

## ON SOME *XYLOCOPA*-SPECIES FROM THE SUNDA ISLANDS

(Hymen.: Xylocopidae).

By

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The majority of the species reported in the present paper are received from Dr. K. W. DAMMERMAN, Director of the Zoölogisch Museum en Laboratorium, Buitenzorg, Java. A few additional materials are from Mr. E. BANKS of the Sarawak Museum, Kuching, Borneo, Dr. WALTHER HORN, Director of the Deutsches Entomologisches Institut, Berlin-Dahlem, Germany, Dr. A. ROMAN of the Entomologiska Advelningen, Naturhistoriska Riksmuseum, Stockholm, Sweden and Dr. FR. MAIDL of the Naturhistorische Hofmuseum, Vienna, Austria. I am greatly indebted to these gentlemen for their kindness in loaning me the specimens.

The specimens listed in the paper are understood to be of the Buitenzorg Museum, otherwise specially mentioned.

Genus **XYLOCOPA** LATREILLE (1804).

Subgenus **Nyctomelitta** COCKERELL (1929).

### ***Xylocopa myops*** RITS.

1876. *Xylocopa myops*, RITSEMA, Tijdschr. v. Ent., XIX, p. 177, no. 1, ♀.

1896. *Xylocopa myops*, DALLA TORRE, Cat. Hymen., X, p. 215.

1901. *Xylocopa grandiceps*, CAMERON, Proc. zool. Soc. Lond., I, p. 33, ♀.

1912. *Xylocopa tranquebarica*, MAIDL (in part), Ann. naturh. Hofmus. Wien, XXVI, p. 306.

1918. *Xylocopa grandiceps*, COCKERELL, Entomologist, LI, p. 104, ♀.

1929. *Xylocopa tranquebarica*, DOVER (nec *Fabricius*), Bull. Raffles Mus. Singapore, II, p. 60, no. 23.

♂. — Unknown.

♀. — Differing from *X. tranquebarica* (FABR.) by the following points:

Pubescence. — Face and posterior abdominal tergites without pale fulvous, long, velvety hairs. Pubescence on dorsal and lateral surfaces of thorax paler and with a little greenish tints. That on abdominal tergites sooty brown, erect, not extraordinarily long; posterior margin except the median portion of tergites II-V each with a narrow and dense fascia of whitish hairs; epipygium with dense, short, rufous hairs.

**Structure.** — Inter-orbital distance at the level of antennal fossae about  $9/14$  as long as vertico-clypeal distance. Frontal keel apically narrow, very strong, and gradually decreasing in elevation towards the base; median fovea shallow. Supraclypeal region poorly defined, not depressed, medially very smooth and broadly impunctate. Tentorial pits extraordinarily elongate. Clypeus very flat, basally with a rather narrow median impunctate band; basal portion distinctly more elevated than its neighbouring frontal regions. Basal triangular area of mandibles separated from outer marginal suture by a broad, weak keel; outer tooth apically narrowly rounded. Vertex punctate in first-degree-density<sup>1)</sup>. Inter-ocellar distance about one and one-half times as long as ocello-ocular distance. Inter-antennal distance and antenno-ocular distance subequal. Wing-vein *M* about  $2/3$  as long as  $M_{1+2}$  (1st section). Knee-caps on posterior tibiae extending to basal half of tibial length. Abdominal tergites deeply and evenly punctate in first-degree-density.

**Dimensions.** — Length of body ♀ 27 - 32 mm, of anterior wing ♀ 23 - 25 mm.

**Type-specimens.** — ♀, from Banka, deposited in the Leiden Museum (one paratype in the British Museum, London). Type of *X. grandiceps* CAM., ♀, from Singapore, in the British Museum (Natural History), London.

**Specimens Examined.** — SUMATRA: Atjeh, Pendeng, 200 m, II.37, A. HOOGERWERF, 1 ♀. — Fort de Kock, 920 m, V.24, E. JACOBSON, 1 ♀. — Bangko, VII.25, Djambi Exped., O. POSTHUMUS, 3 ♀. — Selemoekoe, VIII.25, Djambi Exped., O. POSTHUMUS, 2 ♀. — Silinda, MJÖBERG, 1 ♀ (Stockholm Mus.). — BORNEO: Kaunzak, 11.V.14, 1 ♀ (Sarawak Mus.). — Matang, 7.V.14, H. E. DAVIDSON, 1 ♀ (Sarawak Mus.). — 10th mile, VII.1894, 1 ♀ (Sarawak Mus.). — Quop, III.1894, 1 ♀ (Sarawak Mus.). — Serai, 12.II.10, 1 ♀ (Sarawak Mus.). — "Borneo", 1886, F. BACZES, 1 ♀ (Vienna Mus.) (det. MAIDL as *X. tranquebarica* FABR.).

Besides the Sunda Islands (Sumatra, Java, Borneo), this species is also known to occur in the Malay Peninsula.

**Remarks.** — The identity of this species has often been confused with *X. tranquebarica* (FABR.) because of their similarity in general appearance and in structural characters. They can be, however, readily separated by the frontal keel, clypeus and abdominal punctuation. F. SMITH's *X. rufescens* (1874) from India and Java, now generally considered as a synonym of *X. tranquebarica* as firstly pointed out by SCHULZ (Ztschr. f. Hymen. u. Dipt., I, p. 273, 1901) is without doubt composed of a mixture of both *X. tranquebarica* from India and *X. myops* from Java. Probably SCHULZ has overlooked the specific difference between *tranquebarica* and *myops*, and the specimens (from Perak, Malay Peninsula) which he considered to be *tranquebarica* are really *myops*.

According to Dr. O. W. RICHARDS's information, the term "clypeus" employed by CAMERON in his description of *X. grandiceps* should be read "labrum". It

<sup>1)</sup> Terminology of ALLEN et JAYNES, Proc. U. S. nation. Mus., LXXVI, 17, p. 4. 1930.

may be of some interest to point out that CAMERON has misunderstood *X. rufescens* F. SM. as a *Coptorthosoma* GRIB.

The clypeal punctuation of the Sumatran specimens is distinctly larger than that of the Bornean ones. This seems to indicate some meaning of zoo-geographical variation, but I cannot express any definite opinion about it until I can have both sexes from different regions.

Subgenus **Biluna** MAA (1938).

***Xylocopa nasalis iridipennis*** (LEPEL.), comb. nov.

1841. *Xylocopa iridipennis*, LEPELETIER, Hist. nat. Hymen., II, p. 188, no. 24, ♂ (nec ♀).  
 1854. *Xylocopa iridipennis*, F. SMITH, Cat. Hymen. Brit. Mus., II, p. 353, no. 44.  
 1873. *Xylocopa iridipennis*, F. SMITH, Jour. Linn. Soc. Lond. Zool., XI, p. 393, no. 8.  
 1874. *Xylocopa pictipennis*, F. SMITH, Trans. ent. Soc. Lond., p. 277, n. 65, ♀.  
 1876. *Xylocopa iridipennis*, RITSEMA, Tijdschr. v. Ent., XIX, p. 63.  
 1896. *Xylocopa iridipennis* + *X. pictipennis*, DALLA TORRE, Cat. Hymen., X, pp. 213 & 217.  
 1912. *Xylocopa (Xylocopa) iridipennis*, MAIDL, Ann. naturh. Hofmus, Wien, XXVI, p. 287, ♀♂.  
 1925. *Xylocopa iridipennis*, ALFKEN, Ent. Rundsch., XLII, p. 41.  
 1925. *Xylocopa fenestrata iridipennis*, DOVER, Ann. Mag. nat. Hist., (9) XV, p. 222.  
 1926. *Xylocopa iridipennis*, DOVER, China Jour. Sci. & Art, IV, p. 235.  
 1927. *Xylocopa lunulata*, JACOBSON (nec LEPELETIER), Supplem. Ent. XVI, pp. 94 et seq.  
 1929. *Xylocopa fenestrata* var. *iridipennis*, DOVER, Bull. Raffles Mus. Singapore, II, p. 59, no. 18.  
 1933. *Xylocopa lunulata*, ROEPKE (nec LEPELETIER), Misc. zool. sumatrana, no. 78, pp. 1-3, 1 pl.

Differing from *X. nasalis auripennis* (LEPEL.) by the following points:

**I n t e g u m e n t.** — Black element on face ♂ more prominent: clypeus usually predominantly black, sometimes purely black. Wings basally greenish, with a little bluish and violaceous tints; medially (up to the apex of enclosed cells) with strong purple lustre; apical marginal area greenish golden, with rich purplish tints; extreme apical margin narrowly purple; the greenish golden lustre being much less brilliant than that in *X. nasalis auripennis*, usually more dominant in posterior wings.

**P u b e s c e n c e.** — Sometimes the whitish hairs of ♂ entirely absent.

**S t r u c t u r e.** — Face with punctures mostly in first-degree-density. Length of antennal segment III subequal to segments IV-VI. Posterior femora of ♀ ventrally punctate in second-degree-density. Lateral portion of abdominal tergites I-II and entire III-VI punctate in second-degree-density.

**V a r i a t i o n.** — The wings of some specimens are dominantly purplish in the apical portion and bluish green in the extreme apical margin. The punctuation of the Sumatran and Malayan individuals is usually larger and deeper than that of the Javanese ones.

**D i m e n s i o n s.** — Length of body ♂ 28 - 32 mm, ♀ 19 - 27 mm; of anterior wing ♂ 25 - 28 mm, ♀ 18 - 26 mm.

Type-specimens. — ♂, from "Inde", probably deposited in the Turin Museum; type of *X. pictipennis* F. SM., ♀, from Java, in the British Museum (Natural History), London.

Specimens Examined. — MALAYA: Hills near Taipin, Perak, 26-30.XII.15, N. ANNANDALE, 1 ♂ (Calcutta Museum). — SINKIEB<sup>1</sup>), J. WOOD-MASON, 1 ♂ (Calcutta Museum). — SUMATRA: Fort de Kock, 920 m, E. JACOBSON, 1 ♂, 1 ♀ (Deutsch. ent. Institut) (det. ALFKEN as *X. lunulata* LEP. = *X. iridipennis* LEP.). — SEBESI I. (Strait Sunda), IV.21, K. W. DAMMERMAN, 1 ♀ (det. ALFKEN as *X. mcgregori* CKLL. and det. MAIDL as *X. auripennis* LEP.). — JAVA: Garoet, Kamodjang, 1400 m, 21.IV.30, M. A. LIEFTINCK, 1 ♂. — Mt. Gedeh, Tjibodas, 1400 m, 1 ♂ (det. MAIDL). — Penandjoeng Bay, Tjimerak, VIII.36, M. A. LIEFTINCK, 1 ♀. — E. Preanger, Singadjaja, 570 m, 18.VIII.28, H. H. KARNY, 1 ♀. — "Java", 1 ♀ (Deutsch. ent. Institut) (det. ALFKEN). — Batavia, 27.VI.-9.VII.06, BRUNETTI, 1 ♀ (Calcutta Museum). — Buitenzorg, KEMNER, 1 ♀ (Stockholm Museum).

This subspecies has been erroneously recorded from India, Burma, China and the Philippines.

Remarks. — The original description by LEPELETIER is, without doubt, applying to the male sex (not the female as indicated by him). The female of all known species and subspecies of the subgenus *Biluna* is always purely black-haired, while the male is usually "linea antica collari et macula utrinque subalarum basi, albido villosis." BINGHAM's (1897) remarks "the male with the front entirely black and with no lateral yellow lunules" are incorrect. Presumably LEPELETIER has overlooked this character while describing *iridipennis* and *auripennis*.

ALFKEN has suggested that *X. iridipennis* and *X. lunulata* should be associated as the same species, but I believe it is more reasonable to sink the latter as a synonym of the typical *X. nasalis* WESTW. The name *X. iridipennis* LEPEL. was not included in F. SMITH's monograph of this genus, in which he described *X. pictipennis* as new.

COCKERELL (Philipp. Jour. Sci., XVI, p. 205, 1920) has mentioned that the present subspecies was separable from *X. nasalis mcgregori* (CKLL.) by its longer III antennal segment and by its larger body-size. But these two characters seem to be not quite reliable as shown above (in *mcgregori*, length of anterior wing ♂ 22 - 23, ♀ 21 - 24.5 mm).

#### Subgenus *Zonohirsuta* MAA (1938).

#### *Xylocopa collaris collaris* LEPEL.

1841. *Xylocopa collaris* + *X. (Schonherria) Dejeanii*, LEPELETIER, Hist. nat. Hymen., II, p. 189, no. 26, ♀ & p. 209, no. 59, ♂.  
 1854. *Xylocopa collaris* + *X. (Schonherria) Dejeanii*, F. SMITH, Cat. Hymen. Brit. Mus., II, p. 353, no. 47 & p. 357, on. 62.

<sup>1</sup>) P. Singkep of the Riouw Archipelago? — ED.

1857. *Xylocopa collaris* + *X. Dejeanii*, F. SMITH, Jour. Linn. Soc. Lond. Zool., II, p. 47, no. 2 & p. 48, no. 6.
1858. *Xylocopa Dejeanii* + *X. collaris*, F. SMITH, Jour. Linn. Soc. Lond. Zool., III, p. 8, nos. 3 & 4.
1864. *Xylocopa collaris* + *X. Dejeanii*, F. SMITH, Jour. Linn. Soc. Lond. Zool., IV, p. 8.
1873. *Xylocopa collaris* + *X. Dejeani*, F. SMITH, Jour. Linn. Soc. Lond. Zool., XI, p. 393, no. 11 & p. 394, no. 21.
1874. *Xylocopa collaris*, F. SMITH, Trans. ent. Soc. Lond., p. 270, no. 46, ♀♂.
1879. *Xylocopa collaris*, TASCHEBERG, Ztschr. f. d. ges. Naturw., LII, p. 589, no. 23, ♀♂.
1896. *Xylocopa collaris*, DALLA TORRE, Cat. Hymen., X, p. 208.
1911. *Xylocopa collaris (dejeanii)*, COCKERELL, Proc. U.S.nation. Mus., XXXIX, p. 638, ♂.
1912. *Xylocopa (Xylocopa) collaris*, MAIDL (in part), Ann. naturh. Hofmus. Wien, XXVI, p. 292.
1913. *Xylocopa collaris*, MEADE-WALDO, Jour. Sarawak Mus., I (3), p. 24.
1914. *Xylocopa collaris*, MEADE-WALDO (in part), Ann. Mag. nat. Hist., (8) XIV, p. 455.
1914. *Xylocopa collaris*, FRIESE, Tijdschr. v. Ent., LVII, p. 7, no. 37.
1918. *Xylocopa collaris*, FRIESE, Zool. Jahrb. Syst., XLI, p. 496, no. 39.
1918. *Xylocopa collaris*, COCKERELL, Ann. Mag. nat. Hist., (9) II, p. 384.
1919. *Xylocopa collaris*, COCKERELL, Ann. Mag. nat. Hist., (9) III, p. 241, ♀.
1919. *Xylocopa collaris* var. *bryanti*, COCKERELL, Proc. U. S. nation. Mus., LV, p. 171, ♂.
1920. *Xylocopa collaris*, COCKERELL, Philipp. Jour. Sci., XVII, p. 288.
1924. *Xylocopa (Xylocopa) collaris* + *X. (X.) collaris* var. *penangensis*, DUSMET (in part), Trab. Mus. nac. Cien. nat. Madrid, Zool., XLIX, p. 30, no. 47.
1925. *Xylocopa collaris* (typical form), DOVER, Ann. Mag. nat. Hist., (9) XV, p. 225, ♂.
1929. *Xylocopa collaris*, DOVER (in part), Bull. Raffles Mus. Singapore, II, p. 59, no. 20.

Differing from *X. collaris binghami* CKLL. by the following characters:

♂. — Median pale face markings usually extending upwards to lower margin of median ocellus only. Wings much darker, with beautiful violaceous lustre. Pubescence on posterior metatarsi with more dominant black hairs; third abdominal tergite black-haired. Apical half of clypeus scatteredly punctate; epistomal suture usually perpendicular to frontal sutures but sometimes forming obtuse interior angles with the latter; knee-caps on posterior tibiae apically broadly rounded.

♀. — Wings much darker, fusco-brown, basal and apical portions concolorous, with strong and beautiful greenish and violaceous metallic lustre. Pubescence on postgenae down to the level of lower orbital extremities with dominant white hairs. Abdominal tergite I without white hairs.

Variation. — In one of the males from Kuching, Borneo, the ocellar triangle partly ivory-coloured, punctuation on clypeus similar to that of *binghami* CKLL., abdominal tergites III-IV black-haired. In the males from other parts of Borneo, abdominal tergite III with a mixture of pale and black hairs, IV with predominant black hairs and very scattered pale ones. The females from Borneo are with dominant white hairs on face and very scattered white hairs on lateral margins of scutellum; occiput purely black-haired. The females from Mentawai Islands are scatteredly punctate (in third-degree-density) on

median portion of clypeus, with a mixture of dominant black and very scarce short white hairs on genae, thoracic white-haired collar distinctly broader.

**Dimensions.** — Length of body ♂ 17-21 mm, ♀ 16-20 mm; of anterior wing ♂ 15-16 mm, ♀ 14-17 mm.

**Type-specimens.** — ♀, from Sumatra, ♂ (*X. Dejeanii* LEPEL.) from Java, probably deposited in the Turin Museum; type of *X. collaris* var. *bryanti* CKLL., ♂, from Buitenzorg, Java, in the U.S. National Museum, Washington, D.C.

**Specimens Examined.** — MENTAWAI ISLANDS: Siberoet Island, IX.24, C. BODEN KLOSS & N.S., 2 ♀. — SUMATRA: Loeboek Sikaping, 450 m, 1923-27, L. HUNDESHAGEN, 1 ♀. — JAVA: Radjamandala, 350 m, 8.VI.32, L. J. TOXOPEUS, 1 ♂. — G. Pantjar, 500 m, VII-VIII.36, F. DUPONT, 7 ♂, 5 ♀. — Djasinga, 150 m, IV.35, M. A. LIEFTINCK, 1 ♂. — Djampang Tengah, Mt. Tjisoeroe, 6-800 m, XI.33, M. E. WALSH, 2 ♂. — Djampang, Mt. Tjimerang, XII.32, M. E. WALSH, 1 ♂. — Depok, 27.IX.36, M. A. LIEFTINCK, 1 ♂. — Preanger, Radjamandala, 400 m, 2.I.31, M. A. LIEFTINCK, 1 ♂. — Batoerraden, Mt. Slamet, 800 m, 23.XII.28, F. C. DRESCHER, 2 ♂. — Bantam, Pasaoeran, 23.V.31, M. A. LIEFTINCK, 1 ♂. — Sangiang Tikoro, Tjitaroem, 500 m, 31.VIII.30, L. J. TOXOPEUS, 1 ♂. — Palaboeanratoe, Tjisolak, 2.V.32, M. A. LIEFTINCK, 2 ♂; XII.35, F. DUPONT, 1 ♀. — Mt. Sanggaboena, 500 m, 22.XII.35, M. A. LIEFTINCK, 2 ♀. — Buitenzorg, KEMNER, 2 ♀ (Stockholm Mus.). — BORNEO (all from Sarawak Mus.): Pulo Burong, IV.1899, 1 ♀. — Matang, 13.III.1898, 2 ♀; VIII.1899, 1 ♂. — Kuching, 19.XI.1895, 1 ♂, 1 ♀; 1 ♀; 26.II.1898, 1 ♂; II.1899, 1 ♂.

**Remarks.** — COCKERELL (1918) suggested to restrict the typical form of *X. collaris* LEPEL. to the Malayan form and to make Sumatra as its type-locality; later on (1919) he considered the Javanese race distinct from the *forma typica* and named it as var. *bryanti*. In point of fact, the difference between *bryanti* and typical *collaris* as given by COCKERELL appears to be rather insufficient to erect a distinct subspecies or *forma geographica* and I am unable to find out any definite difference between Sumatran and Javanese individuals. I am inclined to the opinion that it will be more reasonable to regard Java as the type-locality of typical *X. collaris* and to sink the var. *bryanti* CKLL. as a synonym of the former.

### ***Xylocopa collaris nigrocaerulea* (F. SM.).**

1874. *Xylocopa nigro-caerulea*, F. SMITH, Trans. ent. Soc. Lond., p. 279, no. 70, ♀.

1893. *Xylocopa nigrocaerulea*, GRIBODO (in part), Bull. Soc. ent. Ital., XXV, p. 269, no. 17, ♀.

1896. *Xylocopa nigrocaerulea*, DALLA TORRE, Cat. Hymen., X, p. 215.

1912. *Xylocopa (Xylocopa) nigrocaerulea*, MAIDL, Ann. naturh. Hofmus. Wien, XXVI, p. 292, ♀.

1920. *Xylocopa nigrocaerulea*, COCKERELL, Philipp. Jour. Sci., XVI, p. 205, ♀.

1925. *Xylocopa collaris nigrocaerulea*, DOVER (in part), Ann. Mag. nat. Hist., (9) XV, p. 224, ♀ (excl. ♂).

The male sex of this subspecies has never been described so far, and a description of it is thus offered below:

♂.—Differing from the subspecies *X. collaris binghami* CKLL. by the following points: Pale face markings milky yellow, with dominant black hairs, medially extending upwardly to the lower margin of median ocellus only, interrupted along apical portion of frontal keel; regions immediately adjacent to frontal sutures and to basal portion of clypeal sutures black. Breadth of median impunctate band of clypeus about  $\frac{1}{6}$  of the length of epistomal suture. Vertex and occiput with dominant pale hairs but intermixed with numerous black ones. Dorsum of thorax also mixed with numerous black hairs, which are dominant on anterior portion of scutellum. Thoracic pleurites black-haired, only with a round, purely pale-haired tuft immediately below wing-bases. Wings much darker. Inner surface of intermediate tibiae purely black-haired. Anterior, intermediate and posterior metatarsi also purely black-haired except the basal portion of the intermediate, which is pale-haired; tarsal segments II-V with a mixture of golden and black hairs. Abdominal tergite III black-haired.

Dimensions. — Length of body ♂ 19 mm, ♀ 16-19 mm; of anterior wing ♂ 18 mm, ♀ 15-17 mm.

Type-specimens. — ♀, from Tondano, Celebes, deposited in the British Museum (Natural History), London; allotype, ♂, in the Buitenzorg Museum.

Specimens Examined. — C. CELEBES: Todjamboe, near Palopo, 900 m, VII.36, L. J. TOXOPEUS, 1 ♂ (allotype). — Palopo, 2 ♂ (Vienna Mus.). — Patoenoeang, I.1896, H. FRUHSTORFER, 2 ♂ (Vienna Mus.). — 2 ♀, without locality-labels (Vienna Mus.).

Remarks. — In the two males from Palopo, the ocellar triangle is pale-coloured, and the median extension of pale face markings below median ocellus is uninterrupted. In those from Patoenoeang, dorsal surfaces of intermediate and of basal portion of posterior metatarsi are pale-haired, and the abdominal tergite III is covered with few short pale hairs.

The male of this subspecies can be readily distinguished from all other known subspecies of *X. collaris* LEPEL. by the presence of dominant black hairs on pale face markings.

#### Subgenus *Orbitella* MAA (1938).

#### *Xylocopa perversa perversa* WIEDEM.

1824. *Xylocopa perversa*, WIEDEMANN, Anal. Ent., p. 8, ♂.  
 1827. *Xylocopa perversa*, WIEDEMANN, Bull. Sci. nat. & Geol., X, p. 421, ♂.  
 1841. *Xylocopa mesoxantha*, LEPELETIER, Hist. nat. Hymen., II, p. 199, no. 45, ♀ (excl. ♂).  
 1854. *Xylocopa mesoxantha*, F. SMITH, Cat. Hymen. Brit. Mus., II, p. 357, no. 64.  
 1873. *Xylocopa perversa*, RITSEMA, Tijdschr. v. Ent., XVI, p. 221, ♂, pl. 10, fig. 1 (♂) & fig. 2 (♀).  
 1873. *Xylocopa mesoxantha*, F. SMITH, Jour. Linn. Soc. Lond. Zool., XI, p. 394, no. 23.  
 1874. *Xylocopa perversa*, F. SMITH, Trans. ent. Soc. Lond., p. 271, no. 50, ♀♂.  
 1896. *Xylocopa perversa*, DALLA TORRE, Cat. Hymen., X, p. 217.

1912. *Xylocopa (Koptorthosoma) perversa*, MAIDL, Ann. naturh. Hofmus. Wien, XXVI, p. 300.  
1914. *Xylocopa perversa*, FRIESE, Tijdschr. v. Ent., LVII, p. 7, no. 38.  
1935. *Xylocopa perversa*, FRIESE in SCHULTHESS, Rev. Suisse d. Zool., XLII, p. 296.

The following accounts may be supplemented to RITSEMA's re-description of the male:

♂. — P u b e s c e n c e. — Lateral frontal regions with whitish hairs, which are mixed with a few black ones. Postgenae and vertex immediately posterior to upper orbital extremities with dominant yellowish and a few black hairs. Extreme anterior portion of the yellow longitudinal band of thorax yellowish. The yellowish or whitish hairs usually shorter and more erect than either black or bright yellow ones. Anterior portion of propodeum laterally also yellow-haired; medially with some very scattered yellowish long and soft hairs; posteriorly with sooty-brown hairs. White hairs on dorsal and outer surfaces of anterior tibiae and those of anterior tarsi, and on dorsal surface of intermediate tibiae intermixed with some black hairs. Posterior metatarsi dorsally with very scattered yellowish hairs. Pale hairs on tibiae bright yellow, but those on tarsi yellowish. Lateral margin of abdominal tergites I-V and that of posterior portion of abdominal sternites II-V with few yellow hairs.

Structure. — Inter-orbital distance at the level of antennal fossae about  $\frac{5}{6}$  as long as vertico-clypeal distance. Inner orbits strongly curved. Distance between upper orbital extremities very slightly longer than that between the lower. Front evenly punctate in first-degree-density. Frontal keel distinct, narrow and gradually elevating and narrowing towards the apex, which is sharply ended; median fovea deep, V-shaped, basally very wide, forming the basin of median ocellus, apically interrupted. Supraclypeal region very flat, evenly punctate and more elevated than its neighbouring lateral frontal regions. Clypeal sutures weakly curved. Tentorial pits round. Clypeus distinctly more elevated than its neighbouring lateral frontal regions; median impunctate band narrow, weakly carinate. Labrum medially convex, densely punctate, without prominent basal impunctate band; transverse ridge very weak; apical emargination broad and shallow. Genae impunctate, minimum length subequal to the diameter of mandibular punctures. Outer orbital margin with a narrow groove. Postgenae and vertex evenly punctate in first-degree-density. Coronal suture deep. Inter-ocellar distance a little more than twice as long as ocello-ocular distance. Basal side of ocellar triangle about 2.5 times as long as either one of the lateral sides. Inter-antennal distance longer than antenno-ocular distance. Antennal segment III about  $\frac{2}{3}$  as long as segments IV-VI; V distinctly shorter than VI. Disc of mesonotum impunctate, median portion of scutellum and postscutellum punctate in third-degree-density; remaining portion of dorsum of thorax punctate in first-degree-density. Postscutellum lying on the same level with scutellum and about  $\frac{3}{5}$  as long as the latter (in dorsal view); posterior margin very sharply edged and overlapping anterior portion of propodeum. Venter of thorax scarcely pubescent, evenly punctate in third-degree-



density, interspaces between proximate punctures usually longer than twice the diameter of the punctures. Wing-veins  $M + M_{1+2}$  (1st section) about one and one-third times as long as  $M_{1+2}$  (2nd section); vein  $R_4$  angulate half-way its length. Posterior extension of anterior coxae short, apically blunt. Posterior legs ventrally finely and evenly punctate in third-degree-density; coxae without any prominent tuberculation; trochanters apically narrowly rounded, not projecting; femora very smooth, inner margin very weakly keeled; tibiae ventrally depressed, apically very weakly incrassate; knee-caps V-shaped, small, extending to basal  $\frac{1}{3}$  of tibial length. Inner teeth of anterior and posterior claws respectively about  $\frac{4}{5}$  and  $\frac{2}{3}$  as long as the corresponding outer ones. Abdominal tergites evenly punctate in third-degree-density, without median impunctate band, interspaces between proximate punctures usually about twice as long as the punctate diameter. Posterior margin of epipygium medially with a broad and shallow emargination. Posterior margin of abdominal sternites I-V with a sharp median extension; hypopygium medially keeled.

The female of this species may be re-described as follows:

♀. — *I n t e g u m e n t.* — Black, flagella (except I segment) of antennae testaceous below. Wings similarly coloured as the male, but a little darker.

*P u b e s c e n c e.* — Black, but that on face mixed with whitish hairs, postgenae with dominant whitish hairs. Abdominal tergites I-II with bright yellow hairs.

*S t r u c t u r e.* — Inter-orbital distance at the level of antennal fossae about  $\frac{6}{7}$  as long as vertico-clypeal distance. Frontal keel improminent; median fovea deep, basally relatively narrow. Clypeus only a little more elevated than its neighbouring lateral frontal regions. Labrum strongly tuberculate. Coronal suture weak. Inter-ocular and inter-antennal distances subequal to ocello-ocular and antenno-ocular distances respectively. Mesonotum (except the impunctate disc) and lateral portion of scutellum finely and evenly punctate in second-degree-density. Median portion of scutellum scatteredly punctate in third-degree-density. Postscutellum concealed under posterior margin of scutellum. Posterior trochanters apically sharply pointed and ventrally evenly punctate in second-degree-density. Posterior femora ventrally punctate in second-degree-density, inner margin angulate at its mid-way, basal half strongly keeled. Knee-caps on posterior tibiae large, extending to basal  $\frac{5}{9}$  of tibial length. Inner teeth of anterior and posterior claws respectively about  $\frac{1}{2}$  and  $\frac{1}{3}$  as long as the corresponding outer ones. Median furrow of epipygium medially impunctate, uniform in breadth. Hypopygium apically with a median keel. Remaining characters similar to those of the male.

*D i m e n s i o n s.* — Length of body ♂ 11 - 13 mm, ♀ 13 - 15 mm; of anterior wing ♂ 11 - 12 mm, ♀ 11 - 13 mm.

*T y p e - s p e c i m e n s.* — ♂, from Java, deposited in the Leiden Museum; types of *X. mesoxantha* LEPEL., ♀, from Java also, probably in the Turin Museum.

*S p e c i m e n s E x a m i n e d.* — JAVA: Preanger, Radjamandala, 500 m, 8.II.32, L. J. TOXOPEUS, 2 ♂, 1 ♀. — Buitenzorg, Tjampea, 21.II.37, M. A.

LIEFTINCK, 2 ♂. — Buitenzorg, Bolang, 600 m, 11.V.30, M. A. LIEFTINCK, 1 ♀. — Mt. Pantjar, 500 m, IV.37, F. DUPONT, 1 ♂, 1 ♀. — Djampang Tengah, Mt. Tjisoeroe, 6-800 m, III.33, M. E. WALSH, 1 ♀. — Palaboeanratoe, Tjisolak, XII.35, F. DUPONT, 3 ♀. — Depok, 27.IX.36, M. A. LIEFTINCK, 1 ♀. — Djasinga, 150 m, 19.IV.35, M. A. LIEFTINCK, 1 ♀. — NEW GUINEA (?), 1907, 1 ♀ (det. MAIDL).

**Xylocopa perversa shelfordi** (CAM.), comb. nov.

1902. *Xylocopa shelfordi*, CAMERON, J. Straits Br. Roy. Asiat. Soc. XXXVII, p. 128, ♀♂.

Differing from the *forma typica* in the following characters only:

♂. — Punctures on basal triangular area of mandibles and on dorsum of thorax comparatively denser, coarser and deeper, those on abdominal tergites III-IV comparatively denser. Abdominal tergites V-VI without yellow pubescence.

♀. — Punctures on dorsum of thorax coarser and deeper. Dorsal and lateral surfaces of thorax with greenish yellow hairs.

Dimensions. — Length of body ♂ 14 mm, ♀ 13-15 mm; of anterior wing ♂ 12 mm, ♀ 12.5 mm.

Type-specimens. — ♂♀, from Matang, Borneo, deposited in the British Museum (Natural History), London.

Specimens Examined. — BORNEO (all from the Sarawak Mus.): Matang, 3600', VI.1900, 1 ♂ (compared with type). — Santubong, 2600', II.1900, 1 ♀. — Kuching, 21.VII.1899, 1 ♀.

Remarks. — This was originally described as a distinct species but it is practically no more than a *forma geographica* of *X. perversa* WIEDEM.

**Xylocopa flavo-nigrescens** F. SM.

Specimens Examined. — MENTAWAI ISLANDS: Siberoet Island, 11. IX.24, H. H. KARNY, 1 ♀; C. BODEN KLOSS & N.S., 1 ♀. — SUMATRA: Padang, XI.24, C. BODEN KLOSS & N.S., 1 ♀. — Loeboek Sikaping, 450 m, L. HUNDESHAGEN 1 ♂, 4 ♀. — JAVA: Mt. Gedeh, Tjibodas, 1400 m, 1 ♀ (det. MAIDL as *X. confusa* J. PER.). — BORNEO (all from the Sarawak Mus.): Matang Road, 22.XII.12, 1 ♂ (compared with type by G. MEADE-WALDO). — 10th mile, VII.1894, 1 ♀. — Limbang, VI.11, 1 ♀. — Kuching, 2.VI.1898, 1 ♀. — Pulo Burong, IV.1899, 1 ♀. — Tabikang, 13.V.14, 1 ♀.

**Xylocopa smithii** RITS.

1876. *Xylocopa smithii*, RITSEMA, Tijdschr. v. Ent., XIX, p. 182, no. 7, ♀.

1896. *Xylocopa smithii*, DALLA TORRE, Cat. Hymen., X, p. 218.

1901. *Xylocopa insidiosa*, J. PEREZ, Act. Soc. Linn. Bordeaux, LVI, p. 53, ♀.

1912. *Xylocopa (Koptorthosoma) smithii*, MAIDL, Ann. naturh. Hofmus. Wien, XXVI, p. 306, ♀.

♂. — Unknown.

♀. — The following notes may be supplemented to the original description of RITSEMA:

**I n t e g u m e n t.** — Thorax with a little dull greenish purple tints. Wings sometimes violaceous, with a little bluish instead of greenish tints.

**P u b e s c e n c e.** — Face covered with a mixture of whitish and black hairs. Vertex with some 3 or 4 long black hairs.

**S t r u c t u r e.** — Inter-orbital distance at the level of antennal fossae about  $\frac{13}{16}$  as long as the vertico-clypeal distance. Inner orbits a little curved. Distance between upper orbital extremities slightly shorter than that between the lower. Frontal keel weak, scarcely more elevated than its neighbouring regions; median fovea very weak but rather broad and very deep at its extreme basal portion. Supraclypeal region without median impunctate band. Epistomal suture weakly curved. Tentorial pits deep, round. Clypeus medially impunctate, very smooth, a little elevated but basal portion distinctly more elevated than its neighbouring lateral frontal regions. Labrum rugose, tuberculate, with a deep apical emargination. Genae impunctate, minimum length subequal to the diameter of mandibular punctures. Outer orbital margin with a shallow groove. Postgenae shallowly punctate in first-degree-density. Vertex scatteredly punctate in second-degree-density. Coronal suture inrecognisable. Inter-ocellar and ocello-ocular distances subequal. Basal side of ocellar triangle about 2.5 times as long as either one of the lateral sides. Postocellar pits shallow. Inter-antennal distance and antenno-ocular distance subequal. Antennal segment III slightly shorter than segments IV-VI. Dorsum of thorax mostly punctate in first-degree-density, disc of mesonotum impunctate. Scutellum with a narrow median impunctate band, median portion bordering the median band finely punctate in third-degree-density, extreme lateral portions strongly punctate in first-degree-density. Wing-vein *M* slightly longer than  $M_{1+2}$  (1st section); vein  $R_4$  weakly angulate at a point of basal  $\frac{2}{3}$  of its length. Posterior extension of anterior coxae short, apically blunt. Posterior trochanters apically narrowly rounded. Inner margin of posterior femora very weakly curved and keeled. Knee-caps on posterior tibiae V-shaped, apical half of upper margin distinct, extending to basal  $\frac{1}{2}$  of tibial length. Inner teeth of anterior and posterior claws respectively about  $\frac{1}{2}$  and  $\frac{2}{5}$  as long as the corresponding outer one. Abdominal tergites punctate in second-degree-density, tergite I without *Acari-pouch* on its front surface, tergites I-V with a narrow median impunctate band. Median furrow of epipygium narrow. Abdominal sternites I-V medially weakly keeled, with posterior extension; hypopygium rather strongly keeled.

**D i m e n s i o n s.** — Length of body ♀ 16 - 18 mm, of anterior wing ♀ 14 - 16 mm.

**T y p e - s p e c i m e n s.** — ♀, from Celebes, deposited in the Leiden Museum; type of *X. insidiosa* J. PER., ♀, from Celebes also, in the Paris Museum.

**S p e c i m e n s E x a m i n e d.** — CELEBES: Malino, S.W. Celebes, 1000 m, VI.36, L. J. TOXOPEUS, 1 ♀. — Todjamboe, near Palopo, C. Celebes, 900 m, VII.36, L. J. TOXOPEUS, 1 ♀.

**Xylocopa bryorum** (FABR.).

1775. *Apis bryorum*, FABRICIUS, Syst. Ent., p. 381, no. 16, ♂.  
 1781. *Apis bryorum*, FABRICIUS, Spec. Insect., I, p. 478, no. 19, ♂.  
 1787. *Apis bryorum*, FABRICIUS, Mant. Insect., I, p. 301, no. 22 ♂.  
 1789. *Apis bryorum*, OLIVIER, Encycl. méthod. Insect., IV, p. 68, no. 40, ♂.  
 1790. *Apis bryorum*, GMELIN in LINNÉ, Syst. nat. (13th edit.), I (5), p. 2782, no. 108, ♂.  
 1791. *Apis bryorum*, CHRIST, Naturg. d. Insect., p. 125, ♂.  
 1793. *Apis bryorum*, FABRICIUS, Ent. Syst., II, p. 321, no. 28, ♂.  
 1804. *Xylocopa ruficornis* + *Bombus bryorum* + ?*B. aestuans*, FABRICIUS, Syst. Piez., Piez., p. 241, no. 12, ♂, p. 348, no. 28, ♂ & p. 351, no. 44, ♀.  
 1806. *Xylocopa ruficornis* + *Bombus bryorum*, ILLIGER, Magaz. f. Insectenk., V, p. 152, no. 25 & p. 172.  
 1841. *Xylocopa dimidiata*, LEPELETIER, Hist. nat. Hymen., II, p. 199, no. 44, ♀.  
 1854. *Xylocopa ruficornis* + *X. dimidiata* + *Bombus bryorum*, F. SMITH, Cat. Hymen. Brit. Mus., II, p. 353, no. 42, p. 357, no. 66 & p.  
 1873. *Xylocopa ruficornis* + *X. dimidiata*, F. SMITH, Jour. Linn. Soc. Lond. Zool., XI, p. 393, no. 7 & p. 394, no. 21.  
 1874. *Xylocopa bryorum*, F. SMITH, Trans. ent. Soc. Lond., p. 275, no. 59, ♀♂.  
 1876. *Xylocopa ruficornis*, RITSEMA, Tijdschr. v. Ent., XIX, p. 62.  
 1876. *Xylocopa Aruana*, RITSEMA, Tijdschr. v. Ent., XIX, p. 178, no. 2, ♀.  
 1884. *Xylocopa bryorum*, W. F. KIRBY, Ann. Mag. nat. Hist., (5) XIII, p. 412, no. 49.  
 1896. *Xylocopa bryorum*, DALLA TORRE, Cat. Hymen., X, p. 206.  
 1901. *Xylocopa bryorum*, FRIESE, Bien. Eur., VI, p. 228, no. 29, ♀♂.  
 1901. *Xylocopa bryorum*, J. PEREZ, Act. Soc. Linn. Bordeaux, LVI, p. 56, ♀♂.  
 1904. *Xylocopa bryorum*, ASHMEAD, Proc. U. S. nation. Mus., XXXIII, p. 149.  
 1904. *Xylocopa bryorum*, ASHMEAD, Jour. N. York ent. Soc., XII, p. 3, no. 15.  
 1905. *Xylocopa bryorum* subsp. *dimidiata*, COCKERELL, Ann. Mag. nat. Hist., (7) XVI, p. 224, ♂♀.  
 1906. *Xylocopa bryorum*, BROWN, Philipp. Jour. Sci., I, p. 686.  
 1907. *Xylocopa bryorum*, COCKERELL, Bull. Amer. Mus. nat. Hist., XXIII, p. 228.  
 1911. *Xylocopa bryorum*, COCKERELL, Trans. Amer. ent. Soc. XXXVII, p. 236.  
 1912. *Xylocopa (Koptorthosoma) bryorum*, MAIDL, Ann. naturh. Hofmus. Wien, XXVI, p. 298, figs. 31 - 32, ♂.  
 1921. *Xylocopa bryorum*, HACKER, Mem. Queensland Mus., VII, p. 159.  
 1924. *Xylocopa (Koptorthosoma) bryorum*, DUSMET, Trab. Mus. nac. Cienc. nat. Madrid, Zool., XLIX, p. 38, no. 61.  
 1929. *Mesotrichia bryorum aruana*, COCKERELL, Amer. Mus. Novit., no. 343, p. 8.  
 1929. *Mesotrichia bryorum*, COCKERELL, Amer. Mus. Novit., no. 346, p. 4.  
 1935. *Xylocopa bryorum*, FRIESE in SCHULTHESS, Rev. Suisse d. Zool., XLII, p. 295.

Variation. — The vein *r-m* in the Ceramese male is scarcely recognisable. In some females, the face, postgenae, vertex, occiput and dorsal surface of anterior tibiae covered with dominant dirty greenish yellow hairs, intermixed with very few long black ones; abdominal tergites without yellow hairs.

Type-specimens. — ♂, from "nova Hollandia", deposited in the British Museum (Natural History), London; type of *X. ruficornis* FABR., ♂, from "Inde orientali", in the Copenhagen Museum, that of *X. dimidiata* LEPÉL., ♀, from Timor; probably in the Turin Museum, that of *X. Aruana* RITS., ♀, from the Aroe Islands, in the Leiden Museum.

Specimens Examined. — KEI ISLANDS: Ohoider, Kl. Kei N., H. C.

SIEBERS, 2 ♀. — NORTH-EAST NEW GUINEA: Finschhafen, HERTLE, 1 ♀ (det. FRIESE) (coll. MAA). — CERAM, 1 ♂ (Deutsch. ent. Institut) (det. STRAND). — AUSTRALIA: Cape York, 1 ♂, 1 ♀ (Vienna Mus.) (det. MAIDL).

Besides the localities listed above, this species is known to occur in Timor, Aroe Islands, Thursday Islands, New Ireland (Neu Pommern), Tasmania and Hawaii Islands. It has also been erroneously recorded from India, Ceylon, Burma, Malaya, Sumatra, Borneo and Philippine Islands.

Remarks. — *X. ruficornis* FABR., is generally considered as a synonym of *X. aestuans* (LINN.) (in part) or *X. confusa* J. PER. but judging from the kind information from Dr. KAI L. HENRIKSEN of the Copenhagen Museum, it seems to be more probably a synonym of *X. bryorum* (FABR.), which has priority. In case that *X. confusa* and *X. ruficornis* are conspecific, the latter should stand for the former.

### *Xylocopa dammermani*, sp. nov.

♂. — Unknown.

♀. — Integument. — Black; antennal segments IV-XII testaceous below. Wings fusco-brown, darkest at cell  $Sc + R_1 + R_2$ , with dull violaceous and a little greenish metallic lustre.

Pubescence. — Black. Face and vertex with a mixture of black and yellow hairs. Postgenae white-haired, lower portion intermixed with a few long black hairs. Occiput with dominant brownish yellow and a few long black hairs. Dorsal and upper portion of lateral surfaces of thorax, including tegulae and postscutellum, densely covered with bright brownish red hairs; extreme basal portion of wings with brownish hairs. Dorsal and outer surfaces of anterior femora (extreme apical portion only) and tibiae with dominant yellowish and a few black hairs. Abdominal tergite I thinly covered with numerous brownish red hairs and very few black ones. Apex of abdomen with a little dark sooty-brown hairs.

Structure. — Inter-orbital distance at the level of antennal fossae about  $\frac{4}{5}$  as long as vertico-clypeal distance. Inner orbits curved, distance between upper orbital extremities longer than that between the lower. Front shallowly punctate in second-degree-density. Frontal keel basally very weak, interrupted in its mid-way, extending to the level of antennal fossae; median fovea basally very deep but apically much weakened. Supraclypeal region very deeply but rather sparsely punctate, without median impunctate band. Epistomal suture curved and ridged. Clypeal sutures weakly curved. Tentorial pits deep, elongate. Clypeus punctate in first-degree-density; median impunctate band narrow, weakly carinate. Labrum tuberculate, apical emargination narrow, rather deep. Genae impunctate, minimum length subequal to the diameter of mandibular punctures. Outer orbital margin not grooved. Postgenae and vertex strongly punctate in second-degree-density. Coronal suture recognisable at its extreme base only. Inter-ocellar distance about  $\frac{3}{4}$  as long as ocello-ocular distance. Basal side of ocellar triangle about 2.5 times as long as either one of the lateral

sides. Post-ocellar pits deep. Inter-antennal distance and antenno-ocular distance subequal. Antennal segment III shorter than segments IV-VI. Mesonotum with punctures mostly of first-degree-density; disc impunctate. Scutellum laterally punctate in first-degree-density, medially with a rather broad impunctate band. Wing-vein *M* about one and one-fourth times as long as  $M_{1+2}$  (1st section); vein  $R_4$  angulate at a point of basal  $\frac{2}{3}$  of its length. Posterior extension of anterior coxae short, apically blunt. Ventral surface of posterior coxae punctate in third-degree-density in inner portion, and in first-degree-density in outer portion. Posterior trochanters apically strongly depressed, narrowly rounded. Posterior femora ventrally punctate in second-degree-density, inner margin curved and keeled. Knee-caps on posterior tibiae sharply pointed, extending to basal  $\frac{1}{2}$  of tibial length, upper margin apically distinct. Inner teeth of anterior and posterior claws respectively about  $\frac{1}{2}$  and  $\frac{1}{3}$  as long as the corresponding outer ones. Abdominal tergites medially with coarse, deep punctures of second-degree-density, without distinct median impunctate band; laterally punctate in first-degree-density; tergite I bipunctate; median furrow of epipygium long, deep and narrow. Abdominal sternites medially weakly keeled and with weak median extension.

**Dimensions.** — Length of body ♀ 21 - 23 mm, of anterior wing ♀ 19 - 20 mm.

**Type-specimens.** — Holotype, ♀, and one paratype, ♀, deposited in the Leiden and Buitenzorg Museums, respectively, one paratype in my collection.

**Distribution.** — Kambera, N.E. SOEMBA, III.25, K. W. DAMMERMAN, 2 ♀ (Holotype and Paratype); Laora, 100 m, N.W. SOEMBA, IV.25, K.W. DAMMERMAN, 1 ♀ (Paratype).

**Remarks.** — The name of this magnificent species is respectfully dedicated to Dr. K. W. DAMMERMAN, of the Buitenzorg Museum, to whom I am greatly indebted for his kind help to my *Xylocopa*-studies.

In general appearance, this new species is very near to *X. bryorum* (FABR.) and its variety *hertlei* FRIESE, but can be readily separated from either of them by its characteristic thoracic pubescence, strong wing-vein *r-m* and the presence of *Acari*-pouch on the front surface of the first abdominal tergite.

#### ***Xylocopa confusa* J. PER.**

**Variation.** — In the 2 females from the Karimon Djawa Islands (Java Sea) and 4 females from Djampang (W. Java), outer orbital margins each with a shallow and interrupted groove, approaching the character of *X. flavo-nigrescens* F. SM. These may be the hybrids or intermediate form between *X. flavo-nigrescens* and *X. confusa*, because they have been captured on several occasions at the same locality and at the same time. In one of the males from Loeboek Sikaping, vein *r-m* of the left wing is basally suppressed, while the right wing is normal.

**Specimens Examined.** — MALAYA: Malacca, XII.1899, 1 ♀ (Sarawak Mus.). — SUMATRA: Padang, XI.24, C. BODEN KLOSS & N.S., 2 ♀. — Loeboek

Sikaping, 450 m, L. HUNDESHAGEN, 4 ♂, 4 ♀. — Wai Lima (S. Sumatra), Lampongs, XI-XII.21, H. H. KARNY, 1 ♂. — Medan, MJÖBERG, 4 ♀ (Stockholm Mus.). — Bab Lias, MJÖBERG, 3 ♀ (Stockholm Mus.). — KRAKATAU I., I.1922, 2 ♂ (det. ALFKEN). — VERLATEN EILAND, N., IX.20, 1 ♂ (det. ALFKEN). — SEBESI, IV.21, K. W. DAMMERMAN, 1 ♂ (det. ALFKEN). — JAVA: Djampang Tengah, Mt. Tjisoeroe, 6 - 800 m, IX.33, M. E. WALSH, 3 ♂. — Djampang, Mt. Tjimerang, XII.32, M. E. WALSH, 4 ♀. — Mt. Tangkoeban Prahoe, 1300 - 1700 m, Preanger, I.29, F. C. DRESCHER, 1 ♂. — Buitenzorg, KEMNER, 11 ♀ (Stockholm Mus.). — Buitenzorg, Tjiboerial, 25.V.30, M. A. LIEFTINCK, 1 ♂. — Diëng Plateau, Rawah Bening, VIII.30, T. VAN BENTHEM JUTTING, 1 ♀. — Batoerraden, Mt. Slamet, 23.XII.28, F. C. DRESCHER, 2 ♂. — "Java", NYMAN & MELLB., BOHEMAN, 5 ♂, 6 ♀ (Stockholm Mus.). — KARIMON DJAWA ISLANDS: P. Karimoen, 22 - 30.XI.30, M. A. LIEFTINCK, 1 ♂, 3 ♀. — BORNEO: S'pou, I.1899, 1 ♀ (Sarawak Mus.).

### *Xylocopa verticalis* LEPEL.

Specimens Examined. — SUMATRA: Medan, MJÖBERG, 1 ♂ (Stockholm Mus.).

### *Xylocopa nobilis* F. SM.

1858. *Xylocopa nobilis*, F. SMITH, Jour. Linn. Soc. Lond. Zool., III, p. 8, no. 5, ♀.  
 1864. *Xylocopa nobilis*, F. SMITH, Jour. Linn. Soc. Lond. Zool., VIII, p. 93.  
 1873. *Xylocopa nobilis*, F. SMITH, Jour. Linn. Soc. Lond. Zool., XI, p. 394, no. 27.  
 1874. *Xylocopa nobilis*, F. SMITH, Trans. ent. Soc. Lond., p. 279, no. 71, ♀.  
 1896. *Xylocopa nobilis*, DALLA TORRE, Cat. Hymen., X, p. 216.  
 1901. *Xylocopa nobilis*, J. PEREZ, Act. Soc. Linn. Bordeaux, LVI, p. 64, ♀.  
 1912. *Xylocopa (Koptorthosoma) nobilis*, MAIDL, Ann. naturh. Hofmus. Wien, XXVI, p. 298.

♂. — Unknown.

♀. — The original description and later remarks of the female of this species given by F. SMITH are not quite the same. The following accounts may be supplemented to his later remarks.

Integument. — Antennal segments IV-XII testaceous below.

Pubescence. — Face, especially regions near antennal fossae covered with an intermixture of black and a few yellowish hairs. Postscutellum laterally with some yellow hairs. Lateral surfaces of thorax with 2 narrow transverse bands of sparse yellow hairs. Abdominal tergites II-III laterally and III posteriorly margined with ferruginous hairs. Ventral extension of tergites II-III mixed with very few long black hairs. Abdominal sternites covered with ferruginous hairs, intermixed with very few black ones.

Structure. — Inter-orbital distance at the level of antennal fossae about  $\frac{3}{4}$  as long as vertico-clypeal distance. Inner orbits very weakly curved, distance between upper orbital extremities distinctly longer than that between the lower. Face strongly punctate in first-degree-density, except supra-clypeal region and regions immediately neighbouring ocellar triangle where it is in second-degree-density. Frontal keel basally suppressed, apically a little more elevated than

its neighbouring regions; median fovea basally broad, very deep, apically very weak. Epistomal suture curved, ridged. Tentorial pits small, round. Median impunctate band of clypeus weakly carinate. Labrum strongly tuberculate and with a rather deep emargination. Genae impunctate, minimum length about 1.5 times as long as the diameter of mandibular punctures. Outer orbital margins with a deep groove. Postgenae and vertex punctate in second-degree-density. Coronal suture inrecognisable. Inter-ocellar distance about  $\frac{2}{3}$  as long as ocello-ocular distance. Basal side of ocellar triangle about 3.5 times as long as either one of the lateral sides. Post-ocellar pits deep, round. Inter-antennal distance about  $\frac{13}{15}$  as long as antenno-ocular distance. Antennal segment III shorter than segments IV-VI. Dorsum of thorax evenly and strongly punctate in first-degree-density, except the disc of mesonotum and median band of scutellum, which are impunctate. Posterior margin of scutellum a little elevated. Wing-vein *M* about one and three-fourths times as long as  $M_{1+2}$  (1st section); vein *r-m* strongly curved, basally weak, uninterrupted; vein  $R_4$  curved at a point of basal  $\frac{2}{3}$  of its length. Posterior extension of anterior coxae short, uniformly slender and apically blunt. Posterior trochanters posteriorly broadly rounded. Inner margin of posterior femora very weakly curved and keeled. Knee-caps on posterior tibiae V-shaped, extending to basal  $\frac{2}{5}$  of tibial length, upper margin apically distinct. Inner teeth of anterior and posterior claws respectively about  $\frac{3}{5}$  and  $\frac{1}{2}$  as long as the corresponding outer ones. Abdominal tergites evenly and strongly punctate in first-degree-density, without median impunctate band; median furrow of epipygium short, shallow, and narrow. Abdominal sternites I-V medially weakly keeled, posterior margin each with a weak median extension; hypopygium apically strongly keeled.

*Dimensions.* — Length of body ♀ 25 mm, of anterior wing ♀ 24 mm.

*Type-specimen.* — ♀, from Celebes, deposited in the British Museum (Natural History), London.

*Specimens Examined.* — S. CELEBES: Malino, 1000 m, VI.36, L. J. TOXOPEUS, 1 ♀.

Besides Celebes, this species has also been recorded from Amboina and the Soela Islands.

### ***Xylocopa cariniventris*, sp. nov.**

♂. — *Integument.* — Black, but two small spots between lateral ocelli, supraclypeal region, clypeus, basal portion of labrum, basal spots of mandibles and under surface of antennal segments I and III ivory-coloured; antennal segments IV-XIII ferruginous below; posterior margin of abdominal segments with more or less reddish tints. Wings basally subhyaline, cells *Sc* +  $R_1$  +  $R_2$ , *R* and  $R_5$  and apical marginal area smoky, with coppery and rosy-purple metallic lustre.

*Pubescence.* — Head, thorax including tegulae and extreme basal portion of wings, dorsal surface of anterior and intermediate tibiae covered with yellowish green hairs; but those on front, lower portion of postgenae,



vertex, occiput, postscutellum, propodeum, anterior portion of thoracic pleurites intermixed with more or less black hairs; posterior half of thoracic pleurites, thoracic meso- and meta-sternites and ventral surface of all tibiae with pure or predominant black hairs; thoracic prosternite and anterior coxae and trochanters with pure golden brownish hairs; anterior tarsi with golden (intermixed with very slight greenish or brownish tints) hairs; anterior metatarsi ventrally with a little brownish tints and mixed with some short black hairs; intermediate coxae and trochanters covered with a mixture of black and greenish golden hairs, the latter being much predominant along inner margin; hairs on intermediate tarsi similarly coloured as the anterior pair, but with more brownish tints; posterior legs mainly black-haired, but apex of femora with numerous brownish hairs, outer surface of tibiae basally with a narrow longitudinal band of brownish golden hairs, apex of tarsi with numerous ferruginous hairs; abdominal tergites I-II mainly with sooty brownish or blackish hairs, but intermixed with numerous (especially anterior portion of the II) short greenish ones; tergites III, IV and basal portion of V black-haired; lateral margin of tergites II-V (more or less), posterior portion of the V, and entire VI-VII (VI basally mixed with some black hairs) and posterior margin of abdominal sternites III-VI all with bright ferruginous hairs; the remaining portion of sternites black-haired.

**Structure.** — Inter-orbital distance at the level of antennal fossae about  $\frac{2}{3}$  as long vertico-clypeal distance. Inner orbits weakly curved, distance between upper orbital extremities only weakly perceptibly longer than that between the lower. Front, except supra-clypeal region, finely punctate in first-degree-density. Frontal keel basally suppressed, apically narrow, rather strong; median fovea basally deep and narrow. Supra-clypeal region very finely punctate in third-degree-density, without median impunctate band, discally weakly convex. Epistomal suture W-shapedly curved. Clypeal sutures rather strongly curved. Tentorial pits very shallow. Clypeus basally very smooth and very flat, but more elevated than its neighbouring lateral frontal regions; punctuation very fine, of third-degree-density; median impunctate band rather broad but not in uniform breadth and medially a little depressed. Labrum with fine dense punctures and deep, broad, apical emargination; transverse ridge laterally very weak, medially comparatively strong. Genae impunctate. Base of mandibles running tangent to lower orbits. Postgenae finely punctate in second-degree-density. Vertex evenly punctate in first-degree-density. Coronal suture only recognisable at the base. Inter-ocellar distance about one and one-third times as long as ocello-ocular distance. Basal side of ocellar triangle about 4 times as long as either one of the lateral sides. Inter-antennal distance about one and one-half times as long as antenno-ocular distance. Length of antennal segment III and that of segments IV-VI subequal; both IV and V shorter than broad. Dorsum of thorax punctate in first-degree-density, disc of mesonotum and median band of scutellum impunctate. Scutellum posteriorly roundly-edged and not overlapping postscutellum, which is medially very finely punctate in third-degree-density. Wing-vein  $M + M_{1+2}$  (1st section) about one and one-

third times as long as  $M_{1+2}$  (2nd section); vein  $r-m$  basally suppressed, vein  $R_4$  weakly angulate at a point of basal  $\frac{2}{3}$  of its length. Posterior extension of anterior coxae rather long, crescent-shaped, apically narrowed. Anterior trochanters apically very sharply projected. Posterior coxae ventrally strongly punctate in third-degree-density, apically very weakly tuberculate. Posterior trochanters apically very sharply projecting-out and very strongly depressed, smooth, polished, scarcely punctate. Posterior femora with a very sharp spine at the base of median keel; ventral surface impunctate along inner margin and deeply punctate in third-degree-density along outer margin; inner margin very weakly curved, strongly keeled, basally with a sharp vertical projection. Posterior tibiae apically incrassate, major apical spur forming a V-shaped, apically rounded incrassation; knee-caps small, V-shaped, extending to basal  $\frac{1}{3}$  of tibial length. Inner teeth of anterior and posterior claws respectively about  $\frac{3}{4}$  and  $\frac{2}{3}$  as long as the corresponding outer ones. Abdominal tergites evenly punctate in first-degree-density, without median impunctate band. Abdominal sternites each with a median keel, which is more prominent in posterior segments.

♀. — *I n t e g u m e n t*. — Black, antennal segments IV-XII dull testaceous below. Wings fusco-brown, darkest in the cell  $Sc + R_1 + R_2$ , with strong violaceous iridescence, apically with some bluish tints.

*P u b e s c e n c e*. — Black, but mesonotum, tegulae and median portion of scutellum (mixed with very few black hairs) covered with reddish brown hairs. Abdomen densely pubescent with short hairs; lateral margin of tergites II-VI, posterior margin of V, and entire VI, and sternites III-VI (posterior margin) all covered with bright ferruginous hairs.

*S t r u c t u r e*. — Inter-orbital distance at the level of antennal fossae about  $\frac{9}{13}$  as long as vertico-clypeal distance. Inner orbits very weakly curved, distance between upper orbital extremities very slightly longer than that between the lower. Front strongly punctate in first-degree-density. Frontal keel basally suppressed, apically broad and weak; median fovea very deep, gradually decreasing in depth and in breadth towards the apex. Supraclypeal region convex, medially impunctate, apically distinctly more elevated than basal portion of clypeus. Epistomal suture curved. Clypeal sutures weakly curved. Tentorial pits small, deep, round. Clypeus basally scarcely more elevated than its neighbouring lateral frontal regions, medially impunctate, apical portion laterally strongly punctate in second-degree-density. Labrum strongly tuberculate and deeply emarginated. Genae impunctate, minimum length about 6 times as long as the diameter of mandibular punctures. Outer orbital margins with a deep groove. Postgenae scarcely pubescent, punctate in third-degree-density, interspaces between proximate punctures usually more than twice the punctal diameter. Vertex strongly punctate in first-degree-density. Coronal suture in-recognisable. Inter-ocellar distance about  $\frac{5}{3}$  as long as ocello-ocular distance. Basal side of ocellar triangle about thrice as long as either one of the lateral sides. Post-ocellar pits shallow, round. Inter-antennal distance about  $\frac{3}{4}$  as long as antenno-ocular distance. Lengths of antennal segment III and segments IV-VI

subequal; IV slightly longer than broad; V and VI subequal. Dorsum of thorax strongly punctate in first-degree-density, disc of mesonotum and median band of scutellum impunctate. Posterior extension of anterior coxae pointed, a little curved. Posterior trochanters apically rounded. Knee-caps on posterior tibiae small, V-shaped, extending to basal  $\frac{3}{7}$  of tibial length. Inner teeth of anterior and posterior claws respectively about  $\frac{2}{3}$  and  $\frac{1}{2}$  as long as the corresponding outer ones. Abdominal tergites I and VI finely punctate in second-degree-density, II-V strongly punctate in first-degree-density, median furrow of epipygium deep, narrow. Abdominal sternites VI (posteriorly) and I-IV (medially) each with a weak keel and a very weak posterior extension, V posteriorly with a narrow and strong median keel.

**Dimensions.** — Length of body ♂ 27 - 28 mm, ♀ 26 - 27 mm; of anterior wing ♂ 24 - 25 mm, ♀ 26 - 27 mm.

**Type-specimens.** — Holotype, ♂, allotype, ♀, deposited in the Leiden Museum, and one paratype ♂, deposited in the Buitenzorg Museum; two paratypes, 1 ♂, 1 ♀, in my collection.

**Distribution.** — C. CELEBES, Todjamboe, near Palopo, 900 m, VII.36, L. J. TOXOPEUS, 3 ♂, 2 ♀.

**Remarks.** — This new species is rather near to *X. thoracica* FRIESE (of which only ♀ is known) from Toli-Toli, N. Celebes. But in the latter species, the scutellum is "wohl gekantet, aber nicht aufgebogen", and the abdominal tergite II is laterally black-haired; while in the new species, the scutellum posteriorly is sharply truncate and distinctly overlapping postscutellum, and the abdominal tergite II laterally is brightly ferruginous-haired.

### ***Xylocopa grubaueri* FRIESE.**

1903. *Xylocopa grubaueri*, FRIESE, Ztschr. f. Hymen. u. Dipt., III, p. 205, ♂.  
 1903. *Xylocopa (Koptorthosoma) sarawakensis*, CAMERON, Jour. Straits Br. Roy. Asiat. Soc., XXXIX, p. 180, ♂.  
 1916. *Xylocopa malaya*, MEADE-WALDO (nec CAMERON), Ann. Mag. nat. Hist., (8) XVII, p. 465.  
 1924. ? *Xylocopa (Xylocopa) volatilis*, DUSMET (nec F. SMITH), Trab. Mus. nac. Cienc. nat. Madrid, Zool., XLIX, p. 36, no. 57, ♂.  
 1929. *Xylocopa malayana*, DOVER (nec CAMERON), Bull. Raffles Mus. Singapore, II, p. 61, no. 25.  
 1933. *Xylocopa (Mesotrichia) grubaueri*, PAGDEN, Stylops, II, p. 76, ♂.

♂. — The following notes may be supplemented to the original descriptions given by FRIESE and by CAMERON:

**Pubescence.** — Front, postgenae, occiput with a mixture of predominant greenish and some black hairs. Clypeus with predominant black hairs. Lateral surfaces of thorax mixed with few black hairs also, ventral surface with predominant black ones. Apical one-fourth of dorsal surface of anterior tibiae, inner and apical one-half of outer surfaces of the same with predominant greenish hairs; remaining portion with predominant black hairs. Dorsal surface

of intermediate tibiae mixed with very few black hairs, ventral surface purely black-haired. Posterior tibiae black-haired, only with 2 greenish longitudinal bands on dorsal surface. Ventral surface of basal half of intermediate tarsi black-haired. Abdominal tergites II-VI each with 2 pale hair-patches on anterior portion but those on II-III less prominent and with more greenish tints; median portion of VII anteriorly with one large pale hair-patch, which sometimes overlaps the apex of abdomen. Abdominal sternites with a mixture of black and greenish hairs, the greenish ones being predominant in the posterior portion except median band of sternites II-V.

**Structure.** — Inter-orbital distance at the level of antennal fossae about  $\frac{9}{10}$  as long as vertico-clypeal distance. Inner orbits weakly curved, distance between upper orbital extremities distinctly longer than that between the lower. Face evenly punctate in first-degree-density. Frontal keel basally very broad, gradually narrowed towards the apex, which is comparatively strong; median fovea weak, basally uniform in breadth. Furrow surrounding median ocellus very shallow. Apical portion of supra-clypeal region elevated. Epistomal suture ridged. Clypeal sutures very weakly curved. Clypeus with a very narrow, weakly elevated and sometimes interrupted median impunctate band; basal portion distinctly more elevated than its neighbouring lateral frontal regions. Labrum basally heavily punctate, with a small triangular basal impunctate band, transverse ridge medially distinct, apical emargination rather deep. Genae impunctate, minimum length shorter than the diameter of mandibular punctures. Postgenae and vertex very deeply punctate in first-degree-density. Coronal suture distinct. Inter-ocellar distance and ocello-ocular distance subequal. Basal side of ocellar triangle about thrice as long as either one of the lateral sides. Inter-antennal distance and antenno-ocular distance subequal. Antennal segment III shorter than segments IV-VI; IV longer than broad. Mesonotum medially a little longitudinally ridged, disc impunctate, remaining portion punctate in first-degree-density. Scutellum finely punctate in second-degree-density, medially narrowly impunctate. Postscutellum finely and shallowly punctate in second-degree-density, posterior margin rounded, lying on the same level with scutellum and with lateral corners of anterior portion of propodeum. Wing-vein *M* about two and one-third times as long as  $M_{1+2}$  (1st section); vein *r-m* usually interrupted at its base; vein *R*<sub>4</sub> very weakly curved at its mid-way. Posterior extension of anterior coxae short and apically rounded. Anterior trochanters with short, sharp apical extension. Anterior femora ventrally without pubescence, medially weakly depressed. Ventral surface of posterior legs finely punctate in third-degree-density, interspaces between proximate punctures mostly more than thrice the punctual diameter; coxae apically weakly tuberculate; trochanters apically pointed; ventral surface of femora impunctate between median line and inner margin, which is straight, weakly keeled and basally broadly rounded, base of median line with a small, strongly compressed and apically rounded spine-like process; tibiae with weak incrassation apically; knee-caps small, V-shaped, extending to basal  $\frac{1}{3}$  of tibial length. Inner teeth of anterior and

posterior claws respectively about  $\frac{3}{4}$  and  $\frac{2}{3}$  as long as the corresponding outer ones. Abdominal tergites deeply punctate in second-degree-density, without distinct median impunctate band, punctuation being most dense on tergite II; epipygium posteriorly with a shallow median emargination. Abdominal sternites punctate in third-degree-density, medially strongly keeled.

♀. — Unknown.

Dimensions. — Length of body ♂ 25 - 29 mm, of anterior wing ♂ 26 - 30 mm.

Type-specimens. — ♂, from Upper Perak, Malacca, deposited in the Berlin Museum; type of *X. sarawakensis* CAM., ♂, from Matang, Borneo, in the British Museum (Natural History), London.

Specimens Examined. — BORNEO (all from the Sarawak Mus.): Matang, V.02, 1 ♂; 1892, 1 ♂; 3600' VI.1898, 1 ♂. — Top of Matang, 1890 m, 1 ♂.

This species is also known to occur in the Malay Peninsula.

#### Subgenus *Cyaneoderes* ASHMEAD (1899).

#### *Xylocopa tumida* FRIESE.

1903. *Xylocopa tumida*, FRIESE, Ztschr. f. Hymen. u. Dipt., III, p. 205, no. 8, ♀.

♂. — Unknown.

♀. — The following notes may be supplemented to the original description as given by FRIESE:

Pubescence. — Vertex mixed with a few long black hairs. Anterior metatarsi basally with long black and griseous hairs along outer margin, apically bright ferruginous-haired; dorsal surface with brownish black hairs, turning to bright ferruginous towards the apex. Abdominal sternites II-IV with a few pale hairs amidst the predominant black ones.

Structure. — Inter-orbital distance at the level of antennal fossae about  $\frac{3}{5}$  as long as vertico-clypeal distance. Inner orbits weakly curved, distance between upper orbital extremities a little shorter than that between the lower. Face deeply and evenly punctate in first-degree-density. Frontal keel basally depressed, sharply ended, extending to the level of lower margin of antennal fossae; median fovea long, deep, narrow. Supra-clypeal region evenly punctate. Frontal and epistomal sutures forming acute interior angles at their junctions. Tentorial pits shallow, elongate. Clypeal sutures S-formed. Clypeus basally distinctly more elevated than its neighbouring regions; median impunctate band about  $\frac{1}{3}$  as broad as the basal margin, smooth, very strongly but not sharply carinate. Labrum with one median and two submedian small but strong tubercles. Mandibles with 2 sharp teeth; inner margin with a broad emargination at a point of basal  $\frac{1}{3}$  of its length; inner marginal suture incomplete, apically very broad; basal triangular area fused up with median keel, with a few exceedingly minute punctures (in third-degree-density), separated from outer marginal area

by a broad shallow depression; outer marginal suture very weak, extending from a point of  $\frac{1}{2}$  to  $\frac{3}{4}$  of mandibular length. Maxillae with some longitudinal striae, which are a little curved and about  $\frac{3}{5}$  as long as galea. Maxillary palpi with their segment VI distinctly weaker than V and about  $\frac{2}{3}$  as long as V, which is subequal in length to apical bristles of IV. Genae impunctate, minimum length about twice as long as the diameter of clypeal punctures. Postgenae punctate in first-degree-density, vertex in second-degree-density. Upper orbital margins with a deep groove. Inter-ocellar distance about one and one-third times as long as ocello-ocular distance. Basal side of ocellar triangle about 2.5 times as long as either one of the lateral sides. Post-ocellar pits broad, shallow. Inter-antennal distance and antenno-ocular distance subequal. Coronal suture short, deep. Antennal segment III shorter than segments IV-VI, IV broader than long, V and VI subequal. Disc of mesonotum broadly impunctate, remaining portion of mesonotum punctate in second-degree-density, but extreme anterior and lateral marginal areas punctate in first-degree-density. Tegulae punctate in third-degree-density. Scutellum medially impunctate, laterally punctate in second-degree-density; posterior margin a little elevated. Postscutellum punctate in third-degree-density. Thoracic pleurites punctate in first-degree-density. Thoracic sternites finely punctate in third-degree-density. Wing-vein  $M + M_{1+2}$  (1st section) about one and one-half times as long as  $M_{1+2}$  (2nd section); vein  $r-m$  completely suppressed; vein  $R_4$  weakly curved at a point of basal  $\frac{2}{3}$  of its length; vein  $R_5$  weakly curved; veins  $m-m$  and  $M_4$  not parallel; veins  $M_4$  and  $M$  subparallel. Major apical spur of posterior tibiae about  $\frac{1}{2}$  as long as tibial length; knee-caps weak, flattened, broadly blunt, upper margin not distinct. Inner teeth of claws weakly divergent to the outer and about  $\frac{2}{3}$  as long as the outer. Abdominal tergites without median impunctate band, with deep coarse punctures of second-degree-density, except the median portion of tergite I, where it is finely punctate in third-degree-density. Abdominal sternites bipunctate, primary punctures of second-degree-density, medially with a broad impunctate band; hypopygium with a median keel apically.

**Dimensions.** — Length of body ♀ 16 mm, of anterior wing ♀ 16 mm. Breadth of head ♀ 6.5 mm, of abdominal segment II ♀ 8.5 mm.

**Type-specimens.** — ♀, from Banka Island, deposited in the Vienna Museum. I have studied one of the types through the kindness of Dr. FR. MAIDL.

### **Xylocopa caerulea (FABR.).**

1914. *Xylocopa (Koptorthosoma) caeruleiformis*, MEADE-WALDO, Ann. Mag. nat. Hist., (8) XIV, p. 454, ♀♂.
1916. *Xylocopa (Koptorthosoma) caeruleiformis* var. *fusca*, MEADE-WALDO, Ann. Mag. nat. Hist., (8) XVII, p. 465, ♀.
1916. *Xylocopa (Koptorthosoma) caerulea* var. *viridis*, MEADE-WALDO, Ann. Mag. nat. Hist., (8) XVIII, p. 565, ♀.
1936. *Xylocopa (Cyaneoderes) caerulea*, MAA, Ent. & Phytopath., V, p. 357, no. 1, ♂, fig. 1 (♂).
1938. *Xylocopa (Cyaneoderes) caerulea*, MAA, Rec. Indian Mus., XL, p. (in press).

For further bibliography of this species, reference may be made to my other paper (1938) as cited above.

Variation. — After having studied a long series of both sexes of this species from various regions, I am able to conclude that the body-size as well as the colouration of both integument and pubescence of this species vary individually and that *caeruleiformis* M.-W., *fusca* M.-W., *viridis* M.-W., are not more than its individual aberrations. The dominant pubescence of the male ranges from olive green to brownish green, that of the female ranges from deep azure blue to pale griseous blue. The blue hairs on lateral margin of ♀ abdomen occupy tergite II, or III, or IV, sometimes not beyond I. Wings sometimes with rich purple tints but in some cases purple tints are scarcely perceivable. Length of body ranges from 21 to 28 mm. In the female, the epistomal suture is sometimes weakly ridged and the median impunctate band of clypeus sometimes very flat and sometimes distinctly carinate.

Type-specimens. — FABRICIUS's type (from "New Caledonia") and type of *X. semiarmenia* WIED., are probably lost; type of *Cyaneoderes fairchildi* ASHM. deposited in the U.S. National Museum, Washington D.C.; MEADE-WALDO's types all in the British Museum (Natural History), London.

Specimens Examined. — Besides the material from Hainan, Ceylon, Indochina and Malaya, I have studied specimens from the following localities: MENTAWAI ISLANDS: Siberoet Island, IX.24, C. BODEN KLOSS & N.S., 3 ♀. — Sipora Island, X.24, C. BODEN KLOSS & N.S., 1 ♀. — SUMATRA: Loeboek Sikaping, 450 m, L. HUNDESHAGEN, 1 ♀. — Sibolangit, MJÖBERG, 1 ♀ (Stockholm Mus.). — Fort de Kock, 920 m, XII.21, E. JACOBSON, 2 ♀ (Dtsch. ent. Inst.). — JAVA: Mt. Tangkoeban Prahoe, 1300 - 1700 m, Preanger, I.29, F. C. DRESCHER, 1 ♂. — Batoerraden, Mt. Slamet, 23.XII.28, F. C. DRESCHER, 1 ♀. — Djampang, Soekaneegara, 700 - 1000 m, 23-28.XII.31, M. A. LIEFTINCK, 1 ♀. — Mt. Gedeh, Selabintanah, 1000 m, XII.32, M. E. WALSH, 1 ♀. — Mt. Gedeh, Tjibodas, 1400 m, VIII.22, 1 ♀. — Mt. Gedeh, Tjiboenar, 1000 m, XI.29, DRESCHER, 1 ♀. — Buitenzorg, KEMNER, 4 ♀ (Stockholm Mus.). — Plasan (?—ED.), 1 ♀ (Dtsch. ent. Inst.) (det. MAIDL). — BORNEO: Mt. Kinabalu, 3000', 10-14.IX.13, 2 ♀ (Sarawak Mus.). — Trusan, VIII.1900, 1 ♀ (Sarawak Mus.). — Bandjar, 1 ♂.

Remarks. — COCKERELL (Entomologist, LI, p. 137, 1918) has suggested that *X. caeruleiformis* would be no more than a race of *X. dormeyeri* (ENDERL.) but as PAGDEN (Stylops, II, p. 78, 1933) has shown, the latter is a species distinctive from *caerulea* (FABR.) and therefore *caeruleiformis* and *dormeyeri* are, although closely related, not conspecific.

Subgenus **Platynopoda** WESTWOOD (1840).

***Xylocopa gastrica***, sp. nov.

♂. — Unknown.

♀. — Integument. — Black; under-side of antennal segments IV-XII reddish brown. Wings fusco-brown, darkest at cell  $Sc + R_1 + R_2$ ,  $R$  and  $R_5$ , with fine purple iridescence, apically with some greenish tints.

**P u b e s c e n c e.** — Black. Head, dorsum of thorax and abdominal tergites I-IV scarcely pubescent. Propodeum, and front surface and lateral margin of abdominal tergite I with sooty brown and black hairs. Lateral margin of abdominal tergites II-IV and entire V-VI, abdominal sternites II-III (posterior margin) and IV-VI covered with long erect bright golden-brown hairs.

**S t r u c t u r e.** — Inter-orbital distance at the level of antennal fossae about  $\frac{11}{12}$  as long as vertico-clypeal distance. Inner orbits weakly curved, distance between upper orbital extremities a little shorter than that between the lower. Front scatteredly covered with coarse, shallow punctures of second-degree-density, except in the regions immediately exterior to antennal fossae, where it is in first-degree-density. Interspaces between ocellar triangle and inner orbits impunctate. Frontal keel very weak, with a deep and long median fovea. Regions around median ocellus and antennal fossae very strongly elevated, especially that between antennal fossae. Supraclypeal region lying on the same slope with clypeus, with fine scattered punctures of third-degree-density. Epistomal suture weak, curved. Clypeal sutures strongly curved. Tentorial pits elongate, downwardly produced. Clypeus bipunctate, primary punctures fine, of third-degree-density; median impunctate band very flat, with a breadth about  $\frac{1}{3}$  the length of epistomal suture; basal portion slightly more elevated than its neighbouring lateral frontal regions. Labrum very strongly tuberculate and with a deep and narrow apical emargination. Postgenae impunctate, minimum length about 5 times as long as the diameter of mandibular punctures. Upper portion of outer orbital margins with a narrow, rather shallow groove. Postgenae and vertex very scatteredly punctate in third-degree-density, interspaces between proximate punctures usually about thrice the punctual diameter. Coronal suture inrecognisable. Inter-ocellar distance about  $\frac{9}{17}$  as long as ocello-ocular distance. Basal side of ocellar triangle about two and one-third times as long as either one of the lateral sides. Post-ocellar pits round, exceedingly deep. Inter-antennal distance about  $\frac{12}{17}$  as long as antenno-ocular distance. Antennal segment III longer than segments IV-V and shorter than segments IV-VI; V and VI subequal. Dorsum of thorax punctate in third-degree-density (except the extreme marginal areas which are punctate in first-degree-density), interspaces between proximate punctures about 6 times as long as the punctual diameter; disc of mesonotum broadly impunctate; posterior margin of scutellum a little elevated; postscutellum finely punctate in second-degree-density. Wing-vein *M* slightly longer than  $M_{1+2}$  (1st section); vein *R*<sub>4</sub> weakly curved at a point of basal  $\frac{2}{3}$  of its length; veins *M* and *M*<sub>4</sub> not parallel. Knee-caps on posterior tibiae V-shaped, extending to basal  $\frac{1}{2}$  of tibial length. Inner teeth of anterior and posterior claws about  $\frac{1}{2}$  as long as the outer ones. Abdominal tergites strongly punctate in second-degree-density; the punctuation being a little denser near anterior portion of each segment and being gradually denser, coarser and deeper towards apical segments; interspaces between proximate rows of punctures mostly about 3-4 times the punctual diameter in tergites I-II and about twice the diameter in



remaining tergites; tergites III-V with a narrow median impunctate band; median furrow of epipygium short, very narrow and shallow. Abdominal sternites medially weakly keeled, each with a weak posterior extension; hypopygium apically with a very broad and strong median keel, which is with a very shallow and narrow median fovea.

**Dimensions.** — Length of body ♀ 26 mm, of anterior wing ♀ 24 mm.

**Type-specimens.** — ♀, deposited in the Leiden Museum.

**Distribution.** — N.W. SOEMBA: Laora, 100 m, IV.25, K. W. DAMMERMAN, 1 ♀.

**Remarks.** — In structure, this species is very near to its co-subgenera, viz., *X. perforator* F. SM., *X. tenuiscapa* WESTW., *X. magnifica* (CKLL.) and *X. latipes* (DRURY), but is quite distinct from any of them, being chiefly characterised by its sparse punctuation, its strongly elevated region between antennal fossae, its short III antennal segment, its wing-venation, its bright fulvous abdominal pubescence and the shape of its hypopygium.

### ***Xylocopa perforator* F. SM.**

**Specimens Examined:** — SUMATRA: Medan, Mjöberg, 1 ♂, 2 ♀ (Stockholm Mus.). — JAVA: Buitenzorg, Kemner, 1 ♂ (Stockholm Mus.).

**Remarks.** — From Semarang, Batavia and Buitenzorg (Java), Friese (Tijdschr. v. Ent., LVII, p. 7, 1914) has recorded both sexes of *X. tenuiscapa* WESTW.; from Timor Island, Dusmet (Trab. Mus. nac. Cienc. nat. Madrid, XLIX, p. 42, no. 69, 1924) and Friese (Rev. Suisse d. Zool. XLII, p. 295, 1935) respectively have recorded one female of the same; probably all these records are referring to *X. perforator* F. SM. since *X. tenuiscapa* is not an insect of the Sunda Islands.

### ***Xylocopa latipes* (DRURY).**

1917. *Mesotrichia (Platynopoda) latipes* subsp. *basiloptera*, Cockerell, Philipp. Jour. Sci., D, XII, p. 347 & 349, ♀.

1930. *Mesotrichia (Platynopoda) latipes* subsp. *basiloptera*, Cockerell, Philipp. Jour. Sci., XLIII, p. 269.

1938. *Xylocopa (Platynopoda) latipes*, MAA, Rec. Indian Mus., XL, p. (in press).

For further bibliography, reference may be made to my other paper cited above.

**Variation.** — When Cockerell (1917, *loc. cit.*) described his new subspecies *basiloptera* from Palawan, P.I., he has probably overlooked Drury's illustration, in which the wings of this species are clearly shown in the following arrangement: area enclosed by cells bright bluish green, outer marginal area purple or reddish violet, extreme apical margin yellow-green. In some individuals, however, the purple iridescence is represented by greenish golden (sometimes with a little purplish tints), whilst the yellowish green at the extreme apical margin is represented by bright purple. But all these variations appear

to be merely individual aberrations and are possible due to the condition of preservation and so forth.

Specimens Examined. — MENTAWAI ISLANDS: Siberoet I., 23.IX.24, H. H. KARNY, 3 ♀; IX.24, C. BODEN KLOSS & N.S., 3 ♀. — Sipora I., 15.X.24, H. H. KARNY, 1 ♀. — SUMATRA: Asahan, Tangga, 2.VIII.28, 1 ♂, 1 ♀; Deli, Medan, 1 ♂, 9 ♀; Arnhemia, IV.28, 2 ♀; Asahan, Perdoeaän, 5.VIII.29, 2 ♀ (all J. C. VAN DER MEER MOHR). — Kota Tjane, 1 ♂; Tjima Poelos, 1 ♂; Sibolangit, 14 - 1500 m, 1 ♂ (all E. MJÖBERG, from the Stockholm Mus.). — Loeboek Sikaping, L. HUNDESHAGEN 450 m, 2 ♂, 6 ♀. — Atjeh, Pendeng, 200 - 400 m, II-III.37, 3 ♂, 2 ♀; Atjeh, Blangkedjeren, Lösten, III.37, 1 ♀; Atjeh, Pendeng, Gadjah, 400 - 1200 m, II.37, 1 ♀ (all A. HOGERWERF). — Deli, Sibolangit, 1500 m, IX-X.29, W. M. DOCTERS VAN LEEUWEN, 1 ♂. — Fort de Kock, 920 m, E. JACOBSON, 1 ♂ (Dtsch., ent. Inst.). — Poeloe Berhala (off the E.-coast), VIII.27, J. C. VAN DER MEER MOHR, 1 ♀. — SEBESI I. (Strait Soenda), X.21, K. W. DAMMERMAN, 1 ♂ (det. ALFKEN): — JAVA: Mt. Gedeh, Selabintanah, 1000 m, XII.32, M. E. WALSH, 1 ♂; Mt. Gedeh, Tjiboenar Est., 1000 m, XI.29 F. C. DRESCHER, 1 ♂. — Bandoeng, 800 m, III.31, L. VAN DER PIJL, 1 ♂. — Buitenzorg, 250 m, 2.IX.20, 1 ♀; 22.IX.22, 1 ♀; W. M. DOCTERS VAN LEEUWEN; KEMNER, 12 ♀ (Stockholm Mus.). — Wijnkoopsbaai, KEMNER, 1 ♀ (Stockholm Mus.). — "Java", MELLERBORG, 1 ♀ (Stockholm Mus.). — Idjen Mts., Blawan, 950 m, V-VI.24, K. W. DAMMERMAN, 3 ♂, 1 ♀. — SOEMBA I.: Laora, 100 m, IV.25, K. W. DAMMERMAN, 1 ♀. — BORNEO (all from the Sarawak Mus.): Baram, X.10, 1 ♂. — Mt. Kinabalu, 2000 - 3000', 24.IX.13, 1 ♀. — Matang, IX.06, 1 ♀. Kuching, 1 ♀. — Melawi (W. Borneo), BLANCHEMANCHE, XI-XII.24, 4 ♂ (Buitenzorg Mus.).