuously concave, and the elytral punctures are very different. On the male there are some obscurely reddish spots on the base, apex, and sides of the elytra, on the female on the apex only. The elytral punctures in places appear to be in irregular double rows, elsewhere in single rows, many of them have a granulated appearance, and each contains a seta; although the surface is not distinctly wrinkled it is slightly rugose, more noticeably on the female than on the male. The front tibiae do not appear to differ in the sexes.

### ONTHOPHAGUS MICROTRICHIUS sp. nov.

♂ Black, shining, palpi and legs more or less reddish, antennae flavous. Under-surface and legs with sparse hair and short setae; elytra and sides of prothorax with sparse pubescence, or short depressed setae.

Head flat and almost impunctate between eyes, then with rather small sharply defined punctures to clypeal suture. Clypeus short, sides feebly elevated, more strongly so and almost truncated in front, with denser and larger punctures than on rest of head, and in places feebly confluent; suture strongly elevated and earinated in middle, its sides somewhat oblique and narrowly impressed. Eyes narrow, with distinct facets. Prothorax slightly wider than head, front angles obtusely produced, sides moderately margined, apex and base feebly so, the margin vanishing in middle of base; apical fifth or sixth vertical in middle, with two small, flat prominences above; median line shallow about base, and traceable to middle; punctures of moderate size, sharply defined and numerous, but not crowded, very small on retuse portion. Elytra with narrow, subgeminatae striae, containing distinct punctures; interstices separately convex, with numerous somewhat rugose but sharply defined punctures, and in places briefly obliquely strigose. Metasternum opaque and with asperate punctures on sides, shining and with small punctures in middle. Apical segment of abdomen strongly narrowed in middle. Front tibiae rather long. Length, 6–7 mm.

♀ Differs in having a feeble bilobed elevation between the eyes, clypeus moderately notched in front, its suture less elevated in middle; prothorax smaller, not vertical in front, without medio-apical prominences; apical segment of abdomen scarcely narrowed in middle, and front tibiae shorter.

*Hab.* Queensland: Cape York (H. Elgner), Cairns (E. Allen). Type, I. 3783.

The general outlines are somewhat suggestive of *O. macleayi*, *O. queenslandicus*, and *O. comperci*, but the head is very different. The prothorax of the male, as seen from behind, appears to have the whole apex trisinuate, the median sinus smaller than the others. On several females the sides of the clypeus are obscurely reddish.

**ONTHOPHAGUS VARIOLICOLLIS** sp. nov.

Plate viii, fig. 60.

♂ Black, opaque, parts of tarsi, palpi, and base of antennae reddish, club paler.

Head wide, with a wide, thin, strongly curved horn near each eye, each horn with an obtuse projection on its outer side about the middle; punctures between horns and clypeal suture sparser than elsewhere. Clypeus with sides oblique and moderately elevated, apex more elevated and rather lightly notched; with dense asperate punctures; suture not carinated, median portion straight and rather feebly defined, the lateral parts oblique, their conjoint length about half of the total. Eyes rather large, facets inconspicuous. Prothorax with sides rather strongly rounded, front angles subacutely produced, sides with margins and gutters distinct, apex feebly margined, base not at all; with numerous large, round, shallow, but not crowded, punctures. Elytra with narrow striae, interstices feebly separately convex, and each with two irregular rows of small granules, except the first and sixth, which have but one row; suture subtuberculate at base. Metasternum and pygidium with punctures somewhat as on prothorax. Apical segment of abdomen almost vanishing in middle. Front tibiae long and strongly curved. Length, 8 mm.

*Hab.* North-western Australia: Wyndham (J. Clark, from W. Crawshaw). Type, I. 15420.

The upper-surface of the head and prothorax of the type is entirely bald, but the sculpture is of such a nature that this may be due to abrasion; on its under-surface and legs there are but sparse hairs and setae; the species is such an isolated one, however, that I have not hesitated to describe it. The curvature of the horns is somewhat as on *O. nodulifer*; *O. comperci* sometimes has the horns compound in the male, but both outwardly and inwardly its punctures and clypeus are also very different. The punctures on the head appear as if made with a pointed instrument forcing backwards a small portion of the derm when soft, so as to have a granulated appearance in front of the eyes, a transversely granulated appearance between them, and the clypeus to have numerous granules and small transverse ridges; the granules on the elytra are very distinct, and each has a setiferous puncture on its hind part, the setae very small and inconspicuous, even from the sides; on the prothorax the punctures are large and shallow, but well defined, from certain directions some of them appear to be crescentic.

**ONTHOPHAGUS SEMIMETALLICUS** sp. nov.

Plate ix, figs. 79, 80.

♂ Black, shining, head and prothorax with a more or less distinct bronzy gloss, antennae, palpi, and tarsi more or less reddish, club paler. Under-surface and legs rather sparsely clothed.

Head with interocular ridge depressed in middle, near each eye elevated as an obtusely triangular tubercle, punctures not very dense and rather small, more sharply defined on sides than elsewhere. Clypeus with sides oblique and scarcely elevated, but apex distinctly elevated and almost truncated; suture carinated and almost straight in middle, obliquely impressed on sides. Eyes narrow, with distinct facets. Prothorax with front angles subacutely produced, sides with narrow margins and gutters, apex and base very finely margined; apical fourth sloping and with a shallow depression behind each cephalic tubercle; with numerous but not crowded, and rather small, but sharply defined punctures, smaller on medio-apical prominence than elsewhere. Elytra with very narrow striae, interstices separately convex and with minute punctures, but with a row of large punctures on each side. Metasternum with large, irregularly distributed punctures, becoming very small in middle, except at base. Apical segment of abdomen strongly narrowed in middle; pygidium with rather dense, asperate punctures. Length, 4.5–6 mm.

♀ Differs in having the interocular elevations smaller, punctures before clypeus denser and more sharply defined, clypeus with sides more rounded, apex distinctly notched and less elevated, surface closely transversely vermiculate, and suture carinated on sides; prothorax with slightly larger punctures, frontal impressions more feeble or altogether absent; apical segment of abdomen not narrowed in middle, and front tibiae slightly stouter.

*Hab.* Queensland: Bowen, Bogie River, Leichhardt Downs (Aug. Simson). Type, I. 15411.

In general appearance extremely close to *O. zietzi*, but clypeus of male not conspicuously notched; the male in many respects resembles some females of *O. mutatus*, but may be at once distinguished by the front half of the head; some of the small specimens resemble *O. koebelci*, but that species has much larger eyes, with inconspicuous facets; large specimens somewhat resemble *O. fletcheri*, but are readily distinguished by the clypeus; they also resemble *O. microtrichius* and *O. frenchi*, but have much smaller punctures, and the head differently sculptured. On several specimens the legs are almost entirely reddish. The seriate punctures on the elytra are rather large, but are so placed that each appears to be cut into two by the elytral striae. Apparently the only certain external indication of sex is in the apical segment of abdomen, as one small male has the clypeus scarcely

more upturned in front than on the female, its surface obsolete vermiculate, and prothorax with the frontal impressions very feeble; a still smaller male is obscurely reddish, with a vague greenish gloss on the head and prothorax, the interocular elevations feeble, clypeus as on the preceding male, and frontal impressions of prothorax absent.

**ONTHOPHAGUS CUPREOPUNCTATUS** sp. nov.

♂ Black, with a greenish gloss, becoming purplish or bronzy on head, antennae, palpi, and tarsi somewhat reddish, club somewhat piceous, with greyish pubescence. Under-surface and legs rather sparsely clothed.

Head with interocular ridge obtuse in middle, each side appearing as an obtuse subtriangular elevation; in middle a fairly large round fovea, a few conspicuous punctures in front of eyes. Clypeus with sides gently rounded and moderately upcurved, apex moderately notched; with fairly dense, sharply defined punctures in front, becoming feeble posteriorly; suture not traceable across middle, but distinct on sides. Eyes very narrow, facets distinct. Prothorax moderately wide, evenly convex, lateral gutters and margins narrow, apical margin very narrow, basal absent; punctures nowhere crowded, but more numerous on sides than elsewhere, and rather small but sharply defined. Elytra with narrow, geminate striae; interstices not separately convex, with fairly numerous, small punctures, becoming larger on sides. Metasternum with fairly large punctures on sides and apex, becoming sparse and small in middle. Abdomen with apical segment distinctly narrowed in middle; pygidium with rather dense punctures. Length, 4.5-5 mm.

♀ Differs in having the head with denser and coarser punctures, especially on clypeus, interocular ridge very feeble, even on sides, median fovea shallower, elypeal suture carinated throughout, the median portion straight and about three-fourths of the total; prothoracic and elytral punctures somewhat larger; apical segment of abdomen not narrowed in middle, and front tibiae distinctly shorter, with stouter teeth.

*Hab.* New South Wales. Type, I. 15421.

I have seen specimens of this species named as *O. nitidior*, but they differ from that species in being smaller, with the gloss mostly greenish instead of purplish, and both sexes concave between the eyes; the size, colours, and general outlines are somewhat as on *O. negatorius*, but the head, elytra, and legs are all very different. The prothoracic punctures in some lights have a distinct coppery-purple gloss.



**ONTHOPHAGUS BICARINATICEPS** sp. nov.

♂ Black, elytra castaneous, antennae, palpi, and tarsi reddish, club piceous, with greyish pubescence. Under-surface and legs sparsely clothed; upper-surface with sparse, erect setae, shorter and less erect on elytra than elsewhere.

Head with interocular ridge narrow, straight in middle, curved near each eye; behind it (except at base, which is impunctate) and at the sides with fairly large punctures, between it and clypeal suture with somewhat smaller and more crowded ones. Clypeus with sides and apex moderately upturned, the apex rather lightly emarginate; surface with dense and rather small, but sharply defined punctures, interspersed with large ones; suture in three parts, the median part carinated, curved slightly forwards, and three-fourths of the total. Eyes very narrow, with distinct facets. Prothorax rather large, evenly convex, sides with narrow gutters and margins, apex and base very finely margined; with fairly numerous, sharply defined punctures of moderate size. Elytra with narrow geminate striae containing distant punctures, which impinge on interstices; interstices separately convex, with irregular rows of distinct, distant punctures, becoming larger on sides. Metasternum with dense and fairly large punctures at sides and margining coxae, becoming sparse and small in middle. Abdomen with apical segment strongly narrowed to middle; pygidium with somewhat crowded punctures. Length, 3–3.5 mm.

♀ Differs in having somewhat larger punctures, sides of clypeus less upturned, apical segment of abdomen not narrowed in middle, and front tibiae somewhat shorter and stouter.

*Hab.* New South Wales. Type, I. 15408.

The minute size, bicarinated head, clypeus emarginate in front, and dark club associate this species with the description of *O. granum*, but the smallest specimen is 3 mm., the elytra are more or less reddish and have distinct punctures on the interstices, the prothoracic punctures could hardly be regarded as coarse, although not very small, and the upper-surface is not glabrous; from *O. imponderosus* it differs in the clothing of the upper-surface, prothorax entirely black and with larger punctures, and elytral interstices separately convex; the cephalic ridges are somewhat as on *O. koebeleri*, but the two species are otherwise very different. On the type male the head and prothorax have a bronzy gloss, on the type female greenish. Two females from Queensland (Cairns, Dr. J. F. Illingworth) have the head and prothorax purplish, the legs obscurely reddish, and the elytra vaguely infuscated about base and suture.

**ONTHOPHAGUS SUTILISTRIATUS** sp. nov.

♂ Black, head and prothorax with a slight metallic gloss, antennae, palpi,

and parts of legs reddish, club deeply infuscated. Under-surface and legs moderately clothed.

Head with interocular ridge very feeble and arched slightly backwards; between it and base with very minute punctures, between it and clypeus with fairly dense and sharply defined but rather small ones. Clypeus large, sides moderately elevated, apex slightly more elevated and almost truncated; punctures somewhat larger and more crowded on sides than elsewhere; suture in three parts, the median distinctly carinated, arched slightly forwards, and about three-fifths of total, side parts less distinctly carinated, and oblique. Eyes narrow and with distinct facets. Prothorax large, somewhat gibbous in front, sides strongly rounded, front angles produced slightly outwards, lateral margins and gutters moderate, apical ones slight, base almost immarginate; punctures of moderate size and sharply defined, although not deep, smaller and sparser about apex than elsewhere; lateral foveae fairly large and deep; median line very faint, but traceable almost throughout. Elytra with narrow shining striae, containing small, distant punctures; interstices shagreened, subopaque, feebly separately convex, and with very small punctures. Metasternum with irregularly distributed punctures, becoming sparse and small in middle. Abdomen with apical segment strongly narrowed in middle; pygidium with fairly dense but rather shallow punctures. Length, 8 mm.

*Hab.* Queensland: Bowen (Aug. Simson). Type, I. 15404.

At first glance approaching some forms of *O. consentaneus*, but interocular ridge arched backwards instead of forwards, the space between it and clypeus, and the clypeus itself, considerably longer; in general it is extremely close to a female placed (apparently correctly so) with *O. mastersi* by Blackburn, but the clypeus is more elevated in front and the abdomen of the type is distinctly masculine; *O. promptus* and *O. margaretensis* are more metallic, and have the interocular space on head, and the clypeus considerably shorter. The elytral striae have the appearance as of bearing stitches at regular intervals.

### ONTHOPHAGUS INTERRUPTUS sp. nov.

Plate ix, figs. 81, 82.

♂ Black, shining, head and prothorax with a slight bronzy gloss, antennae, palpi, and tarsi reddish, club flavous. Under-surface and legs with rather sparse clothing, but becoming dense on sides of sterna and parts of front legs.

Head wide, sides from near base almost semicircular, flat between eyes, except for short remnants of an interocular ridge; sides in front of eyes with a few punctures, but otherwise almost impunctate behind clypeus. Clypeus moderately elevated on sides, more strongly in front: with dense and fairly large

but shallow, subvermiculate punctures; suture carinated on sides, but obliterated in middle. Eyes large, facets inconspicuous. Prothorax large, sides strongly dilated in middle, then narrowed to apex, but with a sinuous outline, lateral margins and gutters comparatively wide, apical ones narrower, base almost immarginate, front angles obtusely produced, middle feebly produced; remnants of median line faintly visible; sides and apex with small, obsolete punctures, very minute ones elsewhere. Elytra with narrow, geminate striae, containing narrow, transverse, distant punctures; interstices shagreened, opaque, not separately convex, and with very minute punctures. Metasternum with dense, asperate, piliferous punctures on sides, running out at middle of apex, base with somewhat similar ones, middle shining and with minute punctures. Abdomen with apical segment strongly narrowed in middle; pygidium with numerous rather small punctures. Front tibiae elongate. Length, 10–10.5 mm.

♀ Differs in having the interocular ridge interrupted for a short distance only in middle, clypeus slightly notched in front, rather coarsely vermiculate, suture carinated across middle, prothorax evenly convex across apex, apical segment of abdomen not narrowed in middle, and front tibiae somewhat shorter.

*Hab.* Queensland: Bowen (Aug. Simson). Type, l. 15422.

With the general appearance of *O. glabratus*, *O. murchisoni*, and large *O. queenslandicus*, but readily distinguished therefrom by the interocular ridge and sides of prothorax; it is perhaps nearest of all to *O. pronus*, some specimens of which have the interocular ridge interrupted in the middle; it resembles several species of *Macropocopris*, but the claws are normal. On the female the clypeal suture is conspicuously carinated throughout, but each of the side parts, where it joins the median part, is attached to a carina that passes the front of an eye to join the outer end of the broken interocular ridge; on the male, owing to the absence of the median portion, the lateral parts appear to be suddenly directed backwards to the ends of the broken ridge. On both sexes the sides of the prothorax are not evenly rounded to the apex from their widest part, but have a slight (although quite distinct) incurvature between it and the apex; the front of the prothorax of the male could scarcely be regarded as retuse, but from behind it appears widely bisinuate.

### ONTHOPHAGUS OPACIPENNIS sp. nov.

Plate vii, fig. 30.

♂ Black, antennae, palpi, and tarsi reddish. Under-surface and legs with long rusty-red hair.

Head large; interocular ridge semicircularly arched forwards, each end elevated into a rather long and almost upright thin horn; behind the ridge concave

and almost impunctate, between the ridge and clypeus with sparse and minute punctures, the sides with rather dense ones. Clypeus semicircular, sides feebly and evenly elevated; with dense punctures, transversely confluent or vermiculate, except at base, where they are sparsely and separately impressed; suture trisinate and carinated throughout, median sinus slightly arched forwards, and about three-fifths of the total. Eyes moderately narrow, facets distinct. Prothorax large, sides strongly rounded and wider than elytra, front angles strongly produced and subacute, almost vertical and impunctate in front; the declivity crowned by four tubercles, the outer of these subconical and separated from the median ones by a shallow excavation, the median ones connected by a narrow ridge; median line wide and shallow, basal gutter shallower than lateral, and margin less elevated; with moderately large and dense, but not very deep punctures; sublateral foveae fairly deep. Elytra with narrow, geminate striae, containing transverse distant punctures; interstices shagreened and opaque, with small shallow punctures. Metasternum with dense, asperate punctures on sides, becoming larger and sparser about coxae, and small in middle. Apical segment of abdomen strongly narrowed to middle; pygidium shagreened and with fairly dense punctures. Length, 12-13 mm.

*Hab.* Queensland: Mount Tambourine, in October and December (H. Hacker), Blackall Range, in October (F. E. Wilson). Type, in Queensland Museum; cotype, L. 15437, in South Australian Museum.

A large species with prothoracic protuberances somewhat as in *O. pugnae*, but readily distinguished from that and all other large species by the interocular ridge and horns.

#### ONTHOPHAGUS STENOCERUS sp. nov.

♂ Black or blackish, in parts with a faint bronzy gloss. Antennae, palpi, and tarsi reddish. Under-surface and legs with rusty-red hair.

Head large; with a long thin erect horn near each eye, the two without a connecting ridge; from base to clypeus with sparse and minute punctures, but becoming fairly large and dense on sides. Clypeus almost semicircular, sides slightly elevated, apex rather higher than sides; with fairly dense punctures at sides, but smaller and sparser in middle; suture trisinate, and carinated throughout, median sinus slightly arched forwards, and about three-fifths of the total. Eyes large, facets inconspicuous. Prothorax wide, sides strongly rounded, front angles strongly produced, lateral margins and gutters conspicuous, front ones feeble, basal absent; apical half obliquely sloping, and with sparse and minute punctures, elsewhere with slightly larger ones; sublateral foveae rather shallow. Elytra with narrow, geminate striae containing small distant punctures; inter-

stices shagreened and subopaque, with small, inconspicuous punctures. Metasternum with dense, asperate punctures on sides, sparse and small in middle. Abdomen with apical segment almost vanishing in middle; pygidium shagreened, opaque, and with fairly dense, small punctures. Length, 10–12 mm.

♀ Differs in having no horns on the head, the space between the eyes flat and marked in front by a straight carina-like edging, between this and the clypeus with larger punctures, although not very dense; clypeus closely transversely vermiculate almost throughout; prothorax less sloping in front, and with slightly larger punctures; apical segment of abdomen scarcely narrowed in middle, and front tibiae slightly shorter, with stouter teeth.

*Hab.* Queensland: Mount Tambourine and Brisbane (H. Hacker). Type, in Queensland Museum; cotype, female, I. 15438, in South Australian Museum.

Of other species with two long and more or less erect interocular horns in the male it is distinguished (apart from other features) by having much larger eyes than *O. tweedensis*, *O. australis*, *O. anisocerus*, and *O. mustersi*; *O. pieipennis* has a strongly elevated ridge between the horns, and very different prothorax, *O. fitzroyensis* is considerably smaller, more metallic, with the prothorax as well as the elytra shagreened, and with somewhat larger punctures; the other species are all very much smaller. The largest female is almost entirely of a dingy reddish-brown.

### ONTHOPHAGUS PHOENICOCERUS sp. nov.

♂ Black, most parts with a bronzy gloss, antennae (except club, which is blackish), tips of palpi, and tarsi of a more or less dingy red. Under-surface and legs with long, whitish hair.

Head with a wide, flat, bifid horn between eyes; with dense and fairly large punctures. Clypeus with sides moderately elevated, middle more strongly elevated and deeply notched; suture distinct on sides but not traceable across middle. Eyes very narrow, with distinct facets. Prothorax with sides strongly rounded, front angles strongly produced and subacute, margins narrow on sides, still narrower at base and apex; apical third retuse; median line scarcely indicated; with crowded, sharply defined punctures, of moderate size and occasionally confluent. Elytra with narrow, shining, geminate striae, containing small, distant punctures; interstices shagreened, opaque, and with sparse, minute punctures. Metasternum with crowded, asperate punctures on sides, becoming larger and sparser about coxae, and minute in middle. Abdomen with apical segment strongly narrowed to middle; pygidium shagreened and opaque. Length, 7 mm.

*Hab.* Queensland: Brisbane, in November (H. Hacker). Type, in Queensland Museum.

At first glance apparently close to some forms of *O. haagi* (a species in which the interocular horn is very variable), but prothorax without medio-frontal projections, and elytra without granules or small tubercles on the interstices; the prothorax and elytra are sculptured much as on *O. adalaidae*. The process on the head of the type rises abruptly vertical, and with almost parallel sides, for a height about equal to half the distance between the eyes, its ends are then continued as narrow horns for rather more than one-third of the total height; there is a small node on its back part. From the sides the prothorax and elytra may be seen to have very short setae, but they are scarcely visible from most directions.

#### **ONTHOPHAGUS COMPOSITUS sp. nov.**

♂ Black, most parts with a slight bronzy gloss; antennae (club blackish), palpi, and tarsi of a more or less dingy red. Under-surface and legs with rusty-red hairs.

Head with crowded and sharply defined punctures of moderate size; a small conical horn near each eye. Clypeus with sides moderately elevated, apex obtusely notched, suture trisinate and carinated throughout, median sinus almost straight and about three-fifths of the total. Eyes very narrow and with distinct facets. Prothorax with sides strongly rounded, front angles produced and acute, lateral margins narrow, front ones still narrower, basal absent; front somewhat gibbous; median line vaguely traceable near apex and at base; punctures and elytra as described in preceding species. Metasternum with dense, asperate punctures on sides, small, mixed with large ones, elsewhere. Abdomen with apical segment strongly narrowed in middle; pygidium shagreened and with dense punctures. Length, 7 mm.

*Hab.* Queensland: Stanthorpe (von Weildt). Type in Queensland Museum.

The sculpture of the prothorax and elytra approaches that of *O. adalaidae* and *O. phoenicocerus*, but the head is very different; the colour and cephalic horns are somewhat as in *O. granicollis*, but the prothorax is nongranulate; *O. spissicollis* has more rugosely sculptured prothorax and very different clypeus. On the sides of the elytra there are some very short setae, and none elsewhere, but the type may be partly abraded.

#### **ONTHOPHAGUS SQUALIDUS sp. nov.**

♂ Black, in parts with a faint bronzy gloss; antennae, palpi, and tarsi reddish. Under-surface and legs sparsely clothed.

Head with dense and moderately large, subasperate punctures; a shallow depression in middle. Clypeus with sides rather lightly elevated, apex distinctly notched, with a small process on each side of the notch; suture in three parts, median part carinated and straight, lateral parts ill-defined. Prothorax evenly convex, sides strongly rounded and finely margined, front still more finely margined, base not at all; median line scarcely traceable; punctures crowded but sharply defined. Elytra with narrow, geminate striae, containing small, distant punctures; interstices shagreened, opaque, and with numerous small, shining granules. Metasternum with irregularly distributed punctures of various sizes. Abdomen with apical segment somewhat narrowed in middle; pygidium shagreened and opaque. Length, 5.5–6 mm.

♀ Differs in having the clypeus granulate-punctate, apical segment of abdomen not narrowed in middle, and tibial teeth larger and more acute.

*Hab.* Queensland: National Park, in December (H. Haeker). Type, in Queensland Museum.

With the general appearance of very small specimens of *O. carteri*, but the granules appear to rise evenly (although not in regular rows) from the elytra, which are finely shagreened and non-setose; on *O. granulatus* and *O. planicollis* the granules on the elytra are mostly confined to single rows, and the head and prothorax are very different; on *O. granicollis* the prothorax is densely granulate, and the elytral granules are smaller and setiferous. On the female the legs and metasternum are of a dingy red, but this may be due to immaturity; the margins of its clypeus are more strongly elevated than on the male, and the process on each side of the median notch is more prominent, but the male appears to be old and worn.

#### ONTHOPHAGUS STRABONIS sp. nov.

♂ Black, shining, head and prothorax with a slight bronzy or bronzy-green gloss; antennae, palpi, and tarsi reddish, club blackish, but with grey pubescence. Under-surface and legs with rather sparse clothing.

Head with two obtusely triangular transverse elevations between eyes; between elevations and clypeal suture with rather small punctures, somewhat larger and more sharply defined on sides. Clypeus with sides slightly rounded and slightly elevated, apex scarcely more elevated and rather feebly notched; punctures sharply defined on sides, rather feeble about middle of base; suture not carinated, and feeble in middle, distinct on the sides. Eyes very narrow, with distinct facets. Prothorax moderately large, evenly convex, sides finely margined, apex and base still more finely; with numerous but not crowded, and sharply defined but rather small punctures. Elytra with fine geminate striae; interstices not separately convex, with rows of rather small but sharply defined

punctures, and larger ones cut across by striae. Metasternum with large punctures, becoming smaller but more sharply defined in middle. Abdomen with apical segment strongly narrowed in middle; pygidium with crowded and sharply defined punctures. Front tibiae rather long. Length, 4.5 mm.

*Hab.* Northern Territory: Groote Eylandt (N. B. Tindale). Type, I. 15407.

Structurally near male of *O. quadripustulatus*, although cephalic armature not quite identical, but elytra with more distinct punctures and unspotted; from the male of *O. blackburni* it is distinguished by the noncarinated clypeal suture; the male of *O. sydneyensis*, also with the suture noncarinated, has the clypeus truncate in front and impunctate; *O. blackwoodensis* has much larger prothoracic punctures, head of male with one interocular elevation, etc. The front angles of the prothorax from above appear to be rather acute, but at right angles are seen to be almost rectangular.

### ONTHOPHAGUS IMPONDEROSUS sp. nov.

♂ Black, in parts with a slight bronzy or purplish gloss, legs and palpi reddish, antennae paler, sides of prothorax, most of elytra, and apical parts of abdomen obscurely reddish. Under-surface and legs sparsely clothed.

Head with a feebly elevated and almost straight ridge, almost touching the eyes; with small but rather distinct punctures behind it, and somewhat smaller, and sparser ones in front. Clypeus short, sides gently rounded and feebly upturned, middle feebly incurved and not more upturned than sides; punctures small and ill-defined, suture carinated and straight from side to side. Eyes narrow, with distinct facets. Prothorax wide and evenly convex, sides with narrow gutters and margins, apex more feebly margined, base scarcely visibly so; punctures of moderate size, numerous but not crowded, and sharply defined. Elytra with narrow striae; interstices not separately convex, with numerous small punctures, becoming larger on sides, where they are almost as distinct as those on prothorax. Metasternum with sharply defined punctures, larger on sides than elsewhere. Abdomen with apical segment distinctly narrowed in middle; pygidium with slightly larger and more crowded punctures than on prothorax. Length, 2.5 mm.

♀ Differs in having slightly larger punctures and apical segment of abdomen not narrowed in middle.

*Hab.* Northern Territory: Groote Eylandt (N. B. Tindale). Type, I. 15409.

Smaller than any other species in the Museum, and apparently the size of *O. granum*, but club not dark, and clypeus scarcely emarginate, even in the female. The female has the elytra, except for a large space about the scutellum,



obscurely reddish, but the reddish parts not sharply limited; on the male the reddish parts are still more obscure; they are also very obscure on the prothorax.

**MACROPOCOPRIS KINGI** Har. (*Onthophagus*).

In Arrow's table of the species of *Macropocopris*, *M. kingi* is distinguished from *M. parvus* by its "Metasternum unpunctured." This appears to be the case with specimens when greasy, but when clean the metasternum is seen to have fairly numerous asperate punctures on the episterna, some shallow ones tending to obliteration on the sides and near the coxae, and very small ones in middle, but the largest ones are much smaller than those of *M. parvus*.

**MACROPOCOPRIS PARVUS** Blanch. (*Onthophagus*).

Plate ix, figs. 83, 84.

Specimens identified by Blackburn as *O. parvus* and agreeing with Arrow's table are before me: they all have the elytra shining and with minute but rather sharply defined punctures on a non-shagreened surface. In addition to differences in the front legs and abdomen, the sexes may be distinguished by the clypeal suture; in the female this is carinated across the middle as well as on the sides; in the male it is not so carinated, and on some specimens can scarcely be even traced. Mr. Tindale obtained 11, 6, 4 and 3 specimens from the anal region of the common wallaby of Groote Eylandt, *Macropus agilis*; they were running around the anus and amongst the fur; the natives said they were always to be found there; he obtained but one other specimen in ordinary collecting, but the species is common in collections from Cape York to North-western Australia.

A female from Port George IV (North-western Australia) differs from the normal form in having the elytra finely shagreened, and with still more minute punctures, not at all sharply defined; but these do not warrant its being described as a distinct species.

**MACROPOCOPRIS PERAMELINUS** sp. nov.

Plate ix, fig. 85.

♂ Black, shining, antennae, palpi, and tarsi somewhat reddish. Under-surface and legs with irregularly distributed, rusty-red hairs.

Head wide, sides from widest part almost semicircular and moderately elevated, more strongly so in front; obliquely flattened and almost impunctate between eyes, but with a small central fovea, with numerous small punctures elsewhere, becoming larger on clypeus, but nowhere very large. Clypeus with suture carinated on sides, but obsolete across middle, the side parts each joined

on to a thin carina that curves round to near the front of an eye. Eyes large, facets inconspicuous. Prothorax large, sides strongly rounded, lateral gutters fairly deep, margins fairly wide on sides, narrow at apex, but absent from base, front angles somewhat acute; a conspicuous conical tubercle in middle, crowning the summit of a fairly large, subapical depression; punctures very minute, becoming larger but obsolete in front angles. Elytra with narrow, geminate striae, containing narrow, distant punctures; interstices scarcely separately convex, and with minute punctures. Sides of prosternum, sides and base of metasternum, with rather dense piliferous, granulate punctures; metasternum with some large punctures near apex and small ones elsewhere. Abdomen with apical segment strongly narrowed in middle; pygidium with fairly dense small punctures. Claw-joints large, dilated to near apex, claws large and strongly arched at base. Length, 9 mm.

*Hab.* New South Wales: Wingham, one specimen from a bandicoot's nest (W. du Boulay). Type, I. 15396.

The general appearance is suggestive of species of *Onthophagus*, such as *O. glabratus* and *murchisoni*, with the prothorax armed, but the claw-joint and claws are those of *Macropocopriss*; it is the only species at present known of that genus with the prothorax armed.

#### **PEDARIA ALTERNATA** sp. nov.

♂ Black, shining, most parts with a bronzy gloss; antennae, palpi, and tarsi more or less reddish. With short, pale setae, rather sparsely distributed.

Head wide, moderately convex between eyes; with rather sparse punctures becoming dense (but normally concealed) at base, sides flattened but with fine margins. Clypeus with two projections marking the sides of a semicircular notch. Prothorax widely transverse, front angles obtusely produced, hind ones obtuse, sides obliquely decreasing from near apex to base; a large, almost impunctate, medio-basal depression, its front angles obliquely produced, between depression and sides with large, rather dense and suboblong punctures, elsewhere with sparser, smaller, and more rounded ones. Elytra feebly dilated behind shoulders; with deep, sharply defined striae, four interstices on each elytron conspicuously wider than the others, and each with a row of rather distant, setiferous punctures. Metasternum with a large median depression, connected with mesosternum by a median ridge; sides with dense and large punctures, smaller elsewhere, but all sharply defined. Front tibiae moderately long, obtusely tridentate externally, apex with a rather strong inner hook. Length, 4.5-5 mm.

♀ Differs in being less parallel-sided; head smaller, with denser and rather coarse punctures; prothorax with denser and larger punctures, and with many

deep oblong ones in the large depression; front tibiae shorter, stouter, more dilated at apex, with larger and more acute teeth, and without an inner hook.

*Hab.* Northern Territory: Grootte Eylandt (N. B. Tindale). Type, I. 15433.

Consistently larger and more metallic than *P. geminata*, prothoracic excavation with distinct punctures only in the female, elytra nongranulate, etc. Numerous specimens were obtained on the island.

#### EXPLANATION OF PLATES, vi-ix.

##### Plate vi.

- Figs. 1, 2. *Canthonosoma macleayi* Har.  
 3, 4. *C. castelnaui* Har.  
 5. *Copraecus hemisphaericus* Guer.  
 6. *Labroma horrens* Sharp.  
 7. *Merodontus calcaratus* Mael.  
 8, 9. *Aulacopris reichei* White.  
 10, 11. *Coptodactyla ducalis* Blackb.

##### Plate vii.

- Figs. 12-14. *Onthophagus laminatus* Mael.  
 15. *O. cowleyi* Blackb.  
 16. *O. pugnacior* Blackb.  
 17. *O. pugnax* Har.  
 18. *O. atrox* Har.  
 19, 20. *O. sloanei* Blackb.  
 21, 22. *O. fissiceps* Mael.  
 23, 24. *O. ferox* Har.  
 25, 26. *O. pentacanthus* Har.  
 27. *O. pronus* Er.  
 28, 29. *O. leui* Blackb.  
 30. *O. opacipennis* Lea.

##### Plate viii.

- Figs. 31-33. *Onthophagus australis* Guer.  
 34, 35. *O. mastersi* Mael.  
 36, 37. *O. macrocephalus* Kirby  
 38, 39. *O. conspicuus* Mael.  
 40, 41. *O. nodulifer* Har.

- 42-44. *O. haagi* Har.  
 45-47. *O. anisocerus* Er.  
 48, 49. *O. tweedensis* Blackb.  
 50. *O. bovilli* Blackb.  
 51, 52. *O. victoriensis* Blackb.  
 53-56. *O. comperci* Blackb.  
 57, 58. *O. hoplocerus* Lea.  
 59. *O. bicavicollis* Lea.  
 60. *O. variolicollis* Lea.

## Plate ix.

- Figs. 61, 62. *Onthophagus furcaticeps* Masters.  
 63. *O. lobicollis* Macl.  
 64, 65. *O. walteri* Macl.  
 66, 67. *O. cuniculus* Macl.  
 68, 69. *O. dunningi* Har.  
 70. *O. planicollis* Har.  
 71. *O. mamillatus* Lea.  
 72. *O. anchommatus* Lea.  
 73, 74. *O. tricavicollis* Lea.  
 75. *O. spissicollis* Lea.  
 76. *O. varianus* Lea.  
 77. *O. cribricollis* Lea.  
 78. *O. clypealis* Lea.  
 79, 80. *O. semimetallicus* Lea.  
 81, 82. *O. interruptus* Lea.  
 83, 84. *Macropocopris parvus* Blanch.  
 85. *M. peramelinus* Lea.

Photographs by N. B. Tindale.