

ments (14–17). Male generative apertures paired, and situated upon 18th segment of body, which is always *behind* the clitellum; genital papillæ occasionally developed in neighbouring segments. Female generative aperture single, and within the clitellum upon the 14th segment. Two pairs of testes, more or less solid and compact, in segments 11 and 12; terminal portion of vas deferens on either side connected with the duct of a large prostate gland. Copulatory pouches varying in number from two to four pairs, and provided each with a variously shaped supplementary pouch or pouches. Intestine with a cæcum on either side in 20th segment*.

MEGASCOLEX, Templeton.

Megascolex, Templeton, P. Z. S. 1845, p. 89.

Pleurochæta, F. E. B., Trans. Roy. Soc. Edinb. vol. xxx. pt. ii.

Setæ arranged in nearly a continuous row round each segment, only failing for a short space in the dorsal and ventral median lines; clitellum occupying segments 13–20, but not developed upon the area which separates the male genital apertures and papillæ of one side from those of the other. Male genital apertures paired and situated upon 18th segment of body, which is within the area over which the clitellum extends; genital papillæ two pairs, developed upon boundary-line between 17th–18th and 18th–19th segments respectively. Female generative pore single or double, upon 14th segment. A single pair of testes, branched and racemose, in 12th segment; a large prostate gland on either side in 18th segment. Copulatory pouches simple and unprovided with any supplementary pouches; two pairs situated in segments 8 and 9. Intestine with no cæcum, but with a series of large compact glands arranged in fifteen or sixteen pairs, commencing at about segment 106.

XLVII.—*On the Hymenoptera collected during the recent Expedition of H.M.S. 'Challenger.'* By W. F. KIRBY, Assistant in Zoological Department, British Museum.

THE series of Hymenoptera collected during the voyage of H.M.S. 'Challenger' is interesting not only on account of several apparently new species having been obtained, but because

* In two species, *P. Sieboldi* and *P. musicus*, Horst ('Notes Leyden Museum,' &c. pp. 192 & 194) describes six of these cæca on each side; but in the latter species, at least, they do not seem to be at all regular in their presence.

most of the specimens were obtained from localities which have been but little worked; and consequently the greater part were brought from countries which they were not previously known to inhabit. A list is given below.

HYMENOPTERA TEREBRANTIA.

SERRIFERA.

Tenthredinidæ.

PTERYGOPHORINÆ.

1. *Pterygophorus analis*.

Pterygophorus analis, Costa, Ann. Mus. Nap. ii. p. 66 (1864).

Sydney, May 1874.

ENTOMOPHAGA.

SPICULIFERA.

Chalcididæ.

EUCHARINÆ.

2. *Schizaspidia Murrayi*.

Long. corp. $1\frac{1}{2}$ lin.

Male.—Closely allied to *S. nasua*, Walk., from the Philippines. Head and thorax green, granulated, with a slight coppery reflection; antennæ yellowish brown; scape yellow beneath; flagellum with seven long rami before the extremity, which divides into two equal rami, shorter than the others; scutellum sloping upwards, more shortly constricted than in *S. nasua*, and terminating in a blunt fork, about as long as the first portion; abdomen subpetiolated, vertical, smooth and shining, blackish green on the sides, and with a broad yellowish stripe above, continued round backwards to the extremity; legs yellowish. Wings hyaline; subcostal nervure rather thick, blackish; stigma short, blackish, well defined.

Tongatabu, July 1874.

Evaniidæ.

3. *Evania lævigata*.

Evania lævigata, Latr. Gen. Crust. et Ins. iii. p. 251 (1807).

Honolulu.

Braconidæ.4. *Bracon trisignatus*.

Female.—Exp. al. $10\frac{1}{2}$ lin.

Head, thorax, legs, first and base of second segment of abdomen pale luteous; abdomen whitish beneath; antennæ, vertex as far as the antennæ, three spots on thorax, the greater part of the abdomen above, hind tibiæ except at base, and hind tarsi black; ovipositor red, sheaths black; wings yellow nearly to the middle, and smoky black beyond; stigma not coloured.

Zamboanga, Philippines, Oct. 18, 1874.

5. *Bracon stigmaticus*.

Female.—Exp. al. 12 lin.

Luteous; head pale yellow; antennæ black, the scape luteous beneath; wings yellowish hyaline for two fifths of their length, the remaining three fifths being smoky brown; stigma ivory-white; abdomen with the first three segments luteous above, but paler than the thorax, the remainder of the abdomen black above, the last two segments narrowly edged behind with white; abdomen white beneath, except the valves of the ovipositor, which are black; ovipositor red, sheaths black; legs red, hind tarsi black.

Ki Dulan, Sept. 25, 1874.

HYMENOPTERA ACULEATA.

PRÆDONES.

HETEROGYNA.

Formicidæ.*FORMICINÆ.*6. *Formica nigra*.

Formica nigra, Linn. Syst. Nat. ed. x. vol. i. p. 580 (1758).

Bermuda, April 1873.

Perhaps introduced. The specimens do not appear to differ from the ordinary European species.

7. *Camponotus maculatus*.

Formica maculata, Fabr. Spec. Ins. i. p. 491 (1781).

San Jago, Cape Verdes, Aug. 11, 1873; Cape of Good Hope, Nov. 1873.

A common species throughout tropical and subtropical Africa.

8. *Camponotus intrepidus*.

Formica intrepida, Kirby, Trans. Linn. Soc. Lond. xii. p. 477 (1818).

Sydney, May 1874.

9. *Polyrhachis bihamata*.

Formica bihamata, Drury, Ill. Ex. Ent. ii. pl. xxxviii. figs. 7, 8 (1773).

Zamboanga, Philippines, Feb. 1875.

10. *Polyrhachis sculpturata*.

Polyrhachis sculpturatus, Smith, Journ. Linn. Soc. Lond., Zool. v. p. 70 (1861).

Zamboanga, Philippines, Feb. 1875.

Previously recorded from Celebes, Salawatty, Timor, and Siam, but not from the Philippines.

11. *Polyrhachis phyllophila*.

Polyrhachis phyllophilus, Smith, Journ. Linn. Soc. Lond., Zool. v. p. 69 (1861).

Zamboanga, Philippines, Feb. 1875.

Previously recorded from Sumatra and Celebes.

12. *Polyrhachis latifrons*.

Polyrhachis latifrons, Roger, Berl. ent. Zeitschr. vii. p. 155 (1863).

Amboina, Oct. 1874; Cape York, Torres Straits.

Originally described from Java.

13. *Polyrhachis neptunus*.

Polyrhachis neptunus, Smith, Journ. Linn. Soc. Lond., Zool. viii. p. 69, pl. iv. fig. 2 (1865).

Amboina, Oct. 1874.

This species was originally described from New Guinea. In many of the specimens the antennæ and legs are more ferruginous than in the typical form.

ODONTOMACHINÆ.

14. *Odontomachus hæmatodes*.

Formica hæmatoda, Linn. Syst. Nat. ed. x. vol. i. p. 582. n. 16 (1758).

Ki Dulan, Sept. 25, 1874.

*PONERINÆ.*15. *Lobopelta diminuta*.

Ponera diminuta, Smith, Cat. Hym. Ins. B. M. vi. p. 89 (1858).

Zamboanga, Philippines, Feb. 1875.

Widely distributed in the Eastern Archipelago, but not previously recorded from the Philippines.

16. *Paraponera clavata*.

Formica clavata, Fabr. Syst. Ent. p. 394 (1775).

Bahia, Sept. 1873.

17. *Typhlopone punctata*.

Typhlopone punctata, Smith, Cat. Hym. Ins. B. M. vi. p. 112 (1858).

Cape of Good Hope.

*MYRMICINÆ.*18. *Aphænogaster hostilis*.

Atta hostilis, Smith, Cat. Hym. Ins. B. M. vi. p. 165 (1858).

Simon's Bay, Cape of Good Hope, Dec. 1873.

Smith describes the female and the worker minor. The pair in the 'Challenger' collection agree with a series from Natal, which I take to belong to the worker major. They are much darker than the small specimens; but the workers of this genus differ very much in colour.

19. *Atta abdominalis*.

Æcodoma abdominalis, Smith, Cat. Hym. Ins. B. M. vi. p. 184 (1858).

Bahia, Sept. 1873.

FOSSORES.

*Mutillidæ.*20. *Mutilla diadema*.

Mutilla diadema, Fabr. Mant. Ins. i. p. 311 (1787).

Bahia, Oct. 1873.

*Scoliidæ.*21. *Dielis Wallacei*.

Male.—Exp. al. 12 lin.

Black; abdomen with a steel-blue lustre, the greater part

of the body more or less clothed with short grey hair, which is especially dense upon the metathorax; clypeus narrowly bordered below with yellow, and the mouth-parts, above the closed mandibles, of the same colour; mandibles black, the extreme tips red; abdomen with the first two dorsal segments bordered with yellow behind, the border on the second interrupted in the middle; the third segment is marked with a faint spot of the same colour on each side, on its hinder edge; wings violaceous hyaline, with chestnut-brown nervures; tegulæ chestnut-brown.

Ki Dulan, Sept. 2, 1874.

Allied to *D. agilis*, Smith, from Celebes, but quite distinct.

22. *Dielis extranea*.

Exp. al. 11 lin.

Male.—Black; clypeus incised, yellow below; labrum yellow, with a black spot in the angle formed by the clypeus; thorax clothed with greyish pubescence; prothorax and tegulæ yellow, a black stripe, narrowly edged below with yellow, running towards the tegulæ, and bounding the yellow colour on each side; scutellum and postscutellum and the sides of the metathorax behind yellow; the lateral sutures of the mesothorax may also be yellow, but this is much obscured by the villous covering; abdomen with the first three segments broadly bordered with yellow behind, and most broadly at the sides; on the under surface the second and third segments are bordered with yellow behind, this colour being interrupted in the middle; wings yellowish hyaline, with chestnut nervures; front legs yellow, front femora black above; middle legs yellow above, the femora with a black basal stripe above and beneath; the tibiæ and tarsi and a small spot at the tip of the femora black beneath; hind legs black; the femora and a short line on the outside of the tibiæ yellow.

Wild Island (Admiralty Islands).

Allied to *D. aurulenta*, Smith, a Philippine species.

Bembicidæ.

23. *Monedula signata*.

Vespa signata, Linn. Syst. Nat. ed. x. vol. i. p. 574 (1758).

Bahia, Sept. 1873.

Larridæ.24. *Tachytes pompiliiformis* (?).

Larra pompiliiformis, Panz, Faun. Germ. Heft 89, pl. xiii. (1805).

St. Vincent, Cape Verdes, July 1873.

25. *Sphex maura*.

Sphex maura, Smith, Cat. Hym. Ins. B. M. iv. p. 255 (1856).

Zamboanga, Philippines, Feb. 1875.

Originally described from Celebes.

26. *Sphex sericea*.

Pepsis sericea, Fabr. Syst. Piez. p. 211 (1804).

Amboina, Oct. 1874.

27. *Pelopæus chalybæus*.

Pelopæus chalybæus, Smith, Cat. Hym. Ins. B. M. iv. p. 229 (1856).

Cape of Good Hope, Nov. 1873.

Pompilidæ.28. *Priocnemis atlanticus*.

Long. corp. 6 lin.

Male.—Black, orbits (except on the vertex) and mouth-parts red; antennæ straw-coloured, scape of a redder shade; lateral angles of the prothorax prominent, and, as well as the tegulæ, red, shining; abdomen with a coppery-green lustre; legs (especially the front ones) more or less shading into ferruginous; wings with a strong greenish-purple iridescence.

The female differs from the male in having the greater part of the head red; the green lustre of the abdomen is much less distinct, and the wings are of a violet-purple rather than of a greenish lustre.

St. Vincent, Cape Verdes, 1873.

Allied to *P. exasperatus*, Smith, from Natal, but differs in the colour of the head.

29. *Pepsis collaris*.

Female.—Long. corp. 11 lin. Black, with dull bluish-green tints. Face greenish; antennæ: scape black; 2nd, 3rd, and apical joints black above and grey below, the intermediate joints yellow. Prothorax black, the sides varied with green and bordered behind with grey pubescence, indistinct above,

but very conspicuous below the black tegulæ, and on the sides. Mesothorax velvety black or silky green, according to the light. Metathorax inky black, with a double longitudinal carina, and transversely striated; abdomen black, tinted with verdigris-blue on the upper side; legs black, violet-blue above; wings violaceous, an indistinct transverse yellowish crescent near the end of the radial cell; face, thorax, and tip of abdomen clothed with rather long divergent hairs.

Bahia, Sept. 1873.

Allied to *P. mutabilis*, St.-Farg.

30. *Pepsis cærulea*.

Sphex cærulea, Linn. Syst. Nat. ed. x. vol. i. p. 571 (1758).

St. Thomas, March 1873; Bahia, Sept. 1873.

31. *Pepsis stellata*.

Sphex stellata, Fabr. Ent. Syst. ii. p. 217 (1793).

St. Thomas, March 1873.

32. *Pepsis xanthocera*.

Pepsis xanthocera, Dahlb. Hym. Eur. i. p. 120 (1845).

San Jago, Cape Verdes, Aug. 10, 1873.

DIPLOPTERA.

Eumenidæ.

33. *Eumenes colona*.

Eumenes colona, Sauss. Guêpes Solit. p. 70 (1852).

St. Thomas, March 1873.

34. *Odynerus atlanticus*.

Long. corp. 4 lin.

Female.—Black, closely punctured; clypeus convex, bidentate at the apex; sides and lower surface of clypeus, a dot between the antennæ, their lower surface, especially the scape beneath and towards the tip, prothorax above, and the sides in front, tegulæ, and legs red; mesothorax with a shallow and inconspicuous channel above, on each side; abdomen: first segment red, with a black spot in front; second segment black above, with the sides, hinder edge, and under surface red; wings smoky hyaline, with blackish nervures.

St. Vincent, Cape Verdes, July 1873.

Differs from most other black species with red markings by the black scutellum.

Ann. & Mag. N. Hist. Ser. 5. Vol. xiii.

Vespidæ.

35. *Belenogaster bidentatus*.

Exp. al. 12 lin.

Female.—Black, mouth-parts pale testaceous; clypeus with the sides emarginate beneath; mandibles reddish, a very narrow reddish line behind the upper part of the eyes; antennæ ending in a sharp point; this, the two preceding joints, and the base beneath are testaceous; thorax thickly punctured; the prothorax, a large lateral spot below and rather in front of the black tegulæ, two large spots on the scutellum, contiguous, but not united, the hinder part of the postscutellum, and the sides of the metathorax above (the middle is black and channelled) red; legs red, coxæ black; abdomen black and shining, the petiole rather wide at its extremity, where it is slightly marked with reddish beneath and on the lateral angles; on the under surface the median line of the petiole is first carinated and then channelled rather beyond the middle; on the under surface is a small projecting tooth on each side.

Pandana, Fiji, Aug. 1874.

36. *Polistes perplexus*.

Polistes perplexus, Cress. Trans. Amer. Ent. Soc. iv. p. 245 (1872).

Bermuda, April and June 1873.

Originally described from Texas.

37. *Polistes aurifer*.

Polistes aurifer, Sauss. Mon. Guêpes Soc. p. 78 (1858).

Honolulu, Aug. 1875.

38. *Polistes rubiginosus*.

Polistes rubiginosus, St.-Farg. Hym. i. p. 524 (1836).

San Jago, Cape Verdes, Aug. 10, 1873.

39. *Polistes fortunatus*.

Long. corp. $7\frac{1}{2}$ lines.

Female.—Ferruginous-tawny, with more or less extended black markings, and clothed with a slight golden pile. Vertex black, the colour sometimes extending as far as the antennæ, and sending off a branch behind to the occiput; in any case the furrows below the antennæ are always more or less marked with black. Clypeus subconvex, sparingly punc-

tured, and more or less yellowish beneath. Antennæ, except the base of the scape, blackish above. Prothorax ferruginous-tawny, narrowly edged behind with yellow; mesothorax black, with or without a U-shaped pale mark in the middle, often accompanied by a small one on each side; pectus mostly black, except some pale spots on the pleuræ; scutellum and postscutellum ferruginous-tawny; metathorax either of the same colour or black, but always with a wide black groove in the centre. When the mesothorax is black there is always a reddish stripe on each side of the groove, beyond which is sometimes another red mark. Abdomen and legs yellowish tawny, the first segment of the abdomen and often some of the succeeding segments narrowly edged behind with yellow; the first segment sometimes marked with black at the base, the second nearly always with a triangular black spot at the base, and occasionally the succeeding segments are also marked with black at the base. The black markings are always more extended on the under surface than on the upper. Wings subhyaline, iridescent.

Described from eight specimens taken at San Jago, Cape Verdes, on the 10th August, 1873. Not closely allied to any known species.

40. *Polistes Madoci*.

Long. corp. 6 lin.

Female.—Black; face ferruginous. Clypeus hairy. Antennæ ferruginous, black above in the middle of the flagellum, the apical portion more yellow; cheeks yellow, with an indistinct dusky spot on the lower part. Prothorax yellow above, with a large black streak running upwards on the sides; mesothorax black, unmarked; tegulæ, scutellum, postscutellum, two stripes on the back of the metathorax, and two narrower ones on the sides, back of the metathorax, knees, tibiæ, and tarsi yellow; coxæ, femora, and hind tibiæ black; abdomen black, the first four segments bordered with yellow behind, both above and below, except on the first segment, on which it is hardly continued below, but it is continued forwards on the sides of all four segments; hinder segments yellow, tinted with ferruginous. Wings yellowish hyaline.

St. Thomas, March 1873.

Apparently allied to *P. modestus*, Smith, and *navajoë*, Cresson.

41. *Polistes carnifex*.

Vespa carnifex, Fabr. Syst. Ent. p. 365 (1775).

Honolulu, May 1875.

42. *Polistes elegans*.

Polistes elegans, Smith, Journ. Linn. Soc. Lond., Zool. iv. p. 169 (1860).

Ki Dulan, Sept. 25, 1875.

43. *Polistes diabolicus*.

Polistes diabolicus, Sauss. Mon. Guêpes Soc. p. 68, pl. vi. fig. 7 (1858).

Ki Dulan, Sept. 25, 1875.

44. *Polybia occidentalis*.

Vespa occidentalis, Oliv. Enc. Méth. vi. p. 675 (1791).

Small nest and numerous specimens from Bahia. The species does not appear to vary.

ANTHOPHILA.

Apidæ.

DENUDATÆ.

45. *Crocisa scutellaris*.

Nomada scutellaris, Fabr. Spec. Ins. i. p. 487 (1781).

St. Vincent, Cape Verdes, July 1873.

46. *Crocisa nitidula*.

Melecta nitidula, Fabr. Syst. Piez. p. 386 (1804).

Ki Dulan, Sept. 25, 1874.

SCOPULIPEDES.

47. *Xylocopa circumvolans*.

Xylocopa circumvolans, Smith, Trans. Ent. Soc. Lond. 1873, p. 205.

Eucosca Dock, Japan, May 1875.

48. *Xylocopa æneipennis*.

Apis æneipennis, De Geer, Mem. iii. p. 573, pl. xxviii. fig. 8 (1773).

St. Thomas, March 1873; Honolulu, Aug. 1875.

49. *Xylocopa bryorum*.

Apis bryorum, Fabr. Syst. Ent. p. 381 (1775).

Wokan, Dobbo, Aru.

SOCIALES.

50. *Trigona ruficrus*.

Apis ruficrus, Latr. Ann. Mus. Hist. Nat. v. p. 176 (1804).

Bahia, Sept. 1873.

51. *Apis mellifica*.

Apis mellifica, Linn. Syst. Nat. ed. x. vol. i. p. 576 (1758).

Bermuda, April 1873; Sydney, May 1874.

BIBLIOGRAPHICAL NOTICES.

Annual Report and Proceedings of the Belfast Naturalists' Field Club, 1882-83. Ser. 2, vol. ii. part 3. 8vo. 1884.

THE Report for the year ending 31st March, 1883, completes the history of the twentieth year of the Society's existence and work. Besides the reports of the several excursions, in which scientific research and healthy pleasure appear to have been well combined, and of the conversazione and annual meeting, this part contains notices of several interesting papers:—on the crannogs at Lough Mourne, near Carrickfergus (with an illustrative plate); on the stone monuments of Carrowmore, near Sligo; and on Fungi, their properties and uses. Mr. Joseph Wright, in occasional notes, mentions some Foraminifera new to the British fauna, namely *Milionina triangularis*, *Haplophragmium agglutinans*, and *Lagena castrensis*, the last hitherto known only on the Australian coast. These were dredged by him off Dublin. Also *Rhabdogonium tricarinatum* and *Pullenia quinqueloba*, dredged by Messrs. J. Wright and F. P. Blakwill, the first off Lambay Island, in 50 fathoms water, and the second at 45 fathoms about 20 miles off Dublin. A Meteorological Summary for 1883, and the Appendix vii., consisting of a Supplement to a List of Mosses of the North-east of Ireland, by Mr. S. A. Stewart, complete this Report.

Transactions of the Cumberland Association for the Advancement of Literature and Science. No. VIII. 1882-83. Edited by J. G. GOODCHILD. 8vo. Carlisle: G. and T. Coward. 1883.

It must be a question difficult to settle in the minds of many working naturalists how far they should feel grateful to the swarm of small local societies and field-clubs in all parts of the country which bring out their Transactions and Proceedings as separate and independent publications. In the districts to which the activity of these bodies is devoted such publications are doubtless of great interest, and the societies gain much credit by their production; but it is rather hard upon the student to have to keep himself up to the contents of so many comparatively obscure periodicals on the chance of the appearance in their pages, among a mass of material



Kirby, W. F. 1884. "On the Hymenoptera collected during the recent expedition of H.M.S. 'Challenger'" *The Annals and magazine of natural history; zoology, botany, and geology* 13, 402–413.

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