

# **A Synonymic List of the Order Mecoptera**

together with Descriptions of New Species.

By

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Owing to the kindness of the directors of many museums and by the assistance of a great number of collectors I have had the opportunity of examining large lots (several thousands) of specimens of Mecoptera including several type-specimens. As a preliminary result of my work I think the following list will be useful because this order has been so much in confusion as to the synonymy, probably more than any other. In my Monograph of the Mecoptera to be published in „Collections Zoologiques du Baron Edm. de Selys-Longchamps“, I shall give exact descriptions of all the species accompanied by photos of the wings and drawings of the anal appendages of the males of the most species together with a discussion of questions regarding the nomenclature.

## **Panorpidae**

Stephens, Ill. Brit. Ent. 1836.

## **Panorpinae**

Enderlein, Zool. Anz. XXV, p. 385-399, 1910.

## **Panorpa**

Linné, Syst. nat. X, p. 551, 1758.

*Aulops* Enderlein, Zool. Anz. XXV, p. 390, 1910.  
*Estenalla* Navás, Revue Russe d'Ent. XII, p. 356,  
 1912.

#### A. Eurasiatic Species.

1. *P. communis* Linné, Syst. nat. X, p. 551, 1758 = *vulgaris* Imhoff et Labram, Ins. Schweiz, p. 321, 1845.
2. *P. nigrirostris* Mac Lachlan, Ent. Month. Mag., p. 132, 1882.
3. *P. rufostigma* Westwood, Trans. Ent. Soc. Lond., p. 186, 1846.
4. *P. hybrida* Mac Lachlan, Ent. Month. Mag., p. 130, 1882.
5. *P. clavigera* Klapálek, Term. Füz. XXV, p. 166, 1902.
6. *P. germanica* Linné, Syst. nat. X, p. 551, 1758 = *affinis* Leach, Zool. Misc. II., p. 98, 1815 = *apicalis* Stephens, Ill. VI, p. 52, 1836 = *borealis* Stephens, ibid., p. 53 = *montana* Brauer, Neur. austr., p. 36, 1857 = *gibberosa* Mac Lachlan, Trans. Ent. Soc. Lond., p. 59-70, 1869.
7. *P. deceptor* Esben-Petersen, Ent. Mitt., p. 263, 1913.
8. *P. cognata* Rambur, Névr., p. 330, 1842 = *germanica* Stephens, Ill. VI, p. 53, 1836 = *alpina* Hagen, Ent. Ann., p. 32, 1858.
9. *P. meridionalis* Rambur, Névr., p. 329, 1842.
10. *P. annexa* Mac Lachlan, Trans. Ent. Soc. Lond., p. 59-70, 1869 = *meridionalis* Schneider, Stett. Zeit., p. 340, 1845 = *cognata* var. Hagen, Ann. Ent. Soc. France, p. 747, 1860.
11. *P. ghilianii* Mac Lachlan, Trans. Ent. Soc. Lond., p. 59-70, 1869.
12. *P. picta* Hagen, Wien. Ent. Mon., p. 199, 1863.
13. *P. selysi* n. sp.

Head and rostrum shining black. Maxillary palpi pitchy brown, the apical joint black. Antennae black;

the apex of 1st and 2nd basal joints narrow brownish. Thorax dorsally and ventrally pitchy black, paler in the female. Anterior margin of prothorax brownish. Abdomen pitchy black. 6th segment in the ♂ cylindrical, somewhat narrowed at the apex, truncate, about  $1\frac{1}{2}$  times longer than 7th, which is conical, reddish brown basally. 8th segment conical, the apex above somewhat obliquely truncate, basally reddish brown, nearly as long as 7th. 9th segment reddish brown. Branches of lower appendage cylindrical, approximating at the base and apex. Upper appendage broad, the apex with deep rectangular incision. In the ♀ the abdomen is pale; the hind margins of the segments narrowly bordered with brown; the terminal segments dark brown; setae black. Legs brownish yellow. The tip of tibiae and of the three basal joints of the tarsi brown; the 4th and 5th tarsal joints blackish brown. Claws serrate. Wings broad, obtuse at the tip, hyaline, with strongly yellowish tinge, especially at the base. All the nervures strongly yellowish except in the markings, where the longitudinal ones are black. All the spots and bands distinct, broad and sooty black.

Forewing 13–16 mm; hindwing 12–14,5 mm.

Mus. Vienna: 1 ♂, Elisabethopol (Kindermann leg.), 1 ♀, Brussa, 1863 (Lederer leg.). — Mus. Tiflis: 9 ♀, Caucasus.

This species is easily recognized by its strong yellowish tinge on the wings, by the yellow nervures and by the blackish colour of the body.

14. *P. connexa* Mac Lachlan, Trans. Ent. Soc. Lond., p. 59-70, 1869.

15. *P. similis* n. sp.

Head and rostrum shining black. Maxillary palpi reddish brown, apical joint black. Antennae black,

basal joint somewhat brownish. Thorax black above; the sides yellowish grey. Abdomen blackish with a brownish side-streak; the three last segments more or less reddish brown. In the male the posterior margin of third segment above somewhat broadly produced. Sixth segment cylindrical, narrow towards the apex. 7th and 8th elongate, conical. The apical half of 7th and 8th segments and a broad band at the middle of the forceps blackish. Branches of lower appendage short, somewhat pointed; the apex of upper appendage broadly but not deeply incised. Titillators long, curved, pointed towards the apex. Legs brownish yellow; the tip of tarsal joints darker; the fourth and fifth almost blackish. Claws serrate. Wings coloured and marked as in *P. connexa* with exception of the fact that the two spots, that indicate the submedian band sometimes are present also in the hindwing.

Forewing 12—15 mm; hindwing 11—14 mm.

Mus. Tiflis: 4 ♂, 18 ♀, Caucasus.

The species is very similar to *P. connexa*, but its shining black rostrum and its very long and slender titillators are very good specific characters.

16. *P. davidi* ♂ Navás, Mem. Barcel., p. 415, 1908.

17. *P. sibirica* n. sp.

Head and antennae black; rostrum shining brownish black. Thorax above, sides, coxae and abdomen black; the base of 7th and 8th segments brown. Legs yellowish brown, apical tip of tarsal joints dark brown. Claws serrate. Sixth segment cylindrical, the apical margins somewhat incurved laterally. Seventh segment conical, much broadened towards the apex; 8th conical with the apex above obliquely truncate. Branches of lower appendage long, flattened, almost straight and narrow towards the apex, which is obtuse. Titillators deeply

cleft; the branches pointed towards the apex; the inferior pair smallest. The apex of upper appendage strongly haired and with a broad, deep and almost rectangular incision. Wings broad and short with somewhat acutely rounded apex. Membrane hyaline with lacteous tinge. Nervation blackish brown. Markings sooty brown. In the forewings is found a spot in the middle of  $Cu^1$  (the rest of the submedian band); the pterostigmatal band narrow in its posterior half, and its apical branch is absent; the apical band narrow in its posterior half.

Forewing 14 mm; hindwing 13 mm.

Mus. Hamburg: 1 ♂, Amur (Dörries leg.).

18. *P. stigmatalis* Navás, Mem. Barcelona, p. 416, 1908.

19. *P. concolor* n. sp.

Head brown; a black streak between the eyes above the antennae; rostrum castaneous with paler side margins; maxillary palpi brown, the tip of apical joint black. Antennae blackish, the basal joint yellowish brown. Thorax blackish; the hind border of the thoracical segments brown. Sides of thorax greyish brown. Abdomen dorsally and ventrally blackish brown; the three terminal segments reddish brown; setae black. Legs brown; the tip of tarsal joints darker. Claws serrate. Wings with a smoky green tinge, blackish brown nervation, dark greyish brown pterostigma and with acute tips. No markings except a very faint indication of a pterostigmatal band.

Forewing 15 mm; hindwing 14 mm.

Mus. London: 2 ♀, Tainan, Anping, South Formosa, 1907 (Wileman leg.).

20. *P. guttata* Navás, Mem. Barcelona, p. 416, 1908 = *dauidi* ♀ Navás, ibid. p. 415.

21. *P. arcuata* Navás, Revue Russe d'Ent., p. 356, 1912  
= *Estenalla arcuata* Navás, *ibid.*
22. *P. alpina* Rambur, Névr., p. 330, 1842 = *variabilis*  
Brauer, Neuropt. austr., p. 35, 1857.
23. *P. pura* Klapálek, Bull. intern. l'Acad Bohême, p. 4,  
1906.
24. *P. caucasica* Mac Lachlan, Trans. Ent. Soc. Lond.,  
p. 59–70, 1869.
25. *P. dicerus* Mac Lachlan, Ann. Mag. Nat. Hist., p. 423,  
1894.

#### B. Japanese—East Asiatic Species.

26. *P. wormaldi* Mac Lachlan, Trans. Ent. Soc. Lond.,  
p. 186, 1875.
27. *P. multifasciaria* Miyake, Journ. Coll. Agric. Imp.  
Univ. Tokyo, p. 196, 1910.
28. *P. striata* Miyake, Bull. Coll. Agr. Imp. Univ. Tokyo,  
p. 6, 1908.
29. *P. hakusanensis* ♀ Miyake, Journ. Coll. Agric. Imp.  
Univ. Tokyo, p. 354, 1913.

In the male the terminal segments are in some degree similar to those of *P. bicornuta* Mac Lachlan, but the tip of the lateral prolongation of seventh segment is rounded, and the sixth segment is not narrowed towards the tip.

1 ♂ in my collection (Miyake leg.).

30. *P. preyeri* Mac Lachlan, Trans. Ent. Soc. Lond., p.  
185, 1875 = *bouvieri* Navás, Mem. Barcel., p. 418,  
1908 = *leucoptera* (nec Uhler) Miyake, Journ. Coll.  
Agric. Imp. Univ. Tokyo, p. 356, 1913.
31. *P. bicornuta* Mac Lachlan, Bull. ent. Soc. Suisse, p.  
403, 1887 = *magnicauda* Miyake, Bull. Coll. Agric.  
Imp. Univ. Tokyo, p. 192, 1910.
32. *P. leucoptera* Uhler, Proc. Acad. Nat. Sci. Phil., p.  
31, 1858 = *nikkoënsis* Miyake, Bull. Coll. Agric.  
Imp. Univ. Tokyo, p. 11, 1908.

33. *P. japonica* Thunberg, Nov. Ins. Sp. Diss. III, p. 67, 1784 = *macrogaster* Mac Lachlan, Journ. Linn. Soc., p. 257, 1868 = *leucothyria* Navás, Mem. Barcel., p. 414, 1908 = *dyscola* ♀ Navás, Mem. Barcel., p. 420, 1908 = *sinanoensis* Miyake, Bull. Coll. Agric. Imp. Univ. Tokyo, p. 4, 1908 = *rectifasciata* Miyake, *ibid.*, p. 5 = *niphonensis* Miyake, *ibid.*, p. 7 = *pulchra* Miyake, *ibid.*, p. 8 = *irregularis* Miyake, Journ. Coll. Agric. Imp. Univ. Tokyo, p. 198, 1910 = *Aulops interrupta* Navás, Revue Russe d'Entom., p. 283, 1913 = ? *hageni* Navás, *ibid.*, p. 276, 1909 (nom. nud.).
34. *P. nipponensis* Navás, Mem. Barcel., p. 418, 1908 = *brachypennis* Miyake, Bull. Coll. Agr. Imp. Univ. Tokyo, p. 9, 1908 = *klugi* (nec Mac Lachlan) Miyake, Journ. Coll. Agr. Imp. Univ. Tokyo, p. 189, 1910 = *Aulops dentata* Navás, Revue Russe d'Ent., p. 282, 1913 = *Aulops Valignanii* Navás, Bull. Mus. d'Hist. nat. Paris, p. 448, 1913 = *Aulops picea* Navás, *ibid.*, p. 449, 1913.
34. *P. ochraceopennis* Miyake, Journ. Coll. Agr. Imp. Univ. Tokyo, p. 190, 1910.
35. *P. klugi* Mac Lachlan, Journ. Linn. Soc. Lond., p. 256, 1868 = *japonica* (nec Thunberg) Klug, Abh. Königl. Akad. Wiss., p. 106, 1836 = *ochracea* Miyake, Bull. Coll. Agr. Imp. Univ. Tokyo, p. 3, 1908 = *drouarti* Navás, Mem. Barcel., p. 419, 1908 = *dyscola* ♂ Navás, *ibid.*, p. 420 = *Aulops trisignata* Navás, Bull. Mus. d'Hist. nat. Paris, p. 450, 1913.
36. *P. obscura* Miyake, Journ. Coll. Agric. Imp. Univ. Tokyo, p. 195, 1910.
37. *P. trizonata* Miyake, Bull. Coll. Agric. Imp. Univ. Tokyo, p. 7, 1908.
38. *P. lewisi* Mac Lachlan, Bull. Soc. Ent. Suisse, p. 402, 1887 = *chuzenjiensis* Miyake, Journ. Coll. Agric. Imp. Univ. Tokyo, p. 201, 1910.

39. *P. sachalinensis* Matsumura, Journ. Coll. Tohoku Univ. Sapporo IV, p. 12, 1911.
40. *P. orientalis* Mac Lachlan, Bull. Soc. Ent. Suisse, p. 400, 1887 = *Aulops melania* Navás, Revue Russe d'Ent., p. 421, 1912.
41. *P. approximata* n. sp.

Head and rostrum jet black; maxillary palpi pale brown, the apical joint with black tip. Antennae black, becoming brownish black towards the apex. Prothorax black; meso- and metathorax blackish with the posterior half reddish brown. Abdomen black with the hind and side margins of the basal segments somewhat dark reddish brown. Hind margin of 3rd abdominal segment in the male produced into a somewhat raised, clubshaped prolongation, the tip of which rests upon a pointed elevation on the 4th segment; 6th segment cylindrical, the upper edge seen from side, a little incurved; 7th somewhat broadened towards the apex, the upper edge incurved; 8th also broadened towards the apex; the upper edge straight; the sides of the three segments somewhat produced at the apex. Branches of lower appendage very robust, placed on edge in their apical part; upper appendage very long, its apical part turned up between the chelae. The branches of the chelae very long, slender, curved outwards in the middle, downwards in the apical half, the tips approximating. Legs and sides of thorax yellowish brown. Apical joint of tarsi and the tip of the others brownish black. Claws serrate. Wings hyaline with yellowish tinge and elliptical apex. Longitudinal veins dark brown, in the markings blackish; apical cross veins yellowish white in the hyaline areas and yellowish brown in the markings. The markings sooty brown, as in *P. orientalis*.



Forewing 16—17 mm; hindwing 15—16 mm.

Brit. Museum: 1 ♂, 4 ♀, Korea, S. Ichikawa (1905).

At first sight the species looks like *P. orientalis*, but the peculiar shape of the 9th segment in the male easily separates the two species.

42. *P. amurensis* Mac Lachlan, Ann. Soc. Ent. Belg., XV, p. 59, 1872.
43. *P. takenouchii* Miyake, Bull. Coll. Agric. Imp. Univ. Tokyo, p. 10, 1908.
44. *P. cornigera* Mac Lachlan, Bull. Soc. Ent. Suisse, p. 404, 1887 = *galloisi* Navás (nec Miyake), Bull. Mus. d'Hist. nat. Paris, p. 445, 1913.
45. *P. gokaensis* Miyake, Journ. Coll. Agric. Imp. Univ. Tokyo, p. 193, 1910.
46. *P. galloisi* Miyake, Entomologist, p. 93, 1911.
47. *P. arakawae* Miyake, Journ. Coll. Agr. Imp. Univ. Tokyo, p. 343, 1913.

### C. American Species.

48. *P. rufa* Gray, Griffith's Ed. Cuvier's Anim. Kingd. Ins., XV, p. 323, 1838 = *fasciata* Klug (in part), Abh. Königl. Akad. Wiss. Berl., p. 105, 1836 (nec Fabricius).
49. *P. lugubris* Swederus, Kgl. Sv. Vet. Handl. VIII, p. 279, 1787 = *scorpio* Fabricius, Ent. Syst. II, p. 97, 1793.
50. *P. nuptialis* Gerstaecker, Ent. Zeit. Stett., p. 187, 1863.
51. *P. nebulosa* Westwood, Trans. Ent. Soc. Lond., p. 191, 1846.
52. *P. maculosa* Hagen, Syn. Neur. N. Am., p. 245, 1861.
53. *P. longipennis* Banks, Trans. Am. Ent. Soc., p. 349, 1911.
54. *P. banksi* Hine, Bull. Sci. Lab. Den. Univ., p. 247,

- 1901 = *P. affinis* (nec Leach) Banks, Trans. Am. Ent. Soc., p. 315, 1895.
55. *P. latipennis* Hine, Bull. Sci. Lab. Den. Univ., p. 248, 1901.
56. *P. rufescens* Rambur, Névr., p. 330, 1842 = *debilis* Westwood, Trans. Ent. Soc. Lond., p. 191, 1846.
57. *P. confusa* Westwood, Trans. Ent. Soc. Lond., p. 190, 1846.
58. *P. americana* Swederus, Kongl. Sv. Akad. Handl., p. 279, 1787 = *fasciata* (in part) Fabricius, Ent. Syst. II, p. 98, 1793.
59. *P. subfurcata* Westwood, Trans. Ent. Soc. Lond., p. 191, 1846.
60. *P. venosa* Westwood, Trans. Ent. Soc. Lond., p. 190, 1846 = *fasciata* (in part) Klug. Abh. Königl. Akad. Wiss. Berl., p. 105, 1836 (nec Fabricius).
61. *P. canadensis* Banks, Trans. Am. Ent. Soc., p. 315, 1895.
62. *P. signifer* Banks, Trans. Am. Ent. Soc., p. 251, 1900.
63. *P. carolinensis* Banks, Bull. Am. Mus. Nat. Hist., p. 216, 1905.
64. *P. virginica* Banks, Psyche, p. 99, 1906.
65. *P. claripennis* Hine, Bull. Sci. Lab. Den. Univ., p. 252, 1901.
66. *P. terminata* Klug, Abh. Kön. Ak. Wiss. Berl., p. 106, 1836.
67. *P. punctata* Klug, *ibid.*, p. 105, 1836.
68. *P. immaculata* n. sp.

Head and rostrum yellowish; a black cross band above the antennae, extending along the inner margin of the eyes to the hind margin of the vertex; rostrum with two lateral longitudinal bands; maxillary palpi long, brown; apical joint with blackish tip. Antennae blackish; the basal joint yellowish, 2nd joint brownish with yellowish base. Thorax blackish above, with a broad yellowish median

streak. Sides of thorax greyish yellow. Legs testaceous; tip of tarsal joints brown. Claws serrate. Abdomen in ♂ pitchy brown above, yellowish brown below; 6th segment pitchy brown below; 7th, 8th and 9th brownish yellow; sometimes the tip of 7th and 8th somewhat reddish brown above. Hind margin of third abdominal segment a little produced above; 4th segment above with a small tubercle at the tip of the prolongation. 6th segment cylindrical, narrowed towards apex, which is a little obliquely truncate at the apex above. 7th and 8th segments of equal length, united as long as 6th, narrowed from the middle towards the base. Lower appendage very short, with very long stalk. Upper appendage long, its apex incised. Titillators narrow, linear and pointed. In the ♀ the abdomen is pitchy brown above, yellowish brown below, 4th and 5th segments greyish yellow, the last four reddish yellow. Setae black. Wings with a faint yellowish grey tinge, rounded apex, dark brown nervation and without markings. Pterostigma yellowish. In the forewings subcosta joins costa in the middle of the wing.

Forewing 13—14 mm; hindwing 12—13 mm.

Brit. Museum: 12 ♂, 11 ♀, Guerrero, Mexico, 6—8000 feet (H. H. Smith leg.).

69. *P. mexicana* Banks, Trans. Am. Ent. Soc., p. 234, 1913.

### Neopanorpa

Weele, Notes Leyden Mus., p. 4, 1909.

*Campodotecnum* Enderlein, Zool. Anz., p. 39, 1910.

#### A. Javanese Species.

1. *N. angustipennis* Westwood, Trans. Ent. Soc. Lond., p. 6, 1852 (*Panorpa*).

2. *N. hyalinata* Esben-Petersen, Notes Leyden Mus., XXXV, p. 227, 1913 (27. XII) = *Campodotecnum falcatum* Navás, Revue Russe d'Ent., p. 428, 1914 (28. III).
3. *N. mülleri* Weele, Notes Leyden Mus., p. 6, 1909.
4. *N. lemniscata* Enderlein, Notes Leyden Mus., p. 236, 1912 (*Campodotecnum*).
5. *N. cingulata* Enderlein, *ibid.*, p. 237 (*Campodotecnum*).

#### B. Formosan Species.

6. *N. sauteri* Esben-Petersen, Ent. Mitt., p. 197, 1912 (*Panorpa*).
7. *N. formosana* Navás, Revue Russe d'Ent., p. 114, 1911 (*Campodotecnum*).
8. *N. ophthalmica* Navás, *ibid.*, p. 113 (*Campodotecnum*).

#### C. Continental Species.

9. *N. cornuta* n. sp.

Head black; the insertion of antennae yellowish brown; rostrum yellowish brown; maxillary palpi yellowish brown, tip of apical joint black. Basal joint of antennae yellowish; the remainder of the antennae brown, becoming dark brown towards apex. Prothorax black above; front half of mesothorax dark brown, hind part yellowish; metathorax yellowish with a semicircular dark brown spot at the front margin. Sides of thorax yellowish or testaceous with a few minute black dots. Legs yellowish; apex of tarsal joints dark. Claws serrate; teeth not of the same size. In the male the abdomen castaneous above; the venter, the three terminal segments and the apical half of the 6th yellowish brown. Hind margin of 3rd segment produced in the middle above into a long, slender, cylindrical prolongation, a little longer than next segment. Hind margin of 5th segment with two tu-

bercles above. Near the hind margin of 6th segment two strong, raised, cylindrical, obtuse and somewhat divergent yellowish horns, blackish at tip; below the horns a small tubercle placed in the middle of the side margin. 7th and 8th segments of the same length, somewhat conical with the apex obliquely truncate above. Lower appendage of 9th segment of peculiar shape. In the middle of the inner margin a broad flap, bent down; tip rounded, bent upwards. Upper appendage with truncate apex; setae very long. Titillators deeply cleft; the branches narrow, linear and pointed. In the female the abdomen is castaneous dorsally, the venter yellowish; the three terminal segments reddish brown; setae black. Wings narrow at base, gradually broadened towards apex, which is broadly rounded. Membrane with a faint yellowish tinge; nervation pale brown; cross veins in the apical part whitish; markings pale sooty brown. Submedian band as a rule complete in forewing, narrow; median spot in forewing (absent in hindwing) extending so far that it touches the hind part of pterostigmatal band, which is forked in its lower half; apical band broad, in front connected with pterostigmatal band; in the middle of its inner margin with an obtuse prolongation.

Forewing 12,5–15 mm; hindwing 11,5–13,5 mm.

Brit. Museum: 7 ♂, 9 ♀, North Khasia Hills, Assam (Cameron leg.).

10. *N. zebrata* n. sp.

Head and rostrum yellowish brown; on vertex a small blackish spot, enclosing the ocelli. Rostrum long and slender; maxillary palpi yellowish brown; apex of apical joint blackish. Antennae blackish; 1st and 2nd joints yellowish. Thorax pale brown

above and on the sides. Abdomen blackish brown dorsally, brown ventrally; the apical segment brown; setae blackish. Legs yellowish; tip of tarsal joints brown. Claws serrate. Wings hyaline, hardly with yellowish tinge, narrow and long, gradually broadened towards apex, which is elliptical. Longitudinal nervures dark brown; cross veins in the apical part very pale, nearly whitish. Markings sooty brown, in form of irregular, more or less complete cross-bands (about 8 in forewing, 6 in hindwing), connected in the middle of the wing.

Forewing 13 mm; hindwing 12 mm.

Brit. Museum: 1 ♀ Travancore, India (Hampson leg.).

11. *N. appendiculata* Westwood, Trans. Ent. Soc. Lond., p. 186, 1846 (*Panorpa*).
12. *N. flava* n. sp.

♀ Vertex black; front and rostrum yellowish brown; maxillary palpi yellowish brown, apical joint darker at tip; antennae blackish brown (terminal part lost), the three basal joints yellowish brown. Prothorax black with narrow yellowish brown hind margin; mesothorax blackish in its front half above; metathorax black in its front third. Sides of thorax and legs yellowish brown. Claws serrate. The basal abdominal segments blackish above with pale reddish brown hind margins; the terminal segments and the venter of whole of the abdomen yellowish red-brown. Setae long, with hairs, blackish towards apex. Wings long and slender with elliptical apex, and strong reddish yellow tinge; nervation a little more intensely coloured. Markings dark sooty brown. No basal spot; submedian band indicated by two spots in forewing: a small one at radial sector, near base, and a larger one on the hind margin of the wing; only the latter is present in the hindwing; margi-

nal spot narrow; pterostigmatal band broadly furcated in its lower half; the tip of the band does not reach the anterior margin of the wing, but runs for a short distance in apical direction below pterostigma; the basal margin of apical band with a wedge-shaped prolongation, directed obliquely inwards.

Forewing 19 mm; hindwing 17 mm.

Mus. Berlin: 1 ♀ Sikkim, Septbr. 1885.

When the male comes under consideration, it will perhaps be necessary to transfer the species to *Leptopanorpa*.

13. *N. nipalica* Navás, Deutsch. Ent. Zeitschr., p. 288, 1910 (*Panorpa*) = *Aulops suffusa* Navás, Rev. Russe d'Ent., p. 427, 1914.
14. *N. cavaleriei* Navás, Mem. Barcel., p. 417, 1908 (*Panorpa*).
15. *N. harmandi* Navás, Mem. Barcel., p. 416, 1908 (*Panorpa*).
16. *N. fenestrata* Needham, Rec. Ind. Mus. III, p. 195, 1909 (*Panorpa*).
17. *N. sordida* Needham, Rec. Ind. Mus. III, p. 196, 1909 (*Panorpa*).

### Leptopanorpa

Mac Lachlan, Trans. Ent. Soc. Lond., p. 187, 1875.

*Himanturella* Enderlein, Zool. Anz., p. 392, 1910.

*Neopanorpa* Enderlein, Notes Leyden Mus., p. 327, 1912 (nec Weele).

#### A. Japanese Species.

1. *L. ritsemae* Mac Lachlan, Trans. Ent. Soc. Lond., p. 187, 1875.

2. *L. sieboldi* Mac Lachlan, Trans. Ent. Soc. Lond., p. 188, 1875.

#### B. Continental Species.

3. *L. furcata* Hardwicke, Trans. Linn. Soc. Lond., p. 132, 1825 (*Panorpa*).  
 4. *L. effusa* Navás, Revue Russe d'Ent., p. 429, 1914.

#### C. Javanese Species.

5. *L. charpentieri* Burmeister, Handb. Ent. II, p. 958, 1839 (*Panorpa*) = *Panorpa nematogaster* Mac Lachlan, Trans. Ent. Soc. Lond., p. 69, 1866 = *Neopanorpa linguata* Navás, Revue Russe d'Ent., p. 430, 1914.  
 6. *L. longicauda* Weele, Notes Leyden Mus., p. 11, 1909.  
 7. *L. tubifera* Enderlein, Zool. Anz., p. 392, 1910 (*Himanturella*).  
 8. *L. jacobsoni* Weele, Notes Leyden Mus., p. 10, 1909 (*Panorpa*).  
 9. *L. javanica* Westwood, Trans. Ent. Soc. Lond., p. 186, 1846 (*Panorpa*).  
 10. *L. pi* Weele, Notes Leyden Mus., p. 8, 1909 (*Panorpa*).

### Panorpodes

Mac Lachlan, Trans. Ent. Soc. Lond., p. 188, 1875.

#### A. Japanese Species.

1. *P. paradoxa* Mac Lachlan, Trans. Ent. Soc. Lond., p. 188, 1875.  
 2. *P. apicalis* Miyake, Journ. Coll. Agr. Univ. Tokyo, p. 203, 1910 = *naevia* Miyake, *ibid.*, p. 376, 1913 (nec Navás).  
 3. *P. naevia* Navás, Revue Russe d'Ent., p. 273, 1909 (*Panorpa*).



4. *P. decorata* Mac Lachlan, Bull. Soc. Ent. Suisse, p. 405, 1887 = *Panorpa limbata* Navás, Revue Russe d'Ent., p. 274, 1909 = *notata* Navás, ibid. = *singularis* Miyake, Journ. Coll. Agr. Univ. Tokyo, p. 204, 1910.

#### B. American Species.

5. *P. oregonensis* Mac Lachlan, Ent. Month. Mag., p. 37, 1881.  
6. *P. carolinensis* Banks, Bull. Am. Mus. Nat. Hist., p. 215, 1909.

#### Choristinae m.

##### Chorista

Klug, Abh. Kön. Akad. Wiss., p. 101, 1836.

*Euphania* Westwood, Trans. Ent. Soc. Lond., p. 188, 1846.

1. *Ch. australis* Klug, loc. cit. = *Euphania luteola* Westwood, loc. cit.  
2. *Ch. ruficeps* Newman, Zoologist, 1850 (*Panorpa*).

##### Taeniochorista

Esben-Petersen, Ent. Medd. Køb. X, p. 129, 1914.

1. *T. pallida* Esben-Petersen, Ent. Medd., Køb., p. 129, 1914.

##### Meropinae

Enderlein, Zool. Anz., p. 387, 1910.

##### Merope

Newman, Ent. Mag., p. 180, 1838.

1. *M. tuber*, Newman, Ent. Mag., p. 180, 1838.

#### Notiothauminae m.

##### Notiothauma

Mac Lachlan, Trans. Ent. Soc. Lond., p. 427, 1877.

1. *N. reedi* Mac Lachlan, Trans. Ent. Soc. Lond., p. 427, 1877.

## Boreidae

Mac Lachlan, Trans. Ent. Soc. Lond., p. 218, 1868.

### Boreus

Latreille, Cuvier's Règne Anim. V, p. 247, 1825.

#### A. Eurasiatic Species.

1. *B. hyemalis* Linné, Syst. nat. XII, p. 915, 1767 (*Panorpa*) = *Gryllus proboscideus* Panzer, Faun. germ., XXVII, p. 18, 1796 = *gigas* Brauer, Neur. Eur., p. 17, 1876 (nom. nud.).
2. *B. lokayi* Klapálek, Bull. Int. Acad. Sci. Bohême, p. 6, 1901 = ? *tarnanii* Navás, Revue Russe d'Ent., p. 277, 1911.
3. *B. westwoodi* Hagen, Ent. Month. Mag., p. 132, 1866 = *boldyrevi* Navás, Revue Russe d'Ent., p. 278, 1911.

#### B. American Species.

4. *B. nivoriundus* Fitch, Am. Journ. Agr. V, p. 277, 1847.
5. *B. brumalis* Fitch, Am. Journ. Agr. V, p. 278, 1847.
6. *B. californicus* Packard, Proc. Bost. Soc. Nat. Hist., p. 408, 1871.
7. *B. unicolor* Hine, Bull. Sci. Lab. Den. Univ., p. 256, 1901.

## Bittacidae

Enderlein, Zool. Anz., p. 387. 1910.

### Bittacus

Latreille, Hist. nat. Crust. Ins. VIII, p. 20, 1805.

*Leptobittacus* Hine, Journ. Col. Hort. Soc., p. 108, 1898.

*Thyridates* Navás, Mem. Barcel., p. 412, 1908.

*Diplostigma* Navás, *ibid.*, p. 413, 1908.

*Haplodictyus* Navás *ibid.*, p. 413, 1908.

#### A. Eurasiatic Species.

1. *B. italicus* O. F. Müller, Man. Ins. Taur. ed. Allioni, p. 194, 1766 (*Panorpa*) = *tipularia* Fabricius, Syst. Ent., p. 314, 1775 (*Panorpa*) = *tipuloides* Schrank, Beitr. Naturg., p. 82, 1776.
2. *B. hageni* Brauer, Abh. z.-b. Ges. Wien, p. 691, 1860.
3. *B. indicus* Walker, Cat. Neur. Brit. Mus., p. 469, 1853.
4. *B. insularis* n. sp.

Head brown; rostrum pitchy brown towards the tip; vertex black between the ocelli. Antennae slender, dark brown; basal joint subcylindrical, globular, both very stout. Prothorax pitchy brown, meso- and metathorax reddish brown. Abdomen brown. Legs slender, brown; femora, tibiae and tarsal joints with blackish tip. Wings narrow, slender, with rounded tips and with pale greyish brown tinge; apical margin shaded with pale sooty brown. Nervures brown. No apical cross vein in costal area. Subcostal crossvein in forewing half way between origin of radial sector and its fork, in hindwing nearest to the origin. Fork of radial sector opposite to fork of media. Cubital crossvein (i. e. that between the cubital branches) a little beyond fork of media. No crossvein between  $Cu^2$  and 1 A; the latter joins the hind margin far before fork of media and a little beyond origin of radial sector. Pterostigma subrectangular, connected with radial sector by two crossveins. A few bristles on hind margin of wings near base.

Forewing 15 mm; hindwing 18 mm.

Brit. Mus.: 1 ♀ Ceylon, 29. XI 1908.

5. *B. latipennis* Gerstaecker, Mitt. nat. Ver. Neuv. Rüg., p. 37, 1885.
6. *B. sinensis* Walker, Cat. Neur. Brit. Mus., p. 469, 1853 = *quaternipunctatus* Enderlein, Zool. Anz., p. 397, 1910 = *strategus* Navás, Bull. Mus. d'Hist. nat. Paris, p. 442, 1913.
7. *B. mastrillii* Navás, Bull. Mus. Hist. nat. Paris, p. 443, 1913.
8. *B. laevipes* Navás, Revue Russe d'Ent., p. 276, 1909.
9. *B. nipponicus* Navás, Revue Russe d'Ent., p. 275, 1909.
10. *B. takaoensis* Miyake, Journ. Coll. Agr. Univ. Tokyo, p. 388, 1913 (22. XII) = *Haplodictyus polemicus* Navás, Bull. Mus. d'Hist. nat. Paris, p. 449, 1913 (published 1914).
11. *B. marginatus* Miyake, Journ. Coll. Agr. Univ. Tokyo, p. 389, 1913.

#### B. Australian Species.

12. *B. microcercus* Gerstaecker, Mitt. nat. Ver. Neuv. Rüg., p. 36, 1885.

#### C. African Species.

13. *B. africanus* n. sp.

Head, rostrum and maxillary palpi brown. A blackish spot between the ocelli. Antennae pale brown. Thorax brown with some darker spots along the lateral margins. Abdomen pale brown. Upper appendage of male yellowish. Legs yellowish brown; tip of femora and tibiae dark brown. Wings hyaline with a faint yellowish tinge; nervures brown; tip somewhat acute. No apical cross vein in costal area. Subcostal crossvein in forewing nearest to origin of radial sector. Forks of radial sector, of media and of cubitus in a straight line. Anal crossvein (between  $Cu^2$  and 1A) before cu-

bital crossvein. 1A joins the hind margin a little before fork of media. At fork of radial sector a very small dark spot, and at fork of media a large white spot. Pterostigma subrectangular, 3 to  $3\frac{1}{2}$  times longer than broad, yellowish, connected with the radial sector by two crossveins. Bristles on the margins of the wings at base.

Forewing 19 mm; hindwing 17 mm.

Mus. Vienna: 1 ♂, „Urwald Beni“, Oct. 10 (Grauer leg.).

14. *B. montanus* Weele, Sjöstedts Kilim.-Meru Exp., Neur., p. 21, 1909.
15. *B. sjöstedti* Weele, loc. cit., p. 22, 1909.
16. *B. walkeri* n. sp.

Head, rostrum and maxillary palpi yellowish brown; a blackish crossband between the eyes above the insertion of antennae encloses the ocelli. Antennae blackish brown; the basal joints pale brown. Thorax pale brown; mesothorax with four black spots in its front half; metathorax with two black spots on its front margin. Abdomen yellowish brown. Femora and tibiae yellowish brown; tip blackish; joints of fore and intermediate tarsi brown, becoming blackish brown towards the tip; joints of hind tarsi dark brown, blackish towards apex. Hind femora rather incrassate in the middle. First joint of hind tarsus as long as second and third joint united, which are equal; fourth joint two thirds of first; fifth joint as long as fourth; claws very small. Wings very long and slender with elliptical apex. Membrane hyaline, hardly with any yellowish tinge; nervures dark brown, in the apical part of wings narrowly margined with brown. No apical crossvein in costal area. Subcostal crossvein between origin and fork of radial sector, in forewing nearest to the fork, in hindwing nearest to

the origin. Fork of radial sector before fork of media. Anal crossvein far before cubital crossvein, which is opposite to fork of radial sector. 1A joins the margin a little before cubital crossvein and fork of radial sector. Pterostigma subrectangular, about 6 times longer than broad, strongly purple-brown, connected with the radial sector by two crossveins. Bristles on the margins of wings near base.

Forewing 24 mm; hindwing 22 mm.

Brit. Museum: 1 ♂ (Dr. Smith, S. Africa, 44-6).

In the form of the wings this species has great likeness to *B. chlorostigma* and the species of *Haropobittacus*, but the wings are relatively more slender.

17. *B. testaceus* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 98, 1836.
18. *B. schoutedeni* Esben-Petersen, Rev. zool. Afr., p. 143, 1913.
19. *B. capensis* Thunberg, Nov. Sp. Ins. Diss. III, p. 67, 1784 (*Panorpa*).
20. *B. pobeguini* Navás, Mem. Barcel., p. 414, 1908 (*Haplodictyus*).
21. *B. peringueyi* Esben-Petersen, Rev. zool. Afr., p. 144, 1913.
22. *B. chevalieri* Navás, Mem. Barcel., p. 414, 1908 (*Haplodictyus*).
23. *B. fumosus* Esben-Petersen, Rev. zool. Afr., p. 145, 1913.
24. *B. nebulosus* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 99, 1836.
25. *B. weelei* Esben-Petersen, Rev. zool. Afr., p. 142, 1913 = *testaceus* Weele, Sjöstedts Kil.-Meru Exp., Neur., p. 21, 1909 (nec Klug).

#### D. American Species.

26. *B. chlorostigma* Mac Lachlan, Ent. Month. Mag., p. 36, 1881.

27. *B. banksi* n. sp.

Head yellowish brown; rostrum yellowish brown with darker lateral margins; maxillary palpi blackish brown. A black spot between the ocelli. Antennae brown. Thorax and abdomen brown. Legs yellowish brown; hind tarsi dark brown; tip of femora, tibiae and of tarsal joints blackish brown. Wings gradually broadened towards apex, which is rounded. Membrane yellowish brown; nervures brown to dark brown. Pterostigma twice longer than broad, connected with radial sector by two crossveins. Subcosta joins the costa beyond fork of radial sector, which is a little before fork of media. No costal crossveins. Subcostal crossvein between origin and fork of radial sector. Anal crossvein before cubital crossvein, the latter opposite to fork of media. 1A ends opposite to or a little before fork of radial sector. Bristles on the margins of wings near base. In the male the branches of upper appendage very long; their ventral margins somewhat emarginate. Setae almost as long as upper appendage, slender, cylindrical, curved downwards in their middle.

Forewing 23 mm; hindwing 21 mm.

Brit. Museum: 2 ♂, 3 ♀ Guerrero, Mexico (Smith leg.); 3 ♂ S. Geronimo, Guatemala (Champion leg.); 1 spec. San Blas, Jalisco (Schumann leg.); 1 ♀ Temax, N. Yucatan (Gaumer leg.). — Mus. Hamburg: 1 ♂, 1 ♀, 1 spec. (abdomen lost) La Union Salvador (R. Paessler leg.). — Coll. Esben-Petersen: 1 ♂ Guadalajara, Mexico (ex coll. Banks) (type).

In the shape of wings this species has some likeness to *B. mexicanus* Klug, but there are several good and distinct characters. In *B. banksi* 1A joins the hind margin opposite to fork of radial sector, and an anal crossvein is present. In *B. mexi-*

*canus* 1 A joins the hind margin far before fork of radial sector; no anal crossvein. In the male of *B. mexicanus* the branches of upper appendage are pointed towards apex, their apical part bent downwards.

28. *B. mexicanus* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 99, 1836.
29. *B. texanus* Banks, Trans. Am. Ent. Soc., p. 261, 1908.
30. *B. occidentis* Walker, Cat. Neur. Brit. Mus., p. 469, 1853.
31. *B. punctiger* Westwood, Trans. Ent. Soc. Lond., p. 195, 1846.
32. *B. arizonicus* Banks, Trans. Am. Ent. Soc., p. 350, 1911.
33. *B. stigmaterus* Say, West. Quart. Rep., p. 164, 1823 = *pallidipennis* Westwood, Trans. Ent. Soc. Lond., p. 195, 1846 = *mexicanus* Hine, Journ. Col. Hort. Soc., p. 111, 1898 (nec Klug).
34. *B. strigosus* Hagen, Syn. Neur. N. A., p. 246, 1861
35. *B. pillicornis* Westwood, Trans. Ent. Soc. Lond., p. 196, 1846.
36. *B. apicalis* Hagen, Syn. Neur. N. A., p. 248, 1861.
37. *B. geniculatus* Erichson, Schomburgk, Brit. Guyana III, p. 586, 1848.
38. *B. flavescens* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 99, 1836 = *affinis* Westwood, Trans. Ent. Soc. Lond., p. 196, 1846.
39. *B. brasiliensis* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 98, 1836.
40. *B. femoralis* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 98, 1836.
41. *B. chilensis* Klug, Abh. Kön. Akad. Wiss. Berlin, p. 100, 1836.

### **Neobittacus**

Esben-Petersen, Ent. Medd. Köb. X, p. 130,  
1914.



1. *N. blancheti* Pictet, Mém. Soc. Phys. Hist. nat. Genève, p. 7, 1836.

### Harpobittacus

Gerstaecker, Mitth. nat. Ver. Neuv. Rüg., p. 119, 1885.

1. *H. australis* Klug, Abh. Kön. Akad. Wiss., p. 100, 1836 (*Bittacus*) = *Bittacus corethrarius* Rambur, Névr., p. 327, 1842 = *Bittacus intermedius* ♀ Selys, Ann. Soc. Ent. Belge (Compt.-Rend. p. 77-78), 1867-68.
2. *H. tillyardi* n. sp.

Head yellowish brown, vertex black; the two apical thirds of rostrum black; labial and maxillary palpi black. Antennae black; the two basal joints stout. Thorax yellowish brown; the dorsum of prothorax and of the front half of mesothorax brownish black or black. Abdomen reddish brown. In the ♂ the hind border of 2nd-6th segments narrow blackish above; 7th quite black above; 8th og 9th yellowish brown above. In the ♀ the hind border of 2nd-5th segments narrowly blackish above; 6th, 7th and partly 8th totally black above; 9th reddish brown. Femora pale reddish brown; the apical half of fore and intermediate and the tip of hind femora black; fore and intermediate tibiae brown, hind tibiae yellowish brown, the base of tibiae with a narrow and the tip with a broad black band; tarsi and spines black. Wings hyaline with smoky brown tinge, yellowish at the base. Nervures blackish brown; yellowish towards the base except radius, which is blackish brown nearly to the base, especially in the forewing. Pterostigma dark brown, twice to trice as long as broad, connected with radial sector by two crossveins. Where media separates from Cu<sup>1</sup> is sometimes found a small brown dot, touching the

curved part of the stalk of media. No apical crossvein in costal area. Subcostal crossvein in forewing half the way between the origin of radial sector and its fork, in hindwing near to or almost at the origin. Fork of radial sector before fork of media, which is opposite to cubital crossvein. Anal crossvein beyond origin of radial sector, but before its fork. 1A joins the hind margin opposite to or a little before fork of radial sector. Upper appendages of ♂, seen from side, twice as long as broad; the upper margin somewhat emarginated and the tip rounded. The apex with, strong short black bristles and a tooth on the inner side. The hind border of 9th segment above produced into a triangular and somewhat raised prolongation. Genitalia, seen from side, with rounded lower margin and deeply incised apical margin.

Forewing 24–26 mm; hindwing 21–23 mm.

Mus. Hamburg: 2 ♂ Australia (ex Mus. Godeffroy); 4 ♂, 2 ♀ Australia (Schrader leg.). – Coll. Froggatt, Sydney: 1 ♀ Sydney; 1 ♀ N. S. Wales, 4. 11. 03. – Mus. Stockholm 1 ♂, 1 ♀ Australia. – Coll. Esben-Petersen: 3 ♂, 2 ♀ Hornsby, N. S. W., 2. 11. 12. (Tillyard leg.) (type).

This species has hitherto been overlooked on account of its great likeness to *H. australis*, from which it may be separated by the shape of appendages of ♂ and by the colour of abdominal segments. In *H. australis* the hind border of 2nd–5th segments of male narrowly blackish above; 6th and 7th quite black above; 8th and 9th reddish brown. In ♀ the hind border of 2nd–4th segments narrowly blackish above, 5th to 7th and front part of 8th totally black above, apical part of 8th and whole 9th reddish brown above. Upper appendage of male, seen from side, trice as long as broad, the

apical third curved upwards, narrowed at the tip. The apex with short black bristles on the interior side; the lower margin about in the middle with a stout tooth interiorly. The hind border of 9th segment above hardly produced. Genitalfeet, seen from side, short and very broad; ventral margin strongly rounded, the tip incised; all the anal appendages yellowish brown.

3. *H. nigriceps* Selys, Ann. Soc. Ent. Belge (Compt.-Rend. p. 77-78), 1867-68 (*Bittacus*) = *Bittacus intermedius* ♂ Selys, loc. cit.

### **Kalobittacus**

Esben-Petersen, Ent. Medd. Køb. X, p. 131, 1914.

1. *K. bimaculatus* Esben-Petersen, Ent. Medd. Køb., p. 131, 1914.

### **Pazius**

Navás, Brotéria, Ser. Zool. XI, p. 45, 1913.

1. *P. gracilis* Navás, Mem. Acad. Barcel., p. 413, 1908 (*Bittacus*).

### **Apterobittacus**

Mac Lachlan, Ent. Nachr., p. 317, 1893.

1. *A. apterus* Mac Lachlan, Ent. Month. Mag., VIII, p. 100, 1871 (*Bittacus*).
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