

- (8) W. K. PARKER. "On the Structure and Development of the Skull in *Lepidosteus osseus*." Phil. Trans. Roy. Soc. vol. clxxiii. (1882).
- (9) SWINNERTON. "Morphology of the Teleostean Head Skeleton." Journ. of Micr. Science, vol. xlv. (1902), pp. 503-594, text-figs., pls. xxviii.-xxxi.
- (10) A. SMITH WOODWARD. "On the Cranial Osteology of the Mesozoic Ganoid Fishes, *Lepidotus* and *Dapedius*." Proc. Zool. Soc. 1893, pp. 559-565, text-figs., pls. xlix. & l.

LIII.—*Notes on Fossorial Hymenoptera*.—XVIII. *On the Australian Species of Bembex*. By ROWLAND E. TURNER, F.Z.S., F.E.S.

So little was known of the Australian species of *Bembex* at the time of Handlirsch's fine monograph of the genus (1893), that I think a key including the species since described, and also those described by Smith, most of which were not known to Handlirsch, may be useful. The genus is not so well represented in Australian collections as should be the case; probably this is due to the extreme rapidity of flight rendering capture difficult, for in sandy localities many of the species are very common. They burrow in sand, often in colonies—that is, a number of specimens form burrows close together in suitable localities. Little is known of the habits of Australian species, but in other countries the burrows are often left open and fresh flies supplied to the larva daily. Further collecting will doubtless result in the discovery of more species.

Key to the Australian Species of Bembex.

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| 1. Anterior femora serrate | <i>B. egens</i> , Handl. |
| Anterior femora not serrate | 2. |
| 2. Spur of fore tibia much dilated and flattened | 3. |
| Spur of fore tibia not roundly dilated .. | 4. |
| 3. Bands of apical dorsal segments interrupted | <i>B. calcarina</i> , Handl. |
| Bands of apical dorsal segments continuous | <i>B. flaviventris</i> , Sm. |
| 4. Second ventral segment with a small tubercle on each side of the large median tubercle | <i>B. lobimana</i> , Handl. |
| Second ventral segment without lateral tubercles | 5. |
| 5. Basal joint of fore tarsus strongly dilated. | 6. |
| Basal joint of fore tarsus not dilated. . . . | 9. |

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| 6. Clypeus and labrum deeply longitudinally grooved on each side | 7. | |
| Clypeus and labrum without grooves .. | 8. | |
| 7. Labrum with a narrow median groove at the base | | <i>B. flavifrons</i> , Sm. |
| Labrum without a median groove | | <i>B. pectinipes</i> , Handl. |
| 8. Second and third joints of fore tarsus very strongly produced outwards; basal joint of intermediate tarsus dilated; fourth dorsal segment with a pale fascia | | <i>B. palmata</i> , Sm. |
| Second and third joints of fore tarsus normal; basal joint of intermediate tarsi not dilated; fourth dorsal segment entirely black | | <i>B. vespiformis</i> , Sm. |
| 9. Second ventral segment with a raised transverse lamella | | <i>B. lamellata</i> , Handl. |
| Second ventral segment with a longitudinal carina or tubercle | 10. | |
| 10. Tubercle of the second ventral segment bifid at the apex | | <i>B. furcata</i> , Erichs. |
| Tubercle of the second ventral segment not bifid | 11. | |
| 11. Sixth ventral segment normal, without a carina or raised triangular area | 12. | |
| Sixth ventral segment with a carina or raised triangular area | 19. | |
| 12. Intermediate femora serrate | 13. | |
| Intermediate femora not serrate | 18. | |
| 13. Three basal dorsal segments with broad orange bands | | <i>B. aureofasciata</i> , Turn. |
| Without orange colouring | 14. | |
| 14. Labrum and clypeus black | 15. | |
| Labrum and clypeus yellow | 17. | |
| 15. The serration of the intermediate femora extending to the apex; pale markings on abdomen almost or quite obsolete . | | <i>B. funebris</i> , Turn. |
| The intermediate femora serrate in the middle only; pale markings of the abdomen more developed | 16. | |
| 16. Black lobes of the basal joint of the fore tarsus well developed and clearly divided, intermediate and hind legs mostly yellow | | <i>B. atrifrons</i> , Sm. |
| Black lobes of fore tarsus not clearly divided; intermediate legs mostly, hind legs wholly black | | <i>B. severa</i> , Sm. |
| 17. Serration of the intermediate femora well developed and extending to the apex; thorax and abdomen black, with a few narrow abdominal fasciæ | | <i>B. trepida</i> , Handl. |
| Serration of intermediate femora nearly obsolete and not extending to apex; thorax and abdomen mostly yellow .. | | <i>B. latifasciata</i> , Turn. |
| 18. Abdominal fasciæ very broad, yellowish green; sixth ventral segment emarginate at the apex, seventh dorsal segment sinuate at the sides | | <i>B. marsupinata</i> , Handl. |

- Abdominal fasciæ narrow and pale; sixth ventral segment not emarginate, seventh dorsal segment not sinuate at the sides *B. cursitans*, Handl.
19. Sixth ventral segment with a raised, flattened, triangular tubercle..... 20.
Sixth ventral segment with a low longitudinal carina 25.
20. Clypeus pure white, with a black basal fascia, subconcavely truncate anteriorly; apical joint of antennæ strongly bent and pointed, three sub-apical joints strongly spined *B. flavipes*, Sm.
Clypeus and antennæ differing from the above characters 21.
21. Tubercle of second ventral segment not much curved, broadly truncate at the apex 22.
Tubercle of second ventral segment strongly curved, pointed at the apex . 23.
22. Abdomen yellow beneath; basal joint of the anterior tarsi with eight spines. *B. tuberculiventris*, Turn.
Abdomen black beneath; basal joint of the anterior tarsi with six spines *B. mackayensis*, Turn.
23. Clypeus, scape beneath, and legs almost entirely yellow *B. littoralis*, Turn., var.
Clypeus and legs mostly black, scape entirely black 24.
24. Eighth and ninth joints of the antennæ prominent behind *B. musca*, Handl.
Eighth and ninth joints of the antennæ not prominent *B. littoralis*, Turn.
25. Seventh dorsal segment broadly rounded at the apex; abdomen entirely black. *B. leeuwinensis*, Turn.
Seventh dorsal segment narrower, truncate at the apex, or feebly emarginate. 26.
26. Abdominal fasciæ interrupted, not very broad..... *B. variabilis*, Sm.
Abdominal fasciæ continuous, very broad. *B. raptor*, Sm.

♀ ♀.

1. Basal joint of the fore tarsus with twelve or more spines 2.
Basal joint of fore tarsus with six to eight spines 3.
2. Clypeus and labrum with a deep longitudinal groove on each side *B. flavifrons*, Sm.
Clypeus almost, labrum quite without grooves *B. pectinipes*, Handl.
3. Discal area of the mesonotum marked with yellow 4.
Discal area of the mesonotum without yellow markings 11.
4. Sixth dorsal segment with yellow markings 5.
Sixth dorsal segment entirely black 10.
5. Abdominal fasciæ very broad, occupying at least half the length of the segment. 6.

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| Abdominal fasciæ narrower | 9. | |
| 6. Sixth dorsal segment with a large median spot | 7. | |
| Sixth dorsal segment with a spot on each side | 8. | |
| 7. Sixth dorsal segment broadly rounded at the apex | | <i>B. lobimana</i> , Handl. |
| Sixth dorsal segment narrowly rounded at the apex | | <i>B. marsupiata</i> , Handl. |
| 8. Second ventral segment entirely yellow . | | <i>B. latifasciata</i> , Turn. |
| Second ventral segment black in the middle and at the base | | <i>B. raptor</i> , Sm. |
| 9. Abdominal fasciæ continuous | | <i>B. flaviventris</i> , Sm. |
| Abdominal fasciæ narrowly interrupted . | | <i>B. flavipes</i> , Sm. |
| 10. Tibiæ entirely yellow; basal joint of fore tarsus with seven spines. Large, 17 mm. in length | | <i>B. palmata</i> , Sm. |
| Tibiæ with broad black line; basal joint of fore tarsus with six spines. Smaller, 13 mm. in length | | <i>B. littoralis</i> , Turn., var. |
| 11. Third and fourth dorsal segments entirely black, first with a broad fascia . | | <i>B. vespiformis</i> , Sm. |
| Third dorsal segment at least with a fascia, when the fourth is entirely black, then the first also without a fascia | 12. | |
| 12. Clypeus and labrum entirely black | 13. | |
| Labrum at least yellow | 14. | |
| 13. Thorax entirely black | | <i>B. leeuwinensis</i> , Turn. |
| Thorax with lateral yellow spots on mesonotum and scutellum | | <i>B. severa</i> , Sm. |
| 14. Clypeus entirely black | | <i>B. atrifrons</i> , Sm. |
| Clypeus at least partially yellow | 15. | |
| 15. Eyes strongly convergent above, second ventral segment with a low carina from the base | | <i>B. cursitans</i> , Handl. |
| Eyes not strongly convergent above | 16. | |
| 16. With a small yellow spot on each side of the anterior ocellus. Length never exceeding 15 mm. | 17. | |
| Without a yellow spot on each side of the anterior ocellus. Length always exceeding 15 mm. | | <i>B. furcata</i> , Erichs. |
| 17. Third cubital cell distinctly longer on the radius than on the cubitus | | <i>B. variabilis</i> , Sm. |
| Third cubital cell no longer on the radius than on the cubitus, if as long | | <i>B. mackayensis</i> , Turn. |

I have not seen *B. lamellata*, Handl., so cannot include the female in my key. The species of the *musca* group are so close that I cannot tabulate the females on the insufficient material available. Some of the species of this group appear to have the spines of the fore tarsi much more strongly spatulate than others; colour is very variable and not reliable in distinguishing these species.

Bembex egens, Handl.

Bembex egens, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 753 (1893). ♂.

Hab. Australia.

I have not seen this species, which belongs to the same group as *flaviventris*, Sm., but may be distinguished from all other Australian species by the serration of the anterior femora. No definite locality is known.

Bembex calcarina, Handl.

Bembex calcarina, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 754 (1893). ♂.

Hab. Adelaide.

This species, of which I have not seen specimens, is very near *flaviventris*, Sm., from which it may be distinguished by the interrupted bands on the apical dorsal segments, which are continuous in that species. There is no mention in Handlirsch's description of any abnormal structure of the apical joint of the intermediate tarsus, which in *flaviventris* is very long and slender at the base. Handlirsch, in his key, refers under *calcarina* to his figure of an intermediate metatarsus which, according to the plate and description, belongs to *egens*. This is evidently a slip, the only one I have yet found in the work of that author.

; *Bembex flaviventris*, Sm.

Bembex flaviventris, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 299 (1873). ♂ ♀.

This is very near *calcarina*, Handl., which may prove to be a synonym or subspecies. I have not taken the species myself.

Hab. Southern Cross, W.A.; Perth, W.A.

Bembex palmata, Sm.

Bembex palmata, Sm. Cat. Hym. B.M. iv. p. 325 (1856). ♂.

Bembex tridentifera, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 298 (1873). ♀.

Hab. Mackay, Q.; Toowoomba, Q.; Moruya, N.S.W.; Victoria.

The male is easily distinguished from *flavifrons* by the normal clypeus and labrum and by the fewer spines on the basal joint of the fore tarsus. It is nearer in structure to

vespiformis, Sm., but differs conspicuously in the colouring of the abdomen, in the much broader joints of the fore tarsus, and in the acute spine of the eighth ventral segment.

Bembex vespiformis, Sm.

Bembex vespiformis, Sm. Cat. Hym. B.M. iv. p. 327 (1856). ♀ ♂;
Handl. Sitzber. Akad. Wiss. Wien, cii. p. 93 (1893).

Hab. Adelaide (*Smith*), type ♂; Townsville, Q. (*Dodd*); Kalamunda, W.A. (*Turner*); Waroona, W.A. (*Berthoud*).

This species is easily distinguished by the broad band on the basal dorsal segment, sometimes the second and third dorsal segments also have narrow bands, often interrupted, the fourth always without a band; scutellum with a spot on each side, mesonotum immaculate. The male structural characters are the very broad basal joint of the fore tarsus, which has seven spines on the outer margin and is edged with black near the apex; the seventh joint of the flagellum strongly excised beneath, with a strong spine at the base, eighth joint with a minute spine at the base; second ventral segment with a strong tubercle, sixth and seventh unarmed; apical spine of the eighth stout, truncate or feebly bilobed at the apex. West Australian males have the seventh dorsal segment mostly, the sixth and the apex of the fifth entirely, brownish yellow; in Adelaide and Queensland specimens the seventh and fifth are black, with two yellow spots on the seventh in one Queensland specimen, the sixth sometimes with a yellow apical band, sometimes without. It appears to me that the stipes of the genitalia in the Adelaide form are distinctly broader than in the West Australian specimens and also somewhat different in sculpture. In Queensland specimens the wings are infusate on the discoidal area.

Bembex flavifrons, Sm.

Bembex flavifrons, Sm. Cat. Hym. B.M. iv. p. 324 (1856). ♀.
Bembex saussurei, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 873 (1893). ♀.

Hab. Adelaide (*Smith*, *Handlirsch*); Mackay, Q. (*Turner*); Port Denison, Q. (*Handlirsch*).

The distinguishing characters are the deep, lateral, longitudinal furrows on the labrum and clypeus; the large number of spines on the basal joint of the fore tarsus, eighteen in the male, thirteen in the female; the form of the seventh tergite of the male, strongly produced at the apex and trun-

cate, deeply sinuate at the sides and slightly serrate above the sinuation; the anterior tibiae of the male are produced at the outer apical angle and furnished with two long spines; the intermediate femora are feebly serrate beneath; the eighth joint of the flagellum is strongly thickened at the base and excavated. The labrum of the male has a distinct longitudinal groove from the base, which is also visible but less distinct in the female.

Bembex pectinipes, Handl.

Bembex palmata, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 298 (1873).
♂ (nec Smith, 1856).

Bembex pectinipes, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 875 (1893). ♀.

I am not quite sure that my identification of *pectinipes* is correct. The type of *palmata* is identical with Townsville specimens, and differs from ♂ *flavifrons* from Mackay in the less produced and less sinuate seventh tergite, in the absence of a longitudinal groove on the middle of the labrum, and in the greater development of the pale markings, especially in the presence of a large mark on the seventh tergite and of a large U-shaped mark on the mesonotum. The female differs in the more convex clypeus, in which the lateral grooves are almost obsolete, and in the total absence of grooves on the labrum; the pygidium has a better-defined pygidial area and is less closely punctured, and the pale markings are more strongly developed, especially on the scutellum, which has a transverse band, not merely lateral spots as in typical *flavifrons*.

Hab. Townsville, Q.; Port Darwin, N.T.

The differences between the two forms are so small compared with the many features in common, especially in the male, that I doubt if they should be treated as more than local races.

Bembex trepida, Handl.

Bembex trepida, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 759 (1893).
♂.

Hab. Adelaide, S.A.

I only know the male of this species. It is very near *atrifrons* and *funbris*, differing from the former in the serration of the intermediate femora, which reaches the apex, in the yellow colour of the labrum, clypeus, and underside

of the scape; from the latter in the same points in colour, in the much less broadly rounded seventh dorsal segment, and in the much more developed black lobes of the basal joint of the fore tarsi.

Bembex severa, Sm.

Bembex severa, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 297 (1873). ♀ (nec ♂).

Hab. Swan River, W.A. (*Du Boulay*).

I think the female must be taken to be the type of this species. The male described by Smith appears to be *funnebris* with more developed abdominal fasciæ, but I do not think that the female belongs to the same species, but to another male from the same collection, placed by Smith in the series. This is a more robust insect, with the serration of the intermediate femora not reaching the apex, in this point resembling *atrifrons*, from which it differs in the very slight development of the black lobes of the fore tarsus, in the more robust form, and in the more broadly rounded seventh dorsal segment. In both sexes the labrum and clypeus are black. The thorax of the male is almost entirely black, but there is a yellow spot on the tegula. The antennæ are as in *atrifrons*, but the hollowing of the apical joints is more distinct. There are seven spines on the basal joint of the fore tarsus in both sexes.

Bembex atrifrons, Sm.

Bembex atrifrons, Sm. Cat. Hym. B.M. iv. p. 327 (1856). ♀.

Bembex flavilabris, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 299 (1873). ♀.

Bembex atrifrons, Turn. Proc. Zool. Soc. London, p. 353 (1910). ♂ ♀.

Hab. South Perth (*Giles*); Yallingup and Busselton, W.A. (*Turner*).

The male has the serration of the intermediate femora not extending either to the base or apex, the intermediate tibiæ flattened broadly at the apex, the basal joint of the intermediate tarsus broadly emarginate at the base beneath, the basal joint of the anterior tarsus with seven spines on the outer margin and a row of black lobes, a faint longitudinal carina on the third ventral segment, as well as the usual tubercle on the second, the labrum black, the mandibles yellow at the base, and the scape entirely black. The female has the scape more or less yellow beneath and the labrum almost entirely yellow.

Allied to *trepida*, Handl.

Bembex funebris, Turn.

Bembex severa, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 298 (1873).

♂ (nec ♀).

Bembex funebris, Turn. Proc. Zool. Soc. London, p. 353 (1910). ♂.

Hab. South Perth, W.A. (*Giles*); Busselton, W.A. (*Turner*).

The male may be distinguished from the nearly allied *atrifrons* by the complete or almost complete absence of abdominal fasciæ, the only markings being on the legs, by the greater extent of the serration of the intermediate femora, and by the greater apical breadth of the seventh dorsal segment. The lobes of the basal joint of the fore tarsi are less developed than either in *atrifrons* or *trepida*. The female is unknown. The specimen described by Smith as the male of *severa* has the fasciæ of segments 2-4 developed, but broadly interrupted.

Bembex aureofasciata, Turn.

Bembex aureofasciata, Turn. Proc. Zool. Soc. London, p. 354 (1910). ♂.

Hab. South Perth, W.A. (*Giles*); Waroona, W.A. (*Berthoud*).

In structure this is allied to *funebris*, but may at once be distinguished by the broad orange fasciæ of the three basal dorsal segments and by the almost smooth seventh dorsal segment.

Bembex lobimana, Handl.

Bembex lobimana, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 755 (1893).

♂ ♀.

Hab. New South Wales.

I have only seen the female of this large species. The basal joint of the fore tarsus has seven spines. The clypeus of the male is much more broadly flattened in front than in the female.

Bembex marsupiata, Handl.

Bembex marsupiata, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 757 (1893). ♂ ♀.

Hab. Waroona, W.A. (*Berthoud*).

Both this species and *lobimana* have the abdominal fasciæ very broad, and have seven spines on the basal joint of the

fore tarsus of the female. In *marsupiata* the female has the sixth dorsal segment more narrowly rounded than in *lobimana*.

Bembex latifasciata, Turn.

Bembex latifasciata, Turn. Ann. & Mag. Nat. Hist. (8) x. p. 57 (1912). ♂ ♀.

Hab. Strelley River, W.A. (*Giles*) ; Roeburne, W.A.

This belongs to the group of *lobimana* and *marsupiata*. The serration of the intermediate femora is almost obsolete, but is just visible. The tubercle at the base of the first ventral segment is much more strongly developed than in *marsupiata*, the sixth ventral segment is not emarginate at the apex as in that species. The markings on the thorax are much more strongly developed in the present species and the seventh dorsal segment is rounded at the apex, not truncate as in *marsupiata*. The female has the sixth dorsal segment narrowly rounded at the apex, with a yellow spot on each side. It is a much smaller species than *marsupiata*. There is a female of the species in the British Museum from Hermannsburg, Central Australia.

Bembex furcata, Erichs.

Bembex furcata, Erichs. Arch. f. Naturges. viii. p. 266 (1842). ♂ ♀.

Hab. Launceston, Tas. (*Simson*) ; Eaglehawk Neck, Tas. (*Turner*) ; Hobart, Tas. (*Walker*) ; Cottesloe, W.A. (*Giles*) ; Woodford, N.S.W. (*G. A. Waterhouse*) ; Leura, N.S.W. (*Froggatt*).

This is one of the commonest species in the southern portion of Australia, though rare in the south-west. It appears to be the only representative of the genus in Tasmania. The male is easily distinguished by the furcate tubercle of the second ventral segment; the sixth ventral segment is armed with a transverse ridge produced in the middle into a rounded tubercle. The labrum usually, and often the clypeus, of the male is black, of the female yellow.

Bembex cursitans, Handl.

Bembex cursitans, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 762 (1893). ♂ ♀.

Hab. Yallingup, W.A. (*Turner*) ; South Perth, W.A. (*Giles*).

This is a common species in South-western Australia. The male has a large tubercle on the second ventral segment, a low longitudinal carina on the third, and the sixth unarmed. The seventh dorsal segment is truncate at the apex. The eyes are more strongly divergent towards the clypeus in both sexes than in other species.

Bembex flavipes, Sm.

Bembex flavipes, Sm. Cat. Hym. B.M. iv. p. 325 (1856). ♀; Turn. Proc. Zool. Soc. London, p. 502 (1908). ♂.

Hab. Mackay, Q. (Turner); Townsville, Q. (Dodd); Alexandria, N.T. (Stalker); Adelaide River, N.T. (Walker).

The male is easily distinguished by the white clypeus, which has a black band at the base and is almost vertically truncate anteriorly, the face of the truncation subconcave and the apex widely and shallowly emarginate. There is a large tubercle on the penultimate joint of the antennæ, and the apical joint is very sharply bent in the middle, the apical point being almost at right angles to the rest of the joint. The ventral surface of the abdomen is armed as in the *musca* group with a large tubercle on the second segment, truncate at the apex, and a flat triangular tubercle on the sixth segment. The female has the clypeus yellow, with a more or less defined Λ -shaped black mark at the base, strongly convex, the anterior tarsi with six spines on the basal joint, and the sixth dorsal segment marked with two yellow spots. In both sexes the ventral surface of the abdomen is almost entirely yellow. The female might possibly be confused with some of those of the *musca* group, but the markings are much more extensive and the form of the clypeus different.

Bembex musca, Handl.

Bembex musca, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 844 (1893). ♂.

Hab. Australia.

I have not been able to identify this species with any certainty. It is very near *B. littoralis*, Turn., but seems to differ a little in the structure of the eighth and ninth joints of the antennæ. The male only is described.

Other closely allied species in this group are:—

Bembex littoralis, Turn.

Bembex littoralis, Turn. Proc. Zool. Soc. London, p. 502 (1908). ♂.

Hab. Port Darwin, N.T.

This species has the tubercle of the second ventral segment curved and acute as in *B. musca*. A form from Perth, apparently a variety, has the markings strongly developed and the clypeus yellow.

Bembex mackayensis, Turn.

Bembex mackayensis, Turn. Proc. Zool. Soc. London, p. 351 (1910).
♂ ♀.

Hab. Mackay and Cairns, Q. (*Turner*).

Bembex tuberculiventris, Turn.

Bembex tuberculiventris, Turn. Proc. Zool. Soc. London, p. 503 (1908).
♂.

Hab. Cooktown, Q.

The two last species have the tubercle on the second ventral segment truncate at the apex, not acute as in *musca*; *tuberculiventris* also has eight spines on the basal joint of the anterior tarsi, not six as in the other species of the group. The ventral abdominal segments are nearly entirely yellow in *tuberculiventris*, black in *mackayensis*. In the shape of the tubercle these two species somewhat resemble *flavipes*, Sm., but the clypeus and antennæ are very different.

The number of females of the *musca* group available is very small, and the colour and markings vary much in the same species. Except in the case of *mackayensis* I do not feel sufficiently certain as to the correct association of the sexes to venture to describe them. A form of which I possess both sexes from Perth and Kalamunda, W.A., and which I take to be a highly coloured variety of *littoralis*, Turn., has the markings on the disc of the mesonotum and on the five basal dorsal segments of the female well developed, also on the six basal segments of the male, the clypeus in both sexes being yellow with a small black mark on each side near the base, and the fore tarsi in both sexes are without the black marginal line which is present in specimens of *littoralis* taken in the same locality. I have referred to this form in my key as a variety of *littoralis*, but it is quite possible that it may prove to be distinct when specimens are available for the dissection of the male genitalia.

Bembex lamellata, Handl.

Bembex lamellata, Handl. Sitzber. Akad. Wiss. Wien, cii. p. 842 (1893). ♂ ♀.

Hab. Adelaide, S.A.

I have not seen this species.

Bembex variabilis, Sm.

Bembex variabilis, Sm. Cat. Hym. B.M. iv. p. 325 (1856). ♀.

Bembex crabroniformis, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 296 (1873). ♂.

Hab. Mackay, Q. (*Turner*); Townsville, Q. (*Dodd*); Port Darwin, N.T. (*G. Turner*); Baudin Island, N.W.A. (*Walker*); South Perth, W.A. (*Giles*); Waroona, W.A. (*Berthoud*); Yallingup, W.A. (*Turner*); Adelaide, S.A. (*Handlirsch*); Hunter River, N.S.W. (*Smith*).

I can see no structural differences between *variabilis*, Sm., and *raptor*, Sm., in the male sex, but have not been able to examine the genitalia. At one time I thought they might prove to be local races of one species, but I have since taken both forms on the same day in King's Park, Perth. The male *variabilis* has the abdominal fasciæ interrupted and the basal joint of the anterior tarsus bordered with black on the outer edge; the thoracic markings are also less developed than in *raptor*. These colour-differences also exist in the female, in which sex also the second ventral segment is more sparsely punctured in *raptor* than in *variabilis* and the sixth dorsal segment slightly broader in *variabilis*.

Bembex raptor, Sm.

Bembex raptor, Sm. Cat. Hym. B.M. iv. p. 326 (1856). ♂.

Hab. Adelaide, S.A. (*Smith*); Killalpanina, E. of Lake Eyre, S.A. (*Hillier*); Hermannsburg, N.T. (*Hillier*); Alexandria, N.T. (*Stalker*); South Perth, W.A. (*Giles*); Nicol Bay, W.A. (*Du Boulay*); Townsville, Q. (*Dodd*).

This seems to be the commonest form in Central Australia. Handlirsch seems to include it in his description of the very closely related *variabilis*.

Bembex leeuwinensis, sp. n.

♂. Niger; mandibulis in medio sordide albidis; orbitis interioribus angustissime, tibiis tarsisque anticis subtus, tibiisque intermediis subtus basi flavis; tarsis apice brunneis; alis hyalinis, venis fusco-ferrugineis.

♀. Mari similis; segmentis dorsalibus secundo tertioque fascia transversa angusta undulata utrinque sordide albidis.

Var. ♂. Clypeo labroque plus minus sordide albidis.

Long., ♂ ♀, 14–15 mm.

♂. Antennæ normal, the apical joint stout, not curved, blunt at the apex. Clypeus rather strongly convex, truncate at the apex, depressed on the middle of the apical margin. Eyes diverging slightly below. Basal joint of fore tarsus with seven spines; intermediate femora not serrate. Second ventral segment unarmed, sometimes with a very obscure longitudinal carina; sixth ventral segment with an obscure longitudinal carina, sometimes almost obsolete, also with an obscure oblique carina on each side converging towards the apex, the enclosed space more sparsely punctured than the rest of the segment, the apical margin of the segment slightly undulating; seventh ventral segment with a well-marked longitudinal carina; seventh dorsal segment broadly rounded at the apex. Anterior wing nearly two-and-a-half times as long as the breadth of the thorax, third cubital cell about equally long on the radius and on the cubitus.

♀. Seven spines on the basal joint of the anterior tarsus; second ventral segment sparsely punctured in the middle, more closely and finely on the sides; sixth ventral segment convex, subcarinate longitudinally in the middle; sixth dorsal segment narrowly rounded at the apex.

Hab. Yallingup and Busselton, W.A.; December and January (*Turner*).

This belongs to the group of *B. variabilis*, but is easily distinguished by the difference in colour, by the much less developed carina of the second ventral segment, and by the different shape of the seventh dorsal segment. The female has the sixth dorsal segment more rounded at the apex than in *variabilis* and much more sparsely punctured.

LIV.—*A new Bat from Northern Nigeria.*

By OLDFIELD THOMAS.

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Scotæcus falabæ, sp. n.

A medium-sized brown species, rather larger than *S. hirundo*.

General characters very much as in *S. hirundo*, to which the new form is most nearly allied. Size rather larger.



Turner, Rowland E. 1915. "Notes on fossorial Hymenoptera. XVIII. On the Australian species of *Bembex*." *The Annals and magazine of natural history; zoology, botany, and geology* 16, 434–447.

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