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NOTES ON SOME BEES IN THE BRITISH MUSEUM.

BY T. D. A. COCKERELL.

As is well known to all Hymenopterists, the British Museum contains one of the most valuable collections in this group in existence, notwithstanding the fact that it has received little attention during recent years. The ants, at the present time, are being carefully put in order by Colonel Bingham; but the bees have never been rearranged since the death of Mr. F. Smith, about twenty-six years ago. To bring the collection of bees into harmony with modern ideas, and to incorporate and identify the great accumulations at present crowded unarranged in the accession drawers, would be a gigantic but most interesting task. No doubt there are hundreds of new species waiting to be described by anyone who has the time and ability to take them in hand. Some of the material comes from the most out-of-the-way regions, and will throw much light on problems of geographical distribution; some belong to genera of which many Apidologists have never seen a specimen.

During my short recent visit to the Museum I naturally gave most of my attention to the types of F. Smith, of which no less than 238 belong to North American species. The descriptions of many of these, though good for the time when they were written, are inadequate for modern requirements. Characters which amply distinguished a given species from all then known, may be found today to be common to two or more species, which must be separated by other more subtle marks. Hence it seemed desirable to take notes on most of the North American species, for the purpose of more accurately fixing their identity. At the same time, notes were made on many others, and especially on some of the rare and interesting genera which I had never seen before. It is hoped that all these will be found of interest to American and other Apidologists, but of course it will be recognized that they represent only a small part of the work which needs to be done upon the types in the British Museum. I am greatly indebted to Mr. W. F. Kirby and Colonel Bingham for their kindness to me during my visits to the Museum.

The following abbreviations are used: (T.) = type specimen examined; s. m. = submarginal cell; r. n. = recurrent nervure; b. n. = basal nervure; t. c. = transverso cubital nervure; t. m. = transverso-medial nervure; hind spur = hind spur of hind tibia; area = basal area of metathorax; abd. s. = abdominal segment.

NOMADA Fabr.

Nomada valida Sm. ♀ (T.).

A comparatively large, red and black, *Nomada* s. str.; expanse about 17½ mm.; mandibles simple; scape with dark hairs; third antennal joint nearly as long as fourth; third s. m. much narrower above than second; b. n. very slightly basad of t. m.; metathorax black, with a large red spot on each side of area, and a minute red dot on each lateral area; basal half of first abd. s. black right across; pygidial plate very broad and rounded.

Nomada americana Kirby.

The type is not in the collection. The specimens under this name are a mixture of *Nomada* s. str. and *Gnathias*, but include no *Nomadula*. Our so called *Nomada americana* will have to be called *N. articulata* Sm.

Nomada imbricata Sm. ♀ (T.).

Expanse about 18 mm.; mandibles simple; labrum pale yellow, not toothed; head red, a round yellow spot below each antenna, and below each of these a smaller black spot on clypeal margin; third antennal joint slightly shorter (also redder) than fourth; mesothorax red, with no yellow lines; scutellum bilobate, the lobes yellow; metathorax blackened in middle, and laterally red, with an irregular (hook-shaped) yellow mark; legs red, hind femora and tibiae more or less black behind; wings strongly yellowish, stigma ferruginous; b. n. passing considerably basad of t. m.; third s. m. high and narrow.

Nomada torrida Sm. ♀ (T.).

Basal nervure passing just basad of t. m.; antennae with first three joints red, the others dark, 3 and 4 about equal.

Nomada fervida Sm. ♀ (T.).

Third antennal joint a little longer than fourth; mesothorax with very coarse large dense punctures; anterior coxae spined; wings

strongly reddish, fuliginous at apex, stigma ferruginous, nervures fuscous; second s. m. very large; third s. m. greatly contracted above; b. n. meets t. c.

Nomada borealis Zett. ♂.

Taken by Redman in Nova Scotia, and identified by F. Smith. Head black, with anterior part of clypeus broadly, lateral face marks (with a linear extension upwards almost to level of antennae), labrum and mandibles, except their ferruginous ends, bright yellow; mandibles simple; third antennal joint almost as long as fourth seen from above, but conspicuously shorter seen from below; thorax entirely black; stigma and nervures ferruginous; second and third s. ms. about equally broad; b. n. going slightly basad of t. m.; abdomen dark red, copiously ornamented with yellow; apical plate notched.

Nomada annulata Sm. ♀ (T.).

A rather slender insect, with long antennae, so that it looks rather like a male; antennae entirely dull ferruginous above and below; third joint a little longer than fourth; mandibles simple; labrum covered with long hair; b. n. passing a short distance basad of t. m.; abdomen shining, with four broad light yellow bands, and one on first segment ferruginous in middle and yellow at sides.

Nomada miniata Sm. ♀ (T.).

Mandibles simple; third antennal joint much shorter than fourth; mesothorax red, but with yellowish shades indicating the four yellow bands of *Xanthidium*: tegulae red and strongly punctured; b. n. meeting t. m. on the basad side; stigma dark ferruginous; outer side of third s. m. strongly elbowed; abdomen red above and below, except a large orange spot on each side of second segment above. It is a very red *Xanthidium*.

Nomada sulphurata Sm. ♀ (T.).

Third antennal joint very much shorter than fourth and red, contrasting with the rest of flagellum, which is dark; b. n. some distance basad of t. m.

Nomada nigrocincta Sm. ♀ (T.).

Mandibles simple; third antennal joint conspicuously shorter than fourth on under side; flagellum red above and below, but with a row of blackish dots above; b. n. a short distance basad of t. m.

Nomada intercepta Sm. ♂ (T.).

Vancouver Island. Is a *Holonomada*. Mandibles simple; head very hairy, supraclypeal area with a yellow spot; third antennal joint longer than fourth; pleura black, with a large yellow mark in front; metathorax with a yellow mark on each side; apical plate of abdomen narrow, broadly rounded, entire.

Nomada (Gnathias) volatilis Sm. ♂ (T.).

Expanse about 18 mm; mandibles dentate; third antennal joint conspicuously shorter than fourth; mesothorax with two indistinct red lines, scutellum red; tegulae red, yellowish in front; abdomen shiny, its venter red, without yellow marks; apical plate deeply emarginate; b. n. passing far basad of t. m.

Nomada (Gnathias) albofasciata Sm. ♂ (T.).

Mandibles dentate; third antennal joint moderately shorter than fourth; b. n. passing far basad of t. m.; apical plate deeply emarginate.

Nomada (Nomadula) articulata Sm. ♂ (T.).

This is the species we have so named, but the type specimen has the first t. c. reduced to a stump in one wing and wanting in the other. Mandibles simple; third antennal joint shorter than fourth; b. n. just basad of t. m.; abdomen strongly punctured, apical plate emarginate. The specimen has been much broken, and mended. Two specimens placed with the type are quite other species.

Nomada montezumia Sm. ♀ (T.).

Face with an oblique yellow mark on each side; labrum and cheeks below eyes with a dense white tomentum; third antennal joint longer than fourth; b. n. meets t. m.; abdomen remarkably hairy, except first segment, which is smooth and shining; ventral surface covered with hair. The hind tarsus bears the pollen-body of an *Asclepiad*.

The following six species, from South America and Asia, all have simple mandibles:

Nomada advena Sm. ♀.

Colombia. Third antennal joint longer than fourth above, a little shorter below; third s. m. extremely long, narrowed quite two-thirds above; b. n. meeting t. m. on basad side; abdomen slender basally; apex with a semilunar hairy area.

Nomada infrequens Sm. ♀.

Brazil. Peculiar for the extremely coarse sculpture of mesothorax, which on scutellum becomes a mass of irregular tubercles; b. n. meets t. c.; third s. m. greatly narrowed above; wings quite dark.

Nomada japonica Sm. ♀.

Japan. Looks like our species of *Xanthidium*. Orbital margins yellow in front and behind; third antennal joint longer than fourth; flagellum all red above and below; b. n. a short distance basad of t. m.; second submarginal cell narrowed above; first t. c. broken in the middle on both sides; abdomen of the minutely tessellate type.

Nomada fervens Sm. ♀ (T.).

Japan. A red and black *Nomada* s. str. Third antennal joint much shorter than fourth; b. n. some distance basad of t. m.; the only yellow on abdomen is a single large transverse spot on fifth dorsal segment.

Nomada xanthidica n. n.

Nomada versicolor Sm. (not of Panzer), ♀ (T.). Looks like our species of *Xanthidium*. Third antennal joint a little longer than fourth; b. n. a fair distance basad of t. m. N. China.

Nomada lusca Sm. ♀ (T.).

Philippine Islands. Small red species; looks like our *Nomada* s. str., a form with abdomen tapering at base. Third antennal joint a little longer than fourth; sides of metathorax with white tomentum; b. n. some distance basad of t. m.

EPEOLUS Latr. sens. lat.

First two abdominal segments and the scutellum red; legs red; punctures of abdomen distinct but minute; silvery area on fifth abdominal segment not very large; antennae, upper border of prothorax and tubercles red; tibial spurs pale reddish..... **zonatus** Sm. (T.).

First two abdominal segments not red.....1.

1. First abdominal segment entirely without bands or patches of pubescence; specialized area on fifth segment large; stigma large; marginal cell broadly rounded, its apex away from the costa; face covered with silvery tomentum (Brazil)..... **albifrons** Sm. ♀ (T.).

First abdominal segment with conspicuous bands or patches of pubescence...2.

2. Hind margin of first abd. s. with a band (usually interrupted) of pubescence...3.
Hind margin of first abd. s. without any band of pubescence, but there is an interrupted band in the middle, representing the anterior part of the usual ornamentation; abdomen more pointed than usual posteriorly; area on fifth segment small, semilunar, the segment itself small; second s. m. broader below than the first (Ega)...**vagus** Sm. ♀ (T.).
3. Median black area of first abd. s. not produced laterally; pubescence on second segment at sides forming approximately right angles on inner side; size large (like *remigatus*, etc.); legs black, spurs black; last ventral segment directed downwards at tip; wings strongly violaceous; clypeus with numerous minute punctures and sparse large ones.

nigriceps Sm. ♀ (T.).

- Median black area of first abd. s. produced laterally4.
4. Legs black5.
Legs red or nearly so6.
5. Pubescence of abdomen greyish white, without any yellowish tint.

donatus Sm. (T.).

- Pubescence of abdomen decidedly yellowish white on first two segments, but not so on apical half**tepanecus** Cresson.
6. Anterior arms of pubescence on first abd. s. not at all approaching, their inner angle with the posterior band (which is continuous in the middle) sharp; silvery area on fifth segment short.

flavofasciatus Sm. (T.).

- Anterior arms of pubescence on first abd. s. more or less approaching, or almost touching.....7.
7. Lateral projections of black area on first abd. s. rounded; wings nearly clear.

occidentalis Cresson.

- Lateral projections of black area on first abd. s. sharply pointed; wings greatly darkened.....**intrepidus** Sm. (T.).

Robertson has stated that *E. zonatus* is a synonym of *E. scutellaris* Say. It is not at all like the species labelled (I believe quite correctly) *scutellaris* in the Museum.

Triepeolus nigriceps (Sm.) runs in my New Mexico table to "*E. robustus*" (i. e. *nevadensis*), but differs by the fifth abd. s. being wholly without patches of light pubescence. It has a tuft of black hair, but no strong prominence, between the antennæ. The anterior part of mesothorax is broadly margined with light pubescence, this being narrowly interrupted in the middle, and on each side of the middle sending a short tongue backwards.

RHATHYMUS Lepeletier.

For the sake of comparison, I include in my table *Eurytis funereus*, which looks just like a *Rhathymus*.

- Abdomen red.....1.
Abdomen black.....2.

1. Head and thorax red, sides of metathorax with patches of bright white hair (Para)**unicolor** (Sm.) ♀.
Head and thorax black, sides of metathorax with duller patches (Brazil).
bicolor Perty ♀.
2. Abdomen narrower, with four white spots (Mexico).
quadriplagiatus (Sm.).
Abdomen broader, without white spots.....3.
3. Second submarginal cell as broad above as below; third s. m. broader below than second**ater** (Sm.) ♂.
Second s. m. narrower above than below; third s. m. much narrower below than second.....**Eurytis funereus** Sm.

The general appearance of the last two is the same. *R. bicolor* is credited to Perty in the Museum, but it is believed to be identical with the earlier *bicolor* of Lepeletier. *R. quadriplagiatus* is a very peculiar large bee, closely imitating *Scolia guttata* Burm., with patches of white hair on face, prothorax, pleura, sides of metathorax, and especially four large ones on abdomen. The abdominal spots of pubescence imitate the tegumentary spots of *Scolia*. The first r. n. meets the second t. c.; the second s. m. is very broad, but somewhat narrowed above; the second and third are about equally broad below. In *R. bicolor* the second s. m. is extremely broad, and not narrower above; the third is not broader below than second. In *R. quadriplagiatus* the apical segment of the male abdomen is bidentate, and has a median raised line; in *R. ater* it has a narrow truncate plate.

The maxillary palpi in the type of *Eurytis funereus* are 3-jointed, the second joint very long, the others very short. These palpi are to all appearances quite absent in *R. ater*, *unicolor*, *bicolor* and *quadriplagiatus*, as stated by Smith and others.

OSIRIS Smith.

Curious slender yellow bees, like Ichneumonids or slender Mutilids; stigma large, wings hairy, venation quite Andrenoid, but tongue entirely of the long type.

- Abdomen with distinct, clean-cut dark bands; size smaller; legs yellow (Mexico)**marginatus** Cresson.
Abdomen without any distinct dark bands.....1.
1. Legs yellowish testaceous; third s. m. on marginal nervure about as long as distance from its base below to second r. n.**pallidus** Sm. (T.).
Legs ferruginous; third s. m. on marginal nervure much shorter than distance from its base below to second r. n.**tarsatus** Sm. (T.).

In the Museum is an apparently undescribed species which runs to *pallidus* in the above table, but is considerably larger.

LEIOPODUS Smith.**Leiopodus lacertinus** Sm. ♂.

A peculiar South American Epeoloid bee, with narrow abdomen and large and long hind coxæ. Second s. m. very broad, broader below than first; b. n. falling a considerable distance short of t. m.

MELISSA Smith.

Bees looking like *Thalestria*, but with a shorter abdomen. The middle tibiae of all the species have strongly modified spurs; in *M. insignis* ♂ the spur ends in two prongs of about equal length, but one of them, which is slightly curved, has on its inner side two little spines; in *M. regalis* ♀ the arrangement is the same, except that the spine bearing prong is much shorter than the other. The sexes of *M. insignis*, according to the collection and description, are remarkably different; if it should prove that they are wrongly associated, it is not exactly apparent which ought to carry the name, as the ♀ has priority of place in the description, while the ♂ carries the type label in the collection. The following table brings out the differences referred to, and compares the species with *M. regalis*:

Head and thorax with extremely brilliant yellow pubescence, the area between the wings dark, as in some *Rombus*; small yellow hair-spots on sides of abd. s. 1 and 2. **insignis** Sm. ♂ (T.).

Not so; general color not due to pubescence to any extent. 1.

1. Face, cheeks and occiput densely covered with silvery-white hair; two long pencils of red hair projecting from apex of labrum. **regalis** Sm. ♀.

Face without white hair, except a tuft at outer side of each antenna; labrum covered with black hair, the downwardly directed pencils of hair black. **insignis** Sm. ♀.

M. rufipes Perty (said to = *azurea* Lep.), ♂, is distinguished by the dark reddish legs, hind femora with a tooth beneath at base; hair on clypeus shining, white stained with sulphur-yellow.

M. decorata Sm., ♀ (T.), has white hair up each side of face, stained with sulphur-yellow at upper end.

MESOCHEIRA Lepeletier.

Bees with the general build and color of *Thalestria*.

Apex of wing with a large square fuliginous spot; scutellum with two flat processes overlapping base of abdomen; abdomen without lateral white marks. **bicolor** (Fabr.) ♀.

Costa in region of marginal cell and beyond fuliginous, but no square black spot; scutellum with only two tubercles; abdomen with lateral white marks.

asteria Sm. ♀.

M. asteria was described from "Brazil," but the label specifies the exact locality—Santarem. The middle tibiae of these bees have spurs less modified than those of *Melissa*; *M. bicolor* has them truncate, the truncation with three straight spines, the middle one shorter than the others; *M. asteria* shows three very small equal spines, and one big one at the side.

ANDRENA Fabr.

My notes on the American species of this genus will be published by Mr. Viereck in connection with his revision of the American Andrenids.

Andrena vitiosa Sm. ♂ (T.).

N. China. Antennal joints 6–8 strongly convex beneath; head extremely broad, eyes comparatively small; clypeus yellow, short and broad, very much broader than long; palpi normal, first joint of labial palpi not nearly so long as the others united; cheeks very broad, swollen and shining; prothorax elevated into a hump on each side above; area small, very narrow and pointed behind, not margined; stigma large.

Andrena dentata Sm. ♂ (T.).

Japan. Antennæ long, third joint very much shorter than fourth, also shorter than fifth; cheeks broad, angled behind above middle; the remarkable long spines, directed downwards, described by Smith as coming from the bases of the mandibles, are really from the lower part of the malar region; area rather small, triangular, more shining than the parts on each side of it, but not wrinkled or bounded by any raised line; apical ventral plate broadly truncate, the truncation slightly concave.

PASIPHAË Spinola.**Pasiphaë tristis** Spinola ♂.

Chile. A black bee with narrow shining abdomen, with hind margins of segments testaceous; head and thorax with much long hair; area triangular, smooth, minutely beaded on margin; clypeus overlapped by a long moustache of shining white hair; b. n. meets t. m. which is very oblique. Looks like a *Parandrena* or *Hesperapis* superficially, and stands in the Museum between *Andrena* and

Stenotritus. Ashmead places it in the Prosopidæ, where it seems quite out of place.

P. tristis agrees with *Parandrena andrenoides* in having the t. m. oblique and the first r. n. joining the second s. m. far from its base. In *Hesperapis rhodocentrus* the t. m. is not oblique, and the first r. n. joins the second s. m. at its base. The *Pasiphaë* also looks much more like the *Parandrena*, though its face is all black, and the stigma is not so large (being narrower), and the area is different.

Since the mouth parts of *Pasiphaë* take it out of the Andrenidæ, and the general structure and appearance remove it from the Prosopidæ, it seems that it can only rest in the Colletidæ, as its position in Dalla Torre's Catalogue would suggest.

MYDROSOMA Smith.

Mydrosoma metallicum Smith.

Brazil. Looks like a rather large *Andrena* with dark greenish blue abdomen; structurally, of course, it is quite different. Marginal cell truncate.

MEROGLOSSA Smith.

Meroglossa canaliculata Smith.

Australia. A very distinct thing; middle-sized, thorax and abdomen black and punctured, not unlike some *Prosopis*. Face very peculiar, presenting a concave shining black impunctate surface, divided up to level of antennæ by a very broad raised sparsely punctate longitudinal cream-colored band, the same raised pale surface extending over the malar area, and as a narrow line up each inner orbital margin; ocelli large and prominent; scape much swollen; area triangular, distinguished by absence of pubescence; claws bifid; only two submarginal cells, the second receiving both r. n.; second r. n. strongly bent, but without a double curve. In Ashmead's table it is said to have the stigma very small; this is not at all the case. As to the systematic position of the genus, cf. Trans. Am. Ent. Soc. xxix, p. 185.

CALLOMELITTA Smith.

Callomelitta picta Smith.

Tasmania. ♀. A curious bee, rather like a large *Prosopis*, but wings fuliginous except at base, with three s. ms.; and mesothorax,

scutellum and pleura nude, shining brick-red. Last antennal joint obliquely truncate, the truncation shining; a small tooth on middle of anterior margin of clypeus; mandibles tridentate at apex; b. n. meets t. m.; first r. n. joins second s. m. at its middle; nervures with hyaline spots; abdomen dark blue; hind trochanters with long hair, but not a curled floccus; the hair, however, is strongly plumose, and the scopa of hind tibiae is also plumose.

♂. More slender; mesothorax black in middle; pleura black; abdomen black; anterior tibiae and tarsi red; antennæ black, flagellum crenulate beneath; mandibles bidentate at apex.

STENOTRITUS Smith.

This Australian genus is distinguished from *Andrena* by the spurs of the middle tibiae, which are very long and pectinate with numerous short spines. In addition to the two species given below, the Museum contains a third (undescribed) species from W. Australia; it is similar to *elegans*, but smaller. While *S. smaragdinus* and *S. elegans* are congeneric, they are not closely allied.

Stenotritus smaragdinus Sm. ♀ (T.).

Like a very large, bright green *Andrena*; third antennal joint very long; mesothorax with much white plumose hair; area reduced to a very minute basal nearly equilateral triangle; second s. m. extremely broad, receiving first r. n. a little before its middle; hair at apex of abdomen black; pygidial plate large.

Stenotritus elegans Sm. (T.).

Not quite so large as the last; black, hair at apex of abdomen rufo fulvous. Area produced apically, so as to form a broad band passing down metathorax; first r. n. joining second s. m. a little beyond its middle. Last antennal joint (♀) compressed, so as to be pointed seen from above, rounded seen from in front.

CAMPTOPCEUM Spinola.

The European *C. frontale* (Fabr.), of which a ♀ from Hungary has been examined, must be regarded as the type of the genus. The Chilean *C. trifasciatum* Spinola is very different, as the following comparison shows:

C. frontale.

Spinoliella-like in appearance.

Smaller.

Very little hairy.

Abdomen with four cream-colored tegumentary bands, like a *Spinoliella*.

B. n. falls far short of t. m.

Supraclypeal mark, and a small spot just below it (on clypeus) cream color.

Abdomen without any bluish or greenish lustre.

Second submarginal cell longer than first (considerably longer below).

C. trifasciatum.

Rather *Colletes*-like in appearance.

Larger.

Rather hairy.

Abdomen with hair-bands like a *Calliopsis*.

B. n. meets t. m.

Supraclypeal mark, and a spot on each side of it, cream color.

Abdomen with a strong bluish or greenish lustre.

Second submarginal cell scarcely longer than first.

C. trifasciatum has the marginal cell obliquely truncate; the lateral lower corners of clypeus are produced downwards into a spine, as in some forms of *Perdita*. In Ashmead's tables this species runs to *Camptopœum*, though it does not agree with the characters of the genus.

The type of *Spinoliella* is the Chilian *S. nomadoides* (*Camptopœum nomadoides* Spin.). I have not seen this insect, but the American *S. scitula* and *S. australior* are easily separated from the above two species of *Camptopœum* by the fact of having the first submarginal cell longer than the second, as is duly indicated by Ashmead in his original description of the genus. They resemble *C. frontale*, and differ from *C. trifasciatum* in having the b. n. falling far short of t. m. To all appearances *C. frontale* is nearer to *Spinoliella scitula* and *australior* than it is to *C. trifasciatum*. According to Friese, *Camptopœum* is almost naked, always marked with yellow. Two species (*C. handlirschi* and *rufiventre*) have the abdomen red, banded with yellow.

By the characters cited, it appears evident that *C. trifasciatum* must form the type of a new genus.

ACAMPTOPŒUM n. g.

Type, *Acamptopœum trifasciatum* (*Camptopœum trifasciatum* Spinola, 1851).

PSÆNYTHIA Gerstaecker.

Psænythia burmeisteri Gerst.

Dalla Torre gives this as from Brazil; the label on the specimen examined states it to be from the Argentine Republic. Face marks

peculiar, a large quadrate yellow patch on each side, a smaller elongate quadrate yellow patch below each antenna, and a pyriform yellow patch (about the size of those below the antennæ) below each of the large patches; scutellum with a pyriform yellow spot on each side; postscutellum with a yellow band; abdomen with five broad yellow bands.

LAGOBATA Smith.

Lagobata diligens Smith.

Very peculiar; abdomen narrow, with a subtruncate base—rather carrot-shaped; hind spur with a comb of very numerous and closely placed long teeth.

CALLIOPSIS Smith.

Calliopsis maculatus Sm. ♀ (T.).

This is a genuine *Calliopsis*; it has been erroneously referred to *Spinoliella*. The depressed apical margins of the abdominal segments are testaceous. The face markings are rather complicated; the sides of the clypeus are yellow, and there is a small yellow streak on each side adjacent to clypeus; the yellow supraclypeal mark is broad and rounded above, and there is a triangular yellow mark below each antenna, one side of it contiguous with the clypeus.

Calliopsis flavifrons Sm. ♀.

This was described from a male with a yellow face; instead of this, I find the type label on a female, the face-marks of which are white, with only the faintest yellow tint. These marks consist of a narrow stripe down the middle of the clypeus; a large supraclypeal mark, broadly rounded above; and large lateral marks, much longer than broad. It may be that this is the true female of *flavifrons*.

MACROTERA Smith.

Macrotera bicolor Sm. (T.).

Tongue linear, extremely long, longer than thorax; clypeus shining, with irregular large punctures; marginal cell broadly but obliquely truncate; b. n. falling far short of t. m.; extremely long, curved, simple hairs on hind tibia; abdomen dullish, with anal fimbria fulvous.

NOMIA Latr.**Nomia nana** Sm. ♀ (T.).

Adelaide, Australia. *N. ruficornis* Sm. (a small black species with red flagellum; abdomen with light hair-bands) was described from the ♂, and is, I feel sure, the mate of *N. nana*. Consequently the name *N. smithella* Giboda, proposed because *ruficornis* is a homonym, is needless.

The variety of form and color in the genus *Nomia* (sens. lat.) is remarkable. The following summary of the principal types will be of interest to those who have only seen our American species:

- (1.) Species of the subgenus *Paranomia* Friese, like our *N. fori*, with the hind margins of the abdominal segments brightly colored.

Nomia formosa Sm. ♂, from Celebes, has five green abdominal bands shaded with purple; abdomen very coarsely punctured.

N. elegans Sm. ♀, from Celebes, has four yellow-green abdominal bands shot with vermillion; second s. m. almost square.

A third species from Celebes (♀) bears a manuscript name which is preoccupied; it has only three abdominal bands (margin of first segment black), which are light emerald green with pinkish tints. The punctures of the abdomen are large and well separated. Length about 12 mm.

Nomia opulenta Sm., from Morty Island, ♀, has four abdominal bands, these green, shot with vermillion; abdomen only moderately coarsely punctured; postscutellum densely covered with ochrey-whitish hair; tegulae ferruginous; second submarginal cell very narrow (it is not so narrow in *N. formosa*).

- (2.) *N. australica* Sm. ♀. Australia. Abdomen dark bluish or greenish, with two broad bright ferruginous bands of appressed hair on hind margins of segments 3 and 4.
- (3.) Head and thorax black, abdomen red; as the African *N. rubella* Sm. and the much smaller *N. serratula* Sm. from Natal.
- (4.) Abdomen red and black, with ochreous hair-bands (style of our *N. nevadensis*, etc.). *N. floralis* Sm. from Hong Kong.
- (5.) *N. producta* Sm. ♂ (T.). Natal. Abdomen claviform, narrowed basally; second s. m. very broad; first r. n. joining second t. c.; b. n. strongly bent, falling short of t. m.; clypeus greatly produced; hind tibia with a great white lamina, which bears the spurs.
- (6.) *N. nilotica* Sm. (T.). White Nile. A smallish red and black species, with enormous milky-white tegulae, reaching from tubercles to corners of metathorax; metathorax, pleura and most of first two abd. s. red; face and anterior margin of thorax densely covered with white tomentum; first r. n. meeting second t. c.; third s. m. considerably longer than the first.
- (7.) *N. nubecula* Sm. (T.). Sierra Leone. Remarkable for having the apical corner of the wing broadly dark fuliginous, sharply contrasting with rest of wing, which is hyaline; wings hairy; face narrow.

It is probable that some of the African forms should be separated generically, but I do not feel able to define such genera without access to more material.

TRIGONA Jurine.

Honey colored; hind tibiae translucent; sides of face white-pollinose.

luteipes Sm.

- Not honey colored 1.
1. Abdomen red **bipartita** Lep.
Abdomen not red; insect black or almost 2.
2. Size much larger **capitata** Sm.
Size much smaller 3.
3. Each side of face grey-pollinose; hair of scutellum black **mexicana** Guér.
Sides of face not pollinose; wings not so dark as in *mexicana*; middle of clypeus reddish; flagellum clear red beneath **bilineata** Say.

Another small black species is *T. cressonii* Dalla Torre.

LESTIS Lepeletier.**Lestis bombylans** (Fabr.) ♂.

Thorax and abdomen yellowish green; thorax in front with fulvous hair, the three bands just visible as a darker shade; light area on face red.

Lestis aerata Smith ♂.

Thorax and abdomen bluish green, with blue shades on thorax; thorax in front with three black bands and fulvous between them; light area on face pellucid or opaque white. Female bluer than that of *bombylans*. Var. *violascens* (var. nov.), ♂, has much violet color on abdomen.

ALLODAPE Lepeletier.

General appearance like *Ceratina*; only two submarginal cells; first s. m. very much longer than second, second receiving both r. n.; stigma large.

The three Australian species may be separated thus:

- Sides of face yellow; abdomen with suffused brown bands **pieta** Sm. (T.).
Only middle of face light; abdomen black, without bands 1.
1. Larger **simillima** Sm. (T.).
Smaller **unicolor** Sm. (T.).

The following are African:

- Abdomen red **rufogastra** Lep.
Abdomen reddish; scutellum yellow, except margins (Natal) **variegata** Sm.

- Abdomen red and black; very small; face with a very broad light band; legs red, with hind femora mainly black (Zululand).....**juvunda** Sm.
 Abdomen not red1.
 1. Face all black.....**paucargoides** Sm. ♀.
 Face not all black2.
 2. A broad cream-colored stripe down middle of clypeus (Abyssinia).
 Clypeus with a very narrow whitish stripe; inner orbits narrowly sordid white (Sierra Leone).....**pictifrons** Sm. ♀.

EXONEURA Smith.

Exoneura bicolor Sm. is essentially an *Allodape* with only one recurrent nervure. It is from Tasmania, and has a red abdomen, after the fashion of the African *Allodape rufogastra*; which is rather noteworthy, for the reason that the abdomens of the Australian species of *Allodape* are not red.

CERATINA Latreille.(1) *Black species.*

Ceratina compacta Sm., Philippine Islands, is close to *C. hieroglyphica*, but smaller.

C. armata Sm., Cape of Good Hope, is pitch black and strongly punctured; clypeus with a creamy band; sixth abd. s. with a delicate longitudinal keel.

(2) *Species at least partly green or blue.*(a) *Brilliant green (Chrysis-like) Asiatic species.*

C. sexmaculata Sm., Hong Kong. Strongly punctured, with a pair of curious black marks on each of abdominal segments 3-6; sixth segment with a short spine at the apex, and the margins on each side of it spinulose. The more strongly punctured form from Celebes, referred to by Smith, may be called var. *wallacei*.

(b) *American species.*(i) *Abdomen crimson.*

C. eximia Sm. Head and thorax bright green; lateral face marks small, pyriform, the point mesad.

(ii) *Abdomen not crimson.*

Color a wonderful mixture of black and a beautiful dark blue, turning purple on abdomen; face with three cream-colored spots (Panama).

placida Sm.

- Color an extremely brilliant peacock-green1.
 Color dark green or olive-green, or partly black.....2.
 1. Larger, length a little over 11 mm.....**laeta** Spinola.
 Smaller.....**viridula** Sm.
 2. Extremely minute, shining dark green; mesothorax extremely shining; legs pale testaceous**lucidula** Sm.
 Not extremely minute.....3.
 3. Dark green; sides of metathorax white-hairy, leaving the area bare, and shining yellowish green**pubescens** Sm.
 Metathorax not thus hairy4.
 4. Lateral face-marks present.....5.
 Lateral face-marks absent.....6.
 5. Not so large as *placida*; dark olive-green; lateral face-marks elongated, reaching level of antennæ (Panama).....**punctulata** Spin., Sm.
 Legs dull red, but shining, hind femora only moderately angled below; green of apical part of abdomen bright; apex of abdomen bilobed, and from the interval projects a little curved spine; tongue long; lateral face marks small and narrow; wings long, stigma small and dark.
 rufipes Sm. ♂ (T.).
 6. Abdomen olive-green; head very large, with a large oval cream-colored patch on clypeus; wings yellowish, stigma light fulvo-ferruginous, nervures almost colorless.....**capitosa** Sm. ♀ (T.).
 Dark green, with a triangular creamy mark on clypeus; cheeks just behind eyes shining impunctate.....**rotundiceps** Sm.
 Cheeks uniformly punctured; anterior tibiae reddish in front, with a very well defined creamy-white stripe on the outer side; last dorsal segment of abdomen with a little longitudinal keel, on which is a brush of white hair; apex broadly rounded.....**strenua** Sm. (T.).

ANCYLOSCELIS Latreille.**Ancyloscelis armatus** Sm. ♂.

Small and black, with enormously swollen hind femora, so that it looks like some Chalcid; basal joint of hind tarsi with a large rose-thorn like spine on inner side near base; abdomen with bands of white tomentum; anterior margin of clypeus, labrum and spot on mandibles whitish. The ♀ has light red antennæ, and very large plumose sooty scopa on hind tibia and tarsus. Galea long and tapering. According to Ashmead *Ancyloscelis* is *Diadasia*, but certainly *A. armatus* is not a *Diadasia*.

TETRAPEDIA Klug.

Very queer bees, something like *Exomalopsis*, but usually with longer abdomen.

T. punctifrons Sm. is honey color, with a large honey colored

stigma; hind tarsal joint very broad. *T. diversipes* Klug, *T. amplipennis* Sm., *T. basalis* Sm., *T. maura* Cress. and *T. lugubris* Cress. are coal-black.

EXOMALOPSIS Spinola.

Exomalopsis rufitarsis Sm. (T.), ♀. Abdomen very shining black; basal nervure passing basad of t. m.; stigma dark brown.

E. fulvescens Sm. (T.), ♀. With much fulvous hair; tegulae ferruginous; stigma pale honey color; b. n. passing far basad of t. m.

TETRALONIA Spinola.

Tetralonia fervens Sm. ♂.

Compared with *Melissodes luteicornis* Ckll., ♂, this is not so similar as I thought from the description. *T. fervens* is rather smaller than *M. luteicornis*; it has the flagellum strongly crenulate; it seems not unlikely that the flagellum was originally yellow, as it has a rather pinkish appearance.

Tetralonia fulviventris Sm. ♀.

Abdomen beyond first segment with short fulvo ferruginous pile; hair of hind tibiae and tarsi long and bright red; third antennal joint about as long as 4 + 5. In some respects similar to the much larger *T. gabbi* Cresson.

Tetralonia flagellicornis Sm. ♂ (T.).

Looks like a *Melissodes*; the maxillary palpi are 6-jointed, though the sixth joint is very small. Clypeus yellow, with hind margin black; yellow spot on mandibles; antennae extremely long, entirely black, flagellum crenulate; abdominal segments 2-5 with entire apical bands of white pubescence, having a slightly greyish tint. I think this should be known as *Synhalonia flagellicornis*. Some of its characters remind one of *S. crenulaticornis*.

Tetralonia decorata Sm. is a remarkable species, with the tegument of the abdomen entirely fulvous.

T. chinensis Sm. (N. China) has in the ♂ extremely long, entirely black antennae, as in *flagellicornis*. The labrum is yellow, but the mandibles have no yellow spot.

T. fasciata Sm. (N. China), ♂, has the antennae of about ordinary length for the group, the flagellum ferruginous beneath.

T. mirabilis Sm. is elsewhere referred to a new genus, *Trichocerapis*.

T. atrifrons Sm., from Chile, is superficially so like certain Chilean forms of *Megachile* (especially *M. gasperinii* Schlett.) that I found a specimen placed in *Megachile*, with a label bearing a manuscript name (apparently not of Smith) as a new species of the latter genus! The pubescence is of a peculiar pale grey, black on pleura below the wings, and so far as it alone goes, it agrees throughout with the description of *M. gasperinii*. *M. chilensis* Spinola is also superficially similar, but is smaller, and has the hair of pleura under the wings pale grey. *T. atrifrons* has the mandibles slender and simply with an orange mark on outer side; pulvilli very large; r. ns. received near ends of second and third s. ms.; marginal cell rounded or obliquely subtruncate, tip away from costa; claws with an inner tooth.

Tetralonia dispar Sm., ♀ (T.), from Peru, has the wings very hairy; first r. n. joins second s. m. near but not at its end; scopa of hind tibiae black, strongly plumose; hair of pleura black; of hind part of mesothorax, scutellum, etc., fulvo-ferruginous; abdomen without hair bands.

MACROGLOSSAPIS Ckll.

Maxillary palpi only 3 jointed; first r. n. meeting second t. c.; male with clypeus dark, but labrum light. Other characters like *Melissodes*. I feel justified in referring here the following three species, all described by Smith as *Melissodes*; in the case of *M. modesta* and *rubricata* I have examined the maxillary palpi, and found them 3 jointed, the first broadened basally, the others successively narrower. *M. terminata* is obviously related to *modesta*, but distinguished by the color of flagellum.

Macroglossapis terminata Sm. ♂.

The specimen is marked type, but the label on the pin states that it is from Brazil, and it is a male, while the original description is said to be of a ♀ from Venezuela. Clypeus black; labrum large and yellow; mandibles with no yellow spot; flagellum bright red beneath, except at end (last 2½ joints), where it becomes black.

Macroglossapis modesta Sm. ♂ (T.).

Antennae extremely long, flagellum black; clypeus wholly dark; labrum large, yellowish white. The third antennal joint is extremely short, the fourth (long) is somewhat swollen.

Macroglossapis rubricata Sm. ♀.

Peculiar for the reddish abdomen, clouded with darker; except for the broader abdomen it rather suggests a Ligurian honey-bee.

XENOGLLOSSA Smith.**Xenoglossa fulva** Sm. ♀ (T.).

Superficially just like *X. patricia* Ckll.; ground (tegumentary) color of head black, and of abdomen fulvous, as in *patricia*. It differs from *patricia* by having the pygidial plate broader at apex; the abdomen larger and with appressed fulvous pubescence covering the surface, in consequence of which it looks paler and duller than that of *patricia*; thoracic pubescence a redder orange.

Xenoglossa mustelina (*Centris mustelina* Fox) is a valid species, not a synonym of *X. fulva*.

MELISSODES Latr.**Melissodes hæmorrhoidalis** Sm.

South America. Looks like a small *Tetralonia gabbi*, having the same reddish abdomen, black basally. It has the hair of the mesothorax black.

Melissodes smithii D. T. (*californicus* Sm.).

A large species like *M. obliqua*, with the same red hair on inner side of first joint of hind tarsi in ♀. The female has the thorax densely covered with bright fulvo ferruginous hair; abdomen with very distinct light hair-bands, hair of apex black; wings hardly so dark as in *obliqua*. In *obliqua* the first r. n. joins the second s. m. a considerable distance from its end, in *smithii* almost at its end. In *obliqua* the flagellum is strongly reddened beneath, which is not the case in *smithii*. The male *smithii* has the hair on the apical part of ventral surface of abdomen black, but otherwise pale; abdomen above with very distinct bands, like the ♀; flagellum wholly dark, or at any rate not distinctly reddened.

Melissodes hirsuta Sm. ♂ (T.).

Flagellum red beneath. Ordinary looking species, with yellow clypeus; black labrum; no yellow spot on mandibles; hair of thorax above very lively fulvo-ferruginous. Close to *M. aurigena*, but wings faintly dusky, with dark brown stigma and nervures, not whitish, with ferruginous stigma and nervures as in *aurigena*. The labrum of *aurigena* is yellow, but that of *hirsuta* is black.

Melissodes ambigua Sm. ♀ (T.).

A species suggestive of *M. perplexa*, but that has light hair on pleura, while the hair on the pleura of *ambigua* is black. Much black hair on mesothorax and scutellum, but the light hair is dull whitish, not fulvo-ferruginous; scopa of hind tibia plumose; hair on inner side of last joint of hind tarsi black; first r. n. joins second s. m. far before its end.

Melissodes assimilis Sm. ♂, ♀ (T.).

Not a true *Melissodes* I think, but its place must be settled by an examination of the mouth-parts. ♂.—Clypeus and labrum black; antennæ only moderately long, not reaching to abdomen, black, with a very faint reddish tinge on flagellum beneath; flagellum crenulated; first r. n. joins second s. m. a considerable distance before the end. ♀.—Flagellum bright ferruginous beneath, except at base; hind middle of mesothorax and middle of scutellum with black hair, surrounded on all sides by bright rufo-fulvous; hind tarsus with the hair on inner side of first joint reddish-black; scopa of hind tibia abundant and strongly plumose.

Melissodes atrata Sm. ♂ (T.).

Maxillary palpi 5-jointed, the fifth minute; therefore not a true *Melissodes*. Clypeus black, with a large transverse yellow patch; mandibles with no yellow spot; hair of pleura and dorsum of thorax black; first r. n. joins second s. m. not much beyond its middle.

Melissodes obscura Sm. ♀ (T.).

S. Paulo, Brazil. Maxillary palpi 5-jointed; not a true *Melissodes*. Middle and hind tibiae with very large spurs; hair of hind tibiae black, long, bristle like, simple; abdomen peculiarly marked, black, with base of first segment with ochraceous hair, second with a basal streak of white tomentum on each side under rim of first, fourth with two large ochraceous spots (sometimes two little spots on third), fifth and apex nearly all rufo-ochraceous.

Melissodes manipularis Sm. ♂ (T.).

Antennæ long, flagellum bright ferruginous beneath; clypeus yellow, labrum with a large yellow spot; mandibles with no yellow spot; posterior part of mesothorax and scutellum with much black hair, surrounding hair ochraceous; first r. n. joins second s. m. not far from its end.

Melissodes atropos Sm. ♀ (T.).

Santarem, Brazil. Scutellum broad and flat, very shiny, punctured; wings fuliginous, first r. n. joining second s. m. well before its end, outer margin of third s. m. very sharply angled; hair of hind tibia black, bristle-like, plumose, though not apically; abdomen black and shining, strongly punctured, a small spot of white hair on each side of apical margin of fourth segment; apical half of venter with lateral tufts of white hair.

Melissodes n. sp. ?

Constancia, Brazil, January, 1857, J. Gray. Very peculiar; second and third abdominal segments with glittering bands of appressed light golden hair, that on third very broad; the fourth has a few golden hairs; first r. n. joining second s. m. at its extreme apex. This species bears a manuscript name of Smith's, which if published now would be a homonym.

SAROPODA Latr.

Large, with dense bright orange-red pubescence (Australia).

bombiformis Sm.

Smaller, abdomen banded; pubescence of thorax with much black intermixed. (Europe) **bimaculata** Pz.

S. bombiformis has the maxillary palpi 4-jointed, the second joint extremely long, the fourth black and spine like; the labial palpi have only one free joint.

S. bimaculata has the same, except that the fourth joint of maxillary palpi is ordinary. The basal nervure in *bimaculata* passes slightly basad of t. m., but in *bombiformis* it falls short of it. The appearance of *S. bombiformis* recalls *Xenoglossa patricia*.

PACHYMELUS Smith.

This is a valid genus of Anthophorini, though Dalla Torre makes it a subgenus of *Podalirius*, and Ashmead omits it altogether from his tables. *P. microlephas* Sm. from Madagascar is gigantic, over 30 mm. long. *P. conspicuus* Sm. from Nyassa is smaller. Both have 5-jointed maxillary palpi; galea thick, not especially elongated; the maxillary palpi are less than half the length of the galea. The paraglossæ are not hairy; in *P. microlephas* they are long and narrow, about half the length of the labial palpi, which are very broad sheathing basally; but in *P. conspicuus* the paraglossæ are

very short and pointed. Both species have simple mandibles, those of *conspicuus* are angled within. The tongue is broken in the specimen of *microlephas*, but in *conspicuus* it is only moderate, little exceeding the labial palpi. *P. microlephas* has the scutellum strongly bituberculate, in *conspicuus* it is at most slightly depressed in the middle. The venation of *microlephas* is nearly that of *Habropoda*; both r. ns. meet the t. cs. The clypeus of *microlephas* is strongly produced, triangular in lateral view, with the semicircular receding lower half sparsely punctured. In *P. conspicuus* the clypeus is merely gently convex.

In view of the numerous differences observed, *P. conspicuus* may be taken as the type of a new subgenus (or genus?) *Pachymelopsis*.

ANTHOPHORA Latr.**Anthophora solitaria** Rits. (*insularis* Sm.), ♀.

Hair of scutellum black; hair on inner side of basal joint of hind tarsi and brush on apex of outer side splendid red golden, the other hairs on outer side more or less of the same color.

Anthophora marginata Sm.

The ♀ in my New Mexico tables runs to *A. cleomis* Ckll.; the ♂ has the pubescence like the ♀, and the clypeus white, broadly margined at sides with black, as in *cleomis*. The legs are folded up and hard to see, so I cannot tell whether they agree with *cleomis*; but if the two species are different, they are at any rate extremely close. Another male placed with *marginata* evidently represents a different species; it has ochreous hair on the thorax, not mixed with black.

THAUMATOSOMA Smith.**Thaumatosomea duboulayi** Sm. (T.).

Swan River, Australia. Flagellum thread like, with the last joint and the apical half of the one before it forming together a flat black disc; antennæ very long; maxillary palpi apparently 2-jointed (possibly 3-jointed), with a thick basal and a narrow apical joint; two submarginal cells; the second very long and receiving both recurrent nervures, one near its base, the other near its apex; b. n. falling short of t. m.; apex of abdomen with a short spine on each side; first ventral segment with a large prominence; first dorsal abd. s. deeply excavated at base, the excavation with a sharp margin; a deep constriction between first and second dorsal segments.

PSEUDOSMIA Rads.

Two species are in the Museum; they both have the integument black, not at all blue or green; they seem to offer no structural characters of generic importance, and Dalla Torre is apparently correct in regarding the group as a subgenus of *Osmia*.

Pseudosmia jakovlevi (Rads.) ♀.

Transcaspia. Medium sized bee, with white ventral scopa, five narrow but distinct white apical hair-bands on abdomen; very large head and sage-green eyes. Mandibles broad, with three teeth, not counting inner angle; no malar space; antennæ short; b. n. passing some distance basad of t. m.; pulvillus large.

Pseudosmia askhabadensis (Rads.) ♀.

Semsaul, Merw. Much smaller than the last; scopa white, the same white hair-bands, but the first two broadly interrupted in the middle; eyes purplish-brown; basal nervure meets t. m. a little on the outer (apical) side.

OSMIA Panzer.**Osmia simillima** Sm. ♀ (T.).

Scopa black. Is an *Osmia* s. str. sens. Rob., and runs in Robertson's table to *O. major*. The male placed with it (collected by Redman in Nova Scotia) is a *Monilosmia*, and is steel blue, quite different from the dark blue of the ♀. They are certainly different species.

Osmia frigida Sm. ♀ (T.).

Scopa black. Is an *Osmia* s. str. sens. Rob., and also would run to *O. major*, but is a black species with a very large head. The male has third antennal joint only just longer than fourth; middle femur and tarsi simple; apical margin of fifth dorsal abd. s. fringed with pale reddish hair; apical margin of sixth dorsal segment (which is very broad) entire, or very faintly notched medially, curved outwards; of seventh narrow, deeply emarginate but not bidentate (Smith wrongly says entire); venter broad and flat, reddish, first segment not emarginate.

* However, Mr. Titus has examined the mouth-parts of another species of *Pseudosmia*, and considers that they afford good generic characters.

Osmia chalybea Sm. ♂ (T.).

Is an *Osmia* s. str. sens. Rob. Seventh abdominal segment strongly bidentate; sixth broadly emarginate; joint 4 of antennæ not nearly equalling 2 + 3.

Osmia laboriosa Sm. ♀.

Yarkand, Asia. A peculiar species, with red legs and red and black abdomen; scopa red; anterior margin of clypeus red and produced; wings pale orange basally, and beyond fuliginous; first r. n. joins second s. m. nearer its base than the second does to its apex.

Osmia taurus Sm. ♀ (T.).

Hiogo, Japan (Dalla Torre wrongly says China). Dark æneous, scopa red; clypeus with a tubercle in the middle of anterior margin, and a long process on each side. The male has the antennæ very long, but not moniliform; apex of sixth abdominal segment ordinary and entire, of seventh also entire, but slightly depressed in the middle; apex of first ventral abd. s. entire.

LITHURGUS Berthold.

Typical *Lithurgus* has no pulvillus in either sex; I found none in *L. rufipes* Sm. ♀, *L. rubricatus* Sm. ♀, *L. collaris* Sm. ♂, *L. cornutus* (Fabr.) ♀, *L. gibbosus* Sm. ♀, *L. apicalis* Cress. ♀, *L. atratus* Sm. ♂. In *L. dentipes* Sm. ♂, and *L. dubius* (Sich.) ♀, there is apparently a minute or rudimentary pulvillus. In the females of the Indian *L. dentipes* and *atratus* there is a small but distinct pulvillus. In the males of the North American species, which Fox separated as a genus *Lithurgopsis*, the pulvillus is quite distinct. In the male of the Chilean *L. dubius* there is a long pulvillus. If *Lithurgopsis* is a valid genus, which seems rather questionable, *L. dubius* should be referred to it; and we should apparently have another generic name for the two Indian species, with a pulvillus in the female.

In all the species I examined, the claws were simple in the female, cleft in the male.

L. rubricatus, from Australia, has the hair at apex of abdomen red, as in the American *apicalis*; its maxillary palpi are apparently 5 jointed. *L. collaris*, from Japan, has the hair at apex of abdomen black; *L. cornutus* has it brown-black.

L. gibbosus is easily distinguished from *apicalis* in the female, because it has the facial prominence not at all bilobed.

Lithurgus dubius (Sichel).

The Chilian *Megachile dubia* Sichel is a *Lithurgus*, as Vachal has pointed out. It has the curious pale grey and black pubescence characteristic of several other Chilian bees (*Megachile chilensis* and *gasperinii*, *Tetralonia atrifrons*). Both sexes are in the Museum, bearing a manuscript name by Philippi, which indicates it as the long-tongued inhabitant of the mountains. The insect is very large and stout, 19-21 mm long; scopa black; pubescence pale grey above, black at sides, on face, beneath, and on apex of abdomen above. The sexes are easily distinguished thus:

♂.—Rather larger and broader, but head not so large and broad; face normal, densely covered with erect black hair. End of abdomen densely covered with black hair; apical plate narrow, finger-shaped, concave above; hind femora much swollen; mandibles strongly 3-dentate at apex. Maxillary palpi apparently 3-jointed.

♀.—Rather smaller and narrower, but head larger and rounder; face with a very large and prominent punctured transverse ridge just below the antennae. Mandibles tridentate, but the third tooth is easily overlooked, and Sichel erroneously described them as bidentate.

My statements regarding the maxillary palpi of *L. dubius* and *rubricatus* must be taken with some reservation, as it was not possible to see them very well.

There is a small character of the venation which may be of some use in dividing the genus *Lithurgus*, as follows:

- (1) Second r. n. joining second s. m. well before its end. *L. cognatus* Sm. (Australia), *L. dubius* (Sich.), *L. gibbosus* Sm., *L. apicalis* Cress., *L. rufipes* Sm., *L. collaris* Sm.
- (2) Second r. n. joining second s. m. at end, but not quite meeting t. c. *L. dentipes* Sm., *L. atratus* Sm.
- (3) Second r. n. meeting t. c. *L. cornutus* (Fab.).

DIOXYS Lepel.

The Algerian *D. rufiventris* Lep. is covered with deep fox-red hair, and is not at all like our American insects in color or form. It has the scutellar spine, however. *D. cineta* (Jurine), from Corfu, resembles our species.

EUASPIS Gerst.

Friese and Vachal sink *Parevaspis* as a synonym of this genus. Comparing *Euaspis abdominalis* (Fab.) with *Parevaspis abdominalis* (Sm.), the former is a larger and broader bee; however with the same sort of scutellum, which in *E. abdominalis* is deeply emarginate,

but in *E. bicolor* (Lep.) is not at all emarginate. The venation is the same (also dark wings), except that in the *Parevaspis* the b. n. meets the t. m., while in the *Euaspis* it passes basad of it. It also passes basad in *E. bicolor*, and a little basad in *Parevaspis carbonaria* (Sm.). *Euaspis* ♂ has light face marks, while *Parevaspis* has the face all dark. Both have the second r. n. passing beyond the second s. m., as in *Dianthidium*. *Euaspis* is African, while *Parevaspis* is Asiatic.

Euaspis bicolor has been supposed a synonym of *E. abdominalis* (Fabr.), but the species recognized as *bicolor* by Smith is distinct by the character of the scutellum. Presumably this insect should be known as *africanus* (*Anthidium africanum* Sm.), if it is not the real *bicolor*, though I observe that Vachal retains *africanus* in *Anthidium*.

Euaspis (*Parevaspis*) *carbonaria* Sm. is peculiar for being all black. *Parevaspis abdominalis*, when transferred to *Euaspis*, becomes a homonym, and takes the name *E. polynesia*, Vachal, 1903. Friese, being unaware of Vachal's name, proposed the name *E. smithi* in 1904. Vachal considers that *E. erythros* (Meunier) is a good species, and says that *E. modesta* Grib. appears to be identical with it. Friese, on the contrary, regards *erythros* as a synonym of *abdominalis* (Fab.), and *modesta* a synonym of *rufiventris* Gerst.

CÆLIOXYS Latr.

Abdomen entirely red, legs and tegulae red **abdominalis** Guér.

Abdomen with the first segment at least largely red; in some the second also wholly or partly red..... 1.

Abdomen all black..... 4.

1. Stigma red; lateral teeth of scutellum comparatively broad (Texas).

edita Cress.

Stigma black or piceous..... 2.

2. Lateral teeth of scutellum short, hook-like (Cuba) **rufipes** Guér.

Lateral teeth of scutellum more spine-like 3.

3. Larger, ♀ about 18 mm. long (Brazil) **zonula** Sm.

Smaller, ♀ about 12 mm. long (Brazil) **simillima** Sm.

4. Wings hyaline basally, otherwise dark fuliginous, with purple reflections;

pubescence of face rufo-fulvous; end of abdomen much prolonged in

♀ (N. China)..... **fenestrata** Sm.

Wings dark fuliginous; smaller than *fenestrata* (Celebes)..... **fulvifrons** Sm.

Wings not dark fuliginous 5.

5. Females 6.

Males..... 9.

6. Legs bright red, tegulae red 7.

Legs much darker, tegulae black or piceous..... 8.

7. Larger **texana** Cress.
 Smaller **insita** Cress.
 8. Smaller; last ventral segment broad, shovel-shaped, with hairy edges, not at all notched; penultimate ventral segment with large well-separated punctures all over; legs entirely very dark reddish.
 modesta Sm. (T.).
 Larger; last ventral segment elongated, and notched on each side; penultimate ventral segment minutely roughened, with the punctures shallow, except at the extreme base; second dorsal segment strongly transversely grooved; legs black, tarsi and apex of tibiae red.
 dubitata Sm. (T.).
 9. Femora red, tegulae red 10.
 Femora black, tegulae dark 11.
 10. Larger **texana** Cress.
 Smaller **insita** Cress.
 11. Viewed laterally, the upper apical spines of abdomen appear very short and somewhat directed upwards; tarsi red **rufitarsus** Sm. (T.).
 Viewed laterally, the upper apical spines of abdomen appear moderately long and pointed; tarsi not red **funeraria** Sm. (T.).

ANTHIDIUM Fabr.**Anthidium maculatum** Sm. ♂ (T.).

Mexico. Basal joints of middle and hind tarsi light yellow, the small joints dark; first five abd. s. with four yellow spots each, six with two spots, seven without spots; apex of abdomen with long straight parallel blunt spines, the outer ones very much longer than the middle one; subapical lateral spines hooked; mandibles slender, with two large teeth on inner margin.

Anthidium deceptum Sm. ♂ (T.).

Peru (Dalla Torre wrongly says Brazil). Lateral lobes of end of abdomen spine-like.

Anthidium chilense Spinola ♂.

Chile. Legs largely red.

Anthidium coloratum Sm. ♀.

Chile. Markings of abdomen white; tegulae red; scopa yellowish white.

There are in the Museum two other species of *Anthidium* s. str. from Chile, bearing MS. names by Spinola.

MEGACHILE Latr.**Megachile melanophœa** Sm. ♀ (T.).

Scopa entirely rich dark chocolate color.

Megachile pruina Sm. ♀.

Scopa white, black on last segment and apical half of penultimate one; claws with an acute basal tooth; last dorsal segment with suberect or erect bristles only at sides.

Megachile acuta Sm. ♀ (T.).

This is *M. latimanus*.

Megachile scrobiculata Sm. ♂.

Ohio. Immense spines on anterior coxæ; claws cleft and with an acute basal tooth. Is *M. (Ceratis) pugnata*.

Megachile bucephala Sm. ♀ (T.).

This also is *M. pugnata*. Scopa cream-color, black on last segment; last two joints of maxillary palpi with some strong bristles; claws with a sharp basal tooth; segments 2-4 of abdomen with no pubescent fasciæ in basal grooves; third tooth of mandibles as in *Ceratis*; cheeks broad, with a great tooth beneath; clypeus normal for *pugnata*. A species from Texas is erroneously labelled *pugnata* in the Museum.

Megachile lanuginosa Sm. ♀ (T.).

Runs to *M. petulans* in Robertson's table. A small species with white scopa, which is slightly yellowish posteriorly, and black on the last segment; posterior ocellus distinctly nearer edge of vertex than to nearest eye; basal joint of hind tarsus about as broad as tibia; there is black hair on vertex and disc of thorax.

Megachile parallela Sm. ♂ (T.).

Claws apically bidentate, with no basal tooth; face densely covered with white hair; hair of vertex and disc of mesothorax dark brown; anterior femora keeled beneath, the inner face of the keel shining ferruginous; anterior tibiae red beneath; anterior tarsi simple. The type has lost all of abdomen beyond second segment.

Megachile vidua Sm. ♀ (T.).

Posterior half of mesothorax, except at extreme sides, with short black hair; the pubescence has a strong yellowish tint, and the abdomen is shorter than in *M. monardarum*. The clypeus is densely punctured all over, without any well-defined shining median line.

Megachile frigida Sm. ♂ (T.).

This has the keel on end of anterior femur, as in ♂ *monardarum*; the anterior legs are just the same as in that species, except that *frigida* has the tibiae much lighter on inner side.

Undoubtedly *vidua* and *frigida* are one species, and *monardarum* is not more than a subspecies of it; in fact, both could very well be regarded as idiomorphs of the European *M. willughbiella*. The female (*vidua*) differs from *monardarum* by the yellowish pubescence, the scape more slender, the clypeus a little different, and the last ventral segment without black hair.

Megachile sedula Sm. ♀ (T.).

S. Domingo. Easily known by its bare, shining, sparsely punctured mesothorax and scutellum, the pubescence of head and thorax black varied with patches of white, and the black abdomen without any traces of bands, but with an extremely bright red ventral scopa; claws with a sharp inner tooth; wings dark fuliginous.

Megachile solitaria Sm. ♀ (T.).

S. Domingo. Scopa black apically, red basally; abdomen with apical half black, the first three segments covered with deep red hair; wings orange, broadly blackish on apical margin; claws with no basal tooth.

Megachile pollinosa Spinola ♀.

Pubescence grey; abdomen banded; mandibles broad; scopa bright rufo fulvous. Chile.

Megachile chilensis Spinola ♂.

Apex of abdomen strongly bidentate, or rather bispinose; mandibles 3-dentate, the inner tooth broad and pointing away from the others. Chile.

Megachile semirufa Sichel.

A Chilean species with abundant rufo fulvous hair, black at apex of abdomen. It is labelled in the Museum with a MS. name by Spinola, referring to its fox-like color. Another Chilean species, also with a Spinolian MS. name, has rufo-fulvous hair like *semirufa*, but it extends only to base of abdomen.

My remaining notes on *Megachile* are in the form of tables, as follows:

TABLE A.

This table was devised to show the wide distribution of certain striking types, which do not seem likely to have originated independently from more ordinary forms. In particular, one notices the similarity of certain species on the two sides of the Atlantic in tropical regions. This, and the fact that of all bees *Megachile* is, perhaps, most widely spread on oceanic islands, lend support to the idea that the bees are distributed by means of floating trees containing their nests. It is especially interesting to find that all Hawaiian genera of bees are such as nest in stems or tree trunks, the ground-nesting genera being absent.

Wings orange, the outer margin, more or less, broadly blackish1.
Wings with the basal half hyaline, and the apical half fuliginous; metathorax and first abdominal segment covered with white hair (Gambia).

maxillosa Guér.

Wings fuliginous, or at least very dark; insect coal-black.....4.

1. Black, with short black hair; scopa black.....2.

Abdomen largely red, or orange-red haired.....3.

2. Large, fully 20 mm. long; clypeus with a large median tubercle in ♀ (Borneo).

tuberculata Sm.

Smaller, length about 16 mm.; clypeus without an apical median tubercle in ♀ (Nicobar Is.).....

fulvipennis Sm. (T.).

3. Abdomen with short rust-red hair all over (West Indies).

rufipennis (Fabr.).

Abdomen with only the basal half covered with orange-red hair (Sierra Leone).....

rufipes (Fabr.).

(*M. cincta* (Fabr.) from Sierra Leone has the abdomen much more like that of *rufipennis*, but the wings are much less orange.)

4. Species of Ceram.....

lachesis Sm.

Species of India.....

anthracina Sm.

Species of the United States; abdomen broad; scopa black.....5.

5. Punctures of scutellum and hind part of mesothorax larger and more separated; wings darker and longer; second s. m. longer.

xylocopoides Sm. (T.).

Punctures of scutellum and hind part of mesothorax smaller and closer; wings shorter, and not so dark; second s. m. shorter and smaller.

morio Sm.TABLE B.—*Mexican species.*

Hair of vertex and thorax above partly or largely black or blackish.....1.

Hair of vertex and thorax above ochreous or fulvous, without black.....6.

1. Male; abdomen ending in two widely-separated spines or teeth; anterior tarsi simple.....

bidentata Sm.

Females; abdomen broad (not very in *bipartita*).....2.

2. Scopa yellow or yellowish, without black, even at apex; hair of abdomen orange 3.
 Scopa with some black at apex 4.
 3. Last dorsal segment descending; anterior edge of clypeus tuberculate; hind tarsi ordinary; claws with no distinct basal tooth.

bipartita Sm. (T.).

Last dorsal segment not descending; hind tarsi broad and flattened.

candida Sm. (T.).

4. Abdomen without hair-bands; size smaller; scopa yellowish white, black on last segment; a conspicuous band of black hair along hind margin of scutellum, contrasting with a pure white tuft on each side of metathorax 5.
 Abdomen very broad, with well-developed hair-bands 5.

irritans Sm. (T.).

5. Scopa white, black at the sides and on apical segment; tegulae red; a large tuft of hair, dark brown above and white beneath, on each side behind the wings 6.
 Scopa yellowish, black on last two segments (but some yellow basally on the last); tegulae black; claws with a well-developed inner tooth.

breviuscula Sm. (T.).**valida** Sm. (T.).

6. Legs red; abdominal hair-bands orange; tegulae red; hair about base of wings orange-fulvous; claws with no basal tooth 7.
 Legs at least largely black; males 7.

azteca Cress. ♀.

7. Larger; middle femora greatly swollen; anterior tarsi with a boat-shaped scale; anterior coxae with large spines, but no bristles above them; flagellum (except basally) strongly crenulate beneath; claws cleft but with no distinct basal tooth 8.
 Smaller; tarsi light yellow; hind tarsi strongly curved; middle tibiae red (blackened within), with a curious tubercle near apex on inner side; anterior tarsi flattened, canary yellow, the long hairs of the fringe black 8.

armata Sm. (T.).**candida** Sm. (T.).

Megachile armata is a *Xanthosarus*, very close to *M. latimanus*, but has a good deal of black hair near apex of abdomen above, and the hollow scale of anterior tarsus is fringed with black on inner side, and for basal half on outer.

TABLE C.—*Neotropical species.*

- Tegument of abdomen entirely red 1.
 Tegument of abdomen not red, or not entirely red 2.
 1. Scopa white, black on apical segments (Santarem).
rubriventris Sm. ♀ (T.).
 Scopa pale yellowish, becoming fulvous on apical segments (S. Paulo).
pulehria Sm. (T.).
 2. Scopa very bright red; abdomen black, without bands (S. Domingo).
sedula Sm. ♀ (T.).
 Scopa not so colored; or males 3.
 3. Wings orange, with broad blackish outer margins 4.
 Wings not so colored 5.

4. Larger; abdomen covered with short red hair above (West Indies).

rufipennis (Fabr.).

- Smaller; apical half of abdomen black (S. Domingo) 5.
 Abdomen with patches of yellow hair simulating the bands of *Anthidium* (interrupted midially); scopa black and white; hair of thoracic dorsum black (Parana) **anthidioides** Sm. ♀ (T.).*

Abdomen not so 6.

6. Males; abdomen parallel-sided, with narrow hair-bands; anterior tarsi pale yellow, dilated and broadly fringed; anterior coxae spined 7.

Females 8.

7. Larger; anterior tibiae red, except basally (St. Vincent).

flavitarisata Sm. (T.).

Smaller; anterior tibiae black, except pale apical margin, and a reddish tinge within; mandibles with an acute tooth on lower margin directed mesad (S. Domingo) **elongata** Sm. (T.).

8. Legs red; stigma ferruginous (Cuba) **poeyi** Guér.

Legs black, or practically so 9.

9. Clypeus with a long pointed curved process on each side; upper half of marginal cell very dark; scopa entirely pale reddish or reddish white (Mendoza, Argentine) **cornuta** Sm. (T.).

Not so 10.

10. Hair around base of antennae bright rufo-fulvous; scopa yellowish white in middle, black at sides and on two apical segments; middle of clypeal margin broadly concave (Villa Nova) **constructrix** Sm. (T.).

Hair around base of antennae white; abdomen with very distinct entire hair-bands 11.

11. Larger; scutello-mesothoracic suture conspicuously white.

deceptrix Sm. (T.).

Smaller; scutello-mesothoracic suture not conspicuously white.

concinna Sm. (T.).TABLE D.—*Species of Australian Region.*

- Abdomen with at least the apical half red, and usually more (less in *alecto*, however) 1.
 Abdomen black, with a red or orange-red apical hair-patch, and lateral white patches or stripes; size rather small 5.
 Abdomen above not at all red 6.
 1. Abdomen nude, strongly punctured, entirely red; insect about 8 mm. long (Australia) **abdominalis** Sm.
 Abdomen at least largely hairy or tomentose 2.
 2. Size small, abdomen with only the apical half red (Queensland) **calida** Sm.
 Size fairly large, abdomen with little more than the apical two segments red, above and below (Dorey) **alecto** Sm. ♀.
 Size larger; abdomen with more than the apical half red 3.

* Smith described this as new, but it appears that Radoszkowski, five years earlier, described it under the same name.

3. Abdomen with first segment above (except excavated area) covered with white tomentum; second and remaining segments red above and below (Murray I.).....**albobasalis** Sm. ♀.
 Abdomen without white on first segment.....4.
 4. Upper surface of abdomen uniformly and densely covered with orange-red tomentum (Australia).....**mystacea** (Fabr.) Sm.
 Basal part of second and third segments with the hair darker and thinner, producing the effect of two dark bands (Australia).....**ustulata** Sm.
 5. Face densely covered with long fulvous hair (W. Australia).

erythropyga Sm.

Face densely covered with white hair; the three basal joints of anterior tarsi white and greatly flattened and broadened, the second and third each with a black spot within; fourth and fifth joints slender, red (Swan R.).....

ferox Sm. ♂.

Face with the surface not concealed by hair; scopa white; clypeus broad and squarely produced; apex of labrum with outwardly-directed spines (Swan R.).....

heriadiformis Sm.

(The actual type of *heriadiformis* is headless.)

6. Four conspicuous white spots forming a curved line between the wings; abdomen with narrow white hair-bands; hair of face partly black and partly white; claws with a sharp basal tooth; scopa bright red, entirely black on last two segments (New Caledonia).

albomarginata Sm. ♀.

No such white spots; abdomen of the parallel-sided type.....7.

7. Very large; over 20 mm. long; wings deep fuliginous; scopa yellowish white; mandibles with three apical teeth, and a nodule on inner side; clypeus with a great projection on each side; cheeks with a great tooth beneath; claws with a double basal denticle, consisting of a long tooth with a little one mesad of it (Champion Bay).....

moustrorsa Sm.

Smaller, 15 mm. or less; scopa white; females.....8.

8. Wings darkened; base of abdomen with conspicuous white hair; base of antennae not red (Australia).....

lucidiventris Sm.

Wings nearly clear; base of antennae (including all of scape) red; front covered with orange-fulvous hair.....

aurifrons Sm.

The Indian *M. imitatrix* Sm. very closely resembles the Australian *M. ustulata*.

M. rufiventris Guér., Sm., from Rodriguez, very closely resembles the Australian *M. mystacea*, and is perhaps not separable.

Megachile alecto Sm.

The Museum contains both sexes from Dorey. The male has the abdomen black, with a dull reddish apical area, and no white hair-patches; apex broadly emarginate; lower half of clypeus, and area between antennae, with yellowish hair, face otherwise black. The type was a male; the female has the marginal cell longer, and the third s. m. longer and lower, and is perhaps not conspecific. It also has darker wings than the male.

HYLEOIDES Smith.

The species of this genus almost perfectly imitate in color and pattern the Tasmanian Eumenid *Rhynechium mirabile* Sauss. Is it possible that by some accident Smith figured the mouth-parts of the *Rhynechium* for those of the *Hyleoides*? (see Trans. Amer. Ent. Soc., xxix, p. 186).

CAUPOLICANA Spinola (*Megacilissa* Sm.).

Black, with black pubescence; no abdominal bands.....1.

Black, with black and white pubescence; three white abdominal bands (Uruguay).....

lugubris Sm. (T.).

Dark, but hairy; thorax with fulvous pubescence.....2.

Abdomen bright red; pubescence of thorax black to grey, of face white; claws bifid (S. Domingo).....

notabilis Sm. (T.).

1. Wings fuliginous, shot with purple; face with black hair (Mexico).

luctuosa Sm. (T.).

Wings only slightly brownish; face with abundant white hair (Chile).

funebis Sm. (T.).

2. Claws with the inner tooth remote from the end and comparatively short; abdomen strongly metallic (greenish and purplish), with three pale hair-bands; end of marginal cell narrowly obliquely truncate (Mexico).....

eximia Sm. (T.).

Claws bifid, the two teeth long and nearly parallel.....3.

3. Abdomen purplish, apical margins of segments 2-4 with very narrow bands of appressed yellowish hairs; tip of marginal cell very narrowly obliquely truncate (Mexico).....

tenuimarginata Sm. (T.).

Abdomen covered with long hair (thinly, except on first segment), without apical bands of appressed hair; apex of marginal cell rounded (Mexico).....

clypeata Sm. (T.).**ANTHOGLOSSA** Smith.

Larger; second submarginal cell extremely broad, not contracted above; second r. n. practically straight; hind tibia with knee-plate; pygidial plate large; clypeus densely punctured; mandibles strongly elbowed outwards; abdomen with hair-bands.....

plumata Sm. ♀.

Smaller; second submarginal cell greatly contracted above; clypeus shining, with widely separated punctures; mandibles ordinary; hind margins of abdominal segments white, without hair-bands.....

sericea Sm. ♀.

The male of *A. plumata*, with the same venation as the female, has the hind margins of the abd. segments white like *sericea*; it has the face densely covered with long bright orange red hair, and the scape of antennae, hind tibiae and tarsi, etc., red.

A third species, *A. cygni* Ckll., is described in Ann. Mag. Nat. Hist., Sept., 1904.

PARACOLLETES Smith.

After careful consideration, I feel obliged to unite with *Paracolletes* (which has priority of place) the *Leioproctus*, *Dasycolletes* and *Lamprocolletes* of Smith. The characters of the venation relied upon to separate these genera are in themselves slight, and not constant throughout the several series. Thus, among the species assigned to *Paracolletes* by Smith, we find:

- (1) Second r. n. enters third s. m. a little beyond its middle.....**nitidus**.
 (2) Second r. n. enters third s. m. far beyond its middle, but some distance from end.....**marginatus**.
 (3) Second r. n. enters third s. m. very near its end.

crassipes, abdominalis, fervidus.

The Tasmanian *L. chalybeatus* (Erichs.) may be regarded as the type of *Lamprocolletes*. In this insect the b. n. meets the t. m., which is very oblique; the first r. n. joins the second s. m. a little before its middle; the second r. n. joins the extreme tip of third s. m., not really quite meeting the third t. c.; the second s. m. is a little narrowed above. There is really nothing generic separating this from such a species as *Paracolletes crassipes*. The description also applies to *Leioproctus imitatus*, except that in *imitatus* the first r. n. joins the second s. m. about its middle, and the second r. n. enters the third s. m. a short distance before its end, in the manner of *Paracolletes marginatus*. *Lamprocolletus fulvus* has the second r. n. joining third s. m. distinctly before its end.

The insects look not unlike *Colletes*, though some (as *Dasycolletes rubellus*) are very *Andrena*-like, and I believe that "*Lamprocolletes*" *peregrinus* is an *Andrena*. The stigma is usually not well developed; the second r. n. is straight; the hind tibia has a knee-plate; the hind spur may be pectinate with rather numerous fine long teeth (as in *Dasycolletes rubellus*), or minutely ciliate, appearing at a glance simple (as in *Dasycolletes metallicus*). *Lamprocolletes cladocerus*, because of its extraordinary antennae, I have made the type of a genus *Cladocerapis*.

The species may be separated by the following tables:

TABLE A.—Species of *Paracolletes* s. str. (Type *crassipes*).

Abdomen red; first r. n. enters second s. m. slightly before its middle; b. n. meeting t. m. on the outer side.....	abdominalis Sm. (T.).
Abdomen not red	1.

1. Abdomen with a distinct blueish lustre; first r. n. entering second s. m. about or slightly before its middle; b. n. falling a long way short of t. m.

nitidus Sm.

Abdomen without metallic color; b. n. meeting t. m., or approaching it very closely on the outer side.....2.

2. Females; basal joint of hind tarsi much broadened.....3.
 Males4.
 3. Antennae reddish, third joint clear red, contrasting; anterior tibiae and tarsi dark red; first r. n. joining second s. m. a little beyond its middle.

crassipes Sm. (T.).

Antennae, including third joint, dark; first r. n. entering second s. m. about its middle.....**fervidus** Sm. (T.).

4. Hind margins of abd. segments white, the white edged anteriorly with golden brown; tibiae and tarsi lively red; anterior margin of clypeus and labrum pellucid cream color; first r. n. entering second s. m. considerably beyond its middle.....**marginatus** Sm. (T.).

TABLE B.—Species of *Lamprocolletes* (Type *chalybeatus*).

Abdomen chestnut-red, with a large round black spot on each side of second segment; tibiae and tarsi red; clypeus shining, with few large punctures; second s. m. small, much narrowed above, receiving first r. n. very slightly beyond its middle; second r. n. entering third s. m. some distance from its end; b. n. meeting t. m.

Paracolletes bimaculatus (Sm.) (T.).

Abdomen red, very hairy at base, and with thin white hair-bands; no spots on sides of second segment; legs entirely red, front femora with very long hair beneath; antennae red; flagellum blackish above; face covered with long light fulvous hair; second s. m. broad, receiving first r. n. slightly beyond its middle; third s. m. receiving second r. n. some distance from its end; basal nervure meeting t. m. on outer side....**Paracolletes frederici** n. n. = **Lamprocolletes rubellus** Sm. ♂ (T.); not *Dasycolletes rubellus* Sm.

Abdomen not red, or only reddish from the pubescence.....1.

1. Abdomen shining green2.
 Abdomen dark bluish, greenish or purple4.
 Abdomen dark, hairy or nude, but not metallic9.
 2. Size rather large; abdomen with strong crimson tints; hind tibiae and middle and hind tarsi red; flagellum ferruginous beneath; b. n. just falling short of t. m.; first r. n. entering second s. m. just before its middle; second entering extreme end of third s. m.

Paracolletes cupreus (Sm.) (T.).

Much smaller3

3. Female; hind tibiae and middle and hind tarsi red; clypeus and supraclipeal area black, rest of face and front green; marginal cell elongated and obliquely truncate; first r. n. joining second s. m. about its middle; second joining third s. m. at its extreme tip; b. n. meeting t. m.

P. amabilis (Sm.) (T.).

Male; hind tibiae not red.

P. amabilis (Sm.) = **L. metallicus** Sm. (T.).

(*L. metallicus*, being of later date than *Dasycolletes metallicus*, would need a new name if valid; but I am convinced that it is the male of *amabilis*.)

4. Wings with a deep fuliginous cloud, hyaline basally; abdomen dark purple; b. n. meets t. m.; second s. m. very broad, receiving first r. n. about its middle; third receiving second r. n. a long distance before its end. (Yarkand).....**Andrena peregrina** =

Lamprocolletes peregrinus Sm. (T.).

Wings without a fuscous cloud; second r. n. enters tip of third s. m. 5.

5. Size larger.....6.

Size smaller.....7.

6. Head and thorax green, abdomen purple; b. n. joins t. m.; first r. n. joining second s. m. at its middle; stigma narrow and lanceolate.

Paracolletes plumosus (Sm.) (T.).

Abdomen shining dark green; metathorax transversely carinate.

P. carinatus (Sm.) (T.).

7. Abdomen deep blue; hind legs partly red.....**P. bicolor** (Sm.) (T.).

Abdomen greenish; hind legs not at all red.....8.

8. Abdomen narrower.....**P. versicolor** (Sm.) (T.).

Abdomen broader.....**P. providus** (Sm.) (T.).

9. Antennae ramose.....**Cladocerapis cladocerus** (Sm.) ♂ (T.).

Antennae not ramose.....10.

10. Flagellum orange, largely blackened above, last joint all black, shaped like an incisor tooth, with one surface shining; depressed margins of abdominal segments hyaline; b. n. falling just short of t. m.; first r. n. enters second s. m. just beyond its middle; second r. n. enters third s. m. some distance from its end.

Paracolletes antennatus (Sm.) ♂ (T.).

Antennae not so11.

11. Third s. m. receiving second r. n. very near to or at its end.....12.

Third s. m. receiving second r. n. some distance from its end15.

12. B. n. falling a little short of t. m. 13.

B. n. meeting t. m.; first r. n. joining second s. m. about its middle. 14.

13. Larger; first r. n. entering second s. m. not far from its beginning; dorsum of thorax with black hair; face covered with white hair.

P. argentifrons (Sm.) (T.).

Smaller; first r. n. entering second s. m. about its middle; mesothorax shining, little hairy; expanse of wings about 11 mm.

P. nanus (Sm.) (T.).

14. Abdomen pitch-black or perhaps blue-black; stigma and nervures picuous.

P. chalybeatus (Ericks.) ♀.

Abdomen brown-black; stigma and nervures ferruginous.

P. punctatus (Sm.) ♀ (T.).

15. Hair of thorax black and grey, not fulvous or ochraceous.....16.

Hair of thorax fulvous or ochraceous, without black.....17.

16. Distance from first r. n. to second t. c. more than twice distance from second r. n. to third t. c.**P. obscurus** (Sm.).

(*P. obscurus* might also be looked for in Section 12, in which case it will run to 14, and will be separated from *P. chalybeatus* by the dark red-brown stigma.)

Distance from first r. n. to second t. c. little more than distance from second r. n. to third t. c.; legs dark red.....**P. cinereus** (Sm.) (T.).

17. Abdomen with abundant fulvous hair18.

Abdomen without such hair.....20.

18. Larger; legs red; plumose scopa on hind tibia blackish.

P. fulvus (Sm.) ♀ (T.).

Smaller.....19.

19. Enclosure of metathorax large, indistinctly transversely sericeo-striate; flagellum red; face covered with fulvous hair.

P. ruficornis (Sm.) (T.).

Enclosure of metathorax smaller, shining, with a beaded margin; flagellum not red**P. waterhousei** n. sp.

(*P. waterhousei* bears the label "*frontalis* Smith, type," and another label with the remark "clearly not *frontalis*." The description of *frontalis* in Cat. Hym. B. M., under *Leioproctus*, does not at all accord with the present insect, and as the latter is distinct and easily recognized, I name it after Mr. C. O. Waterhouse in recognition of his valuable editorial labors on Smith's posthumously published work.)

20. Abdomen sericeous, hind margins of segments pale golden; first r. n. joining second s. m. about its middle; b. n. falling just short of t. m.; scape red; tibiae and tarsi red.....**P. venustus** (Sm.) (T.).

Abdomen hairy, the margins of the segments not obviously pallid; first r. n. joining second s. m. far before its middle; b. n. meeting t. m.; scape not red**P. aurifrons** (Sm.) (T.).

Three species were not examined: *P. bipectinatus* (Smith, 1856), *P. cristatus* (Smith, 1853), and *P. irroratus* (Smith, 1853).

TABLE C.—Species of *Dasycolletes* (Type *metallicus*).

Abdomen red; first r. n. joining second t. c.; second r. n. meeting third t. c.; hind spur pectinate with numerous fine long teeth.

Paracolletes rubellus (Smith).

Abdomen not red1.

1. Only two submarginal cells (the second t. c. wanting); stigma large; clypeus covered with silvery hair; supraclypeal area nude, shining brassy.

P. vitrifrons (Sm.) ♂.

Three submarginal cells; first r. n. joining second s. m. not beyond its middle2.

2. About 7 mm. long, with a dark purple abdomen; second s. m. strongly contracted above (New Zealand).....**P. purpureus** (Sm.) ♂.

At least 9 mm. long.....3.

3. First r. n. joining second s. m. distinctly before its middle.....4.

First r. n. joining second s. m. near or at the middle; no such patches on mesothorax as occur in *humerosus*.....5.

4. A large patch of short moss-like bright ochraceous hair on each side of mesothorax (Australia).....**P. humerosus** (Sm.)
 No such patches on mesothorax (New Zealand).....**P. confusus** (Ckll.).
5. Apex of abdomen with bright red hair.....6.
 Apex of abdomen with darker or black hair.....7.
6. Stigma dark brownish (New Zealand).....**P. hirtipes** (Sm.).
 Stigma light yellowish or honey color.
P. fulvescens (**Lamprocolletes fulvescens** Sm.)
(fulvescens seems to be only a variety of hirtipes.)
7. Abdomen dark purplish tinged; rather smaller (New Zealand).
P. vestitus (Sm.).
 Abdomen greenish tinged; rather larger; hind spur minutely ciliate (New Zealand).....**P. metallicus** (Sm.).
 Abdomen black; larger than *vestitus* (New Zealand).....**P. boltoni** (Ckll.).

TABLE D.—Species of *Leioproctus* (Type *imitatus*).

Abdomen red, like that of *P. rubellus*; a dense black apical fimbria; first r. n. joining second s. m. much before its middle; second r. n. joining third s. m. before its end; area with a strong transverse keel (Australia).

P. fimbriatus (Sm.).

(*P. fimbriatus* has essentially the venation of *P. confusus*, except that the stigma is obsolete, whereas in *confusus* it is narrow but fairly well developed; it is also fairly well developed in *imitatus*.)*

- Abdomen not red1.
 1. Abdomen, also head and thorax, dark blue; caudal fimbria bright orange-fulvous; first r. n. joins second s. m. much before its middle; size medium; area of metathorax shining.....**P. elegans** (Sm.).
 Abdomen strongly green; area smooth and shining; runs in the *Dasycolletes* table straight to *metallicus*, differs by its larger size (over 13 mm. long), darker wings, and hair on hind tibiae white on inner and black on outer side, the colors sharply contrasting uniformly paleish in *metallicus* (Swan R.).....**P. vigilans** (Sm.).
 Abdomen faintly greenish or purplish; first r. n. joining second s. m. at middle; area not transversely striate (New Zealand).

P. imitatus (Sm.).

P. frontalis (*Leioproctus frontalis*) I have not seen. There are two specimens marked "probably *frontalis*," which represent a species near to *P. purpureus*, but larger. It does not seem likely that they are the real *frontalis*, as the abdomen shows no sign of green.

It will be seen from the characters cited in the tables that the so-called genera include most diverse species, and I find myself unable to recognize any common bond between those of each group, which would justify their generic segregation.

* The original description of *P. fimbriatus* gives no locality, but the specimen is labelled Australia. A male placed with *fimbriatus* in the Museum does not belong to it, but is an *Halictus*.

It is possible that more than one genus may later be recognized among the species I here call *Paracolletes*, but in order to do this it will be necessary to formulate new generic characters, grouping the species in quite a new manner. This may become necessary or useful when more species are known; the Museum now contains quite a series of undescribed species, and no doubt very many more await discovery.

HALICTUS Latr.**Halictus creberrimus** Sm. ♀ (T.).

Hind spur pectinate with few teeth; hind tarsi fulvous, contrasting in color with the brown tibia and femur; base of metathorax finely longitudinally wrinkled; mesothorax dull, with close minute but quite distinct punctures; abdomen quite hairy; third s. m. large, much larger than second. In Robertson's tables it seems to run to *cressoni*, or rather to *versatus* or *coreopsis*; it really runs nearest to *coreopsis*, but I should hardly call the mesothorax sparsely punctured, it is quite closely so. The brown pubescent abdomen would agree with *versatus*. Compared with *H. ruidosensis* it differs by the much smaller punctures of mesothorax; the narrower, broad-oval head with narrower face; the lively ferruginous tegulae; the lack of a shining ridge bounding mesothoracic enclosure; the sepia stigma; the brown, hairy abdomen, etc.

Halictus inconspicuus Sm. ♀ (T.).

Very small, expanse of wings only about 7 mm.; hind spur of hind tibia pectinate with a few large teeth; stigma pale dull brown; tegulae shining-reddish testaceous; area minutely roughened, with only obscure basal wrinkles laterally; abdomen dark brown; third s. m. ordinary, its outer nervure faint. In Robertson's tables seems to run nearest to *versatus*.

Halictus coriaceus Sm.

This is the species we have always so identified.

Halictus crassicornis Kirby ♀.

Nova Scotia (Redman); det. Smith. Is an *Evglytus*, and in Robertson's table appears to run closest to *foxii*. Hind spur pectinate with four or five teeth; head and thorax black, abdomen very dark reddish; tegulae dark reddish; stigma honey color; metathorax truncate, no defined area, but basal region rather coarsely wrinkled all over; mesothorax dull, with minute punctures.

***Halictus farinosus* Sm. ♀ (T.).**

A large banded species; belongs to Robertson's *Halictus* s. str., and runs out of his table because legs are not ferruginous, except middle and hind tarsi, and small joints of anterior tarsi, and the hind spur is finely serrate. Stigma and nervures ferruginous; wings with a decided though not strong reddish tint; third s. m. very broad; the four dull (yellowish or greyish) white abdominal hair-bands are very broad and distinct, the region between the bands is dull, because pubescent; mesothorax closely and strongly punctured; clypeus shining, with quite widely separated punctures; base of metathorax minutely rugose; tegulae large, with a testaceous spot broadly surrounded by dark brown.

***Halictus pectoralis* Sm. ♀ (T.).**

Florida. Runs to *pectoralis* in Robertson's table. Area shining, with large irregular wrinkles; hind spur with six teeth, the basal ones very large; stigma rather dark reddish-brown; second and third abd. segments with lateral subtriangular patches of whitish pubescence. Compared with *H. pectoraloides*, it is a broader, more robust insect, with the area much more coarsely wrinkled, and lunate rather than hemispherical in outline, much shorter than semicircular in an anteroposterior direction; the mesothorax also is much duller and more punctured.

***Halictus confusus* Sm. ♀ (T.).**

Wings very yellow; stigma very pale honey color; third s. m. very large, fully twice as large as second, but its outer margin without a distinct double curve; outer veins not perceptibly weaker than inner; b. n. with the bend very strong; hind spur of the serrate type, but the teeth rather long; head and thorax dark blue-green; clypeus black, supraclypeal area brassy; abdomen without hair-bands, hind margins of segments testaceous; cheeks normal; tegulae testaceous, with a piceous cloud. The first abd. s. seems to have a barely perceptible greenish lustre. Goes to *Halictus* s. str. in Robertson's tables. The above notes are from the type; the series consists of two species mixed.

***Halictus imitatus* Sm. ♂ (T.).**

Very small; head and metathorax very dark green; mesothorax and scutellum with some purple reflections, but they seem to be a stain, produced artificially in some way; the abdomen might fairly

be described as subclavate; the tibiae, especially the hind ones, are dark, with base and apex light red; third s. m. quite large, with its outer nervure quite strong. Smith's expression "rufo-fuscous" does not well describe the abdomen; it is practically black, with the hind margins of the segments reddish. Of Robertson's species it seems nearest to *cressoni*. It is a considerably smaller insect than *zephyrus*, and has a much darker abdomen.

***Halictus pilosus* Sm. ♀ (T.).**

Runs to *pilosus* in Robertson's tables; second s. m. very broad; hind spur with about five long spines; third and fourth abd. segments entirely covered with ochraceous felt.

***Halictus laevissimus* Sm. ♀ (T.).**

Hind spur with very few long teeth; b. n. strongly bent; third s. m. quite large, broad above; outer nervures weak as in *Chloralictus*; abd. segments with basal lateral hair-patches on 2 and 3, and 4 and 5 pruinose-hairy all over, but not closely felted as in *pilosus*; stigma rather large, pale dull honey color; abdomen with a strong reddish tinge; on disc of second segment, at least, one can see numerous very minute and delicate punctures; head and thorax dark blue-green, the mesothorax almost indigo; area rather well-defined, semilunar, with longitudinal wrinkles; head fairly broad. Seems not to be in Robertson's tables.

***Halictus rhododactylus* D. T. (*fulvipes*, Sm.) ♀.**

Remarkable for the wholly fulvous hind tibiae and tarsi, contrasting with the dark brown femora; the other tarsi are fulvous, but their tibiae are clouded with dark brown; hind spur with few long spines; metathorax truncate, its basal area minutely rugoso-cancellate; abdomen quite hairy; venation of *Chloralictus*; second s. m. quite large.

***Halictus capitosus* Sm. (T.).**

Cheeks produced to a large tooth beneath; wings strongly yellowish. A *townsendi* like form.

***Halictus discus* Sm. ♀ (T.).**

Quite large, about 10 mm. long, and robust. In Robertson's tables it runs to *Lasioglossum*, and the metathorax has the truncation with the sharp edge of *fuscipennis*. From type *fuscipennis*, it differs entirely by the abdomen very much broader at base; wings

not nearly so dark, and not so long; base of metathorax with no enclosure, but shining, with very strong longitudinal ridges; the smooth shiny mesothorax, with large widely separated punctures, etc. The hind spur has short saw like teeth. Tegulae shining, dark, with a red spot; stigma fulvo-ferruginous, and remarkably small; third s. m. rather narrower than in *fuscipennis*; abdomen shining, with strong well separated punctures; the depressed apical portions are also punctured; bases of segments 2-4 with dull white hair-bands. Certainly very close to *H. zonulus*; of the latter I found only males in the Museum.

Halictus nymphalis Sm. ♀ (T.).

Small, only about 5 mm. long; in Robertson's tables runs to *testaceus*. Hind spur with few long spines; apical half of abdomen largely fuscous, and very hairy; basal half shining reddish-testaceous; stigma light honey color; area distinct, very finely rugose-wrinkled; mesothorax yellowish-green, closely and distinctly punctured; all the knees pale reddish.

Halictus zephyrus Sm. ♂.

Much larger than *namphalis*; length about 6½ mm.; abdomen shining dark brown, with a greenish reflection, especially on first segment. Runs to *zephyrus* in Robertson's tables.

Halictus similis Sm. ♀ (T.).

A broad thick-set bee, with third s. m. not elongated; abdomen with basal bands, mainly developed at sides, on segments 2 and 3; hind spur serrate. Appears to be a *Lasioglossum*, sens. Rob., and has metathorax sharply truncate; basal enclosure not distinctly defined, and with numerous strong longitudinal keels. The first abd. s. is minutely but very distinctly punctured all over. Stigma very dark brown; apical fimbria of abdomen light fulvous; mesothorax closely punctured.

Closely allied to *H. discus*, but smaller, metathorax much less shiny, stigma darker, etc. It cannot be *H. truncatus*, because of punctured first abd. s., and hind spur without long teeth; and it is not *H. arcuatus*, because of sharply truncate metathorax.

Halictus agilis Sm. ♂ (T.).

Is a true *Halictus*, very distinct from any U. S. species known to me. Third s. m. quite twice as big as second, but very broad at top, and outer side without any distinct double curve; b. n. not

abruptly bent; head, thorax and abdomen yellowish-green; abdomen with apical hair bands on segments 2-5, and basal ones on 2 and 3 at least; tibiae and tarsi, and most of middle and anterior femora, red, but hind femora dark; abdomen broad basally.

Halictus exiguus Sm. ♀ (T.).

Venation of *Chloralictus*; hind spur with few long spines; head and thorax yellowish-green, head of the broad type, cheeks broad. The most obvious distinctive character is the smooth and shining mesothorax, the basal area slightly rugoso-plicate towards the base.

Halictus errans Rits. (*vagans*, Sm.) ♀ (T.).

Second s. m. broad; stigma very pale honey; hind spur with three teeth, the first stout and spine like, the second a flattened and rounded lamina, the third a mere rudiment; abdomen very broad, yellowish green, hind margins of segments broadly testaceous; base of metathorax minutely rugose-wrinkled, with no large plicæ. Eyes, etc., of typical *Halictus*.

Halictus providens Sm. ♀ (T.).

Hind spur with about 5 spines. Is an *Evyllæus* with a large broad head, facial quadrangle very much broader than long. Third s. m. strongly convex on outer side; cheeks broad and subquadrate; mesothorax shining, with very sparse punctures; first abd. s. very shining, impunctate.

Halictus hesperus Sm. ♀ (T.).

Eyes, etc., of *Halictus*; head broad, facial quadrangle about square; hind spur with three broad teeth; abdomen strongly yellowish-green, the pale ochraceous hair-bands basal and apical; third s. m. much longer than second, but very broad above, with outer margin little curved.

Halictus desertus Sm. ♀ (T.).

Hind spur serrate; second and third s. m. very broad, third without any distinct double curve on outer margin; area merely minutely granular; looks much like *coriaceus* or *politus*, but is smaller, stigma browner—not nearly so yellow, wings not yellow like *politus*, etc.

H. politus (*schenckii*, Rits.) has hind spur serrate, but the teeth are rather longer.

The following account of the Halictines of Chile, as represented in the Museum, is offered because of the interesting characters they present. A few bear Spinolian names which have never been published; in two cases these names would be homonyms if published now.

Rhopalictus gayi* (*Halictus gayi*, Spinola) ♀.

Metallic blue; face broad, eyes not emarginate; no facial foveæ; antennæ placed in large hollows, between which is a keel; prothorax normal; parapsidal grooves distinct; three impressed lines on anterior middle of mesothorax; no floccus at base of hind legs; abdomen broad, narrowing about equally to base and apex; no pygidial plate; extreme apex of abdomen with bright fulvous hair and a distinct rima; hind spur stout but perfectly simple; b. n. only very slightly curved, meeting t. m.; marginal cell with pointed end away from costa; second s. m. greatly narrowed above; first r. n. entering second s. m. at its end; first s. m. not longer than third, either on marginal nervure or below; stigma dark and fairly large.

This certainly cannot remain in *Halictus*; it has rather the appearance of an Andrenid, but is by no means an *Andrena*. It does not seem close to the species ordinarily placed in *Corynura*. Dalla Torre cites "*Halictus (Corynura) gayi* Spinola, Gay: Hist. fis. Chile, Zool. VI. 1851, p. 208, n. 10, and p. 301, n. 1." The original description, however, calls it simply *Halictus gayi*, nothing being said about *Corynura*.

Paragapostemon mutabilis (*Halictus mutabilis*, Spinola) ♀.

Head, thorax, and basal half of abdomen shades of peacock-green and purple; abdomen bright red, the colors like those of *H. placidus*. Hind spur with a large blunt tooth and a lamina; eyes fairly emarginate; basal nervure strongly bent. Greatly resembles *placidus*. See also Vachal, Misc. Ent., 1903, p. 96.†

* Mr. J. D. Alfken (Rev. Chil. Hist. Nat., 1904, p. 141) refers *Halictus gayi*, Spin., *H. posticus*, Spin., and *H. gayatinus*, Spin., all to *Ceratina*. They do not look like species of *Ceratina*, and it had not occurred to me to refer them there. The mouth-parts I was not able to examine. In the light of Mr. Alfken's statement, and considering the precisely *Ceratina*-like grooves on the thorax of *H. gayi*, I believe that these insects (certainly out of place in *Halictus*) are Ceratinids, but I should think that they must represent a genus distinct from *Ceratina*.

† Vachal does not cite a type for *Paragapostemon*: *P. podager* (*Halictus podager* Vach.) may be taken as the type.

Agapostemon placidus (*Halictus placidus*, Sm.) ♀.

Abdomen red, head and thorax dark blue shaded with purple; eyes moderately emarginate; first r. n. joins second s. m. near its end.

Agapostemon emarginatus (*Halictus emarginatus*, Spinola) ♂.

Legs yellow; apex of abdomen strongly emarginate. See also Vachal, Misc. Entom., 1903, p. 121.

The remaining species are left for the present in *Halictus*, although they are for the most part not strictly of that genus.

Halictus rubellus Haliday ♀.

Head and thorax black; abdomen largely dark red; eyes deeply emarginate; metathorax truncate, base shining, neither rugose nor plicate; hind spur simple; b. n. strongly bent, falling some distance short of t. m.; third s. m. very large; first r. n. joining second s. m. at its extreme end.

Halictus posticus Spinola ♀.

Eyes emarginate; base of metathorax neither plicate nor rugose; abdomen black with the apex red; stigma extremely large; third s. m. large, but not nearly so long as first; b. n. strongly but not abruptly bent, falling a little short of t. m.; hind spur simple.

Halictus gayatinus Spinola ♀.

A small black species, with very large stigma, and third submarginal cell greatly narrowed above.

Halictus chilensis Spinola ♀.

A magnificent species; first three segments of abdomen jet black, with their hind margins broadly shining light yellow, reminding one of some species of *Nomia*. Fourth segment tinged with purple and green. Head and thorax very dark blue; marginal cell and beyond with a dark fuscous cloud; eyes deeply emarginate; tibiae and tarsi red; base of metathorax neither plicate nor distinctly rugose.

Halictus proximus Spinola ♀.

Head and thorax green; mesothorax splendid peacock green; scutellum clouded with rosy-purple; abdomen very dark purple, with white hair-patches at sides of bases of segments two to four; hind spur with three large teeth.

Halictus maculosus Smith ♀.

Large, black, the white laterobasal hair patches of abdomen very distinct; legs mainly bright red; third s. m. much shorter than first.

Halictus n. sp. Spinola.

A real *Halictus*, but with the eyes unusually emarginate; third s. m. very large; its outer side strongly angled; wings very yellow basally. Has the appearance of the group of *coriaceus*.

Halictus n. sp. Spinola ♀.

Smallish, black, mesothorax faintly greenish; laterobasal hair-patches of abdomen very distinct; stigma large, dark brown.

Halictus n. sp. Spinola ♀.

Small, shining black; second s. m. strongly narrowed above; stigma large, dark brown; the mesothorax shining, with scattered punctures.

H. chloris, Spinola, and *H. nigromarginatus*, Spinola, both belong to *Augochlora*.

Vachal (Misc. Ent., 1903-1904) has recently described the following Halictines from Chile, placing them all in the genus *Halictus*:—*Agapostemon pissisi* (Vach.),* *Paragapostemon nigrocæruleus* (*Halictus nigrocæruleus*, Spinola), *P. dolator* (Vach.), *P. purpurissus* (Vach.), *P. scitulus* (Vach.), *P. cuprellus* (Vach.), *P. iodurus* (Vach.), *P. atrinodis* (Vach.), *P. dilutior* (Vach.), *Augochlora prothysteres* (Vach.), *A. notialis* (Vach.).

AUGOCHLORA Smith.

Mr. Vachal divides this genus (which he regards as part of *Halictus*) into three groups:

Hind margins of first two abdominal segments ciliate with short hairs; hind spur of ♀ pectinate or spined.....	VIBRISSATI.
Hind margins of first two abdominal segments not ciliate.	
Hind spur pectinate or spined.....	SERICEI.
Hind spur not pectinate or spined.....	OXYSTOGLOSSI.

The sections Vibrissati and Sericei have constituted the subgenus *Augochloropsis*. Oxystoglossi has been regarded as typical *Augochlora*, but it includes the genus *Oxystoglossa*, Smith. Smith's *Augochlora* included all three sections, but his first species (*A. diversipennis*) belongs to Vibrissati. Both *Augochlora* and *Oxystoglossa*,

* The Chilean locality of this is doubtful.

according to the descriptions, have the first r. n. meeting the second t. c.; the latter genus has an extremely long tongue.

Species which have been referred to *Augochlora* differ in venation, as follows:

- (1) First r. n. entering middle (or near) of second s. m.: *Corynura briseis* (Sm.).
- (2) First r. n. entering end (or near) of second s. m.
 - (a) *Halictus nanus* (Sm.) and *H. aspasia* (Sm.).
 - (b) *Corynura titania* (Sm.).
 - (c) Sericei, with only three spines on hind spur: *A. chloris* and *aurora*.
 - (d) Oxystoglossi: *A. alcoyne*.
- (3) First r. n. meeting second t. c. (typical venation of *Augochlora*).
 - (a) Group uncertain: *A. festivaga*.
 - (b) Sericei or Oxystoglossi (♀ unknown): *A. daphnis*.
 - (c) Sericei: *A. chryseis* and *deidamia*.
 - (d) Vibrissati: *A. atropos*, *diversipennis*, *calypso*, *paphia*, *viridana*, *flammea*, and n. sp.
- (4) First r. n. entering beginning of third s. m.
 - (a) Vibrissati: *A. læta* and *fervida*.
 - (b) Sericei: *A. refulgens*.
 - (c) Oxystoglossi: *A. feronia*.

These characters of the venation are not always to be relied upon, as variation was noticed in *A. radians* and *vesta*. At the same time, the number of Vibrissati in the third group must be considered significant.

(A) VIBRISSATI.

Augochlora berenice Sm. ♀ (T.).

Hind spur with five long teeth; abdomen with much purple lustre; scutellum closely punctured, the punctures of one size. In my Phil. Acad., 1900, paper it runs to the group of *monochroa*, etc.; it agrees with the description of *monochroa*, except that the sides of metathorax near the truncation are densely covered with punctures. From *heterochroa* it is distinguished by the scutellum. My supposed *A. berenice* from Brazil (t. c., p. 357) is not that species; it should be described in detail, and given a name. It is now in the Carnegie Museum at Pittsburg.

Augochlora læta Sm. ♀ (T.).

Ega. A small species; first r. n. joining base of third s. m.; hind spur with four or five long spines; abdomen broad and convex, yellowish-green; segments one and two delicately ciliate, but the cilia largely concealed by the general hoariness; anterior tibiae a beautiful golden green.

Augochlora calypso Sm. ♀ (T.).

Hind spur with many long spines; vibrissæ very conspicuous, orange, failing in middle of first segment; wings strongly yellowish; marginal cell appendiculate, and having the appearance of being very narrowly truncate at apex; first r. n. joining second t. c.; second s. m. broad, about square; inner orbits narrowly edged with blue; disc of scutellum with widely separated punctures on a shining ground; abdomen with a golden lustre; all the tarsi dark ferruginous. In my table runs to *smithiana*, but is not that species. Because of the scutellum, etc., my supposed *A. calypso* (Pr. Phil. Acad., 1900, p. 364) is not that species. It must be described in detail, and given a new name. The two supposed subspecies of *calypso* (l. c.) must be treated as species, *Augochlora cupreotincta* (Ckll.) and *A. eucalypto* (Ckll.).

Augochlora viridana Sm. ♀ (T.).

Brilliant green, with purple lights; abdomen quite hairy, and segments one and two with a very conspicuous marginal band of pale orange cilia; area of metathorax slightly roughened, not striate; first r. n. meeting second t. c.; hind spur with numerous long spines. In Vachal's tables seems to run to *A. chorisis* (Vach.).

Augochlora flammea Sm. ♀ (*Halictus anthrax* Vach.).

In Vachal's tables runs to *anthrax*, with the description of which it exactly agrees. Head, thorax and abdomen crimson shaded with greenish-golden; abdomen quite hairy, with fulvous hair; hind margins of segments one and two long-ciliate, but the cilia not very conspicuous on account of the other hair; hind spur with four spines; first r. n. meets second t. c.; area short, with little longitudinal (antero-posterior) ridges; upper part of sides of metathorax nude, smooth and shining.

Augochlora n. sp., Smith ♀.

Para. This bears an unpublished name; it was perhaps considered part of *A. hebescentis*. Green, head and thorax with blue shades, abdomen with golden ones; ciliar bands on margins of segments one and two pale yellow, and extremely distinct and conspicuous; hind spur with about five spines; area small, merely rugose; first r. n. meets second t. c.; third s. m. at least twice as broad as second. Runs in my table to the "*calypso*" group.

Augochlora paphia Sm. ♀.

Santarem. Hind spur with eight long spines; cilia of segments one and two fulvous, wanting in middle of one, otherwise very distinct; head broad; scutellum with two purplish spots; wings strongly yellowish; first r. n. meets second t. c.

Augochlora atropos Sm. ♀ (T.).

Very peculiar; head, thorax and first abdominal segment black, with at most vague suggestions of green; rest of abdomen green, with golden tints, and even some crimson tints on third segment; vibrissæ orange, distinct; hind spur with numerous long spines; first r. n. meeting second t. c.

Augochlora diversipennis (Lep.) Sm. ♂.

Shaped rather like a ♀; golden-green, vibrissate on hind margins of abd. segments one and two with orange hairs; antennæ dark, with third joint reddish yellow and swollen anteriorly; anterior margin of clypeus yellow; sides of metathorax very closely punctured; tarsi yellow; first r. n. meets second t. c. Does not agree with any of the species in my Phila. Acad., 1900, paper.

Augochlora electra Sm. ♂ (T.).

Antennæ dark, without any red joint; all the tarsi yellow; area shining, quite smooth, without punctures or wrinkles; hind margins of segments one and two ciliate.

Augochlora bucephala Sm. ♀ (T.).

Hind spur with six spines.

Augochlora artemisia Sm. (T.).

At first sight appears not vibrissate, but there are remains of what must have been a ciliate fringe; first r. n. reaching extreme base of the large third s. m.; scutellum extremely densely punctured. The unique type has both hind legs gone.

Augochlora vesta Sm. ♀ (T.).

Abdomen quite crimson; hind spur with long spines; hind margin of second segment ciliate with orange hairs, but on first the fringe is not apparent. Other specimens labelled *vesta* are from Mexico.

Augochlora cupreola (Ckll.).

My *A. vesta*, var. *cupreola*, must stand as a distinct species.

Augochlora ignita Sm.

Abdomen strongly punctured.

Augochlora fulgida Sm. ♀.

Vibrissate, but rather indistinctly; hind spur with numerous long teeth; area small, dull, contrasting with the shining region beyond; vertex shining purple in some lights.

Augochlora splendida Sm. ♀ (T.).

Conspicuously vibrissate; hind spur with long spines.

Augochlora viridula Sm. (T.).

Considered to be the same as *lucidula*. Hind and middle tarsi with the first joint light yellow, the others brown.

Augochlora lucidula Sm. (T.).

Vibrissate, but the cilia pale and delicate.

Augochlora fervida Sm. (T.).

Conspicuously vibrissate, the cilia pale; first r. n. enters base of third s. m.

The following seven vibrissate species were kindly sent by Mr. Vachal for examination and comparison:

(a) Abdomen red or reddish.

Augochlora æritalis (*Halictus æritalis* Vachal) ♀.

From this species (1) *A. vesta* differs by the duller abdomen, all crimson, including first segment, and area quite different; (2) *A. ignita* differs by its duller, more strongly punctured abdomen, the purple-blue tints on thorax, etc.; (3) *A. acidalia* differs by being larger, with a strong blue shade on mesothorax.

Augochlora multiplex (*Halictus multiplex* Vachal) ♀.

No blue or purple tints on thorax; first abd. segment largely golden-green. This combination of characters separates it at once from *vesta*, *ignita* and *acidalia*.

Augochlora radians (*Halictus radians* Vachal) ♂.

The thorax has rather bluish tints. It is like a Mexican *vesta*, but the middle of mesothorax is more closely punctured (in *vesta* the punctures are sparser in middle). In *vesta* the first r. n. meets second t. c., or even enters third s. m.; in *radians* the first r. n. enters second s. m. or meets second t. c. (the two sides different in

specimens of each!). Certainly very near *vesta*, but apparently separable.

Augochlora notophos (*Halictus notophos* Vachal) ♀.

Abdomen not nearly so red as the others; seems nearest to *acidalia*, but much smaller.

(b) Abdomen not red or reddish.

Augochlora terrestris (*Halictus terrestris* Vachal) ♀.

Has a long face.

Augochlora chorisis (*Halictus chorisis* Vachal).

Looks superficially like *A. regina*, but the abdomen of *chorisis* is less blue and much more strongly punctured. Vachal queries whether it may be *A. cuprea*; I fail to find a specimen of *cuprea* in the Museum.

The types of *A. cuprea* and a few others were in the collection of Mr. W. W. Saunders, and are supposed to be in the Hope Museum at Oxford. I went to the Hope Museum expecting to see them, and was shown the collections by Commodore Walker (Professor Poulton being away), but I failed to find any trace of them.

Augochlora cubiceps (*Halictus cubiceps* Vachal) ♀.

Close to *A. artemisia*, but differing thus:

<i>A. cubiceps.</i>	<i>A. artemisia.</i>
Abdomen yellowish-green, with golden tints.	Abdomen bluish-green, with purple tints
Vibrissæ strongly orange.	Vibrissæ not strongly orange.
Vertex without such purple tints.	Strong purple tints on vertex.
Wings not so stained.	Wings strongly stained with reddish.

The form of the head is the same in both. *A. cubiceps* looks like *A. paphia*, but the sculpture of area is quite different.

(B) SERICEI.*

Augochlora deidamia Sm. ♂ (T.).

S. Paulo. Abdomen broad, bluish green with purple reflections; not vibrissate; the first two segments strongly punctured; mesothorax with well separated punctures, and a very strong crimson lustre; sides of anterior margin of prothorax presenting a prominent keel; first r. n. meeting second t. c.; area very short, with little ridges; hind spur with long spines.

Augochlora chloris (*Halictus chloris* Spinola) ♀.

Abdomen broad, peacock green, with beautiful blue and golden tints; no vibrissæ; face broad, peacock green, vertex shining pur-

* According to the "elimination method," this would be typical *Augochlora*.

ple; first r. n. joining second s. m. at its apex; eyes deeply emarginate; hind spur with three spines.

Augochlora chryseis Sm. ♀ (T.).

First r. n. meets second t. c.; hind spur with three spines; head and thorax dark blue, becoming a little greenish on hind part of thorax; area strongly striate; anterior middle of mesothorax dull and granular between the punctures; abdomen dark green, no vibrissæ; inner orbits concave, but not strongly emarginate.

Augochlora aurora Sm. ♀ (T.).

Hind spur with only three spines, but these sharp; head and thorax dark blue green; abdomen yellowish-green, with a yellowish, almost pollinose, pubescence; no vibrissæ; metathorax sharply truncate, area very closely and finely striate; mesothorax extremely rugose; eyes only moderately emarginate; first r. n. joining second s. m. a short distance before its end; abdomen broad at base as usual. The mesothorax has a sharp edge in front, overlapping prothorax; tubercles keeled and (seen from above) pointed. Does not agree with anything in Vachal's tables.

Augochlora refulgens Sm. (J. of Entom., 1861).

Brazil. Mesothorax with a strong crimson lustre; abdomen green, with a blue lustre; hind spur with numerous long spines; hind margins of segments one and two not at all ciliate, except sides of two very slightly and inconspicuously; first r. n. enters extreme base of third s. m.

Augochlora pandora Sm. ♀ (T.).

Hind spur with five teeth; area rugose; hind margins of abd. segments one and two narrowly darkened, not ciliate.

Augochlora graminea ("Fabr.") Sm.

♀. Hind spur with six spines; runs to *chapadeu* in my table in Pr. Phil. Acad., 1900, p. 361. The ♂ has the last joint of antennæ hooked, as in *binghami*.

(C) OXYSTOGLOSSI.

Augochlora regina Sm. (T.) ♀.

No trace of vibrissæ; area closely striate; hind spur not pectinate. Much larger than *Oxystoglossa decorata*, but seems allied.

Augochlora metallica (Fabr.) Sm.

A small species with black hind margins to segments; punctures of mesothorax extremely close. Should be compared with *A. iheringi*, to which it is at least very closely allied.

Augochlora thalia Sm.

Not at all vibrissate.

Augochlora festiva Sm. ♀ (T.).

Hind spur not pectinate; not at all vibrissate; wings yellowish; hind margins of abd. segments very narrowly black.

Augochlora gratiosa Sm. (T.).

Not vibrissate; hind margins of abd. segments not black.

Augochlora aleyone Sm. ♀ (T.).

S. Domingo. Abdomen blue green and purple, hind margins of segments very narrowly black; no vibrissæ; hind spur curved, simple; first r. n. joining second s. m. at its apex; stigma and nervures dark brown; abdomen more parallel sided than that of *Oxystoglossa decorata*. Looks like a blue *Chrysis*.

Augochlora feronia Sm. ♀ (T.).

No vibrissæ; hind margins of abd. segments black; first r. n. joins base of third s. m.; hind spur curved, simple; wings yellowish-dusky; punctures of mesothorax very close.

It is impossible to say whether the following belongs to Sericea or Oxystoglossi, in the absence of the female:

Augochlora daphnis Sm. ♂.

(The specimen has lost its head.) Hind margins of abdominal segments black; no vibrissæ; scutellum with widely separated but strong punctures on a shining ground; mesothorax strongly and very closely punctured, but the punctures distinct; wings almost clear; middle and hind femora with a good deal of green; first r. n. meeting second t. c.

ANDRENOPSIS n. g.

Form *Andrena* like, but with only two submarginal cells, the second (morphologically second and third) larger than the first, and receiving the first recurrent nervure a considerable distance from its beginning, and the second a less, but not small, distance from its end; basal nervure meeting transverso-medial, which is very oblique; marginal cell long, obliquely truncate at apex; stigma small but distinct; clypeus and supraclypeal area of male yellow; mandibles bidentate; body hairy; hind spur of hind tibia curved, finger like; middle and (especially) hind tarsi with joints two to four produced behind; area of metathorax triangular. The specimen was softened, to extract the mouth-parts, but they did not come readily, and I desisted, for fear of injuring the unique type. Pre-

sumably, judging from the other characters, the tongue is of the Colletid type, although the insect has an extraordinary superficial resemblance to the American *Andrena prunorum* Ckll. The hind legs have a very distinct, lanceolate, knee-plate. The last antennal joint is flattened at apex.

Andrenopsis flavorufus sp. n.—♂ Length about 10½ mm.; head broad, but facial quadrangle considerably longer than broad, the orbits slightly converging below; face and vertex with much long orange hair, cheeks with white hair; mandibles (except apex), labrum, clypeus and supraclypeal area yellow; clypeus with the anterior margin rather bulging, smooth and very shiny, the sides well punctured; malar space obsolete; antennæ ordinary; scape yellow suffused with red; flagellum clear ferruginous beneath and blackish above, not mouiliform; fourth antennal joint very short, broader than long; thorax black, with the hair above fulvous, and beneath white; mesothorax exceedingly densely punctured, with distinct median and parapsidal lines; scutellum rough with punctures like the mesothorax; area of metathorax dull, roughly sculptured, without any trace of a transverse keel; its margin with little cross-ridges separating shining pits; tegulæ ordinary, shining, yellowish-ferruginous; wings somewhat dusky, darker on apical margin; stigma and nervures dark brown; second recurrent nervure bulging outwards; anterior coxæ rather swollen, dark brown; femora and tibiæ clear shining ferruginous, with pale, slightly yellowish hair; tarsi light yellow; basal joint of hind tarsi flat and rather broad; abdomen black, with the hind margins of the segments broadly ferruginous; the second segment is all ferruginous except a patch in the middle and one at each side, and the third is ferruginous at base; the surface is minutely granuloso-punctate, and there is a good deal of erect, pale fulvous hair; the basal half of the venter is pale yellowish-ferruginous and bare, the apical part hairy and much darker.

Hab.—"Australia" (no other particulars known); in the British Museum, from the F. Smith collection, 79.22. Compared with *Biareolina* (*neglecta* Dours), our genus is easily recognized by the venation. In *Biareolina* the marginal cell ends in a blunt point on the costal margin, and the stigma is large; in *Andrenopsis* the marginal cell is obliquely truncate, ending in a point away from the costal margin, and the stigma is small.

POSTSCRIPTS.

(1) Vachal (Bull. Soc. Ent. France, 1905) has proposed the genus *Manuelia* for *Halictus gayi*, *posticus* and *gayatinus*.

(2) Alfken has recently asserted that the Chinese *Nomada versicolor*, Smith, is the same as *N. japonica* Smith. When I had the types (both females) before me, it did not occur to me that they were identical, though they are certainly allied. I believe that they are distinct species.