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No. II - Hymenoptera, Apoidea

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THE
TRANSACTIONS
OF
THE LINNEAN SOCIETY OF LONDON.

THE PERCY SLADEN TRUST EXPEDITION
TO
THE INDIAN OCEAN IN 1905,
UNDER THE LEADERSHIP OF
MR J. STANLEY GARDINER, M.A.
VOLUME IV.

No. II.—HYMENOPTERA, APOIDEA.

By T. D. A. COCKERELL, *Professor of Systematic Zoology, University of Colorado.*



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No. II.—HYMENOPTERA, APOIDEA.

By T. D. A. COCKERELL, *Professor of Systematic Zoology, University of Colorado.*

(Communicated by PROF. J. STANLEY GARDINER, M.A., F.R.S., F.L.S.)

(Text-figures 1—3.)

Read 15th June, 1911.

THE interesting series of bees brought together by Mr Hugh Scott shows that the islands of the Indian Ocean are by no means so poor in these insects as the previous scarcity of records might have suggested. The present paper deals almost wholly with the species of two groups, the Seychelles and Aldabra, including with the latter Assumption Island.

The Seychelles bee-fauna may be divided into groups as follows:

(1) Endemic species, apparently without close relatives elsewhere: *Sphecodes scotti*, *Halictus mahensis*.

(2) Endemic or precinctive species and subspecies, very closely allied to those found elsewhere. These may be again divided into

(a) Species of Holarctic affinities: *Ceratina nodosiventris*, *C. tabescens*.

(b) Species of African affinities: *Mesotrichia incerta seychellensis*.

(c) Species of Indo-Pacific affinities: *Lithurgus scotti*.

(3) Wide-spread species, perhaps introduced by man: *Megachile disjuncta*, *M. rufiventris*, *M. seychellensis*, *Apis unicolor*. The case of *Megachile seychellensis* is peculiar. In its typical form, it is known from the Seychelles and Farquhar, but it has a small race in Aldabra. The Hawaiian *M. palmaram* is almost identical. Thus we seem to have a widespread insular type, with slightly differentiated species or races.

The absence of any distinct Indian element will be noted.

The Aldabra fauna may be similarly divided:

(1) Endemic species, very distinct: *Halictus aldabranus*, *Ceratina fryeri*.

(2) Endemic or precinctive species and subspecies, very closely allied to those found elsewhere:

(a) Species of Holarctic affinities: *Halictus nicolli*, *Heriades aldabranus*.

(b) Race of Seychelles species: *Megachile seychellensis aldabranum*.

(3) Madagascar species: *Anthophora antimenia*.

The Aldabra fauna seems not to have been contaminated by human introductions. It is in strong contrast with that of the Comoro Islands, some 200 miles to the south-west. From the Comoros Friese (1907) records *Apis mellifera* L., *A. unicolor* Latr., *Halictus* 2 spp. not determined, *Megachile rufiventris* Guér., *Gronoceras felina* Gerst., *Mesotrichia caffra* L. (I suppose really *incerta* Pérez), *M. olivacea* Spinola, and *M. lateritia* Klug,—an essentially African fauna, with nothing precinctive, unless the undetermined species of *Halictus* are so.

Here, as in the Pacific, it is noted that many of the insular bees are such as habitually nest in wood, e.g. *Megachile*, *Ceratina* and *Mesotrichia*. It is probable that they have sometimes been carried across the sea by floating trees containing the nests. In the case of the Seychelles, it appears that they might receive material from the Malay region, the equatorial current setting west and ultimately north-west. On the other hand there are apparently currents also from the African coast region. No current, however, flows from India to the Seychelles and, so far as the bees go, there may be said to be no truly Indian element in the fauna.

The bee-fauna of the Maldives is frankly Oriental, and quite distinct from that of the Seychelles.

Family **Andrenidæ**. Subfamily **Sphecodinæ**.

SPHECODES Latreille.

1. *Sphecodes scotti*, sp. nov.

♀. Length about 7—7½ mm., very slender, looking like a male; head rather large, approximately circular seen from in front, black, with the clypeus, lower part of supra-clypeal area, labrum and mandibles all clear ferruginous; lower margin of clypeus with long shining hairs; sides of face broadly covered with appressed silvery (faintly yellowish) pubescence; ocelli moderate; front with dense extremely minute punctures, and a tendency to striæ; third and fourth antennal joints extremely short, broader than long, fourth at least twice as broad as long; second longer than third; scape with the basal two-thirds red; flagellum shining black, dull reddish beneath at extreme base; mesothorax shining, finely punctured, parapsidal grooves distinct; the surface between the punctures is microscopically tessellate; thorax with a fine short hoary pubescence at sides and behind, but very free from hair; mesothorax black, its middle third reddish or wholly dark red; scutellum small, red; postscutellum and upper part of metathorax black, the rest of thorax, including prothorax, pleura &c., all clear red; metathorax long, the basal area elongate, defined by the absence of the small branched hairs which clothe the adjacent parts, its sculpture consisting of a fine raised reticulation; legs red, with little hair (no scopa), middle and hind tibiae and basitarsi strongly blackened; tegulae shining ferruginous; wings ample, pale dusky, nervures and stigma piceous; stigma large; first r.n. joining second s.m. far beyond middle but well before end; second r.n. joining third s.m. slightly or well beyond middle; submarginal cells variable; abdomen narrow, brilliantly shining, clear red beneath, above fuscous with the basal half of first segment (except more

or less at sides), narrow band at base of second, broad bands at base of third and fourth, and sides of third, all light ferruginous; dark parts of fourth and fifth segments black or brown; no caudal rima, the fifth segment covered with fine hair. Hind spur minutely pectinate, with about 13 teeth. Mouth-parts (measurements all in μ): mandibles simple.

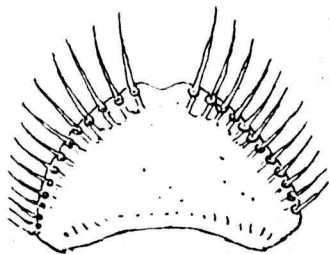


Fig. 1. *Sphecodes scotti*, labrum of female.

1020 long, 375 broad at base; labrum as shown in accompanying figure; blade of maxilla very short; maxillary palpi with joints measuring: (1) 100, (2) 135, (3) 160, (4) 160, (5) 160, (6) 160. Labial palpi: (1) 135, (2) 120, (3) 100, (4) 120. Tongue short, pointed, length 425, breadth at base 220.

Localities. Seychelles Islands, five females collected by Mr Hugh Scott. The type is from Silhouette, "plateau of Mare aux Cochons," September 1908. The others are all from Mahé; two from Cascade Estate, about 1000 ft. alt., February—March 1909, two from Cascade Estate, 800—1000 ft., not dated.

This is an extremely distinct species, easily known by its largely red thorax. I do not know any related form, although some *males* of other species look very similar.

Subfamily Halictinæ.

HALICTUS Latreille.

2. *Halictus aldabranus*, sp. nov.

♂. Length about $4\frac{1}{2}$ mm., slender, black; clypeus yellow, with lateral margins and two broad discal bars dark; the discal bars are rounded at each end, and do not nearly reach base or apex of clypeus; the lateral lobes of clypeus have their yellow in the form of a subpyriform patch, nearly divided from the rest of the yellow by a black band; labrum broad and short, black; mandibles black, red at extreme tip; molar space nearly obsolete; tongue long and slender, extending about $340\ \mu$ beyond the labial palpi; palpi normal, length of maxillary palpi about $645\ \mu$; hind part of cheeks with long dull white finely plumose hair; eyes very strongly emarginate within; ocelli large, diameter of middle ocellus about $135\ \mu$; head and mesothorax with very fine sculpture, minutely lineolate passing into reticulate; antennæ long, entirely black, the flagellum hardly crenulated; second and third antennal joints very short, their combined length about equal to fourth (about $170\ \mu$); postscutellum lemon yellow; tubercles yellow; metathorax shining but punctured, the truncation not distinctly defined, but the large basal area distinct, under a lens appearing dull and granular, but when more magnified showing a very fine irregular raised reticulation, passing into distinct plicæ at the sides; tegulæ piceous, not punctured;

wings more or less dusky, strongly so at apex, stigma and nervures piceous; first r.n. joining second t.c.; second s.m. small, narrowed to a point above; length of first s.m. below about equal to that of the other two combined (about $375\ \mu$); outer side of third s.m. with a single gentle curve; outer nervures not at all weakened; legs black, with dull white hair; small joints of tarsi reddish; abdomen black, with narrow tegumentary yellow bands along apical margins of first three segments, that on third interrupted in middle; sculpture of abdomen feeble; first segment smooth, with scattered very minute punctures visible only with compound microscope; second and third with fine transverse striæ; no hair-bands; stipites very broad, broadly rounded at end.

Locality. Aldabra 1908 (*J. C. F. Fryer*). The type is labelled 312, which shows that it was taken on Esprit Island, December 27.

The unique specimen is in poor condition, with the wings matted, but the species is so distinct that it will be easily recognized. It is doubtless endemic, and its nearest relative, so far as known to me, is *II. flavovittatus* W. F. Kirby, from Socotra. *II. flavovittatus* differs in several particulars, for instance, the postscutellum is not yellow.

3. *Halictus (Erylaeus) nicolli*, sp. nov.

♀. Length about 8 mm., black, with dull white or greyish-white pubescence; structure quite ordinary; head broad, eyes very black, face with short dull white hair; mandibles with the apical half dark reddish; antennæ black, the apical part of the flagellum broadly suffused with ferruginous beneath; clypeus slightly shining; mesothorax dull, exceedingly minutely punctured; scutellum more shining; area of metathorax large, covered with fine anastomosing ridges, the intervals shining; posterior truncation rather small and indistinct; tegulae shining dusky rufous; wings clear, iridescent; nervures and stigma reddish sepia; outer nervures evanescent; first r.n. joining second s.m. at extreme apex; second s.m. little narrowed above; legs black, with pale hair, small joints of tarsi dark reddish; anterior tibiae ferruginous in front; a bright red brush at end of hind basitarsus; abdomen dullish, very minutely punctured, hoary with pale hair, especially the apical half; second and third segments with very strong greyish-white basal hair-bands, basal band on fourth not quite so dense, but covering more than half of segment.

The following characters are microscopical:

Hind spur with about three spines, the last a mere short lamella; third antennal joint distinctly longer than fourth; mesothorax with a minutely tessellate sculpture, and rather numerous small punctures; scutellum sculptured like mesothorax, postscutellum covered with creamy-white tomentum; abdomen distinctly though very minutely punctured on first segment.

♂. Length about 7 mm., more slender; clypeus wholly black; flagellum dull ferruginous beneath; knees, tibiae and tarsi ferruginous, but the hind tibiae have a large black patch in front, and the apical joint of tarsi is darkened basally; abdominal bands evanescent. The antennæ are not very long.

Localities. Female (type) from Aldabra (*R. P. Dupont*); British Museum, 1907—72. Male from Assumption Island (*R. P. Dupont*, 1909). For an account of both Aldabra and Assumption, see M. J. Nicoll, *Three Voyages of a Naturalist* (1908), chapters XI. and

XII. I intended to name the species after the collector, but there is already a species *H. duponti* Vachal; I therefore use the name of the author to whom I am indebted for a description of the type locality*.

This is a very ordinary species of *Evyllæus*, a group common in Europe, North America and other parts of the world.

The female *H. nicolli*, except for the antennæ, has a very strong superficial resemblance to the male of *H. diversus* Smith from Willowmore, Cape Colony (*Brauns*). In *H. diversus*, however, the outer nervures are not weakened, and there are many other differences. *H. geigeriæ* Ckll., from Benguela, is really much more closely related, but differs from *H. nicolli* by the comparatively shining mesothorax, with its disc sparsely but distinctly punctured, the basal abdominal bands reduced to lateral patches, &c.

A somewhat similar species is *H. minikoiensis* Cam., from the Laccadive Islands. I examined the female type of this (Cambridge University Museum) and noted that it was rather of the type of the American *H. cooley*; black; head with pale hair; mesothorax dullish, with punctures of two sizes; tegulæ shining dark red-brown; flagellum ferruginous beneath; stigma and nervures ferruginous; first r.n. meeting second t.c.; hind spur with few long spines; abdominal segments with broad basal bands of pale tomentum, usually concealed in middle by segment before.

4. *Halictus mahensis* Cameron.

Halictus mahensis Cameron, Trans. Linn. Soc. London, ser. 2, Zoology, vol. xii. (1907), p. 70.

The following particulars may be added to Cameron's account:

Hind spur of female with three or four large teeth; mesothorax appearing granular under a lens, with the compound microscope seen to be minutely tessellate and with small punctures.

Mouth-parts (measurements all in μ): mandibles bidentate; maxillary blade 425 long; maxillary palpi, joints (1) 90, (2) 160, (3) 150, (4) 150, (5) 160, (6) 170. Labial palpi, (1) 170, (2) 85, (3) 120, (4) 135, the first joint robust. Tongue about 1020, tapering at end. These measurements are from a female; a male tongue measured about 935. The labrum of the female has a large lobe; I figure the labra of both sexes.

Localities. Mr Scott obtained a very large series of this species from the Seychelles, with the following data:

(1) Mahé. Cascade Estate, 800—1000 ft., 7 ♂, 1 ♀; Cascade Estate, January 1909, 1 ♂, 1 ♀; Anonyme Island, January 9, 1909, 14 ♂, 2 ♀; top of Mount Sebert, nearly 2000 ft., January 16, 1909, 1 ♀; Cascade Estate, February 1909, 2 ♂, 4 ♀; Cascade Estate, October 1908—January 1909 (*Thomasset and Scott*), 1 ♂, 1 ♀; Long Island, July 12—22, 1908, 1 ♂, 1 ♀; Cascade Estate, February 1909, 1 ♀.

(2) Dennis Island. August 1908, 3 ♂. These were collected by J. C. F. Fryer.

* [For a full and accurately scientific account of these islands see J. C. F. Fryer's article in *Trans. Linn. Soc.*, ser. 2, Zool., vol. xiv, pp. 397—442. This report was not published when the above was written.—J. Stanley Gardiner.]

(3) Silhouette. 19 ♂, 7 ♀. Most from the low country, but a female comes from the highest forest, over 2000 ft. (August 12, 1908). Two females and a male are "from marshy plateau of Mare aux Cochons, about 1000 ft.", August 27, 1908. Many are from Grande Barbe. Mr Scott writes that numbers fly around the flowers of certain palms, or round

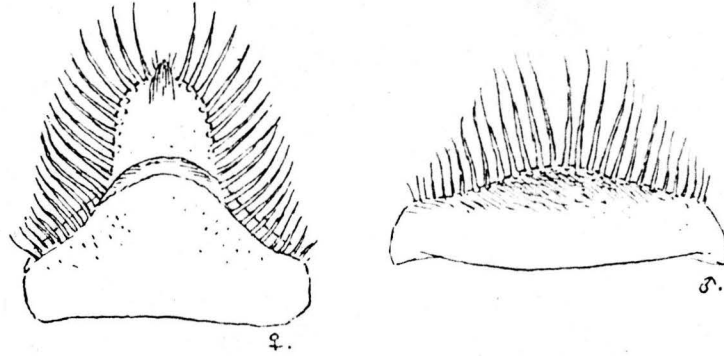


Fig. 2. *Halictus mahensis*, labrum.

flowers of a low-growing *Vinca*, &c., growing in waste places on the red earth where the jungle has been cleared.

The species does not closely resemble any known to me.

Halictus mahensis race *praslinensis* nov.

♂. Clypeus more produced, and its yellow band with a prominent upwardly directed tooth-like extension; tegulae light reddish testaceous (much darker in typical form); hind legs usually almost entirely red.

Locality. Six males from Praslin Island, taken by Mr Scott, November 26—December 2, 1908. One has darker tegulae, and the characters of the race are average rather than absolute ones. Mr Scott tells me that Mahé and Silhouette are much alike, but Praslin is quite a different sort of place.

Family **Ceratinidæ.**

CERATINA Latreille.

5. *Ceratina fryeri*, sp. nov.

♀. Length about 6 mm., black, strongly punctured; head large, eyes moderately converging below; face and front shining, with large punctures, so dense that the surface is cancellate; punctures of sides of face much larger than those on front; on each side of front is a delicate ridge, running downward close to the eye and turning inward below the antennae, ending at the side of the supraclypeal area; clypeus elevated into a snout-like structure, with a broadly emarginate projecting edge; above the edge the surface is densely punctured, and has upon it a small cream-coloured triangle; below the edge is a large smooth and shining plate, covering as it were the end of the snout, and extending down to the base of the labrum; this smooth plate has nearly the shape of a half-circle; labrum with large punctures; mandibles black, extremely massive at base; eyes sage-green, black in front; a tuft of red hair at end of labrum; antennae short, dark; thorax strongly and densely punctured, except disc of mesothorax, which is shining and has punctureless areas.

as in various other species; apical half of tubercles white, covered with white hair; legs black, the knees with a small white spot, and the anterior tibiae with a white band on basal half; tegulae piceous, reddish on margin; wings moderately dusky, stigma and nervures dark; abdomen broad, shining and strongly punctured, with thin white hair. Spurs pale yellowish; hind tibiae with a prominent tooth on outer side, beyond the middle.

♀. var. *a*. Size and other characters the same, but smooth clypeal area smaller, decidedly less than a half-circle.

♀. var. *duponti*, nov. Smaller, length about 5 mm.; smooth clypeal area much smaller, bow-shaped.

♂. Size and superficial appearance of ♀ var. *duponti*; clypeus with a large hat-shaped cream-coloured area; structure ordinary, without any smooth space; labrum with a large U in pale yellow; end of abdomen obtuse, obtusely emarginate in lateral view, the morphological apex with two short teeth; tooth of hind tibia small.

Locality. Aldabra; one var. *duponti* (in British Museum) collected by R. P. Dupont; all the others (one typical ♀, three var. *a*. ♀s; one *duponti* ♀, three ♂s) by J. C. F. Fryer. One male is marked "swept from flowers." A male and a female var. *a*. are labelled 312, which shows that they were obtained on Esprit Island, December 27, 1908. Two females var. *a*. are labelled 306, which refers to "Takamaka and Île Michel, November 1908." The variety *duponti* may prove to inhabit some particular island; it looks distinct, but seems to have no characters beyond those cited.

This little species has a certain resemblance to the group of black forms common in Africa, but is very distinct by the peculiar facial structure of the female, and the toothed hind tibiae. It is to be noted that a little black *Ceratina* (*C. madecassa* Friese) occurs in Nossi-Bé, but it is a normal member of the genus.

6. *Ceratina nodosiventris*, sp. nov.

♂. Length about 5 mm.; head and thorax dark green, the front, especially at sides, with strong brassy tints, the mesothorax shining brassy-green; clypeus nearly all ivory-white, the white taking the form of an old-fashioned tall hat with a high crown; labrum with a very small white spot; mandibles black; antennae black, the flagellum dark red

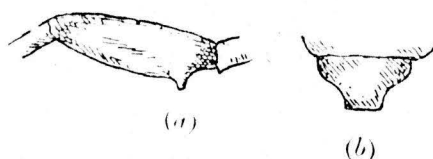


Fig. 3. *Ceratina nodosiventris*, male: (a) hind femur, (b) end of abdomen.

beneath; eyes large, converging below; sides of face dullish, densely rugosopunctate; supraclypeal area shining; front rugosopunctate; mesothorax closely punctured all over, except along the usual lines; scutellum closely and minutely punctured; tubercles largely yellowish-white; tegulae testaceous, with a cream-coloured spot; wings dusky; legs black, the tarsi becoming dark brownish; anterior and hind tibiae with a large cream-coloured

stripe, starting from the base, middle tibiae with only a small spot; middle femora flattened obtusely angulate beyond middle below; hind femora with a prominent erect tooth below near base; abdomen dark yellowish-green, the hind margins of the segments narrowly dull ferruginous; apex broadly and squarely truncate, the truncation proceeding from a much broader base, so that the side of the apex shows a very strong double curve; second ventral segment with a shining transverse tubercle near the base.

Locality. Dennis Island, Seychelles, August 1908 (*J. C. F. Fryer*).

This is a member of Ashmead's subgenus *Zaodontomerus* (cf. Ann. and Mag. Nat. Hist., December 1899, pp. 404—406), and curiously enough, appears to find its nearest relative in the palaearctic *C. dentiventris* Gerst. The apex of the abdomen, however, is not as in *dentiventris*; it may better be compared with that of the Mexican *C. bakeri* H. S. Smith, although the apical lobe is much more produced than in the Mexican insect.

7. *Ceratina tubescens*, sp. nov.

♀. Length about $4\frac{1}{3}$ mm.; a nearly uniform dark green; clypeus with a broad ivory-white stripe, rather sharply pointed above, obtusely below, with straight sides for the greater part of its length; labrum entirely dark; flagellum dark red beneath; antennal sockets in large depressed basins; face and front shining, sides of face with large punctures on a shining ground; cheeks with a row of punctures next to orbital margins; mesothorax shining, finely punctured; tubercles largely white; tegulae ferruginous; wings slightly dusky; second s.m. very broad at base, but narrowed to a point above (not narrowed to a point in *nodosiventris*); third t.c. practically straight above the bend (curved above the bend in *nodosiventris*); legs dark brown, femora brown-black; anterior femur with a short pale stripe beneath; anterior tibiae with a pale stripe on outer side; hind tibiae with about the basal half white on outer side; hind margins of abdominal segments not evidently discoloured; apex pointed as usual. The supraclypeal area is smooth and shining, with three or four punctures, whereas in *C. nodosiventris* it is covered with fine wavy irregular longitudinal striae, with minute scattered punctures (characters determined with the compound microscope).

Locality. Mahé, Seychelles, collected by Mr Hugh Scott "in marshes on coastal plain at Anse aux Pins and Anse Royale," January 19—21, 1909.

Another species of *Zaodontomerus*, closely related to *C. nodosiventris*, but evidently not its female, from the smaller size, and the differences in sculpture and venation. It very closely resembles *C. nautlana* Ckll., from Mexico and Costa Rica.

Family **Xylocopidae**.

MESOTRICHIA Westwood.

8. *Mesotrichia incerta seychellensis*, subsp. nov.

♂. Like *M. incerta* (Pérez), but hair of abdominal venter white at sides, black in middle, nowhere yellow; long hair of anterior tarsi black, but some yellow above (especially at base) and reddish beneath; hair of middle tarsi black, but dense and fulvous beneath beyond basitarsus; hair of hind tarsi entirely purplish-black; apical segment of abdomen

black, covered with black hair which is more or less reddish at ends, and with a median patch of bright yellow hair above; black hair on hind tibia forming a broad band.

Compared with *M. caffra* (L.) it is uniformly smaller, and differs in the dark colour of the hair of the tarsi, as well as in having a vertical yellow band on the clypeus. The hair on the middle of the abdominal dorsum is much shorter than in *caffra*.

♀. Like that of *M. caffra* but smaller, length about 18 mm.

Locality. Mahé, Seychelles, both sexes (*II. Scott*). Two males are dated November 1908. A female has been opened, and found to contain the usual abdominal mites, belonging to the genus *Paragreenia*.

This is the insect recorded from the Seychelles by Pérez (Ann. Soc. Ent. France, 1895, p. 205) as *Xylocopa caffra* and by Cameron (Trans. Linn. Soc. London, ser. 2, Zool. xii., p. 70) as *Koptorthosoma caffrum*. Upon comparing the Seychelles series (5 ♀, 4 ♂) with a good series of genuine *M. caffra* from Cape Colony, I am convinced that they are separable, though very closely allied. On the other hand, *M. incerta* Pérez, from Nossi-Bé, has most of the essential characters of the Seychelles insect, and the differences are only such as might be attributed to variation. Considering the remote locality of the Seychelles bee, it might seem more logical to treat it as a species, but there is a certain practical advantage in connecting it with *M. incerta*; and, in fact, it is not impossible that it represents *incerta* introduced by man at an early date, and now somewhat modified.

Family Anthophoridæ. Subfamily Anthophorinæ.

ANTHOPHORA Latreille.

9. *Anthophora antimensa* Saussure.

Anthophora antimensa Sauss.; Grandidier, Hist. Madagascar, xx., Pt. 1. (1891), p. 6.

Locality. Aldabra, September 1908, one female (*J. C. F. Fryer*).

I have never seen an authentic specimen of *A. antimensa*, described from Madagascar, and so make my determination with a certain measure of doubt, since the bee belongs to a group of closely allied forms, difficult to separate. There are however several characters which seem to be distinctive, and agree with those described for *antimensa*. Such are the dull greyish fulvous ("fulvo-cinereus") tint of the pubescence, with a plentiful admixture of dark hairs on the head and thorax above ("pilis fuscis intermixtis"); the thin but evident appressed fulvous hair on the dark parts of the abdomen ("abdomine fulvo-cinereo appresso-piloso"); the dullish fulvous apical bands; the conspicuous patch of black hair in the middle of the fifth segment ("segmento 5° ♀ macula nigra"); and the black hair on the inner side of the hind tibia and basitarsus. The wings are faintly dusky; the hair on the outer side of the hind legs is ochraceous; the labrum is yellow, with the usual basal spots; the clypeus has a transverse yellow band, joined with a median upright one which runs to a point; there are the usual supraclypeal and lateral marks.

It is fully 200 miles from Madagascar to Aldabra, but there are other islands between.

Family **Megachilidæ**. Subfamily **Lithurginæ**.**LITHURGUS** Berthold.10. *Lithurgus scotti*, sp. nov.

Length, ♂ about $11\frac{1}{2}$, ♀ about 12 mm., black with hair at apex of abdomen black or brownish-black. A species of the group of *L. atratus* Smith (India), *L. atratiformis* Ckll. (Australia) and *L. albofimbriatus* Sichel (Tahiti); so close to these that only a comparative description is useful. It differs from all three in having the first recurrent nervure exactly meeting the first transverso-cubital.

I possess only the male of *L. atratus*; from this *L. scotti* male differs at once by the nearly simple character of the hind tarsi. The basitarsus is distinctly curved, with its apical two-fifths swollen behind, but the apex is not expanded or in any way peculiar. The front and vertex in *atratus* are covered with black hair, while in *scotti* the front is clothed with pale ochreous (a few dark hairs intermixed in the region between the antennæ), while that of the vertex is mixed black and dull pale ochreous. In *atratus* the white bands of the abdomen are conspicuous above and beneath; in *scotti* they are reduced, and not so white, though quite evident toward the sides of the dorsal segments. In *atratus* the marginal cell is much more sharply pointed, and the second submarginal is much longer in proportion to its height.

Compared with female *L. atratiformis*, the female *scotti* is at once distinguished by the wholly pale (creamy-white) hair of pleura (it is black in *atratiformis*), but by the venation and other characters it is very closely allied.

Compared with female *L. albofimbriatus*, it is noted that the hair of the lower part of the cheeks is strongly mixed with black in *albofimbriatus*, while it is all pale yellowish in *scotti*. In both, the lower margin of the clypeus is bearded with shining orange hair. The hind legs of male *albofimbriatus* are formed practically as in *scotti*. The hair of the mesothorax and scutellum in male *albofimbriatus* is black, but in *scotti* it is greyish-white, mixed with black on scutellum. In female *L. albofimbriatus* the supraclypeal area is prominently keeled, but in *scotti* there is a raised smooth line, hardly a keel.

Locality. Mahé, Seychelles, one of each sex (*H. Scott*). The male is from Cascade Estate, 800—1000 ft.; the female from Anonyme Island, January 1909.

This is evidently quite distinct from *L. illudens* Sauss., from Madagascar. I have *L. albofimbriatus* not only from Tahiti, but also from the Hawaiian Islands, whence I have received both sexes from Dr Perkins, with the statement that it was introduced about 1899.

It may be worth while to remark that the differences given by Bingham (Fauna Brit. India) to separate *L. atratus* from *L. dentipes* are mainly sexual. *L. dentipes* was based on a male from Australia; it can be distinguished from the male of *L. atratiformis* by the colour of the pubescence.

The *Lithurgus* of Christmas Island (*L. andrewsi* Ckll.) is very distinct from *L. scotti*.

Subfamily **Osminiæ**.**HERIADES** Spinola.11. *Heriades aldabranus*, sp. nov.

♀. Length $5\frac{1}{2}$ —6 mm.; black, moderately robust, with the usual scanty white hair abdomen with extremely narrow but distinct white hair-bands on all the segments; ventral scopa white. A very ordinary little species, closely related to the European *H. truncorum* and the American *H. carinatus*, differing only as follows: general form rather more compact, the abdomen rather short; clypeus with a pair of strong nodules on its lower margin, these about $255\ \mu$ apart (not contiguous as in *truncorum*); mandibles about as in *carinatus* (much shorter than in *truncorum*), slightly reddish apically; eyes distinctly converging below (like *carinatus*, not like *truncorum*); clypeus and supraclypeal area dull, minutely densely granular-punctate; vertex moderate, distance from top of eye to occiput about equal to distance to lateral ocellus (in *truncorum* especially the vertex is much broader); diameter of cheeks less than diameter of eye (greater in *truncorum*); mesothorax and scutellum shining, but entirely covered with large punctures, which have a diameter of about $70\ \mu$ (in *truncorum* the sculpture is similar, but somewhat finer); the metathorax and base of abdomen offer nothing peculiar, except that the margin of the abdominal basin is practically straight (strongly concave in *truncorum*); legs quite ordinary (as in *truncorum*), the hind basitarsus more than half the width of the tibia; wings as in *carinatus*, with the same venation, but not quite so dusky (considerably darker in *truncorum*); sculpture of abdomen essentially as in *truncorum*, but segments 4 to 6 about equally (not densely) clothed with short appressed white hair. The face has finely plumose white hair at the sides, but is not densely covered as it is in *H. argentatus* Gerst. The pleura is thinly clothed with white hair.

Locality. Aldabra, September 1908, 2 ♀ (*J. C. F. Fryer*). One is labelled "swept from flowers." One of the specimens has a parasitic mite upon the thorax.

Subfamily **Megachilinæ**.**MEGACHILE** Latreille.12. *Megachile disjuncta* (Fabricius).

Apis disjuncta Fabricius, Sp. Insect. I, p. 481 (1781).

Locality. Mahé, Seychelles (*H. Scott*). One is from near Morne Blanc, 1908; another from Long Island, July 1908.

13. *Megachile rufiventris* Guérin.

Megachile rufiventris Guérin; Bélanger, Voy. Ind. Orient., p. 502 (1834).

Localities. Mahé, Seychelles, two females, one from Long Island, July 1908 (*H. Scott*); Félicité Island, December 1909 (*H. Scott*). This species has been reported as *M. mystacea* (Cameron, Trans. Linn. Soc. Lond. xii. 1907, p. 70), but that Australian species is certainly distinct, as F. Smith long ago pointed out.

14. *Megachile seychellensis* Cameron.

Megachile seychellensis Cameron, Trans. Linn. Soc. Lond., ser. 2, Zoology, vol. xii, p. 71 (1907).

Locality. Mahé, Seychelles (*H. Scott*); Silhouette, Seychelles (*H. Scott*); Praslin, Seychelles (*Gardiner*); Farquhar Atoll (*Gardiner*). The Silhouette specimen, one female, is from Mare aux Cochons, September 1908. Mahé specimens have the following data: (1) Cascade Estate, 800—1000 ft.; (2) Cascade Estate, about 1000 ft., December 1908; (3) near Morne Blanc, 1908; (4) Long Island, July 12—22, 1908.

Mr Scott writes that they burrow in banks, in the red earth. He sends some nests which are made of leaves in the usual manner. The cells are about 14 mm. long and $7\frac{1}{2}$ broad.

Cameron describes the ventral scopa as white, but it is black on the last segment and the greater part of the fifth. The species appears to be very closely related to *M. albiscopa* Saussure, from Madagascar. It is a very ordinary little species, greatly resembling the European *M. apicalis* Spinola; and also very similar to the Australian *M. quinquelineata* Ckll. Both sexes vary considerably in size; one male from Mahé is only about 8 mm. long.

I find, to my surprise, that it is almost impossible to distinguish *M. seychellensis* from the Hawaiian *M. palmarum* Perkins, 1899. In the female, *M. palmarum* has the mesothorax evidently less densely punctured, and the black hair of the ventral scopa is confined to the last segment. The extreme sides of the third and fourth segments show some black hair in *seychellensis*, whereas in *palmarum* this is found only on the fifth and sixth. The black hair at the sides of the abdomen also serves to distinguish the male *seychellensis*. The males, however, are almost exactly alike, and had they been found in the same region no one would have thought of separating them.

Perkins states that *M. palmarum* nests frequently in leaves of coconut and other palms, when they have been rolled up by the larva of a Pyralid. The nesting habits are therefore different from those of *M. seychellensis*.

Dr Perkins expresses the opinion that *M. palmarum* has been introduced into the Hawaiian Islands by man, as it is now common in Honolulu, but was not collected by Blackburn, who could hardly have overlooked it, had it been present in his time.

Megachile seychellensis race *aldabrarum* nov.

Agreeing with *M. seychellensis*, but uniformly smaller; males 7 to 8, females 8 to 9 mm.; hair on inner side of hind tarsi paler and duller.

Localities. Aldabra, 1 ♂, 4 ♀, 1908 (*J. C. F. Fryer*); Aldabra, one male, December 1908 (*Fryer*). Assumption Island, 5 ♀ (*R. P. Dupont*).

Family **Apidae.**

APIS Linnaeus.

15. *Apis unicolor* Latreille.

Apis unicolor Latr., Ann. Mus. Hist. Nat., v. (1804), p. 168.

Localities. Numerous workers from Mahé and Silhouette, Seychelles (*H. Scott*); one from Cosmoledo, 1907 (*H. P. Thomasset*). A male from Cascade Estate, Mahé, March

1909, is very black, as described by Friese; Cameron's male, described in the former report, was not genuine *unicolor*. Workers bear data as follows:

(1) Mahé. Long Island, July 12—22, 1908; Cascade Estate, February 1909. Others are from various localities not specified.

(2) Silhouette. Grande Barbe, August 2, 1908; Mare aux Cochons, collected by Gardiner.

This species was also obtained in the Amirantes and Chagos Islands (1905): see Cameron, Trans. Linn. Soc. Lond., ser. 2, Zool., xii, p. 69 (1907).

Apis unicolor var. *adansoni* (Latreille).

Apis adansoni Latr., Ann. Mus. Hist. Nat. v. (1804), p. 172.

Localities. Three workers from Cosmoledo, 1907 (*H. P. Thomasset*); one from Mahé, Seychelles (*Gardiner*). In only one (from Cosmoledo) is the scutellum largely ferruginous; the others have it black, thus differing from true *adansoni*. In one (from Cosmoledo) the yellowish-ferruginous covers the first three abdominal segments, except the hind margins; in the others it does not get beyond the second.

I include this variety under the continental (African) *adansoni*, because it is impossible to define it satisfactorily as a distinct form. I believe, however, that it has arisen independently from *A. unicolor*, to the typical form of which it is probably recessive. It appears to be the prevalent form on Cosmoledo, but very rare in the Seychelles. It is curious that no *Apis* was collected in the Aldabra group.

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	Part X.	1911	0	2	6	0	2	0
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XII.	Part I.	1907	1	8	0	1	1	0
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	Part III.	1908	0	16	0	0	12	0
	Part IV.	1909	1	10	0	1	2	6
	Part V.	Index 1909	0	5	0	0	3	9
XIII.	Part I.	1909	1	4	0	0	18	0
	Part II.	1910	2	3	0	1	12	3
	Part III.	1910	0	16	0	0	12	0
	Part IV.	Index 1910	0	5	0	0	3	9
XIV.	Part I.	1910	1	18	0	1	8	6
	Part II.	1911	1	0	0	0	15	0
	Part III.	1911	1	8	0	1	1	0
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