

OBSERVATIONS ON THE CLASSIFICATION OF
THE BEES COMMONLY PLACED IN THE GENUS
MEGACHILE (HYMENOPTERA: APOIDEA)¹

by CHARLES D. MICHENER²

RECEIVED FOR PUBLICATION NOVEMBER 16, 1961

ABSTRACT

The genus *Megachile* is divided into three genera, *Megachile*, *Chalicodoma*, and *Creightonella*, differing in their nesting habits as well as structure. The following subgenera are described: **Callomegachile**, **Chalicodomoides**, **Chelostomoda**, **Callochile**, *Chalicodoma* (*Callomegachile*) **mystaceana** is described from Australia; this species has usually been called *mystacea* Fabricius, a name properly used for *Megachile* (*Callochile*) *mystacea* Fabricius (= *M. ustulatifformis* Cockerell).

This paper consists of extracts from a large work which will soon be completed on the classification of the bees of Australia and neighboring regions. It is published here, separately, and in preliminary form, only because several of the names proposed are needed by persons working on the megachiline bees in America and Australia. Illustrations of the various groups occurring in the Australian region will be given in the work mentioned above. The bees concerned can be briefly characterized as the nonparasitic Megachilinae without distinct arolia.

Various authors have expressed the idea that *Megachile* (including *Chalicodoma*, *Gronoceras*, etc.) is a group of such diversity in structure and nesting habits that it ought to be divided, and in fact European authors for many years have separated their species of *Chalicodoma* as a distinct genus, which it certainly appears to be when only the European fauna is

¹Contribution number 1122 from the Department of Entomology, The University of Kansas. This study was made possible by a grant from the National Science Foundation for the study of Australian bees.

²I am indebted to Professor Jean Pasteels of Brussels, Belgium, for guidance in various ways. He and I had independently come to similar conclusions about the classification of *Megachile*-like bees, and we had independently coined the name *Callomegachile* for the same major group of Palearctic species. He has been kind enough to urge me to publish this paper in spite of the fact that much of his work is already in manuscript form.

concerned. When faunas of other continents are examined, the gap between these *Chalicodoma* and *Megachile* is narrowed, so that the practice of naming some striking variants (e.g., *Thaumatostoma*, *Gronoceras*) and leaving the bulk of the species in *Megachile* has been followed in the African, Asiatic and Australian faunas. It seems that a more worthwhile procedure is to attempt major divisions.

A seemingly important biological division occurs between those which make nests with pieces of leaves or petals and those which use resin, mud, or other such material. It is not surprising that the mandibles of the female differ, those of the leafcutters having a sharp cutting edge in the interspace between the second and third teeth (second interspace) or in that between the third and fourth teeth (third interspace) or both. As such cutting edges are not found in other bees, their absence is presumably a primitive feature. Other common megachiline features, not shared by the leafcutters, exist among those which do not cut leaves. For example, the body is relative elongate and rather parallel-sided in those which do not cut leaves. This is true, also of some of the leafcutters, but the majority of them are broad, with the abdomen rather flattened. In the non-leafcutters, particularly the smaller ones, the posterior end of the scutellum is not strongly curved down but merely slopes, and the basal part of the propodeum is subhorizontal instead of subvertical. These statements apply to no leafcutters. Again the characteristics of the non-leafcutters are more like those of other megachilines and are presumably more primitive. Finally, the characters of the metanotum, axillar fossae and scutellar crests (terminology of Michener, 1944) as given in the key to genera, distinguish the two groups. It must be made clear that no one of these characters of the posterior end of the thorax, including those indicated in the key, holds perfectly; nonetheless, when one examines the posterior end of the thorax and considers the complex of features presented by it, one can tell whether to expect to find cutting edges on the mandibles of the female or not. There is an exception to the mandibular character in the subgenus *Chelostomoda*. Yet I think we are dealing with two natural groups whose distinctness is somewhat obscured by the amount of radiation that has occurred in each.

For the reasons outlined above it seems to me that it is practical and useful to distinguish two large groups in what has generally been called *Megachile*, and to use for these the names *Megachile* and *Chalicodoma*. Both of these genera are themselves diversified and worldwide in distribution (although *Chalicodoma* is represented, among the native species of the Western Hemisphere, by only two subgenera, *Chelostomoides* and *Stelodides*). An additional small group, *Creightonella*, seems worthy of generic rank.

Key to Genera

1. Mandible of female with cutting edge in second or third interspace between teeth, or both; metasoma usually broad, more or less flattened and not parallel-sided; metanotum fused to propodeum, sometimes indistinguishably so, although usually with a weak line separating them; sublaterally, metanotum usually considerably narrowed, often only half as long sublaterally as medially; axillar fossa shallow, surface behind it (scutellar crest) subhorizontal, no high crest between it and metanotum; eighth metasomal sternum of male bare, rarely with short discal hairs, without marginal hairs (except in *Creightonella*) 2
- Mandible of female without cutting edges between teeth (except in *Chelostomoda*, which has one in second interspace only); metasoma strongly convex dorsally, more or less parallel-sided; metanotum separated from propodeum by a suture which is often as conspicuous as scutellar-metanotal suture (except in the subgenus *Chalicodomoides*); sublaterally metanotum usually but little narrowed; axillar fossa deep, its posterior face usually ascending to strong scutellar crest between fossa and metanotum; eighth metasomal sternum of male with marginal hairs *Chalicodoma*
2. Male with six exposed sterna (sixth sometimes largely hidden); mandible of female with six teeth, second, third and fourth interspaces each with incomplete cutting edge, all of similar shape, that of fourth interspace small and inconspicuous from front; metasoma parallel-sided
Creightonella
- Male with four exposed sterna; mandibles of female with four or five teeth, cutting edges in second and third interspaces only, these edges usually of markedly different shapes or one of them absent; metasoma usually broad, not parallel-sided *Megachile*

Genus *Chalicodoma* Lepeletier

Chalicodoma Lepeletier, 1841, Histoire Naturelle des Insectes. Hyménoptères, 2: 309.

TYPE *Apis muraria* Fabricius, 1798 (designation of Girard, 1879, Traité Élémentaire d'Entomologie, 2: 778).

This name is here used in a completely new sense to include

the species of *Megachile s.l.* that do not cut leaves (and possibly a few that do).

The following group names have been applied to forms falling in *Chalicodoma* as here defined: *Archimegachile* Alfken, 1933; *Chalicodoma* Lepeletier, 1841, *s. str.*; *Chelostomoides* Robertson, 1903 (= *Oligotropus* Robertson, 1903; *Gnathodon* Robertson, 1903; *Sarogaster* Robertson, 1918); *Digronoceras* Cockerell, 1931; *Gronoceras* Cockerell, 1907; *Hackeriapis* Cockerell, 1922; *Maximegachile* Guiglia and Pasteels, 1961; *Pseudomegachile* Friese, 1898; *Stelodides* Moure, 1953, and *Thaumatossoma* Smith, 1865.

In addition to the groups listed above, several new groups are needed for Australian representatives of the genus, as indicated below. Except for the one new species, all *Chalicodoma* listed below are new combinations in that genus.

The type of *Chalicodoma* is commonly cited as *Apis muraria* Retzius, 1783. However, that name was not binominal; it was published as *Apis muraria nitida*. Hence it is not available as a name for the species nor for designation as the type species of *Chalicodoma*. Furthermore, *Apis muraria nitida* was probably not the species now known as *Chalicodoma muraria*, nor was it probably the same genus.

Fortunately, in designating the type species of *Chalicodoma*, Girard wrote "*muraria* Fabricius." Since Fabricius (1798) made no reference to Retzius' work or to any other work in which the species had been named, he obviously was describing the species as new. It is quite proper, therefore, to regard *Apis muraria* Fabricius as the type species of *Chalicodoma*, a course of action which maintains *Chalicodoma* in its usual sense.

This does not answer the question of the proper name for the species described as *Apis muraria* Fabricius, 1798. It is so well known that the name *muraria* probably should be conserved. It is probable that the oldest validly proposed name is *Apis caementaria* Meinecke, 1784. (A description of the work of an animal even though unaccompanied by a description of the animal itself, constitutes an indication in the sense of the rules of zoological nomenclature; Bull. Zool. Nomen., 4: 255, concl. 18, 1950.) Another available name is *Apis parietina* Fourcroy, 1785. It should be noted that this name antedates *Apis parietina* Fabricius, 1793, which is a well known European *Anthophora*.

Callomegachile new subgenus

TYPE *Chalicodoma mystaceana* Michener, new species

A large group of species of Paleotropical megachilids have the same large size, elongate bodies, and striking coloration that characterize *Creightonella*, *Gronoceras*, *Maximegachile*, and others. The species of this group, especially those having elongate, porrect mandibles and a short, tumescent clypeus in the female, have often been called *Eumegachile*. Examination of *Megachile bombycina* Radoszkowski, a Palearctic species on which *Eumegachile* was based, shows that while its mandibles are superficially like those of the tropical species usually placed in that subgenus, in reality the bee is very different. The mandibles of true *Eumegachile* are quadridentate with a cutting edge in the second interspace; like other leafcutting *Megachile* it has the rear part of the thorax similar to that of *Megachile* s.str., or in reality more like that of *Sayapis*, the metanotum and propodeum being less nearly vertical and the axillar fossae larger than in *Megachile* s.str. The tropical species, however, constitute a new subgenus of *Chalicodoma*, here named *Callomegachile*.

The subgenera *Pseudomegachile* and *Archimegachile* are in some ways similar but *Callomegachile* differs from them in its usually striking coloration and the lack of serration of the carina of the sixth tergum of the male. An interesting feature of *Callomegachile* is the arrangement of the punctures of the mesoscutum and the lower halves of the mesepisterna in irregular parallel rows so that a coarsely striate and occasionally extremely rugose appearance is produced. This character of punctation, the slender male gonocoxites, and the rounded rather than bidentate sixth sternum of the female readily separate *Callomegachile* from *Maximegachile*.

Large or sometimes moderate sized, body parallel-sided; posterior part of thorax similar to that of *Chalicodoma* s.str.; head much developed posteriorly, often with a preoccipital carina or distinct ridge; prothoracic lobe usually carinate. Metasoma parallel-sided, occasionally (*menamerae*, etc.) with rather deep transverse grooves suggestive of *Chelostomoides* or *Hackeriapis*.

FEMALE Mandible broad, four or usually five toothed, or slender, porrect, three to four toothed, without cutting edge; clypeus not protuberant; first flagellar segment broader than long and shorter than second. Basitarsi much shorter and much narrower than corresponding tibiae; **claws simple**; sixth tergum slightly concave in profile, sides straight seen from above, surface with short suberect hairs and tomentum as are found on other terga;

sixth sternum with scopal hairs throughout, no bare rim; sterna without apical pubescent bands.

MALE Mandible tridentate with or without median inferior swelling or projection, basal projection absent; first flagellar segment broader than long, much shorter than second. First coxa with apical spine, sometimes reduced to tubercle or absent, anterior surface with short or long hairs, no rufescent bristles; anterior tarsus not or slightly broadened; middle tibial spur present, claws symmetrical; middle and hind basitarsi unmodified, slender, middle ones more than half as long as tibia, hind ones about half as long as tibia. Carina of sixth tergum not much produced, a small weak emargination medially, a deep depression in tergum above center of carina, carina not toothed; margin of sixth tergum not toothed; four sterna exposed; hidden sterna delicate, often without modified hairs; gonocoxites very slender, apices simple.

This subgenus occurs in Africa, southern Asia, the Malay Archipelago, and Australia. It includes numerous species, many of which will be listed in the paper mentioned in the introduction. Among the included forms are not only the close relatives of the type species, such as *pretiosa* (Fries) and *nidulator* (Smith), but various somewhat smaller forms such as *cephalotes* (Smith) and *birói* (Fries), and a group of coarsely punctate forms [e.g., *faceta* (Bingham), *mcnamerae* (Cockerell)] in some of which the females have the scopal hairs thickened or spatulate.

The type species is described as new since, although it is one of the better known species of the subgenus, it is nameless, having long been misidentified as *Megachile mystacea* (Fabricius), which is in reality a species of the subgenus *Callochile* of *Megachile*.

Chalicodoma mystaceana new species

This species differs from its close relatives by the uniformly bright orange pubescence of the metasoma except for the base of the first tergum and by the entirely black thoracic pubescence. Relatives such as *C. pretiosa* and *nidulator* all have black and white areas, at least on the metasoma.

FEMALE Length 13 mm., wing length 9 mm.; Head broader than long; eyes scarcely diverging below; clypeus three times as broad as long, anterior margin little overhanging base of labrum, margin with two weak, feebly defined projections, one on each side of midline; interocellar distance equal to or slightly greater than ocellocular distance, about two thirds of ocellocipital distance; genal area broadest below, about as broad as eye seen from side, margined posteriorly by distinct preoccipital carina. Mandible five toothed, two upper teeth close together. Punctuation of head and thorax

dense; epistomal suture between tentorial pits and longitudinal median clypeal carina (strongest above) smooth and elevated; punctures of mesonotum arranged in irregularly transverse rows, those of lower half of mesepisternum in strong rows with distinct shining ridges between them; metanotum and propodeal triangle finely granular, upper margin of latter with zone of coarse shining pits, distinct laterally and almost absent medially; metasomal punctation fine. Integument entirely black; wings fuscous. Pubescence of head and thorax black, whitish hair intermixed around antennal bases; pubescence of legs black, rufescent on tarsi, especially on under sides; metasoma with pubescence (including scopa) bright orange except that of first sternum and base of first tergum which is black; orange pubescence of terga largely obscuring surface, short and plumose, with scattered longer hairs.

MALE Length 10–11 mm., wing length 8 mm. Similar to female but eyes slightly converging below; clypeus little over twice as broad as long, anterior margin with weak median emargination. Mandible tridentate, lower surface with low, hairy prominence before middle. Anterior coxa with short, anteriorly directed apical spine, anterior surface of coxa with hairs short; anterior tarsus slightly broadened, second tarsal segment the broadest, almost twice as long as broad; first tarsal segment nearly as broad as second and nearly twice as long. Punctation slightly coarser than in female, arrangement of thoracic punctures into rows less obvious but still distinct on lower half of mesepisternum; epistomal suture not elevated; clypeus without longitudinal carina. Integument black except for fore tarsus which is brown with outer margins of first four segments black; distal tarsal segments of other tarsi somewhat rufescent. Pubescence of head and thorax black, forming a dense white to ochre brush, mixed with sparse black hairs, across apex of clypeus; upper two thirds of clypeus nearly bare, with short, sparse black and white hairs; hairs between antennae dense and white; sides of face and vertex with white hairs intermixed among black; lower part of genal area with white hairs; hypostomal area and lower surface of mandible with dusky hairs; pronotal lobes with a few whitish hairs. Pubescence of legs black, dusky or rufescent in certain areas, strongly rufescent on tarsi, ochraceous on under sides of tarsi; front tarsus with some short glistening whitish hairs on outer surface, short coarse, robust, black hairs along inner margins of first three segments, and a few scattered, long, erect, robust, black hairs along outer margins of first three segments. Pubescence of metasomal terga like that of female, that of first and second sterna dusky, of third and fourth ochraceous.

HOLOTYPE female, allotype male, and one male and 19 female paratypes: Brisbane, Queensland, Australia, November 29, 1958, on flowers of *Pongamia pinnata* (C. D. Michener, collector). One female and three male paratypes, same locality, November 7, 1958 (C. D. Michener). The type and allotype will be placed in the collection of the Queensland Museum, Brisbane. Under the name *mystacea* (Fabricius), this species has been recorded from various localities in Queensland, north as far as Kuranda.

Chalicodomoides new subgenus

TYPE species *Megachile aethiops* Smith, 1853

This subgenus is known from a single species which was described as *aethiops* by Smith from Africa. It is, however, widely distributed in northern Australia whence it has been described under the names *doddiana* Cockerell and *clarki* Cockerell. It is presumably a native in Australia; it seems likely that the African record was an error. In general appearance and in the unusually oblique apical margin of the mandibles, this subgenus resembles a sparsely hairy *Chalicodoma s. str.* It differs from that subgenus as well as from most others in having only three exposed metasomal sterna in the male.

Large, with body parallel-sided; posterior part of thorax similar to that of *Chalicodoma s. str.*

FEMALE Mandible with apical margin very oblique, about half as long as maximum mandibular length with only three small widely separated teeth, no cutting edge; clypeus strongly produced over base of labrum; first flagellar segment as long as broad, shorter than second; small sharp tooth behind base of mandible. Basitarsi much shorter than and somewhat narrower than corresponding tibiae; claws each with strong basal tooth. Metasoma robust and rather parallel-sided; sixth tergum protruding midapically so that profile as well as lateral margins (seen from above) are concave; sixth sternum also produced midapically to form broad, weakly bilobed projection; scopal hairs present on base of sixth sternum, otherwise hairs confined to a large lateroapical fovea on each side; large triangular area between foveae and hairy base of sternum smooth and shining, this area continuous midapically with margin of apical projection which is also smooth and shining; sterna without apical hair bands.

MALE Mandible tridentate without inferior projection; first flagellar segment broader than long, shorter than second. Front coxa with anterior surface hairy, no apical spine or spicules; anterior tarsi slightly broadened; middle tibial spur present; middle and hind basitarsi slender, unmodified, much shorter than corresponding tibiae; middle claws symmetrical. Carina of sixth tergum moderately produced, a strong emargination in center, not toothed, no deep depression in tergum; margin of sixth tergum not toothed; three exposed sterna; fifth and sixth sterna with patches of modified hairs; gonocoxites with apices broad, hairy.

Chelostomoda new subgenus

TYPE *Megachile spissula parvula* Strand, 1913¹

This subgenus has exactly the appearance of small, rather ordinary species of *Hackeriapis* or *Chelostomoides*. *M. spissula*

¹ The trinomial is designated as the type because specimens of both sexes of that form have been available for study and dissection. Probably *parvula* is a synonym of *spissula*.

from Taiwan was placed in *Chelostomoides* by Mitchell (1937). This error is entirely understandable in view of the similarity to *Chelostomoides*. The subgenus differs especially by the characters in bold face in the description below, which also separate it from *Hackeriapis*. The presence of a cutting edge in the second interspace of the mandible of the female is unique in *Chalicodoma*; the only *Megachile* having only this cutting edge are in the subgenera *Sayapis* and *Eumegachile*.

Small, slender bodied, parallel-sided, coarsely sculptured; posterior part of thorax as well as transverse tergal grooves as in *Hackeriapis* and *Chelostomoides*, pitted zone at base of propodeum present only laterally; **tergal grooves not fasciate**; terga with apical pubescent fasciae; head not much developed posteriorly, lateral ocellus being little nearer eye than margin of vertex; preoccipital ridge sharp but not carinate; pronotal lobe carinate.

FEMALE Mandible five toothed, **large incomplete cutting edge in second interspace**; first flagellar segment broader than long, slightly shorter than second. Middle and hind basitarsi distinctly shorter and narrower than corresponding tibiae; claws simple. Metasoma parallel-sided, sixth tergum distinctly concave in profile apically, lateral margins about straight seen from above, surface with neither erect hair nor pale tomentum; sixth tergum with scopa over entire surface, **no shining marginal area**; **sterna two to four with apical hair bands** at least laterally.

MALE Mandible tridentate, no inferior projection; first flagellar segment slightly broader than long, less than half as long as second. First coxa hairy on anterior surface, without apical spine or reddish bristles; anterior tarsi somewhat broadened; middle tibial spur present, claws symmetrical; middle and hind basitarsi much less than half length of corresponding tibiae and narrower. Carina of sixth tergum rounded, not toothed, region of carina bulbous except medially, middle of carina minutely and weakly emarginate; margin of sixth tergum with a tooth at each side but no submedian teeth; three exposed sterna.

Distribution: India to Japan, Indonesia, New Guinea, and northern Australia.

The species of this subgenus will be listed in the work referred to in the introduction. Some of them are *spissula* (Cockerell), *erimae* (Mocsáry), and *carteri* (Cockerell).

Genus *Creightonella* Cockerell

Creightonella Cockerell, 1908, Entomologist, 41: 146.

TYPE *Megachile mitimia* Cockerell, 1908.

This group name has previously been used as an African subgenus of *Megachile*, for a group of species with the carina of the sixth tergum of the male very coarsely toothed. The carina is much more rounded in some of the Indomalayan species such as

frontalis (Fabricius). Species of this genus are large, parallel-sided forms, wholly black or with the abdomen covered with red hair or with patches of white hair laterally.

The most distinctive generic characters are the six-toothed mandibles of the female with similar shaped cutting edges in the second, third and fourth intervals (that in fourth small), the parallel-sided body with the posterior thoracic structure similar to that of *Megachile*, the six exposed metasomal sterna of the male (instead of three or four as in other genera), and the transverse form of the eighth metasomal sternum of the male (if the spiculum is ignored).

In the type species and certain other African forms the fourth sternum of the male is quadrispinose and the fifth, although exposed, is smooth, not sculptured like the preceding ones. In the Indomalayan species, as in some African ones such as *consanguinea* (Smith), the six exposed sterna are little modified and the first five are similarly punctate and hairy.

Very large, parallel-sided species; posterior part of thorax similar to that of *Megachile s. str.* but axillar fossa somewhat larger than usual in that group.

FEMALE Mandible six toothed with rather small, incomplete cutting edges in second, third and fourth intervals, that in fourth interval small and inconspicuous from the front; first flagellar segment shorter than second. Middle and hind basitarsi much shorter and narrower than corresponding tibiae; claws simple. Metasoma parallel-sided; sixth tergum scarcely concave in profile, without projecting apex, lateral margins nearly straight seen from above, surface with hairs longer than on preceding terga, no tomentum; sixth sternum with scopal hairs over almost entire surface, hiding posterior marginal bare zone; sterna without apical bands of pale hair.

MALE Mandible tridentate, lower margin with median projection, but lacking basal one; first flagellar segment much shorter than second. First coxa hairy anteriorly, with short, robust, blunt inner apical spine, without rufescent spicules; anterior tarsi unmodified or very slightly broadened; middle tibial spur present, claws symmetrical; middle and hind basitarsi less than half as long as corresponding tibiae and much slenderer. **Carina of sixth tergum broadly expanded**, slightly concave medially, slightly irregular to coarsely toothed, **disc of tergum with longitudinal median ridge**; posterior margin of sixth tergum with strong lateral tooth; **seventh tergum with margin strongly convex, disc with strong longitudinal median ridge**; **six exposed sterna**, sixth with posterior margin broadly convex and forming closure of genitoanal cavity, **fifth and sixth sterna without membranous zones demarking medasternites** such as occur in most *Megachile* and *Chalicodoma*; **eighth sternum a transverse plate**, hairy at apex, with very long spiculum; gonocoxite very slender, not lobed apically.

Distribution: Africa to India, China, the Philippine Islands, Indonesia, and New Guinea, perhaps northern Australia.

Included species are listed in the work described in the introduction but include such forms as *frontalis* (Fabricius) [= *lachesis* (Smith)], *albifrons* (Smith), *fraterna* (Smith), *fervida* (Smith), *atrata* (Smith), etc.

Genus *Megachile* Latreille

Megachile Latreille, 1802, Histoire Naturelle de Fourmis, p. 413, 433.

TYPE *Apis centuncularis* Linnaeus, 1758 (designation of Curtis, 1828, British Entomology, 5: 218).

This generic name is here applied to all the broad-bodied leaf cutting groups. These include the subgenera *Acentron* Mitchell, 1934; *Amegachile* Friese, 1909; *Argyropile* Mitchell, 1934; *Austromegachile* Mitchell, 1943; *Chrysosarus* Mitchell, 1943; *Cressoniella* Mitchell, 1934; *Dactylomegachile* Mitchell, 1943; *Dasymegachile* Mitchell, 1943; *Delomegachile* Viereck, 1916; *Derotropis* Mitchell, 1936; *Eutricharaea* Thompson, 1872 (= *Paramegachile* Friese, 1899; *Androgynella* Cockerell, 1911); *Holcomegachile* Moure, 1953; *Leptorachis* Mitchell, 1934; *Litomegachile* Mitchell, 1934; *Macromegachile* Noskiewicz, 1948; *Megachile* Latreille, 1802, s. str. (= *Anthemois* Robertson, 1903; *Cyphopyga* Robertson, 1903); *Megachiloides* Mitchell, 1924; *Melanosarus* Mitchell, 1934; *Neomegachile* Mitchell, 1934; *Phaenosarus* Mitchell, 1934; *Pseudocentron* Mitchell, 1934; *Ptilosarus* Mitchell, 1943; *Tylomegachile* Moure, 1953; *Xanthosarus* Robertson, 1903; and *Xeromegachile* Mitchell, 1934.

In addition to the above listed subgenera, the genus *Megachile* includes certain parallel-sided forms which fall in the subgenera *Sayapis* Titus, 1905 (= *Gnathocera* Provancher, 1882; *Ceratias* Robertson, 1903) and *Eumegachile* Friese, 1898.

The following new subgenus is named at this time in order that placement of species can be made by certain other workers.

Callochile new subgenus

TYPE *Megachile ustulatiformis* Cockerell, 1910 (= *mystacea* Fabricius, 1775)

This is a subgenus containing large species of broad bodied *Megachile* in which the abdomen, instead of being provided with

apical bands of pale pubescence, has more or less extensive areas of orange tomentum. Superficially, therefore, if body shape (sometimes deceptive) is ignored, these species often resemble those of the subgenus *Callomegachile* of *Chalicodoma*. The terga have strong transverse postgradular grooves. The mandibles of the female are unusually broad, with the second and third teeth broad, thin, the third especially so, and truncate. The broad mandibles with long sharp edges are superficially suggestive of the African *Amegachile*, in which however, the sharp edges are distinctly extraordinarily well developed cutting edges, the teeth proper being pointed.

Large, broad-bodied species; posterior part of thorax as in *Megachile* s. str.

FEMALE Mandible quadridentate with long complete cutting edge in third interval, **third tooth irregularly and broadly truncate, second** (in our forms) **obliquely truncate**; first flagellar segment about two thirds as long as second; middle and hind basitarsi both distinctly shorter than respective tibia, hind nearly as broad as to broader than tibia; claws with small basal spicule. Metasoma broad, sixth tergum slightly concave in profile, lateral margins slightly concave seen from above, surface with suberect hairs and (like other parts of metasoma) orange tomentum; sterna without apical pubescent fasciae, the sixth without large hairless area but hairs short apically, no bare rim.

MALE Mandible four toothed, with inferior basal projection; first flagellar segment less than half length of second. First coxa with anterior face nearly bare, no rufescent bristles, apical spine large; anterior tarsus slightly enlarged; middle tibial spur present and movable; middle claws asymmetrical; middle and hind basitarsi about half lengths of respective tibiae. Carina of sixth tergum rounded with small median emargination; apical margin of sixth tergum with four small teeth, distance between submedian ones slightly greater than distance from one of them to lateral tooth; metasoma with four exposed sterna, fifth with short medasternal area provided with specialized capitate hairs; sixth not narrowed sublaterally, medasternal area represented by a shelf like expansion on either side from disc of sternum bearing coarse, immovable, capitate processes; eighth sternum without hairs on lateral margins; gonostylus somewhat enlarged and slightly lobed at apex.

Distribution: Northern Australia to southeast Asia and India.

Included species are listed in the work mentioned in the introduction. The following are two of the better known forms:

mystacea (Fabricius) (= *ustulatiformis* Cockerell, new synonymy)¹, *bicolor* (Fabricius).

Literature Cited

- FABRICIUS, JOH. CHRIST. 1798. Supplementum Entomologicae Systematicae, pp. 1-572 + 52, Hafnia.
- MICHENER, CHARLES D. 1944. Comparative external morphology, phylogeny, and a classification of the bees (Hymenoptera), Bull. Amer. Nat. Hist., 82: 151-326.
- MITCHELL, T. B. 1937. A revision of the genus *Megachile* in the Nearctic region, Part VIII, Trans. Amer. Ent. Soc., 63: 381-426.

¹ This is not the *mystacea* of most authors, which is *Chalicodoma* (*Callo-megachile*) *mystaceana*. The type of *mystacea* in the Banks Collection, British Museum (Natural History) is a *Callockile* apparently identical to *ustulatiformis* which therefore falls in synonymy. To avoid confusion I have designated the latter name as the type of the subgenus.



Michener, Charles D. 1962. "Observations on the Classification of the Bees Commonly Placed in the Genus *Megachile* (Hymenoptera: Apoidea)." *Journal of the New York Entomological Society* 70, 17–29.

View This Item Online: <https://www.biodiversitylibrary.org/item/206458>

Permalink: <https://www.biodiversitylibrary.org/partpdf/179790>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder

Rights Holder: New York Entomological Society

License: <http://creativecommons.org/licenses/by-nc/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.