

## THE ANNALS

AND

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XXI.—*Descriptions and Records of Bees.*—LXV.  
By T. D. A. COCKERELL, University of Colorado.

*Mesotrichia cuernosensis*, sp. n.

♀.—Length about 23 mm., anterior wing 24.

Very robust, black, thorax above (except a naked smooth shining space in middle of mesothorax, marked anteriorly by a groove) densely covered with short bright fox-red hair, intermixed with black; abdomen strongly and rather closely punctured, its hair entirely black, not hiding the surface. Head broad; face with mixed black and pale yellowish hair; on vertex the hair is mostly black, but on occiput ferruginous, on posterior part of cheeks above yellow, paler lower down, the lower part of cheeks with long black hair; mandibles bidentate; labrum with a very strong median tubercle; clypeus dull, very densely punctured, with a raised but not shining median line; ridge between antennæ obtuse, very feebly grooved; third antennal joint a trifle longer than next three together; flagellum, except basally, dull ferruginous beneath; tubercles and upper part of pleura with red hair, the rest with black; tegulæ black, basally with red hair. Wings very dark fuliginous, with rosy tints, the apical field with green; first t.-c. incomplete at lower end. Legs with black hair, anterior tibiæ with a fringe of yellow hair behind; hind femora with a small red button-like spot or lobe on each side apically; scale-like

process on hind tibiæ rather small, cariniform, rounded at end.

*Hab.* Cuernos Mts., Negros, Philippine Islands (*Baker*, 3125).

Closely related to *Mesotrichia insularis* (*Xylocopa insularis*, Smith), from Borneo, of which only the male is known. It is possible that *M. cuernosensis* is the hitherto unknown female of *insularis*, but, in view of the very different locality, it is much more likely that it is a distinct species. There is a superficial resemblance to the Japanese species *circumvolans*, Smith.

*Mesotrichia dapitanensis*, sp. n.

♀.—Length about 16 mm., anterior wing 14.

Broad, entirely black, except that the flagellum is dull ferruginous beneath (except basally), and the hind margins of the second and following abdominal segments are very narrowly reddish; pubescence all black, except a few coppery-red hairs in region of mouth. Wings strongly brownish, darker in apical field, reddened in marginal cell, with a greenish-golden iridescence, dilute rosy apically; head very broad; clypeus very densely punctured, with a shining median ridge; ridge between antennæ obtuse, distinctly but not deeply grooved; third antennal joint shorter than next three together; mesothorax smooth and shining in middle; tegulæ black. Abdomen well punctured; first t.-c. failing at lower end; scale-like process on hind tibiæ short, rounded, rather like a finger-nail.

*Hab.* Dapitan, Mindanao, Philippine Is. (*Baker*, 3128).

Resembles *M. bakeriana*, Ckll., but much smaller, with the ocelli further apart, the wings paler and redder, and the process on hind tibiæ different.

Professor C. F. Baker sends other Philippine Xylocopids, as follows:—

*Mesotrichia latipes* (*Apis latipes*, Drury), ♀.—Cuernos Mts., Negros (3121).

*Mesotrichia ghiliani* (*Xylocopa ghiliani*, Gribodo), ♀.—Iligan, Mindanao (3124).

*Xylocopa euchlora*, Pérez, ♂.—Dapitan, Mindanao (3123).

*Xylocopa major*, Maidl., ♂.—Malinao (3122).

*Xylocopa fuliginata*, Pérez, ♂.—Dapitan (3126); ♀. Iligan (3127, 3129).

*Nomada bakeri*, sp. n.

♀.—Length nearly 6 mm.

Slender, with clavate abdomen, narrowed basally; black, with the labrum, mandibles (except apices, which are simple), narrow band along posterior orbits, entire face below antennæ, narrow band along anterior orbits to top of eye (ending broadly above eye), upper border of prothorax, tubercles, pleura (but densely covered with silky white hair), scutellum (which is bigibbous, with strong irregular punctures), two small obscure spots on disc of first abdominal segment, a little more than basal half of second segment, basal corners of third and fourth segments and broadly interrupted band on fourth, fifth segment (except a spot at extreme base, and a large black patch on each side), all yellow, reddened by cyanide in type-specimen; labrum and face with pale ochreous hair; antennæ long, second joint conspicuous, third joint elongate, a little longer than fourth, scape ferruginous in front, flagellum black; mesothorax dull, densely punctured; area of metathorax large, less than the basal half rugose with irregular wrinkles; sides of metathorax very densely covered with pale ochreous-tinted hair; tegulæ clear ferruginous. Wings strongly dusky at apex, stigma and nervures piceous; b. n. going a little basad of t.-m.; second s.m. receiving first r. n. about middle; third s.m. less than half as broad above as second. Abdomen smooth and shining, not punctured. Legs red and black, hind legs black with knees and apex of tibiæ red.

*Hab.* Mt. Makiling, Luzon (*Baker*, 3156).

Resembles *N. adusta*, Smith, which I have from the Khasia Hills, India (*Sladen*).

*Nomada lusca*, Smith.

♀.—Los Baños, Luzon (*Baker*, 3160).

*Nomada makilingensis*, sp. n.

♀.—Length nearly 5 mm.

Slender, the abdomen broad-fusiform, narrowed basally; bright clear ferruginous, flagellum strongly dusky above, first abdominal segment with a pair of large suffused blackened patches; mandibles simple; face, pleura, and sides of metathorax with thin clear white hair; antennæ long and slender, third joint about as long as fourth; mesothorax densely punctured, but shining between the punctures;

area of metathorax roughened at extreme base; tegulæ light rufo-testaceous, much smaller than those of *N. bakeri*. Wings dusky at apex, stigma and nervures dull sepia; b. n. going basad of t.-m.; only two submarginal cells, the second t.-c. absent. Abdomen smooth, the second segment with a large round yellow spot (reddened by cyanide in type) on each side.

*Hab.* Mt. Makiling, Luzon (*Baker*, 3155).

*Nomada banahaonis*, sp. n.

♂.—Length of type 6 mm., but of the smallest specimen about 4.5.

Slender, with fusiform abdomen, very narrow at base; black, with labrum, mandibles, band along lower part of posterior orbits, clypeus (except a pair of black patches above), lateral face-marks (ending in a sharp point on orbit about level of top of clypeus), tubercles (but no other part of thorax), small round spot on each extreme side of first abdominal segment, and large spots on each side of second and third (very large on second), all yellow, reddened by cyanide in type; mandibles simple; head broad, face with appressed silky pale hair; scape very long, black, with a red spot at base and apex; flagellum long and thick, ferruginous beneath; second antennal joint hardly visible, third short, not longer than broad, conspicuously shorter than fourth; mesothorax very densely punctured; area of metathorax rugose at base, otherwise shining, with slight transverse striation; pleura and sides of metathorax with dense white hair; tegulæ rufo-piceous. Wings with apex and outer margin broadly dusky, nervures and stigma piceous; b. n. going basad of t.-m.; second s.m. receiving first r. n. about middle. Legs black, with anterior femora in front and above, middle femora in front, anterior and middle tibiæ in front, anterior tarsi, middle basitarsi, posterior knees and apex of posterior tibiæ, all ferruginous. Abdomen smooth and shining, apex and apical plate ferruginous, the latter strongly notched.

*Hab.* Mt. Banahao, Philippine Is. (*Baker*, 3157 = type; 3158, 3159).

This may possibly be the male of *N. lusca*, but I believe it is distinct. In Desc. Rec. Bees, lxiii. p. 365, *Halictus banahaonis*, also from Mt. Banahao, and very possibly the host of the present *Nomada*, is misprinted "*banabraonis*."

*Nomada mindanaonis*, sp. n.

♂ (=type).—Length 4.5–5 mm.

Like *N. banahaonis*, but differing thus: scape shorter and stouter, broadly dull yellow on outer side; third antennal joint very long, a little longer than fourth, which is also long; flagellum entirely black; a small light mark above each eye (a faint trace of this can be seen in *banahaonis*); markings of abdomen and legs suffused and dull, venter of abdomen ferruginous.

♀.—Length a little over 5 mm.

Like *N. lusca*, but smaller, clear bright ferruginous, the abdomen without dusky shades, except a suffused elongate black mark on each side of first segment; scape red, flagellum very long, black; third antennal reddish beneath, very long, conspicuously longer than fourth; b. n. going basad of t.-m.; area of metathorax rugose basally; a patch of pure white hair on each side of metathorax.

*Hab.* Dapitan, Mindanao (*Baker*, 3153, 3154).

The following table separates the above species, and also those described from Borneo and Java. The Sumatran species which doubtless exist are unknown:—

Females .....	1.
Males .....	6.
1. Two submarginal cells; small clear red species, with large round yellow spot on each side of second abdominal segment.....	<i>makilingensis</i> , Ckll.
Three submarginal cells .....	2.
2. Second abdominal segment marked with white; black species with red thorax (Borneo) .....	<i>malayana</i> , Cam.
Second abdominal segment not so marked....	3.
3. Head and thorax red-brown; abdomen black or black-brown, marked with yellow (Java) .	<i>javanica</i> , Friese.
If head and thorax red, abdomen also red ....	4.
4. Black, with scutellum and basal half of first abdominal segment yellow.....	<i>bakeri</i> , Ckll.
Red .....	5.
5. Hind margins of abdominal segments suffused with dusky; flagellum dull red beneath....	<i>lusca</i> , Smith.
Abdomen clear red; flagellum black .....	<i>mindanaonis</i> , Ckll.
6. Tegulae yellow or brownish yellow; insect black, with only the tubercles, tegulae, and spots on abdomen yellow (Java) .....	[ <i>biroi</i> , var.). <i>nigrescens</i> , Friese (as
Tegulae dark .....	7.
7. Third antennal joint long .....	<i>mindanaonis</i> , Ckll.
Third antennal joint short.....	<i>banahaonis</i> , Ckll.

*N. testaceobalteata*, Cam., ♂, from Borneo, is at once distinguished by the rufous thorax, that of the Philippine and Java males being black.

*Lithurgus scabrosus* (Smith).

♀.—Dapitan, Mindanao (*Baker*, 3135). *L. guamensis*, Ckll., is very closely allied, and may prove to be a form of *scabrosus*.

*Megachile clotho*, Smith.

♀, ♂.—Dapitan, Mindanao (*Baker*, 3133, 3134).

*Prosopis pulchricrus*, sp. n.

♂.—Length about 5 mm.

Very robust; black, with the face creamy white, and the tubercles (except for a dark dot) of the same colour, but all the rest of the thorax and abdomen dark, the hind margins of the abdominal segments very obscure reddish; femora clear pale ferruginous, more or less cream-coloured apically, tibiae of the same red with the base (half of outer side of hind pair) cream-colour, tarsi pale red, the hind basitarsi cream-colour except at apex. Face broad, the long clypeus, labrum, mandibles, large equilaterally triangular supra-clypeal mark, and lateral face-marks (filling space between clypeus and eye, and extending upwards, rapidly narrowing to a point on orbital margin somewhat below middle of front) all creamy white; front just above antennae with fine appressed plumose white hairs; front and mesothorax very densely, rather coarsely (for such a small insect) punctured; antennae rather short for a male, light ferruginous, scape cream-colour in front, third and fourth joints extremely short; tegulae testaceous with a light yellow spot. Wings milky hyaline, nervures and stigma fuscous; first r. n. joining second s.m. not far from base. Abdomen broad, very finely punctured; venter without projections, first ventral segment with broadly hyaline margin.

*Hab.* Yarrowin, N.S.W. (*Froggatt*, 248 c).

In my table of Australian *Prosopis* this runs to 34, and runs out on account of the creamy-white face. It is a very distinct species.

*Allodape diminuta*, sp. n.

♂, ♀.—Length about 5 mm.

Resembling *A. simillima*, Sm., but male with scape white in front, and both sexes much smaller. Tubercles and scale at base of wings cream-colour; hind basitarsi of male cream-colour, with the small joints ferruginous. Face-mark in

female broad and pyriform; in male very broad, constricted below middle, with a narrow lateral mark (sharply pointed above) on each side. Pleura of male not conspicuously hairy as it is in *A. simillima*.

*Hab.* Yarrowin, N.S.W. (*Froggatt*, 219 c), 2 ♂, 1 ♀.

Evidently a distinct species, but close to *A. simillima*. The form of the face-mark in the female readily distinguishes it from *A. unicolor*, Sm.

*Exoneura clarissima*, sp. n.

♂.—Length about 5 mm.

Black, the abdomen bright ferruginous, dusky at sides of apex, and the first segment black with a narrow red apical margin; mandibles black, with a broad orange band just before the apex; labrum and clypeus white, the white of the clypeus notched on each side below the middle, and the part below the notch appearing especially broad because a very narrow white lateral face-mark (not reaching eye) is contiguous with it on each side; eyes large, but not remarkably so; scape and second antennal joint white in front, flagellum dull ferruginous beneath; thorax shining; tubercles apically white. Wings hyaline, not reddened; knees broadly, and all the tibiæ and tarsi, bright ferruginous.

*Hab.* Yarrowin, N.S.W. (*Froggatt*, 224 c).

Readily known by the small size and broad white face-patch, broadly truncate above. There are several small species known only in the female, but it does not seem probable that *E. clarissima* belongs with any of them.

*Andrena jacobæa*, sp. n.

♀.—Length a little over 12 mm.

Black, the head, thorax, and two basal segments of abdomen with ferruginous hair, very bright fox-red on head and thorax above, but black on upper half of cheeks, sides of front overlapping foveæ, and lower part of sides of metathorax; legs with hair mostly black, but dark coppery reddish on inner side of tarsi, light ferruginous on under side of anterior and middle femora, long and abundant on anterior femora; long curled floccus on hind trochanters also light ferruginous; first two dorsal abdominal segments with fulvous hair, the others with black hair, with fulvous intermixed on third, and slightly on fourth; venter with black hair. The abdomen is not at all banded. Facial quadrangle

broader than long; clypeus shining, with rather small well-separated punctures, and a smooth median line; malar space short, but distinct; process of labrum broadly truncate, with a transverse sulcus; front dull and granular; facial foveæ dark, not hairy, rather broad, reaching a little below level of antennæ; cheeks very broad, with a little tubercle on hind margin a little above level of middle of eye; antennæ black, third joint longer than next two together, but not quite so long as next three together; mesothorax and scutellum dull and granular; area of metathorax feebly defined, minutely granular; tegulæ piceous, with much red hair. Wings dusky translucent, nervures and stigma reddish brown; b. n. falling just short of t.-m.; second s.m. nearly square, receiving first r. n. beyond the middle but not near end; third s.m. extremely broad above; hind tibial scopa of mostly simple hairs, rather short and thin. Abdomen shining, without evident punctures, second segment depressed hardly a third; hair at apex black; apical plate rather narrow.

*Hab.* Jimtown, Colorado, at flowers of *Thermopsis*, June 7 (Cockerell).

The specimen is stylopized, and perhaps somewhat altered, but it appears to be a quite distinct species. It is very like *A. milwaukeensis*, Graenicher, but differs by the light hair on the face and pleura, the broad cheeks, &c. There is evident close affinity with *A. ribesina*, Ckll., but the third s.m. is very much broader above, the small joints of tarsi are dark, the hair on the abdomen is differently coloured, and the cheeks are broader and flatter. It is perhaps possible that the insect is an extreme variety of *A. ribesina*. In the key in Proc. U.S. Nat. Mus. vol. xlviii. pp. 1-58, it runs nearest to *A. topazana*, Ckll., which is smaller and otherwise distinct.

*Megachile parallela*, Smith.—Males and labelled as follows: Dallas, Texas, at *Gaillardia pulchella*, May 19 (Bishopp); N. Braunfels, Tex., at *Ratibida columnaris*, May 17 (Crawford and Pratt); Barstow, Tex., Oct. 12 (Crawford); Denton, Tex., at *Gaillardia pulchella*, May 29 (Bishopp); Cotulla, Tex., at *Verbesina encelioides* and *Monarda punctata*, Apl. 18-May 12 (Crawford and Pratt).

*Anthophora smithii*, Cresson.—Ward, Colorado, alt. 9200 ft., male at flowers of *Grindelia subalpina*, Aug. 26, 1913 (Cockerell).

*Anthidium emarginatum* (Say).—A male, with two black spots on upper part of clypeus. Between Ward and Peaceful Valley, Colo., July 5 (*Cockerell*).

*Augochlora fervida*, Smith.—About four miles N. of Boulder, Colo., at flowers of *Petalostemon oligophyllus*, June 18, 1 ♀ (*T. & W. Cockerell*).

*Augochlora confusa coloradensis* (Titus).—A female, peculiar for having transverse as well as longitudinal wrinkles on the area of metathorax, but otherwise normal. About four miles north of Boulder, Colo., June 18 (*T. & W. Cockerell*).

*Colletes myroni*, Ckll., variety *a*.—Hair of thorax above creamy white, a little redder on scutellum; pleura with some of the hair more or less pale. 1 ♀, Boulder Cañon, Colo., at flowers of *Phacelia heterophylla*, June 21 (*Cockerell*). Also a ♀ with similar light hair above, but hair of pleura all black, from between Ward and Peaceful Valley, Colo., July 5 (*Cockerell*).

*Andrena lupinorum*, Ckll., ♀.—Between Ward and Peaceful Valley, Colo., July 5 (*Cockerell*).

*Osmia wardiana*, Ckll., ♀.—Timber line on Mt. Martha Washington, Colo., at flowers of *Tetraneuris*, June 25, 1913 (*Cockerell*).

*Melissodes hymenoxidis*, Ckll., ♀.—Ward, Colo., 9200 ft., Aug. 26, 1913 (*Cockerell*).

*Clisodon terminalis* (Cress.).—Bikerdike Ranch, near Allen's Park, Colo., at flowers of *Gentiana affinis*, Aug. 27, 1913 (*Cockerell*). 1 ♀.

*Prosopis basalis*, Smith.—Between Ward and Peaceful Valley, Colo., July 5 (*Cockerell*). 1 ♂.



Cockerell, Theodore D. A. 1915. "Descriptions and records of bees. LXV." *The Annals and magazine of natural history; zoology, botany, and geology* 15, 261–269.

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