

Metallic forms of *Nomia* (*Mellitidia*) of New Guinea
in the collection of Bishop Museum
(Hymenoptera, Halictidae)¹⁾

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This paper has been prepared primarily to describe new species of the subgenus *Mellitidia*, which is one of the most interesting subgenera of the genus *Nomia*, although it concerns only the metallic forms of that subgenus. Previously four metallic species of *Mellitidia*, namely, *longicornis* Smith, *metallica* Smith, *gressitti* Michener and *simplicinotum* Michener, have been known from the Austro-Papuan Region. In this paper, seven more species will be described as new, and the male of *simplicinotum* will newly be described.

The subgenus *Mellitidia* Guérin-Méneville is composed of medium-sized *Nomia* bees which, either black or metallic, are characterized in having the malar area being at least one-half as long as the basal width of the mandible and the metanotum armed with a median projection (although sometimes weak). The females are further distinct in having the mandibles being tridentate and the inner spurs of the hind tibia pectinate because of the presence of two or rarely *three* large projections. So far as the elongate malar area is concerned, *Mellitidia* is most closely related to the subgenus *Ptilonomia* Michener, but is easily separable from the latter in the absence of the darkening along the costa of the hind wing beyond the hamuli. The subgenus has not been found outside the Austro-Papuan Region.

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1. Males	2
Females	5
♂ ♂	
2. Whole body brassy or blue-green with brassy reflection in part ... Metallic coloration limited primarily to thorax or whole body nearly all black	3 4
3. Integument brassy with tints of green on clypeus, "metathorax" and thorax beneath; clypeus produced and highly polished; tegulae and tarsi rufo-testaceous; length about 10 mm. Aru Island (specimen not seen)	<i>longicornis</i> Smith
Integument blue-green with brassy reflection in part; mandible, apical part of malar area and antennae black; posterior face of propodeum purple except for extension of basal enclosure; malar area about twice as long as basal width of mandible; scape about as long as malar area; first fla- gellar segment about twice as long as broad or a little longer, following segments about three times as long as broad, becoming slightly slender apically; ocellocular space distinctly concave; posterior depression of first tergum sharply indicated, about one-half as long as rest of same tergum, about as long as posterior depression of second; first sternum strongly convex in shape of Δ ; length about 10 mm.	<i>gressitti</i> Michener
4. Mesoscutum dark brassy-blue or dark steel-blue, dull; metallic coloration of head, mesepisterna and scutellum weaker than mesoscutum; metasoma black, broad posterior depressions of second to fifth terga testaceous with silky tints; scape slightly longer than malar area, about three times as long as broad at apex; first flagellar segment one and a half times as long as broad; following ones slightly more than twice as long as broad; basal enclosure of propodeum shiny, strongly pitted; posterior depression of first tergum distinctly shorter than that of second; posterior margin of fourth sternum with rather dense ferrugineous or bri- ght ochreous hairs in middle; length 8-9 mm.	<i>simplicinotum</i> Michener
Whole body nearly all black except for weak purple reflections on clypeus and supraclypeal area; first flagellar segment about twice as long as broad, following ones approximately	

- two and a half times as long as broad; propodeal enclosure pitted, median portion not carinate posteriorly; posterior face of propodeum broadly shiny with coarse, sparse punctures laterally; posterior depression of first tergum slightly shorter than that of second; posterior margin of fifth sternum with a dense decoration of black hairs in middle; length about 10 mm. *nigrescens* sp. n.
- ... 2
... 5
... 3 ♀ ♀
5. Integument brilliantly metallic, although metallic coloration of metasoma sometimes weakened 6
Metallic coloration limited primarily to head and thorax or thorax alone 11
6. Dark metallic green, with bright tint of green in certain lights; clypeus black, smooth and shining at apex; basitibial plate broad. Length about 11 mm. Waigiou (specimen not seen) *metallica* Smith
Basitibial plate slender 7
7. Brilliant blue-green species; metallic coloration of clypeus not at all reduced; projection on metanotum strong 8
Metasoma steel-blue or brassy; metallic coloration of clypeus reduced, black or reddened apically; projection on metanotum very weak 10
8. Malar area about as long as basal width of mandible; ocellular space distinctly concave; mesoscutum with weak, sparse punctures; posterior depression of first tergum about two-thirds as long as rest of same tergum, the latter nearly impunctate or with a faint indication of sparse punctures; posterior face of propodeum green above, broadly purple in middle, brassy below; trochanteral floccus ochreous basally, fuscous apically; length nearly 11 mm.
..... *gressitti* Michener
- Malar area shorter than basal width of mandible; posterior depression of first tergum broader, about as long as rest of same tergum or even longer; posterior face of propodeum brassy, with weak purple reflections, if any; mesoscutum with strong punctures; trochanteral floccus fuscous ... 9
9. Malar area longer, about two-thirds as long as basal width of mandible; frons and sides of face strongly brassy, the latter rather densely punctured, spaces between them distinctly tessellate; ocellular space hardly concave; mesoscutum with strong punctures which are nearly as strong as those on clypeus; mesepisterna without longitudinal rugae on upper portion; propodeal corbicula ochreous; hairs
- Smith
Michener
Michener

- on intermediate sterna ochreous; length about 10 mm.
 *viridissima* sp. n. 12
- Malar area shorter, slightly more than one-half of basal width of mandible; frons and sides of face less brassy; the latter sparsely punctured, spaces between punctures hardly tessellate; upper interocular distance narrow; ocellocular space concave; mesoscutum with punctures sparser medially and posteriorly; mesepisterna with longitudinal rugae; propodeal corbícula fuscous; hairs on sterna nearly fuscous; length 11-12 mm. *viridiaenea* sp. n.
10. Head dark steel-blue, mesoscutum and scutellum blue with slight to strong brassy reflections, metasoma steel-blue; clypeus broadly black apically; malar area about one-half as long as basal width of mandible; mesoscutum with strong punctures; posterior depression of first tergum broadened in middle, longer than rest of same tergum, densely punctured except extreme apical margin which is brown in color; dense black hair patches on antero-lateral corners of mesoscutum; sterna with dense, densely plumose, ochreous hairs; length about 9 mm. *plumosiscopa* sp. n.
- Integument brassy; metasoma especially shining with weaker brassy reflections; clypeus reddened apically; malar area as long as basal width of mandible; flagellum beneath pale reddish brown; tegulae nearly rufo-testaceous; legs reddened; trochanteral floccus bright ochreous; inner hind tibial spurs with *three* large projections; first tergum, except for posterior depression, rather strongly punctured, punctures sparse in middle, rather dense at sides, intermixed with minute dense punctures; apical half of posterior depression of second tergum impunctate; length about 9 mm.
 *aeraria* sp. n.
11. Posterior depressions of metasomal terga broad, those of second to fourth or sometimes third and fourth or rarely first to fourth testaceous with silky reflections; head black or with very faint metallic blue, green and purple reflections; clypeus reddish brown or testaceous apically; mesoscutum dark brassy green or brassy blue-green, dull; metanotum densely covered with ochreous hairs which conceal very weak projection; malar area nearly two-thirds as long as basal width of mandible; length about 10 mm.
 *simplicinotum* Michener
- Posterior depressions of metasomal terga hardly discolored; only mesoscutum dark steel-blue or with greenish reflections; scutellum nearly black 12

12. Malar area about as long as basal width of mandible; apical portion of clypeus and central portion of supraclypeal area smooth and shiny; head with long fuscous hairs anteriorly; propodeal corbicula and trochanteral floccus bright ochreous, the latter fuscous apically; hairs on inner sides of hind tibiae fuscous, those on inner sides of hind tarsi bright ochreous; length about 9 mm. *nigrescens* sp. n.

Malar area about one-half as long as basal width of mandible; head primarily with grey hairs; hairs on inner sides of hind tarsi darker. 13

13. Mandibles reddened apically; labrum and clypeus entirely black; clypeus weakly biconvex, sparsely punctured; mesoscutum with punctures rather strong and sparse; metanotum with grey tomenta not hidden integument; propodeal corbicula not well developed, yellowish grey, with fuscous hairs dorsally; base of first tergum with fuscous hairs; posterior depression of first tergum about as long as rest of same tergum, a little longer than posterior depression of second; length slightly less than 10 mm.

..... *subcaerulescens* sp. n.

Mandibles broadly pale reddish brown; labrum and apical portion of clypeus nearly testaceous; clypeus hardly biconvex; mesoscutum with punctures not strong, weaker than in preceding species; metanotum densely covered with ochreous hairs like *simplicinotum*; propodeal corbicula composed of long ochreous hairs; base of first tergum with ochreous hairs; posterior depression of first tergum slightly shorter than rest of same tergum, slightly shorter than posterior depression of second; length about 9 mm.

..... *nigricrus* sp. n.

Nomia (Mellitidia) gressitti Michener

Nomia (Mellitidia) gressitti Michener, 1965, Bull. Amer. Mus. Nat. Hist., 130: 307, ♀ ♂.

This fine species is undoubtedly one of the most remarkable species of *Nomia* in the Austro-Papuan Region. It is easily recognizable by its brilliant blue-green coloration of the body. When Prof. Michener described this species, he did not designate several female specimens as paratypes, although he determined them as *gressitti*. Having examined these specimens not included in the type series, the author came to the conclusion that they may represent two distinct species. Although they are scarce in numbers and lacking in the male sexes, they

are so distinct in many details that the author will describe them as new species. Consequently, the species group of *gressitti* may be composed of three species at present.

Nomia (Mellitidia) viridissima sp. n.

This species is most essentially different from *Nomia gressitti* not only in the head measurements (see below) but also in having the vertex between the orbits and ocelli being not at all concave (distinctly concave in *gressitti*), the vertex more convex in front view (cf. Figs. 1, 2), the punctures on the mesoscutum and scutellum much stronger (very weak in *gressitti*), and the posterior depressions of metasomal terga, especially that of the first tergum, broader and more strongly punctured.

Female: Slightly smaller than *gressitti*, length about 10 mm.; wing length, 9 mm. Relative head measurements: width, 10.2 (11.0 for one paratype of *gressitti*); length, 9.2 (9.5 for one paratype of *gressitti*); thus, head slenderer than in *gressitti*, and face much narrower as shown in figure; eye length, 6.7; lower interocular distance, 5.6; upper interocular distance, 4.7. Inner eye margins very slightly converging below except for upper portions which converge strongly toward ocelli; malar area shorter than in *gressitti*, about two-thirds as long as basal width of mandible; mandibles tridentate as in *gressitti*; clypeus much less biconvex than in *gressitti*; space between orbit and ocellus hardly concave; vertex convex in front view; ocelli smaller than in *gressitti*; interocellar distance much less than ocellocular distance, a little less than twice as long as an ocellar diameter (about one and a half times as long as an ocellar diameter in *gressitti*). Relative lengths of antennae as in *gressitti*. Metanotum with a median projection stronger than in *gressitti*; propodeum vertical like *gressitti*; basal zone more strongly wrinkled (longitudinally) than in *gressitti*. Tibial spurs as in *gressitti*. First tergum with posterior depression as long as or longer than rest of same tergum seen from above; posterior depression of second tergum about three-fourths as long as basal portion; first sternum with a strong longitudinal median keel which ends as a large projection posteriorly; this projection much stronger than in *gressitti*.

Surfaces of head and thorax tessellate as in *gressitti*; clypeus with scattered punctures irregular in distribution and size, slightly stronger than in *gressitti*; lower portion of supraclypeal area more or less triangularly flattened, with strong punctures at sides; paraocular area below antennae, except for space near orbits, much coarsely punctured than in *gressitti*, punctures irregular in size; frons and anterior vertex with punctures stronger than in *gressitti*, though they are much weaker than

those on clypeus; mesoscutum with strong punctures slightly varying in size and distribution; scutellum flat, punctured like mesoscutum; episterna more roughened and more strongly punctured than in *gressitti*. Basal portion of first tergum with strong punctures becoming denser toward lateral portions; punctures on posterior depression sparser than in *gressitti*; basal portion of second tergum with fairly coarse punctures much stronger than in *gressitti*; posterior depression sharply marked, densely punctured except for extreme apical margin; sterna quite densely and coarsely punctured.

Color: Similar to *gressitti*, but differs as follows: frons and paraocular area brassy, shining; black parts along inner orbits much reduced than in *gressitti*; posterior face of propodeum brassy, almost without purple reflection; metasomal terga brighter than in *gressitti*, brassy green, partly a little bluish in holotype; sterna brassy green, shining.

Pubescence: Similar to *gressitti*, but hairs on mesoscutum shorter, less blackish, femoral floccus entirely fuscous (ochreous basally in *gressitti*), and hairs on sterna slightly paler.

Type material: Holotype female (BISHOP 7091), Feramin, 150-120 m., NE New Guinea, 1-6. VI. 1959 (W. W. Brandt); paratype female, Eliptamin Valley, 1,665-2,530 m., NE New Guinea, 19. VI. 1959 (W. W. Brandt).

The specific name refers to the beautiful coloration of the body.

Nomia (Mellitidia) viridiaenea sp. n.

This species is most closely related to *Nomia viridissima*, from which it differs in having the malar area being shorter (much shorter than in *gressitti*), the upper interocular distance narrower (much narrower than in *gressitti*), the ocellocular space distinctly concave (somewhat like *gressitti*, but the ocellar triangle not elevated), and the propodeal corbícula fuscous. The posterior depression of the first metasomal tergum is as long as or even a little longer than in *viridissima*, much longer than in *gressitti*; the puncturation on the mesoscutum is almost as strong as in *viridissima*, much stronger than in *gressitti*. The further characters of importance are given below.

Female: Length, 11-12 mm.; wing length, 10 mm. Relative head measurements: width, 10.6; length, 9.4; upper interocular distance, 4.5; lower interocular distance, 5.7. Face narrower than in *gressitti*; inner eye margins a little converging below except upper portions which converge toward ocelli like *viridissima*; malar area a little more than one-half as long as basal width of mandible; mandibles like *viridissima*; clypeus biconvex like *gressitti* (more strongly so than in *viridissima*), with sparse (sparser than in *viridissima*), strong punctures; paraocular

area below antennal base much less punctured than in *viridissima*, smoother than in *viridissima* and *gressitti*; interocellar distance slightly shorter than ocellular distance, about one and a half times as long as an ocellar diameter. Mesoscutum weakly tessellate, more shining than in *viridissima*, with sparse, rather strong punctures; scutellum much less tessellate than in *viridissima* and *gressitti*, with sparse, strong punctures; metanotal projection like *viridissima*, slightly longer than in *gressitti*; posterior face of propodeum with scattered, rather transverse punctures; basal zone of propodeum sculptured nearly as in *viridissima*; mesepisterna coarsely punctured with wrinkles confluent in longitudinal rows (no longitudinal wrinkles on upper portion in *gressitti* and *viridissima*). Wings and legs essentially as in *gressitti* and *viridissima*. Metasoma more shining than in *gressitti*; punctures on posterior depressions on first and second terga sparser than in *gressitti*, a little weaker than in *viridissima*; median projection of first sternum about as strong as in *gressitti*.

Color: Similar to *gressitti* and *viridissima*; frons more brassy than in *gressitti*; frons and paraocular areas, especially the latter, less brassy than in *viridissima*; mesoscutum and scutellum slightly more bluish; posterior face of propodeum strongly brassy with faint purple reflection; metasoma brighter and less blackish than in *gressitti*.

Pubescence: Similar to *viridissima*, but hairs on sides of propodeum fuscous, and those on venter of metasoma nearly fuscous (slightly darker than in *gressitti* and much darker than in *viridissima*).

Type material: Holotype female (BISHOP 7092), Gailala: Loloipa Owen Stanley Range, New Guinea, 11-20. XII. 1957 (W. W. Brandt); paratype female, 1-15. II. 1958 (W. W. Brandt).

The specific name is responsible for the beautiful coloration of the body.

Nomia (Mellitidia) plumosiscopa sp. n.

This species is distinct so far as the presence of the dense, densely plumose, scopa-like hairs on the second to fifth metasomal sterna is concerned. Females of *simplicinotum*, however, possess such a kind of hairs on the sterna, but they are not conspicuous. The metasoma of *simplicinotum* is black, while it is wholly metallic in this species. In addition, there exists a dense patch of rather short, black hairs on the latero-apical corner (just in front of the tegula) of the mesoscutum. Thus, this species is easily separable from others.

Female: Length, about 9 mm.; wing length, 7 mm. Relative head measurements: width, 9.4; length, 7.6; eye length, 6.3; upper interocular distance, 4.4; lower interocular distance, 4.7. Inner eye margins rather strongly converging below except for upper one-fourth which strongly converges toward ocelli; malar area about one-half as long as basal

width of mandible; mandibles as usual for subgenus; clypeus slightly biconvex; vertex horizontal, below tangent of tops of eyes when seen in front; vertex between ocellus and orbit hardly concave; interocellar distance about one-half as long as ocellocular distance, about one and a half times as long as an ocellar diameter; first two flagellar segments broader than long, third a little longer than broad, following ones longer than broad; metanotal projection weak; propodeal enclosure subhorizontal, posteriorly defined by a sharp carina which is subinterrupted in middle; enclosure with strong longitudinal carinae or, in holotype, subpitted. Basitibial plate like *simplicinotum*; tibial spurs as usual for subgenus. Third submarginal cell distinctly longer than first, the latter more than twice as long as rather narrow second. Posterior depression of first tergum sharply indicated, broadened in middle, longer than basal part of tergum seen from above; posterior depression of second nearly as long as basal part of same tergum; first sternum keeled only basally.

Surfaces of head and thorax weakly tessellate, the former more roughened than the latter except for apical part of clypeus where smooth, shiny, largely impunctate; rest of clypeus with rather sparse, strong punctures irregular in distribution; supraclypeal area narrowly impunctate in middle; paraocular areas with scattered, shallow, roughened punctures; mesoscutum strongly, moderately densely punctured, punctures widely separated posteriorly; anterior portion of mesoscutum intermixed with minute punctures; scutellum flat, punctured like posterior portion of mesoscutum; metanotum roughened; dorso-lateral face of propodeum coarsely sculptured; posterior face of propodeum less coarsely sculptured; mesepisternum densely and coarsely punctured, punctures on upper portion sparser than those on lower portion, rugulae between punctures obscurely running longitudinally on lower portion. Metasomal terga much less tessellate than in thorax; basal part of first tergum nearly smooth and very sparsely punctured in middle, densely punctured at sides; posterior depression very densely punctured, punctures much stronger than in *gressitti*, about as strong as in *viridissima*; basal portion of second irregularly punctured, with small (basally) to large (apically and laterally), contiguous to widely separated punctures; posterior depression punctured like that of first; extreme apical margin of first tergum very narrowly, that of second broadly impunctate; sterna densely, coarsely punctured.

Color: Head less metallic than thorax, dark steel blue with brassy reflection here and there; mandibles, black basally, broadly reddened apically; malar area, apical part of clypeus, and upper paraocular area black; the latter broadened at antennal level; median portion of supraclypeal area bright blue-green; basal part of clypeus and sides of supraclypeal area with purple and brassy reflections. Antennae black

except for undersides of flagella brown. Extreme apical part (vertical) of mesoscutum, and sutures and margins of both mesoscutum and scutellum purple; discs of mesoscutum and scutellum blue with slight (in holotype) to more or less strong (in paratype) brassy reflection; metanotum dark steel blue with purple reflections around projection; propodeum dark steel blue with greenish reflection; sides of thorax steel blue with very slight brassy reflection in paratype; posterior lobes of pronotum nearly black. Tegulae nearly black or deep brown; wings slightly brownish with distal margins more darkened; veins brown; stigma fuscous. Legs blackish (in holotype) or brownish; spurs brownish; metasoma steel blue or more bluish, shining; median part of second tergum narrowly transversely blackened; extreme apical margins of terga brownish; sterna obscurely metallic.

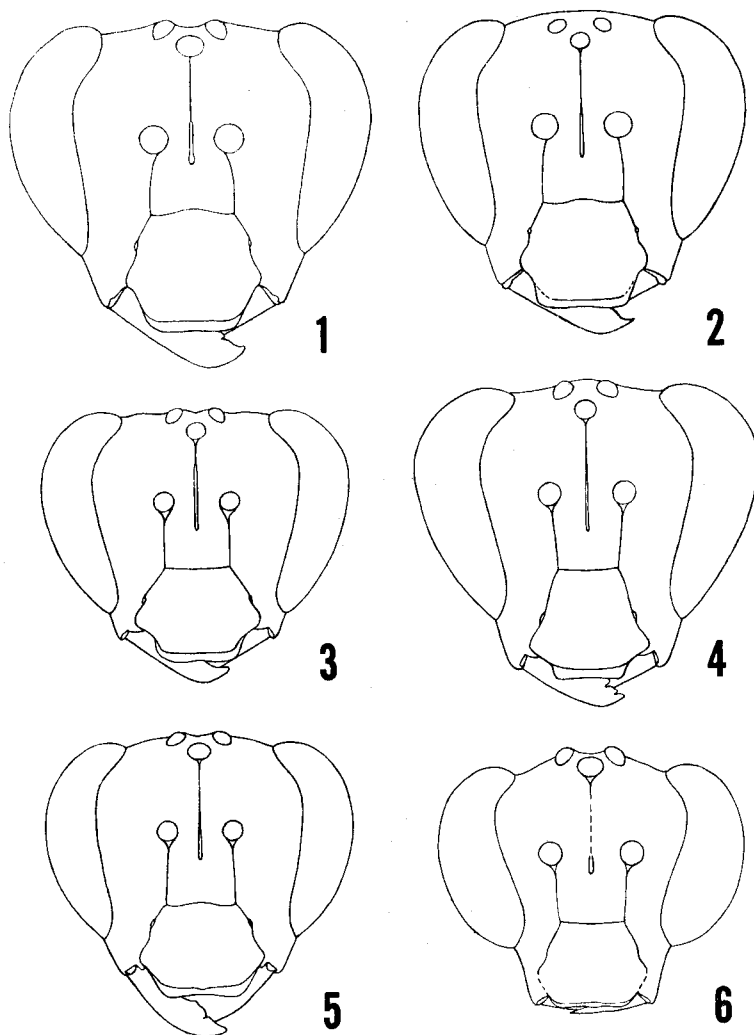
Pubescence: Hairs on face grey except for those on upper paraocular areas and vertex fuscous; dense hairs on genae and occiput grey; black hair patch on latero-apical corner of mesoscutum; hairs on mesoscutum and scutellum blackish, not conspicuous; propodeal corbicula ochreous, well developed. Hairs on mesepisterna paler. Hairs on legs primarily fuscous except for those on inner sides of tibiae and tarsi, especially those on hind legs, bright ochreous and for considerably well developed femoral floccus ochreous basally. Metasoma scanty of hairs dorsally; hairs on basal (vertical) part of first tergum rather short, bright ochreous; posterior margin of first with small pale hair patches at sides; hairs on fifth blackish; hairs on sterna ochreous to pale ochreous; lateral parts of second and third sterna with coverings of short dense hairs; scopa-like plumose hairs of sterna covering only median portion on second, becoming progressively broader toward fourth, and very short on basal portion and becoming progressively longer toward apical margin on each sternum.

Type material: Holotype female (BISHOP 7093), Wau, 1,200 m., New Guinea, 12. X. 1965 (J. & M. Sedlacek, by Malaise trap); paratype female, Saidor: Sibog Vill., Finisterre Range, NE New Guinea, 6-16. VI. 1958 (W. W. Brandt).

The specific name refers to the unusual hairs on the sterna, which may be considered as scopa since, in the paratype, a lot of pollens adheres to it.

Nomia (Mellitidia) aeraria sp. n.

So far as the long malar area is concerned, this species is referable to *Nomia gressitti*, but is easily separable from the latter not only by the coloration of the body but also by the shape of the head as shown in figure. This species is also referable to the following species, *nigres-*



Figs. 1-6. Front view of the heads of *Nomia* (*Mellitidia*).

- | | |
|--|---------------------------------------|
| 1. <i>gressitti</i> Michener, female. | 2. <i>viridissima</i> sp. n., female. |
| 3. <i>plumosiscopa</i> sp. n., female. | 4. <i>aeraria</i> sp. n., female. |
| 5. <i>nigrescens</i> sp. n., female. | 6. <i>nigrescens</i> sp. n., male. |

(Drawn by same scale)

cens sp. n., which also has a long malar area, but is easily distinguished from the latter in having the brassy color of the body.

Female: Length, about 9 mm.; wing length, 8 mm. Relative head measurements; width, 10.5; length, 9.4; eye length, 7.2; upper interocular distance, 4.4; lower interocular distance, 5.0. Inner eye margins more

or less distinctly converging below except for upper portions which converge strongly toward ocelli; malar area about as long as basal width of mandible; mandibles as usual for subgenus; unlike *gressitti*, clypeus not biconvex but roundly convex subapically; supraclypeal area somewhat conical; ocellocular space hardly concave; its distance rather short, a little longer than interocellar distance; the latter about one and a half times as long as an ocellar diameter; scape only slightly exceeding vertex, shorter than in *plumosiscopa* or species group of *gressitti*; first two flagellar segments broader than long, third a little longer than broad, following segments more distinctly longer than broad; scutellum indistinctly biconvex on posterior portion; metanotal projection obscure like *plumosiscopa*; propodeal enclosure posteriorly defined by sharp carina except for median portion extending down onto posterior face of propodeum; interior of enclosure longitudinally carinate or nearly pitted. Basitibial plate slightly broader than in *gressitti*; *inner hind tibial spurs with three large projections*. Third submarginal cell much longer than first, the latter more than twice as long as second. Posterior depression of first tergum less sharply indicated than in *gressitti*, shorter than basal portion of same tergum; that of second indistinctly shorter than that of first, shorter than one-half of rest of same tergum; first metasomal sternum not keeled, median portion only slightly convex subapically.

Surfaces of head and thorax minutely tessellate, apical portion of clypeus rather broadly smooth, shining; clypeus sparsely punctured, punctures on lateral sides much smaller than those on median portion; supraclypeal area more closely punctured than in clypeus, with a few closer punctures on center; paraocular area delicately roughened with indistinct punctures; punctures on frons and anterior vertex very small, but more distinct than those on lower portion of face; punctures on mesoscutum small to large, rather sparse in middle, separated by one to several puncture widths; scutellum a little more sparsely punctured than in mesoscutum; dorso-lateral portion of propodeum roughened; posterior face not aciculate, shining, densely punctured, punctures small, intermixed with strong, rather sparse punctures in middle; mesepisterna moderately roughened. Metasomal terga not aciculate, highly shining, with moderately strong punctures; punctures on basal portion of first tergum sparse in middle, dense on lateral portions, intermixed with minute, dense punctures; posterior depression of first moderately densely punctured, punctures slightly smaller than those larger punctures of basal portion of same tergum; second rather irregularly, more or less strongly punctured, intermixed with minute punctures which are sparser than those of similar size of first; punctures on posterior depression of second slightly smaller and denser than those on corresponding portion of first; extreme apical margin of first narrowly im-

punctate; apical halves of posterior depressions of second and third impunctate.

Color: Mandibles broadly reddened except for darkened basal and apical portions; labrum red; clypeus reddened apically, broadly blackish with weak purple reflections in middle, brassy with strong purple reflections laterally; malar area black, piceous apically; marginal area of supraclypeal area brassy, inside of it dark purple, and centre of supraclypeal area dark blue; rest of head brassy with bluish tint. Antennae piceous, flagellum beneath broadly pale reddish brown. Posterior lobe of pronotum reddish brown; mesoscutum and scutellum brassy; metanotum and propodeum a little less brassy than scutellum; sides of thorax steel blue with slight brassy reflection. Tegulae reddish testaceous, subhyaline; wings with slight yellowish reflection, apical margins darkened; veins and stigma brown. Legs reddish brown or more reddened; spurs and claws nearly ferrugineous. Three basal terga dark with dark brassy reflection; impunctate apical margins of those terga deep reddish brown; fourth and fifth piceous with brassy and purple reflections; sterna piceous, partly darkened.

Pubescence: Face, except for clypeus and supraclypeal area, densely covered with short, densely plumose, glistening pale yellowish hairs; genal area with not specially long (shorter than in *plumosiscopa*), slightly greyish hairs. Posterior lobe of pronotum with yellowish grey hairs; mesoscutum with rather sparse, rather short, fine, finely plumose, pale glistening hairs, intermixed with brownish plumose ones; somewhat long fuscous hairs on latero-apical corners of mesoscutum; metanotum densely covered with yellowish grey tomentum basally; sides of propodeum with more yellowish grey or ochreous hairs; hairs on mesepisterna similar to those on genae in color. Hairs on femora glistening ochreous including well developed femoral floccus of hind legs; hairs on outer sides of tibiae and tarsi fuscous except for long, silvery bristles on hind legs; hairs on inner sides of tibiae and tarsi of fore legs ferrugineous, those of middle legs a little more brownish, those of hind ones nearly fuscous. Hairs on metasoma, including sterna, glistening pale ochreous except for brown hairs on fifth tergum.

Type material: Holotype female (BISHOP 7094), Wewak, 2-20 m., NE New Guinea, 25. VI. 1959 (J. L. Gressitt).

The specific name refers to the brassy color of the body.

Nomia (Mellitidia) simplicinotum Michener

Nomia (Mellitidia) simplicinotum Michener, 1965, Bull. Amer. Mus. Nat. Hist., 130: 390, ♀.

The female of this species has the first metasomal sternum being

armed with an apical small projection which is more evident than the metanotal projection. The intermediate metasomal sterna are decorated with finely branched hairs somewhat like *plumosiscopa*. Coloration of the posterior depressions of the metasomal terga is variable. Usually the depressions of the second to fourth terga are testaceous with silky tint, but occasionally the depression of the second tergum is blackish like that of the first tergum, or rarely the depressions of first four terga are testaceous. Sometimes the legs are more paler than "dark brown" as indicated in the original description. If so, then the tibiae and tarsi or the tarsi and the apices of tibiae or the tarsi alone are ferrugineous.

The male has a similar appearance of the female except for the sexual differences. The description of it is given below.

Male (New to science): Length, 8-9 mm. Relative head measurements; width, 8.7; length, 7.5; eye length, 5.4; upper interocular distance, 4.6; lower interocular distance, 4.3. Inner eye margins converging below except for upper parts which converge strongly toward ocelli; malar area twice as long as basal width of mandible; mandibles simple with sharp apices; clypeus obscurely biconvex; ocellocular space concave, its distance slightly longer than interocellar distance, the latter about twice as long as an ocellar diameter. Scape three times as long as broad; first flagellar segment one and a half times as long as broad, basal portion slightly swollen; following segments slightly more than twice as long as broad. Scutellum biconvex; metanotum with projection obscure like female; unlike female, interior of basal zone of propodeum polished, shiny, strongly pitted. Legs slender; tibial spurs finely serrate. Posterior depression of first tergum sharply indicated, about one-half as long as rest of same tergum, much narrower than depression of second; base of second tergum constricted; first metasomal sternum convex without apical projection; posterior margin of fourth sternum truncate laterally and weakly emarginate in middle.

Surfaces of head and thorax densely tessellate; clypeus weakly shining apically, scattered with small punctures which are about as large as those on frons, a little weaker than those on mesoscutum; mesepisternum as coarse as in female; dorso-lateral portion of propodeum densely punctured; metasoma densely and coarsely punctured, but sometimes punctures weak, especially on first tergum; posterior depression of first tergum weakly and densely punctured, or sometimes punctures evanescent; medio-basal portion of depression of second weakly punctured; depressions of third and fourth impunctate.

Color: Similar to female, but metallic coloration of thorax darker; tibiae and tarsi variable in color, dark brown to ferrugineous; usually posterior depressions of second to fifth terga testaceous with silky tints like female.

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Pubescence: Similar to female except for decumbent, short, bright ochreous hairs on sides of clypeus and paraocular areas, and for dense, ochreous hairs on lower frons and antennal regions; hairs on inner sides of hind tibiae fuscous except for some ferrugineous hairs on apical portions.

Specimens examined: 20 ♂♂, 30 ♀♀, from Northeast and Northwest areas of New Guinea.

Nomia (Mellitidia) nigrescens sp. n.

This species is easily separated from the above described species in having the integument being black except for the mesoscutum which is only slightly metallic. So far as the reduced metallic coloration is concerned, this species is referable to two following species, but this is quite distinct in having the long malar area.

Female: Length, about 9 mm.; wing length, about 7.5 mm. Relative head measurements: width, 9.2; length, 7.8; eye length, 5.7; upper interocular distance, 4.5; lower interocular distance, 5.2. Inner eye margins converging below except for upper one-third which strongly converges toward ocelli; malar area about as long as basal width of mandible; mandible as usual for subgenus; clypeus weakly biconvex; supraclypeal area strongly convex in middle; space between orbit and ocellus very slightly concave, much longer than interorbital distance, the latter a little less than twice as long as an ocellar diameter. Scape long, strongly exceeding vertex; first flagellar segment about as long as wide, second broader than long, third about as long as wide, following segment becoming progressively longer toward terminal one. Scutellum weakly biconvex; metanotal projection small; basal zone of propodeum subhorizontal, carinate posteriorly at sides; interior longitudinally wrinkled, not pitted. Basitibial plate and tibial spurs as usual for subgenus. Third submarginal cell much longer than first, the latter about two and a half times as long as second; posterior depression of first tergum well indicated, about two-thirds as long as basal part of same tergum, about as long as depression of second; first metasomal sternum with an apical projection rounded at apex in lateral view.

Surfaces of head and thorax minutely roughened except for most part of clypeus and central part of supraclypeal area smooth and shiny; clypeus sparsely punctured on basal half, broadly impunctate or with very widely scattered punctures on apical portion; supraclypeal area impunctate in middle; paraocular area almost impunctate near orbit, densely punctured near clypeus and supraclypeal area, punctures much smaller than those on supraclypeal area; frons and vertex with punctures minute and sparse. Mesoscutum densely punctured near

parapsidal lines, sparsely punctured in middle; punctures on median portion of mesoscutum much weaker than those on clypeus; scutellum weakly punctured; dorso-lateral areas of propodeum coarsely sculptured; posterior face almost impunctate or punctures indistinct; mesepisterna coarsely sculptured with longitudinal wrinkles on lower portion. First tergum weakly punctured, broadly nearly impunctate in middle; posterior depression weakly and densely punctured, punctures about as large as those on sides of face; second with large, shallow punctures separated from one to five puncture widths; posterior depression densely punctured basally, punctures becoming sparser and weaker toward apex; metasomal terga, including posterior depressions, tessellate, feebly shining.

Color: Black; mandibles reddened apically; malar area near base of mandible and apical portion of clypeus piceous; sometimes frons with very weak purple reflection. Flagellum beneath brown. Mesoscutum weakly steel blue or greenish blue with weak purple reflection. Legs piceous; spurs brown or reddish brown. Tegulae deep brown; wings brownish, with more or less strong yellowish reflection; veins and stigma brown. Posterior depressions of terga hardly discolored or sometimes deep reddish brown.

Pubescence: Hairs on head and thorax more or less abundant, long, fuscous on head in front and thorax above, ochreous on genae, occiput and sides of thorax including propodeal corbicula; posterior face of propodeum with sparse, long, plumose hairs on upper portion. Trochanteral floccus well developed, bright ochreous, narrowly fuscous apically; hairs on outer faces of tibiae and tarsi fuscous, those on inner sides bright ochreous except for those on inner sides of hind tibiae fuscous; thus, bristles on inner sides of hind tibiae making striking contrast in color to those of inner sides of hind tarsi. Metasoma scanty of hairs as usual for *Mellitidia*; hairs on base of first tergum and those on sterna ochreous; hairs on second and following terga primarily blackish except for some ochreous hairs on extreme sides.

Male: Length, about 10 mm.; wing length, 8 mm. Relative head measurements: width, 9.4; length, 7.8; eye length, 5.7; upper interocular distance, 4.7; lower interocular distance, 4.3. Inner eye margins converging below except upper portions which strongly converge toward ocelli; malar area about twice as long as basal width of mandible; mandibles about two and a half times as long as broad at base, tapering toward pointed apex; clypeus nearly entire or only slightly biconvex subapically; upper portion of supraclypeal area slightly convex medially; ocellocular space deeply concave, its distance longer than postocellar distance, the latter about one and a half times as long as an ocellar diameter. Scape slightly longer than malar area; first segment of flagellum about twice as long as wide, basal half slightly

swollen; following segments approximately two and a half times as long as broad. Scutellum biconvex; metanotum nearly entire; posterior face of propodeum sharply truncate; enclosure with lateral portion horizontal, nearly pitted, median portion not bounded by carina posteriorly. Wings as in female. Legs slender, without special modification; posterior spur of hind tibia finely serrate with rather long teeth. Metasoma more or less elongate; base of second tergum slightly constricted; posterior depression of first tergum sharply marked, about one-half as long as rest of same tergum, slightly shorter than corresponding portion of second; first metasomal sternum convex transversely in shape of Δ , top of which ends as a process apically, rounded in lateral view; posterior margins of second and third sterna entire; posterior margin of fourth truncate laterally and broadly emarginate medially; that of fifth emarginate and hairy.

Surfaces of body including posterior depressions of metasomal terga minutely roughened, dull or nearly so; apical portion of clypeus smooth, shiny, with more sparse punctures than basal portion of clypeus; frons and upper paraocular areas with minute, sparse punctures; mesoscutum more or less densely punctured, punctures weaker than those on basal portion of clypeus; scutellum punctured like mesoscutum; dorso-lateral face of propodeum coarsely sculptured; posterior face of propodeum broadly shining, with coarse, sparse punctures on lateral portions; mesepisterna coarsely sculptured with an indication of coarse, roughened punctures, wrinkles running longitudinally, especially distinct below. Punctures on basal portion of first tergum roughened, those on second irregular in size, rather dense, but smaller than those in female; punctures on posterior depressions more evident than in female.

Color: Black, hardly metallic except for very slight purple reflection on clypeus and supraclypeal area; mandibles red apically; labrum piceous; apical portion of clypeus testaceous. Flagellum beneath obscure reddish brown. Tegulae and wings as in female. Legs piceous or more brownish; inferior faces of fore and mid femora testaceous. Posterior depressions of terga hardly discolored.

Pubescence: Hairs on paraocular areas and sides of clypeus dense, bright ochreous; hairs on antennal regions and lower frons between antennae long, dense, erect, ochreous; head with long, fuscous hairs, most conspicuous on vertex; hairs on genae long, dense, pale ochreous except for sparse fuscous ones near orbits. Hairs on tubercles, mesoscutum and scutellum fuscous; those on dorso-lateral portions of propodeum and basal portion of first metasomal tergum fairly long, well branched, bright ochreous; hairs on pleura nearly fuscous above, becoming ochreous beneath. Hairs on inner sides of tarsi bright ochreous; hairs on inner sides of hind tibiae short, fuscous; hairs on outer faces of tibiae primarily fuscous. Long ochreous hairs on first meta-

somal tergum becoming brownish toward apical margin; hairs on second and following terga fuscous; sterna scanty of hairs; basal portion of fourth sternum with short, glistening pale hairs; apical margin of fifth with dense decoration of black bristles in middle.

Type material: Holotype female (BISHOP 7095), Nondugl, 2,200 m., NE New Guinea, 28. V. 1959 (C. D. Michener); allotype male (BISHOP), Owen Stanley Range, Goilala: Bome, 1,950 m., SE New Guinea, 8-15. III. 1958; paratype female, same, locality as allotype, 24. II-7. III. 1958 (W. W. Brandt); paratype female, same locality as allotype, 16-30. IV. 1958 (W. W. Brandt); paratype female, Edie Creek, 17.6 km West of Wau, 2,000 m., New Guinea, 20. VII. 1961 (J. & M. Sedlacek); paratype female, 22 km. SE Okapa, 2,100 m., NE New Guinea, 28. VIII. 1964 (J. & M. Sedlacek).

The specific name refers to the blackened integument of the body as well as the blackened hairs on the inner sides of the hind tibiae.

Nomia (Mellitidia) subcaerulescens sp. n.

So far as the reduced metallic coloration of the body is concerned, this species is referable to *nigrescens*, but is easily separated from the latter in having the shorter malar area, densely tessellate clypeus and supraclypeal area, fuscous trochanteral floccus, etc. The propodeal corbicula of this species is not well developed, composed of rather short, not specially dense hairs. On the contrary, the trochanteral floccus is highly developed with long, dense hairs.

Female: Rather robust; length, slightly less than 10 mm.; wing length, about 9 mm. Relative head measurements: width, 10.4; length, 8.7; eye length, 7.0; upper interocular distance, 4.7; lower interocular distance, 5.4. Inner eye margins converging below except for upper portions which strongly converge toward ocelli; malar area about one-half as long as basal width of mandible; clypeus very slightly biconvex; supraclypeal area broadly well convex medially; ocellocular space hardly concave; interocellar distance a little more than one-half of ocellocular distance, slightly wider than an ocellar diameter. Scape long, about as long as first six flagellar segments taken together; first flagellar segment about as long as broad, second broader than long, third and following ones longer than broad. Mesoscutum roundly convex; scutellum nearly flat; metanotal projection obscure. Third submarginal cell much longer than first, the latter more than twice as long as second. Basitibial plate and tibial spurs as usual. Posterior depression of first tergum sharply indicated, somewhat broadened medially, about as long as rest of same tergum, very slightly longer than depression of second; first sternum with apical projection obtuse.

Surfaces of head and thorax tessellate; clypeus with rather strong, scattered punctures; supraclypeal area impunctate in middle; punctures on paraocular areas (except for near portion of orbits), frons and anterior vertex weaker than those on clypeus. Mesoscutum rather strongly punctured, punctures almost as coarse as those on clypeus, separated from one to several puncture widths; scutellum punctured like mesoscutum; basal zone of propodeum narrow, weakly wrinkled longitudinally; dorso-lateral face of propodeum densely punctured, punctures weaker than those on mesoscutum; mesepisterna coarsely sculptured, punctures as well as wrinkles becoming stronger toward lower portions; first tergum weakly and sparsely punctured in middle, punctures becoming stronger and denser toward sides of tergum; posterior depression somewhat densely, weakly punctured; second tergum more or less strongly punctured, punctures weaker than those on mesoscutum, irregular in distribution; basal half of posterior depression weakly punctured; punctures on third nearly as distinct as those on second.

Color: Mandibles reddened apically. Flagellum reddish brown beneath. Mesoscutum and scutellum dark steel blue, with purple reflection on margins and sutures. Tegulae deep brown; wings pale brownish with yellowish reflection, distal margins darkened. Legs piceous; spurs brownish except for inner spurs of hind tibiae reddened. Metasoma piceous, posterior depressions hardly discolored.

Pubescence: Hairs on head dull grey except for sparse fuscous ones on paraocular areas, frons and vertex. Hairs on thorax predominantly fuscous; metanotum with grey tomenta; propodeal corbicula yellowish grey, with fuscous hairs dorsally. Wings slightly brownish, with slight yellowish reflections, distal margins darkened. Hairs on legs primarily fuscous except for those on inner sides of hind tarsi slightly paler; hairs on inner sides of hind tibia iridescent in some light. Hairs on metasoma fuscous except for caudal fimbria (on fifth tergum) and for those on sterna bright ochreous; hairs on second to fifth sterna dense.

Type material: Holotype female (BISHOP 7096), Eliptamin Valley, 1,200-1,350 m., 19.-30. VI. 1959 (W. W. Brandt).

The specific name refers to the coloration of the thorax.

Nomia (Mellitidia) nigricrus sp. n.

This species is related to *subcaerulescens* so far as the coloration of the body is concerned, but is distinguished from the latter in having the labrum and the apical portion of the clypeus testaceous, the mesoscutum more densely punctured and the metanotum more densely pubescent. The recognition of the female of this species is rather easy

because of the bicolored clypeus, the feature of which is only seen in *simplicinotum*.

Female: Length, about 9 mm.; wing length, slightly over 7 mm. Relative head measurements: width, 9.5; length, 7.7; eye length, 6.4; upper interocular distance, 4.3; lower interocular distance, 5.0. Inner eye margins converging below except for upper one-third which strongly converges toward ocelli; malar area about one-half as long as basal width of mandible; clypeus nearly entire, not biconvex as in *simplicinotum*; supraclypeal area well convex; postocellar distance slightly shorter than ocellular distance, about one and a half times as long as an ocellar diameter. Scape well exceeding vertex, about as long as first six flagellar segments; first flagellar segment about as long as broad, second broader than long, following ones longer than broad. Posterior portion of scutellum slightly depressed in middle; metanotal projection obtuse; basal zone of propodeum carinate posteriorly, strongly longitudinally carinate or nearly pitted interiorly. Third submarginal cell much longer than first, the latter more than twice as long as second. Basitibial plate and tibial spurs as usual. Posterior depression of first tergum sharply indicated, obscurely broadened in middle, slightly shorter than rest of same tergum, slightly shorter than depression of second.

Surfaces of head and thorax tessellate, dull, metasoma less tessellate and shinier than head and thorax; clypeus more or less strongly, rather sparsely punctured; punctures on apical (colored) portion nearly obsolete; median portion of supraclypeal area narrowly impunctate; sides of face with punctures slightly coarser than those on frons; mesoscutum somewhat strongly punctured, punctures weaker than those on clypeus, intermixed with minute, closer punctures; thus, mesoscutum perforated with two kinds of punctures; scutellum punctured like mesoscutum; dorso-lateral face of propodeum nearly coarsely sculptured; posterior face with scattered weak punctures; mesepisterna with longitudinal rugae distinct. First tergum with sparse, coarse punctures slightly more distinct than in *subcaerulescens*; posterior depression weakly and densely punctured, punctures slightly denser and stronger than in *subcaerulescens*; second strongly and sparsely punctured; posterior depression narrowly impunctate apically; punctures on third considerably weaker than those on second.

Color: Mandibles broadly pale reddish brown medially, darker apically and blackish basally; labrum and apical portion of clypeus nearly testaceous; rest of head black. Flagellum reddish brown beneath. Mesoscutum dark steel blue or slightly more greenish; rest of thorax almost blackened. Tegulae deep brown, narrowly pallid anteriorly; wings dusky, outer margins more darkened; veins and stigma brown. Legs dark brown with tarsi a little reddened; spurs brownish. Meta-

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soma dark piceous; posterior depressions of terga hardly discolored.

Pubescence: Hairs similar to *subcaerulescens* except as follows: mesoscutum with short, plumose, pale hairs laterally; metanotum densely covered with ochreous hairs; propodeal corbicular well developed, bright ochreous, not mixed with fuscous hairs; hairs on base of first tergum bright ochreous.

Type material: Holotype female (BISHOP 7097), Torricelli Mts., Sugoi-Vill., 90 m., NE New Guinea, 24. I-5. II. 1959 (W. W. Brandt).

The specific name refers to the dark legs which are decorated with dark pubescence.