

7.—BEES IN THE COLLECTIONS OF THE WESTERN AUSTRALIAN MUSEUM AND THE AGRICULTURAL DEPARTMENT, PERTH.

By TARLTON RAYMENT.

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In addition to the bees in the institutions mentioned, and which I have studied owing to the courtesy of the Curator, Mr. L. Glauert, B.A., and the Entomologist to the Department, Mr. L. J. Newman, I have included several West Australian species obtained by Mr. Tom Greaves, myself, and other Collectors. The species in the Museum are marked with an asterisk.

It will be noticed that I have a systematized form for the specific descriptions, and this permits the student to make rapid comparisons. The DIVISIONS and FAMILIES are those of Messrs. Cockerell and Robbins (1), and the neuration of the wings is based on the arbitrary method of Messrs. Rohwer and Gahan (2). Systems based on the homology of the hymenopterous nervures with those of other Orders are too cumbrous for taxonomy.

I regret very much to hear from my esteemed mentor, Professor T. D. A. Cockerell, of Colorado, U.S.A., that owing to ill-health, he has had to return unstudied several boxes of Australian bees. "It will have to be a job for the Australians," he concludes regretfully. The Professor has described many hundreds of our bees.

A study of the strigil of bees, in most of the genera of the world, shows it to be an interesting character in generic diagnosis, and its importance is shown in the new genus *Nodocolletes*. I hope to publish a paper on this character during the year. I tender my sincere thanks to Miss Joyce Love for her careful assistance in the preparation of the typescript.

DIVISION COLLETIFORMES.

FAMILY PROSOPIDIDÆ.

GENUS *HYLAEUS*, Fabricius.

1793.—*Hylaeus*, Fabricius, Ent. Syst. ii, p. 302.

1879.—*Hylaeus obtusata*, Smith.

Hab.—Swan River, W.A., January (L. J. Newman).

A male and female taken at the type locality; the latter is typical, but as I am unable to find any description of the former, I give the following details of the allotype:—

Male: Length, 6.5 mm. approx.

Head elongate, black, coarsely punctured; face-marks wide, yellow, extending half-way to ocelli past the insertion of the antennae; frons shining, deeply and densely punctured; clypeus deep yellowish, red anteriorly; supraclypeal area dome-shaped, yellow; labrum blackish; mandibulae black, a lighter subapical patch; scape yellow, flagellum ferruginous beneath.

Prothorax black, two yellow lines ; tubercles yellow ; mesothorax black, bright, coarsely and densely punctured ; scutellum and post-scutellum with a yellow patch, but of similar sculpture ; abdomen blackish, with a purplish tinge, numerous coarse punctures ; metathorax with a V-shaped rugose area.

Legs blackish-red ; this obscure tint also shows in the middle of the abdominal segments in some lights ; a few white hairs ; wings clear, nervures and pterostigma reddish-brown ; basal nervure arched ; first recurrent and intercubitus interstitial.

Close to *H. cognata*, which has no yellow on its smaller prothorax.

*1879.—*Hylaeus cognata* (Smith).

Hab.—Swan River, W.A., January (L. J. Newman) ; Champion Bay, W.A., February, 1914 (L. Glauert).

Three males and a female from the type locality. These are close to *H. obtusata* (Sm.), but are typical specimens.

GENUS MEROGLOSSA, Smith.

1853.—*Meroglossa*, Smith, Cat. Hym. B.M., p. 33.

*1930.—*Meroglossa miranda*, Rayment. Proc. Roy. Soc. Vic., September (with figure).

Hab.—Milly Milly, W.A., May 10, 1922 (L. Glauert).

This extraordinary bee has a huge transverse process on the fourth abdominal segment, and a nodose one on the third ; another very remarkable character is the exceedingly long maxillary palpi, which are very much longer than the antennae ; the short, pointed glossa, however, is typical of the genus. The only other *Meroglossa* recorded for the State is *M. rubricata* (Sm.), Swan River, a red bee with yellow markings, and, therefore, entirely distinct from *M. miranda*, which is black.

GENUS EURYGLOSSIDIA, Cockerell.

1910.—*Euryglossidia* Cockerell, Ann. Mag. Nat. His. (8) VI., p. 358.

*1929.—*Euryglossidia cyanescens* Cockerell, "Bees in Australian Museum," p. 219.

Hab.—Cunderdin, W.A., July, August, September, October (L. Glauert). Described from Kojarena, W.A.

The two females are typical in every character.

GENUS EUPROSOPIS, Perkins.

1912.—*Euprosopis* Perkins, Ann. Mag. Nat. His. (8) IX., p. 106.

*1930.—*Euprosopis elegans* var. *occidentalis* Rayment, Proc. Roy. Soc., W.A., p. 47.

Hab.—Gosnells, W.A., February (H. W. Andrewartha).

Previously recorded from Bungulla, W.A.

The lone male is much smaller than eastern varieties of this species, measuring only 6 mm. in length. There is a large black median patch on the basal segment of the abdomen ; the mandibulae, labrum and yellow face resembling the male of the species ; the apex of the lateral face-marks being somewhat expanded. Specimen in Perth Ag. Dept. Collection.

GENUS *PACHYPROSOPIS*, Perkins.

1908.—*Pachyprosopis* Perkins, Proc. Hawaiian Soc. II., p. 29.

*1913.—*Pachyprosopis haematostoma* Cockerell.

Hab.—Gosnells, W.A., February (L. J. Newman).

Previously recorded from Windsor, Croydon, Vic. ; Kalamunda, W.A.

These females are typical, except that the tarsi are cream-coloured, instead of ferruginous, as in the type.

DIVISION COLLETIFORMES.

FAMILY COLLETIDAE.

GENUS *ANTHOGLOSSA*, Smith.

1853.—*Anthoglossa*, Smith, Cat. Hym. B.M. (1), p. 16.

1906.—*Anthoglossa aureotincta*, Cockerell.

Hab.—Perth, W.A. (L. J. Newman).

A typical female from the type locality.

Anthoglossa vittata, sp. nov.

(Plate XX., Nos. 17, 18, 19).

Female : Length, 14.5mm. approx.

Head transverse, black, bright, numerous large punctures, and much drab hair tipped with black ; face-marks nil, but a dense coat of hair ; frons densely and coarsely punctured ; clypeus wide, coarsely punctured, with much hair ; supraclypeal area rising to a carina that encircles the median ocellus ; vertex sharply developed, not so hairy, a thick post-occipital fringe ; compound eyes blackish, anterior margins parallel, minute peg-like hairs between the facets ; genae rough, a minute shagreen, a few pale hairs, not well developed ; labrum oval, black ; mandibulae with outer edge convex, but not bent ; antennae black, the apical joint oblique, truncated, shining, reddish.

Prothorax not visible from above ; pleura with long, plumose drab hair ; tubercles black, hidden under the abundant yellowish-drab hair ; mesothorax black, bright, scattered coarse punctures, a delicate tessellate sculpture, a thick covering of long yellowish-drab hair tipped with dark brown ; scutellum and postscutellum dull, sculpture rougher, dense hair ; metathorax with a large shining enclosed area having a fine tessellate sculpture ; abdominal dorsal segments black, shining, hind margin of one depressed, margins broadly pallid, three, four and five with a fringe of whitish hair, the black portions with sub-erect long black hair ; apical fimbria blackish-brown ; ventral segments similar, but hair-fringes dull fulvous.

Legs obscurely reddish, with much light-brown and white plumose and forked hairs ; tarsi fulvous, deeply bifid ; empodium large, dark ; hind calcaria fulvous, with long coarse serrations ; tegulae dark-apricot colour ; wings sub-hyaline, brownish, anterior 9.5mm. ; nervures brownish-amber, strong, first recurrent entering second cubital cell at middle, second recurrent entering third cubital at extreme apical corner ; cells : the second cubital almost rectangular, large, the third cubital contracted at apex ; pterostigma brownish-amber, inconspicuous ; hamuli sixteen in number, strongly developed.

Locality : Perth, W.A.

Allies : *A. cygni* Cockerell, which has no hair-bands on abdomen, a ferruginous labrum, and is larger ; *A. plumata*, Smith, which has orange-fulvous hair on fifth abdominal segment.

Type in the collection of the author.

GENUS PARACOLLETES, Smith.

1853.—*Paracolletes*, Smith, Cat. Hym. B.M., p. 6.

1879.—*Paracolletes bimaculatus* Smith.

Hab.—Smith's Mill, W.A., October 16, 1909 (H. M. Giles).

Previously recorded from Swan River, Yallingup, Perth.

Two females which are much larger than the genotype, being 15mm. against the 11mm. of Smith's specimen. The following details were omitted by that author—the anterior edge of the broad clypeus is narrowly ferruginous, the scattered punctures extremely shallow ; labrum clear ferruginous ; the straight mandibulae ferruginous, with blackish-red tips ; the large scattered punctures of the mesothorax are shallow ; the clear ferruginous abdomen is covered with minute appressed black hairs ; the hind calcar is red, with eight strong teeth.

*1879.—*Paracolletes antennatus* Smith.

Hab.—Swan River, W.A. (L. J. Newman, L. Glauert).

A number of males from the type locality. Smith's words in reference to the apex of the antenna seem contradictory, "dilated and compressed." I think flattened and expanded are more suitable for the peculiar black apical segment.

1929.—*Paracolletes melbournensis clarki*, Cockerell.

Hab.—South Perth, W.A., January 21, 1909 (H. M. Giles).

Previously recorded from Perth (J. Clark).

One female, which is not so brassy as the type of the species.

*1853.—*Paracolletes plumosus* Smith.

Hab.—Swan River, W.A., February, 1914 (L. Glauert).

Previously recorded from Perth, W.A. ; Melbourne, Bright, Sandringham, Victoria (Rayment).

There has been some doubt about the male, but I have a large colony of this species close to my home, and the males from these nests conform to Smith's description of *P. bicolor*, but his account is too meagre. However, two males and two females are indistinguishable from those in the colony at Port Philip, Vic. ; moreover, they are awing at the same period.

*1879.—*Paracolletes marginatus*, Smith.

Hab.—Margaret River District, W.A., October, 1912 (L. Glauert).

Previously recorded from Bright, Cheltenham, Victoria, also from Queensland, and Bridport, Tasmania. This new record is a remarkable extension of range. The eastern species are awing much later (February). The two males differ from the type by having the entire length of the flagellum ferruginous beneath.

*1879.—*Paracolletes providus* Smith.

Hab.—Guildford, W.A., 1915 (L. Glauert) ; Moora, Swan River, W.A. (L. J. Newman).

Previously recorded from Port Philip, Victoria ; Eaglehawk Neck, Tasmania. This new record for the State increases the range immensely. The four females are typical.

*1862.—*Paracolletes advena* Smith.

Hab.—Perth, W.A. ; Brisbane, Stradbroke Island, Q. ; Port Phillip, Vic.

The true male is *P. euphenax*, Ckll. I have thousands of the nests close to my home, and the bees are peculiar in this respect : the species are very abundant every second year. The sexes issue together, at the end of August, from deep shafts in sandy ground. The cell-chambers are lined out with a silvery skin. The stores are a thick batter of honey and pollen, and the entire brood is carried over the winter in larval form. There is no sex attraction for males while the females are on the flowers of *Leucopogon* species, for mating takes place in the shafts. During the night, or when the weather is dull and cold, the males cluster "higgly piggly" in a curled, dried frond of bracken-fern, and from two to three hundred are to be found sheltering in a single cluster. I have given a full account of the life-history in the *Age* newspaper.

Alfken (3), of Bremen (Ger.), suggests that *Andrena infirma* (Erichs.) is the male, but Alfken is incorrect in his surmise. However, I have submitted males, taken *in cop.*, to Professor Cockerell, and he identified them as *P. euphenax*. Moreover, I have had many colonies of *Halictus lanarius*, Sm., close to my home, and Cockerell says it is probable, but not certain, that Erichson had the male of this species in mind.

GENUS TRICHOCOLLETES, Cockerell,

(Plate XXI. No. 1).

1912.—*Trichocolletes*, Cockerell. The Entomologist, XIV., p. 176.

*1862.—*Trichocolletes venusta* (Smith).

Hab.—Swan River, W.A., August (L. J. Newman) ; Cunderdin, W.A., September (L. Glauert).

Previously recorded from Brisbane, Birkdale, Q. ; Hobart, Tas. ; Port Phillip, Black Rock, Daylesford, and Macedon, Vic. This new record for the State is a remarkable extension of range. Two males are larger than eastern specimens, and the bright orange hair of the face is so abundant that all sculpture of the face is hidden. The hair of the thorax is more foxy-red. The season of flight is the same for Victoria, and I have given the life-history in the "Victorian Naturalist," December, 1929. The following key will separate the described species :—

- (1) Narrow body, coarse puncturing on abdomen, pallid apical margins and long black hair on abdominal segments, clypeus and labrum fulvous. *T. dowerinensis*, sp. nov.
- (2) Wider body, fine puncturing on abdomen, golden apical margins of abdominal segments, face-hair paler. *T. venusta* (Sm.).

- (3) Smaller, excessively fine transverse striation on abdominal segments, clypeus naked with a tuft of hair at each side. *T. nigroclypeatus*, Raym.
- (4) Scapes blackish, a tuft of hair in middle of clypeus, body-bands very dull and narrow. *T. tenuiculus*, sp. nov.
- (5) Face-hair very dense, reddish-gold, the body-bands exceedingly golden. *T. daviesiae*, sp. nov.

***Trichocolletes dowerinensis*, sp. nov.**

(Plate XXI. No. 3).

Male : Length, 13mm. approximately.

Head black, dull ; face covered with a dense coat of bright orange hair ; frons rough ; clypeus bright fulvous ; supraclypeal area rising to a nodule ; vertex sharply developed, with a fine sculpture ; compound eyes with anterior margins parallel, claret-brown ; genae with long white hair ; labrum oval, bright fulvous, with a stiff fringe of hair ; mandibulae dark reddish ; antennae dark-brown, the apical segment flattened, the third segment slender.

Prothorax not visible from above ; tubercles hidden under fulvous hair. Mesothorax black, dull, a minute scale-like sculpture, fulvous hair ; scutellum and postscutellum similar ; metathorax small, with somewhat similar sculpture, and orange hair ; abdominal dorsal segments black, dull, hind margins broadly pale straw-colour, dark fulvous hair on one and two, long black hair on others ; ventral segments black, margins narrowly lighter, some pale hair.

Legs ferruginous, with white hair ; tarsi ferruginous, basitarsi broad ; claws reddish, bifid ; hind calcariae finely serrated, ferruginous. Tegulae dark amber ; wings hyaline ; anterior 8mm. ; nervures dark brown ; cells : radial, very long ; pterostigma dark-brown ; hamuli fourteen in number, strongly developed.

Locality : Dowerin, W.A.

Allies : *T. venusta* (Smith), which has finer puncturing on abdomen, and *T. nigroclypeatus* Raym., which has naked black clypeus.

Biological data : The shrill note and extremely rapid flight of the male is distinctive. Examination of the pollen-grains shows that these bees are singularly constant to the pea-shaped flowers of the *Daviesia*. In Victoria to *D. corymbosa*, *D. latifolia*, and *D. ulicina* ; in W.A. to *D. horrida*, and in Queensland to *D. ulicina*.

***Trichocolletes tenuiculus*, sp. nov.**

(Plate XXI., Nos. 4, 5).

Male : Length, 12mm. approximately.

Head black, transverse, bright ; face covered with a dense bright-orange hair ; the anterior portion of the clypeus laterally naked ; frons rough ; clypeus very prominent, black, with dense puncturing ; supraclypeal area with a fine carina reaching to the median ocellus ; vertex sharply developed ; two large depressions at sides of face ; compound eyes with long orange sensory hairs, the anterior margins parallel ; genae with a few fulvous hairs ; labrum oval, fulvous ; mandibulae fulvous, black basally and apically ; antennae black, scape obscurely lighter.

Prothorax not visible from above ; mesothorax black, dull, a close minute scale-like sculpture ; disc almost naked, but abundant long orange hair laterally ; scutellum and postscutellum similar ; metathorax black, dull, with a strong crescentic transverse keel and abundant orange hair, abdominal dorsal segments black, bright, with pallid hind margins and adpressed long black hair ; very few orange hairs ; ventral surface similar, with a few long white hairs.

Legs black, except ferruginous knees and tibiae ; median tibiae with black spot ; tarsi ferruginous ; claws reddish, bifid ; hind calcariae finely serrated, reddish ; tegulae shining black ; wings subhyaline, the costal margin darker, anterior 9mm. nervures dark-brown ; pterostigma dark-brown ; hamuli thirteen in number, strongly developed.

Locality : Canowindra, New South Wales, August 1930. (M. Dwyer).

Type in the collection of the Author.

Allies : Clearly, the species is between *T. venustus* Sm. and *T. nigroclypeatus*, Raym. The first has the face completely covered with orange hair, the second has paler hair and bare clypeus. The species in this genus are difficult to separate unless the genitalia are examined.

Female : length, 14mm., approximately.

Head black, the face covered with scattered pale hair ; the clypeus naked, with conspicuous punctures, shining ; the supraclypeal area rising to a distinct node ; labrum oval, fulvous ; mandibulae reddish, black basally and apically ; antennae black.

Thorax with some drab-white hair tipped with fuscous ; the disc is almost naked compared with the reddish hair of other females in the genus ; abdominal segments black, sericeous, the golden bands of the hind margins being inconspicuous, so that the general aspect of these females is very dull.

Legs black, except dark ferruginous knees tibiae and tarsi ; the femora with much long white plumose hair ; the hair of the tibiae and tarsi being light golden ; tegulae shining black ; hind calcar reddish, with six strong teeth ; wings subhyaline ; anterior 9·5 mm., nervures dark-brown.

Locality : Canowindra, New South Wales, August, 1930. (M. Dwyer).

Allotype in the collection of the Author.

Seven large spines and three small ones in the hind calcar. Just as I had recorded for Victoria *T. daviesiae* males on *Hardenbergia monophylla*, I received these females taken on the same plant in New South Wales.

Trichocolletes Nigroclypeatus, Raym.

VICTORIAN NATURALIST, Dec. 1929, p. 162, with fig. of female.

The male is difficult to distinguish from *T. venustus* if the genitalia be neglected. Compared with *T. tenuiculus*, the colouring is much brighter, the body-bands wide and golden, the scapes bright ferruginous.

Locality : Mt. Macedon, Victoria, October, 1929 (Rayment).

Allotype : in the collection of the Author.

Trichocolletes daviesiae, sp. nov.

(Plate XXI., No. 6.)

Male: Length 13 mm. approximately.

Head black, transverse; face covered with dense orange hair, which is paler at anterior margins of eyes; Frons dull; vertex sharply developed; genae with abundant long white hair; labrum amber; mandibulae amber, black basally, reddish apically; antennae black, scape ferruginous.

Prothorax not visible from above; mesothorax black, dull, a scale-like sculpture, the thorax beneath with much whitish hair, dorsally and laterally the hair is orange; scutellum and postscutellum similar; metathorax with much orange hair; abdominal dorsal segments black, the hind margins glistening golden colour; the ventral surface with much white hair.

Tibiae and all tarsi bright ferruginous, the other portions of the legs black, with much long white hair, claws reddish; hind calcar reddish; tegulae brown; wings subhyaline, anterior 8 mm. nervures brown; pterostigma brown; hamuli twelve in number.

Locality: Heathmont, Victoria, August 30th, 1930. (Rayment.)

Type in the collection of the Author.

Allies: This species is between *T. dowerinensis* and *T. tenuiculus*; the first is separated by its amber clypeus and the second by its inconspicuous body bands.

These males were flying over the purple flowers of the Wild Sarsaparilla (*Hardenbergia*) but females were on *Daviesia latifolia*.

Genus Nodocolletes, gen. nov.

(Plate XIX).

Large, semiprismatic, dark-coloured bees.

Length, 13–15 mm.

Head transverse, with occipital region poorly developed; glossa wide, short and hairy, an undulating line just in front of the paraglossae which are fan-shaped and hairy; four segments in the labial palpus and six in the maxillary; clypeus convex; ocelli in a low curve.

Prothorax not visible from above; tubercles heavily fringed with hair; the postscutellum with a distinctive hollow dentate process obscuring the metathorax.

Legs stout and heavily clothed with forked hair; the strong teeth of the hind calcar of the female corresponding in number with the teeth of the strigil; an agreement not found in any other group. Radial cell pointed off the costa at its apex; the three cubital cells slightly contracted at the apex; the basal nervure straight; hamuli well developed; pterostigma inconspicuous.

Genotype: *N. dentatus*, sp. nov.

Allies: *Paracolletes*, Smith, but that genus is now too comprehensive; the new genus is closer to *Lioproctus*, Smith—which has been merged in *Paracolletes*—when the mouth-parts are studied.

Paracolletes diodontus, Ckll., *Lioproctus vigilans*, Sm. and *P. subvigilans*, Ckll., become *Nodocolletes diodontus* (Ckll.), *N. vigilans* (Sm.), and *N. subvigilans* (Ckll.) respectively.

In his generic diagnosis of *Lioproctus*, Smith describes a naked area on the sixth abdominal segment, but does not mention this character in his specific description of *L. vigilans*. I have not seen the type, but my specimens, which conform to his account, do not exhibit such an area. The following key will enable students to separate the species reviewed and described in this paper.

Female : Length, 14 mm., approximately.

Head royal blue ; genae peacock blue ; labrum black ; flagellum lighter ; abdomen shining green ; calcar and strigil with five teeth.

Hab. : Moora, W.A. *N. dentatus*, sp. nov.

Female : Length, 12 mm. approximately.

Head dark-blue ; genae blue ; labrum black ; the second abdominal segment with red margin ; calcar with four teeth.

Hab. : Quairading, W.A. *N. subdentatus*, sp. nov.

Female : Length, 13 mm. approximately.

Head dark-blue ; thorax black ; abdomen black, with margins of segments green ; calcar not in description.

Hab. : Eradu, W.A., Sept. 8, 1926. *N. diodontus*. (Cockerell).

Female : Length, 12.5 mm. approximately.

Head and thorax black ; flagellum fulvous beneath ; abdomen olive green, calcar with five teeth.

Hab. : Swan River, W.A. (L. J. Newman). *N. vigilans*. (Smith).

I have had no opportunity to study the types of *Paracolletes subvigilans*, Ckll., and *P. phanerodontus*, Ckll., and cannot say whether they, too, should be included in this new genus, though the scopa has the contrasting black and white hair of the genotype.

Alftken (3) after examining a small collection of bees from Western Australia, thought that the systematic position of some of the genera must be altered. I agree, and regret that Smith's separation of bees with simple calcaria should be disregarded, and the insects returned to *Paracolletes* which has long strong teeth on the calcar.

This paper was in MS. when Doctor Cockerell's descriptions were published in New South Wales.

Nodocolletes dentatus, gen. et sp. nov.

Plate XIX., No. 3).

Female : Length, 14 mm. approximately.

Head broad, dark royal-blue, shining ; face-marks nil, but much silvery white hair up to the antennae ; frons iridescent, with dense coarse punctures shining ; clypeus broad, rugosopunctate, shining, black, a fringe of long black hair ; supraclypeal area similar to clypeus, with a carina reaching to the level of the median ocellus ; vertex iridescent, coarsely punctured, a few black hairs, ocelli in a low curve ; compound eyes with anterior margins parallel ; genae peacock blue, shining, coarsely punctured, some long silvery hair on

lower half ; labrum black, dull rough, with a median circular depression ; mandibulae dull, black, smooth, a large tooth and a small one, a few long fulvous hairs ; antennae black, rufous at base and apex, apical segment flattened.

Prothorax not visible from above ; tubercles with a dense covering of long white hair ; pleura peacock blue, rugosopunctate ; mesothorax black, shining, iridescent, blue anteriorly, numerous coarse punctures, scattered long fuscous hair dorsally, sterna with much white hair ; scutellum metallic blue, coarsely punctured, with long fuscous hair ; postscutellum almost hidden, with a long dentate concave process, iridescent blue with fuscous hair in the cavity and a dense fringe of silvery hair underneath ; metathorax short, the enclosed area smooth and shining ; abdominal dorsal segments a brilliant iridescent shining green, the wide depressed apical half being coppery and impunctate, the basal half royal blue, coarsely punctured, laterally a few white hairs, apically a black brush ; ventral segments peacock blue, each with a fringe of white hair.

Legs black, with long black hair above, and long silvery white hair beneath on the hind tibiae ; tarsi black, the basitarsi short and broad, with much black hair ; claws deeply bidentate, reddish ; hind calcariae dark-red, with five long slender teeth ; tegulae black, smooth, bright. Wings dusky with a purplish iridescence, basally hyaline ; anterior 10 mm ; nervures strong, blackish, the first recurrent entering the second cubital cell at the basal third, the basal meets the nervulus ; cells : the second and third cubitals of nearly equal size, the third being the larger ; pterostigma narrow, dark-brown ; hamuli thirteen in number, well developed.

Locality : Moora, West Australia. (L. J. Newman). Date unknown.

Allies : Very close to *Nodocolletes diodontus* (Ckll.) which has a black abdomen with green bands, and black antennae ; *N. subvigilans* (Ckll.) which has a differently shaped process on postscutellum ; *N. subdentatus*, sp. nov., which has a finely striate area of the metathorax, and four slender teeth on the calcar. A smaller bee, which conforms to Smith's description of *Lioproctus vigilans*, has five teeth on the calcar. Type in the collection of the Agricultural Department, W.A.

***Nodocolletes subdentatus*, sp. nov.**

(Plate XIX).

Female : Length, 12mm. approximately.

Head broad, dark-blue, shining ; face-marks nil, a close covering of white hair at sides of face below the insertion of the antennae ; frons iridescent dark-blue, shining, with numerous coarse punctures ; clypeus black, shining, rugosopunctate, supraclypeal area similar to clypeus, with a carina reaching to the median ocellus ; vertex with fuscous hair ; compound eyes slightly converging below ; genae blue, rugosepunctate, with long white hair ; labrum suboval, black, bright, with a central depression ; mandibulae bright, with a very small inner tooth, black, with obscure red tips ; antennae black above, fulvous beneath.

Prothorax not visible from above ; the pleura blue, with fuscous hair, sterna with white hair ; tubercles with a dense fringe of white hair ; mesothorax iridescent black, shining, coarsely punctured, fuscous hair, bluish

posteriorly ; scutellum bluish, coarsely punctured, dark hair ; postscutellum with a fringe of white hair, and a distinctive bidentate process ; metathorax short, the enclosed area with concentric striations ; abdominal dorsal segments iridescent green, the apical half impunctate and shining, the basal half coarsely punctured, two being dull, at base, with a wide reddish margin ; the ventral segments blue, with a white fringe.

Legs black, stout, hair of coxae white, hind tibiae with black hair above and white beneath ; tarsi with reddish-brown hair ; claws reddish ; hind calcariae with four long slender teeth, reddish brown ; tegulae black shining ; wings hyaline only basally, dusky over other portion ; nervures blackish-brown ; cells : similar to the genotype ; pterostigma small and narrow ; hamuli thirteen in number, strong.

Locality : Quairading, West Australia.

Allies : very close to *N. diodontus* (Ckll.) which has the metathoracic area smooth, and black antennae.

Type in the collection of the Author.

GENUS STENOTRITUS, Smith.

1853.—*Stenotritus*, Smith, Cat. Hym. B.M., 1, p. 119.

*1930.—*Stenotritus glauerti* (Rayment), Victorian Naturalist, p. 10.

This beautiful large green female is close to *S. smaragdinus*, Smith.

Hab.—Yorkrakine, W.A.

1930.—*Stenotritus pubescens* var. *splendida* Rayment.

Hab.—Geraldton, W.A. (L. J. Newman).

GENUS MELITRIBUS, Rayment.

1930.—*Melitribus*, Rayment, Proc. Roy. Soc., Victoria, p. 219.

1930.—*Melitribus victoriae* var. *B* Rayment, Victorian Naturalist, p. 10.

Hab.—Swan River, W.A. (L. J. Newman).

One male. These shining black bees have a strong superficial resemblance to leaf-cutting bees (*Megachile*).

DIVISION ANDRENIFORMES.

FAMILY ANDRENIDAE.

SUBFAMILY HALICTINAE.

GENUS HALICTUS, Latreille.

(Plate XVII).

1805.—*Halictus* Latreille, His. Nat., xiii., p. 364.

1879.—*Halictus vividus*, Smith.

Hab.—Kalgoorlie, W.A., August (L. J. Newman).

One female that conforms to Smith's specimen, with the exception of the tegulae, which are clear glassy ; the type form is rufotestaceous. It is extremely close to *H. victoriae* Cockerell, which was collected by me, at Sandringham, Victoria. *H. victoriae* has a wide smooth shining rim enclosing the

rugose area of the metathorax ; *H. vividus* has the area covered with fine striae. The hind calcar of both species has one long obtuse tooth, similar to that of *H. greavesi* in the illustration. The third intercubitus and second recurrent nervures are weak in both ; almost obsolete in *H. victoriae*.

The type was described from Swan River.

1879.—*Halictus punctatus*, Smith.

Hab.—Champion Bay, W.A. (Collector unknown).

Previously recorded from Rutherglen, Dandenong, Vic. ; Sydney, N.S.W. ; Brisbane, Q.

There are several species of small *Halicti* that have a dark-green head and thorax, with a chestnut red abdomen. The dark parts are usually highly iridescent, while the second recurrent and third intercubitus nervures are greatly weakened. These features seem to bring the bees within the sub-genus *Chloralictus* Rob.

A few, such as *H. raymenti*, Ckll., have jet-black, highly-polished males that are utterly unlike the female ; other males are not so strikingly unlike ; the head, short antennae and colour strongly resembling the females. Critical study has shown the need for separating these groups from the comprehensive genus *Halictus*, and I propose to publish a paper on these during the year.

However, for the present, I confine myself to seven females that have a strong resemblance. The drawing shows the rugose area of the metathorax, the fine sculpturing of the part that is not covered with rugae, and the tibial spur of the hind leg of each bee ; these characters, taken in conjunction with the following key, will assist the student to separate the bees which measure about 5 mm. in length.

Female : Antennae black ; metathorax blackish ; abdomen a clear chestnut-red without any black ; calcar with three short teeth diminishing in size.

Hab. : Port Phillip, Vict., *Halictus tarltoni*, Ckll.

Female : Antennae dark above, fulvous beneath ; metathorax dark bottle-green, iridescent ; abdominal segments 2–5 suffused with dark brown ; calcar with three long teeth diminishing in size.

Hab. : Champion Bay, W.A. ; Purnong, S.A. ; Mackay and Brisbane, Queensland. *H. vitripennis*, Sm.

Female : Antennae black ; metathorax black ; abdominal segment one with a large black patch basally, a black spot laterally on the others ; calcar with four teeth diminishing in size.

Hab.—Port Phillip, Vict. *H. raymenti*, Ckll.

Female : Antennae dark above, light beneath ; metathorax very light iridescent green ; no black on abdomen ; calcar with three teeth diminishing in size, and an indented edge beyond.

Hab.—Perth, W.A. *H. occidentalis*, Raym.

Female : Only flagellum lighter beneath ; metathorax light green, iridescent ; abdominal segment one dark bronze with a red margin ; calcar with one long tooth, and a narrow undulate edge beyond.

Hab.—Perth, W.A. *H. greavesi*, Raym.

Female: Scapes dark, flagellum pale fulvous; metathorax blackish-green; a short blackish median band on abdominal segments 1-3; calcar with one long tooth and a wide undulate edge.

Hab.—Perth, W.A. *H. glauerti*, sp. nov.

Female: Antennae dark; metathorax dark bottle-green, irregular dark markings on dorsal surface of abdominal segments; calcar with four teeth and a small undulate edge beyond.

Hab.—All States of Australia. *H. punctatus*, Sm.

Male: Length, 4 mm. approximately.

Similar to female in colour, antennae not very long, but entirely light fulvous; tubercles clear yellow; legs lighter than those of females; calcar finely serrated.

Hab.—Perth, W.A. *H. vitripennis*, Smith.

Male: Length 4 mm. approximately.

Polished jet-black, quite unlike the female; calcar finely serrated.

Hab.—Port Phillip, Vict. *H. raymenti*, Ckll.

*1879.—*Halictus vitripennis*, Smith.

Hab.—Perth, W.A., February, 1914 (L. Glauert).

Six females that conform very well to Smith's description, which is a meagre one. The specimens have the anterior half of the clypeus ferruginous which is separated from the black by a dark-purplish band. A lengthy series of this species shows that the blackish marks on the abdomen are very variable. A description of the Allotype is included.

*1910.—*Halictus chapmani*, Cockerell.

Hab.—Denmark, W.A.

Previous record, W.A., October, 1929 (Tom Greaves).

Six females of typical form. These have a superficial resemblance to *H. victoriellus*, Ckll., which are common along the shores of Port Phillip, Vict.

1916.—*Halictus brazieri*, Cockerell.

Hab.—Denmark, W.A., October, 1929 (Tom Greaves).

A typical female. Previously recorded from Yallingup, W.A.

*1914.—*Halictus erythrurus*, Cockerell.

Hab.—Perth, W.A., October, 1929 (Tom Greaves).

Previously recorded from York, W.A.; Brisbane, Q.; entire Eastern shore of Port Phillip, Croydon, Vic.; Launceston, Tas.

A number of females. This species is variable, a few having the metathorax black, some green with a deep-blue suffusion, others greenish-bronze. At Port Phillip I have collected three varieties, (A) with pale fulvous gaster; (B) with black bands on the ventral segments; (C) with ten black spots on the ventral segments. A number show a blackish suffusion on the dorsal segments, but I am not able to distinguish any differences in structure. The calcariae of all having one tooth and a wide undulate edge beyond similar to that of *H. glauerti* in the diagram.

Halictus Vitripennis, Smith.

Male: Length, 4.7 mm. approximately.

Head almost circular in outline, blackish-green, iridescent; face entirely covered with cream-coloured adpressed small scale-like hairs; frons finely striate; clypeus clear fulvous, with a bracket-like posterior margin; supraclypeal area with a minute carina; vertex with a few hairs, the wine-pink ocelli on an elevation; compound eyes claret-brown, converging above and below; genae finely punctured, adpressed white hair; labrum fulvous; mandibulae fulvous, with red tips; antennae entirely clear fulvous.

Prothorax not visible from above; tubercles clear fulvous; mesothorax iridescent green, polished, minute scattered punctures, scattered fine cream hair; scutellum similar in sculpture, but slightly blue; postscutellum rougher, otherwise similar to scutellum; metathorax iridescent blackish-green, the area lighter green with anastomosing rugae at base, a fine scale-like sculpture posteriorly; abdominal dorsal segments—one and two clear ferruginous, three and four black, with light hind margins, five and six fulvous; ventral segments dark amber, a few white hairs.

Legs clear fulvous with sparse white hair; tarsi similar; empodium darker; claws fulvous; hind calcariae fulvous, finely serrated; tegulae fulvous. Wings hyaline, extremely iridescent, anterior 3.8 mm.; nervures palest amber, third intercubitus and second recurrent weak; cells: radial large; pterostigma pale amber; hamuli seven in number, weakly developed.

Locality.—Perth, W.A., January (Rayment).

Allies: Close to *H. occidentalis*, Raym., which has no black on abdomen, and antennae darker above. I associate the sexes from their having been taken together on the same flowers. The species might be included in the subgenus *Chloralictus*, Rob.

Allotype in the Collection of the Author.

Halictus glauerti, sp. nov.

(Plate XVIII., No. 22.)

Female: Length, 5 mm. approximately.

Head circular in outline, iridescent green, shiny, with short white hair; face-marks nil; frons finely rugosopunctate; clypeus with scattered coarse punctures, a purple patch on the disc; supraclypeal area with a purple spot; vertex roundly developed, with wine-pink ocelli; compound eyes claret-brown, reniform; genae striate, some adpressed hair, and a few long ones, large for a *Halictus*; labrum light brown, tending to fulvous; mandibulae fulvous, red apically, blackish basally; antennae with black scapes, flagellum light-fulvous beneath.

Prothorax not visible from above; tubercles fulvous; mesothorax iridescent olive green, the disc polished greenish-purple with numerous fine punctures of two sizes, scattered white hair, delicately cancellate; scutellum similar to mesothorax, including the median patch of purple; postscutellum rough, olive-green, but no purple; metathorax blackish-green, bright, an enclosed area of fine anastomosing rugae. Abdominal dorsal segments clear fulvous, a suffused dark band on one to three; ventral segments similar, a few scattered whitish hairs.

Legs fulvous, coxae and femora basally darker, scattered white hairs ; tarsi fulvous ; claws bifid, fulvous ; hind calcariae fulvous, with one long tooth, and a broad wave-like edge beyond ; tegulae fulvous. Wings hyaline, iridescent, anterior 3.5 mm. ; nervures palest amber, third intercubitus and second recurrent weakened ; cells normal ; pterostigma palest amber ; hamuli six in number, weakly developed.

Locality.—Perth, Western Australia, February (Rayment).

Allies : Extremely close to *H. vitripennis*, Smith, and the several others of this group included in the key, but critical study with the microscope can detect well-marked differences.

Type in the collection of the Author.

* *Halictus bremerensis*, sp. nov.

(Plate XX., No. 21.)

Female : Length, 5 mm. approximately.

Head almost circular, iridescent olive-green, sparse white hair ; face-marks nil ; frons finely striate longitudinally ; clypeus with a large purple patch on disc, coarse scattered punctures ; supraclypeal area similar to clypeus, but minus the purple ; vertex with transverse striation at a right angle to that on frons ; compound eyes blackish, reniform ; genae striate, with a few white hairs ; labrum dark brown ; mandibulae obscurely reddish ; antennae submoniliform, black.

Prothorax not visible from above ; pleura all finely striate ; tubercles dark-green ; mesothorax of a beautiful coppery iridescent green, numerous coarse punctures, and a well-defined tessellate sculpture ; scutellum similar in sculpture to mesothorax, but scarlet coppery ; postscutellum rugose green, but not coppery ; metathorax iridescent olive-green, with a large area of fine anastomosing rugae, a few yellowish hairs posteriorly ; abdominal dorsal segments purplish-black, bright, the hind margins narrowly lighter a fine transverse striation ; ventral segments similar, with a scopa of curled white hair.

Legs obscurely dark-red, with white hair ; tarsi lighter red, with yellowish hair ; claws bifid, ferruginous ; hind calcariae fulvous, with three strong teeth ; tegulae fulvous anteriorly, darker posteriorly ; wings hyaline, iridescent, anterior 4 mm. ; nervures amber, the second recurrent and third intercubitus weak ; cells normal ; pterostigma large, amber-colour ; hamuli seven in number, weak.

Locality.—Bremer Bay, W.A., January, 1916 (L. Glauert).

Allies : This bee has a strong superficial resemblance to *H. demissus*, Cockerell, which has a faint sculpture on mesothorax, and sparse puncturing with radiating rugae on metathorax. There was an interesting cluster of mites on the basal segment of the abdomen.

Type in the Perth Museum.

SUB-FAMILY NOMIINAE.

GENUS NOMIA, Latreille.

1805.—*Nomia*, Latreille, His. Nat., xiii., p. 369.

*1875.—*Nomia australica*, Smith.

Hab.—Harvey, W.A., January (L. J. Newman).

Previously recorded from Melbourne, Vic. ; Brisbane, Stradbroke Is. Q. ; Adelaide, S.A. ; Swan River, W.A.

Compared with females from the Eastern States these bees have lighter face-hair, and the abdominal hair-bands are darker orange.

*1905.—*Nomia flavoviridis*, Cockerell.

Hab.—Gosnells, W.A., March (H. Andrewartha) ; Perth, W.A., (L. Glauert).

Subspecies and varieties of this have been recorded from all the Australian States except Western Australia, so these new records are interesting. The five western females have a strong crimson iridescence on the mesothorax, and may be known as a new variety *rubra*. Queensland has a variety *doddi*, whose mesothorax has a deep blue iridescence. This species, and its numerous subspecies and varieties, may be regarded as the most widely distributed of all the bees in the genus.

SUBFAMILY HALICTINAE.

GENUS PARASPHECODES, Smith.

1853.—*Parasphecodes*, Smith. Cat. Hym. B.M., i., p. 39.

1853.—*Parasphecodes lichatus*, Smith.

Hab. : Swan River, W.A., March. (L. J. Newman).

Previously recorded from West Australia ; Port Phillip, Dandenong, Vic.

These red-bodied bees are typical. Smith's descriptions of the species in this genus are seldom full enough. Only a few *Parasphecodes* have been described from the West, the genus being much more in evidence in the Eastern portion of the Commonwealth.

DIVISION ANDRENIFORMES.

FAMILY MELECTIDAE.

GENUS CROCISA, Jurine.

(Plate XX).

*1807.—*Crocisa* Jurine, Nouv. meth. class., Hym. p. 239.

Crocisa albifrons, sp. nov.

Female : Length, 12·5 mm.

Head small, black, almost entirely covered with long white hair ; face-marks nil ; frons with deep dense punctures ; clypeus with a median depression at anterior, which is naked ; vertex with less white hair and a few black ones ; compound eyes brown ; genae with much white hair ; labrum quadrate, with two nodules laterally ; mandibulae black, with a large median light ferruginous patch ; antennae black.

Prothorax black, with a thick fringe of white hair ; mesothorax black, bright, numerous deep punctures and short black hair ; white marks as follows : a fine line along anterior margin and two lateral spots contiguous to it,

with a longer median patch, four evenly-spaced spots on disc, two at each side divided by the black tegula; pleura covered with white hair; sterna naked, black, coarsely punctured; margin of black scutellum W-like, a few black hairs laterally, some white hair under middle; abdomen black, bright closely punctured, with short black hair, white marks as follows: anterior margin with two semicircular spots laterally, and two circular spots dorsally on segment one, two lateral and dorsal spots combined on segment two, all others with two lateral and two dorsal spots distinct; all ventral segments with a minute spot laterally.

Legs black, exterior with much white hair; all basitarsi with long black hair and white hair exteriorly, other segments black; apical half of anterior wings clouded, with two hyaline spots; length, 11 mm.; posterior wings hyaline; hamuli nineteen; nervures black, pterostigma weak; hind calcar black, bent, finely serrated.

Locality: Landor Station, W.A., 1929. (L. Glauert).

Allies: *C. tincta*, Ckll., which has blue patches on abdominal dorsal segments and no spots on venter. *C. albopicta*, Ckll., which has a white spot at middle of base of first segment. *C. albomaculata*, Sm., which has a white spot on each side of basal segment.

*1913.—*Crocisa wdroonensis*, Cockerell.

Hab.: Dowerin, W.A. (L. J. Newman).

A specimen from a new locality is undoubtedly the undescribed female, A typical male from another district.

Hab.: Landor Station, W.A., 1929. (L. Glauert).

Previously recorded from Waroona, Swan River, W.A.

Allotype: Female: Length, 12 mm. approximately.

Head black, small, face with a large thick tuft of white hair; vertex with ocelli on a prominence, the occipital fringe extending down to meet the white hair of the genae.

The anterior half of the mesothorax covered with bluish-white hair, a spot of white hair on axilla, a large patch laterally on anterior margin of mesothorax, a bar of pale hair on posterior margin of scutellum; pleura with a large patch, and a small one laterally on metathorax; hind margin of scutellum bracket-shaped. Abdominal segment one with a large hour-glass-shaped patch laterally, three and four with subovate patch laterally, and two circular spots dorsally, four and five with suboval spot dorsally; ventral segments with a minute spot laterally.

Legs black, all tibiae with white hair exteriorly, median and posterior basitarsi with a minute spot basally; hind femora armed at the base with a stout tooth; apical half of anterior wings fuscous with hyaline small spots, posterior wings clear; hamuli seventeen; nervures blackish; hind calcariae black, finely serrated.

These spotted bees are well-covered with pollen-granules of three kinds, probably from wattles (*Acacia* sp.)

The fleece, too, is full of small pebbles, indeed, the mandibulae of one are grasping a grain of quartz. I do not believe these bees are entirely parasitic, for I have known some to carry pellets of mud.

* *Crocisa rufitarsus*, sp. nov.

(Plate XX.)

Male: Length, 9 mm. approximately.

Head small, black, bright; face-marks confined to a little greenish-blue at sides of face; frons deeply coarsely and densely punctured; clypeus black, bright, coarsely and densely punctured; supraclypeal area rising to a carina, with scattered blue hair; vertex with ocelli in a low curve; compound eyes light-brown, minute peg-hairs between the facets; genae with narrow line of blue hair along posterior orbital margin; labrum black, with two reddish nodules; mandibulae red, black basally and apically; antennae black above, reddish beneath (in bad condition).

Prothorax black, a bluish-green patch laterally; tubercles black, with a few long white hairs; a large semicircular patch on pleura; mesothorax black, shining, four bluish-green spots on disc, a blue line along margin of the tegulae, two minute dots and a median patch on anterior margin; coarse punctures; scutellum with a bracket-like margin, polished, with numerous punctures; metathorax not visible from above; abdominal dorsal segments black, a minute transverse striation; coarsely punctured; a few black hairs; one with a fine line basally and a large green patch laterally; two to five with a short wide patch laterally; venter black.

Legs dark-reddish, all the tibiae having thin blue hair exteriorly; tarsi reddish; claws reddish; hind calcariae black, finely serrated; tegulae black, bright, with a minute tessellate sculpture and deep punctures; wings clouded, two small hyaline spots, anterior 7.5 mm. Nervures blackish, basal straight; cells: the secone cubital cell roughly hexagonal; pterostigma dark-brown, small; hamuli nineteen in number.

Locality and Collector unknown.

Allies: *C. caerulifrons*, Kirby, which is larger, with blue spots, and black legs. *C. rufitarsus* is easily known from all others by its small size and red legs.

DIVISION MEGACHILIFORMES.

FAMILY MEGACHILIDAE.

SUBFAMILY MEGACHILINAE.

GENUS MEGACHILE, Latreille.

1802.—*Megachile*, Latreille, His. Nat., iii., p. 382.

*1868.—*Megachile sexmaculata*, Smith.

Hab.—South Perth, W.A., February (L. Glauert); O'Connors, W.A., December (L. J. Newman).

Previously recorded from Perth, Yallingup, and Champion Bay, W.A. Two typical females from the first named locality, and two slightly larger females from the second.

*1910.—*Megachile adalaidae*, var. A., var. nov.

Hab.—Mullewa, W.A., 1927 (L. Glauert).

The type locality of the species is Adelaide, and this western variety may be distinguished from the typical form by the clear wings, black tegulae with pallid anterior margins, black legs and no black hairs in the ventral scopa.

853.—*Megachile maculata*, Smith.

Hab.—Swan River, W.A. (L. J. Newman).

Previously recorded from Port Phillip, Vic. ; Brisbane, Townsville, Cairns, Kuranda, Q. ; Bungulla, W.A., October, 1929 (T. Greaves).

Two males and two females of typical form.

*1853.—*Megachile chrysopyga*, Smith.

Hab.—Swan River, W.A., March (L. J. Newman) ; three typical females and two males. Badgerup, W.A., three females ; East Perth, one female (L. Glauert). Claremont, W.A., one male (L. Glauert).

Previously recorded from Tasmania, New South Wales, Queensland, and adjacent Islands ; Geraldton, Perth, W.A.

*1853.—*Megachile semiluctuosa*, Smith.

Hab.—Swan River, W.A. (L. J. Newman).

Two females of typical form. A new record for the State ; the type locality being Adelaide, S.A. Previously recorded from the Mallee, Vic.

1853.—*Megachile heriadiformis*, Smith.

Hab.—Moora and Wyndham, W.A. (L. J. Newman) ; Bungulla, October, 1929 (Tom Greaves).

Previously recorded from Adelaide, S.A., and Yallingup, W.A.

A typical male and female.

1912.—*Megachile cetera*, Cockerell.

Hab.—Swan River, W.A. (L. J. Newman).

A new record for the State, showing a great extension of range.

Previously recorded from Nagambie, Gippsland, Vic. ; Sydney, Cooma, N.S.W. ; Brisbane, Bribie Island, Q.

Two females of typical form.

1913.—*Megachile rufolobata*, Cockerell.

Hab.—Gnangara, W.A., December (L. J. Newman).

Previously recorded from Perth, W.A.

Two typical females.

1868.—*Megachile monstrosa*, Smith.

Hab.—Moora, W.A. (L. J. Newman).

Previously recorded from Townsville, Q. ; Champion Bay, W.A.

One fine large female.

1853.—*Megachile erythropyga*, Smith.

Hab.—Swan River, W.A., October (H. Andrewartha).

Previously recorded from Yallingup, Perth, Kalamunda, W.A.

One male showing three white patches laterally on the abdomen. Smith says female has three, but the male only one white patch. The hair-patches are easily dislodged, sometimes coming off on one's fingers.

1910.—*Megachile nasuta argentifer*, Cockerell.

Hab.—Ascot, W.A., December.

Previously recorded from Melbourne, Vic., so this new record for the State proves a large extension of range.

One typical female.

*1853.—*Megachile clypeata*, Smith.

Hab.—South Perth, W.A., January 28th, 1915 (L. Glauert).

Previously recorded from Busselton, Yallingup, W.A.

A female, not quite typical.

1868.—*Megachile nasuta*, Smith.

Hab.—Moora, Swan River (L. J. Newman).

Previously recorded from Champion Bay, Yallingup, W.A. Two typical females from the first locality, and a slightly smaller one from the second.

1906.—*Megachile cygnorum*, Cockerell.

Hab.—Moora, W.A. (L. J. Newman); and Bungulla, W.A. (Tom Greaves).

Previously recorded from Perth, W.A.; Adelaide, S.A.; N.S.W.; Mackay, Q.; Woodend, Vic.

Professor Cockerell has mentioned it is improbable that this be the male of Smith's *M. maculata*; I have both sexes of *M. cygnorum*, collected by Mr. Tom Greaves, at Bungulla, W.A., and there is no confusion when both species are present. The head of this female is larger than that of Smith's bee. These western bees differ from Queensland specimens by having a shorter and stouter abdomen, the nodule between the two dentate processes of the apical adominal segment is more prominent, but there is much long black hair among the dull-yellow inconspicuous apical patch of the abdomen, as described by Smith for *M. maculata*. My Brisbane specimens of *M. maculata* have no such long black hairs in the patch. The first intercubitalia nervure is much more bent in *M. cygnorum*. I append a description of the allotype.

Female: Length, 12.5 mm.

Head wide, black, coarsely punctured, bright, long pale ochreous hair; frons coarsely punctured; clypeus large, coarse punctures, a polished median longitudinal line extending up over the supraclypeal area; genae with dense long white hair; labrum brown; mandibulae black, rugose, with four teeth, very wide; antennae black, reddish beneath.

Prothorax not visible from above; mesothorax black, bright, with dense coarse punctures, black hair on disc, two cream hair-spots anteriorly, four posteriorly; scutellum similar with cream fringe posteriorly; abdomen black, dull, coarsely punctured, long black hair, five hair-bands of deep ochreous hair, one and two broadly interrupted; ventral scopa white; a few long black hairs at apex.

Legs black, with white hair; tarsi black; claws bifid, reddish; calcar dark, simple; tegulae ferruginous with dark patches; wings hyaline, anterior 9 mm.; nervures brownish black; cells normal; pterostigma inconspicuous, dark brown; hamuli sixteen in number, strongly developed.

Locality : Bungulla, W.A., October (Tom Greaves).

Allies : *M. maculata*, Smith, which has much darker hair posteriorly of scutellum, much more hair on face, so that clypeus is not so bare, narrower between the compound eyes.

Megachile Revicta, Cockerell.

Male : Length, 12 mm. approximately.

Head transverse, black, coarsely punctured ; face-marks nil ; a sparse covering of pale golden hair ; frons bright, densely and coarsely punctured, almost naked ; clypeus densely and coarsely punctured ; supraclypeal area similar, but with less hair ; vertex roundly developed ; compound eyes blackish-claret, anterior margins parallel ; genae large, bright, almost naked ; labrum black ; mandibulae black, convex ; antennae very long, black, obscurely reddish beneath.

Prothorax not visible from above ; tubercles black ; mesothorax black, densely and coarsely punctured, a few whitish hairs ; scutellum and post-scutellum similar, the latter more polished ; metathorax with a bright smooth area ; abdominal dorsal segments polished black, numerous coarse punctures, a fringe of long white hair at base of one ; ventral segments not so polished.

Legs black, with sparse white hair, simple ; tarsi black ; claws blackish, and red ; hind calcariae dark-brown, finely serrated ; tegulae blackish, bright, with a few curled white hairs ; wings slightly clouded apically ; nervures blackish ; cells : the radial deeply clouded ; pterostigma inconspicuous, dark-brown ; hamuli eleven in number, of medium development.

Locality : Sawyers Gully, W.A., December. (L. J. Newman). Perth (Tom Greaves).

Allies : I associate the sexes from their having been taken together in the same flowers, but not *in cop*.

I recovered a few Acaridmites from the metathorax of this bee.

Allotype in the collection of the author.

DIVISION ANDRENIFORMES.

FAMILY ANTHOPHORIDAE.

GENUS ANTHOPHORA, Latreille.

1804.—*Anthophora*, Latreille, Hist. Nat. Crust. Ins. xiv., p. 45.

Anthophorae of a dull, mousy-colour are a feature of the collections ; most of them show a black band similar to *Asaropoda*, to which they are closely related. The following key will assist students to separate the species which are not banded with blue.

Female : Length, 15 mm., approximately.

Clypeus black, with a median yellow mark shaped like an inverted champagne glass with a long stem, but no " foot " ; no supraclypeal mark ; a few scattered hairs on face ; anterior legs reddish ; a small appendiculate cell ; body-hairs the colour of a mouse.

Hab. : Geraldton, W.A. *A. grisescens*, sp. nov.

Female : Length, 15 mm., approximately.

Clypeus yellow, with two large brown patches ; tegument of abdomen black, hind margins of segments broadly red ; tegulae clear testaceous.

Hab. : Adelaide, S.A. ; West Australia. *A. scymna*, Gribodo.

Female : Length, 15 mm., approximately.

Clypeus with a yellow mark like an inverted T, the crossarms being longer than the stem ; legs obscurely reddish, tegulae dark-chestnut ; body-hair mousy in colour.

Hab. : West Australia. *A. preissi*, Cockerell.

Male : Length, 13 mm., approximately.

Clypeus with a yellow mark like an inverted T ; tegument of abdomen red ; a tubercle on fourth ventral segment.

Hab. : Mackay, Brisbane, Pinalba, Q. ; W.A. *A. rhodoscymna*. Cockerell.

Male : Length, 18 mm., approximately.

Clypeus with black dot laterally ; two black bands on abdomen ; apex bilobed ; body-hair sienna-colour ; a dark-brown appendiculate cell ; legs dark-brown ; nervures blackish ; first recurrent nervure entering second cubital cell at apical third.

Hab. : Geraldton, W.A. *A. sordida*, sp. nov.

Male : Length, 13 mm., approximately.

Abdomen with one black band ; apex rounded ; clypeus with a dark dot laterally ; body-hair sienna-colour ; legs dark-brown ; nervures light ferruginous ; first recurrent nervure entering second cubital cell at middle.

Hab. : Swan River, W.A. **A. sordidula*, sp. nov.

Male : Length, 10 mm., approximately.

Lateral face-marks paler yellow ; supraclypeal mark a dirty white crescent ; abdomen with dirty-white hair ; hind margins of segments broadly yellowish-white ; legs light-ferruginous ; the greyish hair is sparse.

Hab.—Swan River, W.A. *A. cygni*, sp. nov.

The blue-banded bees are well represented in both collections, and are very distinct from any of the species in the preceding synopsis.

*1905.—*Anthophora adalaidae*, Cockerell.

Hab.—Wurarga, W.A. (L. Glauert).

A typical male. A new record for the State and a large extension of range.

Previously recorded from Adelaide River, Northern Territory.

*1905.—*Anthophora walkeri*, Cockerell.

Hab.—Guildford, W.A. (L. Glauert).

A male in bad condition ; the genitalia having been removed. The hair on the hind tarsus of this species is entirely black.

Previously recorded from Baudin Is., Long Reef, W.A.

*1804.—*Anthophora cingulata* (Fabricius).

A large number of males and females from new localities. The hair of the thorax varies in colour from greyish-green to fulvous-green ; with this exception they are similar to Victorian species.

Hab.—Waddouring, Wurarga, Perth, Guildford, Badgerbup, Landor Station (L. Glauert) ; Katanning, Wongan Hills, Moora, Beverley (L. J. Newman) ; Stretton (S. Congrieve and B. A. D. O'Connor).

Many of the bees were taken in January, on flowers of *Podalirius*, sp.

Previously recorded from Queensland.

* *Anthophora sordidula*, sp. nov.

(Plate XX, No. 15.)

Male : Length, 13 mm. approximately.

Head transverse, black, bright, with much dull greyish hair ; face-marks yellow, ending abruptly at level of apex of clypeus ; frons with scattered hair ; clypeus yellow, a subtriangular black mark laterally, a few long black hairs ; supraclypeal area with a long triangular yellow mark ; vertex with a few fuscous hairs ; compound eyes with anterior orbital margins parallel ; genae with long pale ochreous hair ; labrum yellow, a dark macula laterally at base ; mandibulae yellowish with reddish tips ; antennae with front of scapes yellow, flagellum dark-brown, reddish beneath.

Prothorax not visible from above ; tubercles hidden under the long greyish-fawn hair of the pleura ; mesothorax black, shining, coarsely punctured, a dense covering of fawn and black hair intermixed ; scutellum and postscutellum similar to mesothorax ; metathorax coarsely punctured ; abdominal dorsal segments black, apical margins broadly red, one black band, the light-fawn hair being adpressed, the black hairs long and sub-erect ; ventral segments polished.

Legs blackish-brown, with long pale sienna-coloured hair ; anterior legs red ; tarsi sienna-coloured ; claws dark-red ; hind calcariae blackish-red, finely serrated ; tegulae dark-brown basally, reddish apically ; wings subhyaline ; a small appendiculate cell almost complete ; nervures light ferruginous ; cells : second cubital contracted at apex ; pterostigma inconspicuous ; hamuli twenty in number, strongly developed.

Locality.—Swan River, W.A. (L. J. Newman).

Allies : *A. sordida*, sp. nov., and *A. cygni*, sp. nov.

Anthophora cygni, sp. nov.

Male : Length, 10mm. approx.

Head wide, black, bright, with a light covering of mouse-coloured hair ; face-marks truncate at apex of clypeus, yellow ; frons densely punctured, with scattered pale-grey hair ; clypeus yellow, with coarse punctures, scattered pale hair, a dark spot laterally ; supraclypeal area with a dirty-white crescentic mark ; vertex with pale hair tipped with dirty-yellow ; compound eyes brown, converging slightly below ; genae with a few dull-white hairs ; labrum dull-yellow, not so square, with three small dark maculae basally ; mandibulae yellow basally, tips dark red ; antennae with yellow on front of stout scapes, flagellum dark-brown above, reddish beneath.

Prothorax not visible from above ; tubercles hidden under the mouse-coloured hair of the pleura ; mesothorax black, shining, coarsely punctured, disc almost naked, but surrounded with a fringe of the ubiquitous mixture of hair ; scutellum similar to mesothorax, with long pale hair ; postscutellum similar to mesothorax, but colour light-brown, long pale-grey hair ; metathorax black, shining, coarsely punctured ; abdominal dorsal segments black, apical margins broadly red ; a light covering of pale adpressed hair ; ventral segments ferruginous, with sparse covering of hair.

Legs light-ferruginous, with pale hair ; tarsi red ; claws dark red ; hind calcariae dark blackish-brown ; tegulae very pale-fulvous, with a rim ; wings clear, iridescent ; nervures reddish ; cells : second cubital greatly contracted at apex ; pterostigma inconspicuous ; hamuli strong, seventeen in number.

Locality : Swan River, W.A. (L. J. Newman).

Allies : *A. sordida*, sp. nov., which is much larger, with dark legs. *A. cygni* is easily known by the small size and red legs.

***Anthophora sordida*, sp. nov.**

Male : Length, 18 mm., approximately.

Head transverse, black, shining, densely covered with long, dull-golden hair ; face-marks as high as insertion of the antennae, yellow ; frons short, shining ; clypeus convex, quadrate, subrugose, yellow, with scattered long black hairs, a black mark, shaped like a long triangle, at each side ; supraclypeal area with yellow margin, bracket-shaped ; vertex sharply developed, a few long black hairs among the golden ; compound eyes with anterior orbital margins parallel, light brown ; genae rough, dull, with paler, long hair ; labrum quadrate, yellow ; mandibulae yellow, with reddish tips ; antennae with front of stout scapes yellow, flagellum dark-brown, obscurely lighter beneath.

Prothorax not visible from above ; tubercles covered with long dull-golden hair ; mesothorax dull, black, numerous large punctures, long sordid-gold hair tipped with black ; scutellum similar to mesothorax ; postscutellum similar to scutellum ; metathorax black, with a delicate tessellate sculpture and large punctures ; abdominal dorsal segments black with posterior margins broadly yellow, many punctures, and much long black hair among the dull-gold, apical one widely bilobed ; ventral segments 3, 4, 5, with progressively deeper emargination, reddish.

Legs blackish-red, interiorly with black hair, exteriorly with dull golden hair mixed with black ; tarsi reddish, the basitarsi short and broad ; claws darker red ; hind calcariae dark-red, finely serrated ; tegulae apricot-colour apically, dark-brown basally ; wings slightly yellowish, anterior 10 mm. ; iridescent ; nervures blackish, third intercubitus bowed ; cells : third cubital almost square, second cubital contracted at apex ; a small appendiculate cell stained with dark-brown ; pterostigma inconspicuous ; hamuli twenty in number, strong.

Locality : Geraldton, W.A. (L. J. Newman).

Allies : This may be the male of *A. grisescens*, sp. nov., and is close to *A. sordidula*, sp. nov.

***Anthophora grisescens*, sp. nov.**

Female : Length, 15 mm., approximately.

Head transverse, black, dull, sparse pale-grey hair ; face-marks confined to dull-yellow, one shaped like a champagne glass without a foot on the clypeus ; frons with a few pale fawn hairs ; clypeus black, bright, coarsely punctured, a few coarse black hairs laterally, a few pale short hairs on disc ; supraclypeal area similar to clypeus ; vertex with scattered black hair ; compound eyes brown, diverging below ; genae with long fawn and black hair intermixed ; labrum dull-yellow with two reddish nodules at anterior margin ; mandibulae black apically, pale-yellow basally, red median area ; antennae with reddish scape, blackish flagellum, third antennal segment slender.

Prothorax not visible from above ; tubercles hidden under the long mixed light-fawn and black hair of the pleura ; mesothorax covered with the ubiquitous mixture of fawn and black hair ; scutellum and postscutellum similar to mesothorax ; metathorax not visible ; abdominal dorsal segments black, apical margins broadly lighter, numerous punctures, adpressed grey hair, long black hair ; ventral segments black, a few dark hairs.

Legs dark brown, anterior tibiae lighter reddish, with long dull-grey hair ; tarsi reddish ; claws darker red ; hind calcariae brownish-black, finely serrated ; tegulae brown, with a rimmed reddish margin, punctured ; wings subhyaline, the appendiculate area dark-brown ; anterior 11 mm. Nervures blackish-brown ; cells : second cubital contracted at apex ; pterostigma inconspicuous ; hamuli twenty-three in number, strongly developed.

Locality : Geraldton, W.A. (collector not known).

Allies : This may prove to be the female of *A. sordida*, sp. nov., and is also close to *A. sordidula*, sp. nov., *A. cygni*, sp. nov. and *A. preissi*, Cockerell, which has long arms on T of clypeus.

Type in the collection of the author.

Mr. John Clark, formerly of Perth, but now of the Melbourne Museum, informs me that the flora of Landor Station is essentially that of Central Australia, and these new records indicate a wonderful extension of range.

GENUS ASAROPODA, Cockerell.

(Plate XX.)

Asaropoda, Cockerell.

The three new bees described in this paper bring the number of species up to six, and since they are determined only after critical examination, the following key will assist the student :—

Female : Length, 17 mm.

Scape clear ferruginous, flagellum blackish ; mandibles with yellow base, blackish tips, reddish median patch ; eyes dark-claret brown ; face wide ; a fine tessellate pattern between the shallow punctures of the mesothorax ; body-hair intensely red ; hind margins of abdominal segments broadly reddish ; abdominal band intense black ; many long black suberect hairs on abdomen ; wings dark-purple ; a small appendiculate area dark-brown. *A. rufa*, sp. nov.

Hab.—Sydney, N.S.W. (L. Robertson).

Female: Length, 15 mm.

Scape ferruginous, flagellum light-brown above, ferruginous beneath; eyes lighter; face narrower; hair of clypeus pale; deep punctures contiguous on mesothorax; body-hair not so red; a few long black suberect hairs on abdomen; wings not so dark; appendiculate area inconspicuous; apex of abdomen with fulvous hair. *A. bombiformis* (Smith).

Female: Length, 16 mm.

Third antennal segment similar to that of *A. bombiformis*, antennae longer; anterior half of second and third abdominal segments slightly greenish.

Hab.—Brisbane, Q. *A. anomala*, Cockerell.

Male: Length, 12 mm.

Lateral margins of clypeus with a broad black band; flagellum ferruginous beneath; bidentate apex of abdomen with black hair; hair on hind tarsi black; legs dark, with much orange hair.

A. alpha, Cockerell.

Male: Length, 12 mm.

Flagellum similar to that of female, with third segment slender and long, the scape yellow in front; black band of body not intense; hair of clypeus pale and there are two small dark spots laterally; wings pale; the second cubital cell is square, and receives the first recurrent nervure at its middle.

Hab.—Q., N.S.W., Vic. *A. bombiformis* (Smith).

Male: Length, 12 mm.

The third antennal segment short and thick; antennae longer; small dot laterally on clypeus; femora clear red; hair on tarsi red; apex of abdomen obtusely bilobed.

Hab.—Brisbane, Q. *A. anomala*, Cockerell.

Male: Length, 14 mm.

Face wide; antennae longer, with third segment short, scape dark-ferruginous, with yellow on front, flagellum dark, very long; two dark spots laterally, and two dark-amber short longitudinal bars on yellow clypeus, which also has much long black hair; hair of cheeks pale-ochreous; eyes light-brown; many long suberect black hairs on abdomen; smooth shining areas between the punctures of the mesothorax.

Hab.—Sydney, N.S.W. *A. punctata*, sp. nov.

Male: Length, 12 mm.

Third segment of antenna long and slender, antennae black, with yellow on front of scape, flagellum obscurely red beneath; head small; eyes light-brown; white hair of genae abundant, and in sharp contrast to the intense red of the body; hind margins of abdominal segments broadly red, very few long suberect hairs; large punctures contiguous on mesothorax.

Hab.—Landor Station, W.A. *A. albigena*, sp. nov.

I have not been able to find the nest of these species, though I suspect they avail themselves of any suitable shafts in dry, warm banks. At Bacchus Marsh, in Victoria, these golden bees may be seen hovering over the flowers of "Mistletoe," a parasitic growth commonly found on many of the gum-trees of the district.

DIVISION XYLOCOPIFORMES.

FAMILY CERATINIDAE.

GENUS EXONEURA, Smith.

1854.—*Exoneura*, Smith, Cat. Hym. B.M., ii., p. 232.

1914.—*Exoneura angophorae occidentalis*, Cockerell.

Hab.—Smith's Mill, W.A., September, 1912 ("W.B. Alexander.").

Previously recorded from Kalamunda, October (T. Greaves); Bremer Bay, and Yallingup, W.A.

The several females show variation in the black markings of the abdomen.

1913.—*Exoneura hamulata*, Cockerell.

Hab.—Swan River, W.A., January (L. J. Newman).

Previously recorded from Brisbane, Stradbroke Is., Caloundra, Q.; Moss Bay, N.S.W.; Melbourne, Cann River, Oakleigh, Vic.

A typical female. This new record for the State is a vast extension of range, but I am not surprised as I have a great number of bees of this genus from Western Australia, though only three have so far been described.

1930.—*Exoneura punctata*, Rayment.

Hab.—Perth, W.A. (L. J. Newman).

Previously recorded from Albany, October, 1929 (Tom Greaves).

GENUS XYLOCOPA, Latreille;

SUBGENUS MESOTRICHIA Westwood.

1802.—*Xylocopa*, Latreille, Nat. His. Ins., iii., p. 379.

1775.—*Xylocopa bryorum* (Fabricius).

Hab.—Wyndham, W.A. ? (Collector not known).

Previously recorded from many localities in Queensland and New South Wales. A small but otherwise typical female. If the label on this specimen be correct, then it indicates a wonderful extension of range, but there seems to be some doubt about this.

DIVISION APIFORMES (Social Bees).

FAMILY APIDAE.

SUBFAMILY MELIPONINAE.

GENUS TRIGONA, Jurine.

1807.—*Trigona*, Jurine, Nouv. Meth. Class. Hymen., p. 245.

Although no bees of this genus were in any of the Western Australian collections, their absence surprised me, as I have reliable accounts of their presence in the vicinity of Kalgoorlie and eastwards.

SUBFAMILY APINAE.

GENUS APIS, Linnaeus.

1758.—*Apis*, Linnaeus, Syst. Nat. Ed. 10a, p. 343.

1767.—*Apis mellifera*, Linnaeus (also the subspecies *A. ligustica*) introduced in 1822, are now spread over large portions of the State.

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3. J. D. Alftken, on the *Apidae* in "Die Fauna Südwest-Australiens" Vol. I. Lief. 6, 1907.

EXPLANATION OF PLATE XVIII.

1. Adult female, *Halictus glauerti*, sp. nov.
2. Front view of head-capsule.
3. Adult male, *Halictus raymenti*, Cockerell.
4. Fine hairs covering the wing surface of *H. chapmani*, Cockerell.
5. Tarsal segments and claws of *H. glauerti*, sp. nov.
6. Submoniliform antenna of *H. glauertis*, sp. nov.
7. The *Halicti* have a peculiar appendage to the labrum.
8. One of the small wide plumose hairs that form bands on many of the *Halicti*.
9. Anterior view of basal segment of female *Halictus*, showing a cluster of Acarid mites arranged in a geometrical pattern.
10. View of the inside of mandible of female, *H. raymenti*, Cockerell.
11. Apical segment of female showing the furrow of the Family.
12. Strigil or antenna-cleaner of male *G. raymenti*, Cockerell.
13. Strigil or antenna-cleaner of female *H. glauerti*, sp. nov.
14. Hind calcar of male *H. raymenti*, Cockerell.
15. The hamuli or wing-hooklets of these prismatic *Halicti* are few and weak.
16. Rugose metathorax, surface sculpture and calcar of *H. raymenti*, Cockerell.
17. Rugose metathorax, surface sculpture and calcar of *H. tarltoni*, Cockerell.
18. Rugose metathorax, surface sculpture and calcar of *H. vitripennis*, Smith.
19. Rugose metathorax, surface sculpture and calcar of *H. occidentalis*, Rayment.
20. Rugose metathorax, surface sculpture and calcar of *H. punctatus*, Smith.
21. Rugose metathorax, surface sculpture and calcar of *H. greavesi*, Rayment.
22. Rugose metathorax, surface sculpture and calcar of *H. glauerti*, sp. nov.
23. Genitalia of *H. raymenti*, Cockerell.

Plate XVIII.

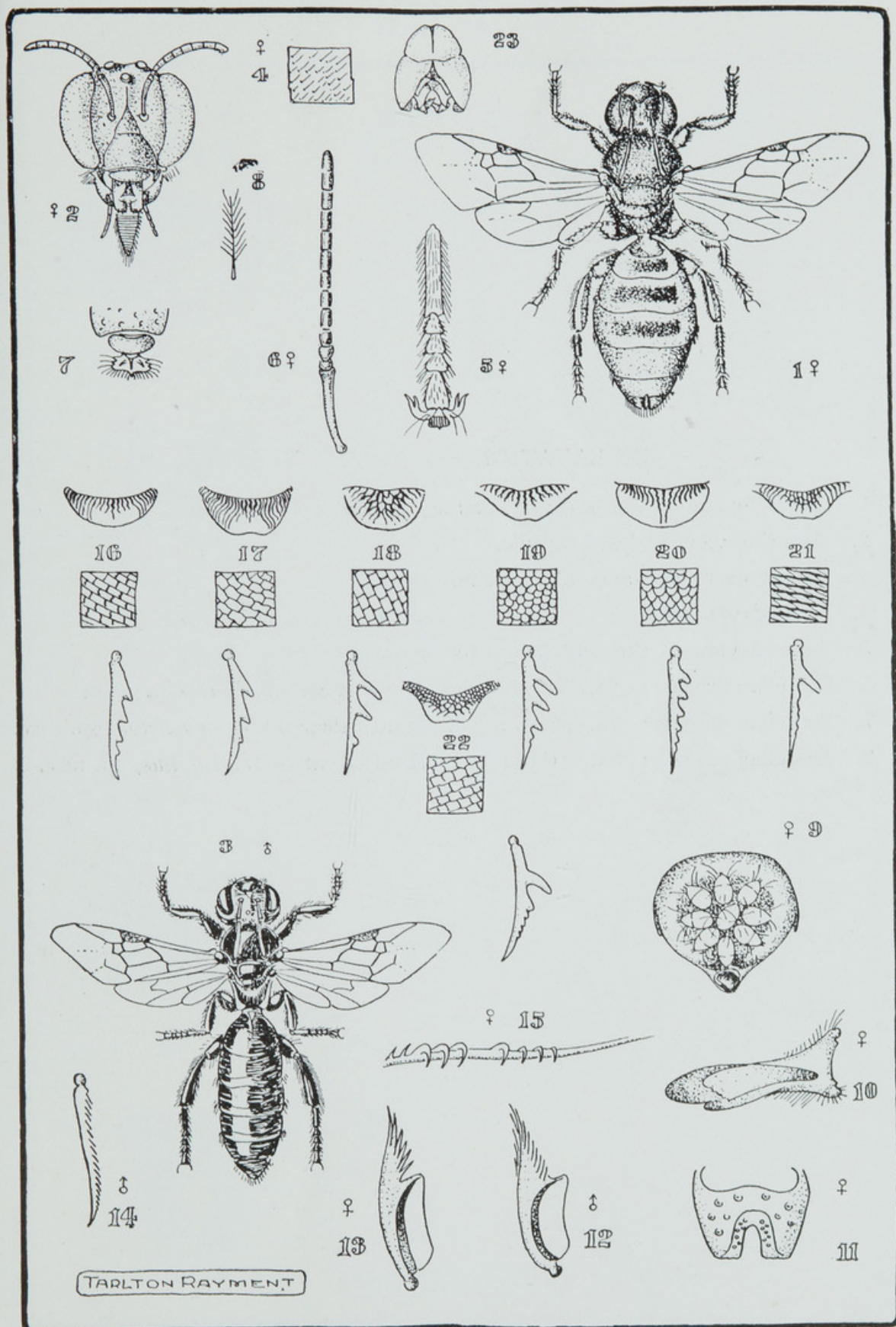
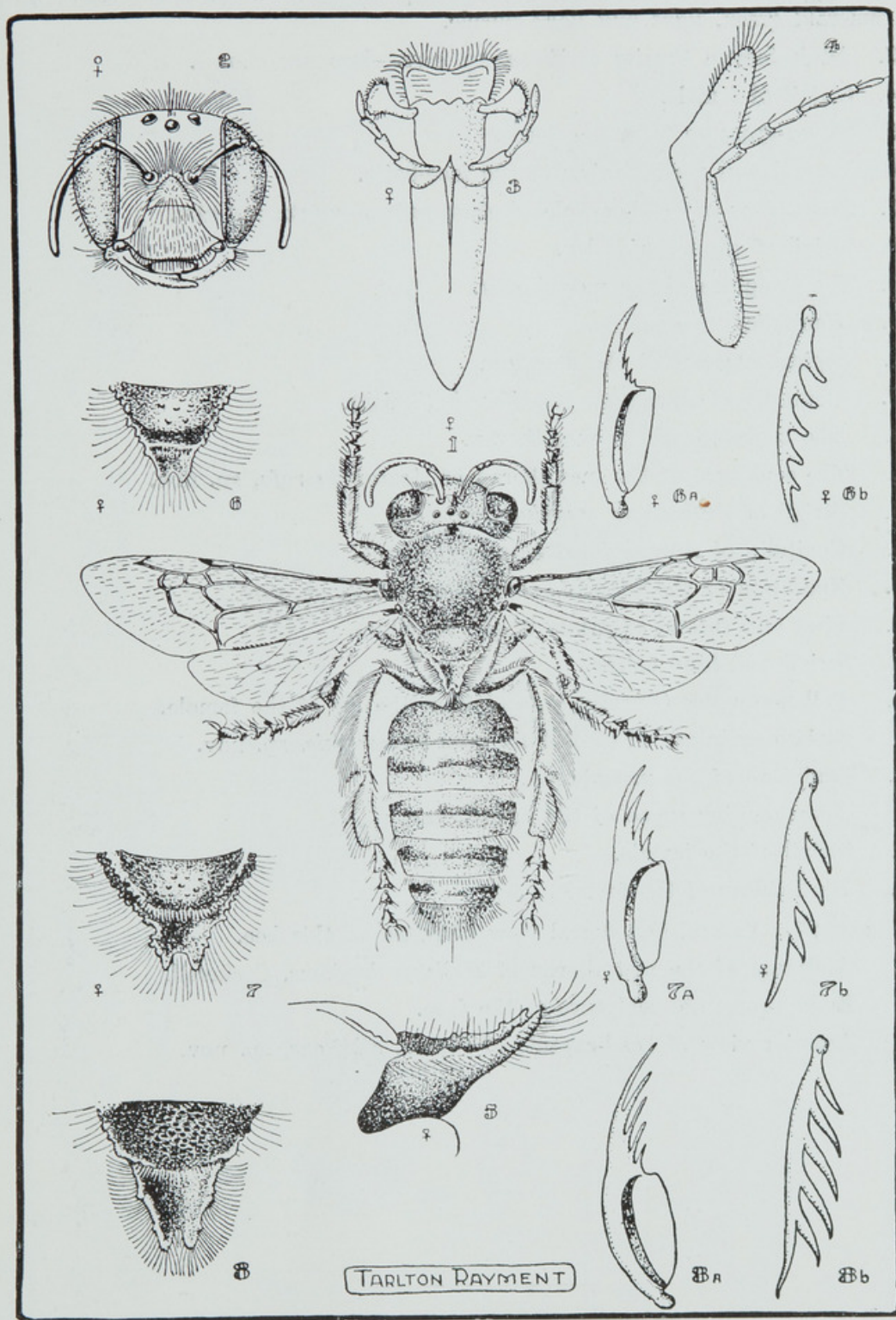


PLATE XIX

EXPLANATION OF PLATE XIX.

1. Adult female of *Nodocolletes dentatus*, gen. et sp. nov.
2. Anterior view of head-capsule.
3. Glossa or tongue and labial palpi.
4. Maxillary palpi.
5. Lateral view of the scutellar process.
6. Scutellar process : 6a. Strigil ; 6b. Hind calcar of *N. vigilans* (Sm.).
7. Scutellar process ; 7a. Strigil ; 7b. Hind calcar of *N. subentatus*, sp. nov.
8. Scutellar process ; 8a. Strigil ; 8b. Hind calcar of *N. dentatus*, sp. nov.

PLATE XIX.



EXPLANATION OF PLATE XX.

1. Adult male *Crocisa rufitarsus*, sp. nov.—legs not shown.
 2. Some of the scale-like hairs that form the patches—the four colours are pale blue, emerald green, light and dark purple.
 3. Adult female *Crocisa albifrons*, sp. nov.—legs not shown.
 4. Strigil of female.
 5. Pollen-granules from the fleece.
 6. Lateral and vertical view of the face-hairs.
 7. Front view of head-capsule of *Asaropoda punctata*, sp. nov.
 8. Strigil of the anterior leg.
 9. The sculpture of the mesothorax.
 10. Genitalia.
 11. Apical segment of the flagellum.
 12. Genitalia of *Asaropoda bombiformis* (Smith).
 13. The sculpture of the mesothorax.
 14. The sculpture of the mesothorax of *Asaropoda rufa*, sp. nov.
 15. Strigil of *Anthophora sordidula*, sp. nov.
 16. Genitalia of *Asaropoda albigena*, sp. nov.
 17. Neuration of the wing of *Anthoglossa vittata*, sp. nov.
 18. First and second segments of the flagellum.
 19. Strigil and hind calcar.
 20. Pollen-granules (*Eucalyptus*, sp.) from the leg of the female.
 21. Striate sculpture of face of *Halictus bremerensis*, sp. nov.
 22. Sculpture of the mesothorax.
 23. Anastomosing rugae of the metathorax.
 24. Strigil of the female.
 25. Hind calcar of the female.
 - 26 and 27. Ventral and dorsal view of mites on this bee.
 28. Sculpture of the metathorax of *Halictus demissus*, Cockerell.
 29. Rugoso-punctate sculpture of the face.
 30. Anterior view of head-capsule of *Crocisa albifrons*, sp. nov.
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Plate XX.

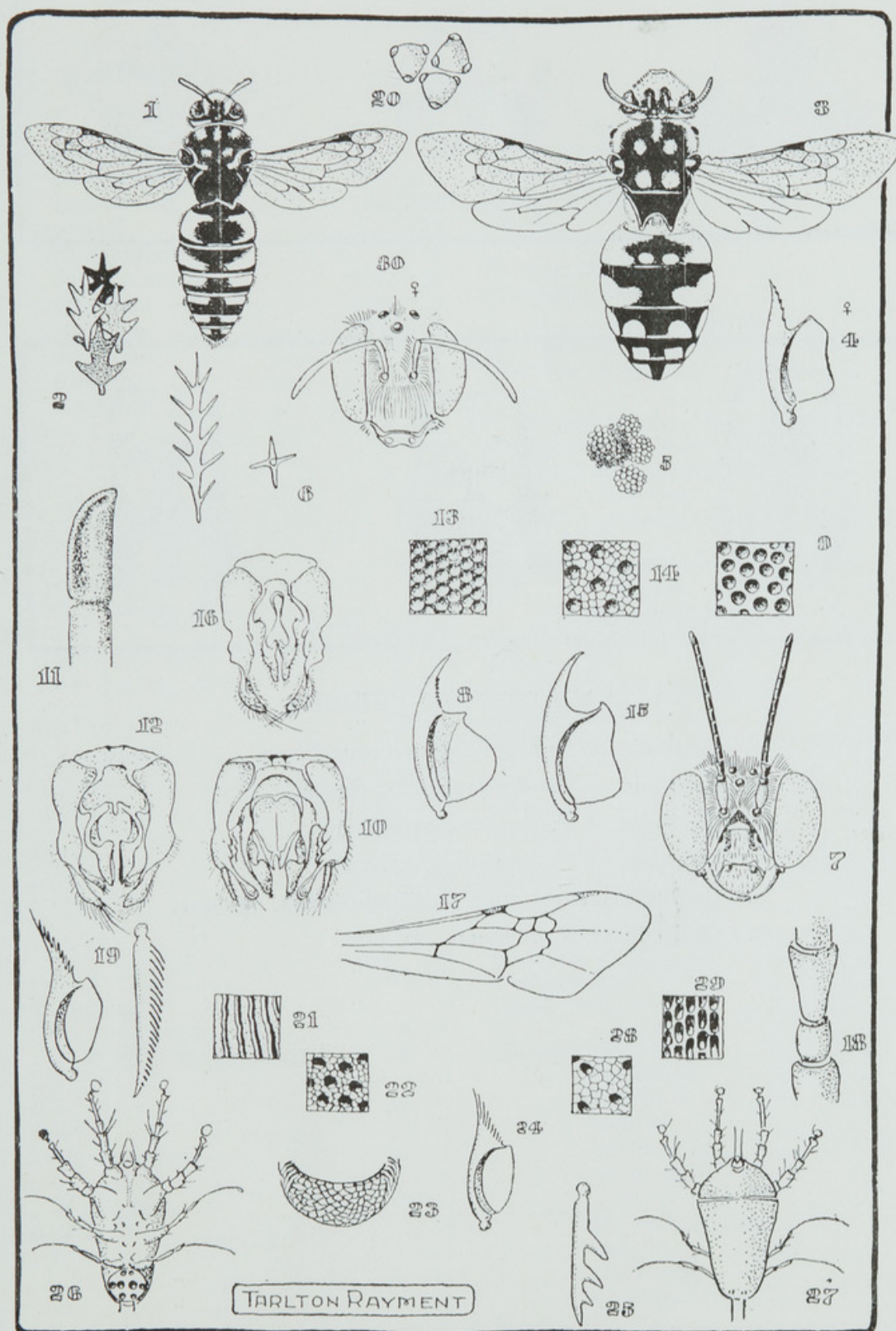
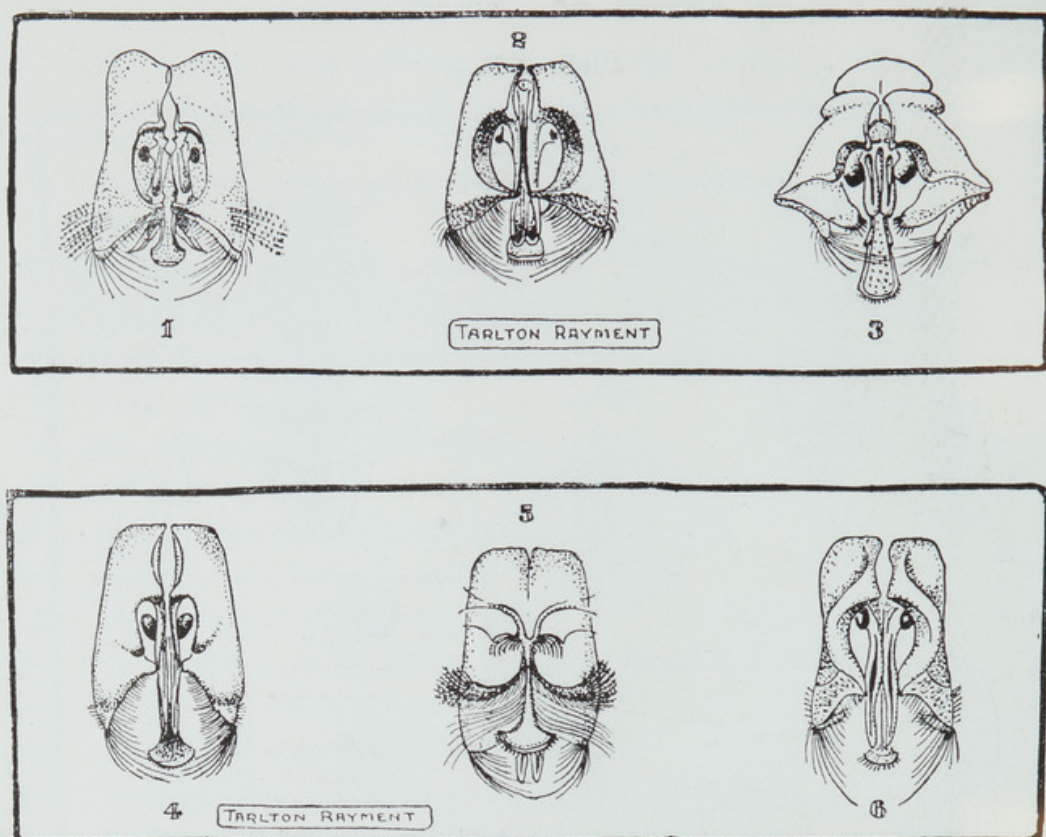


Plate XXI.



EXPLANATION OF FIGURES.

1. Genitalia of *Trichocolletes venustus* (Sm.).
2. Genitalia of *T. nigrohypeatus*, Raym.
3. Genitalia of *T. dowerinensis*, sp. nov.
4. Genitalia of *T. tenuiculus*, sp. nov.
5. Genitalia ventral view of *T. tenuiculus*, sp. nov.
6. Genitalia of *T. daviesiae*, sp. nov.



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