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LEPIDOPTERA INDICA.



LEPIDOPTERA INDICA.

BY

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OF LONDON; CORRESPONDING MEMBER OF THE ENTOMOLOGICAL SOCIETY OF STETTIN,
AND OF THE ENTOMOLOGICAL SOCIETY OF THE NETHERLANDS; ASSOCIATE
MEMBER OF THE LINNEAN SOCIETY, LONDON, AND OF THE ASIATIC SOCIETY
OF BENGAL.

VOL. VI.

RHOPALOCERA.

FAMILY PAPILIONIDÆ.

SUB-FAMILY PAPILIONINÆ (CONTINUED).

FAMILY PIERIDÆ.

SUB-FAMILY PIERINÆ.

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LEPIDOPTERA INDICA.

Sub-family PAPILIONINÆ (*continued*).

Genus ZETIDES.

Zetides, Hübner, Verz. bek. Schmett. p. 85 (1816). Moore, Lep. of Ceylon, i. p. 144 (1881). Kirby, Allen's Nat. Hist. Butt. ii. p. 277 (1896).

Papilio (part), Doubleday and Hewitson.

Pathysa (part), Reakirt, Proc. Ent. Soc. Philad. iii. p. 503 (1864).

Papilio (sect. 27, subsect. c, d, e), Felder, Verh. Z. B. Ges. Wien. pp. 305, 350 (1864).

Papilio (group 36, pt. et 37), Rothschild, Nov. Zool. ii. pp. 429, 446 (1895).

IMAGO.—Male. *Forewing* elongatedly triangular; costa arched, exterior margin concave in the middle, slightly sinuous; cell long and broad; first subcostal branch at one-sixth before end of the cell and anastomosed to the costal, second branch at one-third between the first and end of cell; discocellulars slightly oblique, upper longest. *Hindwing* triangular, broad, short, and slightly produced hindward; exterior margin scalloped (and in some with a short blunt or slightly spatular tail); abdominal margin folded over; when open displaying a longitudinal dense woolly scent organ. *Body* woolly; antennæ comparatively short, club short and spatular. Sexes alike.

LARVA.—Smooth; anterior segments from the head to the fifth increasing in size, and then gradually tapering to the end; a pair of short pointed spines on the second and anal segment, and a pair of short nodular spines on the fourth segment.

PUPA.—Broad anteriorly; thorax with a dorsal forward-projecting frontal process.

TYPE.—Z. Eurypylus.

ZETIDES JASON (Plate 467, fig. 1, larva and pupa; 1a, b, ♂, 1c ♀).

Papilio Jason, Linnæus, Syst. Nat. ed. x. p. 485 (1758); *id.* ed. xii. p. 752 (1767); *id.* Mus. Lud. Ulr. p. 210 (1764). Esper, Ausl. Schmett. pl. 58, fig. 5, ♂ (1796). de Nicéville, Journ. As. Soc. Bengal, 1899, p. 224.

Papilio Eurypylus Jason, Rothschild, Nov. Zool. ii. p. 432 (1895).

Papilio Telephus, Felder, Verh. Z. B. Ges. Wien. 1864, p. 305; *id.* Reise Novara Lep. i. p. 64 (1865).

Davidson and Aitken, Journ. Bombay N. H. Soc. 1896, p. 578.

Zetides Telephus, Moore, Lep. Ceylon, i. p. 144, pl. 63, fig. 3, ♀ (1881).

Papilio Doson, Felder, Verh. Z. B. Ges. Wien. 1864, p. 305. Davidson and Aitken, *l.c.* 1890, p. 364, pl. E, fig. 2, 2a, larva and pupa.

Zetides Doson, Moore, Lep. of Ceylon, i. p. 145, pl. 61, fig. 3, ♂ (1881).

Papilio (Zetides) Doson, Hampson, Journ. As. Soc. Beng. 1888, p. 364. Ferguson, *ib.* 1891, p. 446.

IMAGO.—Male. Upperside black. *Forewing* with three pale emerald-green slender streaks crossing inner-half of the cell, the first being brokenly continued below base of the cell, followed by a lobate outwardly-oblique spot and then a smaller triangular spot in the outer half; beyond is a transverse inner-discal macular band composed of eight spots, the upper four small, the four lower larger and increasing in size, followed by a submarginal row of nine small quadrate spots, the upper second and third being placed opposite each other in the lower subcostal interspace. *Hindwing* with a pale emerald-green transverse subbasal posteriorly-decreasing band, the upper portion of which is white, followed by a submarginal row of six small spots, quadrate in shape except the upper third, which is lunate; abdominal margin folded over, fringed with fine greyish-white hairs, the fold when opened exposing a whitish longitudinal broad streak bordering the submedian vein, and containing a dense patch of long ochreous hairs. Cilia slenderly alternated with white between the veins, those between the upper median and sub-median being also slightly inwardly-edged by a white lunule, and at the anal angle by a white spot. Underside brown; markings, as above, of a bright or dull nacreous tint, the cell-streaks and submarginal spots being larger. *Forewing* with the two lower portions of the discal band bluish-tinted. *Hindwing* with a similar coloured slender basal band and a shorter inner subbasal band extending from the costa to and joining the upper angle of the cell-portion of the broad band, the dark interspace having a short crimson streak above the costal vein; an apical cell-spot and a lower discal row of black spots outwardly bordered with crimson, extending to anal angle, the crimson colour also ascending partly up the inner edge of the sub-median vein.

Female. Upper and underside as in the male; the discal band being slightly narrower on the hindwing and with a white longitudinal streak on abdominal margin. Body greyish-black; collar and front greyish-white streaked; palpi, thorax, and abdomen beneath, lateral band, and femora beneath greyish-white; antennæ black.

Expanse, $2\frac{3}{4}$ to $3\frac{1}{2}$ inches.

LARVA.—“Smooth; anterior segments from the head to fifth increasing in size and then decreasing more gradually to the end; second and anal segment with a

pair of short pointed spines, and also a dorsal pair of short blunt nodular spines—each encircled at the base by a black ring—on the fourth segment. Colour generally black, or smoky, until the last moult, and then dull green, inclining to rusty-brown on the sides; some remain quite black to the end.”

PUPA.—“Broad anteriorly; thorax with a dorsal forward-projecting frontal process. Colour normally green, but varies with that of the object to which it is attached” (Davidson and Aitken, *l.c.*).

HABITAT.—Ceylon; South India.

DISTRIBUTION, HABITS, ETC.—“Very abundant in Ceylon, in July, August, and at the end of the year in the north and eastern portions in the low country. On November 16th, 1898, on the first day of the annual flight, Dr. N. Manders noted that it was migrating in large numbers at Colombo; nearly all the numerous specimens he captured were in more or less tattered condition though freshly emerged, showing that they had flown a considerable distance; they probably came from the dry district of Hambantota on the south-eastern side of the island” (L. de Nicéville, *J. As. Soc. Beng.* 1899, 224). “The larva feeds on *Unona Lawii* and on *Saccopetalum tomentosum*, Order Anonaceæ” (*id. l.c.* 1900, 257). Mr. F. M. Mackwood obtained it in the “low country, and principally in the northern province. Capt. Wade found it common in Kandy, and Galle. Capt. Hutchison took it in the eastern province, in forest ground, in August. Also on the Trincomali road. It sits in crowds on wet places; have covered forty or fifty at once with my net. Very rare elsewhere” (*Lep. Ceylon*, i. pp. 144, 145). In South India “this species may be found in the Kanara district of Bombay, wherever *Pap. Teredon* occurs in this district, though it does not occur further north. It is quite a thirsty creature, and usually contributes to the crowd that collects about moist ground in open places in the forest, but it is scarcely so numerous as *Teredon*. We have met with three specimens of this butterfly in which the green of the upperside was replaced by a pale straw yellow. We found the larva of this butterfly at Karwar, in June and July, feeding on two trees of the Order Anonaceæ, along with the larva of *Pap. Nomius* and *Agamemnon*. Some remained in the pupa state for nearly two months. At first sight the larva is very like that of *P. Agamemnon*, but the second pair of spines is entirely wanting, and the third pair is reduced to mere knobs, encircled by a black ring; the colour is generally black, or smoky, until the last moult, and then dull green, inclining to rusty-brown on the sides; but some of our specimens remained quite black to the end. The pupa has the frontal process straight, but directed forward; its colour is normally green, but varies with that of the object to which it is attached; one, attached to white cloth, was almost pure white” (*J. Davidson and E. H. Aitken, Journ. Bombay N. H. Soc.* 1890, 364, *id.* 1896, 578). The late Mr. S. N. Ward obtained it in “Malabar and Kanara, above and below the

Ghâts. The larva bred. Also taken on the Nilgiris" (MS. Notes). Mr. G. F. Hampson records it as "rather rare on the Nilgiris, from 1,000 to 6,000 feet elevation" (J. As. Soc. Bengal, 1888, 364). Mr. H. S. Ferguson says it is "not common in Travancore; found only on the Hills from 2,000 feet upwards" (J. Bombay N. H. Soc. 1891, 446).

Of our illustrations on Plate 467, fig. 1 is from Mr. Ward's Malabar drawing of the larva and pupa, and figs. 1a, b, c from Ceylon, male and female.

ZETIDES AXION (Plate 468, fig. 1, larva and pupa; 1a, b, c, d, ♂, 1e ♀).

- Papilio Axion*, Felder, Verh. Z. B. Ges. Wien. 1864, pp. 305, 350. Moore, P. Z. S. 1878, p. 697.
Zetides Axion, Moore, P. Z. S. 1882, p. 257.
Papilio (Zetides) Axion, Doherty, Journ. As. Soc. Bengal, 1886, p. 136.
Papilio Eurypylus Axion, Rothschild, Nov. Zool. ii. pp. 433, 504 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 204.
Zetides Eurypylus, Hübner, Samml. Exot. Schmett. ii. pl. 107, fig. 1, 2 (1802 26). Swinhoe, Tr. Ent. Soc. Lond. 1893, p. 314.
Papilio Eurypylus, Moore, Catal. Lep. Mus. E. I. C. I. p. 113, pl. 12, fig. 10, 10a, larva and pupa (1857). Wood-Mason, Journ. As. Soc. Beng. (1889), p. 238; *ib.* (1881), p. 253. Elwes, Tr. Ent. Soc. Lond. 1888, p. 435. Watson, Journ. Bombay N. H. Soc. 1891, p. 53. Rübbe, Ann. Soc. Ent. Belg. 1892, p. 126. Oberthür, Et. Ent. xvii. p. 4 (1893).
Papilio (Zetides) Eurypylus, Wood-Mason, J. As. Soc. Beng. 1886, p. 375. de Nicéville, Sikkim Gaz. 1894, p. 174, *id.* J. As. Soc. Beng. 1895, p. 525.
Papilio Jason, Wallace, Tr. Linn. Soc. xxv. p. 66 (1865). Moore, P. Z. S. 1865, p. 757. Piepers, Tijl. v. Ent. 1876, p. 155; *id.* 1888, p. 347, pl. 8, fig. 1-3, larva. Honrath, Berl. Ent. Zeit. 1884, p. 396. Staudinger, Ex. Schmett. i. p. 9 (1884). Snellen, Mid. Sumatra, ii. p. 25 (1892).
Papilio Jason, var. *Evemonides*, Honrath, Berl. Ent. Zeit. 1884, p. 396, pl. 10, fig. 2.
Papilio Dason, Rothney, Ent. Mo. Mag. 1882, p. 33. de Nicéville, J. As. Soc. Beng. 1885, p. 51. Butler, Ann. Nat. Hist. 1885, p. 342.
Papilio Teleplus, Distant, Rhop. Malay. p. 361, fig. 109 (1885). Weymer, Stett. Ent. Zeit. 1885, p. 273. Holland, Tr. Amer. Ent. Soc. 1887, p. 122. Hagen, Berl. Ent. Zeit. 1892, p. 155; *id.* Iris. 1894, p. 28.
Papilio (Zetides) Teleplus, Elwes and de Nicéville, J. As. Soc. Beng. 1886, p. 437.
Papilio Jason, var. *Teleplus*, Staudinger, Iris, 1889, p. 16.
Papilio Acheron, Moore, Ann. Nat. Hist. 1885, p. 120. Butler, *ib.* 1885, p. 342.
Papilio Eurypylus Axion, aber. *Acheron*, Rothschild, Nov. Zool. ii. pp. 434, 504 (1895).
Papilio Mecisteus, Distant, Rhop. Malay. p. 361, fig. 108 (1885).
Papilio Eurypylus Acheron et *Cheronus*, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 203-4.

IMAGO.—Male. Upperside similar to *Z. Jason*. Forewing with the pale emerald-green cell-streaks and lower basal streak broader, the discal transverse macular band composed of larger and longer posterior portions, and the submarginal spots also larger. Hindwing with the transverse band also broader, the subbasal short white costal-streak of the underside being more or less apparent, or frequently well-

defined, and is then joined to the upper angle of the cell portion of the band; the submarginal spots also larger; abdominal margin fringed with long fine greyish-white hairs, the fold when open displaying a longitudinal broad whitish streak, bordering the submedian, containing a patch of fine long ochreous hairs. Underside brown, with similar markings of a bright or dull nacreous tint, the cell-streaks and submarginal spots being much larger. *Forewing* with the pair of upper submarginal spots sometimes united. *Hindwing* with the white subbasal costal streak either disconnected or united to the upper angle of the cell portion of the band, and the black of the apical cell-spot occasionally extending inward below the base of the lower subcostal veinlet, and occasionally there are two black apical cells-spots divided by the crimson lunule, the outer one being small; the crimson outer discal lunules are more intense.

Female.—Upperside with the cell streaks, and transverse band on both wings narrower than in male. *Hindwing* with the subbasal costal streak ill-defined, the abdominal border with a longitudinal whitish band. Underside with similar larger cell-streaks and submarginal spots as in male, the transverse band on both wings as on upperside, the abdominal margin with a longitudinal white band.

Expanse, ♂ 3 to $3\frac{1}{2}$, ♀ $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

LARVA and PUPA.—Similar to *Z. Jason*. (See Plate 468.)

HABITAT.—N. Western and Eastern India; Sikkim; Lower and Eastern Bengal; Assam; Burma; Shan States; Siam; Tenasserim; Malay Peninsula; Andamans; Sumatra; Nias; Banka; Billiton; Java; Borneo; Balabac; Palawan; Hainan; Tonkin.

DISTRIBUTION, ETC.—Mr. W. Doherty records “one male, taken at Askot, E. Kumaon, at 5,000 feet elevation” (J. As. Soc. Beng. 1886, 136). Mr. J. H. Hocking took it in the Kangra District (P. Z. S. 1882, 257). Mr. H. J. Elwes found it “common in the low valleys of Sikkim from April to October” (Tr. Ent. Soc. 1888, 435). It also occurs in Bhotan. Col. C. Swinboe has received “several examples from the Khasia Hills” (Tr. Ent. Soc. 1893, 314). Mr. J. Wood-Mason obtained “eleven males and one female in the forests around Silcuri, Cachar, from May 6th to August 8th” (J. As. Soc. Beng. 1888, 375). Dr. G. Watt took it near Manipur (Ann. Nat. Hist. 1885, 342). Mr. L. de Nicéville says it “appears in Calcutta in March, and specimens may be met with throughout the summer, but the spring brood is the largest. The larva feeds on the young leaves of *Polyalthia longifolia*” (J. As. Soc. Beng. 1885, 51). Mr. J. Rothney found it “rather uncommon in Barrackpur, near Calcutta. It frequents the flowers of *Durantia Plumieri*” (Ent. Mo. Mag. 1882, 33). Mr. A. Grote found the “larva, in Calcutta, feeding on *Michelia Champa* and *Uvaria longifolia*” (MS. Notes). Mr. W. C. Taylor records it as “not very common at Khorda, in Orissa” (List, p. 16). Col. C. H. E.

Adamson says "males are very common throughout Burma. From April to October they frequent beds of streams, flying up and down the same with great rapidity" (List. of Burm. Butt. 1897, 49). Lieut. E. Y. Watson found it "common at Beeling" (J. Bombay, N. H. S. 1888, 26). "A single specimen was taken at Tilin in February, and another at Choungkwa in May" (*id. l.c.* 1891, 54). It was found "not uncommon at the foot of the N. Chin Hills, in May" (*id. l.c.* 1897, 672). Mr. de Nicéville also records it from "Chin Lushai, March; and Lamtok in April" (*l.c.* 1890, 6). Mr. H. J. Elwes records "numerous males, but no females, from Ponsekai and the Hills, Tavoy" (J. As. Soc. Beng. 1886, 437). Mr. F. de Roepstorff obtained it at "Port Blair, S. Andamans" (P. Z. S. 1877, 593, J. As. Soc. Beng. 1880, 238).

Of our illustrations on Plate 468, fig. 1, *larva* and *pupa*, are from Mr. A. Grote's Calcutta drawings; figs. 1, a, b, from Sikkim males; fig. 3, a Sikkim male; 1d, from the male type of *Acheron*, and 1e, from a Calcutta female.

ZETIDES CHIRON (Plate 469, fig. 1, 1a ♂, 1b, c, ♀).

Papilio Chiron, Wallace, Trans. Linn. Soc. xxv. p. 66 (1865). Moore, Proc. Zool. Soc. 1865, p. 757.

Honrath, Berl. Ent. Zeit. 1884, p. 397. Staudinger, Exot. Schmett. i. p. 9 (1884).

Papilio Bathycles, var. *Chiron*, Elwes, Trans. Ent. Soc. Lond. 1888, p. 436.

Papilio Bathycles Chiron, Rothschild, Nov. Zool. ii. p. 438 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 207.

Papilio Bathycles, Moore, Catal. Lep. Mus. E. I. C. i. p. 114 (1857). Butler, Ann. Nat. Hist. 1885, p. 343. Manders, Tr. Ent. Soc. Lond. 1890, p. 536.

Zetides Bathycles, Swinhoe, Tr. Ent. Soc. Lond. 1893, p. 314.

Papilio (Zetides) Bathycles, de Nicéville, Sikkim Gazetteer, 1894, p. 175.

Papilio Chiron, var. *Chironides*, Honrath, Berl. Ent. Zeit. 1884, p. 397, pl. 10, fig. 4. Fruhstorfer, Deuts. Ent. Zeit. 1901, p. 346; *ib.* Berl. Ent. Zeit. 1902, p. 207.

IMAGO.—Male. Upperside black. *Forewing* with four pale emerald-green cell-streaks and a small spot at its end, a smaller less-apparent streak also below base of the cell, a transverse inner-discal oblique macular band of eight spots, the upper three being small, the lower five increasing posteriorly in size and length, followed by a submarginal row of small mostly quadrate spots. Cilia black. *Hindwing* with a pale emerald-green transverse subbasal posteriorly-decreasing band, which is broadly intersected by black-bordered veins, the two costal portions being white; sometimes there is also a dot or a very small contiguous spot in the upper median interspace; beyond is a submarginal row of mostly-quadrate spots; abdominal margin broadly white, the scent-organ absent. Ciliary lunules slenderly white. Underside sepia-brown, with similar markings, as on upperside, of a bright nacreous tint, the cell-streaks and submarginal spots being much larger. *Forewing* with the

apical markings flushed with olivaceous-ochreous. *Hindwing* with the basal markings flushed with olivaceous-yellow, in some a very small bright ochreous-yellow spot is present between the two costal portions; a lower-discal row of bright ochreous-yellow spots; abdominal border white. *Head* and front of thorax black, spotted with white; sides of thorax clothed with fine grey hairs; abdomen above greyish-brown, beneath white with a lateral longitudinal brown stripe; thorax beneath, and palpi white; legs black above, white beneath; antennæ black.

Female. Upper and underside similar to the male.

Expanse, ♂ 3 to 3½ inches; ♀ 3½ inches.

HABITAT.—Sikkim; Assam; Burma; Shan States; Annam; Tonkin.

DISTRIBUTION.—The late Mr. W. S. Atkinson notes that this species is "not uncommon in Sikkim and the Khasias" (MS. Notes). Mr. H. J. Elwes says "the male is not uncommon, in Sikkim, at from 2,000 to 3,000 feet elevation, from April to October; but I have never seen a female" (Tr. Ent. Soc. 1888, 436). We possess specimens from Nepal, taken by Gen. G. Ramsay; from Sikkim; the Shan States, Siam, taken by Mr. J. Roberts, C.E., and also from Tavoy. Col. C. Swinhoe records "many examples, from the Khasia Hills" (Tr. Ent. Soc. 1893, 314). Col. C. H. E. Adamson says "this insect is by no means common in Burma; I have taken it in Tenasserim and near Bhamo" (List, 1897, 49). Capt. E. Y. Watson records "three specimens obtained at the foot of the North Chin Hills, in May" (J. Bombay N. H. S. 1897, 672).

ZETIDES AGAMEMNON (Plate 470, fig. 1, *larva* and *pupa*, 1a, b, ♂, 1c, ♀).

Papilio Agamemnon, Linnæus, Syst. Nat. ed. x. p. 462 (1758); *id.* ed. xii. p. 748 (1767); *id.* Mus. Lud. Ulr. p. 202 (1764). Fabricius, Syst. Ent. p. 455 (1775). Jablonsky and Herbst, Nat. Schmett. iii. p. 192, pl. 48, fig. 1, 2 (1788). Römer, Gen. Ins. Linn. p. 68, pl. 13, fig. 3 (1789). Esper, Ausl. Schmett. p. 183, pl. 46, fig. 1, 3 (1796). Donovan, Ins. of China, pl. 27, fig. 2 (1798). Boisd. Spec. Gén. Lep. i. p. 230 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 14 (1846). Gray, Catal. Lep. B. M. i. p. 27 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 114, pl. 3, fig. 9, 9a, *larva* and *pupa* (1857). Wallace, Trans. Linn. Soc. xxv. p. 67 (1865). Moore, P. Z. S. 1865, p. 757. Semper, Verh. Z. B. Ges. Wien. (1867), p. 698. Druce, P. Z. S. 1874, p. 108. Butler, Tr. Linn. Soc. Zool. 1877, p. 552. Moore, P. Z. S. 1877, p. 592, *id.* 1878, p. 841. Wood-Mason, Journ. As. Soc. Bengal, 1880, p. 238, *id. l.c.* 1881, pp. 237, 253; *id.* 1882, p. 18. Dewitz, Nov. Acta Ac. Nat. 1882, p. 265, pl. 2, fig. 4, 4a, b, *larva* and *pupa*, Staudinger, Exot. Schmett. i. p. 9, pl. 6 ♂ (1884). Kheil, Rhop. Nias, p. 37 (1884). Butler, Ann. Nat. Hist. 1885, p. 343. Distant, Rhop. Malay. p. 363, pl. 32, fig. 7 (1885); *id.* Ann. Nat. Hist. 1887, p. 274. Holland, Trans. Amer. Ent. Soc. 1887, p. 122. Piepers, Tijd. v. Ent. 1888, p. 341, pl. 7, fig. 1-7, *larva* and *pupa*. Elwes, Tr. Ent. Soc. Lond. 1888, p. 437. Staudinger, Iris, ii. p. 16 (1889). Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1890, p. 363. Hagen, Deuts. Ent. Zeit. 1891, p. 155; *ib.* Iris, 1894, p. 28. Snelling, Mid. Sumatra, ii. p. 25 (1892). Rothschild, Nov. Zool. ii. p. 447 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 217.

- Iphiclides Agamemnon*, Hübner, Verz. bek. Schmett. p. 82 (1816).
Aërnauta Agamemnon, Berge, Schmett. p. 108, pl. 34, fig. 5 (1842).
Zetides Agamemnon, Moore, Lep. of Ceylon, i. p. 145, pl. 63, fig. 2, ♂, 2a, larva (1881). *id.* Journ. Linn. Soc. Zool. 1886, p. 50. Swinhoe, P. Z. S. 1885, p. 145; *id.* Tr. Ent. Soc. Lond. 1893, p. 314.
Papilio (Zetides) Agamemnon, Doherty, Journ. As. Soc. Bengal, 1886, p. 136. Wood-Mason, *ib.* 1886, p. 375; Elwes, *ib.* 1886, p. 437. Hampson, *ib.* 1888, p. 364. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 446. de Nicéville, Sikkim Gaz. 1894, p. 175; *id.* Journ. As. Soc. Bengal, 1895, p. 527.
Papilio Agamemnon, var. *Snellen*, Tijd. v. Ent. 1894, p. 71, pl. 3, fig. 3.
Papilio Agamemnon, var. *rufescens*, Oberthür, Etud. Ent. iv. p. 58 (1879).
Papilio Agamemnon, var. *decoratus*, Rothschild, Nov. Zool. ii. p. 452 (1895).
Papilio Agamemnon, subsp. *rufoplenus*, Fruhstorfer, Berl. Ent. Zeit. 1898, p. 310.
Papilio Dorylas, Sulzer, Gesch. Ins. pl. 13, fig. 3 (1776).
Papilio Ægistus, Cramer, Pap. Exot. ii. p. 15, pl. 106, fig. C, D (1776).

IMAGO.—Male. Upperside olivescent-black. *Forewing* with a bright olive-green transverse basal stripe, a stripe crossing base of the cell, three equidistant short pairs across its middle and a short one before the apex, two small spots beyond end of the cell, an oblique discal series of seven spots, the upper two small, the second outwardly placed, the others gradually increasing in size, followed below by three outwardly-oblique spots and a parallel subbasal stripe cut by the submedian vein; beyond is a submarginal row of nine small spots. *Hindwing* with a bright olive-green basal stripe, a subbasal broken stripe extending broadly from the costa and obliquely narrower across the cell, and thence inwardly within the lower median interspace, followed by a transverse discal curved series of six spots decreasing in size posteriorly, the upper or costal spot being large and white, and then a submarginal row of irregularly-lunate spots, the four lower being narrow and the upper one white; abdominal fold greyish-white, sometimes greenish, when open displaying a greyish-ochreous woolly scent patch. Cilia slenderly greyish-white. Underside pale purplish-brown, clouded with dark olive-brown patches. *Forewing* with the olive-green markings as on upperside, but less prominent, the submarginal more or less obscured by brown scales, those in the lower median and submedian interspaces almost white-scaled, and the discal spots have their exterior portion densely covered with white scales. *Hindwing* with similar disposed markings as on upperside, the basal and the upper part of subbasal stripe—from the costal to partly across the cell—being olive-green, the lower portion of the latter, the lower four discal spots, and the submarginal spots being obscured by brown scales; the fifth discal spot is small, round, and very pale green, the upper discal or costal spot is broad and either greyish-white or pinkish-white, both these latter being inwardly margined with a pink-bordered black lunule; a small black spot above anal angle preceded by a reddish spot, both being bordered with greyish or black scales. Tails of males

variable in length, frequently short, of females slightly spatulate. *Body* above olivescence-black, the sides of abdomen brown; collar and thorax laterally margined with olive-green hairs and the abdomen with grey scales; a red hairy spot behind the eyes; palpi white, tipped with red hairs; body beneath pinkish-grey; legs above blackish, beneath greyish; antennæ black.

Female. Upperside similar to the male. *Hindwing* with a whitish or greenish abdominal stripe. Underside similar to the male.

Expanse, ♂ 3 to 4, ♀ $3\frac{1}{2}$ to 4 inches.

LARVA.—"Smooth. From the head, which is moderately large, the anterior segments increase in thickness to the fourth or fifth and then gradually decrease to the tail; there are four pairs of spines, one pair on the second segment, another pair on the fourth, the latter rather long, curved, and sharp, a short pair on the third, and a pair on the anal segment. Colour at first smoky-black, but at the last moult becomes a light, clear green, faintly marked with wavy lines of a darker shade."

PUPA.—"Smooth and regular, with a pointed process rising from the thorax above the head; it is normally of a pale watery-green, the frontal process being broadly tipped with rusty-brown, which continues in an irregular line along the outside edge of the wing-cases" (Davidson and Aitken, *l.c.* 1890, 363).

HABITAT.—N.W. and E. and S. India; Ceylon; Andaman and Nicobar Isles; Burma; Tenasserim; Siam; Tonkin; Malay Peninsula; Sumatra; Nias; Java; Borneo; Natuna; Palawan; Philippines; Hainan.

HABITS OF LARVA AND IMAGO.—"The larvæ are extremely shy and cautious, resting motionless most of the day on the upperside of a leaf, along the midrib, with their heads towards the stalk. The leaf on which they rest is usually carpeted with silk; they eat little and grow slowly. They feed on the Custard-Apple (*Anona squamosa*), the 'Ramphull' (*Anona reticulata*), and others of the genus, and also on the 'Ashok' (*Gualteria longifolia*). It is often difficult to find, and must be looked for on the less exposed leaves of trees in quiet, shady places. The season is from July till November. We do not remember having found it at any other time. The butterfly is pretty common everywhere in the North Kanara District of Bombay, frequenting gardens and forests. In the former the larvæ feeds chiefly on the Custard-Apple, and in the latter on several trees of the same Order. The larvæ appear in June, and again more abundantly three months later, at which time the butterfly is most common, but it may be met with every month of the year" (Davidson and Aitken, *l.c.* 1890, 363; *id.* 1896, 578). Mr. de Nicéville records the food-plants of the larva, as "*Unona discolor*, *Polyalthia longifolia*, *Anona squamosa*, *A. reticulata*, and *Saccopetalum tomentosum*, all of the Order Anonaceæ" (J. As. Soc. Beng. 1900, 257).

DISTRIBUTION, HABITS, ETC.—In N. Western India, Mr. W. Doherty obtained it

in the "Lower Gori, Kumaon, at 2,500 feet elevation. Scarce" (J. As. Soc. Beng. 1886, 136). We possess specimens from Nepal, taken by the late Gen. G. Ramsay. Mr. H. J. Elwes found it "common in Sikkim up to 3,000 feet elevation, from April to December" (Tr. Ent. Soc. 1888, 437). Mr. L. de Nicéville says it is "common in Sikkim at low elevations throughout the year" (Sikkim Gaz. 1894, 175). Mr. J. Wood-Mason records "ten males and three females, taken in forests around Silcurei, Cachar, from May 12th to August 5th" (J. As. Soc. Beng. 1886, 375). Col. C. Swinhoe records it from the "Khasia Hills" (Tr. Ent. Soc. 1893, 314). In Southern India it was obtained by Mr. S. N. Ward, in "Malabar and Kanara, above and below the Ghâts, and in the Nilgiris" (MS. Notes). Messrs. J. Davidson and E. H. Aitken obtained the larvæ and butterfly in the N. Kanara District of Bombay, the larvæ appearing in June, and again more abundantly three months later, at which time the butterfly is most common, but it may be met with every month of the year" (J. Bombay N. H. S. 1896, 578). Mr. G. F. Hampson obtained it on the "Nilgiris, from 1,000 to 7,000 feet elevation" (J. A. Soc. Beng. 1888, 364). It is "very common in the low country and hills of Travancore" (H. S. Ferguson, J. Bombay N. H. S. 1891, 446). Lieut. E. Y. Watson records it as "the commonest butterfly in Madras, from March to August" (J. As. Soc. Beng. 1890, 268). In Ceylon the larva is stated, by Dr. Thwaites, to feed on Magnoliaceæ and Anonaceæ. Mr. F. M. Mackwood found the butterfly in fair numbers, both in low country and above 4,000 feet elevation, all through the year. The larva feeding on Soursop (*Anona*) and Cinnamon" (Lep. Ceylon, i. 145). Dr. N. Manders says it is "usually common and frequently very abundant in Ceylon, especially in the low country and lower hill districts, and is given to migrating" (J. As. Soc. Beng. 1899, 224). Prof. R. Meldola obtained it in "Kamorta, Nicobars, in April, and Mr. F. de Roepstorff at Port Blair, S. Andamans" (P. Z. S. 1877, 592). In Burma it is found "throughout the country, except in the central Plains. It frequents gardens, and the larva is easily found" (Col. C. H. E. Adamson, List, 1897, 49). Mr. O. Limborg obtained it on the road from "Moulmein to Meetan; Hatseiga; and Houngduran Source" (P. Z. S. 1878, 841). Signor L. Fea took it at "Shwegoomyo in October, and at Bhamo in November" (MS. Note). Capt. E. Y. Watson obtained "a single specimen in the N. Chin Hills, at 3,500 feet elevation, in the rainy season" (J. Bombay N. H. S. 1897, 672). Mr. H. J. Elwes records "a few males from Ponekai, Tavoy, and the Hills on the Siam frontier" (J. As. Soc. Beng. 1886, 437). Dr. J. Anderson obtained it in "Mergui in December, Zediwon in December, on Sullivan Island in January, and on Elphinstone Island in March" (J. Linn. Soc. Zool. 1886, 50). Dr. L. Martin writes, "It is common, in N.E. Sumatra, throughout the year, everywhere in the plains where *Anona muricata* and *Michelia champaca*, the food-plants of the larvæ, are found, and frequents the flowers of the *Lantana*, etc., in

gardens and near houses. As the butterfly is found also in the forest, some wild species of *Anonaceæ* or an allied plant for the larva to feed on must grow there. The full-fed larva exists in two varieties, a bright transparent shining green form, and a yellow form, both having on the first three segments (omitting the head) a horny tubercle with orange base on each side of each segment. After fifteen days the imago emerges from the pupa. The female butterfly prefers young low plants of the *Anona* on which to lay her eggs, as on young newly-planted bushes four or five caterpillars are often found together" (J. As. Soc. Beng. 1895, 527).

INDO-MALAYAN SPECIES.—*Zetides Gordion* (Papilio Gordion, Felder, Verh. Z. B. Ges. Wien. 1864, p. 305; *id.* Reise Nov. Lep. i. p. 66 (1865). Pap. Eurypylus Gordion, Rothschild, Nov. Zool. ii. p. 435 (1895). *Habitat.* Philippines.—*Zetides Mikado* (Pap. Mikado, Leech, P. Z. S. 1837, p. 406, pl. 35, fig. 1, ♀; Butt. of China, etc., p. 526, pl. 32, fig. 6 (1893). Pap. Eurypylus Mikado, Rothschild, *l.c.* p. 435. *Habitat.* S. Japan.—*Zetides Evemon* (Pap. Evemon, Boisd. Spéc. Gén. Lep. i. p. 234 (1836). Distant, Rhop. Malay. p. 360, pl. 32, fig. 1 (1885). Rothschild, *l.c.* p. 436. Fruhst. Berl. Ent. Zeit. 1902, p. 206. Pap. Jason, *var.* Evemon, Staudinger, Exot. Schmett. i. p. 9, pl. 6, ♂ (1884). *Habitat.* Malacca; Sumatra; Java; Borneo.—*Zetides albociliatus* (Pap. Evemon *subsp.* albociliatus, Fruhstorfer, Soc. Ent. 1901, p. 177; *id.* Berl. Ent. Zeit. 1902, p. 205. *Habitat.* Tonkin.—*Zetides Igneolus* (Pap. Evemon *subsp.* Igneolus, Frust. Soc. Ent. 1901, p. 90. *Habitat.* Nias.—*Zetides Procles* (Pap. Procles, Grose-Smith, Ann. N. H. 1887, p. 433; *id.* Rhop. Exot. i. Pap. p. 13, pl. 6, fig. 1, 2, ♂ (1888). Rothschild, *l.c.* p. 436. *Habitat.* N. Borneo.—*Zetides Leechi* (Pap. Leechi, Rothschild, Nov. Zool. ii. p. 437, ♂ (1895). P. Bathycles, Leech, Butt. of China, etc., p. 525. *Habitat.* China.—*Zetides Bathycles* (Pap. Bathycles, Zinken, Nov. Acta Acad. N. C. 1831, p. 157, pl. 14, figs. 6, 7, ♂. Guerin, in Belanger's Voy. Zool. p. 505, pl. 5, fig. 1, 1a (1834). Boisd. Spéc. Gén. Lep. i. p. 232. Rothschild, *l.c.* p. 437. *Habitat.* Java.—*Zetides Bathycloides* (Pap. Bathycles *var.* Bathycloides, Honrath, Berl. Ent. Zeit. 1884, p. 396, pl. 10, fig. 3 (1884). Semper, Phil. Tagfalt, p. 283 (1892). Rothschild, *l.c.* p. 438. P. Bathycles, Distant, Rhop. Malay. p. 362, pl. 32, fig. 2, ♂ (1885). *Habitat.* Malay Peninsula; Sumatra; Borneo; Palawan.—*Zetides Arycles* (Pap. Arycles, Boisd. Spéc. Gén. Lep. i. p. 23 (1836). Distant, Rhop. Malay. p. 362, pl. 32, fig. 5, (1885). Rothschild, *l.c.* p. 446. *Syn.* Pap. Rama, Felder, Reise Nov. Lep. i. p. 71, pl. 12, fig. D (1865). *Habitat.* Malay Peninsula; Sumatra; Java; Borneo; Palawan.—*Zetides Arycleoides* (Pap. Arycles *subsp.* Arycleoides, Fruhst. Iris, 1901, pp. 344-5; *id.* Berl. Ent. Zeit. 1902, p. 220. *Habitat.* Siam.—*Zetides Sphinx* (Pap. Arycles *subsp.* Sphinx, Fruhst. Iris, 1901, p. 345; *id.* B. E. Z. 1902, p. 220. *Habitat.* Tonkin.—*Zetides incertus* (Pap. Arycles *subsp.* incertus, Fruhst. Iris, 1901, p. 345. *Habitat.* Singapore.

Genus DALCHINA.

Dalchina, Moore, Lep. of Ceylon, i. p. 143 (1881). Kirby, Allen's Nat. Hist. Butt. ii. p. 277 (1896).

Chlorissas,* Swainson, Zool. Illustr. ii. pl. 89 (1832-3).

Papilio (sect. 27, subsect. a, b, f), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 304, 306, 349, 351.

Papilio (group 36, part), Rothschild, Nov. Zool. ii. p. 429 (1895).

IMAGO.—Male. *Forewing* elongatedly triangular, attenuated and pointed at the apex; costa slightly arched, exterior margin very long, oblique and nearly even, posterior margin short; cell very long, rather narrow; first and second subcostal branches at nearly equal distances apart, first branch short and anastomosed to the costal, second also touching the costal close to its apex; discocellulars inwardly oblique. *Hindwing* triangular, produced and attenuated hindward; costa short and oblique, exterior margin oblique, sinuous, and produced into a short blunt pointed tail at end of upper median veinlet, abdominal margin long and folded, with a hairy patch beneath; cell very long, narrow; second subcostal branch very concave at the base. *Body* robust, woolly; antennal club very short and thick. Sexes alike.

LARVA.—Smooth; thickened from the second to fifth segment, and thence decreasing to the end; with two short subdorsal fleshy spines on the fourth segment, two shorter spines on the second and third, and two on the anal segment.

PUPA.—Conical; truncated in front; thorax produced into a lengthened obtusely-pointed frontal process.

TYPE.—D. Sarpedon.

DALCHINA SARPEDON (Plate 471, fig. 1, larva and pupa; 1a, b, ♂, 1c, ♀).

Papilio Sarpedon, Linnæus, Syst. Nat. ed. x. p. 461 (1758); *id.* ed. xii. p. 747 (1767); *id.* Mus. Lud. Utr. p. 196 (1764); Fabricius, Syst. Ent. p. 447 (1795). Esper, Ausl. Schmett. p. 38, pl. 8, fig. 2 (1785). Zinken, Nov. Act. Ac. Nat. Cur. xv. p. 156 (1831). Lucas, Lep. Exot. p. 9, pl. 5, fig. 1 (1835). Thon, Nat. Schmett. p. 19, pl. 6, fig. 22 (1837). De Haan, Verh. Nat. Gesch. Ned. pp. 7, 34, pl. 7, fig. 15 (1840). Doubleday and Hewitson, Gen. D. Lep. i. p. 14 (1846). Hutton, Tr. Ent. Soc. Lond. 1847, p. 51. Kollar, Hügel's Kaschmir, iv. pt. 2, p. 405 (1844). Lucas, Chenu's Encycl. Hist. Nat. Pap. pl. 20, fig. 1 (1853). Moore, Catal. Lep. Mus. E. I. C. i. p. 113, pl. 3, fig. 8, larva (1857). Lang, Ent. Mo. Mag. 1864, p. 101. Felder, Verh. Z. B. Ges. Wien. 1864, pp. 304, 350. Wallace, Tr. Linn. Soc. xxv. p. 65 (1865). Moore, P. Z. S. 1865, pp. 487, 757; *id.* 1878, p. 841; *id.* 1882, p. 257. L'Orza, Lep. Japon. p. 10 (1869). Butler, Catal. Fabr. Lep. B. M. p. 242 (1869). Druce, P. Z. S. 1873, p. 357. Piepers, Tijds. v. Ent. 1876, p. 155; *id.* 1888, p. 346, pl. 7, fig. 8, 9, larva. Butler, P. Z. S. 1877, p. 814; *ib.* Tr. Linn. Soc. Zool. 1877, p. 552. Oberthür, Etud. Ent. iv. p. 59 (1879). de Nicéville, Journ. As. Soc. Bengal, 1881, p. 59. Elwes, P. Z. S. 1881, p. 873; *ib.* Tr. Ent. Soc. 1888, p. 434. Aurivillius, Kong. Sv. Vet. Ak. Handl. 1882, p. 20. Staudinger, Exot.

* Preoccupied as *Chlorissa*, by Stephens, in 1829.

Schmett. i. p. 9 (1884). Butler, Ann. Nat. Hist. 1885, p. 343. Distant, Rhop. Malay. p. 359, pl. 32, fig. 6 (1885). Pryer, Rhop. Nipon, p. 5, pl. 1, fig. 9 (1886). Distant and Pryer, Ann. Nat. Hist. 1887, p. 273. Holland, Tr. Amer. Ent. Soc. 1887, p. 122. Staudinger, Iris, ii. p. 15 (1889). Manders, Tr. Ent. Soc. Lond. 1890, 536. Snellen, Tijd. v. Ent. 1890, p. 305. Watson, Journ. Bombay N. H. Soc. 1891, p. 54. Hagen, Berl. Ent. Zeit. 1892, p. 165; *ib.* Iris, vii. p. 28 (1894). Oberthür, Et. Ent. xvii. p. 4 (1893). de Nicéville, Journ. As. Soc. Beng. 1895, p. 526. Rothschild, Nov. Zool. ii. p. 440 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 213.

Zetides Sarpedon, Hübner, Verz. bek. Schmett. p. 85 (1816); *ib.* Samml. Ex. Schmett. iii. pl. 25 (1827-37).

Chlorisses Sarpedon, Swainson, Zool. Illustr. ii. pl. 89 (1832).

Dalchina Sarpedon, Moore, P. Z. S. 1882, p. 257, *ib.* Journ. Linn. Soc. Zool. 1886, p. 50. Swinhoe, Tr. Ent. Soc. 1893, p. 314. Kirby, Allen's N. H. Butt. ii. p. 277.

Papilio (Dalchina) Sarpedon, Doherty, J. As. Soc. Bengal, 1886, p. 136. Wood-Mason, *ib.* 1886, p. 376. Elwes and de Nicéville, *ib.* 1886, p. 437. de Nicéville, Journ. Bombay N. H. Soc. 1893, p. 54, pl. 1, fig. 11, ♂ (—*melanoid* var.); *id.* Sikkim Gazetteer, 1894, p. 174. Mackinnon, Journ. Bombay N. H. Soc. 1898, p. 595, pl. W, fig. 26a, b, *pupa*.

Papilio Demophon, Meerburgh, Afbeeld, pl. 9 (1775). Shaw, Gen. Zool. vi. i. pl. 64 (1806).

IMAGO.—Male and female. Upperside black. *Forewing* with a medial-discal oblique transverse macular band composed of nine pale emerald-green spots, extending from the apex to the posterior margin, the anterior spots being small and well separated, the posterior broadly widening and conjoined, the two lowest being blue-tinted. *Hindwing* with a medial-discal transverse posteriorly-tapering blue-green band, the broad costal portion of which is whitish; beyond is a submarginal medial row of four slender blue-green lunules, and usually with a more or less obsolescent anterior and posterior grey-scaled lunule; abdominal margin grey, the fold in the male, when open displaying a hairy patch; cilia slenderly alternated with white. Underside dark purplish-brown. *Forewing* with glossy macular band, as above. *Hindwing* with medial band as above, the costal portion being pale green and inwardly bordered by a subbasal black spot traversed by a deep crimson bar; the medial band also outwardly bordered by black patches, the patch at apex of the cell and those from the radial to anal angle traversed by a deep crimson lunule, that at the anal angle being broad; beyond, the submarginal pale green lunules are less defined than on upperside. *Body* greyish-black above; beneath, legs and palpi, grey-streaked; antennæ black.

Expanse, 3 to 3½ inches.

LARVA.—Smooth; thickened from the second to fifth segment, and thence decreasing to the end; with two short subdorsal fleshy spines on the fourth segment, between which is a transverse pale yellow line, two shorter spines also on the second and third, and two on the anal segment; colour green, with a longitudinal posterior lateral and lower pale yellowish line.

PUPA.—Conical; truncated in front; thorax produced into a lengthened obtusely-pointed frontal process.

HABITAT.—N. India; Burma; Tenasserim; Andamans; Malay Peninsula; Tonkin; Hainan; Sumatra; Engano; Java; Natuna Isles; Borneo; Palawan; Philippines; Loo Choo Isles; S. Japan.

DISTRIBUTION AND HABITS.—In the N.W. Himalayas, Capt. T. Hutton says this is “one of the commonest butterflies at Masuri. It appears early in May, and is found till the end of the rains in September. It usually frequents the tops of Oak trees, where it flits about with a jumping or jerking flight, and is somewhat difficult to capture, from its quickness, and the height at which it keeps” (Tr. Ent. Soc. 1847, 51). Capt. A. M. Lang states that it is “seen but in few places in the N.W. Himalayas, and never more than one at a time. It is bold and rapid in flight, and not easily captured” (Ent. Mo. Mag. 1864, 101). Mr. P. W. Mackinnon records it as “very common at Masuri in the spring, summer, and beginning of the rainy season, and in the Dun in March and August. The larva, in Masuri, feeds on the leaves of *Machilus odoratissima*, N.O. Laurineæ. It pupates in June, and the imago emerges the following spring” (Journ. Bombay N. H. Soc. 1898, 595). Mr. W. Doherty obtained it at Sarju, Ramganga, Gori and Kali Valleys, 2,000 to 5,000 feet elevation, in Kumaon” (J. As. Soc. Beng. 1886, 136). Mr. J. H. Hocking took it in the “Kangra Hills. It flies round and round the tops of trees” (P. Z. S. 1882, 257). We have specimens from Nepal, taken by Gen. G. Ramsay. Mr. H. J. Elwes records it as “common in Sikkim at low elevations, and occurs up to 7,000 feet between April and October. It is a very strong flyer, and only caught when settled on wet places in the sun” (Tr. Ent. Soc. 1888, 434). Mr. L. de Nicéville also says it is “common in Sikkim throughout the warm months, from 1,000 to 7,000 feet elevation” (Sikkim Gaz. 1894, 174). Col. C. Swinhoe records it from the Khasia Hills (Tr. Ent. Soc. 1893, 314). Col. C. H. E. Adamson says it is found “throughout Burma; males being very common, the female very rare” (List, 1897, 49). Lieut. E. Y. Watson took it at “Beeling, Upper Tenasserim; and at Choungkwa, Chin Lushai Hills, in May. It was also common at the foot of the Chin Hills from March to May” (J. Bombay N. H. S. 1888, p. 26; *id* 1891, 54; *id*. 1897, 672). Signor L. Fea took it in the Kharen Hills. Dr. N. Manders found it “abundant in the Shan States; commonest at elevations of 3,000 feet” (Tr. Ent. Soc. 1890, 536). Mr. H. Grose-Smith has examples from the Andamans.

DALCHINA TEREDON (Plate 472, fig. 1, *larva* and *pupa*, 1a, b, c, ♂ ♀).

Papilio Teredon, Felder, Verh. Z. B. Ges. Wien. 1864, p. 305; *id*. Reise Novara Lep. i. p. 61 (1865).

Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 578.

Dalchina Teredon, Moore, Lep. of Ceylon, i. p. 143, pl. 62, fig. 1, 1a, ♂ ♀; 1b, *larva* and *pupa* (1881).

Papilio (Dalchina) Teredon, Hampson, Journ. As. Soc. Bengal, 1888, p. 364. Ferguson, Journ. Bombay N. H. Soc. 1892, p. 446.

Papilio Sarpedon Teredon, Rothschild, Nov. Zool. ii. p. 442 (1895). de Nicéville, Journ. As. Soc. Bengal, 1900, p. 257.

Papilio Sarpedon, var. *a*, Gray, Catal. Lep. Brit. Mus. i. p. 28 (1852).

Papilio Sarpedon, Davidson and Aitken, Journ. Bombay N. H. Soc. 1890, p. 364.

Dalchina Thermodusa, Swinhoe, Proc. Zool. Soc. Lond. 1885, p. 146.

Papilio (Dalchina) Thermodusa, Hampson, Journ. As. Soc. Bengal, 1888, p. 364.

IMAGO.—Male and female. Upperside black, with similar markings to those in *D. Sarpedon*. Forewing with the transverse macular band generally much narrower, the upper spots being smaller and wider separated, and the lower portions mostly divided by black veins; the band is composed of either eight or nine portions, the upper spot being sometimes absent, in both sexes from Ceylon and S. India, the band being either at its narrowest or widest width, this spot—when present—is very small. Hindwing produced into a rather prominent tooth at end of upper median veinlet; the medial band mostly narrower than in *Sarpedon*. Underside with the transverse bands as above. Hindwing with the subbasal crimson bar not inwardly bordered with black; other markings similar to *Sarpedon*.

Expanse, $2\frac{8}{10}$ to $3\frac{5}{10}$ inches.

LARVA AND PUPA.—Similar to that of *Sarpedon* (see Plate 472).

HABITAT.—Ceylon; S. India.

DISTRIBUTION AND HABITS.—In Ceylon this butterfly “is abundant in the Hills, and in the North and Eastern portions of the Island in the low country, but is not found in the damp South-eastern district. The larva feeds on *Cinnamomeum* and many other plants” (Dr. N. Manders, J. As. Soc. Beng. 1899, 224). Mr. F. M. Mackwood records it as “numerous everywhere in Ceylon. In the dry-season dozens together are to be seen on the damp sandy spots near streams. Capt. Wade found it common in Kandy and Galle” (Lep. Ceylon, i. 143). In South India, Mr. S. N. Ward found it “common both above and below the Ghâts on the Malabar Coast, more particularly so on the Nilgiris. The larva was found on the Dalchey-wild Cinnamon” (MS. Notes). Messrs. Davidson and Aitken write, “We found the larva of this at Karwar from July till October on *Litsæa sebisera* and *Alseodaphne semicarpifolia* (N. O. Laurineæ). It is even more shy and retiring than that of *P. Agamemnon*, and we got very few. It is very like that of *Agamemnon*, but prettier, being of a soft, dark green, inclining to emerald and passing into a pale bluish on the last segment and the under parts. The pupa is easily distinguished from that of *Agamemnon* by one mark, viz. the horn is not straight, but curves slightly backwards” (J. Bombay N. H. Soc. 1890, 364). “In the Kanara District the butterfly is commoner than *Agamemnon*, and may be seen all through the dry-season as well as in the rains, but rarely in gardens. Nothing suits it better than a

clearing in heavy forest, with a stream of water to keep the ground cool and moist, for it is a thirsty creature" (*id. l.c.* 1896, 578). Mr. G. F. Hampson obtained it on the "Nilgiris, at 2,000 to 7,000 feet elevation, and two specimens of the form *Thermodusa*, in February, at 3,500 feet" (J. As. Soc. Beng. 1888, 364). Col. C. Swinhoe took his specimens of *Thermodusa* on "Matheran Hill, Bombay, in November and December" (P. Z. S. 1885, 146). We possess specimens from Matheran taken by Dr. A. Leith. Mr. H. S. Ferguson records it as "common in the low country of Travancore, and up to 4,000 feet in the Hills on the South; common also on the high range" (J. Bombay N. H. Soc. 1891, 446).

Of our illustrations on Plate 472, fig. 1, *larva* and *pupa*, is copied from Sir W. Gregory's Ceylon drawings; figs. 1a and c from a Ceylon male and female, and fig. 1b from a Nilgiri male.

DALCHINA CLOANTHUS (Plate 473, fig. 1, *larva* and *pupa*; 1a, b, ♂, 1c, ♀).

- Papilio Cloanthus*, Westwood, Arcana Entom. i. p. 42, pl. 11, fig. 2 (1841). Kollar, Hügel's Kaschmir, iv. pt. 2, p. 405, pl. 2, fig. 1, 2 (1844). Hutton, Trans. Ent. Soc. Lond. 1847, p. 51. Gray, Catal. Lep. B. M. i. p. 28 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 112 (1857); *id.* P. Z. S. 1865, p. 757; *id.* 1882, p. 257. Felder, Verh. Z. B. Ges. Wien. 1864, pp. 304, 349. Lang. Ent. Mo. Mag. 1864, p. 101. Oberthür, Stud. Ent. iv. p. 60 (1879). Staudinger, Exot. Schmett. i. p. 9, pl. 6 (1884). Butler, P. Z. S. 1886, p. 376; *id.* Ann. Nat. Hist. 1888, p. 206. Elwes, Tr. Ent. Soc. 1888, p. 439. Rothschild, Nov. Zool. ii. p. 445 (1895). Robson, Journ. Bombay N. H. Soc. 1895, p. 497, *larva*.
- Dalchina Cloanthus*, Moore, Proc. Zool. Soc. 1882, p. 257. Swinhoe, Tr. Ent. Soc. 1893, p. 314.
- Papilio (Dalchina) Cloanthus*, Doherty, Journ. As. Soc. Bengal, 1886, p. 136. de Nicéville, Sikkim Gazetteer, 1894, p. 174. Mackinnon, Journ. Bombay N. H. Soc. 1898, p. 595, pl. W, fig. 27, a, b, c, d, *larva* and *pupa*.
- Papilio Cloanthus*, var. *Cloanthulus*, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 140.

IMAGO.—Male and female. Upperside purplish-black. *Forewing* with a pale olive-green very broad medial transverse band, the upper portion macular to the third median veinlet and composed of five large spots, the lower portion being conjoined and blue-tinted; within the cell is a large rounded spot joined to the outer one in the interspace of the fourth and third median, and also a large elongated triangular lower spot joined to the outer portions in the interspaces of the second and third median. *Hindwing* with a pale olive-green very broad posteriorly-decreasing medial band, and a submarginal row of four large spots, the lower three being conical and the upper one narrow; at the apical and posterior angle is also a slightly-apparent slender greyish lunule, and at the anal angle a very obscure reddish spot. Underside dark purplish-brown. *Forewing* with pale green markings as above, and the outer border traversed by a submarginal pale obscure greyish line. *Hindwing* with a broad pale green band and submarginal spots, as above, the inner

costal-end of the band with a black patch crossed by a crimson slender sinuous streak, and its lower outer-end from within apex of the cell to anal angle bordered with black patches crossed by crimson lunules; abdominal margin with a grey streak, and in the male with a pale ochreous woolly-patch; cilia from upper median to anal angle slenderly alternated with white. *Body* above greyish-black, beneath and legs greyish; antennæ black.

Expanse, $3\frac{1}{4}$ to 4 inches.

LARVA.—“ Full-fed $1\frac{1}{2}$ inch long. Head and neck contractile; body widest at the fifth segment, from which it tapers gradually to the anal segment; the ridge over the head is furnished with two tubercles, black in front, white posteriorly; the fifth segment has a yellow bar which projects on each side beyond the body, and has the appearance of a yoke, the points of this yoke are black. Colour green; the thirteenth segment is of a pale transparent blue-green; a pale yellow subdorsal line, and an almost white spiracular line are the only markings; head greenish-yellow; legs, claspers, and abdomen blue-green; the thirteenth segment terminates in two sharp points which join at the end, so that the division between them is apparent only on close examination” (Mrs. S. Robson, Journ. Bombay N. H. Soc. 1895, 497).

PUPA.—Conical; truncated in front; head slightly cleft in front; thorax angled in front and at the sides, and with a short dorsal frontal projected process. Colour pale green, with a lateral and a divaricated pale yellow dorsal line.

HABITAT.—North Western, Central, and Eastern Himalayas; Assam; Burma; Shan States; ? Malay Peninsula.

DISTRIBUTION, HABITS, ETC.—We have a male from Kashmir, taken by the late Capt. R. Bayne Reed. Capt. T. Hutton records it as “very common, at Masuri, in fine warm weather, flitting with great rapidity over the tops of the loftiest trees. It usually selects some lofty Oak, over the summit of which it continues to dance with a jerking flight, like that of *P. Sarpedon*, until its domain is invaded by another individual, when a rapid chase round and round the tree takes place, one-while they dart away from the tree down the side of the steep mountain, but ever and anon return to the favourite tree, until one is fairly driven off, when the other resumes its dance as before. It is difficult to capture, from its high and rapid flight. It appears at the end of April, and continues throughout the summer” (Tr. Ent. Soc. 1847, 51). Capt. A. M. Lang says it is “equally rare with *P. Sarpedon*, affecting the same localities in the N.W. Himalaya, at altitudes from 5,000 to 7,000 feet. I have taken both the species, sitting with closed wings by the moist margins of a trickling rill” (Ent. Mo. Mag. 1864, 101). Major J. W. Yerbury obtained it at “Murree in August and September” (P. Z. S. 1886, 376). Mrs. S. Robson found the larva at Masuri, in June, on a large and common tree, *Machilus odoratissima*”

(J. Bombay N. H. S. 1895, 497). Mr. P. W. Mackinnon records it as "common in Masuri, in the spring and summer months. The larva feeds on the leaves of *Machilus odoratissima*, N. O. Laurineæ. It is bright green with a yellow collar on the fifth segment. The pupa is bright green, with the angles yellow. The larva pupates in June, and the butterfly emerges in the following April" (J. Bombay N. H. S. 1898, 595). Mr. W. Doherty took it at "Khati, Loharkhet, and in Lower Ramganga, 2,000 to 7,000 feet, in Kumaon. Gen. G. Ramsay obtained it in Nepal. Specimens labelled Nepal, and Barrackpur near Calcutta, are in the British Museum. Mr. H. J. Elwes writes, "Möller gives the habitat of this species, in Sikkim, as from 2,000 to 4,000 feet; occurring from April to October. I saw it in Khasia at 6,000 feet, flying on sunny days round the tops of trees with very rapid flight, and hard to catch" (Tr. Ent. Soc. 1888, 434). Mr. G. C. Dudgeon took it in Bhotan. Col. C. Swinhoe records it from the Khasia Hills (Tr. Ent. Soc. 314). Mr. W. Rothschild records it from the Shan States (Nov. Zool. ii. 1893, 445).

Of our illustrations on Plate 473, fig. 1, larva and pupa, is copied from Mr. Mackinnon's Masuri drawings; fig. 1a, b, male from Kashmir, and fig. 1c, female from N.W. Himalaya.

INDO-MALAYAN SPECIES.—*Dalchina rufofervida* (Pap. Sarpedon rufofervidus, Fruhstorfer, Berl. Ent. Zeit. 1897, p. 305). *Habitat.* Nias.—*Dalchina semifasciata* (Pap. Sarpedon, var. semifasciatus, Honrath, Ent. Nachr. 1881, p. 161. Rothschild, Nov. Zool. ii. p. 442. Pap. Sarpedon, var. Leech, Tr. Ent. Soc. 1889, p. 115, pl. 7, fig. 2. Fruhst. Berl. Ent. Zeit. 1902, p. 215. *Habitat.* China.—*Dalchina Parsedon* (Pap. Parsedon, Westwood, Tr. Ent. Soc. 1872, p. 99, pl. 5, fig. 1, 2). *Habitat.* Java (Coll. Moore).—*Dalchina Clymena* (Pap. Cloanthus, var. Clymenus, Leech, Butt. of China, p. 523, pl. 32, fig. 2 (1893). Rothschild, *l.c.* p. 445). *Habitat.* C. and W. China.—*Dalchina Sumatrana* (Pap. Cloanthus var. Sumatranus, Hagen, Iris, vii. p. 27 (1894). Rothschild, *l.c.* p. 445). Pap. (Dal.) Cloanthus, de Nicéville, J. As. Soc. Beng. 1895, p. 526. *Habitat.* Sumatra.

Genus *Ilaidcs*, Hübner, Verz. bek. Schmett. p. 85 (1816). Papilio (Group 35) Rothschild, Nov. Zool. ii. p. 424. *Type.* I. Codrus.—*Idaides Empedocles* (Pap. Empedocles, Fabricius, Mant. Ins. ii. p. 10 (1787). Donovan, Ins. of India, pl. 20, fig. 1 (1800). Wallace, Tr. Linn. Soc. 1865, p. 65. Butler, Catal. D. Lep. Fabr. B. M. p. 243 (1869). Rothschild, Nov. Zool. ii. p. 427 (1895). de Nicéville, Journ. As. Soc. Beng. 1895, p. 525. *Habitat.* Sumatra Java; Banka; Borneo.—*Idaides Melanthus* (Pap. Melanthus, Felder, Wien. Ent. Monats. vi. p. 283; *id.* Nov. Voy. Lep. i. p. 72, pl. 12, fig. C, ♂ (1865). Semper, Phil. Tagfalt. p. 279 (1892). Pap. Codrus Melanthus, Rothschild, Nov. Zool. ii. p. 426. *Habitat.* Philippines.

Genus PATHYSA.

- Pathysa*, Reakirt, Proc. Ent. Soc. Philadelphia, iii. pp. 503, 504 (1864). Moore, Lep. of Ceylon, i. p. 141 (1881). Kirby, Allen's Nat. Hist. Butt. ii. p. 274 (1896).
Iphiclides (part), Hübner, Verz. bek. Schmett. p. 82 (1816).
Podalirius (part), Swainson, Zool. Illustr. ii. pl. 105 (1833).
Papilio (part), Doubleday and Hewitson.
Papilio (sect. 21, subsect. C), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 302, 346.
Papilio (group 31), Rethschild, Nov. Zool. ii. p. 410 (1895).

IMAGO.—Male. *Forewing* broad, triangular; costa very much arched; apex obtuse; exterior margin oblique, concave in the middle and slightly uneven posteriorly; cell long, broadest across the middle; first subcostal branch short and anastomosed to the costal, emitted at about one-seventh, and second branch at one-tenth before end of the cell; discocellulars nearly straight, upper slightly longest. *Hindwing* broad; costa rather long and oblique; exterior margin convex, very sinuous and produced into a very long narrow ensiform tail; cell very long and narrow; first subcostal at one-half before end of the cell, second branch concave at the base; discocellulars bent outward, radial from their angle; abdominal margin with an elongated hairy scent-organ beneath the fold. *Body* short, stout; antennæ with a short thick rounded club. Sexes similar.

LARVA.—Smooth; slightly distended about the fourth and fifth segments; with two short pointed subdorsal tubercles on third and fourth segment, two fleshy tubercles on second, and two on anal segment.

PUPA.—Attenuated at anal end; thorax truncated in front and with a short frontal dorsal prominence; head excavated in front.

TYPE.—*P. Antiphates*.

PATHYSA ALCIBIADES (Plate 474, fig. 1, 1a, larva and pupa, 1b, c, d, ♂, 1e, ♀).

- Papilio Alcibiades*, Fabricius, Mant. Ins. ii. p. 8 (1787); Ent. Syst. iii. i. p. 25 (1793).
Papilio Antiphates, var. *Alcibiades*, Butler, Catal. Fabr. Lep. B. M. p. 240 (1869).
Papilio Antiphates Alcibiades, Rothschild, Nov. Zool. ii. p. 411 (1895).
Papilio Antiphates, Boisduval, Spec. Gén. Lép. i. p. 248 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 15 (1846). Gray, Catal. Lep. B. M. i. p. 31 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 116, pl. 3, fig. 10, 10a, larva and pupa (1857). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 302, 346. Wallace, Trans. Linn. Soc. Lond. 1865, p. 63. Moore, P. Z. S. 1865, p. 757; *id.* 1878, p. 841. Butler, Trans. Linn. Soc. Zool. 1877, p. 552; *id.* Ann. Nat. Hist. 1885, p. 342. Piepers, Tijd. v. Ent. 1888, p. 349, pl. 8, fig. 4, larva. Elwes, Tr. Ent. Soc. Lond. 1888, p. 433. Eimer, Artbild. Schmett. pl. 2, fig. 2 (1888). Robbe, Ann. Soc. Ent. Belg. 1892, p. 126. Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 579, pl. 6, fig. 1, 1a, larva and pupa.
Pathysa Antiphates, Moore, Lep. of Ceylon, i. p. 142, pl. 63, fig. 1, 1a, ♂ (1881); *id.* Journ. Linn.

- Soc. Zool. 1886, p. 50. Swinhoe, Tr. Ent. Soc. 1893, p. 313. Kirby, Allen's Nat. Hist. Butt. ii. p. 274 (1896).
- Papilio (Pathysa) Antiphates*, Wood-Mason, Journ. As. Soc. Beng. 1886, p. 376. Elwes, *ib.* 1886, p. 437. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 445. de Nicéville, Sikkim Gaz. 1894, p. 174; *id.* Journ. As. Soc. Beng. 1895, p. 524.
- Papilio Pompilius*, Fabricius, Mant. Ins. ii. p. 8 (1787); *id.* Ent. Syst. iii. i. p. 25 (1793). Horsfield, Catal. Lep. Mus. E. I. Company, pl. 3, fig. 3, 3a, *larva* and *pupa* (1828). Lucas, Lep. Exot. p. 43, pl. 22, fig. 1 (1835).
- Iphiclides Pompilius*, Hübner, Verz. bek. Schmett. p. 82 (1816).
- Podalirius Pompilius*, Swainson, Zool. Illust. ii. pl. 105 (1833).
- Papilio Antiphates*, var. *Pompilius*, Distant, Rhop. Malay. p. 357, pl. 31, fig. 5, ♂ (1885). Hagen, Berl. Ent. Zeit. 1892, p. 155, *id.* Iris, 1894, p. 27. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 197.
- Papilio nebulosus*, Butler, Ann. and Mag. Nat. Hist. 1881, p. 33, pl. 4, fig. 3 (*melanoid* var.).
- Papilio Itamputi*, Butler, in Forbes' Nat. Wand. Sumatra, p. 276 (1885).
- Papilio Antiphates Javanicus*, Eimer, Artbild. Schmett. p. 136 (1888).
- Papilio Antiphates continentalis et Ceylonicus*, Eimer, *l.c.* pp. 137, 149 (1889).

IMAGO.—Male. Upperside pale olivescient yellowish-white. *Forewing* with eight transverse black bands, each proceeding from the costa; the first slender and at the extreme base, the second also somewhat slender and ending either at the submedian vein or extending to the posterior margin; the third generally ending in the lower median interspace but sometimes at the submedian vein; the fourth, fifth and sixth broader and not extending beyond lower border of the cell; the fifth being sometimes short and wedge-shaped—and then not crossing the cell; the seventh broad, tapering posteriorly, and ending at the second or first median veinlet, its lower end sometimes partly coalesced to the marginal band, the latter ending before or at the posterior angle; basal and apical interspaces tinted with pale olive-green, and the veins in the latter black lined. *Hindwing* with a marginal zigzag row of black lunules, these being mostly continuous and include the length of the tail, also a broader spot at anal angle; a submarginal series of more or less defined slender black-speckled lunules, the latter being sometimes obsolete anteriorly; the caudal area with a more or less broad dusky-grey patch sparsely speckled with black scales; the basal and discal markings of the underside also visible, as greyish patches, by semitransparency; cilia alternated with white, including edge of the tail. Underside. *Forewing* white, with transverse bands as on the upperside, the basal being black, the anterior purplish-black, and their interspaces darker olivescient-green tinted. *Hindwing* with a black variable narrow transverse basal, subbasal, and inner-discal band, the two latter obliquely crossing the cell and the three ending in a short cross bar in the submedian and lower median interspace, the two inner bands are straight, the outer somewhat sinuous; beyond is a discal transverse parallel row of various-shaped black spots, the upper one being narrow and curved, the next large and conical, the next four small and rounded—one of the latter being within apex

of the cell; these are followed by a black bar between that of the basal bands and the large anal spot; beyond is a submarginal row of black slender broken lunules, which are more defined than on upperside, and then the marginal zigzag row of lunules; basal interspaces tinted with dark olivescence-yellow, and the outer discal interspaces clouded with bright yellowish-ochreous. *Body* and legs greyish-white; sides of abdomen pale ochreous, with a longitudinal row of black spots; thorax above clothed laterally with fine grey hairs, a longitudinal black dorsal streak extending to front of head; collar and sides of frontal tuft ochreous; forelegs blackish above; tarsi blackish; antennæ black.

Female. Upperside similar to the male. *Hindwing* with the dark grey caudal patch broader. Underside similar to the male.

Expanse, ♂ 3 to $3\frac{3}{4}$, ♀ $3\frac{3}{4}$ to 4 inches.

LARVA.—Smooth; slightly distended about the fourth and fifth segment; with two short pointed subdorsal tubercles on third and fourth segment, two fleshy tubercles on second segment, and two on anal segment. The colour, according to specimens reared by Davidson and Aitken (*l.c.* 1890, 579), "in its early stages, is pure white, marked only with thin transverse lines of black or dark green; at the last moult but one it becomes yellow, with thicker lines, and after the last moult attains the colour shown in our figure. Feeds on *Unona Lawii*, N. O. Anonaceæ."

PUPA.—Attenuated at anal end; thorax truncate in front and with a short frontal-pointed dorsal prominence; colour pale green, with lateral pale yellowish line.

HABITAT.—Ceylon; S. and C. India; Assam; Sikkim; Bhotan; Burma; Shan States; Siam; Tenasserim; Malay Peninsula; Sumatra; Java; Borneo.

DISTRIBUTION AND HABITS.—In Ceylon, according to the observations of Mr. F. M. Mackwood, this is "a scarce butterfly, being found only in a few localities, widely apart, at about 1,500 to 3,000 feet range. Capt. Hutchison obtained it in the Eastern Province, in plains and forest, in August. Capt. Wade took it in the Kottowar forest, and at Galle; rare elsewhere" (*Lep. Ceylon*, i. 142). Dr. N. Manders says it is "rare and local in Ceylon. It seems to be more partial to the Eastern and drier parts of the Island" (*J. As. Soc. Beng.* 1899, 223).

In S. India, Messrs. Davidson and Aitken write, "Our acquaintance with this species is limited. We first met with it at Gairsoppa, in the South of Kanara, but have since found it at one or two places further North. It begins to appear in March, and there can be little doubt that it is on the wing for a few months only, like *P. Nomius*. On April 26th, 1893, a female deposited a single egg, and though the little caterpillar which emerged perished by starvation, the plant (*Unona Lawii*) not being then obtainable, we next year succeeded in getting a few more, and an amateur figure was made of the larva and pupa. The pupa is supported by an

uncommonly long band, and from its green colour would seem to be normally formed on the plant and not under stones" (J. Bombay N. H. S. 1896, 579). We possess a coloured drawing of a specimen taken by the late Sir Walter Elliot at Nullacherla, between Rajamundry and Ellore, Madras. Mr. H. S. Ferguson records it as "rare in Travancore; two specimens only being taken, in open forest, at the foot of the Ashambu Hills in August, and some were taken by Mr. Garrett near Ariankarvu" (J. Bombay, N. H. S. 1891, 313). Mr. W. C. Taylor says it is "not common at Khorda, in Orissa" (List, p. 16). Col. C. Swinhoe has received it "in great numbers, from the Khasia Hills" (Tr. Ent. Soc. 1893, 313). Dr. G. Watt obtained it near Manipur (Ann. N. H. 1885, 342). Mr. J. Wood-Mason obtained "nine males and one female at Silcuri, Cachar, from March 19th to July 29th (J. As. Soc. Beng. 1886, 376). Mr. H. J. Elwes records it as "common in the lower valleys of Sikkim, up to 3,000 feet, from April to October" (Tr. Ent. Soc. 1888, 433). Capt. E. Y. Watson found it "not uncommon at the foot of the N. Chin Hills, Burma, from March to May" (J. Bombay N. H. S. 1897, 672). Col. C. H. E. Adamson obtained it at "Moulmein; taken in company with *P. Nomius*, but it is much less common" (List, 1897, 48). Capt. Watson also says it is "common at Beeling, N. of Moulmein" (J. Bomb. N. H. S. 1888, 26). Mr. H. J. Elwes records "many males from Ponselai and the Hills on the Siamese frontier" (J. As. Soc. Beng. 1886, 437). Dr. J. Anderson took it in "Mergui, Tenasserim, in December and March" (J. Linn. Soc. Zool. 1886, 50).

Dr. N. Manders writes that "it is common, in N.E. Sumatra, over the whole of our area, in and near forest, throughout the year, but most abundant in March. The males come in crowds to wet spots on roads, and settle among a number of *Pierinæ*, where they evidently feel protected, as they also have white wings. When on the wing they look like a "White," as their long tails, when flying rapidly, can hardly be seen. The females are only caught in the forest, as they do not come to roads" (J. As. Soc. Beng. 1895, 524).

Of our illustrations on Plate 474, fig. 1, *larva* and *pupa*, is copied from Messrs. Davidson and Aitken's S. Indian drawing, and fig. 1a from Dr. Piepers' Java larva; fig. 1b, d from a Sikkim male, 1c from a Ceylon male, and 1e from a Sikkim female.

PATHYSA NAIRA (Plate 475, fig. 1, 1a, ♂).

IMAGO.—Male. Smaller than *P. Epaminondas*. Upperside. *Forewing* with similar-positioned black bands, the two subbasal being much narrower, and the second one not quite reaching the submedian veinlet; the other bands also comparatively narrower, the submarginal and marginal being coalescent from the third median, their anterior pale olivescient interspace composed of less quadrate-shaped

portions. *Hindwing* with much less apparent transverse subbasal and discal markings; the outer marginal dark grey band is not so broad as in *Epaminondas*, and the marginal black lunules are narrower. Underside. *Forewing* with black transverse markings as on upperside, the two outer bands being divided throughout their length. *Hindwing* with prominent black markings disposed as in *Epaminondas*; the subbasal and discal band being narrower, the bordering outer spots of the latter longitudinally larger, the upper one being inwardly angled, the submarginal and marginal lunules narrower.

Expanse, ♂ 3 to $3\frac{1}{4}$ inches.

HABITAT.—Travancore, S. India. Described from two males, in our collection, labelled Travancore.

PATHYSA EPAMINONDAS (Plate 475, fig. 2, 2a, ♂, 2b, ♀).

Papilio Epaminondas, Oberthür, Etudes Ent. iv. p. 62, pl. 4, fig. 1, ♂ (1879). Staudinger, Exot. Schmett. i. p. 9, pl. 6, ♂ (1888). Eimer, Artbild. Schmett. p. 121, pl. 2, fig. 6 (1889). Rothschild, Nov. Zool. ii. p. 414 (1895).

Papilio Laestrygonum, Wood-Mason, Proc. As. Soc. Bengal, 1880, p. 102; *id.* Journ. As. Soc. Bengal, 1880, p. 178, pl. 6, fig. 1, ♂. de Nicéville, *l.c.* 1880, p. 238; *id.* *l.c.* 1881, p. 253, ♀. Marshall and de Nicéville, Butt. of India, etc., i. *front plate*, fig. 1, 1a, ♂ (1882).

Papilio Antiphates, Moore, Proc. Zool. Soc. 1865, p. 593.

IMAGO.—Male and female. Upperside creamy-white. *Forewing* with a black slender streak at its junction with the thorax; two black outwardly-oblique transverse subbasal bands extending from the costa to posterior margin, the second emitting a slight outward point at base of the lower median veinlet; a broader short band across middle of the cell, a short wedge-shaped band and then a much broader band, the latter extending across and beyond end of the cell; beyond is a transverse submarginal broad band, which widens below end of the cell and then decreases to the posterior margin, followed by a broad marginal band, the two latter being obscurely coalescent posteriorly from the second median; interspaces between the basal and subbasal bands and also that between the cell and submarginal and of the latter and marginal band, slightly tinted with pale olivaceous-yellow. *Hindwing* with a black slender streak at the extreme base; a subbasal transverse more or less pale greyish-black band extending from the anterior margin across the cell and thence paler scaled for half distance along each side of the lower median; beyond is a discal parallel paler grey waved band, which is outwardly bordered by a series of partly coalescent similar-coloured blackish-centred lunular patches, these two latter being the bands of the underside showing through the wing; followed by a broad marginal dark grey band, sparsely speckled with black scales, and traversed by a submarginal and an outer marginal series of black lunules,

the two upper pairs being partly coalesced; a broad black lunule also at the anal angle, the anal area below the latter being tinted with pale ochreous; cilia between the veins, and the tail edges white. Underside pale bluish-white. *Forewing* with purplish-black similar transverse bands, as above, except that the two subbasal do not reach the posterior margin, and the marginal band is separated from the submarginal throughout its length; the basal and apical interspaces tinted with pale olivescens-yellow. *Hindwing* with a well-defined black transverse slender basal band, which is continued along the submedian vein, a subbasal band, a discal band and a contiguous outer macular band, the latter series curving inward to the end of the basal band between it and the anal spot, and its costal portion is lengthened and is either erect or slightly angled inward; the submarginal and marginal black lunules narrower than on the upperside, and their interspaces pale grey, the former being inwardly broadly-bordered with diffused ochreous-yellow; basal interspaces also tinted with pale olivescens-yellow. *Body* greyish-white; head black with two frontal white bands; collar with two ochreous spots; thorax above black, bordered on each side with long grey hairs, beneath white; abdomen greyish-white, with a blackish longitudinal dorsal band and a lateral broken segmental band; legs black above, white beneath; antennæ black.

Expanse, $3\frac{1}{2}$ to $3\frac{3}{4}$ inches.

HABITAT.—Andaman Islands.

DISTRIBUTION.—Specimens were taken at Port Blair, S. Andamans, by Mr. F. de Roëpstorff.

PATHYSA ANTICRATES (Plate 476, fig. 1, 1a, b, ♂, 1c, ♀).

Papilio Anticrates, Doubleday, Ann. and Mag. Nat. Hist. xviii. p. 371 (1846); Doubleday and Hewitson, Gen. D. Lep. i. p. 14 (1846). Gray, Catal. Lep. Brit. Mus. i. p. 29, pl. 3, fig. 3, 3a, (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 115 (1857); *id.* P. Z. S. 1865, p. 759. Felder, Verh. Z. B. Ges. Wien. 1864, p. 302; Distant, Rhop. Malayana, p. 470, pl. 42, fig. 7 ♂ (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 434. Eimer, Artbild. Schmett. p. 170, pl. 3, fig. 6 (1889). Hagen, Iris, 1894, p. 27.

Pathysa Anticrates, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 313.

Papilio (Pathysa) Anticrates, de Nicéville, Sikkim Gazetteer, 1894, p. 174.

Papilio Aristeus Anticrates, Rothschild, Nov. Zool. ii. p. 419. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 136.

Papilio Pathysa Hermocrates, Elwes, Journ. As. Soc. Bengal, 1886, p. 437. de Nicéville, *id.* 1895, p. 525.

Papilio Aristeoides, Eimer, Artbild. Schmett. p. 163, pl. 3, fig. 3 (1889).

Papilio Anticrates var. *nigricans*, Eimer, *l.c.* p. 175, fig. T (1889)—*melanic* var.

IMAGO.—Male. Upperside white, with a very faint bluish tint. *Forewing* with six black transverse bands and a broad outer marginal band, from the costa; the

first slender and at the extreme base, the second broader and extending to posterior margin, the other four still broader, the third terminating decreasingly either at the submedian vein or posterior margin, the fourth, fifth, and sixth only crossing the cell, the fifth being, more generally, wedge-shaped and not reaching lower edge of the cell; beyond is the much broader black marginal band decreasing posteriorly and traversed medially by a linear row of narrow white lunules. *Hindwing* with a black slender extreme abdominal marginal fold, outwardly fringed with grey hairs, the fold beneath lined with long pale ochreous hairs; a black transverse subbasal band extending from the costa obliquely across base of the cell and thence more or less decreasingly and less defined along lower median to above anal angle, followed beyond by a parallel inner-discal more or less defined band, which is interrupted across the cell, the anterior portion formed by a decreasing or constricted grey-edged streak, the lower portion, from below apex of the cell to above anal angle, being macular and grey-edged, and in some specimens the crimson streaks of the underside are slightly apparent; beyond is a black marginal band with incurved sinuous inner-edge, traversed by a row of six slender white incurved lunules, the caudal inner-interspaces of the band being speckled with grey scales; cilia and edges of the tail slenderly alternated with white. Underside. *Forewing* pale bluish-white; with transverse bands, as above, but of an ochreous-brown colour, the third and marginal darkest. *Hindwing* with a broad subbasal transverse brown band, a parallel inner-discal broken duplex-band from the costa to anal angle, the inner and outer portions, between the veins, being black (the inner sometimes dark brown anteriorly), and each pair with a central deep crimson streak; the marginal band, as above, pale brown, and traversed by six black outer lunules centred by a slender white lunule; cilia as above. *Body* black above; thorax, front of head and abdomen with a lateral greyish-white band; abdomen beneath and legs greyish-white, femora above black; antennæ black.

Female. Upperside similar to the male. *Hindwing* with the discal crimson streaks of the underside more apparent. Underside similar to the male.

Expanse, ♂ $2\frac{1}{2}$ to 3, ♀ 3 inches.

LARVA.—Unknown.

HABITAT.—Sikkim; Bhotan; Assam; Khasias; Burma; Tenasserim; Malay Peninsula; Sumatra; Borneo.

DISTRIBUTION.—Mr. H. J. Elwes records it as "rare in the lowest valleys of Sikkim, but found in abundance by Mr. Otto Möller's native collectors at Sivoke in May" (Tr. Ent. Soc. 1888, 434). Mr. L. de Nicéville says it "occurs in Sivoke in April and May only, when it is very common. It is also found along the Rungeet road in the same months, but elsewhere it seems scarce. It is single brooded" (Sikkim Gazetteer, 1894, 174). Specimens from Shillong, Assam, are

in the British Museum. Mr. G. C. Dudgeon took it in Bhotan; Col. C. Swinhoe has received "a great number of specimens from the Khasia Hills" (Tr. Ent. Soc. 1893, 313). Col. C. H. E. Adamson "took two males in Akyab, in March. It also occurs not uncommonly at Katha in Upper Burma" (List, 1897, 48). Specimens from Tenasserim are in the British Museum.

PATHYSA NOMIUS (Plate 477, fig. 1, 1a, larva and pupa, 1b, c, ♂, 1d, e, ♀).

- Papilio Nomius*, Esper, Ausl. Schmett. p. 210, pl. 52, fig. 3 (1785-93). Boisduval, Spec. Gén. Léop. i. p. 251 (1836). Berge, Schmett. 109, pl. 34, fig. 3 (1842). Doubleday and Hewitson, Gen. D. Lep. i. p. 14 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 115 (1857), *id.* P. Z. S. (1867), p. 578. Oberthür, Etud. Ent. iv. p. 63 (1879). Staudinger, Exot. Schmett. i. p. 9 (1884). Eimer, Artbild. Schmett. p. 164, fig. Q, et pl. 3, fig. 4 (1889). Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1890, p. 364, pl. E, fig. 1, 1a, larva and pupa. Beetham, *id.* 1891, p. 330. Rothschild, Nov. Zool. ii. p. 421 (1895). de Nicéville, Journ. As. Soc. Beng. 1899, p. 223.
- Pathysa Nomius*, Moore, Lep. of Ceylon, i. p. 142, pl. 62, fig. 2 (1881). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 313.
- Papilio (Pathysa) Nomius*, de Nicéville, Journ. As. Soc. Beng. 1885, p. 51. Hampson, *id.* 1888, p. 364. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 446.
- Princeps Heroicus Meges*, Hübner, Samml. Exot. Schmett. i. pl. 106 (1806-24).
- Iphiclides Meges*, Hübner, Verz. bek. Schmett. p. 82 (1816).
- Papilio Niamus*, Godart, Encyc. Méth. ix. p. 51 (1819). Swainson, Zool. Illustr. ii. pl. 32 (1831-3).
- Papilio Orestes*, Gray, Catal. Lep. B. M. i. p. 29 (1852). Butler, Catal. Fabr. Lep. B. M. p. 240 (1869).
- ? *Papilio Orestes*, Fabricius, Ent. Syst. iii. i. p. 34 (1793).
- Papilio Orestes*, var. Feld. Verh. Z. B. Ges. Wien. 1864, pp. 302-346.

IMAGO.—Male. Upperside bluish-white. *Forewing* with six black transverse bands and a broad outer-marginal band; the first slender and at extreme base, second and third extending to the posterior margin, fourth generally ending below the cell, but not reaching to the lower median, fifth and sixth extending only across the cell; the marginal band broader than in *P. Anticrates*, its inner-edge being excurved between the veins, and submarginally traversed by a row of rounded white spots, of which the apical second is placed obliquely outward. *Hindwing* with a blackish grey slender extreme abdominal marginal fold, fringed with grey hairs; a black transverse subbasal and an inner-discal band, both ending posteriorly in a cross macular bar near and above anal angle; beyond is a broad black marginal band with excurved inner-edge between the veins, and traversed by a row of white lunules, the caudal inner-interspaces of the band and the lower lunules being speckled with grey scales. In some specimens the two inner transverse bands, on both wings, are narrower and more attenuated posteriorly. Cilia and edges of tail slenderly alternated with white. Underside. *Forewing* bluish-white, with trans-

verse bands, as above, of an ochreous-brown colour, the third and marginal being darkest posteriorly, in some the bands are of a uniform dusky-brown. *Hindwing* with the subbasal and marginal band ochreous-brown or dusky-brown; a discal transverse broken duplex-band from the costa to anal angle, its inner and outer portions between the veins being black, and each pair with a central red or crimson streak; the marginal band traversed by six black lunules, each broadly centred by a grey-scaled lunule, the caudal inner-interspaces being pale ochreous or greyish-ochreous; cilia and tail as above. *Body* black above; thorax, front of head, and abdomen with a lateral greyish-white band; abdomen beneath and legs greyish-white; antennæ black.

Female. Upperside similar to the male. Underside. *Forewing* with darker brown bands. *Hindwing* also with darker brown bands; the discal crimson streaks brighter, and the outer marginal grey-centred lunules broader.

Expanse, ♂ $2\frac{3}{4}$ to $3\frac{1}{4}$, ♀ $3\frac{1}{2}$ inches.

LARVA.—Smooth; anterior segments somewhat thickened, and with three pairs of small fleshy sharp spines, a pair also on the anal segment. Colour usually black, banded on the sides with narrow white stripes, except on the first three or four segments and the last, on which there is more or less rusty-red, but the shade varies very much, and in some the ground-colour is green.

PUPA.—Head with two short processes in front, and a short forward-projected dorsal prominence. Colour earthy-brown. Attached by tail and silken girdle, in crevices, or under stones and roots.

HABITAT.—Ceylon; South, Central, and Lower Provinces of India.

LIFE HISTORY, HABITS OF LARVA, ETC.—"This butterfly was very common, in the North Kanara District of Bombay, in 1889, in March, June, and July. It frequented one particular spot about half-way up the Goodbally Hill; elsewhere we seldom met with it. On June 23rd we discovered the larva on a jungle tree (since identified as *Saccopetalum tomentosum*, N. O. Anonaceæ), and literally collected hundreds. By the end of July these had all become pupæ, and we got no more. Of the pupæ a few produced butterflies in the course of the same month, but the great majority remained until February following, when a little rain fell and a few butterflies emerged, but they stuck to the pupa case, or else their wings failed to expand, for want of moisture apparently. We took the hint and watered about twenty, with the result that the butterflies came out of them all in good condition. We had lost a great many by accidents when on tour, and the few had hatched at odd intervals; but we kept what remained carefully until June, and within a few days after the bursting of the Monsoon they all came out. From this it would appear that of each season's pupæ some were hatched at once, some are brought out by the spring showers or heavy dews of February and March, and the

rest remain till June. Do the butterflies which come out in August and March lay eggs, and, if so, what becomes of them?

The larva of this species is not so thick proportionally at the fourth segment as those of *P. Dason*, *Sarpedon* and *Agamemnon*, and is somewhat quadrangular. It has four pairs of spines, which are small, but sharp. The most usual colour is black, banded on the sides with narrow white stripes, except on the first three or four segments and the last, on which there is more or less rusty-red; but the shade varies very much, and in some the ground-colour is green. The pupa has the usual horn which characterizes this group, and also two short processes on the head, and is of some shade of earthy-brown. It is attached by the tail and a close band in crevices, or under stones and roots. We furnished our cages with bits of broken tiles, but several of the larvæ preferred the old clay nest of a wasp, into the empty cells of which they crept. This curious habit is of course connected with the hibernation which the majority of the pupæ undergo. Along with our larvæ of *P. Nomius* we found some of *P. Agamemnon* and *P. Dason*, and it is remarkable that while very many of these had been attacked by a large parasitic fly, the grub of which ate its way out and fell to the ground after the pupa had formed, *P. Nomius*, so much more conspicuous and feeding on the same tree, seemed to enjoy entire immunity from the pest." "We have since proved that *P. Nomius* remains for more than half the year, from the end of July till at least March, or oftener May, in the pupa state under stones and roots" (J. Davidson and E. H. Aitken, Journ. Bombay N. H. Soc. 1890, p. 364, *id.* 1896, p. 579).

DISTRIBUTION, HABITS, ETC.—In Ceylon, Mr. F. M. Mackwood records it as being found in the "low country only, and principally in the Northern provinces. Very scarce. Captain Hutchison obtained it in the Eastern province, in the plains and forest, in August. Taken only on one occasion, on a journey from Kandy to Trincomalie, associated with *Pap. Antiphates* and *Dason*, sitting in numbers on damp places on the road, dense forest being on both sides. Captain Wade also took it at Trincomalie" (Lep. Ceylon, i. 142). Dr. N. Manders found it "common and frequently abundant in the North Central Province and on the Trincomalie side of the Island. It is fond of setting in large numbers together on damp patches of sand. It flies in July and August, and again at the end of the year" (Journ. As. Soc. Beng. 1899, 223). Col. J. W. Yerbury obtained it at "Tamblegam and Trincomalie in September" (MS. Notes). In South India, Mr. H. S. Ferguson found it "rare in Travancore. One specimen only being taken at the foot of the Ashambu Hills" (Journ. Bombay N. H. S. 1891, 16). Mr. G. F. Hampson obtained "one specimen only in the Nilgiris, at 1,000 feet elevation" (Journ. As. Soc. Beng. 1888, 364). Mrs. Hamilton found and reared the larva in Saugor, in July, 1852, describing it as dark blue with brown ends and green underneath, six anterior and two posterior

spines; pupa suspended by tail and medial band; imago emerged in August (MS. Notes). Messrs. J. Davidson and E. H. Aitken record "this butterfly was very common in the N. Kanara District of Bombay, in 1889, in March, June, and July; it frequented one particular spot about half-way up the Goodhally Hill; elsewhere we seldom met with it. On June 23rd we discovered the larva on a jungle tree (since identified as *Saccopetalum tomentosum*, N. O. Anonaceæ) and literally collected hundreds. By the end of July these had all become pupa" (J. Bombay, N. H. S. 1890, 364). "The butterfly is plentiful enough where it occurs, much more so, however, in some years than others, but it is very local, and its appearance is limited to the hot season and the first two months in the rains. More than half the year, from the end of July till at least March, or oftener May, is passed in the pupa state under stones and roots" (*id. l.c.* 1896, 579). A specimen from Belgaum, Bombay, is in the British Museum. Mr. J. Beetham obtained it in the Central Provinces (*l.c.* 1891, 330). Col. C. Swinhoe records it from "Mount Aboo, Central Provinces" (Tr. Ent. Soc. 1893, 313). He also possesses a specimen from Ranchi, Chota Nagpur, Lower Bengal. Mr. W. C. Taylor found it "very common in some places in Khorda, Orissa" (List, 1888, 16). The late Edw. Blyth writes that it "abounds in the vicinity of Calcutta and other parts of Bengal, during the dry hot season" (MS. Note). Mr. J. Rothney found it "rather uncommon in the Calcutta District. It frequents the flowers of *Durantia Plumieri*" (Ent. Mo. Mag. 1882, 33). Mr. L. de Nicéville says, "This species comes out in profusion, in the neighbourhood of Calcutta, in March, and is the only single-brooded species in Calcutta with which I am acquainted. The larva feeds on *Polyalthia longifolia*" (J. As. Soc. Beng. 1885, 51).

Of our illustrations on Plate 477, fig. 1, *larva* and *pupa*, is from the drawings of Mrs. Hamilton, made at Saugor in 1852; fig. 1a, also *larva* and *pupa*, is copied from Messrs. Davidson and Aitken's published drawings; fig. 1, b, c is from a Ceylon male; 1d from an Indian female, and 1e from a Barrackpur female.

PATHYSA PERNOMIUS (Plate 478, fig. 1, 1a, b, ♂).

Papilio Nomius, form temp. *Pernomius*, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 202.

Papilio (Pathysa) Nomius, Elwes, Journ. As. Soc. Beng. 1886, p. 437. de Nicéville, Sikkim Gaz. 1891, p. 174. Adamson, List of Burma Butt. 1897, p. 48.

Papilio Nomius, de Nicéville, J. Bombay N. H. Soc. 1890, p. 387. Watson, *id.* 1891, p. 54.

Papilio Nomius Swinhoei (part), Rothschild, Nov. Zool. ii. p. 422 (1895).

Male and female. Upperside. *Forewing* with comparatively broader black bands than in typical *Nomius* from Ceylon and S. India. *Hindwing* also with broader black marginal band, the inner-interspaces of the caudal area being almost or entirely black, and the two lower subanal white spots smaller. Underside. Bands on both

wings paler and brighter ochreous than in *Nomius*; and on the hindwing the basal band has a black streak along the precostal vein, which latter is also present in *P. Swinhoei*, but not in *Nomius*; the marginal band is also inwardly-edged with more or less well-defined black lunules.

HABITAT.—Sikkim; Burma; Upper Tenasserim; Shan States.

DISTRIBUTION.—Col. C. Swinhoe possesses two males from Sikkim. A single specimen was obtained in Sikkim by Mr. Otto Möller. We possess specimens from Pegu, and from Thoungyeen, Upper Tenasserim, the latter taken by Col. C. T. Bingham in February. Col. Swinhoe also has it from Pegu. Capt. E. Y. Watson took it at "Tiling, from March to May" (J. Bombay N. H. S. 1891, 54). He also writes, "The Eastern race of *Nomius* (Swinhoei Moore) was common in the Upper Chindwin District, Burma, from March to May, and Capt. Longe also obtained it commonly at 2,000 feet elevation, on the Manipur River in February" (*id. l.c.* 1897, 672). Specimens from Tilin Yaw and Toungoo, taken by Capt. E. Y. Watson, are in the British Museum. Col. C. H. E. Adamson has taken it in "Akyab, Moulmein, and Bhamo, and says it affects the borders of tanks and moist places in otherwise dry forests, in March, April, and May, the females being very uncommon" (List, 1897, 48).

We possess four males from the Upper Mekong, Shan States, taken by Mr. J. Roberts, C.E.

Of our illustrations on Plate 478, fig. 1, 1a is from a Pegu male, and fig. 1b from a Shan States male.

INDO-MALAYAN SPECIES.—*Pathysa Antiphates* (Papilio *Antiphates*, Cramer, Pap. Exot. i. p. 113, pl. 72, fig. A, B (1775). Jablonsky and Herbst, Nat. Schmett. iii. p. 151, pl. 43, fig. 1, 2. Rothschild, Nov. Zool. ii. p. 410 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 197. *Habitat.* S.E. China; Tonkin; Hong Kong; Hainan.—*Pathysa Antiphonus* (Pap. *Antiphates*, subsp., *Antiphonus*, Fruhstorfer. Soc. Ent. 1902, p. 170; *id.* Berl. Ent. Zeit. 1902, p. 198. *Habitat.* Nias.—*Pathysa decolor* (Pap. *Antiphates*, var. *decolor*, Staudinger, Iris, i. p. 279 (1888). Semper, Philip. Tagfalt. p. 285, pl. 48, fig. 3, ♂ (1893). Rothschild, *l.c.* p. 413 (1895). Pap. Ant. Palawanicus, Eimer, Artb. Schmett. p. 149 (1889). Pap. Ant. tigris, Semper, *l.c.* p. 284, pl. 48, fig. 2, ♀. Pap. Ant. Euphratoides, Eimer, *l.c.* p. 133, pl. 2, fig. 4 (1889). Semper, *l.c.* p. 284, pl. 48, fig. 1, ♀. *Habitat.* Palawan; Mindanao; Banguay.—*Pathysa Euphrates* (Pap. *Euphrates*, Felder, Wien. Ent. Mon. 1862, p. 283; *id.* Reise, Nov. Lep. i. p. 54, pl. 11, fig. D (1863). Eimer, *l.c.* p. 125, pl. 2, fig. 5 (1889). Semper, *l.c.* p. 285, pl. 48, fig. 4, 5, 6, ♂ ♀. Pap. Ant. *Euphrates et aber. atratus*, Rothschild, *l.c.* pp. 413, 414 (1895). *Habitat.* Luzon; Mindoro.—*Pathysa Hermocrates* (Pap. *Hermocrates*, Felder, Verh. Z. B. Ges. Wien. 1864, p. 302; Reise, Nov. Lep. i. p. 57, pl. 12, fig. E, ♂ (1835). Oberthür, Et. Ent. iv.

p. 63 (1879). Staudinger, *Iris*, i. p. 14 (1888); *id.* ii. p. 14, ♀ (1889). Oberthür, *l.c.* xvi. p. 4. (1893). Eimer, *Artb. Schmett.* p. 161, pl. 3, fig. 2 (1889). Semper, *Philip. Tagfalt.* p. 283 (1892). Fruhstorfer, *Berl. Ent. Zeit.* 1902, p. 200. *Habitat.* Philippines; Palawan; Tonkin.—*Pathysa Swinhoei* (Pap. Swinhoei, Moore, *P. Z. S.* 1878, p. 697. Holland, *Tr. Amer. Ent. Soc.* 1887, p. 123. Oberthür, *Et. Ent.* xvii. p. 4 (1893). Pap. *Nomius Swinhoei* (pt.), Rothschild, *Nov. Zool.* ii. p. 422 (1895). Fruhstorfer, *l.c.* 1902, p. 201. *Habitat.* Hainan; Tonkin.

Genus DEORIS.

Papilio (sect. 21, subsect. B), Felder, *Verh. Z. B. Ges. Wien.* 1864, pp. 302, 346.

Papilio (part), Doubleday and Hewitson.

Papilio (group 32), Rothschild, *Nov. Zool.* ii. p. 417 (1895).

IMAGO.—Male. *Forewing* short, triangular; glossy; semi-transparent apically; costa arched, apex pointed, exterior margin oblique and almost straight; cell long and narrow. *Hindwing* triangular; exterior margin very oblique, sinuous, and with a long slender tail; abdominal margin folded and enclosing an elongated woolly scent-organ, the extreme margin very hairy. *Body* short, stout, hairy; antennæ short, club thick.

TYPE.—D. *Agetes*.

DEORIS AGETES (Plate 478, fig. 2, 2a, ♂, 2b, ♀).

Papilio Agetes, Westwood, *Arcana Entom.* ii. p. 93, pl. 55, fig. 1, 2 (1843). Doubleday and Hewitson, *Gen. D. Lep.* i. p. 15 (1846). Gray, *Catal. Lep. Brit. Mus.* i. p. 31 (1852). Moore, *Catal. Lep. Mus. E. I. Company*, i. p. 116 (1857). Felder, *Verh. Z. B. Ges. Wien.* 1864, pp. 302, 346. Oberthür, *Etud. Ent.* iv. p. 67 (1879). Staudinger, *Exot. Schmett.* i. p. 9 (1884). Elwes, *Trans. Ent. Soc. Lond.* 1888, p. 433. Eimer, *Artbild. Schmett.* p. 53, pl. i. fig. 8 (1889). Haase, *Unters. üb. Mim.* p. 32 (1893). Rothschild, *Nov. Zool.* ii. p. 417 (1895).

Papilio (Pathysa) Agetes, Elwes and de Nicéville, *Journ. As. Soc. Beng.* 1886, p. 437.

Pathysa Agetes, Swinhoe, *Tr. Ent. Soc. Lond.* 1893, p. 313.

IMAGO.—Male. Upperside pale olivescent-white. Cilia black. *Forewing* with a black extreme basal slender band, a broader transverse subbasal and a still broader inner-discal band extending decreasingly from the costa to submedian veinlet, an equidistant similar band beyond across the cell, and a short triangular stripe above end of the cell, which latter sometimes extends very slenderly down the discocellulars; followed by an outwardly oblique transverse submarginal band attenuating posteriorly and there coalescing with a marginal band; the basal, cell, and apical interspaces tinged with very pale olivescent-green, the apical interspaces being semi-transparent. *Hindwing* with the subbasal and medial band of the underside showing

through by semi-transparency; a black outer-marginal narrow band which widens posteriorly, including the tail, and ends upward at the abdominal angle in a broken more or less bright crimson black-edged spot, this band is also posteriorly inwardly bordered with grey scales and bears a triangular white anal spot below the crimson one, a similar white marginal spot in the angle of the upper median interspace, two grey-scaled lunules in the two lower median interspaces, and also a very slender streak in the subcostal interspaces. Underside. *Forewing* with similar black bands as on upperside, the basal and anterior interspaces olivescient tinted. *Hindwing* pale olivescient tinted; with a black basal, subbasal, and a medial band, coalesced posteriorly above the anal angle, the latter traversed anteriorly and posteriorly outwardly-bordered by crimson zigzag broken streaks, followed by a marginal black band with markings as on upperside. *Body* above blackish, beneath and palpi pinkish-white; abdomen with a black lateral band; thorax above laterally clothed with long silky grey hairs; collar and head above with a lateral pale crimson band; legs olivescient-grey; antennæ black.

Female. Upperside duller white than in male. *Forewing* with the black medial, cell, and oblique submarginal band somewhat broader, the medial band extending to below the submedian vein. *Hindwing* as in male. Underside as in male.

Expanse, ♂ 3, ♀ $3\frac{2}{10}$ inches.

HABITAT.—Sikkim; Assam; Khasias; Burma; Tenasserim; Shan States.

DISTRIBUTION.—Mr. L. de Nicéville records it as "occurring in Sikkim, in the outer valleys, such as the Sivoke, in April and May. It is rare, and probably single brooded" (Sikkim Gaz. 1894, 174). Mr. G. C. Dudgeon took it in Bhotan. Col. C. Swinhoe has received "several hundreds, all males, from the Khasia Hills" (Tr. Ent. Soc. 1893, 313). Col. C. H. E. Adamson obtained "two males in Burma, while imbibing moisture from damp sand, in February and March" (List, 1897, 48). Col. C. T. Bingham obtained specimens in Thoungyeen, Upper Tenasserim. We have two males from the Upper Mekong, Shan States, taken by Mr. R. Roberts, C.E.

INDO-MALAYAN SPECIES.—*Deoris Iponus* (Papilio Iponus, Fruhstorfer, Soc. Ent. 1902, p. 57). Pap. Agetes, Distant, Rhop. Malay. p. 469, pl. 42, fig. 8 (1886). *Habitat.* Malay Peninsula.—*Deoris insularis* (Pap. Agetes var. insularis, Staudinger, Iris, vii. p. 349 (1895). Rothschild, Nov. Zool. ii. p. 417 (1895). de Nicéville, Journ. As. Soc. Beng. 1895, p. 524. Pap. Kinabalensis, Fruhstorfer, l.c. 1902, p. 58. *Habitat.* Sumatra; Borneo.—*Deoris tenuilineatus* (Pap. Agetes subsp. tenuilineatus, Fruhstorfer, Soc. Ent. 1901, p. 90, id. Berl. Ent. Zeit. 1902, p. 199. *Habitat.* S. Annam.—*Deoris Stratiotes* (Pap. Stratiotes, Grose-Smith, Ann. Nat. Hist. 1887, p. 433. Honrath, Berl. Ent. Zeit. 1888, p. 349, pl. 6, fig. 3 (1888). Eimer, Artbild. Schmett. p. 151, fig. P. (1889). Rothschild, Nov. Zool. ii. p. 417 (1895). *Habitat.* Borneo.

Genus PAZALA.

Pazala, Moore, Desc. Lep. Coll. Atkinson, p. 283 (1888). Kirby, Allen's Nat. Libr. Butt. ii. p. 273 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 20, and 21, subsect. a), Felder, Verh. Z. B. Ges. Wien. (1864), pp. 301, 346.

Papilio (group 30), Rothschild, Nov. Zool. ii. p. 406 (1895).

IMAGO.—Male. *Forewing* short, broad, triangular, glossy, semi-transparent in the basal, costal, and apical interspaces; costa slightly arched towards the end, apex broad and obtuse, exterior margin slightly waved and scarcely oblique; cell long, broad at the end; discocellulars straight, upper longest; first subcostal branch short and anastomosed to the costal vein. *Hindwing* triangular; costa rather long and oblique, exterior margin very oblique, sinuous anteriorly and deeply scalloped posteriorly, with a long, very slender tail; cell long, somewhat broad across the middle; first subcostal branch emitted at more than half before end of the cell, second concave at the base; discocellular bent inward below the middle; abdominal fold feebly developed, no scent-organ present, the margin very hairy. *Body* short, thickly-clothed with fine long silky-hairs; front of head and palpi densely hairy; femora hairy beneath; antennæ very short, the club short and thick.

LARVA.—Cylindrical; head rather large; 3rd and 4th segments slightly tumid; 2nd, 3rd, and 4th segments each with two subdorsal pointed tubercles, and two similar tubercles on anal segment.

PUPA.—Suspended; head truncated; body tapering hindward; thorax with a frontal forward-projected lengthened point.

TYPE.—P. Glycerion.

PAZALA GLYCERION (Plate 479, fig. 1, 1a, ♂, 1b, ♀).

Papilio Glycerion, Gray, Zool. Misc. p. 32 (1831), *id.* Lep. Ins. of Nepal, p. 6, pl. 3, fig. 2 (1846).

Boisduval, Spec. Gén. Lép. i. p. 247 (1836). Doubleday and Hewitson, Gen. D. L p. i. p. 15 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 116 (1857). Heron, Ann. and Mag. Nat. Hist. 1899, p. 119.

Pazala Glycerion, Moore, Desc. Lep. Coll. Atkinson, p. 283 (1883).

Papilio Paphus, de Nicéville, Journ. Asiatic Soc. Bengal, 1886, p. 254, pl. xi. fig 6, ♂. Elwes, Trans.

Ent. Soc. Lond. 1888, p. 432. Eimer, Artbild. Schmett. p. 46, fig. C, *et* p. 66 (1889).

Papilio (Pathysa) Paphus, de Nicéville, Sikkim Gazetteer, 1894, p. 174.

Papilio Mandarinus, subsp. *Paphus*, Rothschild, Nov. Zool. ii. p. 408 (1895).

IMAGO.—Male. Upperside white. *Forewing* glossy and semi-transparent in the interspaces of the basal, costal, and outer markings, and tinted with pale olivescent-green; with a black extreme basal band, an outwardly-oblique transverse subbasal and an inner-discal band, both extending from the costa to posterior margin, two equidistant

bands crossing middle of the cell, the outer one extending slightly up the base of second median branch, and the inner one sometimes less so up the first median; two partly-connected bands across apex of the cell; beyond is a discal transverse band which is wavy anteriorly and interiorly broken above the fourth median; followed by a submarginal narrower undulated band which is posteriorly coalesced to the discal band, and then by a broader marginal band; the outer veinlets from the third median upward are lined and edged with black from the cell outward, and the two lower medians also similarly black lined from the discal band. Cilia black, slightly edged with white. *Hindwing* with a black slender basal band extending obscurely along each side of the submedian vein to above abdominal angle; a parallel subbasal band obliquely crossing the cell and along the lower median veinlet, its lower end joining the former; a less defined and very slender waved medial band, extending from below the costa, across the cell, and thence obsolescently to the middle median veinlet, followed by a discal, a submarginal, and then a marginal slender interrupted band, each extending from the subcostal to the radial veinlet, the discal band from the latter inwardly joining the ends of the subbasal and basal bands; the broad anal interspace, from the radial, including the tail, being black—thus forming a large anal patch, which latter is inwardly speckled with grey scales, and outwardly has three marginal blue-scaled lunules, as well as two bright yellow spots from the abdominal angle, below which is a triangular white spot indented by an upwardly-oblique black point, a similar white spot being present above the upper median angle. Cilia, inclusive of that of the tail, and also its tip, white. *Underside*. *Forewing* similar to the upperside, except that the outer transverse bands are narrower and less prominent. *Hindwing* with the ground-colour pale olivescence-yellow, the black markings, similar to the upperside, but more distinctly defined, the veins outwardly from the cell being also black-lined, the medial band looped at its costal end and also at apex of the cell, the three outer slender interrupted bands each extending upward to the costal vein, the two yellow spots from abdominal angle paler, and the black anal patch with three irregular-shaped spots of the ground-colour above the blue-scaled lunules. *Body* above, from frontal tuft, covered laterally with long fine silky grey hairs, and dorsally with blackish hairs; palpi white; sides of thorax beneath black; thorax and abdomen beneath covered with long grey hairs, the latter with a lateral black streak; legs grey, femora above blackish; antennæ black.

Female. Upper and underside similar to the male.

Expanse, ♂ 3 to 3½, ♀ 3¾ inches.

HABITAT.—Nepal; Sikkim; Assam; N. Chin Hills, Upper Burma.

DISTRIBUTION.—The Nepal type specimen, from Gen. Hardwicke's collection, is in the British Museum, also both sexes from Sikkim, taken in April by Mr. G. C. Dudgeon; males from Assam, from Capt. E. Y. Watson's collection, and also from the Khasia

Hills. We also possess it from Nepal, taken by Gen. G. Ramsay, and others from Sikkim. Mr. H. J. Elwes records "a dozen male specimens taken in Sikkim in May, June, and July, some of them near Mongpo and some on the top of Sinchul. Mr. Möller says its range is from 3,000 to 7,000 feet elevation, but as far as I can judge, it is found at higher elevations than *Glycerion* [Sikkima], and is more of a temperate than a tropical species" (Tr. Ent. Soc. 1888, 432). Mr. L. de Nicéville says it "occurs in Sikkim from 3,000 to 7,000 feet, from May to July" (Sikkim Gaz. 1894, 174). Captain E. Y. Watson records "a single not quite typical male of *Papthus* was obtained in the N. Chin Hills at 7,000 feet elevation, in April. Several other specimens were noticed at the same time flying round the tops of trees in copses" (J. Bombay N. H. Soc. 1897, 672).

PAZALA SIKKIMA (Plate 479, fig. 2, 2a, ♂, 2b, ♀).

Papilio Sikkima, Heron, Ann. and Mag. Nat. Hist. 1899, p. 120.

Papilio Glycerion, Elwes, Trans. Ent. Soc. Lond. 1888, p. 432. Eimer, Artbild. Schmett. p. 66, pl. 1, fig. 2 (1889). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 313.

Papilio Glycerion (form a), Rothschild, Nov. Zool. ii. p. 407 (1895).

IMAGO.—Male. Upperside white. *Forewing* with similar black bands and black-edged anterior veins as in *P. Glycerion*, the narrow submarginal band being straighter in its course. *Hindwing* with the basal bands very slender and obsolete posteriorly, the three outer interrupted bands very slender, the inner or discal being either obsolete or slightly apparent only in the radial interspace, the submarginal also being more or less obsolescent in the subcostal interspace; the black anal patch narrower, its yellow spots not definitely separated, the lower anal white spot quadrate in shape and its indented black point slightly downwardly-oblique. Underside. *Forewing* with less prominent markings, as on upperside. *Hindwing* with the ground-colour olivescens-yellow, darker than in *Glycerion* and *Cashmirensis*, the basal, and catenulated discal band, the outer bands, and the anal markings, similar to those in *Cashmirensis*.

Female. Upperside and underside similar to the male; the anal yellow spots on the hindwing being brighter yellow.

Expanse, ♂ $2\frac{6}{10}$ to 3, ♀ 3 inches.

HABITAT.—Nepal; Sikkim; Assam.

DISTRIBUTION.—Mr. H. J. Elwes records this species as not very abundant in Sikkim, but occurs at about 2,000 to 4,000 feet elevation in May and June. I saw it on several occasions in the valleys below Mongpo in those months, but found it difficult to take, on account of its very quick flight" (Tr. Ent. Soc. 1888, 432). Mr. L. de Nicéville says it is "probably single brooded, and occurs in Sikkim, at low

elevations in May and June" (Sikk. Gaz. 1894, 174). Mr. G. C. Dudgeon took it in Sikkim in March and April. Specimens from the Khasia Hills, from Capt. E. Y. Watson's collection, are in the British Museum. Examples from Cherra Punji, Shillong, and the Jaintia Hills, Assam, are in Mr. W. Rothschild's collection. Col. C. Swinhoe records it from Shillong (Tr. Ent. Soc. 1888, 313).

PAZALA CASHMIRENSIS (Plate 480, fig. 1, *larva* and *pupa*; 1a, b, ♂, 1c, d, ♀).

Papilio Glycerion, subsp. *Caschmirensis*, Rothschild, Nov. Zool. ii. p. 407, ♂ (1895). Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 595, pl. W, fig. 25, a, b, c, *larva* and *pupa*.

Papilio Caschmirensis, Heron, Ann. and Mag. Nat. Hist. 1899, p. 120.

Papilio Glycerion, Westwood, Arcana Ent. ii. p. 24, pl. 55, fig. 3, ♂ (1843). Robson, Journ. Bombay N. H. Soc. 1895, p. 497, *larva* and *pupa*.

IMAGO.—Male. Upperside white; the basal, costal, and apical area less glossy and transparent than in typical *Glycerion*. Both wings with similar but less prominent black markings. *Forewing* with the discal and submarginal transverse band both narrower and disconnected posteriorly, the former not reaching the posterior angle and the latter not reaching the lower median veinlet; the marginal band is also more attenuated posteriorly, the anterior veins being slender and not black-edged. *Hindwing* with the basal-marginal and subbasal bands narrower, much less defined, and obsolescent posteriorly; a medial and an outer-medial wavy line of the underside being visible by transparency; the discal, submarginal, and the marginal band is also more slender and less defined, these latter being posteriorly nearer together and thus much restricting the width of the anal black patch, the two yellow spots being paler and less defined in shape, and the white triangular anal spot below is indented by a black downwardly-oblique point. Underside. *Forewing* similar to the upperside, the markings being paler, and the marginal band very slender. *Hindwing* with the ground-colour pale olivaceous-yellow; the blackish basal, sub-basal, the catenulated medial band, and the anal black patch with its white anal spot indented by a downwardly-oblique black point, the two yellow spots more defined than on upperside; the interspaces of the discal catenulated-band being also pale yellow.

Female. Upper and underside similar to the male.

Expanse, ♂ $2\frac{8}{10}$, ♀ 3 inches.

LARVA.—Cylindrical; head rather large; 3rd and 4th segment slightly tumid; 2nd, 3rd, and 4th segments each with two subdorsal pointed tubercles, and two similar tubercles on anal segment; colour green; head and legs pale ochreous-green.

PUPA.—Suspended. Head truncated; body tapering hindwards; thorax with

a frontal forward-projected lengthened point; colour bright green, with a yellow longitudinal lateral line and a dorsal line from the frontal point divaricating subdorsally hindward from the thoracic segment. (Described from Mackinnon's drawing.)

HABITAT.—N. Kashmir; N.-W. Himalayas.

LIFE HISTORY.—“LARVA; when full-fed, $1\frac{1}{8}$ to $1\frac{1}{4}$ inch in length; the 4th and 5th segments are the thickest, the larva tapering from the 5th segment to the 13th. Colour green, of the same shade as the food-plant, the leaves of *Machilus odoratissima*. The whole larva is covered with minute black dots, except on the anal segment; the 3rd segment is bordered anteriorly by a narrow ochreous ridge, which surmounts the head when drawn in, and is continued in unbroken spiracular lines to the tail; this ridge or hood is furnished with two short, blunt, black, subdorsal spines; the 4th and 5th segments are furnished each with two subdorsal vermilion tubercles armed with a short black spine; the last segment is bifurcated, and the points are yellow tipped with black; these appendages project outwards; the legs, claspers, and abdomen are of a whitish-green.

PUPA.—1 inch long, of a brighter green than the larva; marked longitudinally with four ochreous-yellow curved bars.

The larva here described was found in Masuri, N.-W. Himalayas, in June, 1894. The pupa was kept in Masuri from June to October, and then brought down to Bankipur in the plains of Behar. The imago emerged on March 21st, 1895” (Mrs. S. Robson, *l.c.*).

DISTRIBUTION.—The type specimens, in Mr. W. Rothschild's collection, are labelled N. Kashmir. Mr. P. W. Mackinnon records it as “very common in Masuri at about 5,000 feet elevation, in March and April, the larva feeding on *Machilus odoratissima*, N. O. Laurineæ” (*l.c.* p. 595). In the late Mr. J. H. Leech's collection, now in the British Museum, are specimens from Kujjar, 6,000 feet elevation, taken in April by Capt. MacArthur, also from Sultanpur, Kulu, taken by Capt. Graham Young.

Of our illustrations on Plate 480, fig. 1, larva and pupa, are copied from Mr. Mackinnon's published drawings, and figs. 1a—d are from the male and female types in Mr. W. Rothschild's collection.

CHINESE SPECIES.—*Pazala Mandarinina* (*Papilio Mandarinus*, Oberthür, *Etudes Ent.* iv. p. 115 (1879). Leech, *Butt. of China*, etc. p. 520 (1893). Rothschild, *Nov. Zool.* ii. p. 408 (1895). *Habitat.* W. China.—*Pazala Eurois* (*Pap. Eurois*, Leech, *l.c.* p. 521, pl. 32, fig. 3, ♂ (1893). Rothschild, *l.c.* p. 408 (1895). *Habitat.* C. China.—*Pazala Panopæa* (*Pap. Panopæa*, de Nicéville, *Journ. Bombay Nat. Hist. Soc.* 1900, p. 172, pl. E, E, fig. 20. *Habitat.* W. China.—*Pazala Alebion* (*Pap. Alebion*, Gray, *Catal. Lep. Brit. Mus.* i. p. 30, pl. 13, fig. 6, ♂ (1852). Rothschild, *l.c.* p. 409. *Syn.*

Pap. Mariesi, Butler, Ann. Nat. Hist. 1881, p. 33, pl. 4, fig. 4, ♂. Leech, *l.c.* p. 552. *Habitat.* C. China.—*Pazala Tamerlana* (Pap. Tamerlana, Oberthür, Etud. Ent. ii. p. 13, pl. 2, fig. 1 (1876); *id.* iv. p. 64 (1879). Leech, *l.c.* p. 521, ♂ ♀ (1893). Rothschild, *l.c.* p. 409. *Habitat.* W. China.—*Pazala Parus* (Pap. Parus, de Nicéville, Journ. Bombay N. H. Soc. 1900, p. 172, pl. E, E, fig. 21. *Habitat.* W. China.

Genus IPHICLIDES, Hübner, Verz. bek. Schmett. p. 82 (1816). Stephens, Illust. iv. p. 404 (1835). Scudder, Rev. Amer. Butt. p. 34 (1872). Kirby, Allen's Nat. Hist. Butt. ii. p. 274 (1896). *Papilio* (sect. 25) Felder, Verh. Z. B. Ges. Wien. pp. 303, 348 (1864). *Papilio* (group 29) Rothschild, Nov. Zool. ii. p. 402 (1895). *Forewing* short, broadly triangular, costa slightly arched, apex almost pointed, exterior margin slightly oblique; cell broad; upper discocellular shortest, lower concave; subcostal branches free from the costal vein. *Hindwing* short, prolonged and narrowed hindward; exterior margin sinuous and produced into a long narrow tail at end of upper median; cell broad in the middle and pointed at end; first subcostal at one-third before end of the cell, second concave at the base; discocellulars long and bent inward very close to lower end of the cell, radial from its angle. *Body* short, stout; antennæ short, with a stout spatular club. **TYPE.** I. *Podalirius*, Linn.—*Iphiclides Podalirinus* (*Papilio Podalirinus*, Oberthür, Etudes Entom. xiii. p. 37, pl. 9, fig. 99 (1890). Leech, Butt. of China, p. 519 (1893). Rothschild, Nov. Zool. ii. p. 405 (1895). *Habitat.* Western China.

Genus PAPILIO.

- Papilio* (part), Linnæus, Syst. Nat. ed. x. p. 458 (1758); ed. xii. p. 744 (1767). Fabricius, Ent. Syst. iii. i. p. 258 (1793).
- Papilio*, Linnæus, Fauna Suec. p. 267 (1761). Poda, Ins. Mus. Græc. p. 61 (1761). Fuessly, Verz. Schweiz. Ins. p. 28 (1775).
- Achivus*, Barbut, Gen. Ins. Linné, p. 169 (1781). Kirby, Allen's Nat. Hist. Butt. ii. p. 286 (1896).
- Papilio* (sect. e, Eques), Cuvier, Tabl. Elem. d'Hist. Nat. p. 591 (1798).
- Papilio* (sect. c), Eques pt.), Lamarck, Syst. Nat. Anim. p. 283 (1801).
- Pieris* (part), Schrank, Faun. Boica, ii. i. pp. 152, 160 (1801).
- Papilio* (Eques, pt.), Latreille, Hist. Nat. Gen. Cr. et Ins. iii. p. 387 (1802).
- Papilio* (part), Latreille, *l.c.* xiv. p. 108 (1805).
- Papilio*, Latreille, Consid. Gén. Anim. (Ins.) p. 440 (1810). Samouelle, Ent. Comp. p. 235 (1819). Stephens, Illust. Brit. Ent. Haust. i. p. 6 (1827). Westwood, Intro. Class. Ins. ii. Gen. Syn. p. 87 (1840).
- Princeps*, Hübner, Tentamen, p. 1 (1806). Scudder, Hist. Sketch Gen. Butt. p. 257 (1875).
- Jasoniades* (pt.), Hübner, Verz. bek. Schmett. p. 83 (1816).
- Amaryssus*, Dalmann, Kongl. Vet. Acad. Handl. xxxvii. pp. 60, 85 (1816). Scudder, Syst. Rev. Amer. Butt. p. 45 (1872).

Papilio (Eques, pt.), Latreille, Cuvier's Rég. Anim. iii. p. 549 (1817); *id. l.c.* v. p. 375 (1829).

Papilio (sect. 51), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 314, 362.

Papilio (group 5, pt.), Rothschild, Nov. Zool. ii. p. 272 (1895).

IMAGO.—*Forewing* triangular; costa slightly arched, exterior margin oblique and slightly uneven; cell somewhat fusiform; upper discocellular shortest; first subcostal branch emitted at one-third and second at one-fourth before end of the cell. *Hindwing* short, broad; costa very oblique, exterior margin sinuous, and with a moderately long tail which is broad at the base and acute at the tip; cell broad; first subcostal emitted at nearly half before end of the cell, second branch straight at the base. *Body* short, thick; thorax and head densely, and abdomen slightly, pilose; femora densely pilose; antennæ short, the club very stout.

LARVA.—Adult; smooth; anterior segments somewhat thickened; furnished with two retractile tentacula on the anterior segment.

PUPA.—Head obtusely cleft in front; thorax laterally angled, and with a dorsal obtusely-pointed projection.

TYPE.—*P. Machaon*.

PAPILIO ASIATICA (Plate 481, fig. 1, *larvæ* and *pupæ*, 1a, b, ♂, 1c, ♀; Plate 482, fig. 1, ♂).

Papilio Machaon, var. *Asiatica*, Ménétries, Enum. Corp. Anim. Mus. Petrop. Ins. i. p. 70 (1855).

Doherty, Journ. As. Soc. Beng. 1886, p. 136. Butler, Ann. Nat. Hist. 1888, p. 205.

Alpheraky, Rom. Mem. Lep. v. p. 60 (1889). Heyne, in Rühl, Gross-Schmett. p. 694 (1895).

Papilio Asiatica, Moore, Proc. Zool. Soc. Lond. 1882, p. 258. Butler, *id. l.c.* 1886, p. 377, *ib.* Ann. Nat. Hist. 1888, p. 205.

Papilio Machaon, Kollar, Hügel's Kaschmir, iv. pt. 2, p. 406 (1844). Gray, Lep. Ins. Nepal, p. 6, pl. 3, fig. 1 (1846). Hutton, Trans. Ent. Soc. Lond. 1847, p. 47. Moore, Catal. Lep. Mus. E. I. C. i. p. 111 (1857). Lang, Ent. Mo. Mag. 1864, p. 101. Stoliczka, Verh. Z. B. Ges. Wien. 1866, p. 866.

Papilio Machaon Sphyrus (pt.), Rothschild, Nov. Zool. ii. p. 275 (1895).

Papilio Machaon Sphyrus, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 592.

IMAGO.—Male. Upperside black. Cilia alternated with yellow. *Forewing* with the base densely irrorated with yellow scales; a pale yellow outwardly-oblique bar crossing outer third of the cell, a similar bar within apex of the cell, an inner-discal oblique transverse macular band widening posteriorly, the portions being broadly divided by the black veins, followed by a submarginal row of small more or less oblong spots, the outer-discal black area being medially-traversed more or less by minute yellow scales. *Hindwing* with the black abdominal border speckled with yellow scales, and clothed with long yellowish-grey hairs; a broad yellow inner band divided by narrow black veins, the portions outside apex of the cell being sometimes small and disconnected, followed by a submarginal row of broad yellow

lunate spots, and a prominent deep red anal spot, which latter is inwardly-edged by a blue-scaled lunule; the outer-discal black area being medially traversed generally by a more or less lunularly-disposed cluster of blue scales between the veins; cilia between the veins edged inwardly by a slender yellow lunule. Underside. *Forewing* with pale yellow basal interspaces, cell bars, transverse discal band, and a broad submarginal continuous band, the veins and the margins of the markings only being black; the outer-discal interspace being also almost completely filled up with densely packed yellow scales. *Hindwing* pale yellow, the veins only and the edges of the outer markings being black; the anal ocellus paler red, the end of upper and middle and sometimes of each yellow interspace often being also red tinted; the entire transverse discal interspaces densely covered with yellow scales and inwardly thickly speckled with violet-blue scales. *Body* above black, beneath and sides of abdomen pale yellow; sides of thorax above, frontal tuft and palpi yellow; legs above blackish, beneath yellowish, the tarsi being blackish; antennæ black.

Female. Upperside similar to the male. *Forewing* with the yellow cell-bars broader, the discal band generally somewhat narrower, and the submarginal spots larger. Underside similar to the male.

Expanse, $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

LARVA and PUPA (see Plate 481).

HABITAT.—North-Western and Central Himalayas.

LIFE HISTORY.—EGG. “Small, globular, and of a somewhat bluish-green colour. Laid in considerable numbers on the Fennel, distributed over the numerous ends of the branches,—but, on the Hemlock I never detected the eggs, though larvæ were hatched from every bunch of flowers I obtained nearly. The first batch of eggs are evidently laid early in April, and come out in May. The May batch must be laid on some other plant than the Hemlock, which barely lasts out the month. The Fennel is no doubt an adopted food, not being indigenous, but found in nearly every native garden.

YOUNG CATERPILLAR.—“Newly born. Head large, shining black and hirsute. Body spined, the spines longest on the thorax, graduating and very much reduced in length on the 7th and 8th segment, and longer again from thence to the anal segment. All the spines thickly branched, and much swollen at the base. A dorsal white patch on the 7th and 8th segment (on which the spines also are white); the rest of the surface ochreous-green. Anterior margin of the 2nd segment and spiracular inflation light coloured. True legs shining black; the claspers dark coloured with light tips. *First Molt*.—Larva pale ochreous spotted with black, with the dorsal white patch on the 7th and 8th segment, and whitish about the vent. Dorsal spines velvety-black, except those included in the white patch, which have black branches. The lateral line of tubercles above the spiracular inflation

emit one or two hairs. Head hirsute, white marked with broad black longitudinal streaks, and a spot on the lower part of each cheek and in the middle of the forehead. Ventral area and about the claspers whitish. True legs and anal claspers tipped with black; abdominal claspers marked with three round spots placed in the form of a triangle, two at the base and one near the tip of the clasper.

Second Moul.—Spines black and branched, largest on the 4th, 5th, and 12th segments, very minute on the 2nd segment. A subdorsal and a lateral row of orange coloured spots (varying from light orange to deep reddish-orange) divide a series of broad velvety-black bands—on the back—into three brick-shaped spots, of which the medio-dorsal ones are the largest and best defined—and on the sides—into oblique semi-comma shaped markings. On the 2nd, 3rd, and 4th segments the bands are not divided, but include the orange spots along the front edge, and on the 13th segment the medio-dorsal spot is the smallest and is rounded. On the anal flaps are two round spots at the base and three short lines, one on each side, and one at the tip, marking its margin. The division between the segments, dull coloured black, showing broadly on the back, but narrowly on the sides, the markings extending to just above the natural inflation. Frontal margin of the 2nd segment square cut and tubercled at the angles, colouring yellow. Head and forehead yellow, with a medial black spot. Two broadish black, concave longitudinal streaks converging to a fine point on the top of the head, and a similarly convex streak at the back of the cheek, with an ovate spot between, low down, leaving an inverted V-shaped marking of the ground-colour. Lateral inflations well defined, marked with round spots thus:—above the true legs two spots one above the other; on the 5th and 6th segment one spot, above the claspers two spots far apart placed horizontally, on the 11th and 12th segment variable—sometimes absent. True legs with a round spot at the base, and tipped with black; abdominal claspers with a round spot near the tips; anal claspers margined with black. Under-surface of the body whitish.

Third Moul.—Larva destitute of spines; markings exactly similar to those in the second moult, but the general coloration a beautiful pale blue-green—almost an emerald green, and the black markings much broader. Tentacles under the 2nd segment pale orange-yellow, emitting a strong orange scent when protruded. The breadth of the black markings vary greatly in individuals, some are almost entirely green, others pale, others again, almost entirely yellow. The bands in some examples are almost entire, and include the rows of orange spots, which latter also vary from deep orange to pale yellow. In fact, the whole of the markings as well as the general colouring is subject to considerable variation. Many of the larvæ were lost towards the middle of May, by which date the flowers of the Hemlock were over, and the seeds had ripened and become hard. They utterly refused to eat the leaves of the plant.”

PUPA.—"Ground-colour ochreous pinky-grey, with sooty-blackish suffusions and markings, more especially about the back of the head and the angular points. Many examples are pale emerald-green with bright yellow spots and markings on the back of the abdomen, others are pale ochreous-grey with yellow markings, with suffusions of a slightly darker shade. Of the specimens bred twenty-two were dark coloured, four were green, and two were grey. Head more or less bluntly bifid, with a single notch on each; sides of the head compressed, flattened, and ridged over the eyes. A blunt projection, or process, at the base of the wings. Thorax humped; posterior portion of the hump flattened, with an inverted V-shaped rough ridge, margined outwardly with light colouring—varying according to the colour of the chrysalis, the darker colour of the ridge passing in the form of a streak down the sides, over the region of the spiracles, to the vent. Wing covers slightly but angularly compressed at the waist at the point where the suspending thread passes round. Two very slight projections more or less rounded at the apex of the wings, one on the 5th and on the 6th segment—more prominent in some individuals than in others. Back of the abdomen roughly shrivelled, coloration bright yellow in the green form, and pale coloured in the darker forms, with two rows of very slightly raised carunculous-tubercles, which are most prominent on the 3rd and 7th to 9th segments, and which converge slightly towards the tail, leaving a broad medio-dorsal space, which is usually either darker than the ground-colour in the green specimens, or very much darker in the darker ones. Interspaces between the tubercles and spiracles marked with faint striated longitudinal markings. The outline of the spiracles marked by a slightly raised ridge in continuation of the outline of the wings. Front view, tips of two pairs of legs raised; breast not very highly angled; a raised dotted line along the hind margin of the wings, a dot between each vein; the middle of the abdomen somewhat flattened. The perfect insect emerges in thirty and thirty-one days from date of changing to pupa."

FOOD-PLANTS AND HABITS OF LARVA.—"Feeds on the Common Fennel (native name Saumph), also on a species of Hemlock (native name Ahjuan). The larvæ feed on the flowers and seeds only, and will not eat the leaves. When feeding the larvæ move about on the top of the clusters of flowers, returning to the stem to rest. The larger larvæ prefer to rest almost at the bottom of the stalks. The usual attitude when at rest, is with the head upwards, and tucked under the thoracic segments" (Major H. C. Harford; MS. Notes, Kausali).

DISTRIBUTION.—Major H. B. Hellard obtained it in Kashmir, and Indus Valley between the Dras river and Skardo, in July, August, and September. One specimen taken on the Rajdiangan Pass, about 10,000 feet elevation, in September. Others also at Masuri, Simla, and Pangi in Busahir" (MS. Notes). Capt. R. Bayne Reed also obtained it in Kashmir. Capt. A. M. Lang records it as "pretty common in the N.W. Himalaya, on grassy downs and slopes, from 6,000 to 10,000 feet

elevation" (Ent. Mo. Mag. 1864, 101). In Mr. J. H. Leech's collection are specimens taken in the Goorais Valley in May, June, and September; Kokser, Lahul, July, Kutjiar, 6,000 feet, April, Jalauri Pass, May, and Kala in June, taken by Capt. H. McArthur. Major J. W. Yerbury obtained "a few specimens at Campbellpur in June and July. It was common at Murree in August, and found commonly on the lower slopes of Thundiani in September" (P. Z. S. 1886, 377). The Rev. J. H. Hocking took it in the Kangra District at 6,200 feet. The larva found on Parsnip on July 9th, the imago emerging August 6th. Also found on the Samp, a kind of Fennel on March 20th (P. Z. S. 1882, 258). Mr. P. W. Mackinnon records it as "very common all over the N.W. Himalayas, right up to the frontiers of Tibet, where it meets and merges into the aberration *P. Ladakensis*, and flies from April to November, in the lower and warmer regions, being at least double-brooded. In the cold and higher regions it is single-brooded. The tails of those from the Nilung Valley vary greatly in length, some specimens have hardly any, while others have them very long, as long as in typical *Machaon*. In Masuri the larva feeds on a species of *Heracleum*, N. O. Umbelliferæ. The butterfly is also found sparingly in the Dun" (J. Bombay N. H. S. 1898, 592). Mr. W. Doherty found it "common from 2,000 feet in the Sarju and Kali Valleys up to 14,000 feet in Bijans, and 12,500 feet in the Pindari Valley, Kumaon" (J. As. Soc. Beng. 1886, 136). Capt. T. Hutton found it "at Deyrah in the Valley of the Dhun. It is seen on the wing as early as February, and in April its larvæ are abundant on the Carrot. At Masuri, in the Hills, it appears in the latter end of March, and continues till October. Its larva is green, with a black velvety transverse band across each segment, bearing four spots of bright orange; it possesses the orange-coloured retractile process on the head, from which it exudes a liquid drop of a strong aromatic scent when it is touched. The food is the wild and the garden Carrot, and the leaves and flowers of the Radish. I have taken the larvæ at Masuri early in May, and the pupæ on May 18th. It is also abundant at Simla, and extends far into the interior" (Trans. Ent. Soc. Lond. 1847, 47). General G. Ramsay obtained it in the "Hills and Valleys of Nepal" (MS. Notes).

Of our illustrations on Plate 481, fig. 1, larvæ and pupæ are copied from Major H. C. Harford's original drawings, made at Kausali in 1889; fig. 1a, b, ♂, 1c, ♀, from Kausali, and on Plate 482, fig. 1 is a male from Nepal.

PAPILIO LADAKENSIS (Plate 482, fig. 2, ♂).

Papilio Ladakensis, Moore, Journ. Asiatic Soc. Bengal, 1884, p. 31. de Nicéville, Report of Pamir Boundary Com. p. 43 (1898).

Papilio Machaon Sphyrus, aber. *Ladakensis*, Rothschild, Nov. Zool. ii. p. 275 (1898).

IMAGO.—"Male. Distinguishable from N.W. Himalayan and Nepalese specimens of *P. asiatica* by the absence of the elongated tail on the hindwing, which in this

form is reduced to a short point but little more acute than the anal angle, the forewing is comparatively narrower, and the hindwing less convex and with less acutely sinuous exterior margin. Upperside of a paler yellow. *Forewing* numerously covered with yellow scales between all the markings; cell-bars shorter transversely and broader, the inner bar being regularly quadrate; the discal band also comparatively narrower, and with more slender intervening black veins; the submarginal row of spots is broader, and the intervening transverse discal area is narrower. *Hindwing* with the outer edge of the yellow basal area excavated between the veins, the submarginal spots shorter and somewhat broader, the anal lobe-spot smaller and broader."

Female. Upperside similar to the male. *Forewing* with still broader cell-bars and submarginal spots. Underside similar to the male.

Expanse, $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Ladak.

DISTRIBUTION.—The type specimen was obtained by Dr. F. Stoliczka at Tarhsam, Ladak. Specimens from Dras and Skoro La, Ladak, taken in June and July, are in Mr. J. H. Leech's collection, and a male from Ladak, taken by Capt. F. E. S. Adair, and a female from Lahul, Ladak, at 12,000 feet elevation, taken by Mr. G. C. Dudgeon, are in the British Museum. Mr. L. de Nicéville records it as having been taken, during the Pamir Boundary Commission, on the ascent to Burzil Pass, 11,000 feet elevation, and also near the Baroghil Pass, about 14,000 feet" (*l.c.* p. 43).

Our illustration, Plate 482, fig. 2, is copied from a drawing of the type specimen in the Indian Museum, Calcutta.

PAPILIO SIKKIMENSIS (Plate 482, fig. 3, ♂, 3a, ♀).

Papilio Sikkimensis, Moore, Journ. Asiatic Soc. Bengal, 1884, p. 32.

Papilio Machaon, Elwes, Trans. Ent. Soc. Lond. 1888, p. 437. de Nicéville, Journ. Bombay N. H. Soc. 1890, p. 387. Manders, Trans. Ent. Soc. Lond. 1890, p. 526. Watson, Journ. Bombay N. H. Soc. 1897, p. 671. Leech, Butt. of China, p. 516 (part), pl. 37, fig. 2, ♂ (1893). de Nicéville, Sikkim Gazetteer, 1894, p. 175.

Papilio Machaon Sikkimensis, Rothschild, Nov. Zool. ii. p. 276 (1895).

IMAGO.—Male and female. Upperside. Differs from N.W. Himalayan and Nepalese specimens of *P. asiatica* in the much darker black colour, and deeper tint of yellow. *Forewing* with the yellow cell-bars quadrate in form, the discal band composed of smaller and shorter portions, and the area intervening between the band and the submarginal spots broader. *Hindwing* with the veins broadly black-lined, the abdominal border is black and broader, leaving but a small subanal yellow lunule; the discal border of the yellow area has a more regularly scalloped

edge, and there is also a broader discal area between it and the submarginal spots; the red anal-lobe spot is smaller and narrower, and is separated from the blue-scaled lunule above it by a black semicircle. Underside. Ground-colour much darker than in *P. asiatica*, the veins and markings broader black lined.

Expanse, 3 to 3¼ inches.

HABITAT.—Eastern Himalayas; E. Tibet; W. China. Chin Lushai and N. Chin Hills, Burma; Shan States, Burma.

DISTRIBUTION.—Mr. H. J. Elwes writes that “neither Möller nor myself have ever seen this species in British Sikkim, and I believe it only occurs in the higher, dry hills of the interior, probably from 8 to 10 or 12,000 feet elevation, whence our native collectors have brought very numerous specimens in July and August” (Tr. Ent. Soc. Lond. 1888, 437).

Dr. Hooker (Himalayan Journ. ii. p. 26) records *P. Machaon* as being “found at Choongtam, in Sikkim, and on p. 65, that the larva of the Swallow-tail butterfly (*P. Machaon*) was common in the Lacheng Valley, feeding on Umbelliferous plants.” In the late W. S. Atkinson’s collection were specimens labelled “Lacheng Valley.” In the British Museum are specimens labelled “Chumbi, Bhotan,” from Mr. G. C. Dudgeon, and “Yatung, Tibet, June,” taken by Capt. F. C. Colomb. In Mr. J. H. Leech’s Cabinet are specimens taken at Moupin and Wa-ssu-kow, W. China. Mr. L. de Nicéville records it from the “Chiu Lushai Hills, Burma” (J. Bombay N. H. S. 1890, 387), and Capt. E. Y. Watson from the “North Chin Hills, Burma,” at and above 6,000 feet elevation, in March and April” (id. *l.c.* 1897, 671). A male from Kokang, N. Shan States, and a female from the S. Shan States, are in Mr. W. Rothschild’s collection; a male, also from the N. Shan States, is in the British Museum. These three Shan States specimens are smaller than typical *Sikkimensis*, each, on the hindwing, having the blue-scaled lunule separated from the red anal spot, but they have the abdominal margin very narrowly black bordered, with the yellow extending up the submedian interspace to its base.

PAPILIO XANTHUS.

Papilio Xanthus, Linnæus, Syst. Nat. Ed. xii. p. 751 (1767)—in indice “*Xuthus*.” Rothschild, Nov. Zool. ii. p. 278 (1895).

Papilio Xuthus, Müller, Naturs. v. i. p. 576 (1774). Fabricius, Syst. Ent. p. 454 (1775). Cramer, Pap. Exot. i. p. 115, pl. 73, fig. A, B (1776). Jablonsky and Herbst, Nat. Schmett. iii. p. 202, pl. 49, fig. 3, 4 (1788). Lucas, Léop. Exot. p. 36, pl. 19, fig. 1 (1835). Boisduval, Spéc. Gen. Lep. i. p. 327 (1836). Moore, Catal. Lep. Mus. E. I. C. i. p. 111, pl. 4, fig. 1, larva (1857). Butler, Catal. Fabr. Lep. B. M. p. 248 (1869), *id.* P. Z. S. 1877, p. 814. Pryer, Rhop. Nipon. p. 3, pl. 1, fig. 2, 2a, b (1886). Leech, Butt. China, etc., p. 514 (1893). Moore, in Anderson’s Zool. Res. Yunan Exped. ii. p. 923 (1878).

HABITAT.—Japan; Corea; Amur; Formosa; Chusan; China; N.E. Burma.

We verified specimens of this butterfly in the collection made by Dr. J. Anderson, during the Expedition to Yunan in 1868—as noted in his “Zool. Researches” above cited. It is also entered by the late W. S. Atkinson in his MS. Notes, 1869, as having been “taken by Dr. Anderson at Bhamo, on the Yunau frontier.” We also subsequently examined and verified a specimen labelled “Bhamo,” in Mr. Atkinson’s collection, whilst the latter was in my charge at the India Museum, London—from whence it passed into the possession of Mr. Hewitson—and, in my MS. Catalogue of this collection this species is entered, from its label, as having been taken at “Bhamo, Feb. 28th,” during the Yunan Expedition.

This Bhamo specimen was evidently not retained by Mr. Hewitson, as it is not in his Cabinet at the British Museum. It may be here stated that the residue of the Atkinson collection was transferred, by Mr. Hewitson, to Dr. Staudinger.

CHINA AND JAPAN SPECIES.—*Papilio Hippocrates*, Felder, Verh. Z. B. Ges. Wien. 1864, pp. 314, 362. Butler, Ann. Nat. Hist. 1882, p. 19; *id.* 1883, p. 113. Pap. Machaon, De Haan, Verh. Nat. Ges. Ned. Zool. p. 42, pl. 5, fig. 4 (1840). L’Orza, Lep. Japon. p. 11 (1867). Pryer, Rhop. Nipon. p. 3, pl. 1, fig. 1, a, b (1886). Leech, Butt. of China, etc., p. 516 (1893). Pap. Machaon Hippocrates, Rothschild, Nov. Zool. ii. p. 276 (1895). Pap. Machaon *var.* Micado, Pagenstecker, Verh. Nat. Ver. Heidelb. p. 98 (1875). *Habitat.* E. and C. China. Japan.

Genus MEANDRUSA.

Meandrusa, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1887). Kirby, Allen’s Nat. Hist. Butt. ii. p. 278 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 29, subsect. B), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 306, 352.

Papilio (group 28, part), Rothschild, Nov. Zool. ii. p. 400 (1895).

IMAGO.—Male. *Forewing* triangular; costa much arched from the base, apex prolonged, falcate and acuminate, exterior margin concave below the apex, lower angle abrupt, posterior margin short; cell large and very broad; first subcostal branch free from the costal vein; lower discocellular very concave, twice as long as the upper. *Hindwing* short, much narrowed hindward; exterior margin oblique, sinuous, with a long narrow curved tail; anal and subanal angle almost obsolete; base of the wing and abdominal fold densely hairy; cell very long and narrow, extending to three-fourths of the wing. *Body* large; thorax and base of abdomen somewhat woolly; frontal tuft short, dense, and compact; antennæ short, with a very short, broad club. Sexes similar.

LARVA and PUPA.—Unknown.

TYPE.—M. EVAN.

MEANDRUSA EVAN (Plate 483, fig. 1, 1a, ♂ ♀; 1b, c. ♂ ♀).

Papilio Evan, Doubleday, Ann. and Mag. Nat. Hist. 1845, pp. 235, 304. Doubleday and Hewitson, Gen. D. Lep. i. p. 14, pl. 2, fig. 2, ♀ (1846). Westwood, Cabinet of Orient. Entom. p. 63, pl. 31, fig. 1, 1a, ♂ (1848). Felder, Verh. Z. B. Ges. Wien. 1864, p. 306. Oberthür, Etud. Ent. iv. p. 60 (1879). Heylarts, Tijd. v. Entom. 1891, p. 29. Haase, Untersuch. üb. Mim. p. 35, fig. 5 (1893).

Meandrusa Evan, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1888). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 313.

Papilio (Meandrusa) Evan, de Nicéville, Sikkim Gazetteer, 1894, p. 175.

Papilio Payeni Evan, Rothschild, Nov. Zool. ii. p. 401 (1895). de Nicéville, Journ. Bombay Nat. Hist. Soc. 1899, p. 335. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 193.

Papilio Evan, subsp. *Evanides*, Fruhstorfer, Soc. Ent. 1902, p. 58; *id.* Berl. Ent. Zeit. 1902, p. 193.

Dry-season form (Plate 483, fig. 1, ♂, 1a, ♀).

IMAGO.—Male. Upperside yellowish-ochreous. *Forewing* with the base and costa tinged with brownish-ochreous; the outer veins dark brown; an oblique variable cluster of dark ochreous-brown or almost black small spots across outer-third of the cell, and a broad irregularly-angulated decreasing bar at end of the cell; a transverse inner-discal more or less incomplete—or sometimes a complete—row of small hastate vein-spots, each being coalescent, where present, with a parallel outer-discal sinuous band, the upper portion of the latter from the middle median upward being interspaced with increasingly-widening triangular spots of the yellowish-ochreous ground-colour; the apex and outer margin of the wing being also dark ochreous-brown, the latter posteriorly with intervening yellowish-ochreous lunular spots between it and the discal band. *Hindwing* with the outer area, from the costa across apical fourth of the cell to the abdominal angle, dark ochreous-black, traversed by a submarginal row of five large broad lunate spots of the yellowish-ochreous ground-colour, preceded by an inner submarginal lower row of either three or four similar but deeper-coloured conical spots; the tail brownish-ochreous; cilia between the veins more or less yellowish-ochreous and inwardly-edged by a slender brighter ochreous lunule. Underside. Basal and discal areas bright yellowish-ochreous, the outer areas pale brownish-ochreous. *Forewing* with ochreous-brown cell-spots, patch at its end, transverse inner-discal hastate marks and outer-discal duplex slender sinuous lines, disposed as on upperside; there is also a subbasal narrow-angled cell-spot, which is sinuously continued below the cell to the submedian vein. *Hindwing* with an ochreous-brown apical cell-spot, two upper inner-discal lunules and three lower-discal lunules, each being traversed by silvery-white scales; followed by a sinuous slender discal and then a submarginal line; the cilia slender lunules and the tail being reddish-ochreous; there is also a subbasal ochreous-brown slender sinuous line. *Body* above brownish-ochreous, beneath

yellowish-ochreous; abdomen with a lateral segmental row of black dots; thorax, frontal tuft and palpi reddish-ochreous; legs above brownish-ochreous, beneath paler; antennæ blackish.

Female. Upperside paler yellowish-ochreous than in the male. *Forewing* with the base brighter ochreous, similar markings, but less defined. *Hindwing* with similar markings; the submarginal lunules being larger and longitudinally coalesced to one another; the inner lower lunules are also larger. Underside similar to the male.

Expanse, ♂ $4\frac{1}{2}$ to 5, ♀ $5\frac{1}{2}$ inches.

Wet-season brood (Plate 483, fig. 1b, ♂, 1c, ♀).

Male. Upperside ground-colour somewhat brighter than in the *dry-season* form. *Forewing* with the markings more prominent, darker, and somewhat broader. *Hindwing* with broader and blacker outer area, the submarginal lunules and the inner lower spots somewhat smaller; the ciliary lunules less apparent. Underside. Ground-colour paler yellow than in *dry-form*, the markings darker and more prominent; the outer border of forewing and the discal interspaces being darker and brighter brownish-ochreous.

Female. Upperside ground-colour as in *dry-form*. *Forewing* with the markings more prominent and somewhat broader. *Hindwing* with the dark outer area broader than in *dry-form*, the marginal markings more sharply defined and somewhat smaller. Underside with the ground-colour paler yellow than in *dry-form*; markings similar to those of the male.

Expanse, ♂ $4\frac{3}{4}$, ♀ $5\frac{1}{4}$ to $5\frac{1}{2}$ inches.

LARVA and PUPA.—Unknown.

HABITAT.—Sikkim; Bhotan; Assam; Khasias; Burma.

DISTRIBUTION.—“Mr. G. C. Dudgeon obtained a male of this species at Sivoke, in Sikkim, on March 15th, 1890. To the eastward in Bhotan, and the Khasia Hills, it becomes somewhat common” (L. de Nicéville, Sikkim Gaz. 1894, 175). Mr. W. S. Atkinson obtained it at “Sibsagar, Assam” (MS. Notes). Col. C. Swinhoe records “many specimens of both sexes from the Khasia Hills” (Tr. Ent. Soc. 1893, 313). Mr. T. A. Hauxwell took it in the “Daunat Range, Middle Tenasserim, in March” (J. Bombay N. H. Soc. 1899, 335). Col. C. T. Bingham obtained it in the Thongyeen Valley, Tenasserim.

INDO-MALAYAN SPECIES.—*Meandrusa Payeni* (Pap. Payeni, Boisduval, Spéc. Gen. Lep. i. p. 235 (1836). Van der Hœven, Tijd. Nat. Gesch. v. p. 340, pl. 8, fig. 2, a, b (1838). De Haan, Verh. Nat. Gesch. Ned. 1840, p. 34. Doubleday and Hewits. Gen. D. Lep. i. p. 14 (1846). Gray, Catal. Lep. B. M. i. p. 27 (1852). Felder, Verb. Z. B. Ges. Wien. 1864, p. 306. Wallace, Trans. Linn. Soc. xxv. p. 65 (1865).

Staudinger, Exot. Schmett. i. p. 10 (1884). Haase, Untersuch. üb. Mim. p. 35 (1893). Fruhstorfer, Ent. Nachr. 1894, p. 301; *id.* Berl. Ent. Zeit. 1902, p. 192. Rothschild, Nov. Zool. ii. p. 400 (1895). *Habitat.* Java.—*Meandrusa Brunei* (Pap. Payeni Brunei, Rothschild, *l.c.* ii. p. 401 (1895)). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 192. Pap. Payeni, Heylarts, Tijd. v. Ent. 1891, p. 29. Hagen, Iris, 1894, p. 29. Pap. (Meandrusa) Payeni, de Nicéville, J. As. Soc. Bengal, 1895, p. 523. *Habitat.* Borneo; Sumatra.—*Meandrusa Langsonensis* (Pap. Payeni *subsp.* Langsonensis, Fruhstorfer, Soc. Ent. 1901, p. 90; *id.* Berl. Ent. Zeit. 1902, p. 120.

Genus DABASA.

Dabasa, Moore, Desc. Lep. Coll. Atkinson, p. 283 (1887). Kirby, Allen's Nat. Hist. Butt. ii. p. 278 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 29, subsect. a), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 306, 352.

Papilio (group 28, pt.), Rothschild, Nov. Zool. ii. p. 400 (1895).

IMAGO.—Male. *Forewing* triangular; costa much arched, apex obtusely rounded, exterior margin concave, posterior margin short; first subcostal branch free from the costal vein; cell broad; lower discocellular slightly concave. *Hindwing* short, rather broad; exterior margin sinuous, with a rather long outwardly-curved spatulate tail; the angle at end of lower median veinlet prolonged; basal area above and the abdominal border beneath thickly clothed with fine hairs; cell very long, extending to two-thirds of the wing, narrow. *Body* hairy; antennæ slender, club short, broad and abruptly curved. Sexes somewhat dissimilar.

LARVA and PUPA.—Unknown.

TYPE.—D. Gyas.

DABASA GYAS (Plate 484, fig. 1, 1a, ♂, 1b, ♀).

Papilio Gyas, Westwood, Arcana Entom. i. p. 41, pl. 11, fig. 1, ♂ (1841). Doubleday and Hewitson, Gen. D. Lep. i. p. 10 (1846). Gray, Catal. Lep. Brit. Mus. i. p. 16 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 110 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 306, 352. Wallace, Trans. Linn. Soc. Lond. xxv. p. 65 (1865). Moore, Proc. Zool. Soc. Lond. 1867, p. 672. Oberthür, Etud. Ent. iv. p. 60 (1879). Staudinger, Exot. Schmett. i. p. 10 (1884). Elwes, Trans. Ent. Soc. Lond. 1888, p. 437. Haase, Untersuch. üb. Mim. p. 35 (1893). Rothschild, Nov. Zool. ii. p. 401 (1895). de Nicéville, Journ. Bombay Nat. Hist. Soc. 1899, p. 335. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 194.

Dabasa Gyas, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1888). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 313.

Papilio (Dabasa) Gyas, de Nicéville, Sikkim Gazetteer, 1894, p. 175.

Papilio Gyas, *subsp.* *Lachinus*, Fruhstorfer, Iris, ii. p. 292 (1901); *id.* Berl. Ent. Zeit. 1902, p. 194.

IMAGO.—Male. Upperside purpurescent-brown, base and outer borders darkest. *Forewing* with a darker brown narrow bar across the cell and a broad decreasing bar

at its end ; an upper-discal series of obscured brownish-ochreous spots, followed by a submarginal row of similar lunate spots. *Hindwing* with a submarginal row of obscured brownish-ochreous narrow lunules, and a cluster of violet-blue scales above anal angle. Underside. *Forewing* with the base and broad apical-cell bar deep purple-brown, with sharply defined edges ; the outer area much paler brown and traversed by a paler submarginal fascia ; the discal area violet scaled, and from the apex with a transverse duplex series of obscure violet-white speckled dentate marks, the lower disc being also whitish. *Hindwing* with deep purple-brown basal area and a large lower-discal outer patch, the upper outer area and marginal border being paler brown ; from the basal dark border and the upper edge of the lower dark patch, the discal area is more or less thickly violet-white scaled, and traversed by a discal and an upper submarginal obscurely-defined brown sinuous line, the latter line being continued along the outer edge of the dark lower patch, in a more sharply defined violet-white sinuous line. *Body* above olivescient-brown, beneath purple-brown ; abdomen beneath speckled with ochreous scales ; legs and antennæ purple-brown, club black.

Female. Upperside. *Forewing* purpurescent-brown, palest apically, the base being somewhat greyish-brown ; with a lower medial-discal transverse violet-white sinuous-edged band extending from within the lower end of the cell to the posterior margin, beyond which is an upper-discal and a submarginal series of ochreous-yellow spots, disposed as in the male. *Hindwing* with the base olivescient greyish-brown ; a broad transverse medial violet-white band ; the outer border very dark purple-brown, traversed by a submarginal series of ochreous-yellow lunules larger than in the male ; the cilia between the veins slenderly, and the tail and anal borders being broadly ochreous-red. Underside. Similar to the male, except that the discal fascia on both wings is more broadly and paler violet-white, and the transverse markings more distinct ; the basal areas and outer areas are of a redder tint, the tail and anal borders being also ochreous-red.

Expanse, ♂ $4\frac{1}{2}$ to $4\frac{3}{4}$, ♀ $4\frac{3}{4}$ to 5 inches.

LARVA and PUPA.—Unknown.

HABITAT.—Sikkim ; Assam ; Khasias ; Burma ; Upper Tenasserim.

DISTRIBUTION.—Mr. H. J. Elwes records it as “ a decidedly rare species in Sikkim. I have seen it once only, flying round the top of a hill at 6,000 feet, at Rikisum, in August. Mr. Otto Möller has seen it on Birch Hill at 7,000 feet, in July, and Mr. Knyvett has taken the very rare female on Sinchul, in August ” (Tr. Ent. Soc. 1888, 437). Mr. L. de Nicéville says it is “ very rare in Sikkim, and occurs from 6,000 to 7,000 feet, on Birch Hill, Sónchal, and Rikisum, in July and August, but is more common on the Labah ridge in Daling at 7,000 feet ” (Sikk. Gaz. 1894, 175). Mr. H. Fruhstorfer records his *Lachinus* as having been taken at Lachin Lachon, in

Sikkim (Berl. Ent. Zeit. 1902, 194). Mr. G. C. Dudgeon obtained it in Bhotan in May and June. It has been taken at Shillong, in Assam. Col. C. Swinhoe records "many males and females from the Khasia Hills" (Tr. Ent. Soc. 1893, 313). Mr. T. A. Hauxwell obtained it on the "Mooleyit Mountain, Upper Tenasserim, at 6,000 feet, in February" (J. Bombay N. H. Soc. 1899, 335).

CHINA SPECIES.—*Dabasa Hercules* (*Papilio Hercules*, Blanchard, Compt. Rend. 1871, p. 809. Rothschild, Nov. Zool. ii. p. 402 (1895). *Pap. Gyas var. Hercules*, Leech, Butt. of China, p. 535, pl. 32, fig. 1 ♂ (1893). *Pap. Sciron*, Leech, Entomol. 1890, p. 192. *Habitat.* W. China.

Genus SARBARIA.

Sarbaria, Moore, Proc. Zool. Soc. Lond. 1882, p. 258. Kirby, Allen's Nat. Hist. Butt. ii. p. 298 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 64, pt.), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 323, 371.

Papilio (group 23), Rothschild, Nov. Zool. ii. p. 378 (1895).

IMAGO.—*Forewing* comparatively longer and of less breadth than in typical *Achillides*, the exterior margin being more oblique; the male generally with five elongated tomentose streaks—one on the three lower median veinlets, the submedian vein, and another between the lower median and submedian. *Hindwing* of less breadth and more deeply scalloped.

LARVA.—Adult. Smooth; anterior segments swollen, scutellated and with a well-defined small ocellus on each side above the rim of the shield; a pair of short fleshy retractile tubercles on the 2nd segment, and probably a shorter pair on the anal segment.

PUPA.—Ventral surface very convex in the middle, dorsal surface erect; head small, bifid in front; thorax convex posteriorly; sides of wing cases and abdomen basally dilated.

TYPE.—S. Polycator.

SARBARIA POLYCTOR.

Wet-season form (Plate 485, fig. 1, *larvæ and pupæ*, 1a, ♂, 1b, ♀).

Papilio Polycator, Boisduval, Spéc. Gen. Lep. i. p. 205 (1836). Blanchard in Jacquemont's Voy. Inde. iv. Ins. p. 14, pl. 1, fig. 1, 2 (1844). Kollar, in Hügel's Kaschmir, iv. pt. 2, p. 403, pl. 1, fig. 1, 2 (1844). Doubleday and Hewitson, Gen. D. Lep. i. p. 11 (1846). Gray, Catal. Lep. B. M. i. p. 16 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 109 (1857); *id.* P. Z. S. 1865, p. 487. Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Oberthür, Etud. Ent. iv. p. 39 (1879). Staudinger, Exot. Schmett. i. p. 8 (1884). Butler, Proc. Zool. Soc. 1886, p. 377. Rothschild, Nov. Zool. ii. p. 381 (1895).

Sarbaria Polycitor, Moore, Proc. Zool. Soc. 1882, p. 258. Kirby, Allen's Nat. Hist. Butt. ii. p. 298 (1896).

Papilio (Sarbaria) Polycitor, Doherty, Journ. As. Soc. Bengal, 1886, p. 136. Mackinnon and de Nicéville, Journ. Bombay N. H. Soc. 1898, p. 594, pl. W, fig. 24, a—e,—larva and pupa.

IMAGO.—Male. Upperside black. *Forewing* numerously irrorated with bright green scales; with a transverse submarginal broad golden-green scaled vein-divided band, which becomes more or less slightly obsolescent anteriorly; generally with five elongated brown tomentose streaks—one on each of the three lower median veinlets, the submedian, and another between the lower median and submedian, these being most developed on the two lower medians; cilia slenderly white. *Hindwing* with the basal and lower outer-discal area and middle of the tail numerously irrorated with bright green scales, those on the costal area above the cell gradually replaced by blue scales; a moderately-broad upper discal bright purplish-blue band which narrows posteriorly, and then curves inward to the abdominal margin above the anal ocellus, the lower portion of the band being golden-green scaled; a deep red ocellated spot with black centre and inwardly edged with pale violet scales; one, or sometimes two or three, lower submarginal red lunules; cilia alternately narrowly edged with white. Underside. Dark sepia-brown. *Forewing* with the cell, lower basal, and apical area sparsely irrorated with ochreous-grey scales; the submarginal fascia being only posteriorly defined, narrower, and greyish-white scaled. *Hindwing* with the base and discal area densely irrorated with greyish-ochreous scales, the outer border with a submarginal series of six red lunules and anal ocellus, each being inwardly-edged with pale violet-blue scales; the cilia between the veins being also narrowly inwardly-edged with white, and the lower slightly red tinted. *Body* above, and frontal tuft black and speckled with green scales; the collar spotted with white; body beneath dark brown; legs and antennæ black.

Female. Upperside similar to the male, except that, on the forewing, the tomentose streaks are not present, and the submarginal green band is broader.

Expanse, ♂ $3\frac{1}{4}$ to $4\frac{3}{4}$, ♀ $4\frac{1}{2}$ to $4\frac{3}{4}$ inches.

LARVA AND PUPA.—(See Plate 485.)

Dry-season brood (Plate 486, fig. 1, 1a, ♂, 1b, ♀).

Sarbaria Peeroza, Moore, Proc. Zool. Soc. 1882, p. 258.

Male. Generally comparatively smaller than the *wet-season* brood, and with shorter hindwing and tail. *Forewing* with the transverse green band somewhat narrower, and the tomentose streaks somewhat shorter. *Hindwing* with the band generally restricted to the anterior area, and is sometimes green tinted; the posterior portion of this band is either absent or more or less obsolescent.

Female. Upperside. *Forewing* with the green band somewhat narrower than in *wet-season* form. *Hindwing* with the band as in the male; the red anal ocellus and submarginal lunules more defined.

Expanse, ♂ $3\frac{1}{4}$ to 4, ♀ $3\frac{1}{2}$ to $4\frac{1}{2}$ inches.

HABITAT.—N.-W. Himalayas; Nepal.

LIFE HISTORY.—“EGG.—Pale green; shaped like an orange, and rather flattened at the base where it adheres to the leaf. The majority of the eggs appear to be laid on the underside of the leaves, as I have found but very few on the uppersides of the leaves. When laid above they are easy to detect, but on the underside it is a very much more difficult matter, the peculiar transparent green of the egg accords so well with the leprous-like spotting of the leaf, especially when looked at from below, nature having thus clearly afforded it protection. About three days before hatching, a slight suffusion of dark colouring, which looks to the naked eye like a spot, appears on the top of the egg. The following notes are taken from an egg laid at 8 a.m. on August 4th, which hatched early on the morning of the 9th = five days.”

NEWLY-BORN LARVA.—“Very dark in colour, of a velvety greenish-black, rather paler on the back from 7th to 13th segment. Processes on the 2nd segment large in proportion to the animal, and these, together with the smaller ones on the 12th and 13th segment very pale brownish. Before changing its skin the whole colouring becomes a pale brown. *First Moult*.—August 15th. The 2nd, 12th, and 13th segments light ochreous, with long branched spines. Thorax prominently rounded; dorsal area pale yellowish-olivaceous; a dark line on the sides, broken by a whitish patch (which is spotted with greenish) about the 6th and 7th segments; a deep black spot just below the tubercles on the 6th segment. The 2nd segment is furnished with two long branched spines, with a smaller one situated at the base on the inner-side of each. The 3rd segment bears four, the 4th segment six, and the other segments two spines on the dorsal surface. The thorax and the vent are clothed with minute hairs. *Second Moult*.—August 21st. It took a little over forty-eight hours to shed its skin. General colour of a somewhat dull emerald-green, intermingled with slaty irrorations and suffusions, and a distinct white patch on the sides of the 6th and 7th segments. On the side of the head above the eyes is a little darkish green spot margined with three brown spots. The spines on the 2nd and 12th segments yellow. Thoracical shield darker green on the edgings, with the tubercles (which are only visible through a magnifying glass) looking like small blisters, graduating in size (lessening) towards the middle of the back, each of which is marked above with a slate-coloured spot; these spots are carried out down the sides of the back; the whole shield is variegated and mottled. A suffusion of whitish commencing broadly about the 5th segment inclines backward and nearly

meets on the back and continues along the sides to the vent in map-like streaks. Below the lateral inflation from the 8th to the 13th segment is a narrow white line even in width but interrupted, which from the 7th segment to the head becomes suffused into the white area above. True legs and anal claspers pale green, the other claspers yellowish; remainder of the lower surface pale bluish-white. *Third Molt.*—August 27th. General colour now vivid green, with the thoracical shield very marked. Head very much larger than 2nd segment, and pale green. The 2nd to 5th segments raised, and capped with a shield, which just slightly protrudes over the head. In outline the shield is somewhat pear-shaped, narrow towards the head, and bulging out considerably on the 4th segment; in colour it is of a little darker shade of green in front than the general coloration of the body, and powdered with pale slaty-greyish on the hind part. There is a dark well-defined ocellus on either side, just above the rim on the 4th segment, consisting of a black spot, with a narrow white one, followed by a larger reddish-brown one, which, in turn, is narrowly-edged below with white. The whole of the fore-part of the shield is beautifully variegated with fine black lines, twisted into loops up to the 4th segment, and from thence to the hind-part are grey irrorations. The most central one of these is usually the most clearly defined in outline, and in many cases connects the ocelli, like the bridge in a pair of spectacles. The rim of the shield in front, and up to the ocelli, is pale yellowish-green, margined narrowly with black. Down the sides of the body are four oblique lines of a darker green than the ground-colour, slightly margined above with yellow, the first of which commences on the 7th segment above the lateral stripes, and crosses the 8th and 9th segments; the second is on the 10th segment; and the third on the 11th segment; these three lines or streaks terminate on the back, but do not join; the fourth is on the 12th segment and joins with the protruding anal tubercled skin-fold of that segment. These markings vary considerably; in some individuals they are very conspicuous, in others almost absent; in some also there is a fine black streak running through the above markings. The whole of the upper surface is more or less irrorated with yellow, which gives the general colouring a very vivid green appearance. There are, also, a dorsal and lateral row of very minute slate-coloured spots, which are carried on through the shield. The colouring at the divisions of the segments (only made apparent when the animal is in motion) is pale slaty-grey, except that portion between the 5th and 6th segments behind the shield, which is deep velvety-black. This also lies hidden, and is only exhibited on the animal being alarmed, when the thoracical shield is raised in a very snake-like aggressive attitude, and the black division rolled out as it were from under the shield. The under-parts are pale bluish-white; the true legs pale green, the claspers semi-transparent, the anal claspers being paler whitish.”

FOOD-PLANT.—“The larva feeds on a species of wild Orange, native name Teemur.”

PUPA.—“The whole of the front portion (i.e. breast, etc.), pale bluish-green, with a few lines of a darker shade on the wing-coverts, and body, and with a faint medial line. On the back the colouring is of a more yellowish-green, with pale yellow, pale whitish, and brownish dots and markings. Outline of the breast highly arched, and hind margin of wings slightly raised. Sides slightly flattened out, with a hard sharp ridge running longitudinally round the whole insect, usually of a pale brownish colour, but which, in some individuals, is very dark, and in others almost white. This ridge forms a very marked outline, viewed from the front or back, and runs thus:—Head comparatively small, markedly bifid, with the inner portions of the projections distinctly notched; behind the eyes concave, angling out at the shoulder, from thence somewhat square-cut, and contracting to a sharp notch at the waist, through which the suspending cord passes. From the waist to the end of the 9th segment a considerable curving out takes place (the margin of the ridge of this portion is slightly folded inwards over the back); from the 6th to the 13th segment the body rapidly narrows, the whole body thus being somewhat heart-shaped. The thorax is raised and angular, and from its summit runs a pale greyish line (commencing very gradually) bounded on either side with brown to a little beyond the waist (this brown edging ends abruptly in, as it were, two short lines very well defined) in continuation with a broader medio-dorsal line margined on either side with darker green than the ground-colour to the vent; just below the waist and opposite the terminus of the brown marking above mentioned on either side is a dark somewhat quadrate spot, which varies in different individuals, and in some these spots are absent; about this region there is usually a yellow suffusion; a bright yellow line passes from these spots to the tail, curving outwards to the shape of the body in its course, and between this line and the medio-dorsal line is a line of yellow dots. The spots on the body seem to vary very much, but their general outline is the same. On the thorax there are usually five dark dots, placed one in the centre below the head, the other four, two on either side of the raised portion of the thorax diverging towards the waist. The spiracles follow the outline of the ridge, and are situated just along the inner edge above. The majority of the pupæ were green, as described, but a few were of a pale grey colour. The pupa is generally suspended head upwards, one or two assumed the reverse position. Some of the perfect insects emerged in eleven days, others in fifteen and seventeen days from date of changing into pupæ.”

HABITS OF LARVA.—“The larva rests on the upper sides of the leaves in the first and second stages, laying out full length, with the first five segments slightly raised; but in the last stage they seem to prefer reposing further in the shrub at the

base of the stems, and assume a pro-erect attitude, which, with the peculiar spectacle-like marking on the shield, give it a most pugnacious appearance. The tentacles of the 2nd segment are pale greenish-yellow, it is difficult to get them to protrude these appendages, but when doing so the head is thrown well back, and the tentacles directed well over the head; a powerful odour, similar to the smell of the leaf, being emitted at the same time. I have never found more than four larvæ on any one bush, and have taken numbers at Abbottabad and on the Simla Hills, about Solon, Sabathu, and Kasauli, and also at Dalhousie, where the Teemun sbrub flourishes" (Major H. C. Harford, Kasauli, MS. Notes.)

DISTRIBUTION.—Capt. R. Bayne Reed obtained it in Kashmir. Major H. B. Hellard took it in "Kashmir and Simla in July, August, and September" (MS. Notes). Capt. A. M. Lang recorded it as "abundant about springs, rivulets, and on the damp sandy margins of larger streams, in all parts of the N.-W. Himalayas, at least as far as the crossing of the Sutlej at Wangtoo, but as we approach the bleaker Tibetan uplands it disappears. The larva feeds on *Zanthoxylum hastile*" (P. Z. S. 1865, 487). Col. J. W. Yerbury records it as "fairly common at Muree in August. A few seen along the Hills as far as Thundiani in September. A female obtained between Abbottabad and Kala Pani in September" (P. Z. S. 1886, 377). Mr. W. Doherty took it at "Almora, Sarju, and Ramganga Valleys, Kumaon, at 2,000 to 5,000 feet elevation" (J. As. Soc. Beng. 1886, 136). Col. J. C. Pilcher obtained it in Kumaon in May and August. Mr. P. W. Mackinnon records it as "very common in the low valleys about Masuri from March to October, wherever the food plant of the larva *Zanthoxylum alatum*, N. O. Rutaceæ, is plentiful. A few specimens are taken every year in the Station of Masuri, at least 6,000 feet elevation. The small specimens of the spring-brood (*P. Peeroza*) are of course taken in the same spots where the butterflies of the larger rains-brood are found" (J. Bombay N. H. S. 1898, 594). Gen. G. Ramsay obtained it in Nepal.

SARBARIA GANESA (Plate 487, fig. 1, ♂, 1a, ♀).

Papilio Ganesa, Doubleday, in Gray's Zool. Miscellany, p. 73 (1842). Doubleday and Hewitson, Gen. D. Lep. i. p. 11 (1846). Gray, Catal. Lep. B. M. i. p. 16, pl. 3, fig. 5, ♂ (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 107 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 323, 371. Oberthür, Etud. Ent. iv. p. 40 (1879). Staudinger, Exot. Schmett. i. p. 8, pl. 5, ♂ (1884). Elwes, Trans. Ent. Soc. 1888, p. 428. Robbe, Ann. Soc. Ent. Belg. 1892, p. 125.

Papilio (Sarbaria) Ganesa, de Nicéville, Sikkim Gazetteer, 1894, p. 172.

Papilio Polycctor Ganesa, Rothschild, Nov. Zool. ii. p. 383 (1895). Fruhstorfer, Soc. Ent. 1902, p. 66.

IMAGO.—Male. Upperside similar to *S. Polycctor*. Forewing less densely irrorated with green scales; the submarginal band brighter golden-green scaled,

ascending more narrowly and obsolescently, its upward course being comparatively farther from the outer margin. *Hindwing* with a broader blue—or in some light emeraldine-green—upper discal patch, which terminates hindward at the upper median veinlet. Underside. Ground-colour much darker. *Forewing* very sparsely scaled basally, the outer pale fascia being much wider basally, well defined, and ascending broadly upward. *Hindwing* with the basal area only sparsely irrorated with greyish-ochreous scales, the broader outer area being almost black, and the submarginal red lunules being each disposed more obliquely inward.

Female. Upperside less densely irrorated with green scales. *Forewing* with the submarginal band as in the male. *Hindwing* with the upper-discal patch as in the male. Underside as in the male.

Expanse, ♂ 4 to $5\frac{1}{4}$, ♀ 4 to $4\frac{3}{4}$ inches.

HABITAT.—E. Nepal; Sikkim.

DISTRIBUTION.—We possess a male taken in Nepal by Gen. G. Ramsay. Mr. H. J. Elwes records it as an “inhabitant of the lower valleys of Sikkim, and occurs from April to December in successive broods” (Tr. Ent. Soc. 1888, 428). Mr. L. de Nicéville says it “occurs in Sikkim throughout the warm months at low elevations, and the male is very common, the female very rare” (Sikk. Gaz. 1894, 172).

SARBARIA TRIUMPHATOR (Plate 488, fig. 1, ♂).

Papilio Polycitor, subsp. *triumphator*, Fruhstorfer, Soc. Ent. 1902, p. 66; *id.* Berl. Ent. Zeit. 1902, p. 185.

Sarbaria Ganesa, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 312.

Male. Upperside. *Forewing* differing from Sikkim *Ganesa* in the much less defined, or entire obsolescence of the transverse submarginal green-scaled band. *Hindwing* with a smaller, tripartite, blue patch. Underside. *Forewing* with the discal grey band broader. *Hindwing* with the cilia lunules narrower.

Expanse, ♂ $4\frac{1}{4}$ to $5\frac{1}{4}$ inches.

HABITAT.—Assam; Khasia Hills; Tonkin; Siam.

DISTRIBUTION.—We possess a male from Assam taken by Dr. G. Watt. Col. C. Swinhoe has examples from the Khasia Hills. Mr. H. Fruhstorfer records it from Shillong and the Khasia Hills.

Our figure on Plate 488 is from a male from the Khasia Hills.

SARBARIA SIGNIFICANS (Plate 488, fig. 2, ♂).

Papilio, Polycitor, subsp. *Significans*, Fruhstorfer, Soc. Ent. 1902, p. 66.

Male. Upperside. *Forewing* similar to the Assam *S. triumphator*, except that it has a shining white-scaled spot at the posterior angle. *Hindwing* with bright

shining green apical patch, and red lower lunules edged with violet scales. Under-side. *Forewing* with the discal fascia posteriorly narrower than in *S. triumphator*. *Hindwing* with broad white marginal cilia-lunules.

Expanse, ♂ $4\frac{1}{2}$ to $4\frac{3}{4}$ inches.

HABITAT.—Lower Burma; Tenasserim.

DISTRIBUTION.—Mr. H. Fruhstorfer records his type from "Tandong, Tenasserim, 4,000 feet, taken in May" (*l.c.* 66).

Our figure on Plate 488 is from a male, taken in the Karen Hills by Signor L. Fea.

SARBARIA GLADIATOR (Plate 489, fig. 1, ♂).

Papilio Bianor Gladiator, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 184.

Male. Upperside black. *Forewing* irrorated with bright green scales; with five elongated tomentose streaks; cilia slenderly white. *Hindwing* with the upper discal area densely irrorated with bright blue scales, and the basal and lower discal area with bright green scales, the outer area with a submarginal series of more or less slightly-defined crimson lunules irrorated with blue scales, and a prominent crimson anal ocellus with large black centre; cilia alternated with white. Underside sepia-brown. *Forewing* with the base very sparsely irrorated with grey scales; a broad posteriorly-decreasing dusky-grey band intersected by the veins. *Hindwing* with the basal area numerously irrorated with ochreous-grey scales; the outer area deep black between the veins; a submarginal series of six bright crimson lunules and an anal ocellus, each traversed by a prominent violet-scaled streak; cilia inwardly edged by a narrow reddish-ochreous lunule. *Body* black; thorax above and frontal tuft green scaled; collar and palpi white spotted; legs and antennae black.

Expanse, $4\frac{3}{4}$ to 5 inches.

HABITAT.—Lower Burma; Tonkin; Hong Kong.

DISTRIBUTION.—We possess two males, one labelled "Thyetymyo, Pegu," and the other "Burma," both specimens agreeing with a Tonkin example in Mr. W. Rothschild's collection.

Our figure on Plate 489 is taken from the Thyetymyo male.

CHINA AND JAPAN SPECIES.—*Sarbaria Bianor* (Pap. *Bianor*, Cramer, Pap. Exot. ii. p. 10, pl. 103, fig. C (1777). Fabricius, Spec. Ins. ii. p. 1 (1781). Esper, Ausl. Schmett. p. 137, pl. 35, fig. 2. Boisduval, Spec. Gen. Lep. i. p. 205 (1836). Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Butler, Catal. Fabr. Lep. B. M. p. 256 (1869). Oberthür, Et. Ent. iv. p. 39 (1879). Leech, Butt. of China, p. 527 (1893). Rothschild, Nov. Zool. ii. p. 378 (1895). *Habitat.* China.—*Sarbaria Dehaani* (Pap. *Dehaani*, Felder, Verh. Z. B. Ges. Wien. 1864, pp. 323, 371. Murray, Ent. Mo.

Mag. 1874, p. 166. Oberthür, Et. Ent. iv. p. 39 (1879). Pap. Bianor, *var.* Dehaani, Leech, *l.c.* p. 527 (1893). Rothschild, *l.c.* ii. p. 379 (1895). Pap. Lorquini, Reakirt, Proc. Ent. Soc. Philad. 1864, p. 462. Pap. Japonica, Butler, Journ. Linn. Soc. Zool. 1866, p. 50. Pap. Alliacmon, L'Orza, Lep. Japon. p. 9 (1869). *Habitat.* Japan.—*Sarbaria Maacki* (Pap. Maacki, Ménétries, Bull. Acad. Petersb. xvii. p. 212 (1859); *id.* Schrenck's Reisen, Amur-Lande, ii. Lep. p. 10, pl. 1, fig. 1, 2 (1859). Bremer, Lep. Ost. Sib. p. 3 (1864). Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Oberthür, Et. Ent. iv. p. 39 (1879). Pryer, Rhop. Nipon. p. 3, pl. 1, fig. 3 (1886). Leech, Butt. of China, etc. p. 529 (1893). Pap. Bianor Maacki, Rothschild, *l.c.* p. 380 (1895). Pap. Raddei, Bremer, Mem. Acad. Petrop. viii. p. 3, pl. 1, fig. 1 (1864). Pap. Dehaani, *var.* Jutanus, Fenton, P. Z. S. 1881, p. 855; *id.* Papilio, ii. p. 36, figs. 13, 14 (1882). *Habitat.* Amur; N. China; Corea; N. Japan.—*Sarbaria Syfanus* (Pap. Syfanus, Oberthür, Etudes Ent. xi. p. 13, pl. 1, fig. 3 (1886). Leech, *l.c.* p. 532, pl. 32, fig. 5, ♂ (1893). Pap. Bianor Syfanus, Rothschild, *l.c.* p. 380 (1895). Pap. Dialis, Leech, Entom. 1893, Suppl. p. 104; *id.* Butt. of China, p. 532, pl. 32, fig. 4 ♂ (1893). *Habitat.* W. China.—*Sarbaria Okinauensis* (Pap. Okinauensis, Frubstorfer, Soc. Ent. xiii. p. 74 (1898). *Habitat.* Okinawa, N. Japan.

Genus PANGERANOPSIS.

Papilio (subgen.) *Pangeranopsis*, Wood-Mason, Journ. As. Soc. Bengal, 1886, p. 374. de Nicéville, *id.* 1897, p. 567.

Papilio (sect. 65, subsect. D, pt.), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 324, 372.

Papilio (group 22), Rothschild, Nov. Zool. ii. p. 378 (1895).

IMAGO.—Male. *Forewing* elongated, triangular; costa much arched, apex rounded, exterior margin very oblique and concave in the middle, posterior margin short; with a well developed elongated tomentose brand on middle and lower median veinlet, and a less developed brand on the submedian vein. *Hindwing* short, prolonged hindward; exterior margin erect, scalloped, truncated posteriorly, tailless. *Body* stout; head rather large; antennal club gradually thickened. Sexes similar.

LARVA.—UNKNOWN.

TYPE.—P. Elephenor.

PANGERANOPSIS ELEPHENOR (Plate 489, fig. 2, ♂).

Papilio Elephenor, Doubleday, Ann. and Mag. Nat. Hist. 1845, p. 305. Doubleday and Hewitson, Gen. D. Lep. i. p. 10 (1846). Westwood, Cabinet of Orient. Entom. p. 64, pl. 31, fig. 2, 2a, ♂ (1848). Gray, Catal. Lep. B. M. i. p. 15 (1852). Moore, Proc. Zool. Soc. 1867, p. 672. Felder, Verh. Z. B. Ges. Wien. 1864, pp. 324, 372. Doherty, Journ. As. Soc. Bengal, 1889, p. 130. Haase, Untersuch. üb. Mim. p. 53 (1893). Rothschild, Nov. Zool. ii. p. 378 (1895).

Papilio (Pangeranopsis) Elephenor, Wood-Mason, Journ. Asiatic Soc. Bengal, 1886, p. 374. de Nicéville, *ul. l.c.* 1897, p. 507.

IMAGO.—Male. Upperside. *Forewing* dark fuliginous-black, with black veins, longitudinal cell-streaks and streaks between the outer veins; numerous irrorated with green scales; the middle and lower median veinlet and the submedian vein with an elongated tomentose brand. *Hindwing* deep black, anteriorly densely irrorated with blue scales, and posteriorly with green scales; a dark crimson ocellus with black centre at the anal angle; the cilia at anal angle and within the incisions of the outer margin, white. Underside. *Forewing* greyish-black, with black veins and cell-streaks, and paler grey longitudinal intervening lower vein streaks. *Hindwing* purpurescent-black, the base and abdominal margin slightly speckled with grey scales, the outer marginal interspaces between the veins being deep black; a series of five upper outer-marginal crimson irregularly-lunate marks speckled with violet scales, and a lunularly crimson-speckled double lunulate black-spotted patch at the anal angle, which latter is posteriorly coalesced to a broad similar lunule in the lower median interspace. *Body* above and below black; sides of abdomen greyish-white; collar and vertex ochreous spotted, frontal tuft and palpi ochreous; antennæ and legs black.

EXpanse, $4\frac{1}{4}$ to $4\frac{1}{2}$ inches.

HABITAT.—Upper Assam; Naga and Khasia Hills.

DISTRIBUTION.—Mr. W. Doherty obtained “two males of this rare butterfly at Dikrang, near Sadiya, Upper Assam” (J. As. Soc. Beng. 1889, 130). Specimens of the male, from the Naga Hills and Shillong, are in the late Mr. P. Crowley’s collection, three males are also in the Hewitson Cabinet at the British Museum. Two males from the Khasia Hills are in Mr. W. Rothschild’s Cabinet. Mr. Wood-Mason obtained “one male at Dhurmka, Cachar, in July, and Mr. J. L. Sherwill took it at Jorehat, in Assam” (J. A. S. Beng. 1886, 374).

PANGERANOPSIS DODDSI (Plate 489, fig. 3, ♂).

Papilio Doddsi, Janet, Bull. Soc. Entom. Fr. 1896, p. 186. Crowley, Proc. Zool. Soc. Lond. 1900, p. 510. Fruhstorfer, Iris, 1901, p. 269, ♂ ♀; *ib.* Berl. Ent. Zeit. 1902, p. 183.

Papilio (Sarbaria) Doddsi, de Nicéville, Journ. As. Soc. Bengal, 1897, p. 566, pl. 4, fig. 30, ♂.

Papilio Megei, Oberthür, Ann. Soc. Ent. Fr. 1899, p. 268.

IMAGO.—Male. Upperside. *Forewing* fuliginous-black, with black veins, longitudinal cell-streaks and a streak between outer veins, and narrowly irrorated between with rich green scales; middle and lower median and submedian vein with an elongated tomentose brand. *Hindwing* black; the anterior half purplish-black and

irrorated with blue scales, and the posterior half with green scales; a deep red anal ocellus with a large black centre and anterior violet-scaled lunule, followed by three lower submarginal red lunules. Underside. *Forewing* greyish-black with black veins and streaks, the outer intervening spaces being paler grey. *Hindwing* deep black, the base and abdominal margin speckled with dull green scales; a submarginal complete series of six deep red lunules each bearing anteriorly a violet-scaled streak; a similar coloured coalesced anal and subanal ocellus with black centre; cilia slenderly alternated with white. Head, thorax, and body above black, speckled with green scales; antennæ and legs black.

Expanse, ♂ 5 inches.

HABITAT.—South Shan States, Burma; Tonkin; Hainan.

Differs from *P. Elephenor* in the hindwing being broader, the outer margin produced into a very short and blunt tail-like point at end of the middle median veinlet.

Our illustration on Plate 489, fig. 3, is copied from Mr. de Nicéville's published figure.

Genus ACHILLIDES.

Achillides, Hübner, Verz. bek. Schmett. p. 85 (1816). Kirby, Allen's Nat. Libr. Butt. ii. p. 297 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 64, pt.), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 323, 371.

Papilio (group 24), Rothschild, Nov. Zool. ii. p. 383 (1895).

IMAGO.—Male. *Forewing* broadly triangular; costa much arched, exterior margin oblique and very slightly scalloped; tomentose streaks not present. *Hindwing* short, broad; exterior margin oblique, scalloped, with a broad large spatulate tail. Antennæ with a lengthened slender club.

LARVA.—(Arjuna). Somewhat limaciform; anterior segments scutellated, the shield raised in front of the head.

PUPA.—Curved backward, the head projected and slightly bifid in front; thorax dorsally convex.

TYPE.—A. Paris.

ACHILLIDES ARCTURUS (Plate 490, fig. 1, ♂).

Papilio Arcturus, Westwood, Ann. Nat. Hist. 1842, p. 37; *id.* Arcana Entom. i. p. 101, pl. 27 (1843). Doubleday and Hewitson, Gen. D. Lep. i. p. 11 (1846). Gray, Catal. Lep. B. M. i. p. 21 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 108 (1857); *id.* Proc. Zool. Soc. 1865, p. 757. Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Butler, P. Z. S. 1886, p. 377; *id.* Ann. Nat. Hist. 1888,

p. 205. Elwes, Trans. Ent. Soc. Lond. 1888, p. 427. Leech, Butt. of China, p. 533 (1893). de Nicéville, Journ. Bombay N. H. Soc. 1899, p. 335. Rothschild, Nov. Zool. ii. p. 383 (1895).

Achillides Arcturus, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 311.

Papilio (Achillides) Arcturus, de Nicéville, Sikkim Gaz. 1894, p. 172.

IMAGO.—Male. Upperside. *Forewing* brownish-black, veins and intervening streaks black; numerous irrorated with bright green scales; with a transverse narrow fascia, composed of densely-packed green scales, becoming more or less obsolescent anteriorly. *Hindwing* black, the basal and lower outer area including the tail irrorated with bright green scales; with an irregular-shaped bright blue apical broken-patch extending upward from below apex of the cell and thence outward below end of upper subcostal; at the anal angle is a large dark red ocellus with an anterior violet-scaled streak and black centre, this ocellus being inwardly bordered by a lengthened recurved prominent green-scaled streak; the submargin also bearing a series of violet-scaled deep red lunules of which the two lowest are almost or quite obsolete. Cilia alternated with white. Underside brown-black. *Forewing* with the veins and streaks black; basal area very sparsely irrorated with grey scales; a broad discal greyish fascia, traversed by the black veins and streaks, narrowing and becoming paler or greyish-white hindward. *Hindwing* black outwardly between the veins; the basal and lower discal area irrorated with grey scales; a prominent submarginal series of large deep red lunules, an anal and a larger lower ocellus with black centre, all anteriorly bearing a violet-scaled streak; the white cilia inwardly bordered by a slight red lunule. *Body*, legs, and antennæ black; thorax and frontal tuft green speckled; head and palpi white spotted; abdomen and femora beneath, grey speckled.

Female. Upperside similar to the male. *Hindwing* with the red submarginal lunules and anal ocellus more prominent. Underside similar to the male.

Expanse, ♂ 4 to 5, ♀ 5 inches.

HABITAT.—N.-Western and Eastern Himalayas; Assam; Khasias; Burma.

DISTRIBUTION.—Major J. W. Yerbury records it as "common in the N.-W. Himalaya, at Murree and Thundiani, in August" (Ann. N. H. 1888, 205). A male from Kala, N.-W. Himalaya, taken in June by Capt. H. McArthur, is in Mr. J. H. Leech's collection. Gen. G. Ramsay took it in Nepal. Mr. H. J. Elwes records it as being "found in Sikkim, in similar places and at the same time of year as *P. Krishna*. It has similar habits, but is less abundant as a rule. I have seen it in the forest paths, where it occasionally settles" (Tr. Ent. Soc. 1888, 427). Mr. G. C. Dudgeon obtained it in Bhotan, at 7,000 feet elevation in March. Col. C. Swinhoe records it from the Khasia Hills (Tr. Ent. Soc. 1893, 311). A male from Burma is in Mr. W. Rothschild's collection. Mr. T. A. Hauxwell obtained it in the Tao

Plateau, Middle Tenasserim, 4,000 feet elevation, in December" (J. Bombay N. H. S. 1899, 335).

ACHILLIDES KRISHNA (Plate 490, fig. 2, ♂).

Papilio Krishna, Moore, Catal. Lep. Mus. East Ind. Company, i. p. 108, pl. 2a, fig. 6, ♂ (1857); *ib.* Proc. Zool. Soc. Lond. 1865, p. 757. Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Oberthür, Etud. Ent. iv. p. 39 (1879). Staudinger, Exot. Schmett. i. p. 8 (1884). Elwes, Trans. Ent. Soc. Lond. 1888, p. 427. Rothschild, Nov. Zool. ii. p. 384 (1895).

Papilio (Achillides) Krishna, de Nicéville, Sikkim Gazetteer, 1894, p. 171.

IMAGO.—Male. Upperside black. *Forewing* irrorated with bright green scales; with a prominent transverse discal vein-divided narrow band composed mostly of bright golden-green scales; cilia white. *Hindwing* with the basal and lower marginal area irrorated with bright green scales; with a broad and outwardly-angular bright blue apical patch, which is continued from below the apex of the cell, in a narrow bright golden-green scaled streak, to the submedian vein and is thence bent inward above the anal ocellus; beyond are four lower submarginal crimson lunules and an anal ocellus, each anteriorly traversed by violet scales; cilia alternated with white and inwardly edged by a narrow red lunule. Underside. Dark sepia-brown. *Forewing* with black veins and streaks, the transverse discal band creamy-white and slightly wider, the outer border of the wing to near the margin being dusky-grey. *Hindwing* with a transverse discal creamy-white narrow band decreasing from the costa to upper median veinlet and thence bent sinuously inward more narrowly to above the anal ocellus, followed by a submarginal complete series of six crimson lunules, an anal ocellus, and ciliary red lunules as on upperside. *Body* black, green speckled above; frontal tuft and palpi entirely black; collar white spotted; legs and antennæ black.

Female. Upperside and underside similar to the male.

Expanse, ♂ ♀ 4 to 4½ inches.

HABITAT.—Sikkim; Bhotan.

DISTRIBUTION.—Mr. H. J. Elwes records it as a "common species in Sikkim, in some seasons at certain places, and found from 3,000 up to 9,000 feet elevation, but difficult to catch in good condition. I have seen it most often on or about the bare tops of hills, like Sinchul, which are clothed with dense Chestnut, Oak, and Magnolia forest, in which it probably lives and breeds, and comes out on sunny mornings into the openings, where alone it can be taken. The female is very rare only one or two being known to us. Its season is from May to August" (Tr. Ent. Soc. 1888, 427). Mr. G. C. Dudgeon obtained it in Bhotan, and in Sikkim at 8,000 feet elevation.

ACHILLIDES PARIS (Plate 491, fig. 1, 1a, b, ♂; 1c, ♀).

- Papilio Paris*, Linnæus, Syst. Nat. ed. x. p. 459 (1758); *id.* Mus. Lud. Ulr. p. 184 (1764); *id.* Syst. Nat. ed. xii. p. 745 (1767). Clerck, Icones Ins. i. pl. 13, fig. 1 (1759). Drury, Ill. Nat. Hist. i. p. 23, pl. 12, fig. 1, 2 (1773). Fabricius, Syst. Ent. iii. i. p. 30 (1779). Cramer, Pap. Exot. ii. p. 9, pl. 103, fig. A, B (1779). Esper, Aus. Schmett. p. 17, pl. 2, fig. 1 (1784). Jablonsky Nat. Schmett. ii. p. 151, pl. 14, fig. 1, 2 (1784). Donovan, Ins. of China, pl. 22 (1798). Boisduval, Spéc. Gen. Lep. i. p. 208 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 11 (1846). Gray, Catal. Lep. B. M. i. p. 17 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 107 (1857); *id.* Proc. Zool. Soc. 1865, p. 757. Felder, Verh. Z. B. Ges. Wien. 1864, p. 323. Butler, Catal. Fabr. Lep. B. M. p. 255 (1869). Oberthür, Etud. Ent. iv. p. 40 (1879). Aurivillius, Kongl. Sv. Akad. Handl. 1882, p. 9. Holland, Trans. Amer. Ent. Soc. 1887, p. 123. Elwes, Trans. Ent. Soc. Lond. 1888, p. 427. Manders, Trans. Ent. Soc. Lond. 1890, p. 523. Watson, Journ. As. Soc. Bengal, 1891, p. 54. Leech, Butt. of China, etc. p. 535 (1893). Oberthür, Etud. Ent. xvii. p. 4 (1893). Walker, Trans. Ent. Soc. Lond. 1895, p. 468. Rothschild, Nov. Zool. ii. p. 384 (1895). Fruhstorfer, Iris, 1901, p. 346; *id.* Berl. Ent. Zeit. 1902, p. 186.
- Achillides Paris*, Hübnér, Verz. bek. Schmett. p. 85 (1816). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 312. Kirby, Allen's Nat. Libr. Butt. ii. p. 297 (1896).
- Papilio (Achillides) Paris*, Doherty, Journ. As. Soc. Bengal, 1886, p. 136. de Nicéville, Sikkim Gazetteer, 1894, p. 171.
- Papilio (Harimala) Paris*, Wood-Mason, Journ. As. Soc. Bengal, 1886, p. 377. Elwes, *id. l.c.* 1886, p. 437.

IMAGO.—Male. Upperside black. *Forewing* numerously irrorated with green scales; crossed by an outer discal vein-divided narrow band composed of densely packed bright golden-green scales, the band is very variable in length, extending upward, generally more or less obsolescently to the lower subcostal, but on some only to the lower or middle median veinlet, and sometimes, but very rarely, it is entirely absent; cilia slightly alternated with white. *Hindwing* with the basal and lower outer area, including the tail, numerously irrorated with green scales; a broad upper-discal bright emerald-green patch—which in some lights is blue—extending from or close to the costal apex to or slightly beyond the upper median veinlet—its inner edge being evenly incurved and its outer edge excavated between the veins—it is thence continued in a slender recurved streak of bright golden-green scales to the abdominal margin; sometimes the red apical-lunule of the underside is also slightly apparent; beyond are three lower submarginal more or less defined green-scaled lunules, and a prominent dark crimson anal ocellus surmounted by violet scales. Underside dark sepia-brown. *Forewing* with the base and apex sparsely irrorated with grey scales, the outer area crossed by a broad discal posteriorly-decreasing, vein-divided, grey band, which is most prominent and whitish hindward, its inner edge being upright and not touching end of the cell. *Hindwing* with the basal area irrorated with grey scales, the outer area being black between the veins, and with a prominent complete submarginal series of bright crimson lunules with

extended ends, and an anal ocellus, each traversed by violet-blue scales, followed by more or less defined marginal ochreous-red cilia-lunules, the two lower pair generally being ocellated; cilia alternated with white. *Body*, legs, and antennæ black; body and thorax above, and frontal tuft, green speckled; collar and palpi white spotted.

Female. Upperside and underside similar to the male, except that on the hindwing, above, the green patch is somewhat smaller, the costal portion of which is replaced by an obscure red lunule.

Expanse, $4\frac{1}{2}$ to 5 inches.

LARVA and PUPA.—Unknown.

HABITAT.—Western, Central, and Eastern Himalayas; Assam; Burma; Shan States; Tenasserim; Malay Peninsula; Siam; Tonkin; E. China; Hong Kong; Hainan.

DISTRIBUTION AND HABITS.—Mr. W. Doherty obtained it in the “Kali Valley, Kumaon, W. Himalaya, at 2,000 to 3,000 feet elevation” (J. As. Soc. Beng. 1886, 136). Gen. G. Ramsay obtained it in Nepal. Mr. H. J. Elwes records it as “the commonest of the green Papilios, in the low valleys of Sikkim, and found up to 5,000 feet elevation. It settles on flower heads and damp sand in river beds, and flies rapidly up and down their banks. The female is very seldom taken” (Tr. Ent. Soc. 1888, 427). Mr. L. de Nicéville says it is “very common in Sikkim, from the Terai up to 5,000 feet, and flies all through the year except during the three coldest months” (Sikkim Gaz. 1894, 171). Mr. G. C. Dudgeon took it in Bhotan. Mr. J. Wood-Mason obtained “two males in Cachar” (J. As. Soc. Beng. 1886, 377). Col. C. Swinhoe records it from the Khasia Hills (Tr. Ent. Soc. 1893, 312). Col. C. H. E. Adamson says it is “rare in Burma. I have taken only three specimens, two at Bhamo, and one in Tenasserim” (List, 1897, 47). Capt. E. Y. Watson obtained it at Tilin in March, and at Choungkwa in May, during the Chin-Lushai Expedition of 1889-90” (J. Bombay N. H. S. 1891, 54). Signor L. Fea obtained it in the Karen Hills from July to October. Mr. Elwes records “a few males from Tavoy, Ponsekai, and the Hills on the Siamese frontier” (J. As. Soc. Beng. 1886, 437). We possess males from the Upper Mekong, Shan States, Siam, taken by Mr. R. Roberts, C.E. Dr. N. Manders says it is a “common species everywhere in the Shan States, and in Karenni” (Tr. Ent. Soc. 1890, 535). A male, from Thaiping, Malay Peninsula, is in Mr. W. Rothschild’s collection.

ACHILLIDES TAMILANA (Plate 492, fig. 1, ♂, 1a, ♀).

Papilio Paris, var. Moore, Catal. Lep. Mus. E. I. Company, i. p. 107 (1857).

Papilio Tamilana, Moore, Trans. Ent. Soc. Lond. 1881, p. 313. Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 581.

Papilio (Achillides) Tamilana, Hampson, Journ. As. Soc. Bengal, 1888, p. 364.

Papilio Paris Tamilana, Rothschild, Nov. Zool. ii. p. 385 (1895).

IMAGO.—Male. Upperside similar to *A. Paris*. Forewing with the discal transverse band slightly broader, and either short or extending more or less obsolescently upward. Hindwing with the discal bluish-green patch much larger and broader, its lower end reaching the middle median veinlet, and its golden-green scaled continuation to the abdominal margin broader. Underside similar to *A. Paris*, except that, on the forewing, the discal transverse band is whiter, narrower, and sometimes more obsolescent anteriorly, its inner edge is also more or less excurved. On the hindwing, the submarginal red lunules are more distinctly surmounted with violet scales.

Female. Upperside similar to the male. On the hindwing, the anal ocellus is larger and brighter coloured, and the apical red lunule of the underside is sometimes apparent. Underside similar to the male.

Expanse, ♂ $4\frac{1}{2}$ to 5, ♀ 5 inches.

LARVA and PUPA.—UNKNOWN.

HABITAT.—South India.

DISTRIBUTION AND HABITS.—Messrs. Davidson and Aitken record it as being “found in many parts of the North Kanara District, Bombay, as far as Castle Rock, during the rains, and also in March and April, but it is very local. It has a regular beat, round and round, which it goes during the hottest hours of the day, with little change; so that by taking your stand where one has passed, you may make pretty sure of meeting it again every half hour or so, that is, if you go on missing it. If you catch it that ends the fun. Of course you get only males in this way. We do not know how females are to be got” (J. Bombay N. H. S. 1896, 581). Mr. T. R. Bell has “observed the female laying eggs on *Evodia Roxburghiana*, N. O. Rutaceæ” (de Nicéville, J. As. Soc. Beng. 1900, 258). Mr. G. F. Hampson found it “not common on the Nilgiris, from 3,000 to 7,000 feet” (J. As. Soc. Beng. 1888, 364). We possess a specimen from Kowdas, Travancore, taken at 2,000 feet, by Mr. Bourdillon.

CHINA AND INDO-MALAY SPECIES.—*Achillides Arcturulus* (Pap. *Arcturus subsp.* *Arcturulus*, Fruhstorfer, Deuts. Ent. Zeit. 1901, p. 349). Pap. *Arcturus*, pt. Rothschild, Nov. Zool. ii. p. 383 (1895). *Habitat.* W. and C. China.—*Achillides Charlesi* (Pap. *Krishna subsp.* *Charlesi*, Fruhstorfer, Soc. Ent. 1902, p. 73). *Habitat.* Szetchuan; Wa-shan; W. China.—*Achillides Chinensis* (Pap. *Paris subsp.* *Chinensis*, Rothschild, Nov. Zool. ii. p. 385 (1895). Pap. *Paris*, Leech, Butt. of China, p. 535 (1893). *Habitat.* W. China.—*Achillides Arjuna* (Pap. *Arjuna*, Horsfield, Catal. Lep. Mus. E. I. C. pl. 1, fig. 14, 14a, ♀; pl. 4, fig. 11, 11a, larva and pupa (1828). Doubleday and Hewits. Gen. D. Lep. i. p. 11 (1846). Moore, Catal. Lep. Mus.

E. I. C. i. p. 107, pl. 3, fig. 7, 7a, *larva* and *pupa* (1857). Wallace, Trans. Linn. Soc. xxv. p. 46 (1865). Oberthür, Etud. Ent. iv. p. 40 (1879). Rothschild, Nov. Zool. ii. p. 386 (1895). Pap. Paris, Zink.-Som. Nov. Acta. Acad. N. C. 1832, p. 142. Pap. Arjuna var. *Tenggerensis*, Fruhstorfer, Ent. Nachr. 1893, p. 286; *id.* Stett. Ent. Zeit. 1894, p. 119, pl. 3, fig. 1, ♂. *Habitat.* E. Java.—*Achillides Karna* (Pap. Karna, Felder, Verh. Z. B. Ges. Wien. 1864, p. 323; *id.* Reise Nov. Lep. i. p. 125 (1865). Pap. Arjuna Karna, Rothschild, *l.c.* p. 386 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 186. *Habitat.* West Java.—*Achillides Gedeensis* (Pap. Arjuna var. *Gedeensis*, Fruhstorfer, Ent. Nachr. 1893, p. 285; *id.* Berl. Ent. Zeit. 1902, p. 186. *Habitat.* Mt. Gede, W. Java.—*Achillides Carnatus* (Pap. Arjuna *subsp.* *Carnatus*, Rothschild, *l.c.* ii. p. 387 (1895). P. Arjuna Karnata, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 186. *Habitat.* Borneo.—*Achillides Prillwitzii* (Pap. Prillwitzii, Fruhstorfer, Ent. Nachr. 1893, p. 225; *id.* Berl. Ent. Zeit. 1902, p. 186. Rothschild, *l.c.* ii. p. 387 (1895). *Habitat.* W. Java.

Genus HARIMALA.

Harimala, Moore, Lep. of Ceylon, i. p. 145 (1881). Kirby, Allen's Nat. Libr. Butt. ii. p. 296 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 63), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 322, 370.

Papilio (group 25), Rothschild, Nov. Zool. ii. p. 387 (1895).

IMAGO.—Male. *Forewing* short, triangular; costa much arched, exterior margin moderately oblique and scalloped; cell broad; first subcostal branch at two-fifths and second at one-fifth before end of the cell; with, or without, a lengthened narrow tomentose streak on the lower and middle median and a much less developed streak on the submedian vein. *Hindwing* short; exterior margin deeply scalloped and furnished with a large spatular tail; abdominal margin long; first subcostal branch at one-half before end of the cell. Antennal club slender.

LARVA.—Limaciform; anterior segments convexly scutellated; with two short fleshy tubercles on anterior segment and two on anal segment.

PUPA.—Curved backwards anteriorly; head broad in front.

TYPE.—H. Crino.

HARIMALA CRINO (Plate 493, fig. 1, *larva* and *pupa*, 1a, b, ♂, 1c, d, ♀).

Papilio Crino, Fabricius, Ent. Syst. iii. i. p. 5 (1793); Jones, Icon. *ined.* i. pl. 53. Donovan, Ins. of China, pl. 23 (1793). Guerin, Rev. Zool. 1840, p. 43, pl. 1, fig. 1. Doubleday and Hewitson, Gen. D. Lep. i. p. 11 (1846). Gray, Catal. Lep. B. M. i. p. 18 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 109 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, p. 322. Butler, Catal. Fabr. Lep. B. M. p. 255 (1869). Westwood, Trans. Ent. Soc. Lond. 1872, p. 88. Oberthür,

Etud. Ent. iv. p. 40 (1879). Betham, Journ. Bombay N. H. Soc. 1891, p. 325. Rothschild, Nov. Zool. ii. p. 339 (1895). de Nicéville, Journ. As. Soc. Bengal, 1899, p. 223.

Papilio (Harimala) Crino, de Nicéville, Journ. As. Soc. Bengal, 1885, p. 51. Hampson, *id.* 1888, p. 364.

Papilio Crino, var. *montanus*, Felder, Verh. Z. B. Ges. Wien. 1864, pp. 322, 370.

Harimala montanus, Moore, Lep. of Ceylon, i. p. 146, pl. 61, fig. 1, ♀ (1881).

IMAGO.—Male. Upperside brownish-black; densely covered with emerald-green scales; cilia alternated with white. *Forewing* with a transverse discal vein-divided erect band, extending more or less narrowly from the costa, outside end of the cell, and thence widens to the posterior margin before the angle, the band is bright emerald-green—or, in some lights, bright blue, its inner-edge being nearly straight and even, and its outer-edge generally more or less sinuous; furnished—but not always—with a more or less developed elongated slender brown tomentose streak along middle of the two lower median veinlets and a much less developed streak on the submedian vein. *Hindwing* with a broader transverse discal oblique band, of variable width, which is either entirely emerald-green or anteriorly blue—or in some lights entirely-blue; this band starts from the upper subcostal and is widest anteriorly, its inner-edge being even and somewhat recurved, its outer-edge more or less diffusely rounded between the veins; at the anal angle is a prominent red nearly-complete ocellus with black centre, and anteriorly surmounted by a violet-scaled lunule; along the lower margin are generally three distinct green-scaled slender lunules; tip of tail with a green or blue-scaled spot. Underside. sepia-brown. *Forewing* with the basal, costal, and outer margin numerously irrorated with ochreous scales; crossed by an outer-discal excurved narrow ochreous-white broken sinuous fascia. *Hindwing* numerously irrorated with ochreous scales; crossed by a submarginal complete row of ochreous lunules and a redder anal ocelloid spot, each being inwardly preceded by a contiguous slender violet-scaled lunule, and the entire series generally enclosed by an inner submarginal slender ochreous-scaled line. *Body* above black, speckled with green scales, beneath brown and ochreous scaled; palpi, and fore femora beneath whitish; legs brown; antennæ black.

Female. Upperside similar to male, except that the forewing is without the tomentose streaks, the transverse band narrower and more regularly sinuous between the veins. *Hindwing* with the band varying in width, as in male. Underside similar to the male.

Expanse, ♂ $3\frac{1}{4}$ to $3\frac{3}{4}$, ♀ $3\frac{3}{4}$ to 4 inches.

LARVA.—Somewhat limaciform; anterior segments convexly scutellated; furnished with a pair of short fleshy tubercles on anterior and two on anal segment.

PUPA.—Curved backward anteriorly; head broad in front; green.

HABITAT.—Ceylon; South India; Central Provinces; Lower Bengal.

DISTRIBUTION.—In Ceylon, this butterfly is recorded by Mr. F. M. Mackwood

as occurring in the "low country and to be seen occasionally above 2,000 feet elevation. It is usually abundant in March and April. Its flight is swift. Capt. Hutchison says it occurs everywhere in the Plains and Hills up to 6,000 feet. Abundant during the S.W. Monsoon. Flight very rapid, but wavering, and difficult to capture on the wing. Settles on leaves. Capt. Wade found it rather scarce at Galle, but common at Kandy" (Lep. Ceylon i. 146). Mr. de Nicéville writes, "In Ceylon it is common and widely distributed; the females are rare. It is less common in the higher hills, where it is probably a passenger only; it is abundant at Kandy, and common in the Northern Provinces as far north as Anaradhapura, in June, July, and December" (J. As. Soc. Beng. 1899, 223). The larva was found by Mr. John Pole, in Ceylon, feeding on the Satin-wood tree, *Chloroxylon Swietenia*, in December, and from whose drawing our description and the figures on Plate 493 are taken. In South India, it was taken by the late S. N. Ward, on the Nilgiris. Mr. G. F. Hampson obtained it on the "Nilgiris, from 1,000 to 3,000 feet elevation" (Journ. As. Soc. Beng. 1888, 364). Capt. E. Y. Watson obtained it in Berhampur, Ganjam, Madras, in October; and Mr. J. Walhouse took it in Coimbatore. Mr. Betham records it from the "Central Provinces" (J. Bombay N. H. S. 1891, 325). Mr. W. C. Taylor found it "common in Khorda, Orissa" (List 1888, p. 16). Mr. L. de Nicéville writes, "Single specimens met with in the Calcutta District throughout the hot weather. It first appears in March, but is the rarest *Papilio* in Calcutta" (J. As. Soc. Beng. 1885, 51).

HARIMALA BUDDHA (Plate 494, fig. 1, larva and pupa, 1a, b, ♂, 1c, ♀).

Papilio Buddha, Westwood, Trans. Ent. Soc. Lond. 1872, p. 86, pl. 3, fig. 1, ♂. Butler, Proc. Zool. Soc. Lond. 1881, p. 612. Rothschild, Nov. Zool. ii. p. 389 (1895). Davidson and Aitken, Journ. Bombay N. H. Soc. 1896, p. 581, pl. 6, fig. 2, 2a, larva and pupa.
Papilio (Harimala) Buddha, Hampson, Journ. As. Soc. Bengal, 1888, p. 364.

IMAGO.—Male. Upperside black; the base of both wings densely, and the apex of forewing sparsely, irrorated with bright green scales; cilia alternated with pale ochreous. *Forewing* with a broad transverse medial band, extending from the costa across apex and outer edge of the cell and thence widens—to generally twice of its anterior width—to the posterior margin before the angle; this band is bright emerald-green, or, in some lights, bright blue, its inner edge is straight and its outer edge wavy. *Hindwing* with a very broad transverse medial emerald-green band, of variable width, starting from the upper subcostal veinlet and extending across the cell to abdominal margin, its inner-edge being straight and even and its outer-edge much excurved and diffusely speckled; at the anal angle is a more or less prominent reddish-ochreous or red ocellus, followed by four lower submarginal slightly-defined lunular clusters of green scales and then two upper reddish-ochreous lunules. In

some lights the band and scaling on both wings is blue. Underside dark sepia-brown. *Forewing* with the basal area numerously irrorated with pale ochreous scales; crossed by a broad outer-discal pale ochreous-grey fascia traversed by brown veins and intervening streaks, the fascia decreasing to a point at the posterior angle, the extreme outer apical area being pale brown. *Hindwing* with the basal area to the submargin numerously irrorated with pale ochreous scales, these scales being more densely packed within and below the cell; beyond is an outer-marginal purplish-grey band, traversed by a submarginal complete series of ochreous-red lunules and an anal ocellus, each being outwardly-edged by a black line and inwardly bordered by a bright blue grey-scaled lunule. *Body* above black; head and thorax speckled with green scales; palpi white; collar white spotted; body beneath dark brown, speckled with ochreous scales; legs black, femora beneath whitish; antennæ black.

Female. Upper and underside similar to the male.

Expanse, ♂ 4 to 4 $\frac{1}{4}$, ♀ 4 $\frac{1}{4}$ inches.

LARVA.—Adult. Anterior segments scutellated; a pair of short fleshy tubercles on second segment and a pair on anal segment. Colour green, with a whitish line edging the scutellum, and a whitish lower line from the fifth to anal segment; the middle and posterior legs also white.

PUPA.—Much curved backwards, attenuated anteriorly; head cleft in front; colour green.

HABITAT.—South India.

LIFE HISTORY, HABITS, ETC.—“This butterfly appears to be spread over the whole district of North Kanara, affecting cultivated tracts as well as forest, and is by no means rare in some parts; but it is one of the most difficult butterflies to come by. It usually flies very high and fast, and seldom alights or hovers over flowers. When caught, if not already broken, it often contrives to break off a goodly bit of one wing in the net. We had long been sure that it laid its eggs on *Zanthoxylum Rhetsa*, and at last, on September 24th, 1892, we got one larva. This died two days later, but we had got on the scent now, and hunted every accessible leaf of every known tree within some miles of Karwar. To realize the difficulties of the search, it must be remembered that the ‘Tirphal’ tree is studded with thorns on every branch and twig and all down the stem to the roots, while the principal boughs will scarcely bear the weight of a man. Add that the caterpillar rests motionless on the upperside of a leaf, which is of exactly the same shade of green as itself, and that it is slightly speckled with a paler shade in imitation of the effect produced on the leaf by minute insects eating away the soft tissue. However, with the aid of ladders we got four larvæ, of which we succeeded in rearing three. Next year we did not find any, but in 1894 the butterfly was unusually common, and we

got several. The larva, when young is spiny, but when full-grown only two pairs of minute sharp processes remain on the 2nd and last segment. A thin, but well-defined, yellow ridge, commencing at each side of the 2nd segment, encircles the 5th segment, enclosing an oval space as seen from above. The colour is green, faintly freckled as mentioned above. When at rest the larva often holds the head and forepart raised after the manner of a Sphinx moth. The pupa is in outline a little like the others of the group, but it is straighter, less angular, and entirely wants the dorsal process on the thorax; the head processes are long and upturned; the back is keeled, and the sides also in a less degree; the colour is a wonderful example of 'protective resemblance.' It consists of two shades of green, sharply separated by the lateral keel; the ventral, half which is of course uppermost, has the dark green tint of the upperside of the leaf of *Z. Rhetsa*, while the dorsal half, like the underside of the same leaf, is of a pale and dull shade. We do not understand the seasons of the butterfly's appearance. It is not seen in June and July, but begins to appear in August, is common by October, and may be met with till the end of the year. Now the 'Tirphal' tree loses every leaf soon after the close of the monsoon, and remains bare until the following April at least, more often till June. We are almost forced to conclude that the butterflies which we see from October onwards lay their eggs on the dry trees, and that these, hatching in the following June, produce the first butterflies seen in August. There may then be one or even two larger broods before the trees become unfit for food" (J. Davidson and E. H. Aitken, Journ. Bombay N. H. Soc. 1896, 581).

DISTRIBUTION.—"This butterfly appears to be spread over the whole district of North Kanara, affecting cultivated tracts as well as forest, and is by no means rare in some parts, but it is one of the most difficult butterflies to capture. It usually flies very high and fast, and seldom alights or hovers over flowers" (J. Davidson and E. H. Aitken, J. Bombay N. H. S. 1896, 581). Mr. S. N. Ward found it "rare in Kanara, but in Calicut and Malabar generally, it is more common, chiefly just after the Monsoon. I have seen it on the Nilgiris, and it is found on the Karnatic Hills, even on the isolated range near Vellore" (MS. Notes). A specimen taken on "Matheran Hill" is in Mr. H. Druce's collection. Mr. G. F. Hampson records it as "confined to the Western slopes of the Nilgiris, where it is not uncommon" (J. As. Soc. Bengal, 1888, 364).

Of our illustrations on Plate 494, fig. 1, *larva* and *pupa*, is copied from Messrs. Davidson and Aitken's published figure; 1a, b, a male, and 1c, a female.

HARIMALA PALINURUS (Plate 495, fig. 1, 1a, ♂, 1b, ♀).

Papilio Palinurus, Fabricius, Mant. Ins. ii. p. 2. (1787); *id.* Ent. Syst. iii. i. p. 5 (1793). Godart, Encyc. Méth. ix. p. 66 (1819). Boisduval, Spéc. Gen. Lep. i. p. 207 (1836). De Haan, Verh. Nat. Gesch. Ned. 1840, p. 28, pl. 7, fig. 3. Doubleday and Hewitson, Gen. D. Lep. i. p. 11

(1846). Vollenhoven, Tijl. v. Ent. 1860, p. 73. Butler, Catal. Fabr. Lep. B. M. p. 255 (1869). Oberthür, Etud. Ent. iv. p. 40 (1879). Rothschild, Nov. Zool. ii. p. 387 (1895). de Nicéville, Journ. As. Soc. Bengal, 1899, p. 335.

Papilio (Harimala) Palinurus, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 523.

Papilio Regulus, Stoll, Cram. Pap. Exot. Suppl. p. 175, p. 41, fig. 1, 1a, ♀ (1790).

Laertias Regulus, Hübner, Verz. bek. Schmett. p. 84 (1816).

Papilio Brahma, Guérin, Rev. Zool. 1840, p. 43, pl. 1, fig. 3, 4, ♂ ♀; *id.* Deless. Voy. Inde. ii. p. 71 (1843). Gray, Catal. Lep. B. M. i. p. 18 (1852). Felder, Verh. Z. B. Ges. Wien. 1864, p. 322. Wallace, Trans. Linn. Soc. xxv. p. 46 (1865). Druce, Proc. Zool. Soc. 1873, p. 357. Distant, Rhop. Malay. p. 338, pl. 32, fig. 4, ♂ (1885). Hagen, Iris, vii. p. 26 (1894).

IMAGO.—Male. Upperside black. *Forewing* with the basal and outer area numerously irrorated with bright green scales; a transverse medial bright green band, extending from the costa across apex and outer edge of the cell and thence generally widening somewhat, to the posterior margin, the band in some lights changing to bright blue, its inner-edge being straight or slightly excurved and its outer-edge more or less slightly uneven and excurved. *Hindwing* with the basal area densely irrorated with bright green scales; a transverse lower-medial bright green band, somewhat wedge-shaped and of variable width, starting broadly from above the lower subcostal and across apex of the cell and thence decreasing in width to abdominal margin; the band in some lights changing to bright blue, its inner-edge being even and almost straight, its outer-edge more or less uneven and speckled; beyond is a submarginal series of either four or five broad green-scaled lunules, an apical obscure red lunule, and an anal ocellus, the latter inwardly edged by blue scales. Underside dark sepia-brown. *Forewing* with the basal area densely irrorated with pale ochreous scales; crossed by a broad outer-discal pale greyish-ochreous fascia traversed by blackish veins, decreasing to a point at the posterior angle. *Hindwing* with the basal area very densely, and the inner-discal area sparsely irrorated with pale ochreous scales, the outer marginal area being paler brown and traversed by a submarginal row of blackish outer-bordered slender red lunules, and an anal ocellus, the apical one being larger and broader, and each more or less distinctly inwardly-edged with blue scales. *Body* above and frontal tuft thickly speckled with green scales; body beneath speckled with pale ochreous scales; palpi white; legs and antennæ black.

Female. Upperside similar to the male. *Forewing* with the transverse green band somewhat narrower and more excurved. *Hindwing* with the band also somewhat narrower; with two upper submarginal ochreous-red lunules, and brighter red anal ocellus. Underside as in the male.

Expanse, ♂ $3\frac{1}{2}$ to 4, ♀ $3\frac{3}{4}$ inches.

HABITAT.—Burma; Tenasserim; Malay Peninsula; Sumatra; Borneo.

DISTRIBUTION AND HABITS.—Mr. L. de Nicéville writes, "Widely distributed in

Burma, but is always rare. Mr. T. A. Hauxwell notes "this butterfly has the habit of bathing in shallow water in hill streams. It skims the surface of the water like a swallow, and dips its body into the water, giving itself a shake as it comes out and then flies on again" (J. Bombay N. H. Soc. 1899, 335). Col. C. H. E. Adamson obtained "two specimens in the Upper Tenasserim provinces, one in October, the other in January" (List, 1897, p. 47). Col. C. T. Bingham obtained it in the Yoonzaleng Valley and at Haundraw, in November.

Of our illustrations on plate 495, fig. 1, 1a is from a male taken at Tavoy, Tenasserim, by Mr. Tucker; fig. 1b is from a Malacca female.

INDO-MALAY SPECIES.—*Harimala Adventus* (Pap. *Palinurus Adventus*, Fruhstorfer, Deuts. Ent. Zeit. Iris, 1902, p. 306. *Habitat.* Nias.—*Harimala Angustata* (Pap. *Dædalus var. Angustatus*, Staüdinge, Iris, i. p. 273 (1888); *id.* ii. p. 12 (1889). Pap. *Palinurus Angustatus*, Rothschild, Nov. Zool. ii. p. 388 (1895). *Habitat.* Palawan.—*Harimala Dædalus* (Pap. *Dædalus*, Felder, Wien. Ent. Monats. v. p. 298 (1861); *id.* Reise Nov. Lep. i. p. 123, pl. 18, fig. B, ♂ (1865). Wallace, Trans. Linn. Soc. xxv. p. 46 (1865). Westwood, Tr. Ent. Soc. 1872, p. 90. Oberthür, Etud. Ent. iv. p. 40 (1879). Semper, Philipp. Tagfalt. p. 278 (1892). Pap. *Palinurus*, Guérin, Rev. Zool. 1848, p. 44, pl. 1, fig. 2. *Habitat.* Philippines.—*Harimala Peranthus* (Pap. *Peranthus*, Fabricius, Mant. Ins. ii. p. 4 (1787). Donovan, Ins. of China, pl. 25 (1798). Lucas, Lep. Exot. p. 22, pl. 12, fig. 2 (1835). Boisd. Spéc. Gen. Lep. i. p. 203 (1836). Doubleday and Hewits. Gen. D. Lep. i. p. 11 (1846). Moore, Catal. Lep. Mus. E. I. C. i. p. 109 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, p. 322. Wallace, Trans. Linn. Soc. xxv. p. 45 (1865). Butler, Catal. Lep. Fabr. B. M. p. 255 (1869). Oberthür, Etud. Ent. iv. p. 40 (1879). Staudinger, Exot. Schmett. i. p. 8 (1884). Haase, Untersuch. üb. Mim. p. 51 (1893). Rothschild, Nov. Zool. ii. p. 390 (1895). *Habitat.* Java.

Genus TAMERA.

Tamera, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1888). Kirby, Allen's Nat. Libr. Butt. ii. (1896).

Papilio (sect. 60, subsec. C.), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 320, 368.

Papilio (group 19), Rothschild, Nov. Zool. ii. p. 357 (1895).

IMAGO.—Male. *Forewing* triangular; costa arched, apex convex. *Hindwing* short, broad, exterior margin convex and scalloped, the angle at end of upper median broadly dentate and slightly produced. Antennæ slender, with a gradually lengthened club.

LARVA.—[Dravidarum]. "Head and shape of body as in the group containing *Pap. Helenus*, *Polymnestor*, and *Pammon*. Last segment with two subdorsal longish conical tubercles; segment twelve with two much smaller tubercles."

PUPA—"Head with processes like *Pap. Helenus*, diverging considerably; thorax running up into a short laterally-compressed process, rounded on the top" (T. R. Bell, MS. Note).

TYPE.—*T. Castor*.

MIMICRY.—The normal female of *T. Castor* is probably a mimic of the Euplœine butterflies *Tirumala Linnia* or *Caluga Melaneus*, and also bears a fair resemblance to the protected Papilionine, *Chilasa dissimilis*. The female of *T. Mehala*, also, has a similar resemblance to *Chilasa Onpape*. Both sexes of *T. Dravidarum* are excellent mimics of the Euplœine butterfly, *Crastia Core*, and have a resemblance also to *Chilasa Casyapa*. The male of *T. Mahadeva* fairly resembles *Chilasa Papone*, and the female the *Chilasa Onpape*; the female also probably being a mimic of the Euplœine, *Crastia Layardi*.

TAMERA CASTOR (Plate 496, fig. 1, 1a, b, ♂, 1c, d, e, ♀).

(Plate 497, fig. 1, 1a, b, ♀, Var.)

Papilio Castor, Westwood, Ann. and Mag. Nat. Hist. ix. p. 37, ♂ (1842); *id.* Arcana Entom. ii. p. 129, pl. 80, fig. 2, 2a, ♂ (1845). Doubleday and Hewitson, Gen. D. Lep. i. p. 12 (1846). Gray, Catal. Lep. Brit. Mus. i. p. 21 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 93 (1857). Semper, Wien. Ent. Monats. vi. p. 281, pl. 19 (gynandromorphic Var.). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 320, 367. Oberthür, Etud. Entom. iv. pp. 49, 114 (1879). Wood-Mason, Journ. As. Soc. Beng. 1880, p. 146, pl. 9, fig. 1, 2, ♂ ♀. Westwood, Proc. Zool. Soc. Lond. 1881, p. 479, pl. 44, fig. 1, 2, 3, ♂. Elwes, Trans. Ent. Soc. Lond. 1888, p. 437. Robbe, Ann. Soc. Ent. Belg. 1892, p. 124. Haase, Untersuch. üb. Mim. p. 46 (1893). Rothschild, Nov. Zool. ii. p. 357, ♂ ♀ (1893). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 175.

Papilio (Charus) Castor, Wood-Mason, Journ. As. Soc. Bengal, 1886, p. 375, ♂ ♀.

Tamera Castor, Moore, Desc. Lep. Coll. Atkinson, p. 284, ♂ ♀ (1888). Swinhoe, Trans. Ent. Soc. 1893, p. 315.

Papilio (Tamera) Castor, de Nicéville, Sikkim Gazetteer, 1894, p. 172, ♂ ♀. Watson, Journ. Bombay Nat. Hist. Soc. 1897, p. 672.

Papilio Pollux, Westwood, Ann. and Mag. Nat. Hist. ix. p. 137, ♀ (1842); *id.* Arcana Entom. ii. p. 129, pl. 80, fig. 1, ♀ (1845). Doubleday and Hewitson, Gen. D. Lep. i. p. 21 (1846). Westwood, Proc. Zool. Soc. Lond. 1881, p. 479, pl. 44, fig. 4, ♀.

IMAGO.—Male. Upperside rich dark brown. *Forewing* with the cell-streaks and outer area irrorated with minute ferruginous scales; a marginal series of very small white ciliary dentate-lunules, and, more rarely, one or two lower submarginal dots. *Hindwing* with the lower outer-area sparsely ferruginous scaled; an upper-discal prominent broad creamy-white patch composed of either four or five portions, the lowest being narrow and speckled with brown scales; sometimes a few white scales are clustered within apex of the cell; generally, three or four very small upper sub-marginal white-scaled incipient lunules are present, these latter, in some, being more distinctly formed; marginal intervening ciliæ white. Underside paler.

Forewing with the cell-streaks and apical area sparsely ferruginous scaled; a small prominent white spot at lower end of the cell, a submarginal incomplete, or complete row of small white dentate spots, and marginal dentate-lunules. *Hindwing* basally more or less irrorated with ferruginous scales; the upper-discal patch, as on upper-side, white, its portions being narrower and smaller, and in some specimens, with decreasing portions continued to the abdominal margin; beyond is a complete row of submarginal white dentate-lunules, and then slender cilia lunules. *Body* dark brown; front of thorax, collar, and palpi black, spotted with white; abdomen with a sublateral and lateral rows of white spots; antennæ and legs black, fore femora white beneath.

Female. Upperside dark ochreous-brown, ferruginous-scaled. *Forewing* with a large white spot at lower end of the cell, a submarginal row of conical-dentate spots—the series varying in size in different specimens, and marginal row of cilia dentate spots. In many specimens there is also a lower discal series of upward-decreasing faint sullied grey-scaled streaks. *Hindwing* with the cell, or its apical half only, filled up with sullied grey-scaled streaks, and the outer interspaces between the veins from their base to the outer disc, also filled up with sullied grey scales; beyond is a submarginal row of prominent white dentate-lunules, and then marginal slender cilia lunules. Underside duller coloured than the upperside. *Forewing* with larger prominent white spot at lower end of the cell, submarginal and marginal spots and lower discal sullied-white streaks. *Hindwing* with the cell streaks and discal interspaces, as on upperside, sullied-white or grey scaled, the submarginal dentate lunules larger and prominently white; the marginal cilia lunules white.

Female. Var. (Plate 497, fig. 1, 1a, b).—Upperside. *Forewing* with either very small or moderate-sized cell spot and submarginal row of spots and marginal dentate-lunules. *Hindwing* with a discal transverse sullied-white band sparsely speckled with brown scales; a few sullied-white scales are also sometimes present within apex of the cell; submarginal dentate-lunules either narrow or moderately broad. Underside. *Forewing* with large white cell-spot, submarginal spots, and small dentate marginal lunules, and faint lower discal intervening speckled streaks. *Hindwing* with discal transverse band as on upperside, but somewhat whiter, submarginal row of broader white lunules and narrow cilia lunules.

Expanse, ♂ $3\frac{3}{4}$ to $4\frac{3}{4}$, ♀ 4 to 5 inches.

HABITAT.—Sikkim; Assam; Naga, Cachar, and Khasia Hills; Upper Burma; Tonkin.

DISTRIBUTION.—Mr. H. J. Elwes records it as “not uncommon in Sikkim, up to 2,000 or 3,000 feet elevation, from April till October, but the females are less often procured than the males” (Trans. Ent. Soc. 1888, 437). Mr. L. de Nicéville says it “flies, in Sikkim, from 1,000 to 3,000 feet, from April to October” (Sikk. Gaz.

1894, 172). A male, from Bhotan, is in the British Museum Collection. Mr. J. Wood-Mason verifies examples in the Indian Museum, Calcutta, from "Sikkim, Silhet, and Cherra Punji, Khasia and Naga Hills" (Journ. As. Soc. Beng. 1880, 147). "Seventeen males taken at Irangmara, Cachar, in July and August" (*id.* l.c. 1886, 375). Col. C. Swinhoe records it from the Khasia Hills (Trans. Ent. Soc. 1893, 315). Capt. E. Y. Watson obtained "a single quite typical female in the Upper Chindwin Hills, Burma, in April" (Journ. Bombay N. H. S. 1897, 672). Col. C. H. E. Adamson "found males common on a jungle path near Shevegoo, in the Bhamo District, Upper Burma, in September, 1887. They, in company with *Pap. Chaon* and *Pap. Helenus*, were to be found resting on damp, sandy roads under lofty trees. No females were to be seen on the roads, but they could be found by searching the dense undergrowth on the side of the road" (List, 1897, 48). Signor L. Fea obtained two females at Bhamo, in October. Specimens of both sexes, labelled "Mungpha, Burma, from Mr. W. S. Atkinson," are in the British Museum Collection.

MIMICRY.—The normal female of this species is probably a mimic of the Euploëine butterflies *Tirumala Limniace* or *Caduga melaneus*, and also bears a fair resemblance to the Papilionine *Chilasa dissimilis*.

TAMERA MEHALA (Plate 498, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Mehala, Grose-Smith, Ann. and Mag. Nat. Hist. 1886, p. 150; *id.* Rhop. Exotica, i. *Pap.* pl. 2, fig. 1, ♂, 2 ♀ (1888).

Papilio Castor, subsp. *Mehala*, Rothschild, Nov. Zool. ii. p. 358, ♂ ♀ (1895).

IMAGO.—Male. Upperside rich dark brown. *Forewing* with the cell-streaks and outer area numerously irrorated with minute ferruginous scales; a minute white spot at lower end of the cell, a marginal row of white small dentate cilia spots, and very rarely also a submarginal lower row of minute spots. *Hindwing* with the cell and lower basal area—and sometimes also the lower outer area—irrorated with ferruginous scales, these scales in the outer area being occasionally greyish; across the disc is a prominent creamy-white broad band, its portions gradually decreasing posteriorly, the upper portion being also small, in some specimens the portions are of more uniform length, while in others the lower three portions are much the smallest, and the two lowest tinged with pale ochreous, or, sometimes, obsolescent, being feebly white-scaled; beyond is an upper submarginal row of three or four feebly defined small white-scaled lunules, or a complete row of distinct white lunules, and then a marginal row of slender cilia lunules. Underside paler. *Forewing* with the cell-streaks and apical area ferruginous-scaled; a prominent white small cell spot, marginal dentate cilia spots, and lower submarginal spots. *Hindwing* with

the entire basal and lower area ferruginous-scaled, the discal band whiter and narrower than on upperside, the portions being of more uniform length; submarginal lunules prominent and broad, the cilia lunules distinct. *Body* dark brown; front of thorax, collar, and palpi black, spotted with white; abdomen with a lateral, sublateral, and ventral row of white spots; antennæ and legs black; femora white beneath.

Female. Upperside dark ochreous-brown. *Forewing* darkest basally; cell-streaks and veins dark brown; a prominent white large spot at lower end of the cell, a submarginal excurved row of large white posteriorly-decreasing conical spots, and a marginal row of small dentate cilia spots. *Hindwing* with a discal transverse row of sullied-grey lanceolate spots, the upper one short and irregular shaped, the next two large and broad, the others narrower and decreasing in size; beyond is a submarginal series of prominent white broad dentate lunules, of which the two upper are broadest and the anal one a straight bar; cilia lunules white and slender. Underside similar to upperside. *Forewing* with larger white spot at lower end of the cell, large submarginal spots and small marginal cilia spots. *Hindwing* with discal grey lanceolate spots, submarginal large white lunules, and marginal slender lunules, as on upperside.

Expanse, ♂ 4 to 4 $\frac{3}{4}$, ♀ 5 inches.

HABITAT.—Lower Burma; Upper Tenasserim.

DISTRIBUTION.—We possess a male from Palon, Pegu, taken in August. Mr. H. Grose-Smith's types are from Tounghoo. He has also since obtained males from the Tounghoo Hills, taken by Mr. J. A. Hauxwell in March.

MIMICRY.—The female of this species has a fair resemblance to the Papilionine, *Chilasa Onpape*.

Our illustrations on Plate 498 are taken from the type specimens in Mr. H. Grose-Smith's Collection.

TAMERA MAHADEVA (Plate 499, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Mahadeva, Moore, Proc. Zool. Soc. Lond. 1878, p. 840, pl. 51, fig. 1, ♂. Wood-Mason, Journ. As. Soc. Bengal, 1880, p. 144. Rothschild, Nov. Zool. ii. p. 359 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 176.

Papilio (Charus) Mahadeva, Elwes and de Nicéville, Journ. As. Soc. Beng. 1887, p. 437, ♂ ♀.

IMAGO.—Male. Upperside rich dark brown. *Forewing* with the cell-streaks and outer area numerously irrorated with minute ferruginous scales; a very small white spot at lower end of the cell; a marginal row of small white dentate cilia spots, and in some specimens also a lower submarginal series of three or four similar small dentate spots are present. *Hindwing* with the cell and lower outer area irrorated with

ferruginous scales, those anteriorly gradually changing to grey; an outer-discal transverse row of seven creamy-white short broad conical spots, these spots varying in size in different specimens, and in some examples the three lowest decrease in size; beyond is a submarginal corresponding row of small narrow dentate lunules, and then a marginal row of slender cilia lunules, in some specimens two or three of the lower discal and submarginal row are tinged with ochreous-yellow. Underside paler. *Forewing* with the small white cell-spot, marginal cilia dentate spots, and the lower sub-marginal spots prominent. *Hindwing* with the outer-discal row of white spots, as above, but decreasing in size at each end, submarginal dentate lunules, and marginal slender cilia lunules.

Female. Upperside paler than in male, ochreous-brown, irrorated with ferruginous scales. *Forewing* with prominent white cell-spot and complete submarginal row of very small spots, and cilia spots. *Hindwing* with an outer-discal row of brown-speckled sullied white short lanceolate pointed spots, submarginal narrow dentate lunules, and very slender cilia lunules, the anal one of the latter being tinged with ochreous. Underside paler than in male. *Forewing* with prominent white cell spot, submarginal and marginal spots, as on upperside. *Hindwing* with similar sullied white short lanceolate pointed spots, submarginal narrow dentate lunules, and very slender cilia lunules, as on upperside. *Body* dark brown; front of thorax and head black, spotted with white; abdomen with a lateral, sublateral, and ventral row of white spots; antennæ and legs black, femora white beneath.

Expanse, ♂ $3\frac{1}{2}$ to $4\frac{1}{2}$, ♀ 4 inches.

HABITAT.—Lower Burma; Tenasserim; Shan States; N.-W. Siam.

DISTRIBUTION.—Signor L. Fea obtained it in the "Karen Hills, 600 to 700 feet elevation, in April." The type specimen was taken on the road from "Moolai to Moolat, 4,500 feet elevation, Upper Tenasserim" (P. Z. S. 1878, 840). Col. C. H. E. Adamson obtained "one male at Hpapoon on the Yoonzaleen River, Middle Tenasserim, in September" (List 1897, 48). Mr. H. Grose-Smith possesses males from the Ataran Valley, taken in February, and from the Thoungyeen Valley, Upper Tenasserim, taken in January by Mr. J. A. Hauxwell. Mr. W. Rothschild has males from Tenasserim, and both sexes from Muong Gnow, Shan States, N.-W. Siam. We possess a male from "Hills between Burma and Siam," and also a male from Tavoy, Lower Tenasserim, taken in February by Mr. Tucker.

MIMICRY.—The male of this species fairly resembles the Papilionine *Chilasa Papone*, and the female the *Chilasa Onpape*; the female also, probably, being a mimic of the Euplœine, *Crastia Layardi*.

Our illustrations on Plate 499, figs. 1, 1a, are from a Tenasserim male, and figs. 1b, c, from the Shan States female in Mr. W. Rothschild's Collection.

TAMERA DRAVIDARUM (Plate 500, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Dravidarum, Wood-Mason, Journ. Asiatic Soc. Bengal, 1880, p. 144, ♂ ♀, pl. 8, fig. 1, ♂.
Rothschild, Nov. Zool. ii. p. 359 (1895).

Papilio Pollux, var. *Dravidarum*, Westwood, Proc. Zool. Soc. Lond. 1881, p. 482, pl. 45, fig. 1 ♂,
fig. 2, ♀.

Papilio (Chilasa) Dravidarum, Hampson, Journ. As. Soc. Bengal, 1888, p. 363. Ferguson, Journ.
Bombay Nat. Hist. Soc. 1891, p. 446.

Papilio Abrisa Kirby, Proc. Roy. Dublin Soc. 1880, p. 338. Davidson and Aitken, Journ. Bombay
Nat. Hist. Soc. 1896, p. 583. de Nicéville, Journ. As. Soc. Bengal, 1900, p. 259.

IMAGO.—Male. Upperside rich dark ochreous-brown. *Forewing* darkest basally, cell-streaks and outer area irrorated with minute ferruginous scales; a very small white spot at lower end of the cell, a submarginal transverse excurved row of nine prominent creamy-white short conically-dentate spots, and a marginal row of small dentate ciliary spots. *Hindwing* with the cell and outer area irrorated with ferruginous scales, those towards the apex gradually changing to grey; a discal transverse row of seven creamy-white broad short lanceolate spots, which are more or less slightly irrorated with brown scales, these spots generally decreasing in size posteriorly; beyond is a submarginal row of large narrow dentate lunules, the upper one largest and conical, and the anal one straight; ciliary lunules white, narrow. Underside paler. *Forewing* with a prominent white apical cell-spot, submarginal conically-dentate spots, and small marginal spots. *Hindwing* with discal unsullied white lanceolate spots, submarginal wider dentate lunules, and narrow marginal ciliary lunules. *Body* dark brown; front of thorax, collar, and head black, spotted with white; abdomen with a lateral, sublateral, and ventral row of white spots; antennæ and legs black; femora white beneath.

Female. Upperside somewhat paler than the male. *Forewing* with a prominent small white cell-spot, larger submarginal spots and marginal ciliary spots. *Hindwing* with similar discal row of somewhat larger brown-speckled white lanceolate spots, submarginal dentate lunules and marginal slender ciliary lunules. Underside paler. *Forewing* with prominent white large cell-spot, larger dentate submarginal spots, and marginal ciliary spots. *Hindwing* with large white discal lanceolate spots, submarginal lunules, and slender ciliary lunules.

EXpanse, ♂ 4 to $4\frac{1}{4}$, ♂ $4\frac{1}{2}$ inches.

HABITAT.—South India.

LIFE HISTORY.—“EGG.—Spherical, slightly roughened on the surface, coarsely covered with a red-brown pigment in blotches, thickly on the top, more thinly at the bottom; surface shiny.”

LARVA.—“Head and shape of body as in the group containing *Helenus Polymnestor*, and *Pammon*. Last segment has two sharp, hard, longish, subdorsal,

conical, yellow tubercles—one on each side. Segment twelve has two very much smaller tubercles. The eyes at the end of the marking of the ridge of segment four are surrounded at some distance by a black line, and have a black patch at the bottom, this patch being lined at the top with yellow, the eye itself is a thin black circumference with four blue segments of circles surrounding a blue square in the middle. The intersegmental membrane of segments five and six is black. On segments two to twelve is a lateral and subdorsal blue spot. The intersegmental membrane of all the segments, except five and six, is blue. Spiracles light, oval, with a thin black border. The colour of the body is a mottled dark, transparent-looking green, with a white marginal line on segments seven to twelve. The band of segments eight and nine (*vide P. Helenus*) is of a slightly darker green than the body, and indistinct."

PUPA.—“Head with processes like *P. Helenus*, diverging considerably, hardly toothed inside, rounded on the top and a good deal compressed laterally. Eyes more prominent underneath than in *P. Polymnestor*. Segment two concave; thorax running up into a short, laterally-compressed process, rounded on the top and at right angles to median axis of pupa. Surface of wing-cases much less rugose than in *P. Helenus* and *Polymnestor*. Dorsal line of abdomen from segment four to cremaster nearly a straight line; the ventral line from end of wing cases to the end is also a straight line, and is in the same straight line with the sutural line of the wing-cases. Very small subdorsal tubercles on segments eight and nine. Spiracles depressed, oval, striated transversely. Surface of pupa finely rugose. Colour green, abdomen dorsally yellow; a subdorsal dark green spot on each segment. Length $1\frac{1}{2}$ to $2\frac{1}{4}$ inches. Feeds on *Glycosmis pentaphylla*.” (T. R. Bell, Karwar, Bombay in letter dated August 14th, 1895.)

DISTRIBUTION AND HABITS, ETC.—“This butterfly easily passes for *Papilio Panope* [*Chilasa Casyapa*] on a careless view, and even for *Euploea Core* [*Crastia Core*], so that it may well be less rare than might be supposed from the number of specimens caught or noticed. At Karwar, in the Kanara District of Bombay, however, our specimens have been caught on the ascent of the Ghâts, or at the top.” A larva, found feeding on *Glycosmis pentaphylla*, N. O. Rutaceæ, was taken for a dull specimen of *Pap. Polytes*, and only when it became a chrysalis did we note that it was different. The chrysalis differs from that of *Pap. Erithonius* chiefly in that it is more bent back on the thorax, and the apex of the thorax is produced into a short blunt parallel apipedal process; it is coloured like that of *P. Polytes*.” (J. Davidson and E. H. Aitken, Journ. Bombay Nat. Hist. Soc. 1896, 583.) Mr. J. R. Bell, in a letter from Karwar, Bombay, dated August 14th, 1895, writes us, “This butterfly is found, in certain localities in the Kanara District, in fair quantity at certain times. In the cold weather it is to be met with in the beds of perennial

Nullahs flying up and down in certain spots; the flight is in such cases very much like that of a *Euplœa*—until the insect is disturbed, when it darts off with wonderful rapidity. It is met with hovering round the tops of high hills at times in company with *Papilio Panope* and *Pap. dissimilis*, these, however, are always males. At the end of the rains and in the hot weather it is found pretty plentifully, in parts, where the evergreen jungles abound. It is nowhere common. The egg is laid singly on the underside of an old leaf, never on a new one, in out-of-the-way places among brushwood, etc. The time I saw two eggs laid was 5 p.m., a late hour for *Papilios* to be laying; this was at Tarimallapur, on April 2nd, 1895." Mr. G. F. Hampson records it as "common on the western slopes of the Nilgiris, rare on the northern" (*Journ. As. Soc. Beng.* 1888, 363). Mr. J. Wood-Mason's type specimens were taken at "Trevandrum, Travancore, by Mr. F. W. Bourdillon, and from the Kadur District, Mysore, at about 2,500 feet elevation, by Mr. G. H. Kearney" (*Journ. As. Soc. Beng.* 1880, 144). Mr. H. S. Ferguson records it as "fairly common in the low country of Travancore, less so on the Hills" (*J. Bombay N. H. S.* 1891, 446). We possess both sexes from Karwar, received from Mr. Bell, and from Travancore, received from Mr. Bourdillon, and males from the Nilgiris, taken by Mr. Hampson. Mr. L. de Nicéville says the larva also feeds on *Alseodaphne semicarpifolia*, N. O. Laurineæ (*l.c.* 259).

MIMICRY.—Both sexes of this species are excellent mimics of the *Euplœine* butterfly, *Crastia Core*, and have a resemblance, also, to the *Papilionine*, *Chilasa Casyapa*.

ALLIED SPECIES.—*Tamera Selangorana* (Pap. Mahadeva Selangoranus, Fruhstorfer, *Soc. Ent.* 1901, p. 51; *id.* *Berl. Ent. Zeit.* 1902, p. 177. *Habitat.* Selangore Island.—*Tamera Pharangensis* (Pap. Mahadeva Pharangensis, Fruhstorfer, *Soc. Ent.* 1901, p. 98; *id.* *Berl. Ent. Zeit.* 1902, p. 176. *Habitat.* S. Annam.—*Tamera Hamela* (Pap. Hamela, Crowley, *Proc. Zool. Soc. Lond.* 1900, p. 509, pl. 35, fig. 3. *Habitat.* Hainan.—*Tamera Formosana* (Pap. Castor Formosanus, Rothschild, *Nov. Zool.* iii. p. 423 (1896). *Habitat.* N. Formosa.

Genus CHILASA.

Chilasa, Moore, *Lep. of Ceylon*, i. p. 153 (1881). Kirby, *Allen's Nat. Hist. Butt.* ii. p. 279 (1896).

Arisbe (part), Hübner, *Verz. bek. Schmett.* p. 89 (1816).

Clytia,* Swainson, *Zool. Illustr.* 2nd Ser. iii. pl. 120 (1833).

Papilio (sect. 37 part), Felder, *Verh. Z. B. Ges. Wien.* 1864, pp. 303, 354.

Papilio (group 21 part), Rothschild, *Nov. Zool.* ii. p. 364 (1895).

* Inadmissible. Also previously used.

IMAGO.—*Forewing* triangular; costa arched, apex obtusely pointed; first subcostal branch emitted at about one-third and second at nearly one-fifth before end of the cell, third from its end and terminating at the apex, fifth at one-fifth from below the fourth; cell extending three-fifths of the wing, broad; discocellulars slightly concave, radial from their angle; median veins at equal width apart; submedian curved near the base. *Hindwing* short, subtriangular; costa slightly arched, exterior margin convex, scalloped; cell narrow; costal vein much arched; first subcostal at three-fifths before end of the cell, second slightly concave at the base; upper discocellular very oblique, lower bent inward, radial from their angle; middle median branch at one-fourth, lower at more than one-half before end of the cell; submedian nearly straight. *Body* moderately stout; antennæ short, and with a short club. Sexes similar.

LARVA.—Thick; with a subdorsal row of fleshy processes, and a lateral row on anterior segments; two short tentacles in front of second segment.

PUPA.—Resembling a dead twig broken off irregularly at the upper end; elongated, truncated anteriorly, excavated in front of thorax; abdominal segments with a dorsal and lateral row of short warty-spines.

TYPE.—*C. dissimilis* (= *Clytia*).

LOCAL RACES.—The local races of this genus, as herein grouped, exhibit certain obvious differences, and are fairly distinguishable one from the other, each race being a mimic of a corresponding local species of *Euplœina*.

DIMORPHISM.—Each race is also dimorphic in both sexes; the dimorphic form (*dissimilis*), from each restricted area, being inseparable one from the other (except in *flavolimbata* and *Commixta*), and is a mimic of the *Euplœine* butterflies of the genus *Tirumala*.

CHILASA CLYTIA (Plate 501, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Clytia, Linnaeus, Syst. Nat. ed. x. p. 479, No. 125 (1758); *id.* Mus. Lud. Ulr. p. 296 (1764); *id.* Syst. Nat. ed. xii. p. 781 (1767). Fabricius, Syst. Ent. p. 507 (1775); *id.* Ent. Syst. iii. i. p. 127 (1793). Aurivillius, Kongl. Sv. Vet. Akad. Handl. 1882, p. 96. Rothschild, Nov. Zool. ii. p. 364 (1895).

Papilio (Chilasa) Clytia, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 594.

Papilio Panope, Esper, Ausl. Schmett. p. 232, pl. 57, fig. 2 (1798).

Princeps Dominans Panope, Hübner, Samml. Exot. Schmett. i. pl. 134 (1806-16).

Papilio Panope, Hutton, Trans. Ent. Soc. Lond. 1847, p. 49. Kollar, Hügels Kashmir, iv. p. 406 (1844). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 303, 355. Elwes, Trans. Ent. Soc. 1888, p. 430. Robbe, Ann. Soc. Ent. Belg. 1892, p. 124.

Chilasa Panope, Moore, Proc. Zool. Soc. Lond. 1882, p. 261.

Papilio (Chilasa) Panope, Doherty, Journ. As. Soc. Bengal, 1886, p. 137. de Nicéville, Sikkim, Gazetteer, 1894, p. 173.

Papilio Panopes (part), Godart, Encyc. Méth. ix. p. 75 (1819).

IMAGO.—Male. Upperside dark umber-brown; on the forewing almost black within the cell area and discal interspaces. Cilia alternated with white. *Forewing* with a submarginal row of creamy-white large dentate spots, of which the upper two and the fifth are inwardly placed, followed by a marginal row of much smaller spots, the upper one of which is also placed obliquely inward before the apex; the upper spot of each series is also sometimes coalescent.* *Hindwing* with a lower discal row of five creamy-white scaled elongated sagittate streaks and a few similar scales more or less representing an upper sixth streak, followed by a submarginal complete row of similar coloured large broad dentate spots, of which the anal one is narrower and bright ochreous, these two series being either quite separated or the outer points of the five discal series are coalesced to the submarginal; beyond is a marginal row of ochreous broad lunate spots, which latter are either entirely separated from the submarginal, or are slightly coalescent, or obsolescent, except the anal one. Underside ground colour, either dark or paler umber-brown. *Forewing* with two marginal rows of spots, as above, but whiter. *Hindwing* with two small white spots above base of the costal vein, the discal sagittate streaks and submarginal spots, as above, whiter, the latter separated or more or less coalescent with the marginal ochreous spots. *Body* blackish; thorax in front, collar, frontal tuft and palpi, and thorax beneath, white spotted; abdomen with a subdorsal and two lateral rows of white spots; antennæ and legs black, fore femora beneath white.

Female. Upper and underside similar to the male.

Expanse, ♂ ♀ 4 to 4½ inches.

HABITAT.—Western and Eastern Himalayas.

DISTRIBUTION.—Captain A. M. Lang obtained it in the “Simla District, Masuri, and Lucknow” (MS. Notes). Mr. J. H. Hocking records it from the “Kangra District. Flight very strong” (P. Z. S. 1882, 261). Mr. P. W. Mackinnon writes, “not rare in Masuri in the spring and summer, and in the Dhun from the spring to the autumn. The butterfly is dimorphic in both sexes, the streaked form with pale markings, generally known as *P. dissimilis*, and the dark fuscous unstreaked form, known as *P. Panope*, both occurring in Masuri and the Dhun. The larva feeds, in the Dhun, on *Litsæa sebifera*, N. O. Laurineæ” (Journ. Bombay N. H. S. 1898, p. 594). Mr. W. Doherty obtained it in the “Kali Valley at Jhulaghat, 2,000 feet elevation in Kumaon” (Journ. As. Soc. Beng. 1886, 137). Mr. H. J. Elwes records it as “common in Sikkim, from the plains up to 3,000 feet elevation, and occurs from March to November” (Trans. Ent. Soc. 1888, 430). Mr. L. de Nicéville also

* In a male from Bhotan, an inner-discal elongated broad streak of whitish scales is present in the lower median interspace, and a less defined narrow streak in the submedian interspace, both resembling the male brands in a *Euplocine* butterfly.

says it is "found in Sikkim with *dissimilis* at the same elevations and seasons. I have no doubt that these two species are really one species, which is dimorphic in both sexes, but as this theory has never been proved, I have kept them distinct. Mr. Dudgeon has noticed the two species flying together, but has not succeeded in taking the opposite sexes in coitu" (Sikkim Gaz. 1894, 173). We possess males from Gurhwal and Sikkim, and one from Bhotan, taken by Mr. G. C. Dudgeon.

Our Plate 501, figs. 1, 1a, represent a male, and figs. 1b, c, a female from the Western Himalayas.

CHILASA CASYAPA (Plate 502, fig. 1, *larva* and *pupa*, 1a, ♂, 1b, ♀).

Papilio Casyapa, Moore, Proc. Zool. Soc. Lond. 1879, p. 143.

Papilio (Chilasa) Casyapa, de Nicéville, Journ. As. Soc. Bengal, 1885, p. 52.

Papilio Clytia, *aber. Casyapa*, Rothschild, Nov. Zool. ii. p. 367 (1895).

Papilio Clytia, Aitken, Journ. Bombay N. H. Soc. 1887, p. 37. de Nicéville, Journ. As. Soc. Bengal, 1900, p. 259.

Papilio (Chilasa) Clytia, Hampson, Journ. As. Soc. Beng. 1888, p. 363. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 446.

Papilio Panope, Moore, Proc. Zool. Soc. 1865, p. 756. Watson, Journ. As. Soc. Beng. 1890, p. 268; *id.* Journ. Bombay N. H. Soc. 1890, p. 9. Betham, *id.* 1891, p. 325.

Chilasa Clytia, Swinhoe, Proc. Zool. Soc. 1885, p. 145.

Chilasa Panope, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 314.

Papilio dissimilis and *Panope*, Davidson and Aitken, Journ. Bombay N. H. Soc. 1890, p. 368; *id.* 1896, p. 583.

IMAGO.—Male and female. Upperside. *Forewing* differs from the W. Himalayan *Clytia* in having a third or outer-discal series of white-speckled slender dentate spots more or less developed in both sexes, the submarginal spots are also generally smaller and the upper one either obsolescent or absent. *Hindwing* with the discal sagittate streaks somewhat shorter, generally narrower, and well separated from the submarginal spots, the marginal ochreous lunules being very narrow or obsolete. Underside. *Forewing* with three series of markings, as on the upperside. *Hindwing* similar to *Clytia*.

Expanse, 4 to 4½ inches.

LARVA.—"Not unlike the Ornithoptera group in form, having similar rows of fleshy processes. It is of a dark brown colour, with a bright red spot at the base of each process, a dorsal row of large, irregular, yellow patches, and a partial lateral row ending in a diagonal band which connects the two."

PUPA.—"Resembles a dead twig about an inch long and less than a quarter of an inch in diameter, broken off irregularly at one end. The last segment is so modified that the pupa is not attached by one point, but appears as if it had grown

out of the branch to which it affixed itself" (Davidson and Aitken, Journ. Bombay N. H. S. 1890, 368).

HABITAT.—North-Eastern, Central, and South India.

DISTRIBUTION, ETC.—A male from Bhotan, taken by Mr. G. C. Dudgeon in the rainy season, is in the British Museum Collection. We also possess a male from Bhotan, received from Mr. Dudgeon. Col. C. Swinhoe records it, as *Panope*, from the Khasias (Tr. Ent. Soc. 1893, 314). Mr. A. E. Russell obtained it at Bauleah, Bengal, and records taking *P. dissimilis* and *P. Panope* "in coitu" (Proc. Zool. Soc. 1865, 756). Mr. L. de Nicéville says it "occurs in Calcutta in the hot weather, and mimics the local species of *Euploea*. The larvæ of this species and of *dissimilis* feed on *Antiaris todicaria*. The larvæ and pupæ of the one are indistinguishable from those of the other, and both occur always together in all parts of India; it therefore appears to me not improbable that they are one and the same species" (Journ. As. Soc. Bengal, 1885, 52). Mr. W. C. Taylor found it "rather common at Khorda in Orissa" (List 1888, 16). Mr. Betham records its occurrence in the Central Provinces (Journ. Bombay N. H. S. 1891, 325). Col. C. Swinhoe obtained it in Bombay (P. Z. S. 1885, 145). Mr. S. N. Ward obtained it in "Kanara, the larva being found feeding on the Wild Cinnamon tree—Dalcheny—the changes occupying about ten days" (MS. Notes). Messrs. Davidson and Aitken write, "we found the larva of this in Bombay on *Tetranthera apetala*, and in Karwar on *Alseodaphne semicarpifolia*, N. O. Laurineæ, at the beginning of the rains and again in September and October. We got both sexes of each form (*dissimilis* and *Panope*). Some of our pupæ continued in that state for a month or two. The larva is evidently 'protected,' the pupa resembles a dry twig—this protective 'mimicry' showing that the offensive qualities of the larva are cast off with its skin. The butterfly carries on the same deception, posing itself off for *Danais Limniace*, and *Euploea Core*. The two forms (*dissimilis* and *Panope*) are about equally common, and both may be reared from any batch of larvæ. This butterfly can fly exceedingly fast, but usually imitates the lazy manner of the two which it impersonates" (Journ. Bombay N. H. S. 1890, 368, *id.* 1896, 583). Mr. G. F. Hampson found it "rare on the Nilgiris, at from 1,000 to 4,000 feet elevation" (J. As. Soc. Beng. 1888, 363). Capt. E. Y. Watson obtained "one specimen in Madras, in May" (J. As. Soc. Beng. 1890, 268). Capt. Watson also took "a few specimens at Kadur, in Mysore, in November, and at Kathlekan, in November, December, and January" (J. Bombay N. H. S. 1890, p. 9). Mr. H. S. Ferguson found it "not uncommon on the Travancore Hills" (*id.* 1891, 446). Mr. L. de Nicéville gives the "food-plants of the larva, as *Cinnamomeum zeylanicum*, *Alseodaphne semicarpifolia*, *Litsæa tomentosa*, and *L. sebifera*, all of the N. O. Laurineæ" (J. As. Soc. Beng. 1900, 259).

Of our illustrations on Plate 502, fig. 1, larva and pupa, is from Mr. Ward's Kanara drawings; and figs. 1a, 1b, from Calcutta male and female.

CHILASA LANKESWARA.

Papilio Lankeswara, Moore, Proc. Zool. Soc. Lond. 1879, p. 143. de Nicéville, Journ. As. Soc. Bengal, 1899, p. 222.

Chilasa Lankeswara, Moore, Lep. of Ceylon, i. p. 154, pl. 56, fig. 2, 2a, ♂ ♀, 2b, larva and pupa (1881).

Papilio Clytia, subsp. *Lankeswara*, Rothschild, Nov. Zool. ii. p. 368 (1895).

Papilio Clytioides, Moore, Lep. of Ceylon, i. p. 154, pl. 56, fig. 1, ♂ (1881).

IMAGO.—Male and female. Upperside. *Forewing* with a complete or incomplete submarginal series of small white spots. *Hindwing* with the discal sagittate streaks generally narrower and less prominent, the submarginal dentate lunules narrow, the marginal ochreous lunules short, and in the female slender. Underside. *Forewing* with marginal markings as on upperside. *Hindwing* with the discal and submarginal markings as above, the marginal ochreous spots large.

Expanse, 4 to $4\frac{3}{4}$ inches.

LARVA and PUPA.—(See Lep. Ceyl. pl. 56).

HABITAT.—Ceylon.

DISTRIBUTION, ETC.—In Ceylon, this "is a common species on the lower Hills. It is in all its forms an admirable mimic of species of *Danaïs* and *Euploea*. The light form (*dissimilis*) mimics *D. Limniace*, the dark form *E. asela* and *E. montana*" (de Nicéville, J. As. Soc. Beng. 1889, 222).

CHILASA ONPAPE (Plate 503, 1, 1a, ♂ ♀, 1b, c. ♂ ♀, 1d, e, ♂ ♀).

Papilio Onpape, Moore, Proc. Zool. Soc. Lond. 1878, p. 840. Distant, Rhop. Malayana, p. 355, pl. 27, fig. 5 (1855). de Nicéville, Journ. Bombay N. H. Soc. 1890, p. 387. Watson, *ib.* 1891, p. 54.

Papilio (Chilasa) Onpape, Elwes and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 433.

Papilio Clytia, Manders, Trans. Ent. Soc. Lond. 1890, p. 536.

Papilio (Chilasa) Clytia, Watson, Journ. Bombay N. H. Soc. 1897, p. 536.

Papilio Clytia, subsp. *Panope* (part), Rothschild, Nov. Zool. ii. p. 369 (1895).

Papilio Clytia Panope, aber. *Onpape*, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 181.

IMAGO.—Male and female. Upperside dark umber-brown. *Forewing* with a submarginal and marginal series of prominent whitish or brownish-white spots, the submarginal being smaller than in *Clytia* and *Casyapa*, the upper pair and sometimes the second and third pair are each coalesced, and more rarely each pair in both rows are enlarged and also coalesced and more prominently white. *Hindwing* with shorter and narrower discal sagittate streaks, or, more generally

these are very short and occasionally faintly defined; the submarginal spots are also smaller and narrower, both series being placed comparatively nearer the outer margin. Underside. *Forewing* with the two series of marginal spots either separate or partly, or entirely coalesced, as on the upperside. *Hindwing* with the discal sagittate streaks and submarginal lunate spots, as on upperside, also nearer the outer margin; the marginal ochreous spots being broad.

Expanse, ♂ ♀ $3\frac{1}{2}$ to $4\frac{1}{2}$ inches.

HABITAT.—Upper and Lower Burma; Tenasserim; Siam; Malay Peninsula.

DISTRIBUTION.—The type specimens of this race were taken at "Hatseiga, Hougnduran, and Naththoung, Upper Tenasserim" (P. Z. S. 1878, 840). Signor L. Fea obtained it at "Bhamo, Upper Burma, in November, and at Malawoon, Lower Tenasserim, in August." Col. C. H. E. Adamson records it, as *Panope*, "a very common insect in Burma, from May to October, and very variable in the amount of white markings on both wings. It occurs wherever *dissimilis* is found" (List 1897, 49). Capt. E. Y. Watson found it "common at Rangoon and Beeling" (J. Bombay N. H. S. 1882, 26). Mr. F. E. Dempster took it during the Chin-Lushai Expedition of 1889-90 at Laivar and Launghut, in March" (*id.* 1890, 387). Capt. E. Y. Watson records "two specimens taken at Tilin, in March, during the same Expedition" (*id.* 1891, 54), and also found it "common in the Chin Hills and the Upper Chindwin, from March to June, but not found above 3,000 feet elevation. These also include the *dissimilis* form" (*id.* 1897, 672). Mr. H. J. Elwes records "several males from Tavoy, Pousekai, and the Hills on the Siamese frontier" (J. As. Soc. Beng. 1886, 433).

MIMICRY.—This race is a fair mimic of the Euplœine butterfly *Crastia Godartii*.

CHILASA JANUS (Plate 504, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Clytia Onpape, aber. *Janus*, Fruhstorfer, Sitzung. Berl. Ent. Ver. 1901, p. 22; *id.* Berl. Ent. Zeit. 1902, p. 181, ♂ ♀.

IMAGO.—Male. Upperside blackish or dark umber-brown. *Forewing* darkest basally; with the normal submarginal and marginal spots distinctly black, and which are, generally, more or less obscurely speckled with a few centrally-disposed ochreous-white scales. *Hindwing* with five outer-discal very short sagittate marks, which are ochreous-white and brown speckled; the submarginal white lunules are very narrow, the marginal lunules being also narrow and either ochreous or whitish; in some specimens the discal and submarginal row is obscurely defined. Underside paler umber-brown. *Forewing* with the submarginal and marginal spots, as on upperside, but less defined. *Hindwing* with the outer-discal and submarginal spots more prominent, the marginal ochreous lunules being very broad.

Female. Upperside paler umber-brown, darkest basally. *Forewing* with small but not prominently defined normal submarginal and marginal whitish-scaled spots, of which the lower five of the submarginal series, in one specimen, are obliterated by dark scales. *Hindwing* with the outer markings less defined than in the male. Underside. *Forewing* similar to the upperside. *Hindwing* similar to the male.

Expanse, ♂ 4 to $4\frac{1}{2}$, ♀ $4\frac{1}{2}$ inches.

HABITAT.—Lower Burma; Upper Tenasserim; Siam; Annam.

DISTRIBUTION.—We possess specimens of this race from Rangoon and Magaree, Pegu; and from Thoungyeen Valley, Upper Tenasserim, taken in April by Col. C. T. Bingham. Mr. W. Rothschild has males from Moulmein and Tenasserim. A male is in Mr. P. Crowley's Collection, from Yunzaleen Valley, Upper Tenasserim, taken in March.

CHILASA PAPONE ((Plate 505, fig. 1, 1a, ♂, 1b, ♀).

Papilio Papone, Westwood, Trans. Ent. Soc. Lond. 1872, p. 94, pl. 3, fig. 2, ♂. Marshall, Journ. As. Soc. Bengal, 1882, p. 43.

Papilio Clytia, aber. *Papone*, Rothschild, Nov. Zool. ii. p. 367 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 180.

IMAGO.—Male. Upperside rich purpurescent-black, flushed with blue in certain lights. *Forewing* immaculate, or, in some specimens, with faint traces of very small whitish-scaled normally-positioned submarginal and marginal spots. *Hindwing* with five rather short discal sagittate whitish streaks varying in width, which are more or less speckled with dark scales; a submarginal row of narrow white lunules, and generally a marginal row of slender ochreous lunules; in some specimens a sixth or upper-discal sagittate streak is feebly defined. Underside rich red-brown. *Forewing* rich dark red-brown, purplish tinted in some lights; cell and outer interspaces more or less black streaked and blue flushed. *Hindwing* with the discal sagittate marks and submarginal lunules as above, and a marginal row of moderately-broad ochreous spots.

Female. Upper and underside similar to the male.

Expanse, ♂ ♀ $3\frac{1}{2}$ to $4\frac{1}{2}$ inches.

HABITAT.—Lower Burma; Upper Tenasserim; Shan States; Siam; Annam.

DISTRIBUTION.—In the British Museum Collection are males of this form from the Thoungyeen Valley, Upper Tenasserim, taken in November by Col. C. T. Bingham, and a female labelled Burma. In Mr. W. Rothschild's Collection is a male from the Yunzaleen Valley, Upper Tenasserim, taken in March by Col. Bingham. A female from Tavoy, taken in February, is in Mr. P. Crowley's Collection. We possess a male from the Upper Mekong, Shan States, Siam, taken by Mr. R. Roberts, C.E.

We separate this as quite distinct from the other races, and assign *Commixta* as, apparently, representing its dimorphic form. It is a fair mimic of the blue-tinted Euploine butterflies *Menama modesta* and *Penoa Limborgii*, or the allied *Penoa Alcathee*.

CHILASA COMMIXTA (Plate 505, fig. 2, 2a, ♂).

Papilio Clytia, aber. *Commixtus*, Rothschild, Nov. Zool. ii. p. 367 (1895).

IMAGO.—Male. Upperside rich dark purpurescent brownish-black. *Forewing* darkest basally and faintly flushed with blue; with a marginal and submarginal row of small feebly-marked white-speckled spots, a discal and a lower inner-discal series of similar-scaled short feeble streaks, and also a slender lengthened streak below the submedian. In one specimen from Bassein, the lower only of the submarginal and marginal small spots are apparent. *Hindwing* with the apical half of the cell, seven discal elongated broad white sagittate streaks, each of the latter extending inwardly to the base of the respective interspace; followed by the submarginal white broad dentate spot and ochreous anal spot, and the marginal narrow ochreous or narrower white lunules. Underside. *Forewing* with the markings as on upperside. *Hindwing* with the discal white interspaces as on upperside, the cell and the two upper interspaces being only feebly white-speckled; submarginal dentate spots white and broad, marginal lunules ochreous.

Expanse, ♂ 4 to 4½ inches.

HABITAT.—Khasias; Burma.

DISTRIBUTION.—Mr. Ernest Swinhoe has received several specimens of this form from his native collectors in the Khasia Hills. Males, from the Khasias, are in the collection of Mr. W. Rothschild and of Mr. P. Crowley. Col. C. Swinhoe possesses an exactly similar male, from Bassein, Lower Burma, taken in November.

This is, apparently, the dimorphic form of *P. Papone*, and differs from the normal dimorphic form (*dissimilis*) of the other races, in not possessing—or not having yet acquired the fully-developed white streaks on the forewing, as are always present in that form.

CHILASA DISSIMILIS (Plate 506, fig. 1, larva and pupa, 1a, b, ♂, 1c, d, ♀).

Papilio dissimilis, Linnæus, Syst. Nat. ed. x. p. 479, No. 130 (1758). Clerck, Icones, i. pl. 16, fig. 2 (1759). Linn. Mus. Lud. Ulr. p. 301 (1764); *id.* Syst. Nat. ed. xii. p. 782 (1767). Fabricius, Syst. Ent. p. 511 (1775). Cramer, Pap. Exot. i. p. 129, pl. 82, fig. C, D (1776). Sulzer, Gesch. Ins. p. 145, pl. 18, fig. 6 (1776). Jablonsky and Herbst, Nat. Schmett. vi. p. 41, pl. 126, fig. 2, 3 (1793). Esper, Ausl. Schmett. p. 233, pl. 57, fig. 3 (1798). Godart, Encyc. Méth. ix. p. 75, (1819). Lucas, Lep. Exot. p. 46, pl. 23, fig. 2 (1835). Boisduval, Spec. Gén. Lép. i. p. 377 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 21 (1846). Hutton, Trans. Ent. Soc. Lond. 1847, p. 49. Lucas, Chenu's, Enc. H. N. Lep. pl. 14 (1851-3). Moore, Catal. Lep. Mus.

- E. I. C. i. p. 91, pl. 2, fig. 3, 3a, b, *larva* and *pupa* (1857). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 355. Chaumette, Ent. Mo. Mag. 1865, p. 37. Moore, Proc. Zool. Soc. Lond. 1865, p. 486. Oberthür, Etud. Ent. iv. p. 100 (1879). Watson, Journ. As. Soc. Beng. 1890, p. 268; *id.* Journ. Bombay N. H. Soc. 1891, p. 54. Davidson and Aitken, Journ. Bombay N. H. S. 1890, p. 368; *id.* 1896, p. 583.
- Arisbe dissimilis*, Hübner, Verz. bek. Schmett. p. 89 (1816).
- Clytia dissimilis*, Swainson, Zool. Illust. 2nd Ser. iii. p. 120 (1833).
- Papilio Clytia*, var. *dissimilis*, Butler, Catal. Fabr. Lep. B. M. p. 244 (1869).
- Chilasa dissimilis*, Moore, Lep. of Ceylon, i. p. 153, pl. 57, fig. 1, 1a, ♂, 1b, *larva* (1881); *id.* Proc. Zool. Soc. 1882, p. 261. Swinhoe, Proc. Zool. Soc. 1885, p. 145; *id.* Trans. Ent. Soc. 1893, p. 314.
- Papilio Clytia*, Aurivillius, Kongl. Sv. Vet. Akad. Handl. 1882, p. 96. Distant, Rhop. Malay, p. 353, pl. 27, B, fig. 2 ♂ (1885). Elwes, Trans. Ent. Soc. Lond. 1888, p. 430. Manders, *id.* 1390, p. 536. de Nicéville, Journ. As. Soc. Beng. 1900, p. 259.
- Papilio (Chilasa) dissimilis*, de Nicéville, Journ. As. Soc. Beng. 1885, p. 52. Rothney, Ent. Mo. Mag. 1882, p. 33. Doherty, Journ. As. Soc. Beng. 1886, p. 137. Hampson, *id.* 1888, p. 363. Ferguson, Journ. Bombay N. H. S. 1891, p. 446.
- Papilio (Chilasa) Clytia*, Elwes and de Nicéville, Journ. As. Soc. Beng. 1886, p. 434. de Nicéville, Sikkim Gaz. 1894, p. 173.
- Papilio Clytia*, aber. *dissimilis*, Rothschild, Nov. Zool. ii. p. 367 (1895).

IMAGO.—Male and female. Upperside bluish-black, with pale bluish-white or creamy-white markings. *Forewing* with a basal costal slender streak, longitudinal basal cell divergent-streaks and short broad streaks within apex of the cell, a discal curved series of spots of irregular shape and size, of which the two, sometimes three upper or subcostal are small, the two next elongated streaks, the others of either nearly equal size or varying in width and length, those between the two lower medians being broken transversely, the inner portion of the upper being sometimes obsolete, and that in the submedian interspace slender and longitudinally divided as well as being transversely broken near the outer end, below the submedian is also a slender elongated streak broken at each end; beyond these is the normal positioned row of submarginal and marginal spots. *Hindwing* with either slender elongated streaks, or a broad streak with slight black lines occupying the entire cell; a discal series of narrow or broad elongated sagittate-streaks—each extending from base of the interspaces from the costal vein to the submedian; beyond is a submarginal corresponding row of dentate spots—the anal one being ochreous, and then a marginal row of narrow, more or less apparent, ochreous lunules, edged with white cilia. Underside. Both wings with similar, but whiter markings, those on the forewing being tinted with pale blue, the marginal ochreous spots on the hindwing uniformly broad. *Body* black; thorax, collar, front and palpi white spotted; abdomen with a broad white subdorsal and two lateral bands; antennæ and legs black, femora beneath white.

Expanse, ♂ $3\frac{1}{2}$ to $4\frac{1}{2}$, ♀ 4 to $4\frac{1}{2}$ inches.

HABITAT.—Western, Central, and Eastern Himalayas; North-Western, Eastern, Central, and South India; Ceylon; Burma; Tenasserim; Malay Peninsula; Shan States; Siam; Tonkin; Hong Kong; Hainan; Formosa.

LIFE HISTORY.—“EGG. Half a line in diameter, round, golden-brown, pilose. Solitary, on the upper surface of the leaf.

“LARVA.—*After first change*, $\frac{1}{3}$ inch long. *Ground colour*, jet black. *Dorsal line*, none. *Lateral line*, yellow ochre, irregular, just over feet. *Other remarks*: A square patch of milk-white covers the entire upper surface of 11th and 12th segments, and joins a V-shaped patch of same colour on back, the arms of which dilate to the sides of the 6th and 5th segments (towards the head) and there meet a series of squarish broad milk-white patches (one on each segment) from the 4th to 1st segment which form a continuous broad band. Abdomen, pale reddish-brown. Prolegs, reddish-brown, each with a black spot. *Thoracic legs*, jet black. *Anal pair*, milk white. *Head*, jet black. *Stigmata*, rusty. *Miscellaneous*. A lateral and sublateral row of white protuberant oval spots from the 4th to last segment. A double row of curious spines, club shaped and rather spinose at apex, and swollen at base (two rows on either side of back) from the 1st to 4th segment only—from the 5th to last segment there is a single row only. From 5th to 1st segment is a broad longitudinal band of yellow ochre on back. The 1st segment is entirely yellow ochre. Spines on 1st, 8th, and 9th segments yellow ochre. Those on 2nd, 3rd, 4th, 5th, 10th, and 11th segments are shining black. Those on 12th segment white tipped with black. Those on 7th segment milk-white. V-shaped tentacula, deep violet. Two small black spots on back of first segment. On the anal segment are besides the spines already mentioned, four others directed outwards, and two large milk-white spots behind them. *After second change*, $\frac{3}{4}$ inch long. As first change. *After third change*, nearly 1 inch long. *Differs by*, lateral line almost obsolete. Sides shaded with deep ochre. The double row of spots are either pearl-white, or of a most lovely ‘mauve’ colour. Longitudinal band on back and 1st segment, milk-white instead of yellow ochre. Spines on 2nd, 3rd, 4th, 5th, 6th, 9th, and 10th segments black; on 11th and 12th, black, with white base; on 7th and 8th, amber. At base of each spine, excepting that on the 12th segment, is a large ‘mauve’ or pearl-white spot. Tentacula leaden colour. The two outer anal spines are white. Stigmata pale. Two little club-shaped black lines occasionally on back of 11th and 12th segments. Abdomen pale reddish-brown. *After last change*, length $1\frac{1}{4}$ to $1\frac{3}{4}$ inch. *General characters*, flattened on back and sides, spiney, swollen on the anterior segments. *Ground colour*, rich velvet purple-black. Lateral line faint velvet black. The double row of spots are of the most beautiful carmine. All the spines except those on anal and penultimate segments are velvet black and moveable, but no longer club shaped—they taper to a point and arise from a swollen carmine

base. Those on the 11th and 12th segments are black with the base yellowish-white. Tentacula leaden colour. The two outer anal spines are yellowish-white. Stigmata pale. Abdomen, black, with the ventral line white. Instead of club-shaped lines on back of 11th and 12th segments a deep longitudinal velvet patch. The white in this stage is yellowish-white. Feeds on the leaves of *Nauclea Cadamba*, and in a state of repose contracts the anterior segments and jerks itself in a peculiar manner. Went into *chrysalis* on July 1st, 1861.

“CHRYsalis (*succincta*) about 1' 2" long. Grey mottled and marked with brown and black, particularly on the posterior segments and abdomen. A black dash on the head. The anterior segments have the appearance of a shark's jaw. A row of warts (4 in number) on either side of ventral line.

“IMAGO (*dissimilis*) out on July 14, 1861. *Where found.* At Lucknow. *Period on the wing,* July. Scarce” (Capt. H. L. Chaumette, Lucknow, MS. Notes).

DISTRIBUTION, ETC.—In the Himalayas, the extreme Western record of its capture is by Col. J. W. Yerbury, who obtained it at “Rawal Pindi, 1,800 feet elevation, in April” (Ann. N. H. 1888, 206). Captain T. Hutton says it “occurs in the warm glens of Masuri as well as in the Dhun, but it does not appear to be very numerous. It is found rather sparingly in the Hills during summer, but is more abundant in the Dhun” (Tr. Ent. Soc. 1847, 49). Capt. A. M. Lang observes “the only place I have seen this species is Subathoo, 4,000 feet elevation, in June, frequenting a grassy undulating down, flying rapidly in long circuits, pitching occasionally on grassy knolls, and generally returning by the same route to the same spot, after a flight” (Ent. Mo. Mag. 1864, 102). Mr. J. H. Hocking obtained it in the Kangra District (P. Z. S. 1882, 261). Mr. W. Doherty took it in the “Kali Valley at Jhulaghat and Baghrihat, Kumaon, at 2,000 to 3,000 feet elevation” (J. As. Soc. Beng. 1886, 137). Gen. G. Ramsey obtained it in Nepal. Mr. H. J. Elwes says it is “a common species, in Sikkim, from the Plains up to 3,000 feet elevation, and occurs from March till November” (Tr. Ent. Soc. 1888, 430). Mr. L. de Nicéville also records it as “occurring in Sikkim from March to November, at low elevations” (Sikkim Gaz. 1894, 173). Col. C. Swinhoe records it from the Khasia Hills” (Tr. Ent. Soc. 1893, 314). Mr. L. de Nicéville says it is “not rare in Calcutta in the hot weather. . On the wing it may be taken for *Danais Limniace*” (J. As. Soc. Beng. 1885, 52). Mr. J. Rothney found it “common in Calcutta during the rains” (Ent. Mo. Mag. 1862, 33). Mr. A. E. Russell records “*dissimilis* and *Panope* taken in coitu, at Bauleah, Bengal” (P. Z. S. 1865, 756). Mr. W. C. Taylor found it “rather common at Khorda, in Orissa” (List, 1888, 16). Capt. H. L. Chaumette, in his MS. Notes, writes, “I found many larvæ on a small tree in the Badshah Bagh, Lucknow. The imago emerged from the *chrysalis* and proved to be *dissimilis*. Larvæ were also reared, by me, from the egg in Lucknow, in June, 1861,

it feeds on *Nauclea Cadamba*. Went into chrysalis July 1st, the imago emerging on July 14th."

In Southern India, Col. C. Swinhoe records it from "Bombay, taken in 1877, and from Khandalla, December; affects the hill-sides" (P. Z. S. 1885, 145). Messrs. Davidson and Aitken write, "the two forms (*dissimilis* and *Panope*) are about equally common, in Bombay, and both may be reared from any batch of larvæ" (J. Bombay N. H. S. 1896, 583). Mr. G. F. Hampson obtained it on the "Nilgiris from 1,000 to 4,000 feet, rare" (J. As. Soc. Beng. 1888, 363). Mr. Walter Elliot obtained it in "Madras, and reared the larva on *Tetranthera apetala*, in July" (MS. Notes). Capt. E. Y. Watson took "two specimens in Madras in May" (J. As. Soc. Beng. 1890, 268). Capt. Watson also obtained "two specimens at Kathlekan, Mysore, in December and January" (J. Bombay N. H. S. 1890, 9). Mr. H. S. Ferguson records it from "Travancore, being fairly common in the low country, less so on the Hills" (J. Bombay N. H. S. 1891, 446).

In Burma, Col. C. H. E. Adamson records it as being "common in the country, from May to October" (List, 1897, 49). Capt. E. Y. Watson obtained it at "Tilin, March to May, during the Chin-Lushai Expedition of 1889-90" (J. Bombay N. H. S. 1891, 54). Mr. F. E. Dempster took it at "Lounghut in March, and at Bwetet in February and March, during the same Expedition" (*id. l.c.* 1890, 387). Capt. Watson also found it "common at Rangoon and Beeling" (*id. l.c.* 1888, 26). Signor L. Fea obtained it at Bhamo, in November, and in Tounghoo in May. Dr. N. Manders says it is "a very common species in the Shan States, at low elevations. The dark form *Panope* also occurs" (Tr. Ent. Soc. 1890, 536). Mr. H. J. Elwes records "a single male taken in Tavoy, Tenasserim" (J. As. Soc. Beng. 1886, 434).

Our Plate 506, fig. 1 larva and pupa, is from Mr. Walter Elliot's Madras drawings, figs. 1a, b, males, and figs. 1c, d, females.

CHILASA FLAVOLIMBATA (Plate 507, fig. 1, ♂, 1a, 1b, ♀).

Papilio dissimilis, var. *flavolimbatus*, Oberthür, Etudes Entom. iv. p. 101 (1879).

Papilio Clytia, var. *flavolimbatus*, Wood-Mason, Journ. Asiatic Soc. Bengal, 1880, p. 238.

Papilio (Chilasa) Clytia, var. *flavolimbatus*, Wood-Mason, *id. l.c.* 1881, p. 253, pl. 14, fig. 1, 2, ♂.

Papilio Clytia, subsp. *flavolimbatus*, Rothschild, Nov. Zool. ii. p. 370 (1895).

IMAGO.—Male and female. Upperside similar to *dissimilis*. Forewing with the submarginal series of white spots comparatively larger. Hindwing with the discal sagittate streaks shorter, the submarginal spots larger, and decreasingly sullied with ochreous within their outer edge, the marginal ochreous lunules conspicuous and broader, the anal ochreous lunules being also larger and coalesced. Underside.

Forewing with the submarginal spots, as on upperside, also larger. *Hindwing* with the discal streaks short, as on upperside, the submarginal spots larger and coalesced with the ochreous marginal spots, the submarginal each being sullied with ochreous.

Expanse, ♂ ♀ $4\frac{1}{2}$ inches.

HABITAT.—South Andamans.

DISTRIBUTION.—Mr. J. Wood-Mason records “many males and one female, taken by Mr. F. A. de Roepstorff, at Port Blair, South Andamans” (J. As. Soc. Beng. 1881, 253). Specimens of both sexes are in Mr. W. Rothschild’s Collection.

NOTE.—Specimens of the *Clytia* form have, as yet, not been recorded from the Andamans, though the Euplœine butterfly it mimics (*Crastia Core*) sparingly occurs there. It is also interesting to note, that the Linnaine butterfly (*Tirumala Linniaee*) of which *flavolitubatus* is a mimic, has not, as yet, been captured in the Andamans, though it occurs not uncommonly in the neighbouring Nicobar Islands.

ALLIED RACES.—*Chilasa Panope* (Pap. Panope, Linn. Syst. Nat. ed. x. p. 479, No. 131 (1758); *id.* ed. xii. p. 782 (1767). Fabricius, Syst. Ent. p. 512 (1775). Cramer, Pap. Exot. iv. p. 13, pl. 295, fig. E, F (1782). Boisduval, Spec. Gén. Lep. i. p. 373 (1836). Oberthür, Etud. Ent. iv. p. 101 (1879). Arisbe Panope, Hübn. Verz. bek. Schmett. p. 89 (1816). Pap. *Clytia*, *subsp.* Panope (pt.), Rothschild, Nov. Zool. ii. p. 369 (1895). de Nicéville, Journ. As. Soc. Bengal, 1902. p. 30. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 179. Pap. Panopes (pt.), Godt. Enc. Méth. ix. p. 75 (1819). Pap. *Clytia* = *dissimilis* = Panope, Walker, Trans. Ent. Soc. Lond. 1895, p. 470. Pap. *Dissimilis* (part), Auctorum.—Male and female. Upperside of a more uniformly darker colour than in the Burmese *Onpape*; submarginal spots on forewing small. Hindwing with the discal series of short sagittate marks more inwardly placed, the submarginal spots much larger and broader. *Habitat.* S.-E. China, Tonkin; Annam; Hong Kong; Formosa. Mr. J. J. Walker, R.N. (*l.c.*) records this as “fairly common at Hong Kong, appearing on the wing at the beginning of March, and the larvæ are often met with in May, on a species of *Morinda* (N. O. Rubiacæ), growing commonly along the roadsides. *P. Panope*, which is not very common—(though perhaps often passed over as an Euplœa, while *Clytia*=*dissimilis* has on the wing a considerable but less striking resemblance to one of the green *Danaïds*)—has been bred from larvæ collected with those of *P. Clytia*=*dissimilis*, and quite undistinguishable from them, and I have seen specimens intermediately between the two forms.”

Chilasa Saturata (Pap. Saturatus, Moore, Proc. Zool. Soc. Lond. 1878, p. 697). Pap. Panope, Holland, Trans. Amer. Ent. Soc. 1887, p. 122. Pap. *Clytia* Panope *aber. loc.* Saturatus, Rothschild, Nov. Zool. ii. p. 369 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 179. *Habitat.* Hainan.—*Chilasa Panopina* (Pap. Panope, *var.* Panopinus, Staudinger, Iris, ii. p. 9 (1889). Pap. (*Chilasa*) *Palephates*, *var.* Pano-

pinus, Semper, Philipp. Tagfalt. p. 267, pl. 43, fig. 8, 9, ♀ (1891). Pap. Clytia Panopinus, Rothschild, Nov. Zool. ii. p. 369 (1895). *Habitat.* Palawan; Mindoro. —*Chilasa Palephates* (Pap. Palephates, Westwood, Arcana Ent. ii. p. 127, pl. 79, fig. 1 ♀ (1845). Dewitz, Nova Acta Leop. Car. Acad. Nat. 1882, p. 262, pl. 9, fig. 8, a—c, larva and pupa. Pap. (Chilasa) Palephates, Semper, Philipp. Tagf. p. 266, pl. 43, fig. 6, 7 (1891). Pap. Clytia Palephates, Rothschild, Nov. Zool. ii. p. 370 (1895). *Habitat.* Philippines.—*Chilasa Lacedemon* (Pap. Lacedemon, Fabricius, Ent. Syst. iii. i. p. 36 (1793). Jones's Icones, *ined.* fig. ♂. Donovan, Ins. of India, pl. 17, fig. 3 (1800). Rothschild, *l.c.* p. 371 (1895). *Habitat.* Malabar (acc. to Fabricius), but doubtless erroneous.

Genus EUPLŒOPSIS.

Papilio, subgen. *Euplœopsis*, de Nicéville, Journ. Asiatic Soc. Bengal, 1887, p. 433. Kirby, Allen's Nat. Libr. Butt. ii. p. 280 (1896).

Papilio (sect. 37 pt.) Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 354.

Isamiopsis, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1888).

Papilio (group 21, pt.), Rothschild, Nov. Zool. ii. p. 364 (1895).

IMAGO.—Male. *Forewing* elongated, triangular; costa arched regularly, apex and posterior angle obtusely pointed, exterior margin oblique and almost straight; cell long, broad. *Hindwing* short, triangular; costa oblique beyond the end of costal vein, somewhat produced and obtusely pointed at end of upper subcostal, the extreme outer margin very slightly scalloped; submedian fold very hairy; cell extending to half the wing, narrow; upper subcostal emitted at about one-third from base of the cell; discocellular acutely bent inwards below the middle. Antennæ short, with a gradually thickened lengthened club.

TYPE.—E. *Telearchus*.

MIMICRY.—The typical species, *Telearchus*, of this genus, mimics, in both sexes, the corresponding sexes of the common Euplœine butterfly *Trepsichrois Linnæi*, the female, according to the observations of Mr. W. Doherty, appears to be dimorphic, one form resembling the male, and the other the female of *T. Linnæi*. Our other Indian species, *Danisepa*, is also a beautiful mimic of the Euplœine butterfly *Danisepa Rhadamanthus*.

LARVA, PUPA, and HABITS of Allied Species.—Dr. L. Martin writes of the allied Sumatran species, *Euplœopsis Butleri*. "The larva was found on a low shrub in the forest; they were velvety-black with fleshy red tubercles. The pupa suspended by a black median girth, adheres, by the three posterior abdominal segments, to a branch of the food-plant, and looks like an obliquely cut-off bit of stick, as do the pupæ of all this group; the pupa is quite rigid, and has no motion in the abdominal

segments whatever. The butterfly appears from January to June, and again in September, but in no other months. The males, if undisturbed, are, on the wing, exactly like *T. Linnæi*, but as soon as they scent danger, they assume the typical rapid flight of a *Papilio*. They are very fond of wet swampy spots in the forest. The females are very scarce." Of his species, *Euplæopsis Penomimus*, he also writes:—"I bred this from larvæ found in May. They feed on a low shrub in the forest, called by the Malays 'Dahoen Laksah,' the larvæ are velvety-green and deep indigo-blue, with round lateral red spots, and short fleshy tubercles. The pupa is similar to that of *E. Butleri*, being suspended by a black girth to a stalk of the food-plant, the three posterior abdominal segments greatly flattened on the side touching the stick. As the stalk was still green, the pupa also was mostly green, with brown and white markings; the imago emerged in sixteen days. The butterfly occurs from January to March, and again in June" (Journ. Asiatic Soc. Bengal, 1895, p. 520).

EUPLÆOPSIS TELEARCHUS (Plate 511, fig. 1, 1a, ♂, 1b, c, ♀).

- Papilio Telearchus*, Hewitson, Trans. Ent. Soc. Lond. 1852, p. 22, pl. 6, fig. 3, ♂. Gray, Catal. Lep. Brit. Mus. i. p. 72 (1852). Felder, Verh. Z. B. Ges. Wien. 1864, p. 308. Moore, Proc. Zool. Soc. Lond. 1878, p. 839. Swinhoe, Proc. Ent. Soc. Lond. 1894, p. 31, ♀.
- Papilio Paradoxa*, var. *Telearchus*, Oberthür, Etud. Ent. iv. p. 99 (1879).
- Papilio* (subgen. *Euplæopsis* *Telearchus*, de Nicéville, Journ. As. Soc. Bengal, 1887, p. 433, ♂. Doherty, *id. l.c.* 1889, p. 130, ♀. de Nicéville, Journ. Bombay N. H. S. 1889, p. 169, pl. A, fig. 5, ♀.
- Isamiopsis Telearchus*, Moore, Desc. Lep. Coll. Atkinson, p. 284 (1888). Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 403.
- Papilio Paradoxus Telearchus*, Rothschild, Nov. Zool. ii. p. 375 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 182.

IMAGO.—Male. Upperside. *Forewing* rich dark blackish-brown, brilliantly glossed with steel-blue from near the base; a pale violet-grey oval spot at lower end of the cell, and a discal curved series of dentate spots of which the upper third, fourth, and fifth are elongated, followed by a submarginal anteriorly-curved row of smaller dentate white spots. *Hindwing* dark umber-brown, darkest basally, slightly flushed with blue in certain lights; with a submarginal upper row of small obsolescent bluish-white spots or a complete row of small posteriorly-decreasingly white spots; cilia very slenderly alternated with white. Underside umber-brown. *Forewing* with a less-defined bluish-white cell spot, small obsolescent discal spots, and distinct submarginal small white spots. *Hindwing* with a submarginal row of bluish-white spots. *Body* black; thorax, collar, front, and palpi white-spotted; abdomen with two lateral rows of white spots; antennæ and legs black, fore femora white beneath.

Female. Upperside blackish-brown. Forewing with the brilliant steel-blue gloss restricted to the apical half; the cell spot, the curved discal row of spots, and the submarginal spots disposed as in the male, but all prominently bluish-white; a greyish-white scaled elongated divaricated streak extends along lower basal two-thirds of the cell, a short incipient streak also along upper half of the cell, a similar scaled streak in the basal interspace of the middle median, and another in the lower median, a longer pair in the submedian, and a broken streak along the posterior margin. *Hindwing* with a greyish-white scaled elongated discal streak in each interspace, each extending from their base to the outer disc, and one within the cell, followed beyond by a submarginal row of white dentate spots, and then a marginal row of smaller cilia spots. Underside dull umber-brown. *Forewing* with the markings as on upperside, the cell and lower discal streaks being ochreous-grey. *Hindwing* with the cell and elongated discal streaks, as on upperside, ochreous-grey; the submarginal dentate spots being larger, and with the marginal cilia spots white. *Body* black; front of thorax, collar, frontal tuft, and palpi white-spotted; base of thorax white-streaked; abdomen with a subdorsal, sublateral, and a lower longitudinal row of white streaks; abdomen and legs black; femora and tibiæ white beneath.

Expanse, ♂ $4\frac{1}{2}$ to 5, ♀ $5\frac{1}{2}$ inches.

HABITAT.—Assam; Khasias; Burma; Tenasserim; Tonkin.

MIMICRY.—This species is a mimic, in both sexes, of the corresponding sexes of the Euplœine butterfly *Trepsichrois Linnæi*; and, according to the observations of Mr. W. Doherty, the female appears to be dimorphic, one form resembling the male, and the other the female of *T. Linnæi*.

DISTRIBUTION.—Mr. W. Doherty records the capture of this species, "on the Dikrang, near Sadiya, Assam, the female appearing to be dimorphic, one form resembling the male, and the other the female, of *Euplœa Linnæi*. Both forms were taken" (Journ. As. Soc. Bengal, 1889, 130). Col. C. Swinhoe records "eleven males and one female, from the Khasia Hills. The female did not differ from the other sex" (Trans. Ent. Soc. 1893, 314). The female described and figured by Mr. L. de Nicéville (*l.c.*), was obtained by the Rev. W. Hamilton's native collectors in the Khasia Hills below Shillong, and is now in the collection of Mr. Walter Rothschild. A similar female from Cherra Punji, Assam, is also in the British Museum. A male taken by Mr. W. Doherty, in the Dunsiri Valley, Assam, at 1,000 feet elevation, in June, is in Mr. F. Goodman's Collection. A male from Manipur, taken by Mr. G. C. Dudgeon, and males from the Thoungyeen Valley, the Daunat Range, taken in June, and from the Ye Valley, Lower Tenasserim, taken in March by Col. C. T. Bingham, are in the British Museum. A male taken in March in the Daunat Range is in Mr. W. Rothschild's Collection, and a female, also from the

Daunat Range, Middle Tenasserim, taken in April, is in Mr. H. Grose-Smith's Collection. We possess a male from Hatseiga, Upper Tenasserim. Mr. F. Fruhstorfer records it from Tonkin.

EUPLEOPSIS DANISEPA (Plate 512, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Danisepa, Butler, Ann. and Mag. Nat. Hist. 1885, p. 313.

Isamiopsis Danisepa, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 314.

Papilio (Eupleopsis) Danisepa, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1895, p. 366, pl. Q, fig. 48, ♀.

Papilio Caurus, subsp. *Danisepa*, Rothschild, Nov. Zool. ii. p. 377.

IMAGO.—Male. Upperside. *Forewing* rich dark purpurescent-brown, brilliantly glossed with dark steel-blue from near the base; a creamy-white faintly blue-flushed broad patch occupying the outer half of the cell, its inner edge being outwardly-oblique and irregular, a slender white streak above it in the base of first and second subcostals, two very small obscure white-speckled spots outside end of the cell—but which are sometimes obsolete, a larger lobate or outwardly-angled white spot in basal interspace of upper median, below which is an elongated blue-speckled white streak in base of middle median interspace, and an obscure smaller denser blue-speckled streak in middle of the lower median interspace, and a less apparent smaller similar blue-speckled duplex-streak in middle of the submedian interspace, followed beyond by a submarginal anteriorly-curved row of small bluish-white spots. *Hindwing* rich dark purpurescent-brown; the veins basally being black lined; the entire cell-area and interspaces of the outer veins, from their base to about middle of the discal area white, the outer ends of the latter being thickly speckled with deep-blue scales; beyond is a submarginal complete row, or a more or less obsolescently incomplete row, of very small bluish-white spots. Cilia very slightly intervened with white between the veins. Underside dark umber-brown. Both wings with white markings as on the upperside; base of posterior margin of the forewing broadly greyish. *Body* black; front of thorax, collar, frontal tuft and palpi bluish-white spotted; abdomen beneath with two lateral rows of white spots; antennæ and legs black, fore femora white beneath.

Female. Upperside dark purplish-brown, glossed with dark purpurescent-blue. *Forewing* with similar, but somewhat larger white markings, as in the male, the discal series being complete. *Hindwing* also with similar somewhat larger markings. Both wings with the white dentate ciliary spots more defined. Underside darker-brown than in the male. *Forewing* with white markings as on the upperside. *Hindwing* also with similar white markings, the submarginal spots being larger. *Body* as in the male, but with larger white spots; base of thorax white-streaked; abdomen with a subdorsal, two lateral, and a ventral row of white spots.

Expanse, ♂ 5, ♀ 5½ inches.

HABITAT.—Assam; Burma; Tenasserim.

MIMICRY.—This species is a beautiful mimic of the Euplœine butterfly *Danisepa Rhadamanthus*.

DISTRIBUTION.—The type specimen of the male, described by Mr. Butler, was taken by Dr. G. Watt in Assam. Col. C. Swinhoe records it from “Cherra Punji, Assam” (Tr. Ent. Soc. 1893, 314). Mr. Ernest Swinhoe has received both sexes from his native collectors in the Khasia Hills. Col. C. H. E. Adamson obtained a single male in the “Arakan Hills, Burma, in March” (List, 1897, 49). Mr. L. de Nicéville records it from “Mowhun, 3,000 feet elevation, in the Katha District, Upper Burma, the female, which he first described and figured, having been taken by Lieut. J. M. Burn, R.E.” (Journ. Bombay N. H. Soc. 1895, 366). It has also been taken in the Thoungyeen forests, Middle Tenasserim. Mr. H. Grose-Smith has a male from the Ataran Valley, Middle Tenasserim, taken in February.

INDO-MALAY SPECIES.—*Euplœopsis Paradoxus* (Zelima Paradoxa, Zinken-Sommer, Acta Acad. N. C. xv. p. 162, pl. 15, fig. 9, 10, ♂ (1832). Papilio Paradoxus, Doubleday and Hewitson, Gen. D. Lep. i. p. 21 (1846). Westwood, Cabinet of Orient. Ent. p. 17, pl. 9, fig. 1, 1a (1848). Gray, Catal. Lep. B. M. i. p. 72 (1852). Vollenhov. Tijd. v. Ent. 1860, p. 88. Felder, Verh. Z. B. Ges. Wien. 1864, p. 308. Wallace, Trans. Linn. Soc. Lond. 1865, p. 60. Oberthür, Etud. Ent. iv. p. 99 (1879). Staudinger, Exot. Schmett. i. p. 6 (1884). Haase, Unters. üb. Mim. p. 47 (1893). Rothschild, Nov. Zool. ii. p. 371 (1895). *Habitat.* Java.—*Euplœopsis Niasicus* (Pap. Paradoxus, *subsp.* Niasicus, Rothschild, *l.c.* p. 372, ♂ ♀ (1895). Pap. Paradoxus, Weymer, Stett. Ent. Zeit. 1885, p. 271. *Habitat.* Nias Island.—*Euplœopsis Telesicles* (Pap. Telesicles, Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 355, ♂ ♀. Pap. Paradoxus, *var.* Hewitson, Proc. Zool. Soc. 1859, p. 422, pl. 67, fig. 1, ♂, 2, ♀. Pap. Paradoxus Telearchus, Rothschild, *l.c.* p. 372 (1895). Pap. Paradoxa, *loc. f.a.* Wallace, Trans. Linn. Soc. 1865, p. 60. *Habitat.* Borneo.—*Euplœopsis Kerosa* (Pap. Kerosa, Butler, Ent. Mo. Mag. 1869, p. 55; *id.* Lep. Exot. p. 33, pl. 13, fig. 2, ♂ (1869). Pap. Paradoxus Telearchus, *aber. e.* Rothschild, *l.c.* p. 373, ♂. *Habitat.* Sarawak; S.-E. Borneo.—*Euplœopsis Juda* (Pap. Juda, Butler, *l.c.* p. 56; *id.* Lep. Exot. p. 34, pl. 13, fig. 3, ♂ (1869). Pap. Par. Tel. *aber. i.* Rothschild, *l.c.* p. 373, ♂. *Habitat.* Sarawak.—*Euplœopsis Zanoa* (Pap. Zanoa, Butler, *l.c.* p. 56; *id.* Lep. Exot. p. 34, pl. 13, fig. 1, ♂ (1869). Pap. Par. *var.* Zanous, Haase, Unters. üb. Mim. p. 47, pl. 8, fig. 54, ♂ (1893). Pap. Par. Tel. *aber. k.* Rothschild, *l.c.* p. 373, ♂ (1895). *Habitat.* Sarawak.—*Euplœopsis Daja* (Pap. Par. Tel. *aber. Daja*, Rothschild, *l.c.* p. 374, ♀ (1895). Pap. Juda, Butler, Lep. Exot. pl. 13, fig. 4, ♂. *Habitat.* Sarawak.—*Euplœopsis Russus* (Pap. Par. Tel. *aber. Russus*, Rothschild, *l.c.* p. 374, ♀. Pap. Paradoxus, *var.* Hewits. P. Z. S. 1859, pl. 67, fig. 3, ♀. *Habitat.* Borneo.—

Euplœopsis Leucothoides (Pap. Paradoxus, var. Leucothoides, Honrath, Berl. Ent. Zeit. 1892, p. 490, ♀. Pap. Paradoxus, var. Hewits. P. Z. S. 1859, p. 423, pl. 66, fig. 4, ♀. Pap. Schonbergianus, Honrath, l.c. 1891, p. 441, ♀. Pap. Par. Tel. aber. x. Leucothoides, Rothschild, l.c. p. 375, ♀ (1895). *Habitat.* Borneo.—*Euplœopsis albostriatus* (Pap. Par. Tel. aber. albostriatus, Rothschild, Nov. Zool. iii. p. 66, ♀ (1896). *Habitat.* N. Borneo.—*Euplœopsis Butleri* (Pap. Butleri, Janson, Cistula Entom. ii. p. 433, pl. 8, fig. 3, ♂ (1879). Pap. Par. Tel. aber. p. Rothschild, l.c. p. 374, ♂ (1895). *Habitat.* Malacca.—*Euplœopsis Distanti* (Pap. Par. Tel. aber. n. Distanti, Rothschild, l.c. p. 373, ♂ (1895). Pap. Butleri, Distant, Rhop. Malay. p. 352, pl. 27a, fig. 6, ♂ (1885). ? Pap (Euplœopsis) Butleri, Martin and de Nicéville, Journ. As. Soc. Bengal, 1895, p. 519, ♂ ♀. *Habitat.* Malacca; ? Sumatra.—*Euplœopsis Ænigma* (Pap. Ænigma, Wallace, Trans. Linn. Soc. 1865, p. 60, pl. 7, fig. 3, ♂. Pap. Par. Tel. aber. q. Ænigma, Rothschild, l.c. p. 374, ♂ (1895). Pap. (Euplœopsis) Ænigma, Martin and de Nicéville, Journ. As. Soc. Bengal, 1895, p. 520. *Habitat.* Malacca; Sumatra.—*Euplœopsis Nepticala* (Pap. Par. Tel. aber. u. Rothschild, l.c. p. 374, ♀. Pap. Butleri, Distant, Rhop. Malay. p. 352, pl. 27, fig. 6, ♀ (1885). *Habitat.* Malacca.—*Euplœopsis Haasei* (Pap. Par. Tel. aber. w. Haasei, Rothschild, l.c. p. 375, ♀ (1895). Pap. Par. var. Zanous, Haase, Unters. üb. Mim. p. 47, pl. 8, fig. 55, ♀ (1893). *Habitat.* Malacca.—*Euplœopsis fuscus* (Pap. Butleri, var. fuscus, Hagen, Berl. Ent. Zeit. 1892, p. 155, ♀. Pap. Par. Tel. aber. z. Rothschild, l.c. p. 375, ♀ (1895). *Habitat.* Banka Island.—*Euplœopsis Penomimus* (Pap. Penomimus, Martin, Einige neue Tagschmett. N.-E. Sumatra, pt. i. p. 2 (1895). de Nicéville, Journ. As. Soc. Bengal, 1895, p. 521. *Habitat.* N.-E. Sumatra.—*Euplœopsis Caunus* (Pap. Caunus, Westwood, Cabinet of Orient. Entom. pl. 9, fig. 2, 2a, ♂ (1848). Doubleday and Hewitson, Gen. D. Lep. ii. p. 529 (1852). Vollenhov. Tijd. v. Ent. 1860, p. 88. Rothschild, Nov. Zool. ii. p. 376, ♂ (1895). *Habitat.* Java.—*Euplœopsis Ægialus* (Pap. Ægialus, Distant, Ann. and Mag. Nat. Hist. 1883, p. 352, ♂; *id.* Rhop. Malay. p. 353, pl. 27b, fig. 5, ♂ (1885). Pap. Caunus, *subsp.* Ægialus, Rothschild, l.c. p. 376, ♂ (1895). Pap. Euplœopsis Ægialus, Martin and de Nicéville, Journ. As. Soc. Bengal, 1895, p. 521. *Syn.* Pap. Velutinus, Butler, Ann. and Mag. Nat. Hist. 1885, p. 343, ♂. *Habitat.* Malay Peninsula; Sumatra.—*Euplœopsis Mendax* (Pap. Caunus, *subsp.* Mendax, Rothschild, l.c. p. 376, ♂ ♀ (1895). Pap. Caunus, Honrath, Berl. Ent. Zeit. 1892, p. 10, ♀. Haase, Unters. üb. Mim. pl. 8, fig. 53, ♂ (1893). *Habitat.* Borneo.

Genus CADUGOIDES.

Cadugoides, Moore, Proc. Zool. Soc. Lond. 1882, p. 260. Kirby, Allen's Nat. Libr. Butt. ii. p. 280 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 38), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 355.

Papilio (group 20, pt.), Rothschild, Nov. Zool. ii. p. 359 (1895).

IMAGO.—*Forewing* elongated, triangular; costa arched towards the end, apex convex, exterior margin very oblique, even, and slightly concave in the middle, posterior angle rounded; cell very long, extending to fully two-thirds the wing; upper discocellular outwardly-oblique, lower inwardly-oblique and concave; median branches comparatively close together, the lowest emitted at more than half from its base. *Hindwing* elongate, fan-shaped, the costal margin being very long and extending beyond posterior angle of forewing, apex abruptly convex, exterior margin short, very oblique and very slightly scalloped, anal angle rounded, abdominal margin long; cell extending to more than half the wing. *Body* moderately slender in male, stout in the female; antennæ short, slender, club moderately and gradually thickened to tip.

LARVA AND PUPA.—[Govindra]. Similar to *Chilasa*.

TYPE.—*C. Agestor*.

MIMICRY.—*C. Agestor* is a mimic, in both the general form of wings and colour of markings, of the Limnaine butterfly *Caduga Tytia*.

CADUGOIDES AGESTOR (Plate 508, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Agestor, Gray, Zool. Miscellany, i. p. 32 (1832); *id.* Lep. Ins. of Nepal, p. 6, pl. 4, fig. 2, ♂ (1846); *id.* Catal. Lep. Brit. Mus. i. p. 71 (1852). Boisduval, Spec. Gén. Lep. i. p. 376 (1836) Doubleday and Hewitson, Gen. D. Lep. i. p. 21 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 91 (1857); *id.* Proc. Zool. Soc. Lond. 1865, p. 756. Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 355. Oberthür, Etud. Ent. iv. p. 100 (1879). Staudinger, Exot. Schmett. i. p. 6 (1884). Elwes, Trans. Ent. Soc. Lond. 1888, p. 431. Haase, Untersuch. üb. Mim. p. 48, pl. 7, fig. 47 (1893). Rothschild, Nov. Zool. ii. p. 360 (1895).

Cadugoides Agestor, Moore, Proc. Zool. Soc. Lond. 1882, p. 260. Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 315.

Papilio (Cadugoides) Agestor, de Nicéville, Sikkim Gazetteer, 1894, p. 174. Adamson, List Burmese Butt. p. 48 (1897).

IMAGO.—Male. Upperside. *Forewing* black, in fresh specimens blue-black; with a bluish-grey scaled slender basal costal streak, the cell-area and interspaces of the outer veins broadly from their base to the disc, followed by an outer-discal contiguous or partly coalesced grey conical spots, and then by a submarginal row of very small spots; the grey cell-area is apically longitudinally black streaked and obliquely broken at the apex; cilia black. *Hindwing* light red, or dark red in fresh specimens, including the veins, except at the base, where they are black; the outer discal interspaces showing a more or less dusky-red lanceolate streak, these dusky streaks, in some specimens, being more distinctly defined; a greyish-white scaled

spot at base of costa, three cell streaks united towards the base, an elongated feeble streak from base of costal interspace and another more prominent in the submedian interspace, an inner-discal series of five small oval spots basally placed in the interspaces, the three lower of which are the smallest and narrow, and in some specimens are more feebly defined, or obsolescent, or entirely absent, followed by an outer discal series of two or three upper smaller spots, the lower ones being feebly represented by a few scales or quite obsolete, in some specimens the latter series is entirely absent; the interspace between the two upper pair of discal spots is generally black scaled; beyond is a submarginal series of more or less feebly defined small dentate lunules; cilia slenderly alternated with white.* Underside. *Forewing* similar to the upperside, except that the ground-colour of the apex is brownish-ochreous. *Hindwing* similar to the upperside, except that the costal and submedian streak is less defined or obsolescent, the black less apparent or absent between the two upper discal pair of spots, and the submarginal lunules are well defined; in some specimens the discal intervening dusky spaces are more prominent. *Body* black; a streak behind the eyes, and base of palpi white; thorax white spotted; abdomen with a lateral row of transverse prominent white segmental bands, and a ventral row of spots; antennæ and legs black, fore femora white-streaked beneath.

Female. Upper and underside similar to the male, except that the markings of the hindwing are whiter.

Expanse, ♂ 4 to $4\frac{1}{2}$, ♀ $4\frac{1}{2}$ to $4\frac{3}{4}$ inches.

HABITAT.—Nepal; Sikkim; Bhotan; Assam; Burma; Shan States; Tenasserim; Malay Peninsula.

MIMICRY.—This is a most excellent mimic of the Limnaine butterfly *Caduga Tytia*.

DISTRIBUTION AND HABITS.—We possess several specimens of both sexes from Nepal, taken by the late Gen. G. Ramsay. Mr. H. J. Elwes writes, "This is a rare species in Sikkim, which I have never seen myself, but Mr. Otto Möller has taken it on Birch Hill at 6,000 to 7,000 feet elevation, in May, and records it from a lower elevation in April, as well" (Tr. Ent. Soc. 1888, 431). Mr. L. de Nicéville says it is "single-brooded and rather rare in Sikkim, flying from March to May, from 5,000 to 7,000 feet elevation" (Sikkim Gaz. 1894, 174). A male from Bhotan, taken in June by Mr. G. C. Dudgeon, is in the British Museum Collection. Col. C. Swinhoe has received it from the Khasia Hills; the specimens, being freshly caught, have the ground-colour of the hindwings darker red. Col. C. H. E. Adamson obtained a

* In Gray's figure of this butterfly the discal small spots on the hindwing have failed in retaining their original *white* colour, and have turned *black*.

single specimen on the Taoo plateau, Upper Tenasserim, in March (List. Burm. Butt. 1897, 48). Mr. F. D. C. Godman has a female from E. Pegu, taken by Mr. W. Doherty. We possess a male from the Upper Mekong, Shan States, taken by Mr. R. Roberts, C.E. Mr. W. Rothschild has a female from Perak, Malay Peninsula, taken by Mr. W. Doherty.

Our figures on Plate 508 are from male and female Nepal specimens.

CADUGOIDES GOVINDRA (Plate 509, fig. 1, larva and pupa, 1a, ♂, 1b, ♀, 1c, ♂, 1d, ♀).

Papilio Govindra, Moore, Entom. Monthly Mag. 1864, p. 101, ♂; *id.* Proc. Zool. Soc. 1865, p. 486.

Butler, Ann. Nat. Hist. 1888, p. 206.

Cadugoides Govindra, Moore, Proc. Zool. Soc. Lond. 1882, p. 261.

Papilio Agestor Govindra, Rothschild, Nov. Zool. ii. p. 361 (1895).

Papilio (Cadugoides) Agestor Govindra, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 594, pl. 5, fig. 22, a—d, larva and pupa.

Papilio Agestor, Kollar, in Hügel's Reise Kashmir, iv. pt. 2, p. 406, pl. 3, fig. 1, 2, ♂ (1844). Hutton,

Trans. Ent. Soc. 1847, p. 50. Westwood, Arcana Entom. i. p. 59, pl. 16, fig. 2, ♀ (1848).

Cadugoides Gopala, Moore, Proc. Zool. Soc. Lond. 1882, p. 260, ♀.

IMAGO.—Male. Upperside. *Forewing* blue-back, with grey-scaled markings similar to those in *C. Agestor*; in some specimens the small submarginal spots are entirely absent. *Hindwing* outwardly either pale brownish-ochreous or ochreous-red; with prominent grey-scaled basal spot, cell-streaks, elongated costal and submedian streak, inner and outer-discal spots, and generally a submarginal row of small dentate lunules, the latter sometimes being entirely absent; the veins basally and the cell-lines are black, the intervening space between the upper-discal pairs of spots and sometimes of each pair of the entire series and their lateral edges is also black, and more or less coalescent with the widening black outer marginal patches, these latter patches posteriorly decreasing more or less in size; sometimes, but more rarely, the entire intervening spaces, from the cell outward, are black, except at the anal margin; cilia slenderly intervened with white between the veins. *Body* blue-black; thorax, collar, frontal tuft and palpi white-spotted; abdomen with lateral and sublateral white segmental bands; antennæ and legs black.

Female. Upperside. *Forewing* similar to the male. *Hindwing* with the ground-colour either brighter ochreous or ochreous-red, with similar markings to the male. Underside similar to the male, the hindwing being either brighter ochreous or darker ochreous-red.

Expanse, ♂ $3\frac{1}{2}$ to $3\frac{3}{4}$, ♀ $3\frac{3}{4}$ to $4\frac{1}{2}$ inches.

LARVA.—Similar to *Chilasa*. With subdorsal and lateral fleshy processes. Colour brown above, pale ochreous beneath; with three longitudinal irregular-

shaped yellowish-ochreous patches, each edged by a black line, the middle and anal patch each partly joined across the back; segments between the patches with red and black spots.

PUPA.—Similar to that in *Chilasa*.

HABITAT.—North-Western Himalayas.

LIFE HISTORY.—“The female deposits her eggs on the young leaves of *Machilus odoratissimus*, N. O. Laurineæ, about the end of April. The larva is at first of a reddish colour, but very soon turns black and white, and lies on the upper surface of a leaf, where it greatly and protectively resembles a bird's dropping. After the last moult it assumes the handsome appearance shown in our figures. The pupa, remarkably like a broken-off twig of dead wood, is found in June, the imago emerging the following spring” (P. W. Mackinnon, Journ. Bombay N. H. Soc. 1898, 594).

DISTRIBUTION AND HABITS.—In Mr. W. Rothschild's Collection is a female labelled “Cashmere.” Specimens from Kujjar, taken at 6,000 feet elevation, in September, by Capt. MacArthur, and from Sultanpur, Kulu, taken by Capt. G. Young, are in Mr. I. H. Leech's Collection. A male, from Thundiani, taken by Col. J. W. Yerbury in May, and a female (*Gopala* type), taken in the Kangra District, by the Rev. J. H. Hocking, are in the British Museum Collection. Capt. T. Hutton says “it is by no means rare at Masuri, being found in woody situations in April and May, dancing lightly over the tops of low bushes and trees, with a sailing flight, gliding along without moving the wings” (Trans. Ent. Soc. 1847, 50). Capt. A. M. Lang says it “appears rare, as I have only taken two specimens, both in identically the same spot, in April, at Kasauli, on the first range of the Himalayas, at 6,000 feet elevation. Each of these specimens affected a high spray of bramble, whence it dashed off for a rapid soar for a short distance, returning to its post” (Proc. Zool. Soc. 1865, 487). Mr. P. W. Mackinnon found it “common in Masuri in March, April, and May, and very easy to capture, as it returns repeatedly to the same spot, even if temporarily driven off” (J. Bombay N. H. S. 1898, 594). We possess males from Gurhwal and Nyne Tal, Kumaon. Mr. F. Godman has a male from Landour.

Our Plate 509, fig. 1, larva and pupa, is copied from Mr. Mackinnon's published drawings; figs. 1a, b, male and female, typical *Gopala*, and figs. 1c, d, from typical *Govindra*.

CADUGOIDES EPYCIDES (Plate 510, fig. 1, 1a, b, c, d, e, ♂).

Papilio Epycides, Hewitson, Exotic Butt. iii. Pap. pl. 6, fig. 16, ♂ (1864). Felder, Verh. Z. B. Ges. Wien. p. 308 (1864). Moore, Proc. Zool. Soc. 1865, p. 756. Oberthür, Etud. Ent. iv. p. 100

(1879). Elwes, Trans. Ent. Soc. Lond. 1888, p. 432, ♂ ♀. Rothschild, Nov. Zool. ii. p. 361 (1895).

Cadugoides Epycides, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 315.

Papilio (Menamopsis) Epycides, de Nicéville, Sikkim Gazetteer, 1894, p. 173.

Papilio Epycides, subsp. *Curriatus*, Fruhstorfer, Deuts. Ent. Zeit. 1901, p. 349.

IMAGO.—Male. Upperside pale black. *Forewing* with a sullied greyish-white basal costal streak, longitudinal cell-streaks, lower discal elongated streaks, and an outer-discal curved row of spots, of which latter the upper one is placed in the basal interspace of the third and fourth subcostal branches, the lower spots being rounded and the upper oval; faint slender streaks are also generally present in the apical interspaces. *Hindwing* with either a pale olivescence-white or pale ochreous-white elongated costal and submedian streak, cell-streaks, inner-discal short streaks and an outer-discal contiguous, or sometimes coalescent, curved row of round spots, followed by a submarginal row of smaller spots, the anal largest and bright ochreous, the latter series sometimes being minute and feebly developed. Underside. *Forewing* much paler black basally, the apical area being pale brownish-ochreous, the greyish-white markings as on upperside but less sharply defined. *Hindwing* either pale brownish-ochreous or pale ochreous, the markings complete, as on upperside, but less sharply defined, or sometimes more or less obsolescent. *Body* dark black; thorax, collar, and frontal tuft, white-spotted; abdomen with two lateral and a ventral row of small white spots; antennæ and legs black.

Female. Similar to the male, but with somewhat broader wings, and all the markings comparatively larger.

Expanse, ♂ $2\frac{6}{10}$ to 3, ♀ 3 inches.

HABITAT.—Nepal; Sikkim; Bhotan; Assam; Upper Burma.

DISTRIBUTION AND HABITS.—We possess males from Nepal, Sikkim, and Bhotan. Mr. H. J. Elwes records it as "occurring, in Sikkim, not uncommonly in some seasons at 2,000 to 3,000 feet elevation, in April and May. Mr. Otto Möller says it frequents the sandy beds of streams, and to be single-brooded" (Tr. Ent. Soc. 1888, 432). Mr. L. de Nicéville says it is "single-brooded, occurring in Sikkim in April and May, at low elevations, especially at Sivoke. It appears to be very local, but is not rare where found in river-beds at 1,000 feet elevation. It occurs also in Bhotan, the Khasia Hills, and Upper Burma" (Sikkim Gaz. 1894, 173). Mr. H. Fruhstorfer records his *curriatus* from the "Ruby Mines, Upper Burma" (D. Ent. Zeit. 1901, 349).

ALLIED SPECIES.—*Cadugoides restrictus* (*Papilio Agestor var. restricta*, Leech, Butt. of China, p. 557, pl. 35, fig. 5, ♀ (1893). Rothschild, Nov. Zool. ii. p. 361 (1895). *Habitat.* W. China.—*Cadugoides Horatius* (*Pap. Horatius*, Blanchard, Compt. Rend. 1871, p. 809. *Pap. Epycides var. Horatius*, Leech, *l.c.* p. 555 (1893). Rothschild, *l.c.* p. 362 (1895). *Habitat.* W. China.

Genus MENAMOPSIS.

Papilio (subgen. *Menamopsis*) de Nicéville, Journ. Asiatic Soc. Bengal, 1887, p. 433.

Papilio (sect. 37, pt.), Felder, Verh. Z. B. Ges. Wien. 1864, p. 308.

Papilio (group 20, pt.), Rothschild, Nov. Zool. ii. p. 359 (1895).

IMAGO.—Male. *Forewing* elongated triangular; costa very slightly arched, apex convex, exterior margin oblique, posterior angle rounded; cell long and broad; first and second subcostal branches free. *Hindwing* triangular; apex obtusely pointed, exterior margin somewhat convex and almost even; cell long and rather broad.

Body rather long; antennæ with a slender club.

TYPE.—*M. Tavoyanus*.

MIMICRY.—The species of this genus are mimics of the Euploëine butterflies of the genus *Menamia* and *Penoa*.

MENAMOPSIS SLATERI (Plate 513, fig. 1, 1a, b, ♂, 1c, d, ♀).

Papilio Slateri, Hewitson, Exot. Butt. ii. *Pap.* text, pl. 4 (1859). Westwood, Proc. Ent. Soc. Lond. 1864, p. 10. Moore, Proc. Zool. Soc. Lond. 1865, p. 756. Oberthür, Etud. Ent. iv. p. 100 (1879). Staudinger, Exot. Schmett. i. p. 6 (1884). Elwes, Trans. Ent. Soc. Lond. 1888, p. 429, ♂ ♀. Haase, Untersuch. üb. Mim. p. 47 (1893). Rothschild, Nov. Zool. ii. p. 362 (1895).

Isamiopsis Slateri, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 314.

Papilio (Menamopsis) Slateri, de Nicéville, Sikkim Gazetteer, 1894, p. 173.

Papilio Slateri Slateri, et aber. *Jaintinus*, Fruhstorfer, Berl. Ent. Zeit. 1902, pp. 177, 178.

IMAGO.—Male. Upperside. *Forewing* rich dark purpurescent blue-black, the outer margin in some specimens being blackish brown; a violet-blue scaled short streak within upper end of the cell and sometimes either one or two narrow streaks below it, followed by a discal curved series of nine similar coloured elongated streaks with truncate outer ends, each increasing in length, from near the base of third subcostal interspace to the submedian interspace, in which latter space there are two, both more slender than the others, and the lowest is sometimes partly obsolescent, or obsolete. *Hindwing* purpurescent ochreous-brown, the basal area within and below the cell and the outer marginal border being somewhat darker brown; with a prominent ochreous-yellow spot inwardly-bordered with black at the anal angle. In some specimens a submarginally-disposed series of short whitish-scaled streaks are more or less faintly visible in pairs between the veins. Underside. Both wings uniformly ochreous-brown. *Forewing* with more or less faintly-defined sparsely whitish-scaled traces of the cell and discal streaks, disposed as on upper-side. *Hindwing* unmarked, except by a white basal spot and the anal ochreous-

yellow spot; generally there is also present a submarginal row of more or less faintly-defined white-scaled streaks in pairs between the veins. *Body* black; thorax and head pale blue spotted; abdomen with a subdorsal, two lateral, and a ventral row of white spots; antennæ and legs black.

Female. Upperside similar to the male, except that on the *forewing* the discal streaks are wider, a few blue scales also longitudinally disposed below the submedian vein, and there are three pale-blue scaled short longitudinal streaks within middle of the cell, and the spots at its apex more prominent. *Hindwing* similar to the male. Underside darker brown than in the male; markings similar.

Expanse, ♂ $3\frac{1}{2}$ to 4, ♀ 4 to $4\frac{1}{2}$ inches.

HABITAT—Assam; Sikkim.

DISTRIBUTION.—Specimens have been received by Mr. Ernest Swinhoe from the Khasia and Jaintia Hills, Assam. Mr. W. Rothschild has examples from Cherra Punji, Assam. Mr. H. J. Elwes says "this is a very rare species in Sikkim. It seems to occur in the outer hills at a very low elevation, and the few specimens Mr. O. Möller has procured were taken at Sivoke in May" (Tr. Ent. Soc. 1888, 429). Mr. L. de Nicéville records it as being "common at Sivoke, and a single-brooded species, which flies, in April and May, in the low outer valleys only" (Sikkim Gaz. 1894, 173). A specimen from Bhotan, taken in September by Mr. G. C. Dudgeon, is in the British Museum Collection.

MENAMOPSIS TAVOYANUS (Plate 514, fig. 1, 1a, b, c, d, ♂).

Papilio Tavoyanus, Butler, Ann. and Mag. Nat. Hist. (Nov. 1882), p. 373 ♂.

Papilio (subgen. *Menamopsis*) *Tavoyanus*, de Nicéville, Journ. As. Soc. Bengal, 1887, p. 433, ♂.

Papilio Slateri, subsp. *Tavoyanus*, Rothschild, Nov. Zool. ii. p. 363, ♂ (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 177, ♂.

Papilio Clara, Marshall, Journ. As. Soc. Beng. (Dec. 1882), p. 42, pl. 4, fig. 5, ♂.

Papilio Slateri, f. *geogr. marginata*, Oberthür, Etud. Ent. xvii. p. 3, pl. 4, fig. 35, ♂ (1893).

IMAGO.—Male. Upperside. *Forewing* either of the same rich dark purpurescent blue-black, with the cell and discal pale blue streaks almost as prominent as in typical *Slateri*, or, more generally, the black colour is less intense and is restricted to the basal three-fourths, the outer margin of the wing being dark brown, the discal blue streaks shorter and less defined, or these streaks are more or less obsolescent; in some specimens this wing is of a uniform dark ochreous-brown with faintly defined blackish streaks at end of the cell and basally within the discal interspaces, these dark streaks being very slightly speckled with blue scales. *Hindwing* with a submarginal prominent row of white streaks in pairs between the veins, these streaks varying in length in certain specimens from about one-tenth to nearly three-tenths of an inch; in some specimens the outer margin occasionally

also faintly show a few clustered ochreous-white scales; anal spot either pale ochreous-yellow or ochreous-white. Underside. *Forewing* unmarked, or, in some, a few whitish scales are present above the posterior angle. *Hindwing* with the basal white spot, submarginal duplex streaks, as on the upperside, but ochreous-white, these streaks being either partly or entirely confluent with the similar coloured and prominent marginal spots, and thus, together, form a series of lengthened marginal streaks; anal spot as on the upperside.

Female. Not seen.

Expanse, ♂ $3\frac{3}{4}$ to 4 inches.

HABITAT.—Burma; Upper Tenasserim; Shan States; Siam; Tonkin.

DISTRIBUTION.—Col. C. H. E. Adamson records it as "occurring frequently near Katha, Upper Burma. Two specimens also taken near Meple in Tenasserim, in February" (List, 1897, 49). Col. C. T. Bingham obtained it in the Daunat Range, in January, and in the Thoungyeen Valley, Middle Tenasserim. Mr. T. A. Hauxwell also took specimens in the Daunat Range. We possess a male from the Upper Mekong, Shan States, taken by Mr. R. Roberts, C.E.

INDO-MALAYAN SPECIES.—*Menamopsis Sticheli* (Pap. Sticheli, Tetens, Ent. Nachr. 1900, p. 296). Pap. Slateri, *aber.* Sticheli, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 178. Pap. Slateri Sticheli *aber.* Persoides, Fruhst. *l.c.* p. 178. *Habitat.* Perak, Malay Peninsula.—*Menamopsis Perses* (Pap. (Menamopsis) Perses, de Nicéville, Journ. As. Soc. Bengal, 1894, p. 46, pl. 4, fig. 7, ♂; *id. l.c.* 1895, p. 518). Pap. Slateri, *subsp.* Perses, Rothschild, Nov. Zool. ii. p. 363, ♂ (1895). Fruhst. Berl. Ent. Zeit. 1902, p. 178. Pap. Hewitsoni *var.* Sumatrana, Hagen, Iris, vii. p. 28 (1894). *Habitat.* N.E. Sumatra.—*Menamopsis Petra* (Pap. (Menamopsis) Petra, de Nicéville, *l.c.* 1894, p. 47, pl. 4, fig. 5, ♂; *id. l.c.* 1895, p. 519). Pap. Slateri Perses *aber.* Petra, Rothschild, *l.c.* p. 363. Fruhst. *l.c.* 1902, p. 178. *Habitat.* N.E. Sumatra.—*Menamopsis Hewitsoni* (Pap. Hewitsoni, Westwood, Proc. Zool. Soc. Lond. 1864, p. 10, ♂. Wallace, Tr. Linn. Soc. Lond. xxv. p. 61 (1865). Staudinger, Exot. Schmett. i. p. 6 (1884). de Nicéville, *l.c.* 1894, p. 46. Pap. Slateri *subsp.* Hewitsoni, Rothschild, *l.c.* p. 363 (1895). Fruhstorfer, *l.c.* 1902, p. 178. Pap. Hewitsoni *aber.* Persides, Fruhst. *l.c.* p. 178. Pap. Slateri, ♀, Hewitson, Exot. Butt. ii. *Pap.* pl. 4, fig. 9. *Habitat.* N. Borneo.

Genus PARANTICOPSIS.

Papilio (subgen. *Paranticopsis*), Wood-Mason and de Nicéville, Journ. Asiatic Soc. Bengal, 1887, p. 376.

Kirby, Allen's Nat. Libr. Butt. ii. p. 279 (1896).

Papilio (part), Doubleday and Hewitson.

Papilio (sect. 36), Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 364.

Papilio (group 39), Rothschild, Nov. Zool. ii. p. 456 (1895).

IMAGO.—Male. *Forewing* slightly elongated, triangular; costa arched, apex obtuse, exterior margin oblique and slightly concave in the middle, uneven, posterior margin short; first subcostal branch anastomosed to the costal vein. *Hindwing* short, triangular; exterior margin somewhat convex, scalloped; abdominal margin very hairy beneath, folded over above, the fold when opened displaying a lengthened scent-organ, consisting of a dense series of fine long silky-hairs, extending from the base along middle of the marginal interspace.

LARVA AND PUPA.—Unknown.

TYPE.—*P. Macareus* (W. M. and de N.).

MIMICRY.—The species of this genus are mimetic, some resemble species of the Limnaine genera *Parantica*, *Radena*, and *Ideopsis*, also of the Nymphaline genera *Hestina* and *Parhestina*, and certain females much resemble the same sex of the Euploëine genus *Trepsichrois*; others those of the mimetic Papilionines of the genera *Cadugoides* and *Chilasa*.

DIMORPHISM.—This is known to occur in the female of certain species—namely, in that sex of *Paranticopsis indicus*, of which we describe and figure both forms, Fruhstorfer, in Berl. Ent. Zeit. 1902, pp. 222-3, also figures a female of his *Pap. indochinensis* and of *Pap. argentiferus*, which are doubtless dimorphic forms. The *Pap. Astina*, Westwood (figured in "Cabinet of Orient. Entom." pl. 9) is also, probably, the *dimorphic* form of the female of the Java species, *P. macareus*, Godt., the normal form of female of this latter species being that figured in Horsefield's plate 5*—of which specimen we possess a coloured drawing made by the same artist.

PARANTICOPSIS POLYNICES (Plate 515, fig. 1, ♂, fig. 1a, ♀).

Papilio (Paranticopsis) Polynices, de Nicéville, Journ. Asiatic Soc. Bengal, 1897, p. 568, ♂ ♀.

Papilio Macareus, Elwes, Trans. Ent. Soc. Lond. 1888, p. 431.

Papilio (Paranticopsis) Macareus, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1892, p. 457, pl. 1, fig. 1, ♂ *aberration*; *id.* Sikkim Gazetteer, 1894, p. 173.

Papilio Macareus Indicus, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 226, *née* Rothschild.

IMAGO.—Male. Upperside black; cilia very slenderly alternated with white. *Forewing* with a small white basal-costal spot, and a few minute clusters of white scales faintly visible along the costal edge; with three greyish-white outwardly-oblique broad cell-streaks and also two short streaks within its apex, four spots

* Horsefield's Java Collection was transferred from the East India Company to the British Museum in 1860, but the specimen of this female of *Macareus* is not in the British Museum Cabinet, and we have failed to discover what has become of it. This female is enumerated, with two males, in the E. I. C. Museum Catalogue of Lep. vol. i. p. 90, published in 1857, as being at that time in the Collection.

outside end of the cell, a discal series of streaks, the upper one of which is small and somewhat rounded, the next three short and outwardly indented, the lower broad and elongated, that in the lower median interspace divided by a longitudinal curved black line; beyond is a submarginal row of rounded spots. *Hindwing* with greyish-white cell-area, which is cut by a slender black oblique line near the apex, broad discal streaks, those from the lower subcostal to lower median short, the one in the latter interspace with a small spot beyond its end, and the submedian with a similar coalescent spot; beyond is a submarginal row of two upper rather large spots—the uppermost one being generally coalesced to the costal streak, and four lower dentate lunules; abdominal margin very hairy beneath, folded over above, the fold when opened displaying a lengthened scent-organ consisting of a dense series of fine long silky hairs, extending from the base along middle of the marginal interspace. Underside ochreous-brown. *Forewing* blackish between the lower discal streaks, with markings, as on the upperside, but less prominent. *Hindwing* with less prominent markings, as on upperside, the upper submarginal spots obsolete, the lower lunules prominent, the two subanal spots small. *Body* black; front of thorax, collar, and palpi white spotted; thorax above laterally clothed with fine silky grey hairs; abdomen with a broad white lateral and a sublateral band; antennæ and legs black; femora and tibiæ whitish beneath.

Female. Upperside with the hindwing brownish-black. Both wings marked as in the male, except that in the hindwing the cell has a less defined subapical oblique line, the lower discal streaks are somewhat narrower, and the two subanal spots small but widely separated from the corresponding streaks. Underside as in the male.

Expanse, ♂ $3\frac{1}{2}$ to $3\frac{3}{4}$, ♀ $3\frac{3}{4}$ inches.

HABITAT.—Sikkim.

MIMICRY.—Both sexes are mimics of the Limnaine butterfly *Parantica melanoides*, and probably also of the Nymphaline butterfly *Parhestina persimilis*.

DISTRIBUTION.—Mr. L. de Nicéville's type specimens of both sexes are recorded from "Sikkim" (*l.c.* p. 568). Mr. H. J. Elwes writes, "males not uncommon in Sikkim at low elevations, during May and June, but the females are extremely rare" (*Trans. Ent. Soc.* 1888, 431). Mr. L. de Nicéville says it is "single brooded and rather rare in Sikkim. It occurs in the low outer valleys only from April to June" (*Sikkim Gaz.* 1894, 173).

Our illustrations on Plate 515, figs. 1, 1a, are from a Sikkim male and female.

PARANTICOPSIS INDICUS (Plate 515, fig. 2, ♂, 2a, ♀, 2b, *dimorphic* ♀).

Papilio Macareus, subsp. *Indicus*, Rothschild, *Nov. Zool.* ii. p. 457, ♂ ♀ (1895).

Papilio Macareus (part), Doubleday and Hewitson, *Gen. D. Lep.* i. p. 21 (1846). Moore, *Proc. Zool.*

Soc. Lond. 1865, p. 756. Staudinger, Exot. Schmett. i. p. 6 (1834). Haase, Untersuch. üb. Mim. p. 37 (1893).

Papilio Xenocles var. *Macareus*, Gray, Catal. Lep. B. M. i. p. 71 (1852).

Papilio (subgen. *Paranticopsis*) *Macareus*, Wood-Mason and de Nicéville, Journ. Asiatic Soc. Bengal, 1887, p. 376. Elwes and de Nicéville, *ib.* 1887, p. 433.

Paranticopsis Macareus, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 315.

Papilio Macareus Lioneli, Fruhstorfer, Soc. Ent. 1902, p. 74; *id.* Berl. Ent. Zeit. 1902, p. 226.

IMAGO.—Male. Upperside similar to the Sikkim *P. Polynices*, except that the cell and discal markings on both wings are much narrower. Underside ochreous-brown. *Forewing* blackish between the lower discal streaks. Both wings with the markings, as on upperside, much narrower than in *Polynices*.

Female. Larger than the male. Upperside brownish-black, but with narrower markings than in the male. *Forewing* with the inner portion of the cell-streaks and the apical upper cell-spot obliterated, the upper and lower spot outside the cell also obliterated, the upper four discal streaks small and short, the lower narrow. *Hindwing* with the cell longer than in the male; all the streaks narrow, the cell-streak very widely interrupted, the discal streaks longer, the lower median streak with a spot, and the submedian streak with a dentate lunule beyond the end; the submarginal upper spots and lower lunules distinctly defined; a small cluster of ochreous-yellow scales at the anal angle. Underside. *Forewing* with the ground-colour dark ochreous-brown, blackish between the outer veins; markings, as on the upperside, bluish-white. *Hindwing* ochreous-brown; all the markings, as on upperside, somewhat broader.

Expanse, ♂ 3 to $3\frac{1}{2}$, ♀ 4 inches.

DIMORPHIC FEMALE.—Indicus ♀, Rothschild. Size of male. Upperside. Ground-colour pale greyish-black. *Forewing* devoid of all markings except a submarginal row of small ill-defined whitish spots. *Hindwing* with the apical end of the white cell-streaks only present, the discal streaks, two upper submarginal spots and lower lunules, as in male, but less defined. Underside. Ground-colour pale dull greyish ochreous-brown; markings, as on upperside, but paler and less defined. *Body* with a broad sublateral whitish band.

Expanse, ♀ 3 inches.

HABITAT.—Assam; Burma; Tenasserim; Shan States.

MIMICRY.—The male is a fairly good mimic of the Limnaine butterfly, *Parantica Melanoides*, the female more resembling the latter sex of the Euploëine genus *Trepsichrois*.

DISTRIBUTION.—Col. C. Swinhoe records it from the Khasia Hills (Trans. Ent. Soc. 1893, 315). Mr. W. Rothschild's male and female are also from the Khasia Hills, his type female being the *dimorphic* form we describe above. Mr. de Nicéville

also records this species from the Khasias (Journ. As. Soc. Beng. 1897, 568). Col. C. H. E. Adamson remarks "males are common on beds of streams and damp places in the Tenasserim Province, in February and March, but I have not met with it in Upper Burma" (List, 1897, 49). We possess males from the Thoungyeen forests, Tenasserim, taken in February by Col. C. T. Bingham. Mr. H. J. Elwes records "many males from Ponselai and the Hills on the Siamese frontier" (Journ. As. Soc. Beng. 1887, 433). Males, from Bankasoon and Malawoon, Tenasserim, taken by Mr. H. O. Hume, are in Mr. F. Goodman's Collection, and males, from Muong Gnow, Shan States, are in Mr. W. Rothschild's Collection.

Of our illustrations on Plate 515, figs. 2, 2a are from male and female Khasia specimens, and fig. 2b from the Khasia type ♀ described by Mr. Rothschild.

PARANTICOPSIS PHRONTIS (Plate 516, fig. 1, ♂, 1a, ♀).

Papilio (Paranticopsis) Phrontis, de Nicéville, Journ. Asiatic Soc. Bengal 1897, p. 568, ♂ ♀.

Papilio Xenocles, Elwes, Trans. Ent. Soc. Lond. 1888, p. 430, ♂ ♀.

Papilio (Paranticopsis) Xenocles, de Nicéville, Sikkim Gazetteer, 1894, p. 173.

Papilio Xenocles Phrontis, f. temp. *Xenocrates*, Fruhstorfer, Soc. Ent. 1901, p. 145; *id.* Berl. Ent. Zeit. 1902, p. 229.

IMAGO.—Upperside similar to the same sex of typical *P. Xenocles*, except that on the *hindwing* the lower submarginal spots are less distinctly dentated, these latter generally being small and rounded, the lower pair more or less obliterated, and the large yellow anal spot spreading more or less into the lower median interspace.

Female. Upperside. *Forewing* with the ground-colour, and the markings, entire, as in the male. *Hindwing* with the ground-colour either darker or of a more reddish chestnut tint, the basal markings somewhat broader, the cell-area usually entire, but sometimes slenderly divided; the lower submarginal spots are either lunularly dentate, or small and rounded, or obsolescent, the anal chrome-yellow spot very large and spread out into the lower median interspace.

Expanse, ♂ 4 to $4\frac{1}{2}$, ♀ 4 to $4\frac{3}{4}$ inches.

HABITAT.—Sikkim; Bhotan.

DISTRIBUTION.—Mr. L. de Nicéville records his types from "Sikkim and Bhotan" (*l.c.* 568). Mr. H. J. Elwes says it is "a common species in the lower valleys of Sikkim, up to 3,000 feet elevation, from April to November. Females are rare" (Trans. Ent. Soc. 1888, 430). Mr. L. de Nicéville writes, "flies in Sikkim from April to November, from the level of the Terai up to about 3,000 feet. The males are fairly common, the females very rare" (Sikkim Gaz. 94, 173). Mr. G. C. Dudgeon obtained it in Bhotan, in May.

Our illustrations on Plate 516, figs. 1, 1a, are from Sikkim male and female.

PARANTICOPSIS XENOCLES (Plate 516, fig. 2, ♂, 2a, ♀).

Papilio Xenocles, Doubleday, in Gray's Zool. Misc. p. 74 (1842). Westwood, Arcana Ent. ii. p. 127, pl. 79, fig. 2, ♂ (1845). Doubleday and Hewitson, Gen. D. Lep. i. p. 20, pl. 1a, fig. 2 ♂ (1846). Gray, Catal. Lep. B. M. i. p. 71 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 90 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, pp. 308, 354. Oberthür, Etud. Ent. iv. p. 100 (1879). Staudinger, Exot. Schmett. i. p. 6, pl. 3, ♂ (1884). Butler, Ann. and Mag. Nat. Hist. 1885, p. 384. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 229.

Papilio (Paranticopsis) Xenocles, Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1887, p. 376.

Paranticopsis Xenocles, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 315.

IMAGO.—Male. Upperside black; cilia very slenderly alternated with white. *Forewing* with a small greyish-white spot at base of the costa, four elongated upwardly-oblique cell-streaks, and a spot between the upper pair at lower end of the cell, four, or sometimes only three rounded spots—the lowest being absent—outside end of the cell, followed by a discal series of broad streaks with indented outer ends, the upper five being short, the others elongated, that between the lower median and submedian divided by a black curved line; beyond is a submarginal row of nine rounded spots. *Hindwing* with greyish-white cell area, elongated broad discal streaks, a submarginal row of two upper irregularly-oval spots and four lower dentate-lunules, and a large quadrate chrome-yellow anal spot; the abdominal margin densely clothed with ochreous-white hairs, the fold when open displaying a lengthened pale ochreous scent-organ. Underside dull ochreous-brown; markings as on the upperside, but less sharply defined. *Thorax*, head, antennæ, and legs black; front of thorax, head, and palpi white spotted; base of thorax laterally clothed with fine grey silky hairs; abdomen dull black, with a broad lateral and sublateral white longitudinal band; fore femora and tibiæ whitish beneath.

Female. Upperside. Ground-colour either dark ochreous-brown or blackish-brown, with the cell and discal streaks on both wings narrower. *Forewing* with the costa and outer area blacker; the inner portions of the cell-streaks obliterated, the rounded spots outside end of the cell also more or less obliterated, the discal streaks much narrower and shorter, the upper two absent, the submarginal spots somewhat smaller. *Hindwing* with the cell and discal streaks narrower, the cell streak and that in the lower median interspace being broadly broken near the end, the submarginal spots all prominent, the anal spot smaller and paler yellow. Underside. *Forewing* dull, or dark ochreous-brown; markings as on the upperside, the lower submarginal spots being somewhat larger. *Hindwing* dull, or brighter, ochreous-brown, with the markings broader than on upperside.

Expanse, ♂ 4 to 4½ inches, ♀ 4 inches.

HABITAT.—Assam.

MIMICRY.—The male is a mimic, probably, of the Limnaine butterfly *Parantica melanoides*, of the Nymphaline genus *Hestina*, and of the Papilionine *Cadugoides Agestor*. The female is, probably, also a mimic of the same sex of the Limnaine *Trepsichrois Linnæi*, and of the mimetic Papilionine, *Chilasa dissimilis*.

DISTRIBUTION.—The type of *P. Xenocles* is recorded to be from Silhet. Col. C. Swinhoe received it from the "Khasia Hills" (Tr. Ent. Soc. 1893, 315). Mr. J. Wood-Mason records "a male taken in May at Durgakuna, Cachar" (J. As. Soc. Beng. 1887, 376). Specimens were taken by Dr. G. Watt "near Manipur" (Ann. N. H. 1885, 384).

Our illustrations on Plate 516, figs. 2, 2a, are from a Khasia specimen of male and female.

PARANTICOPSIS NERONUS (Plate 517, fig. 1, 1a, ♂).

Papilio Xenocles, f. temp. *Neronus*, Fruhstorfer, Soc. Ent. 1902, p. 74.

Papilio Xenocles Kephisos, f. temp. *Neronus*, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 229.

Papilio Xenocles, Moore, Proc. Zool. Soc. Lond. 1878, p. 840.

Papilio (Paranticopsis) Xenocles, Elwes and de Nicéville, Journ. As. Soc. Bengal, 1887, p. 433.

IMAGO.—Male. Upperside. *Forewing* similar to the typical Assamese *Xenocles*. *Hindwing* with narrower and shorter discal streaks, the lower submarginal spots small and less dentate, or the upper one and the three lower obliterated, the chrome-yellow anal spot somewhat smaller; abdominal margin clothed with ochreous or ochreous-brown hairs. Underside. *Forewing* similar to the upperside. *Hindwing* with similar narrow and short discal streaks and submarginal spots as on the upperside, or the latter obsolescent.

Expanse, ♂ 4 inches.

HABITAT.—Burma; Tenasserim; Shan States; Siam; Upper Tonkin.

DISTRIBUTION.—Col. C. H. E. Adamson records "males not uncommon in Arakan and Tenasserim, at slight elevations, from July till March. The female not seen" (List, 1897, 49). Col. C. T. Bingham obtained it in the Daunat Range, Tenasserim, in September, and in the Thoungyeen Valley in February. Mr. H. Grose-Smith has males from the Ataran Valley, Tenasserim, taken by Mr. T. A. Hauxwell. Mr. H. J. Elwes records "a male from Tavoy, taken in March" (J. A. S. Beng. 1887, 433). We possess a male from Tavoy, taken by Mr. Tucker, and also males from the Upper Mekong, Shan States, taken by Mr. R. Roberts, C.E.

Of our illustrations on Plate 517, fig. 1, is from a Tavoy male, and fig. 1a, from Shan States male.

PARANTICOPSIS MEGARUS (Plate 517, fig. 2, ♂, 2a, ♀).

Papilio Megarus, Westwood, Arcana Entom. ii. p. 98, pl. 72, fig. 2, ♂ (1845). Doubleday and

- Hewitson, Gen. D. Lep. i. p. 20 (1846). Gray, Catal. Lep. Brit. Mus. i. p. 71 (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 90 (1857); *id.* Proc. Zool. Soc. Lond. 1867, p. 672; *id.* *l.c.* 1878, pp. 697, 840. Felder, Verh. Z. B. Ges. Wien. 1864, p. 308. Staudinger, Exot. Schmett. i. p. 6 (1884). Elwes, Trans. Ent. Soc. Lond. 1888, p. 430. Haase, Unters. üb. Mim. p. 37 (1893). Rothschild, Nov. Zool. ii. p. 460 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 230. *Papilio (Paranticopsis) Megarus*, Elwes and de Nicéville, Journ. As. Soc. Bengal, 1887, p. 433. de Nicéville, Sikkim Gazetteer, 1894, p. 173. *Paranticopsis Megarus*, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 315.

IMAGO.—Male. Upperside black with bluish-white markings. *Forewing* with a basal transverse slender macular streak; within the cell are two small basal spots, two medial outwardly-oblique more or less perfect slender waved streaks—the upper one being generally broken, and then two short small oval longitudinally-superposed spots at the apex; beyond are two upper-discal transverse series of small spots, of which the third of the inner row and the two upper of the outer row are sometimes absent, an elongated streak in the lower median interspace, two very slender streaks in the submedian, and then a slender basally obliquely-broken streak along the posterior margin, followed by a submarginal row of rounded spots. *Hindwing* with a slender apically-broken cell-streak, a costal basal spot and a more or less defined elongated slender streak, a subcostal elongated slender broken streak, two lower discal series of four small conical spots in pairs, which are more or less outwardly-indented, the two lower of the inner series each preceded by a short slender streak within the basal interspaces; a slender, elongated streak in the submedian interspace with a small anal spot beyond its end; followed by a submarginal row of curved lunules, the two upper being the broadest; abdominal margin hairy, folded over above, the fold when opened displaying an elongated scent-organ composed of fine silky hairs. Underside pale ochreous-brown. *Forewing* blackish posteriorly; with markings as on upperside, the cell streaks and the inner row of upper-discal spots sometimes being more or less obliterated. *Hindwing* with markings as on upperside, but less prominent; also with two white basal costal spots. *Body* black; front of thorax, collar, and palpi white-spotted; base of thorax clothed with fine silky grey hairs; abdomen with a lateral, sub-lateral, and ventral whitish band; antennæ and legs black.

Female. Similar to the male. Upperside. *Forewing* duller black, the hindwing brownish-black. *Forewing* with the cell markings complete and somewhat broader, the upper discal markings also broader. *Hindwing* with the cell and discal markings slightly narrower than in the male, the submarginal lunules also generally narrower. Underside. Similar to the male. *Forewing* with the cell and discal streaks complete.

Expanse, ♂ $2\frac{3}{4}$ to 3, ♀ $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Sikkim; Assam; Burma; Shan States; Tenasserim.

DISTRIBUTION.—A male, labelled Sikkim, is in Mr. H. J. Elwes' Collection. A female, also labelled Sikkim, is in Col. C. Swinhoe's Collection. Mr. L. de Nicéville says "its occurrence in Sikkim is more than doubtful" (Sikkim Gaz. 1894, p. 173). It is recorded by Col. Swinhoe from the "Khasia Hills" (Tr. Ent. Soc. 1893, 315). We possess specimens from Silhet. Col. C. H. E. Adamson records it as "a rare species in Burma; three specimens only were taken by me in Tenasserim, in March and April" (List, 1897, 49). Lieut. E. Y. Watson obtained "a few specimens at Beeling, Upper Tenasserim" (J. Bombay N. H. S. 1888, 26). Col. C. T. Bingham took it in the Ataran Valley, Tenasserim, in March, and also in the Thoungyeen Valley. Mr. H. J. Elwes records "many males from Ponselai and the Hills on the Siamese frontier" (J. As. Soc. Beng. 1887, 433). Mr. W. Rothschild has a female from Martaban, Pegu, taken by Col. Bingham, and also both sexes from Muong Gnow, Shan States.

INDO-MALAYAN SPECIES.—*Paranticopsis Macareus* (Papilio Macareus, Godart, Encyc. Méth. ix. p. 76, ♂ (1819). Horsfield, Catal. Lep. Mus. E. I. Company, pl. 5, fig. 1, ♀ (1828). Lucas, Léop. Exot. p. 45, pl. 23, fig. 1, ♂ (1835). Boisduval, Spec. Gén. Lep. i. p. 374, ♂ ♀ (1836). Moore, Catal. Lep. Mus. E. I. C. i. p. 90 ♂ ♀ (1857). Oberthür, Etud. Ent. iv. p. 100 (1879). Rothschild, Nov. Zool. ii. p. 456, ♂ ♀ (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 226. *Syn.* Pap. Striatus, Zinken-sommer, Nova Acta Akad. Nat. Cur. xv. p. 154, pl. 14, fig. 5, ♂ (1831). Pap. Astina, Westwood, Cabinet of Orient. Ent. p. 20, pl. 9, fig. 3, ♀ (1848), *dimorphic form.* *Habitat.* Java.—*Paranticopsis Palanus* (Pap. Macareus *aber.* Palanus, Fruhstorfer, Soc. Ent. 1902, p. 74, ♂. *Habitat.* W. Java.—*Paranticopsis Masformis* (Pap. Macareus *aber.* Masformis, Lathy, Entomologist, 1899, p. 149, ♀. Fruhstorfer, Berl. Ent. Zeit. 1902, p. 226. *Habitat.* E. Java.—*Paranticopsis striatus* (Pap. striatus, Lathy, Entom. 1899, p. 149, ♂. Fruhstorfer, *l.c.* p. 227. *Habitat.* Siam.—*Paranticopsis Indochinensis* (Pap. Macareus Indochinensis, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 222, fig. ♂ ♀. *Habitat.* Tonkin.—*Paranticopsis Argentiferus* (Pap. Macareus argentiferus, Fruhstorfer, *l.c.* p. 223, figs. ♂ ♀. *Habitat.* Middle Siam.—*Paranticopsis Perakensis* (Pap. Macareus Perakensis, Fruhstorfer, Soc. Ent. No. 7, xiv.; *id.* Berl. Ent. Zeit. 1902, p. 227. Pap. Macareus (part), Wallace, Trans. Linn. Soc. 1865, p. 62. *Habitat.* Malay Peninsula; Perak; Malacca.—*Paranticopsis Xanthosoma* (Pap. Macareus *var.* Xanthosoma, Staudinger, Iris, ii. p. 7 (1889). Hagen, *ibid.* vii. p. 20 (1894). Rothschild, Nov. Zool. ii. p. 457 (1895). Fruhstorfer, Berl. Ent. Zeit. 1902, p. 227. Pap. (Paranticopsis) Xanthosoma, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 528. *Habitat.* Sumatra.—*Paranticopsis Macaristus* (Pap. Macaristus, Grose-Smith, Ann. and Mag. Nat. Hist. 1887, p. 434. Rothschild, *l.c.* p. 457 (1895). Fruhstorfer, *l.c.* p. 227 (1902). *Syn.* Pap. Macareus *var.* Borneensis, Staudinger, Iris, ii. p. 7 (1889). *Habitat.* Borneo.—*Paranticopsis*

Maccabæus (Pap. *Macareus* var. *Maccabæus*, Staudinger, Iris, ii. p. 6 (1889). Rothschild, *l.c.* p. 458 (1895). Fruhstorfer, *l.c.* 1902, p. 227. *Habitat.* Palawan.

Paranticopsis Stratocles (Pap. *Stratocles*, Felder, Wien. Ent. Monats. v. p. 298 (1861); *id.* Verh. Z. B. Ges. Wien. 1864, p. 308. Wallace, Trans. Linn. Soc. 1865, p. 63. Staudinger, Iris, ii. p. 7 (1889). Rothschild, *l.c.* ii. p. 461 (1895). Pap. (Chilasa) *Stratocles*, Semper, Philipp. Tagfalt. p. 267, pl. 43, figs. 2, 3, 4, ♂, 5, ♀ (1893). *Syn.* Pap. *Magicus*, Staudinger, Iris, ii. p. 7 (1889). *Habitat.* Philippines.—

Paranticopsis Kephisos (Pap. *Xenocles*, *subsp.* *Kephisos*, Fruhstorfer, Deuts. Ent. Zeit. 1901, p. 346; *id.* Berl. Ent. Zeit. 1902, p. 227. *Habitat.* Middle Tonkin.—

Paranticopsis Lindos (Pap. *Xenocles* *subsp.* *Lindos*, Fruhstorfer, Deuts. Ent. Zeit. 1901, p. 347; *id.* Berl. Ent. Zeit. 1902, p. 228. *Habitat.* Middle Siam.—

Paranticopsis Xenoclydes (Pap. *Xenocles* *subsp.* *Xenoclydes*, Fruhstorfer, Soc. Ent. 1902, p. 73; *id.* Berl. Ent. Zeit. 1902, p. 229. *Habitat.* Hainan.—

Paranticopsis Delesserti (Pap. *Delesserti*, Guérin, Rev. Zool. 1839, p. 233; *id.* *l.c.* 1842, p. 153; *id.* Delessert's *Souv. Voy. Ind.* ii. p. 68, pl. 17, ♀ (1843). Doubleday and Hewitson, Gen. D. Lep. i. p. 20 (1846). Gray, Catal. Lep. B. M. i. p. 71 (1852). Moore, Catal. Lep. Mus. E. I. C. i. p. 91 (1857). Felder, Verh. Z. B. Ges. Wien. 1864, p. 308. Butler, Tr. Linn. Soc. Zool. i. p. 552 (1877). Distant, Rhop. Malay. p. 356, pl. 27 B, fig. 4, ♂ (1885). Hagen, Berl. Ent. Zeit. 1892, p. 155. Rothschild, Nov. Zool. ii. p. 459 (1895). Pap. (Paranticopsis) *Delesserti*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 528. *Syn.* *Papilio Laodocus*, De Haan, Verh. Nat. Gesch. Ned. 1840, p. 42, pl. 8, fig. 5, ♂. Vollenhov. Tijd. v. Ent. 1860, p. 88. Druce, P. Z. S. 1873, p. 356. Staudinger, Exot. Schmett. i. p. 6 (1884). Hagen, Iris, iii. p. 19 (1894). Pap. *Melanides*, Erichson, Wieg. Archiv. fur Nat. ii. p. 248 (1843). Pap. *De Haanii*, Wallace, Tr. Linn. Soc. Lond. 1865, p. 62. Pap. *Laodocus* var. *Palawanicus*, Staudinger, Iris ii. p. 6 (1889). Pap. *Catoris*, Grose-Smith, Ann. Nat. Hist. 1892, p. 426. Pap. *Deless.* *subsp.* *hyalinus*, Fruhstorfer, Soc. Ent. 1901, p. 90. *Habitat.* Malay Peninsula; Nias; Sumatra; Java; Natuna; Borneo; Palawan.—

Paranticopsis Leucothoë (Pap. *Leucothoë*, Westwood, Arc. Ent. ii. p. 128, pl. 79, fig. 3, ♂ (1845). Felder, Verh. Z. B. Ges. Wien. 1864, p. 308. Wallace, Tr. Linn. Soc. 1865, p. 62. Oberthür, Etud. Ent. iv. p. 100 (1879). Staudinger, Exot. Schmett. i. p. 6 (1884). Distant, Rhop. Malay, p. 356, pl. 27a, fig. 2, ♂, 3, ♀ (1885). Rothschild, Nov. Zool. ii. p. 458 (1895). *Habitat.* Malay Peninsula.—

Paranticopsis interjectus (Pap. *Lencothoë* var. *interjectus*, Hourath, Berl. Ent. Zeit. 1893, p. 490. Hagen, Iris, viii. p. 20 (1894). Rothschild, *l.c.* p. 459 (1895). Pap. (Paranticopsis) *Lencothoë*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 528. *Habitat.* Sumatra.

Paranticopsis Ramaceus (Pap. *Ramaceus*, Westwood, Trans. Ent. Soc. Lond. 1872, p. 95, pl. 5, fig. 3, ♂. Druce, Proc. Zool. Soc. Lond. 1873, p. 356. Pap. *Leucothoë* *subsp.* *Ramaceus*, Rothschild, *l.c.*

p. 459 (1895). *Syn.* Pap. Schonbergianus, Honrath, Berl. Ent. Zeit. 1888, p. 250, pl. 5, fig. 4, ♂. *Habitat.* Borneo.—*Paranticopsis similis* (Pap. similis, Lathy, Entomologist, 1899, p. 149, ♂). Pap. Megarus similis, Fruhstorfer, Berl. Ent. Zeit. 1902, p. 230. Pap. Megarus, Distant, Rhop. Malay. p. 468, pl. 42, fig. 9. *Habitat.* Malay Peninsula.—*Paranticopsis Martinus* (Pap. Megarus *subsp.* Martinus, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 134; *id.* Berl. Ent. Zeit. 1902, p. 230. Pap. (Paranticopsis) Megarus, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 529. *Habitat.* Sumatra.—*Paranticopsis Mendicus* (Pap. Megarus *subsp.* Mendicus, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 134; *id.* Berl. Ent. Zeit. 1902, p. 230. *Habitat.* Siam.—*Paranticopsis Megapenthes* (Pap. Megarus *subsp.* Megapenthes, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 133; *id.* Berl. Ent. Zeit. 1902, p. 230. Pap. Megarus, Moore, P. Z. S. 1878, p. 697. Holland, Trans. Amer. Ent. Soc. 1887, p. 122. Oberthür, Etud. Ent. xvii. p. 5 (1893). *Habitat.* S. Annam; Tonkin; Hainan.—*Paranticopsis Sagittiger* (Pap. Megarus *subsp.* Sagittiger, Fruhstorfer, D. E. Z. 1902, p. 134; *id.* B. E. Z. 1902, p. 230. *Habitat.* N. Borneo.—*Paranticopsis fleximacula* (Pap. Megarus *subsp.* fleximacula, Rothschild, Nov. Zool. ii. p. 460, ♂ ♀. *Habitat.* Banguay Island.—*Paranticopsis Megæra* (Pap. Megæra, Staudinger, Iris, 1888, p. 275; *id.* l.c. 1889, p. 8. Rothschild, Nov. Zool. ii. p. 461 (1895). *Habitat.* Palawan.

Family PIERIDÆ.

- Papilio Danaï Candili*, Linnæus, Syst. Nat. x. ed. p. 467 (1758); *id.* xii. ed. p. 758 (1767). Sulzer, Gesch. der Ins. p. 143 (1776). Esper, Die Schmett. p. 51 (1777). Barbut, Gen. Ins. Linn. p. 170 (1781). Esper, Nat. des Linn. Syst. p. 209 (1784). Cuvier, Tabl. Elem. Hist. Nat. p. 590 (1798). Latreille, Hist. Nat. Gen. C. et Ins. iii. p. 396 (1802). Haworth, Lep. Brit. p. 7 (1803). Ochsenheimer, Schmett. Eur. ii. p. 141 (1808).
- Pap. Danaï Candidi* (pt.), Poda, Ins. Mus. Græc. p. 61 (1761). Scopoli, Ent. Carn. p. 166 (1763). Linn. Mus. Ulr. p. 236 (1764). Fabricius, Syst. Ent. p. 468 (1775).
- Papilio Danaï* (pt.), Müller, Faun. Ins. Frid. p. 32 (1764); Barbut, Gen. Ins. Linn. p. 162 (1781). Lamarek, Syst. Nat. Anim. p. 284 (1801).
- Danaï*, Fabricius, Ent. Syst. iii. i. p. 186 (1793). Weber, Nomen. Ent. pp. 99, 106 (1795). Scudder, Syst. Rev. Amer. Butt. p. 37 (1872).
- Papilio Danaï Flavi*, Ochsenheimer, Schmett. Eur. ii. p. 172 (1808).
- Pap. Heliconii* (pt.), Linn. Syst. Nat. x. ed. p. 465 (1758); *id.* xii. ed. p. 744 (1767); *id.* Faun. Suec. p. 268 (1761).
- Pap. Heliconii*, Barbut, Gen. Ins. Linn. pp. 162, 169 (1781).
- Andropoda*, Hübner, Verz. bek. Schmett. p. 90 (1816).
- Papilionida* (pt.), Leech, Edin. Encycl. ix. p. 127 (1815).
- Papilionides* (pt.), Latr. Hist. Nat. C. et Ins. iii. p. 387 (1802); *id.* iv. pp. 187, 193 (1809). Samouelle, Ent. Comp. p. 234 (1819). Scudder, Syst. Rev. Amer. Butt. p. 37 (1872).
- Papilionidæ* (pt.), Swainson, Phil. Mag. ser. 2, i. p. 187 (1827); *id.* Cab. Cycl. p. 86 (1840).

- Stephens, Ill. Brit. Lep. Haust. i. p. 5 (1827); *id.* Catal. Brit. Lep. Brit. Mus. p. i. (1850). Westwood, Intr. Ent. ii. p. 347 (1840). Stainton, Manual B. Lep. i. p. 12 (1857). Bates, Journ. Ent. i. p. 219 (1861); *id.* ii. p. 177 (1864). de Nicéville, Butt. of India, etc. i. p. 18 (1882). Moore, Lep. Ceylon, i. p. 116 (1881). Distant, Rhop. Malay. p. 283 (1885). Scudder, Butt. U.S. ii. 1027 (1889). Moore, Lep. Ind. i. p. 3 (1890).
- Pierides*, Boisduval, Spéc. Gen. Lep. i. pp. 163, 402 (1836); *id.* Index Méth. Eur. Lep. p. 4 (1840). Westwood, Intr. Ent. ii. p. 349 (1840). Blanchard, Hist. Ins. ii. p. 326 (1845). Kirby, Eur. Butt. pp. 2, 7 (1863). Staudinger & Schatz, Exot. Schmett. ii. p. 52 (1886).
- Pieridæ*, Duponchel, Catal. Lep. Fr. p. 21 (1840); *id.* Cat. Lep. Eur. p. 23 (1844). Doubleday and Hewitson, Gen. D. Lep. i. p. 32 (1847). Lang, Eur. Butt. i. p. 26 (1884). Doherty, Journ. As. Soc. Bengal, 1886, p. 110. Kirby, Allen's Nat. Libr. Butt. ii. p. 137 (1896). Tutt, Brit. Butt. pp. 86, 223 (1896). Jordan, Nov. Zool. v. p. 381 (1896). Grote, Trans. Ent. Soc. Lond. 1897, p. 340. Young, Journ. Bombay N. H. Soc. 1903, p. 306.
- Pierinæ*, Swainson, Cab. Cycl. p. 87 (1840). Bates, Journ. Ent. ii. p. 177 (1864). Butler, Catal. Fabr. Lep. B. M. p. 199 (1869). Kirby, Syn. Catal. D. Lep. p. 428 (1871). Moore, Lep. Ceylon, i. p. 116 (1881). Marshall and de Nicéville, Butt. Ind. etc. i. p. 18 (1882). Distant, Rhop. Malay. p. 283 (1885). Scudder, Butt. U.S. ii. p. 1033 (1889).
- Heliconides*, Wallengren, Lep. Scand. pp. 5, 130 (1853).
- Pieridi*, Stainton, Man. B. Lep. i. pp. 12, 15 (1856).
- Pieridina*, Herr. Schæffer, Lep. Exot. p. 54 (1858); *id.* Prod. Syst. Lep. p. 7 (1864). Plotz, Mitth. Nat. Ver. N. V. Rügen, xvii. p. 7 (1886).
- Dismorphiadæ* et *Pierididæ*, Grote, Proc. Amer. Phil. Soc. xxxix. pp. 13, 18 (1900).

CHARACTERS OF THE PIERIDÆ.

IMAGO.—Wings of moderate or of small size; discoidal cells always closed. *Forewing* subtriangular, rarely triangular, apex either rounded or obtusely or pointedly-angled, occasionally subfalcate and the outer margin slightly dentated; subcostal vein either *three, four, or five* branched; the first, and usually also the second branch, is emitted before the end of the cell; the second being either single or rarely bifid, or the third is bifid or trifid; the upper radial veinlet is most frequently emitted beyond the end of the cell—and, when so positioned, appears as an additional subcostal branch, the lower radial only then being emitted from the discocellulars; in some genera five subcostal branches arise consecutively beyond the end of the cell, and the two radials are both emitted from the discocellulars; median vein three branched; submedian vein free. *Hindwing* broadly rounded externally, never tailed; outer margin rarely slightly dentated and with a more prominent angulation at the end of the upper median veinlet; abdominal margin channelled for the reception of the abdomen; precostal vein free and emitted at some distance from the base of the costal vein; no interno-basal costal cell; a submedian and an internal vein present. *Body* moderately slender; abdomen of male with moderately large anal valves; palpi rather long, basal joints hairy; antennæ long, club more or less lengthened, or short, thickened gradually to the

apex, which is truncate; legs all perfect, long, tarsal claws bifid, and mostly with pulvilli and paronychæ; front tibiæ without a lateral spur.

EGG.—“Very tall and slender, tapering toward a much smaller rounded summit, either squarely truncate at the base, or tapering as much or nearly as much as at the summit, so as to render the egg subfusiform; provided with a number of distinct longitudinal ribs and crossed by frequent transverse finer raised lines” (Scudder, *l.c.* 1033).

ADULT LARVA.—Cylindrical; very slightly tapering at the ends; body smooth or uniformly clothed with short fine pubescence arising from minute warts, or the hairs are longish and sparsely distributed; head free; prothoracic segment not furnished with retractile tentacula.

PUPA.—Attached by the tail and a girth round the body; slender, angulated; head more or less pointed.

HABITS OF LARVÆ, ETC.—“All the larvæ of the Pieridæ lie, when full grown, on the upperside of the leaf, and, when solitary (some of them are gregarious) along the mid-rib, coating the leaf where they lie with a bed of silk. The eggs are generally laid singly on the upper surface of the leaf or on young shoots; exceptions to this are *Teracolus amatus*, *Appias Hippoides*, and *Delias Eucharis*,—this last is aberrant also in that the eggs are laid on the underside of the leaf, where the larvæ herd together,—*Belenois Mesentina*, *Terias Silhetana*, which lay their eggs in clusters, the larvæ of these, when young, are gregarious, but generally, when full grown, separate where the food is plentiful. The egg of the Pieridæ is spindle-shaped, standing on one end, and is always more or less strongly ridged longitudinally and striated finely transversely; in colour it is generally pure white, turning to yellow or orange, that of *Nychitona Xiphia* is blue, and that of *Huphina* blotched with red. With few exceptions, the Pieridæ are very much alike in the larva state, more alike than the different species of one genus often are among the Nymphalidæ. The head is large, the body long and somewhat depressed, without excrescences, but rough owing to the presence of minute tubercles discernible generally only with the aid of a lens; the colour is green, with usually a lateral stripe” (Davidson, Bell, and Aitken, Journ. Bombay N. H. Soc. 1896, 569).

CANNIBALISM.—“The larvæ of *Appias* will eat each other and any other species of larva feeding on the same food-plant as themselves, if forced to it by hunger. I have seen the larvæ of *Appias Libythea* and *A. Taprobana* eat freshly-formed pupæ of their own species, as well as larvæ changing their skins, and also the larvæ and pupæ of *Leptosia Xiphia*” (J. R. D. Bell, Journ. As. Soc. Bengal, 1900, 189).

FOOD PLANTS.—The larvæ of the Pieridæ feed on plants of the Nat. Orders *Leguminosæ*, *Loranthaceæ*, and *Capparidaceæ*.

SWARMING AND MIGRATORY HABITS OF IMAGO.—A pseudonymous author, “Eha,”

in "The Tribes on my Frontier," p. 113, quoted by Mr. Distant (Rhop. Malay. p. 285), observes that "butterflies of some kinds—especially those energetic greenish-white ones of the family surnamed *Callidryas*—are sometimes seized with a mania for migrating to the far West. I have stood near one of the parade-grounds at Poona, and watched them, with scarce a pause to rest their wings or sip a flower, from eight or nine o'clock until the afternoon, as far as the eye could reach, the host kept streaming past."

"It was probably butterflies principally belonging to the Pieridæ," writes Mr. W. L. Distant (Rhop. Malayana, p. 284), "which were observed by Mr. E. L. Arnold in Southern India, on one of his excursions in the dry-season." He relates that he "came upon a quiet nullah meandering through the jungle. The bed by chance, just there, was broad and sandy, and the stream a single thread that seemed every moment in danger of vanishing. But to my astonished eyes the whole place appeared a garden of flowers of a thousand colours, and crowded so close by the water that the sand could scarcely be seen. I looked and looked again, and then stepped down to observe the parterre closer; but, as I did so, these animated blossoms sprang into the air in a huge cloud, and the truth was plain that they were a countless host of thirsty butterflies, collected from the forest all round to drink at this thread of liquid" (On the Indian Hills, ii. 314 (1881). Mr. G. F. Hampson writes, "the only regular flight of butterflies that I have observed in the Nilgiri District, S. India, is one that takes place at the end of May and beginning of June, and consists principally of *Catopsilias* and *Catophagus* (with some *Limnainæ* and *Euplœinæ*). Its direction is from West to East, and the object may be to avoid the S.-W. Monsoon due on June 15th, and sure to deluge the Western and Northern Slopes for many weeks together, with hardly a break" (Epist. Sept. 14th, 1886). Sir J. E. Tennent, in his Nat. History of Ceylon, p. 403, says, "at times the extraordinary sight presented itself of flights of these delicate creatures, generally of a white or pale yellow hue, apparently miles in breadth and of such prodigious extension as to occupy hours, and even days, uninterruptedly in their passage—whence coming no one knows, whither going no one can tell. The butterflies I have seen in these wonderful migrations in Ceylon were mostly *Callidryas Hilaria*, *C. Alcmeone*, and *C. Pyranthe*, with straggling individuals of the genus *Euplœa* (*E. Core* and *E. Prothoe*). Their passage took place in April and May, generally in a north-easterly direction. A friend of mine travelling from Kandy to Kornegalle drove for nine miles through a cloud of white butterflies which were passing across the road by which he went." Dr. Thwaites, in his Ceylon MS. Notes, writes, "This family of butterflies contains several species which are remarkable, like some of the *Euplœinæ*, for their apparently migratory flights. At certain times of the year immense hosts of these butterflies, mostly of a white colour or nearly

white, may be observed during the hottest part of the day rushing in an impetuous flight across the country, drawn by some irresistible instinctive impulse, and impatient of any obstruction in their headlong course; even ascending hills of 6,000 feet elevation, and descending again; striking like animated snow-flakes against any one meeting them in their course; and then, after passing the obstruction, making on with the same pertinacity as before towards where they are hurrying to, until the failure of sunshine arrests their progress for the day, to be continued probably on succeeding days until the wondrous furor has exhausted itself. By the superstitious natives these marvellous movements of white butterflies are attributed to a desire on the part of the insects to do homage to the footstep of Buddha on Adams Peak, moved, as the native himself is, to do so at certain times of the year. But the phenomenon itself, apart from the native idea, is well worthy of study by any one who has time and opportunities to devote to it. It would be interesting to ascertain, firstly, whence these butterfly hosts come and where their feeding grounds when in the larval state; secondly, to determine if the immense numbers of these butterflies, which have halted for the night, wake up in the early morning to continue their course in exactly the same direction as on the previous day, and at what hour the resumed movement commences; and thirdly, to ascertain if, during the time their progress is arrested by night, many fall a prey to the attacks of birds, bats, lizards, etc., to an extent to reduce their numbers very considerably, and how their eventual disappearance is to be accounted for. I should remark that amongst the main body of these travelling white butterflies, small groups of half a dozen individuals or more may be observed, which in strings of sequence, looking as if playing 'follow my leader,' have a very pretty appearance. In some portions of the country in their line of flight, where shallow water may be lying, large numbers of these white butterflies may be seen quenching their thirst on the damp ground, and flying up when disturbed in quite a startling cloud." Mr. T. J. Mann writes (Proc. Linn. Soc. Lond. June, 1895), "I observed *Catopha Galene*, in Ceylon, migrating in thousands across the northern part of the Island during March and April, 1859, in a direction from N.E. to S.W. The movement commenced about 7 a.m., and lasted until noon, when it decreased, and was renewed in the afternoon for another two hours." Dr. N. Manders, in Mr. de Nicéville's List of Ceylon butterflies (Journ. As. Soc. Bengal, 1899, 172), remarks, "After the initial heavy rains, butterflies start afresh in November, December, and January, and it is in these months more especially, though to a slighter extent at the beginning of the S.W. Monsoon in June, that the extraordinary migratory flights of butterflies take place. These flights are perfectly amazing and scarcely credible. At Colombo, where Dr. Manders has more particularly noticed them, the direction of the flight is always northerly and principally along the sea shore, possibly the more readily to

avoid obstacles. The species which comprise these sensational flights are the following, to the exclusion of almost any other:—*Euplœa Asela* (and *E. Montana* in May), *Appias albina*, *A. Paulina*, and the two *Catopsilias*, *Papilio Demoleus*, and *Belenois Mesentina* [*Taprobana*], irregularly. He calculated the number passing two fixed points 20 yards apart close to the edge of the sea, and concluded that not less than 14,000 passed between these points during the hours the flight lasted, from 10 a.m. to 2 or 3 p.m.” Another observer, Col. C. J. Bingham, says, “I had been in the Salween forests, beyond the great rapids, and was returning to Moulmein. It was a steamy day in October, and I was lying with the hot fever fit on me in the boat on the Salween below Shwëgon, when I noticed clouds of butterflies, chiefly *Catopsilia*, migrating, crossing the Salween from East to West in a continuous stream” (Tr. Ent. Soc. Lond. 1902, 363).

MIMICRY.—Mimicry in this family of butterflies, within our area, occurs in the genus *Metaporis*,—*M. Caphusa*, *Ariaca*, and *Agathon*, each being fair mimics of the common Limnaine butterfly *Parantica melanoides*. The females of the various species of *Nepheronia*, also mimic species of the Limnaine genera *Bahora*, *Parantica*, *Caduga*, and *Badacara*. In *Hebomoia Glaucippe*, and allied species, when at rest with the wings vertically closed, the resemblance to a dead leaf is very striking. Mimicry also occurs between certain genera within the Family, an example of which is the Ceylonese *Prioneris Sita*, this rare species being, in both sexes, a splendid mimic of the common and highly-protected *Piccarda Eucharis*.

SEASONAL BROODS.—In his “Notes on Indian Pierinæ,” Capt. E. Y. Watson (Journ. Bombay Nat. Hist. Soc. 1894, p. 489) writes, “In different parts of the Indian region the seasons vary to a certain extent, so that it cannot be laid down as a fixed rule that specimens captured in any particular month will belong to any particular form; besides which allowance has to be made for breaks in the rains or showers in the dry-season. Roughly, however, the *rainy-season* may be said to extend from the middle of May to the middle of November, and the *dry-season* for the rest of the year, and it will be found that the very large majority of the specimens obtained during these periods will be wet- and dry-season forms respectively. The limitations given above are approximately those of the seasons in Burma, but they are liable to vary a fortnight either way, while in the hilly districts of that country the rains sometimes continue till well in December. The same limitations would also apply fairly well to the whole of Eastern and Southern India, but in the dry tracts of the North-west the rains are of shorter duration and are less continuous; consequently rainy-season forms are scarce, and dry-season ones are much more pronounced.

“It must also be borne in mind that these seasonal races are not confined to two clearly-defined forms, *i.e.* a rainy-season and a dry-season form, but that in

most species there are not only two very distinct-looking forms which represent the extremes of the two seasonal races, and which prevail in the rainy and dry-seasons respectively, but also numerous intermediates linking these extremes together, many of these intermediates having received names. A further point to be noticed is that these forms themselves vary according to the vegetation and rainfall, so that the extreme of the rainy-season form from a district where the rainfall is great and the vegetation dense, is much more pronounced than the extreme of the rainy-season form from a district with slight rainfall and sparse vegetation; and these differences are even more marked in the dry-season forms; while in all genera the dry-season forms are, as a rule, smaller than the rainy-season forms."

Sub-family PIERINÆ.

- Pieridi* (pt.), Stephens, Catal. Brit. Lep. B. M. p. 3 (1850). Stainton, Manual Brit. Lep. i. p. 15 (1857).
Pierinæ (Div. 1; et 2 pt.), Butler, Cistula Ent. i. p. 55 (1870).
Pieridæ, Schatz, Exot. Schmett. ii. p. 58 (1886).
Pieridi, Scudder, Butt. U.S. ii. p. 1154 (1889).
Pierinæ, Kirby, Allen's Nat. Libr. Butt. ii. p. 139 (1896).
Pierinæ (Tribe *Aporidi* et *Pieridi*) Tutt, Brit. Butt. pp. 86, 225-9 (1896).
Pierinæ (pt.), Jordan, Nov. Zool. v. p. 381 (1898).
Pieridini (pt.), Grote, Proc. Amer. Phil. Soc. 1900, p. 20.
Voracia, Hübner, Verz. bek. Schmett. p. 90 (1816).

CHARACTERS OF THE PIERINÆ.

IMAGO.—*Forewing* with the subcostal vein either *three* or *four* branched; the first branch and usually also the second is emitted before the end of the cell; the second being either single or rarely bifid, and the third most generally bifid; the upper radial veinlet most generally emitted beyond the end of the cell, and the lower radial only starting from the discocellulars; in *Baltia* both radials start from the subcostal beyond the cell.

Genus DANAUS.

- Danaus* (*Danai Candidi*), Linnæus, Syst. Nat. x. ed. pp. 467-470 (1758); *id.* xii. ed. i. 2, pp. 758-765 (1767).
Danaus, Esper, Die Schmett. i. p. 51 (1777). Cederheim, Faun. Ingricæ Prod. p. 206 (1798).
 Panzer, Faun. Ins. Germ. Hefte, 84, Index, p. xi. (1801). Oken, Lehrb. i. p. 723 (1815).
 Crotch, Cistula Entom. i. p. 60 (1870).
Pieris (sect. 3 pt.), Schrank, Fauna Boica, iii. i. p. 160 (1801).
Pieris (pt.), Latreille, Sonn. Buff. xiv. p. 111 (1805); *id.* Gen. Cr. et Ins. iv. p. 203 (1809). Lamarck, Hist. Nat. Anim. iv. p. 30 (1816). Boisduval, Spéc. Gen. Lep. i. p. 437 (1836). Doubleday

and Hewitson, Gen. D. Lep. i. p. 42 (1847). Stainton, Man. Brit. Lep. i. p. 18 (1857). Kirby, Eur. Butt. p. 8 (1863).

Mancipium, Hübner, Tentamen, p. 1 (1806). Scudder, Proc. Amer. Acad. A. and Sci. 1875, p. 210. Grote, Proc. Amer. Phil. Soc. xxxix. p. 21 (1900).

Pontia (pt.), Fabricius, Illiger's Mag. vi. p. 283 (1867). Leach, Edinb. Encyc. p. 716 (1815). Ochsenheimer, Schmett. Eur. iv. p. 30 (1816). Samouelle, Ent. U. Comp. p. 236 (1819). Jermyn, Butt. Coll. Vade Mec. pp. 43, 66. (1824).

Pieris, Latreille, Consid. Gen. C. et Ins. p. 440 (1810). Staudinger and Schatz, Exot. Schmett. ii. p. 60 (1886). Scudder, Syst. Rev. Amer. Butt. p. 41 (1872); *id.* Butt. U.S. ii. p. 1171 (1889). Kirby, Allen's Natr. Libr. Butt. ii. p. 142 (1896). Tutt, Brit. Butt. p. 229 (1896). Grote, Proc. Amer. Phil. Soc. xxxix. p. 21 (1900).

Ganoris (pt.), Dalmann, Vetensk. Acad. Handl. xxxvii. pp. 61, 86 (1816).

Catophaga (pt.), Hübner, Verz. bek. Schmett. p. 93 (1816).

Pontia (sect. 1), Stephens, Illust. Brit. Ent. Haust. i. p. 15 (1827).

Pontia, Rennie, Consp. Butt. p. 2 (1832). Westwood, Intr. Class. Ins. ii. Syn. p. 87 (1840).

Pieris (sect. A), Stephens, Catal. Brit. Lep. B. M. p. 4. (1850).

IMAGO.—*Forewing* elongated, triangular; apex obtusely angled; cilia ample; subcostal vein four branched, first and second free; first at one-fourth before end of the cell, second immediately before the end, third bifid, the fourth starting from close to the apex; upper radial emitted from the subcostal at nearly one-third beyond the cell, lower radial from angle of the discocellulars; cell long and broad; median veinlets equidistant apart; submedian vein recurved. *Hindwing* elongated anteriorly; costa very oblique, convex externally; cilia ample; cell long, broad across the middle and pointed at the apex; discocellulars long and very oblique, nearly straight; subcostal branches very long; submedians long. *Thorax*, head and front clothed with fine silky hairs; palpi short, hairy beneath to the tip, terminal joint cylindrical and longer than second; antennæ long, slender, club gradually thickened to tip, club almost cylindrical; abdomen of male above densely clothed with laxly compressed longish hair-like scales, denser beneath.

EGG.—Flask or skittle-shaped, with 15 to 17 longitudinal ribs, and delicate transverse reticulation. Deposited on end in batches.

LARVA.—Cylindrical; clothed with very short fine hairs. Often gregarious, but not living under a web. Feeds on *Cruciferae* and *Tropæolaceæ*.

PUPA.—Attached by the tail and a girth round the body. "Stout, somewhat angulated; head with a central projected spike; back keeled throughout, the keel rising angularly on thorax to an obtuse posterior point and then descending to the waist; abdomen not so prominently keeled, at the end the keel bifurcates forming the two sides of the anal spike; the shoulders angulated, from these a subdorsal ridge angulated along the wing-cases with two prominences, the second is highest, and in some becomes quite a spike; outline of belly gently curved from head to end of wing-cases, where the tongue-case projects free, thence the abdomen is less curved

to the tail; the anal spike flat, almost square, being made up of the two outside ridges with a triangular piece between and set on the ventral surface with many short spines curved at the tip and then spreading into broad edged hooks." (Buckler.)

TYPE.—D. Brassicæ.

HISTORICAL NOTE ON THE GENUS DANAUS.

1758. Linnæus, Syst. Nat. ed. x. pp. 467-470, used the name DANAUS only, at the heading of the pages, for both the sections of his Papilio Danai, viz. *Danai Candidi* and *D. Festivi*. The species enumerated under the first section being modern *Pieridæ*, and those of the second section mostly *Euplœinæ*.
1761. Poda, Ins. Mus. Græcensis, p. 61, cites species of *Pieridæ* only, under *D. Candidi*.
1777. Esper, Die Schmett. i. p. 51, uses the name *Danaus*, in a subgeneric sense, for species of *Pieridæ*, representing the Linnæan *D. Candidi*, and figures *D. Brassicæ*.
1788. Borkhausen, Nat. Eur. Schmett. i. p. 252, establishes the *Danai* on modern *Pieridæ*, *Rhamni*, *Cleopatra*, *Hyale*, *Cardamines*, *Daplidice*, *Sinapis*, *Napi*, *Brassicæ*, *Cratægi*, etc.
1793. Fabricius, Ent. Syst. iii. p. 186, restricts the *Danai* to the *D. Candidi* of Linnæus, and separates the modern *Danainæ* [*Euplœinæ*] under the name of *Festivi*.
1795. Weber, Nomen. Ent. pp. 99, 106, follows the restriction of Fabricius.
1798. Cuvier, Tabl. Elem. Hist. Nat. p. 590, cites species of *Pieridæ* only (*Brassicæ*, *Rapæ*) under *Danai*.
1798. Cederheim, Faun. Ingricæ Prod. p. 206, uses *Danaus* for species of *Pieridæ* (*Brassicæ*, *Rapæ*, *Napi*, *Sinapis*, *Daplidice*, *Cardamines*, *Rhamni*).
1801. Lamarck, Syst. Anim. p. 284, under *P. Danai*, gives *Brassicæ* and *Argus*.
1801. Panzer, Faun. Ins. Germ. Hefte, 73, 74; *id.* 84, Index p. xi. uses *Danaus* generically, for species of *Pieridæ*.
1806. Turton, Linn. Syst. Nat. iii. pt. 2, p. 64, also restricts the *Danai* to species of *Pieridæ*.
1809. Latreille, Gen. C. et Ins. iv. p. 201, proposed *Danaus* to supplant his own genus *Danaida* (Sonn. Buff. xiv. 108 (1805), and of *Danais* (Illiger's Mag. vi. p. 291 (1807), using it for species of *Euplœinæ*.
1815. Oken, Lehrb. i. p. 723, used *Danaus* for *Pieridæ* only.
1872. Crotch, Cistula Entom. i. p. 60, refers *Danaus* to Linnæus, and says the type was fixed by Cuvier (Tabl. Elem. 1798, p. 590) as *Brassicæ*.

From the above details of the restriction of the Linnæan *Danaï* to the *D. Candidi*, it is evident that the action of these earlier authors must take precedence of that of Latreille. (*Conf.* Kirby, Journ. Linn. Soc. Zool. x. pp. 397-8 (1870); *id.* Allen's Nat. Libr. Butt. i. p. 18 (1894); *id. l.c.* ii. p. 142 (1896). Moore, Lep. Ceylon, i. p. 1 (1881); *id.* Lep. Indica, i. p. 8 (1890).

DANAUS BRASSICÆ (Plate 518, fig. 1 ♂, 1a ♀).

Pap. Danaus Brassicæ, Linnæus, Syst. Nat. x. ed. p. 467 (1758). Müller, Faun. Ins. Frid. p. 32 (1764). Linn. Syst. Nat. xii. ed. p. 758 (1767). Esper, Die Schmett. i. p. 52, pl. 3, fig. 1 (1777).

Pieris Brassicæ, Schrank, Fauna Boica, ii. i. p. 165 (1801). Kollar, Hügel's Kaschmir, iv. 2, p. 409 (1844). Elwes, P. Z. S. 1882, p. 401; *id.* Trans. Ent. Soc. 1888, p. 416. Mackinnon, Journ. Bombay, Nat. Hist. Soc. 1898, p. 590.

Pieris Brassicæ var. *Nepalensis*, Gray, Lep. Ins. of Nepal, p. 9, pl. 6, figs. 1, 3 ♂ ♀ (1846). Lang, Ent. Mo. Mag. 1864, p. 103. Moore, P. Z. S. 1865, p. 490; *id.* 1874, p. 273.

Mancipium Nipalensis, Moore, Proc. Zool. Soc. 1882, p. 256.

Danaus Brassicæ, Crotch, Cist. Ent. i. p. 60 (1870).

Ganoris Nipalensis, Swinhoe, Trans. Ent. Soc. 1885, p. 343. Butler, P. Z. S. 1886, p. 376; *id.* Ann. Nat. Hist. 1888, p. 204.

Mancipium Brassicæ, de Nicéville, Sikkim Gaz. 1894, p. 168.

IMAGO.—Male. Upperside white. *Forewing* with the base and costa slightly greyish-black scaled; the apex with a broad black posteriorly-decreasing band extending to below the middle median veinlet, its inner margin being excurved and slightly irregular; occasionally a very few black scales are present in the upper median interspace. *Hindwing* with a black costal spot. Underside. *Forewing* white, the apical band very pale yellow; a large quadrate black discal spot between the upper and middle medians, and a more irregular shaped spot between the lower median and submedian. *Hindwing* very pale yellow, sparsely speckled with minute black scales, these scales being slightly more numerous in the cell area; extreme basal edge of costa slightly brighter yellow; costal black spot less prominent than on upperside.

Female. Upperside white. *Forewing* with the black apical band somewhat broader; a discal large black quadrate spot between the upper and middle median veinlets, a similar spot between the lower median and submedian, and a more or less elongated streak below the latter vein. *Hindwing* with a black costal spot which is generally larger than in the male. Underside similar to the male. *Body* above greyish-black; thorax clothed with grey hairs; body beneath white; front of head, palpi, and legs white; antennæ black above, segmented beneath with white, the tip white.

Expanse, ♂ $2\frac{1}{2}$ to $2\frac{3}{4}$, ♀ $2\frac{3}{4}$ inches.

HABITAT.—Europe; N. and C. Asia; Afghanistan; W. and E. Himalayas.

DISTRIBUTION (Within our Area).—Specimens from Chitral, taken by Capt. G. H. Colomb, from Gilgit, by Capt. Biddulph, and from Ladak, by Capt. F. E. S. Adair, are in the British Museum Collection. We possess a male from Ladak, taken by the Messrs. Schlagtweit, both sexes from Kashmir, taken by Capt. R. Bayne Reed, and others from Simla, Masuri, and Kumaon. Capt. H. B. Hellard obtained it at “Pangi, in Busahur, in July and August, in the Indus Valley between Dras River and Skardo in July, and also in Kashmir from July to September” (MS. Notes). In Mr. J. H. Leech’s Collection are specimens taken by himself at Dras in June, others from Kujiar, 6,000 feet elevation, and Narkunda in April, Kardong, 14,000 feet, in August, Chonging Valley, 15-17,000 feet, in July and August, and at Kylang, 13,000 feet, in September, all taken by Capt. H. McArthur. Col. J. W. Yerbury found it “common at Campbellpur from May to July, and from October to December. The Cabbages in my garden are covered at the present time, January 11th, with the caterpillars of some white butterfly, and there are some half-dozen chrysalides on the walls of the bungalow, all probably belonging to this species” (Proc. Zool. Soc. 1886, 376). Also taken at “Thundiani, in September” (*id.* Ann. N. H. 1888, 204). Col. C. Swinhoe records “a single male taken at Kasian, Afghanistan, in June” (Tr. Ent. Soc. 1885, 343). Mr. P. W. Mackinnon found it “very common in Masuri and less so in the Dun, in March, but not found in any great numbers later in the year, although an occasional specimen may be seen in almost every month in gardens in Masuri in the spring, the larva does great damage to cabbages (*Brassica campestris*, N. O. Cruciferæ), so much so that boys have to be continually employed in picking them off” (Journ. Bombay N. H. Soc. 1898, 590). Capt. A. M. Lang records it being found “everywhere in the N.W. Himalayas up to 10,000 feet altitude” (P. Z. S. 1865, 90). Capt. Lang also records it as “abundant at Umballa, in the Plains, in January, but I never saw it in Oudh” (Ent. Mo. Mag. 1864, 103). “Common in Dharmasala; larvæ reared on May 5th from eggs found on the *Nasturtium*. Imagines came out on May 25th. Two or three broods in the year” (J. H. Hocking, P. Z. S. 1882, 256). Mr. L. de Nicéville records it from “Singal, Gilgit River Valley, at 7,100 feet elevation” (Rept. Pamur Comm. 43). Mr. G. R. Gray’s type was obtained in Nepal by Gen. T. Hardwicke (List. Lep. B. M. i. 32 (1844)). Mr. H. J. Elwes says “it is commoner in the interior of Sikkim than at Darjiling, but occurs there from March to December, and as low as 3,000 feet” (Tr. Ent. Soc. 1883, 416). Mr. Elwes has also received specimens, taken by native collector, probably in the Chumbi Valley. Col. C. T. Bingham has received it from “Yatung, Tibet, taken in June.” Mr. Dudgeon obtained it in Bhotan.

DANAUS DEOTA (Plate 518, fig. 2, 2a, ♂).

Mancipium Deota, de Nicéville, Journ. Asiatic Soc. Bengal, 1883-4, p. 82, pl. 9, fig. 10, ♂; *id.* Report, Pamir Comm. pp. 16, 43 (1898).

Pieris Roborowskii, Alpheraky, Rom. Mem. v. p. 69, pl. 4, fig. 3, a, b, ♂ ♀ (1889).

IMAGO.—Male. Upperside white. *Forewing* with a black apical marginal band, which is somewhat narrower than in *Brassicæ*, and extends posteriorly beyond the lower median veinlet, its lower inner-edge being deeply sinuous between the veins; a distinct but slight black-scaled small discal streak is also generally present between the upper and middle median veinlets. *Hindwing* with a black costal spot, and a continuous narrow macular outer marginal band. Underside. *Forewing* white, with the outer band paler and apically powdered with brown scales; a black medial-discal spot which slightly extends below the middle median veinlet, a similar smaller spot between the lower median and submedian vein, and an upper costal spot extending to below the lower subcostal veinlet. *Hindwing* greyish-brown, irrorated with black scales, clusters of these black scales also forming an ill-defined costal spot and marginal macular band, as disposed on the upperside, and also a small discal spot between the upper and middle median veinlets.

Female. Upperside white. *Forewing* with the black apical marginal band broader; a large black medial discal spot between the upper and middle median veinlets, this spot extending brokenly above and below these two veinlets; a large similar spot also between the lower median and submedian, below which is an elongated streak on the posterior margin. *Hindwing* with a larger black costal spot than in the male, this spot being pointedly extended below the lower subcostal veinlet; the marginal macular band being composed of larger but shorter and wider separated portions, there is also a small black discal spot between the upper and middle median veinlets. Underside similar to the male. *Body* above greyish-black; thorax, front, and palpi clothed with grey hairs; legs white; antennæ black above, tip of club white, beneath segmented with white.

Expanse, ♂ ♀ $2\frac{3}{4}$ inches.

HABITAT.—Ladak.

DISTRIBUTION.—“Mr. L. de Nicéville’s type was taken by himself at Gya, in Ladak, on July 11th, 1879. Three others which were seen escaped owing to their swift flight” (*l.c.* p. 82). Specimens of both sexes, from Kuruk Tag, Ladak, are in Mr. W. Rothschild’s Collection at Tring. A male and female, from Ladak, taken by Capt. F. E. S. Adair, are in the British Museum Collection. “A single male, the only specimen seen, was taken on the Great Pamir” (de Nicéville, *l.c.* p. 43). The type specimens of *Roborowskii* were taken at “Lob Nor, 2,500 feet, and at Ak Sou, 3,000 feet, Tibet” (*l.c.* 69).

DANAUS DEVTA (Plate 518, figs. 3, 3a, ♂, 3b, ♀).

Mancipium Devta, de Nicéville, Journ. Asiatic Soc. Bengal, 1883-4, p. 82, pl. 9, fig. 9, ♂, 9a, ♀.

IMAGO.—Male. Upperside white. *Forewing* with the outer margin at the apex to the discoidal nervule marked with black, a similar spot internal to this, and a large roundish spot between the second and third median nervules. *Hindwing* with a black spot on the costa below the first subcostal branch beyond its middle, otherwise unmarked. Underside. *Forewing* as on the upperside, but the outer margin towards the apex marked with greenish and fuscous irrorated scales. *Hindwing* with the basal two-thirds irrorated with greenish and fuscous scales, except an oblong patch from the costa to middle of the cell, which is clear of these scales, the outer margin also marked between the nervules with similar irrorations.

Female. Upperside. *Forewing* with all the markings larger and clearer, there being two additional black spots on the outer margin between the third and second and second and first median nervules; also a diffused spot joined to the large round spot between the second and third median nervules almost reaching the submedian nervure. *Hindwing* with the costal spot also much larger. Underside. *Forewing* differs from the male in having the base of the wing diffused with pale yellow, the apex and costal spot internal to it also suffused with yellow, and a prominent black spot on the disc below the large spot between the second and third median nervules, as on the upperside. *Hindwing* with the base irrorated with pale yellow; and with an irregular discal band, its outer edge in the same position as that edge of the irrorated dark basal portion in the male, this band widest and deepest coloured at the costa, decreasing to the fold below the submedian nervure, irrorated with yellowish fuscous; the outer margin marked with yellowish-fuscous irrorations.

Expanse, ♂ $2\frac{3}{10}$, ♀ $2\frac{4}{10}$ inches.

HABITAT.—Ladak.

DISTRIBUTION.—“A male and four females were taken by Mr. L. de Nicéville on June 3rd and 4th, 1879, amongst the irrigated fields adjoining the villages of Lama Yuru and Nurla, in Ladak” (*l.c.* p. 82). Two females from Ladak and Kashgar, taken by Capt. F. E. S. Adair, and a male from Samarkand, are in the British Museum Collection. Both sexes were taken by Mr. J. H. Leech at Kiris, in July, at 11,000 feet elevation, and a male was taken by Capt. H. McArthur in the Digha Pass in July, at 11,000 feet elevation.

DANAUS NAGANUM.

Mancipium Naganum, Moore, Journ. Asiatic Soc. Bengal, 1884, p. 45, ♂.

IMAGO.—Male. Upperside pale yellowish-white. *Forewing* with the base of the

costa sparsely black speckled ; a black band at the apex, the inner edge of the band being curved, very slightly irregular, and terminating at the middle median veinlet ; a slight black speckled discocellular spot at lower end of the cell, and a small or moderately-large black discal spot between the upper and middle median veinlets. *Hindwing* unmarked. Underside. *Forewing* white, with the apex pale yellow, the cell and discal spot as on the upperside. *Hindwing* pale yellow.

Expanse, 2 inches.

HABITAT.—Naga Hills, Upper Burma.

DISTRIBUTION.—The type specimen from the Naga Hills is in the Indian Museum, Calcutta. A male from Upper Burma, taken by Capt. E. Y. Watson, is in the British Museum.

DANAUS RAPÆ (Plate 519, fig. 1, ♂, 1b, c, ♀).

Pap. Danaus Rapæ, Linnæus, Syst. Nat. x. ed. p. 468 (1758) ; *id.* xii. ed. p. 760 (1767).

Ganoris Rapæ, Butler, Proc. Zool. Soc. 1881, p. 612. Swinhoe, Trans. Ent. Soc. Lond. 1885, p. 343 ; *id.* Proc. Zool. Soc. 1886, p. 431.

Pontia Mannii, Meyer, Stet. Ent. Zeit. 1851, p. 151.

Ganoris Mannii, Butler, Proc. Zool. Soc. 1880, p. 411 ; *id.* 1881, p. 612.

IMAGO.—Male. Upperside white. *Forewing* with the base faintly greyish-black scaled ; a more or less broad short blackish apical patch, and generally with a small blackish discal spot between the upper and middle median veinlets. *Hindwing* generally with a slightly-defined small greyish-black scaled costal spot. Underside. *Forewing* white, the apex tinted with very pale yellow ; a small blackish scaled discal spot, as on the upperside, and also one between the lower median and the submedian vein. *Hindwing* tinted with very pale yellow, and more or less slightly irrorated with minute blackish scales, which are more thickly disposed along lower half of the cell area.

Female. Upperside white. *Forewing* with the apical blackish patch somewhat broader, the discal spot and similar spot between the lower median and submedian always present, and generally there is a slight slender streak below the latter on the posterior margin. *Hindwing* with the costal spot more distinct. Underside similar to the male.

Expanse, ♂ $1\frac{8}{10}$ to 2, ♀ 2 to $2\frac{2}{10}$ inches.

HABITAT.—Europe ; W. Asia.

DISTRIBUTION (Within our Area).—A male from Chitral is in Mr. H. Grose-Smith's Collection. We possess specimens of both sexes from Yarkund, males from the Indus Valley, Skardo, and Paskyun in Ladak, taken by Mr. R. B. Shaw. Both sexes, from Kashgar, and a male from Ladak, taken by Capt. F. E. S. Adair, are in

the British Museum Collection. Mr. J. H. Leech obtained it at Dras, 8,000 feet, in June, at Skardo, 8,000 feet, in July, and at Kiris, 11,000 feet, in July. Numerous specimens were obtained by Col. C. Swinhoe in "Quetta, March to May; Goolistan, May; Lora Valley, June; Chaman, S. Afghanistan, in May; Kandahar, January, March, April, October, and November. Common everywhere. Out of many hundred examples I have examined some are referable to *Rapæ* and some to the true type of *Manni*, but there are so many intermediate that it is impossible to separate the two forms" (Tr. Ent. Soc. 1885, 343).

DANAUS AJAKA (Plate 519, fig. 2, ♂, 2a, b, ♀, 3 ♂, 3a, b, ♀).

Pieris Ajaka, Moore, Proc. Zool. Soc. 1865, p. 490, pl. 31, fig. 16 ♀.

Ganoris Ajaka, Butler, Proc. Zool. Soc. 1886, p. 375; *id.* Ann. Nat. Hist. 1888, p. 204. Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 135.

Pieris Melete, Elwes, Trans. Ent. Soc. 1888, p. 416. Manders, Trans. Ent. Soc. 1890, p. 534. de Nicéville, Sikkim Gaz. 1894, p. 168. Watson, Journ. Bombay, Nat. Hist. Soc. 1897, p. 669. Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 590.

MALE.—Upperside white. *Forewing* with the costal edge and base irrorated with blackish scales; a black apical decreasing band and a large discal spot between the upper and middle median veinlets—both larger than in *Napi*, also a more or less slightly-defined spot between the lower median and submedian vein. *Hindwing* with a black costal spot; the marginal end of the veins more or less black-lined. Underside. *Forewing* white, the apex pale olivaceous-yellow; veins black-lined; two large black discal spots. *Hindwing* pale olivescence-yellow, the base of costa being bright yellow; veins narrowly or broadly blackish bordered; costal spot more or less indistinct.

Female. Upperside white or olivescence-white, and the base of *forewing* clouded with dusky scales, and on the *hindwing* a few dusky scales clustered across the disc; all the veins on both wings either slenderly or more broadly black bordered, those on the *hindwing*, in some specimens, being dilated at the marginal end. *Forewing* also with the black apical band and two discal spots broader, the upper spot more or less diffusely coalescent with the apical band, and the lower spot joined to a slender or broad streak extending below the submedian to base of posterior margin. *Hindwing* also with a large black costal spot. Underside similar to the male.

Expanse, ♂ 2 to $2\frac{4}{10}$, ♀ $2\frac{2}{10}$ to $2\frac{6}{10}$ inches.

HABITAT.—N.W. and E. Himalayas; Assam; Upper Burma; Shan States.

DISTRIBUTION.—Capt. A. M. Lang, R.E., who obtained the type specimens in Lower Kunawur, says, in his MS. Notes, "this is somewhat local and not common, and has not a long-lived brood. It is of very weak flight, affecting low, damp glens, flying

amidst wet herbage near streams in woods. I have taken it at Narkunda, Jarunda, and at Syldung from June to August." We possess a male, labelled Kaschmir, taken by Capt. R. B. Reed. In Mr. J. H. Leech's Collection are specimens from Goorais Valley, 7,000 feet elevation, taken by himself in June, from Narkunda, April, and Rala, in June, taken by Capt. H. McArthur. Col. J. W. Yerbury obtained it at "Murree in August and September. Common in August under the shade of trees. Also common at Thundiani in August" (P. Z. S. 1886, 375; Ann. N. H. 1888, 204). Mr. P. W. Mackinnon records it as "occurring sparingly in Masuri in May and June; a few being also taken by native collectors in the Nila and Bhilung Valleys in July and August" (J. Bombay N. H. Soc. 1898, 590). Col. J. W. Yerbury also took it at Thundiani in May, 1887. Mr. W. Doherty took it at "Naini Tal, Dhankuri, Khati, and Dwali, 6,000 to 11,000 feet elevation, in Kumaon" (Journ. As. Soc. Beng. 1886, 135). Mr. H. J. Elwes records it as being "common in the interior of Sikkim towards Bhotan and the Chumbi Valley, but I never took it in the outer hills of Sikkim. I have obtained it not uncommonly in the Khasias in September" (Tr. Ent. Soc. 1888, 417). Mr. L. de Nicéville says it "occurs only in the interior of Sikkim, and is very rare" (Sikkim Gaz. 1894, 168). Col. C. T. Bingham has received both sexes from Yatung, Tibet. Specimens of both sexes are in Mr. W. Rothschild's Collection, taken in Sikkim in June and July. We possess specimens from Silhet and Cherra Punji, Assam. Col. C. H. E. Adamson took "a single male in the Chin Hill, Burma, in November, at 3,000 feet elevation" (List. Burm. Butt. 1897, 44). Capt. E. Y. Watson records "a single male, taken in May, in the N. Chin Hills, Burma, at 5,000 feet" (Journ. Bombay N. H. Soc. 1897, 669). Dr. N. Manders took "two males and one female at Bernardmyo, Shan States" (Tr. Ent. Soc. 1890, 534).

Of our illustrations on Plate 519, fig. 2 is from a N.W. Himalayan male, and fig. 2a, b, from a female taken by Col. Yerbury in May at Thundiani; figs. 3 and 3a are from the male and female Kunawur types, and 3b from a Cherra Punji female.

DANAUS CANIDIA (Plate 520, fig. 1, 1a, b, c, ♂; 1d, e, f, g, h, ♀).

Papilio Canidia, Sparmann, Amæn. Acad. vii. p. 504 (1768).

Pieris Canidia, Kirby, Syn. Cat. D. Lep. p. 455 (1871). Elwes, Trans. Ent. Soc. 1888, p. 415. Manders, Trans. Ent. Soc. 1890, p. 534. Leech, Butt. of China, ii. p. 455 (1894). Watson, Journ. Bombay Nat. Hist. Soc. 1897, p. 669. Mackinnon, *id. l.c.* 1898, p. 590, pl. v. fig. 21, *pupa*. de Nicéville, Journ. As. Soc. Bengal, 1902, p. 28.

Mancipium Canidia, Moore, Proc. Zool. Soc. 1882, p. 256. Watson, Journ. Bombay N. H. Soc. 1891, p. 51. de Nicéville, Sikkim Gaz. 1894, p. 168. Fruhstorfer, Iris, 1902, p. 276; *id.* Soc. Ent. 1903, p. 25.

Ganoris Canidia, Doherty, Journ. As. Soc. Bengal, 1886, p. 135.

Pieris (Ganoris) Canidia, Walker, Tr. Ent. Soc. 1895, p. 465.

Papilio Gliciria, Cramer, Pap. Exot. ii. pl. 171, fig. E. F, ♂ (1779).

Pieris Gliciria, Boisduval, Spec. Gén. Lep. i. p. 524 (1836). Kollar, Hügel's Kaschmir, iv. 2, p. 409 (1844). Doubleday and Hewitson, Gen. D. Lep. i. p. 48 (1847). Moore, Catal. Lep. Mus. E. I. C. i. p. 75 (1857). Lang, Ent. Mo. Mag. 1864, p. 103; *id.* P. Z. S. 1865, p. 490. Moore, P. Z. S. 1874, p. 273.

Ganoris Gliciria, Butler, Proc. Zool. Soc. 1881, p. 611; *id.* 1886, p. 375; *id.* Ann. Nat. Hist. 1888, p. 204. Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

Pieris Glaphyra, Godart, Encyc. Méth. ix. p. 160 (1819).

Pieris Napi, Gray, Lep. Ins. of Nepal, p. 10, pl. 6, fig. 2, ♂ (1846).

Synchlœa claripennis et *sordida*, Butler, Ann. and Mag. Nat. Hist. 1877, p. 96.

IMAGO.—Male. Upperside white. *Forewing* with the base and costa slightly greyish-black scaled; a black apical marginal band, which is deeply sinuous from below the lower subcostal veinlet, a large discal spot between the upper and middle median veinlet, and faint traces of the lower spot of the underside between the lower median and submedian vein. *Hindwing* with a more or less prominent black large costal spot and a series of outer marginal spots. Underside. *Forewing* white, the apex pale olivescens-yellow; base greyish-black scaled; a black middle and lower discal large spot, and a more or less apparent blackish-scaled upper discal spot. *Hindwing* pale olivescens-yellow, more or less distinctly irrorated with minute greyish-black scales—which are more densely packed along lower half of the cell, and also as forming the costal spot, sometimes these scales are more densely packed and border the veins to the outer margin; base of the costa bright yellow.

Female. Upperside white, in some specimens—but very rarely—pale yellowish-white. *Forewing* with the base, including the cell area to near its end, more thickly greyish-black scaled, the black apical marginal band more sharply sinuous, the two discal spots larger and prominent, the upper one sometimes coalesced to the angles of outer band, the lower one joined to a streak below the submedian vein. *Hindwing* with the basal area, including the cell, more or less irrorated with greyish-black scales, some of these scales occasionally also forming a discal cluster between the upper and middle median veinlet; the black costal spot larger and extending below the lower subcostal veinlet; marginal spots larger. Underside similar to the male.

Expanse, ♂ $1\frac{7}{10}$ to $2\frac{3}{10}$, ♀ 2 to $2\frac{4}{10}$ inches.

HABITAT.—North-West, Central, and Eastern Himalayas; S. India; Assam; Upper Burma; Shan States; China; Hong Kong; Hainan; Formosa.

DISTRIBUTION (Within our Area).—It was taken in Kaschmir by Capt. R. Bayne Reed (P. Z. S. 1874, 273). Capt. H. B. Hellard, R.A., obtained it in "Kaschmir, Masuri, and Pangi in Busahur, from June to October" (MS. Notes). Col. J. W. Yerbury records it as "fairly common at Campbellpur in May and June. Also common in October and November" (P. Z. S. 1886, 375); also taken at "Attock

Bridge, Khairabad side, in April; Hassan Abdal in May, and at Thundiani in August" (*id.* Ann. N. H. 1888, 204). Mr. W. Doherty obtained it in the "Kumaon Hills, from 2,000 to 11,000 feet elevation, from the Kali Valley at Jhulaghat up to Garbyan in Byans" (Journ. As. Soc. Beng. 1886, 135). Mr. P. W. Mackinnon records it as "common both at Masuri and in the Dun all the year round" (J. Bombay N. H. Soc. 1898, 590). Capt. A. M. Lang found it "abundant at Umballa in the Plains in January, and up to 10,000 feet altitude everywhere in the N. W. Himalayas" (Ent. Mo. Mag. 1864, 103). We possess a female from Nepal taken by Gen. G. Ramsay. In Sikkim "it is common at 4,000 to 12,000 feet altitude during the rainy season, and found, according to Möller, as low as 3,000 feet from March to December" (H. J. Elwes, Tr. Ent. Soc. 1888, 415). Mr. G. C. Dudgeon obtained it in Bhotan, in May. In South India it is recorded by Mr. G. F. Hampson from the "Nilgiris, being confined to the Plateau" (J. As. Soc. Beng. 1888, 362). Specimens from Ootacamund, Nilgiris, and the Annamully Hills, 3,000 to 4,000 feet altitude, are in the British Museum Collection. Col. C. Swinhoe has specimens of both sexes from Madras. Dr. G. Watt obtained it near Manipur; specimens from the Khasias and Shillong, Assam, are in the British Museum. In Burma, according to Col. C. H. E. Adamson, it is "common throughout the cold weather about Bhamo and among the Hills on the Upper Chindwin River" (List, 1897, 44). Capt. E. Y. Watson found it "common in the North Chin Hills, at from 5,000 to 7,000 feet altitude, in April. A few being also obtained in the Upper Chindwin in April and May" (Journ. Bombay N. H. Soc. 1897, 669). Capt. Watson also took it at "Tilin in December and February, during the Chin-Lushai Expedition of 1889-90" (*id. l.c.* 1891, 51). Dr. Leonard Fea obtained it at Cobago in April, and also at Bhamo. Dr. N. Manders took it in "April, when on the Jatsouk Expedition, and in August at Fort Stedman, Shan States" (Tr. Ent. Soc. 1890, 534).

Of our illustrations on Plate 520, figs. 1, 1a are from a N.W. Himalayan male; 1b, from a Kaschmir male; 1c, Madras male; 1d, a Simla female; 1e, a Madras female; 1f, female; 1g, a Nepal female; and 1h, a Nilgiri female.

CHINA AND JAPAN SPECIES.—*Danaus Cisseis* (Pieris Cisseis, Leech, Entom. 1890, p. 192, ♂; *id.* Butt. of China, Corea, and Japan, ii. p. 455, pl. 43, fig. 5, ♂ (1894). *Habitat.* C. China; Yunnan.—*Danaus Crucivora* (Pieris Crucivora, Boisduval, Spec. Gen. Lep. i. p. 522 (1836). De L'Orza, Lep. Japan, p. 12 (1869). *Syn.* Pieris Orientalis, Oberthür, Etud. Ent. v. p. 13 (1880). P. Mandschuria, Speyer, Stett. Ent. Zeit. 1882, p. 379. Pieris Rapæ, Leech, Butt. of China, etc. ii. p. 456 (1894). *Habitat.* E. China; Corea; Japan.—*Danaus Melete* (Pieris Melete, Ménétriés, Catal. Lep. Mus. Petropol. ii. p. 113, pl. 10, fig. 1, 2, ♂ ♀ (1857). Leech, Butt. of China, ii. p. 448 (1894). *Habitat.* Japan.—*Danaus Aglaope* (Pieris Aglaope, Motsch. Etudes Ent. ix. p. 28 (1860). P. Melete, var. Aglaope, Leech, *l.c.* ii. p. 449.

Habitat. Japan.—*Danaus Megamera* (*Synchloe Megamera*, Butler, Cist. Entom. i. p. 173 (1873). *P. Melete*, var. *Megamera*, Leech, *l.c.* ii., p. 449, pl. 43, fig. 3, 4, ♂ ♀ (1894). *Habitat.* Hakodadi, Japan.—*Danaus Dulcinea* (*Ganoris Dulcinea*, Butler, Ann. and Mag. Nat. Hist. 1882, p. 18). *P. Melete*, var. *Dulcinea*, Leech, *l.c.* ii. p. 450. *Habitat.* Corca.—*Danaus Orientis* (*Pieris Napi*, var. *Orientis*, Oberthür, Etudes Ent. v. p. 13 (1880). *P. Melete*, var. *Orientis*, Leech, *l.c.* ii. p. 450. *Habitat.* Askold.—*Danaus Erutæ* (*Pieris Erutæ*, Poujade, Ann. Soc. Ent. Fr. 1888, p. 19). *P. Melete*, var. *Erutæ*, Leech, *l.c.* ii. p. 450 (1894). *Habitat.* Moupin.—*Danaus Veris* (*Pieris Melete*, var. *Veris*, Staudinger, Rom. Mem. Lep. iii. p. 126, pl. 16, fig. 1, 2 (1887). Leech, *l.c.* p. 451. *Habitat.* Amurland.—*Danaus Mandarina* (*Pieris Melete*, var. *Mandarina*, Leech, *l.c.* ii. p. 451 (1894). *Habitat.* W. China.—*Danaus extensa* (*Pieris Erutæ*, var. *extensa*, Poujade, Ann. Soc. Ent. Fr. 1888, p. 19). *Pieris extensa*, Leech, *l.c.* ii. p. 454, pl. 36, figs. 4, 5, ♂ ♀, *ib.* pl. 43, fig. 6, ♂ (1894). *Syn.* *Pieris Eurydice*, Leech, Entom. 1891, Suppl. p. 5. *Habitat.* W. and C. China.

Genus PONTIA.

- Pontia*, Fabricius, Illiger's Mag. für. Ins. vi. p. 283 (1807). Leach, Edin. Encyc. p. 716 (1815).
 Oehsenheimer, Schmett. Eur. iv. p. 30 (1816). Samouelle, Ent. U. Comp. p. 236 (1819).
 Jermyn, Butt. Coll. Vade Mec. pp. 44, 66 (1824).
Pontia, Curtis, Brit. Ent. pl. 48 (1824). Scudder, Proc. Amer. Acad. A. and Sc. 1875, p. 255; *id.*
 Butt. U. S. ii. p. 156 (1889). Kirby, Allen's Nat. Libr. Butt. ii. p. 151 (1896). Grote, Proc.
 Amer. Phil. Soc. 1900, p. 38.
Pieris (pt.), Latreille, Gen. Cr. et Ins. xiv. p. 111 (1805); *id.* *l.c.* iv. p. 203 (1809). Doubleday and
 Hewitson, Gen. D. Lep. i. p. 42 (1847). Kirby, Eur. Butt. p. 9 (1863). Tutt. Brit. Butt.
 p. 229 (1896).
Ganoris (pt.), Dalman, Vet. Acad. Handl. 1816, pp. 61, 86.
Synchloe (pt.), Hübner, Verz. bek. Schmett. p. 94 (1816).
Mancipium (pt.), Stephens, Illust. Brit. Ent. Haust. i. p. 22 (1827). Rennie, Consp. p. 4 (1832).
Mancipium, Stephens, Catal. Brit. Lep. B. M. p. 5 (1850).
Synchloe, Schatz, Exot. Schmett. ii. p. 61 (1886).

IMAGO.—*Forewing* triangular; apex obtuse, rounded, exterior margin oblique, posterior margin short; subcostal vein three branched, first and second branches free, upper radial from below the third subcostal branch at nearly half beyond the cell; upper discocellular veinlet short and outwardly-oblique, lower concave, lower radial from their angle; cell long, broad; middle and lower median veinlets widest apart. *Hindwing* short; anterior margin arched, apex and exterior margin convex; cell broad apically; upper discocellular short and oblique, lower concave; upper subcostal short. *Thorax*, head and front finely hairy; palpi very small, hairy beneath to the tip, terminal joint slightly shorter than second; abdomen smoothly

clothed with short scales ; antennæ with a rather short club broadening to the tip, compressed and grooved beneath.

EGG.—“Acorn-shaped, with 12 or 14 prominent ribs. Deposited on end.”

LARVA.—“Adult. About 1 inch 3 lines, rather slender, with tubercular black spots, each emitting a black hair. Food plant *Reseda*, N. O. Resedaceæ. Fond of lying at full length along the flower spikes, and several crowded together at the summit in amicable companionship.”

PUPA.—“Seven and a half lines long, thickest across the thorax and end of wing-cases ; head with a projecting taper-point ; thorax sharply keeled and humped on the back” (Buckler, Brit. Butt. 121 (1886)).

TYPE.—*P. Daplidice*.

PONTIA DAPLIDICE (Plate 521, fig. 1 ♂, 1a, b, ♀).

Papilio Daplidice, Linnæus, Syst. Nat. x. ed. i. p. 468 (1758) ; *id.* xii. ed. i. 2, p. 760 (1767).

Hübner, Eur. Schmett. figs. 414, 415.

Pontia Daplidice, Fabricius, Illiger's Mag. vi. p. 283 (1807). Curtis, Brit. Entom. pl. 48 (1824).

Kirby, Allen's Nat. Libr. Butt. ii. p. 152 (1896).

Pieris Daplidice, Godart, Enc. Méth. ix. p. 128 (1819). Boisd. Spec. Gén. Lep. i. p. 544 (1836).

Doubleday and Hewitson, Gen. D. Lep. i. p. 48 (1846). Moore, Catal. Lep. Mus. E. I. C. i. p. 75 (1857) ; *id.* Proc. Zool. Soc. 1865, p. 489. Lang, Ent. Mo. Mag. 1868, p. 33. Butler, Catal. Fabr. Lep. B. M. p. 204 (1869). Bienert, Lep. Ergeb. Reise Persien, p. 26 (1870).

Mancipium Daplidice, Stephens, Illust. Brit. Ent. Haust. i. p. 22 (1827) ; *id.* Catal. Brit. Lep. B. M. p. 5 (1850).

Synchloe Daplidice, Butler, P. Z. S. 1880, p. 410 ; *id.* Ann. Nat. Hist. 1881, p. 611 ; *id.* 1882, p. 4. Staudinger and Schatz, Exot. Schmett. ii. p. 61, pl. 4 (1886). Swinhoe, Trans. Ent. Soc. 1885, p. 342. Butler, P. Z. S. 1886, p. 375 ; *id.* Ann. Nat. Hist. 1888, p. 204. Leech, Butt. of China, ii. p. 458 (1894).

IMAGO.—Male. Upperside greyish-white. *Forewing* with the base slightly irrorated with greyish-black scales ; a black large quadrate spot at end of the cell crossed by the slender white discocellular veinlet, an apical black band traversed by four white irregular-shaped spots of which the upper and third are largest and each slenderly extending to the outer margin ; in some specimens a faint indication of a lower discal blackish-speckled spot between the lower median and submedian is also present. *Hindwing* with the markings of the underside visible and of a darker tint than the ground colour ; sometimes with a slightly indicated greyish-black scaled costal spot and submarginal lunules, these scales also occasionally extending along the tip of the veins to the outer margin. Underside. *Forewing* with the apical white-spotted band less prominent, olivescence-green, its lower portion slightly irrorated with blackish scales, the cell spot less prominent. *Hindwing* olivescence-green, sparsely irrorated with minute black scales ; with a large sub-basal costal

spot, a cell spot, a curved discal broken sinuous macular band and marginal row of somewhat quadrate spots.

Female. Upperside white. *Forewing* with the basal area more broadly irrorated with darker scales, the white-spotted black apical band broader, the cell spot larger, the lower discal black spot always present, below which latter is a slender blackish marginal streak. *Hindwing* with the dark markings of the underside distinctly indicated, the basal being greyish-black scaled, the discal macular band and coalesced marginal spots distinctly black-scaled. Underside similar to the male.

Expanse, ♂ $1\frac{6}{10}$ to $2\frac{2}{10}$, ♀ 2 to $2\frac{4}{10}$ inches.

LARVA.—Adult. "Head yellow, round, thickly covered with black dots, each emitting a black hair. Body bluish-grey, with tubercular black spots, each glossy and emitting a black hair; a lateral yellow stripe, not very noticeable, from its low position, and from being interrupted at each segment; spiracles flesh colour with paler whitish centre very inconspicuous and situated on the yellow stripe; belly along the middle glaucous and paler than the green beneath the spiracular stripe."

PUPA.—"Whitish, with numerous black dots" (Buckler, *l.c.* 121).

HABITAT.—S. Europe; Asia Minor; Persia; S. Asia; W. China; Ladak; Kashmir; W. Himalayas; Afghanistan; Beluchistan.

DISTRIBUTION (Within our Area).—Col. C. Swinhoe records it from "Quetta, in Beluchistan, males and females being taken in May; males also caught in a maize-field near Chaman on August 16th, 1880" (Ann. Nat. Hist. 1882, 4). Col. Swinhoe also obtained it in "Quetta from February to April, and again in August and September; at Goolistan in April; Chaman, May and August; Balgai and Kasian, June; Kandahar, February, April, August, and October. Common everywhere above the Bolan Pass" (Tr. Ent. Soc. 1885, 342). Major Howland Roberts obtained it at "Kokeran, near Kandahar, where it was common in June, frequenting cultivated ground and gardens. It settles suddenly on a flower and is as suddenly off again" (P. Z. S. 1880, 410). Capt. A. M. Lang writes, "This butterfly occurs in the valleys of Upper Kunawur, also in the Spiti Valley, which is geographically, Tibetan. In Spiti and Gughe, the few valleys are oases of barley, millet, and buckwheat for 5 or 6 months in the year; the whole country being perfectly treeless and bare of all vegetation but Artemisia, Astragalus, a few oases and sparse grasses. In these village oases, among the fields, moist and luxuriant from the waters of the snow-rills, this butterfly swarms, but it never leaves the verdure of the villages" (MS. Notes). "I saw this butterfly in considerable numbers, flying about the village fields of cereals and turnips, in the villages on the Spiti River, Leo, Chango, Shialkur, etc., and in the Chinese frontier village of Shipkee" (*id.* P. Z. S. 1865, 489). Dr. Jerdon obtained specimens in the "Valley of Kaschmir" (Ent. Mo. Mag.

1868, 33). Capt. H. B. Hellard took it in the "Valley of Kaschmir and at Goorais, in July, August, and September" (MS. Notes). Col. J. W. Yerbury records it as "common in the neighbourhood of Campbellpur in May and June, and at Hassan Abdal in May" (Ann. Nat. Hist. 1888, 204). Mr. R. B. Shaw obtained it at Paskyam, Ladak, 10,870 feet altitude, during the Yarkand Mission of 1870. Col. C. T. Bingham has received specimens from Chitral, taken in September, 1903. In the British Museum Collection are specimens from Kashgar, taken in November; Ladak, Capt. F. E. S. Adair; and in Mr. J. H. Leech's Collection from Kashmir Valley, taken in June; Goorais Valley, September; Deosai, August; and Western China. Mr. W. B. Pryer obtained it at Shanghai.

PONTIA GLAUCONOME (Plate 521, fig. 2, ♂, 2a, b, ♀).

Pontia Glauconome, Klug, Symb. Phys. pl. 7, figs. 18, 19 (1829). Boisduval, Spec. Gén. Lep. i. 546 (1836).

Pieris Iranica, Bienert, Lep. Ergeb. Reise Persien, p. 27 (1870).

Synchlœ Iranica, Butler, Proc. Zool. Soc. 1880, p. 410, pl. 39, fig. 7, *pupa*. Swinhoe, Trans. Ent. Soc. 1885, p. 343.

Pieris Vipasa, Moore, Proc. Zool. Soc. Lond. 1872, p. 565, ♀.

IMAGO.—Male. Upperside greyish-white. *Forewing* with a large quadrate black spot at end of the cell crossed by the white discocellular veinlet; a black apical band traversed by four white spots. *Hindwing* with the markings of the underside indicated by darker greyish-white than the ground-colour; an ill-defined small black-scaled costal spot, two similar anterior submarginal zigzag spots, and a marginal row of four small black dentate spots. Underside white. *Forewing* with the cell spot and apical band as on upperside, the latter pale olive-green except at its lower portion which is black, the veins dividing the band being yellow lined. *Hindwing* with the veins and base of costa yellow lined; two pale olive-green costal cross bars, the inner one being continued across end of the cell and along its lower margin, followed by a similar coloured marginal band enclosing a row of broad white oval spots.

Female. Upperside greyish-white. *Forewing* with the black cell spot larger, and the apical band broader than in the male. *Hindwing* with the markings of the underside more distinctly indicated; the costal spot and marginal markings similar. Underside. *Forewing* as in the male, the apical band being dusky olive-green. *Hindwing* with the veins and base of costa yellow lined as in the male; the basal and outer area dusky olive-green, enclosing a large white subbasal spot, a cell spot, a broad discal sinuous band, and marginal row of white spots.

EXpanse, ♂ $1\frac{6}{10}$, ♀ $1\frac{8}{10}$ inches.

LARVA.—"About 1 inch long. General colour pale green, with longitudinal

yellow bands and black dots; thickest in the middle, slightly tapering at both ends, has a rough appearance from being ribbed, and is covered with minute hairs. Dorsal and lateral bands dull green, the black dots giving it a blue appearance; subdorsal band yellow; spiracular band white, yellow at the junction of the segments. Head pale green with black dots; a yellow patch on each side, a whitish collar on second segment; belly pale green; feet pale green with a yellow mark above each; spiracles indistinct" (Major Howland Roberts, Proc. Zool. Soc. 1880, 410).

PUPA.—"Attached to the stem or leaf of its food-plant by the tail and also by a thread over the back. A beak-like proboscis turned upward and rather long" (*id. l.c.*).

HABITAT.—S. Arabia; Persia; S. Afghanistan; S. Punjab.

DISTRIBUTION (Within our Area).—Major H. Roberts obtained it at "Kandahar, being common in May and June, frequenting the rocky uncultivated slopes of the Hills, where the food plant grows. The larva was found in the middle of May and June on the wild Mignonette growing on the rocky hills and slopes" (*l.c.* 1880, 410). Col. C. Swinhoe records it from "Kandahar, taken in June" (Tr. Ent. Soc. 1885, 343). We possess two females labelled, Derajat, S.W. Punjab.

Of our illustrations on Plate 521, fig. 2 is from a male, and fig. 2a, b, from the female type of *Vipasa*, from Derajat.

Genus PARAPIERIS.

Parapieris, de Nicéville, Journ. As. Soc. Bengal, 1897, p. 563.

Synchloe (pt.), Hübner, Verz. bek. Schmett. 94 (1816).

Synchloe, Butler, Cistula Ent. i. pp. 38, 51 (1870). Scudder, Syst. Rev. Amer. Butt. p. 42 (1872).

IMAGO.—*Forewing* less triangular than in *Pontia Daplidice*, the exterior margin being less oblique and the posterior margin longer; subcostal four branched, the third branch generally, in both sexes, having a short fork near its tip, the upper radial being emitted at fully one-third beyond end of the cell; median veinlets equidistant. *Hindwing* comparatively longer than in *Daplidice*, the costa not arched, and the apex more regularly convex. Abdomen compactly scaled, and dorsally hairy. Antennæ similar.

TYPE.—*P. Callidice*.

PARAPIERIS CALLIDICE (Plate 521, fig. 3, ♂, 3a, b, ♀).

Papilio Callidice, Esper, Schmett. i. 2, pl. 115, figs. 2, 3 (1800). Hübner, Eur. Schmett. i. figs. 468-9, 551-2 (1803).

Pieris Callidice, Godart, Encyc. Méth. ix. p. 129 (1819). Boisduval, Spec. Gén. Lep. i. p. 542 (1836). Alpheraky, Rom. Mem. Lep. V. p. 98 (1889).

Synchloe Callidice, Doherty, Journ. As. Soc. Bengal, 1886, p. 135. Leech, Butt. of China, ii. p. 459 (1894).

Parapieris Callidice, de Nicéville, Journ. Asiatic Soc. Bengal, 1897, p. 563; *id.* Journ. Bombay Nat. Hist. Soc. 1898, p. 590.

Pieris Chrysidice, Herr. Schæff. Eur. Schmett. i. figs. 200-3 (1844).

Pieris Kalora, Moore, Proc. Zool. Soc. Lond. 1865, p. 489, pl. 31, fig. 15, ♂.

IMAGO.—Male. Upperside greyish-white. *Forewing* with the base slightly greyish-black scaled; a black narrow quadrate spot at end of the cell crossed by the discocellular veinlet, a transverse upper-discal and an apical-marginal series of small black dentate spots, which are anteriorly slightly coalesced at their vein angles; sometimes a few blackish scales are present between the lower median and submedian vein. *Hindwing* with the base greyish-black scaled; without markings. Underside white. *Forewing* with markings as on upperside, but less prominent, the apical pale olive-brown and slightly coalescent anteriorly. *Hindwing* with all the veins broadly bordered with pale olive-brown sparsely irrorated with minute black scales, leaving a white elongated subbasal costal spot, one within the cell, and a discal series of lanceolate marks and marginal oval pointed-spots.

Female. Upperside greyish-white. *Forewing* with the basal area darker greyish-black scaled; the black cell-spot larger and broader, the discal transverse band continuous and extending to the posterior margin, being slightly broken only at the lower median veinlet, the marginal band also extends to the posterior angle, both bands coalescing at their vein angles. *Hindwing* with the base and all the veins broadly greyish-black scaled; a darker black upper submarginal zigzag band; the basal, discal, and inter-marginal spaces forming a series of ill-defined whitish inwardly-pointed spots. Underside similar to the male, except that on the *forewing* the cell-spot is larger, and both outer bands extend more continuously to the posterior margin. *Hindwing* as in the male.

Expanse, ♂ $1\frac{8}{10}$ to 2, ♀ 2 to $2\frac{4}{10}$ inches.

HABITAT.—S.E. Europe; N.E. Asia Minor; N. Persia; N.W. Himalayas; S.W. China.

DISTRIBUTION (Within our Area).—Capt. A. M. Lang, in his MS. Notes, states this to be “an alpine species of the Kunawur and Tibet frontier, not a village butterfly, as is *P. Daplidice*, but only to be seen on the edges of glaciers and deep snow-beds in company with *Parnassius*. I have only seen it in two localities, the Ronang and Hungrung Passes in Upper Kunawur. Only one stray specimen I caught on the latter, whereas on the former a good number were flying. It is apparently a local species.” “On the Hungrung Pass, 15,000 feet elevation, one I saw was flying very fast at the top of the Pass over the dwarf Tibetan Furze (*Carayana versicolor*). On the next Pass, the Runang, about 14,000 feet, a good many were flying very fast up and down the bare stony slopes just at the summit of the Pass. I never saw the insect again, unless on the Tari Pass into Spiti, 15,000 feet, over glaciers and snow-

beds, where the rarified air prevented any pursuit of insects, but where I saw some fast-flying white butterflies which I could not secure" (P. Z. S. 1865, 489). In another Note, Capt. Lang says, "taken on the Runang, Hungrung, and Kongma Passes in June and July." Mr. L. de Nicéville records its capture on the "northern side of Darkot Pass, about 12,000 feet elevation" (Rept. Pamir Exped. 1898, 42). Capt. H. B. Hellard, R.E., obtained it in Kashmir, on the Rajdiangan Pass, about 10,000 feet; Gungabul Lake, about 13,000 feet; Sarsungar and Stakpila Passes; taken in July and September" (MS. Notes). Mr. W. Doherty took "two males on the Pindari Glacier, 12,000 feet elevation, N.W. Kumaon, in September" (Journ. As. Soc. Beng. 1886, 135). In the British Museum Collection are specimens from Chitral, taken by Captain G. H. Colomb; Ladak, Capt. F. E. S. Adair; Hunza, Mr. Conway; and in Mr. J. H. Leech's Collection, from Zojji La, taken in June, and Skardo, in July. In Mr. W. Rothschild's Collection are specimens of both sexes, labelled, Kulu. Mr. P. W. Mackinnon records it from the Western Himalayas, as being "found at high elevations only far in the interior near the snows, in the Nila and Baspa Valleys, and from the Nilung Village, all at about 12,000 feet elevation, in July and August" (J. Bombay N. H. Soc. 1898, 590).

PARAPIERIS CHLORIDICE.

Papilio Chloridice, Hübner, Eur. Schmett. i. figs. 712, 713 (1803-18).

Pieris Chloridice, Duponchel, Lep. Fr. Suppl. i. pl. 4, figs. 3-5 (1832). Boisduval, Spec. Gén. Lep. i. p. 543 (1836). Lederer, Horæ Soc. Ent. Ross. 1869, p. 74. Bienert, Lep. Reise Pers. p. 28 (1869).

Synchloe Chloridice, Leech, Butt. of China, ii. p. 459 (1894).

IMAGO.—Male. Upperside greyish-white. *Forewing* with a black lunate-bar at end of the cell crossed by the white discocellular veinlet; a short oblique subapical black-scaled sinuous band extending from the costa to the discoidal veinlet, and which is partly coalesced to an apical-marginal row of decreasing spots. *Hindwing* with the markings of the underside indicated by a greyish tint darker than the white ground-colour. Underside white. *Forewing* with the cell lunate-bar and apical markings as on the upperside, the latter less prominent and pale olive-green. *Hindwing* with all the veins broadly bordered with pale olive-green, leaving a white subbasal costal obliquely-curved streak, a narrow spot within the cell, an irregular-curved discal sinuous band, and a marginal row of broad dilated spots.

Female. Upperside. *Forewing* with the black cell-bar, the subapical sinuous band and apical-marginal spots larger and blacker; a lower-discal black spot being present between the lower median and submedian vein. *Hindwing* with the basal markings of the underside indicated as in the male, but the upper-discal and

the marginal are distinctly black. Underside similar to the male, except that on the *forewing* the lower discal spot is also present.

Expanse, ♂ ♀ $1\frac{8}{10}$ inch.

HABITAT.—Asia Minor; Persia; Beluchistan; S. Russia; Kashgar; Ladak; Tibet; S.W. China.

DISTRIBUTION (Within our Area).—In the British Museum Collection are specimens from Quetta, Beluchistan, Kashgar, and Ladak, taken by Capt. F. E. S. Adair. In Mr. J. H. Leech's Collection are both sexes from Chonging Valley, 17,000 feet elevation, taken in July, and from Digha Pass, 15,000 feet, by Capt. H. McArthur. We possess a specimen from Sirikol; and Mr. H. Grose-Smith has both sexes from Chitral.

PARAPIERIS CHUMBIENSIS (Plate 522, figs. 1, 1a, ♂).

Parapiervis Chumbiensis, de Nicéville, Journ. Asiatic Soc. Bengal, 1897, p. 563, pl. i. fig. 6, ♂.

Pieris Dubernardi, Elwes, Trans. Ent. Soc. Lond. 1888, p. 415, *nec* Oberthür.

Mancipium Dubernardi, de Nicéville, Sikkim Gaz. 1894, p. 168.

IMAGO.—Male. Upperside white, the base thickly sprinkled with black scales; cilia white. *Forewing* with the base of costa black scaled, the veins also slightly black scaled; a black slender inwardly-dentate streak bordering the lower discocellular veinlet; an apical marginal decreasing dentated band, a large rounded discal spot between the upper and middle median veinlets, and a small cluster of a few slightly-defined blackish scales in the interspace below it. *Hindwing* with the veins slightly black lined; a rounded black-scaled apical costal spot below which is a slightly-defined discal series of two or three small clusters of black scales; a few black scales are also marginally sprinkled at the vein ends. Underside. *Forewing* white; all the veins black lined; the black apical band indicated by the dilatation of the marginal end of the veins; the discal spot as above, and with a slightly-defined lower cluster of scales extending to the submedian vein; the discocellular streak broader and bordering both veinlets. *Hindwing* pale ochreous-yellow; base of costa chrome-yellow; all the veins broadly black bordered, leaving an elongated yellow subbasal and cell streak, narrow discal streaks, and broader marginal streaks, the discal points of the two latter series being slightly coalescent.

Female. Unknown.

Expanse, ♂ $2\frac{2}{10}$ to $2\frac{4}{10}$ inches.

HABITAT.—Chumbi, E. Tibet.

DISTRIBUTION.—Mr. H. J. Elwes records "eight or nine male specimens of this species which were obtained by a native collector employed by the late Capt. Harman, R.E., in surveying the Tibetan frontier" (*l.c.* p. 415).

Our illustration on Plate 522, fig. 1, 1a, is from a male in our possession received from Mr. Elwes.

CHINESE SPECIES.—*Parapieris Dubernardi* (*Pieris Dubernardi*, Oberthür, *Etudes Ent.* ix. p. 13, pl. 1, fig. 6, ♂ (1884). *Aporia Dubernardi*, Leech, *Butt. of China*, ii. p. 467, pl. 36, fig. 8, ♀ (1894). *Habitat.* W. China.—*Parapieris Davidis*, (*Pieris Davidis*, Oberthür, *Etud. Ent.* ii. p. 18, pl. 1, fig. 5, ♂ (1876). Leech, *Entom.* 1891, *Suppl.* p. 57. *Aporia Davidis*, Leech, *Butt. of China*, ii. p. 468, pl. 36, fig. 1, ♂ (1894). *Pieris Davidina*, Oberth. *Etud. Ent.* xv. p. 8, pl. 3, fig. 20 (1891). *Habitat.* W. China; E. Tibet.—*Parapieris Venata* (*Pieris Davidina var. Venata*, Leech, *Entom.* 1891, *Suppl.* p. 58. *Aporia Davidis var. Venata*, Leech, *Butt. of China*, ii. p. 469, pl. 36, fig. 3, ♀ (1894). *Habitat.* W. China.

Genus BALTIA.

Baltia, Moore, *Ann. and Mag. Nat. Hist.* 1878, p. 288. Kirby, *Entomologist*, 1894, p. 100; *id.* Allen's *Nat. Libr. Butt.* ii. p. 156 (1896). Dixey, *Trans. Ent. Soc. Lond.* 1894, pp. 249, 334.

MALE. Wings small. *Forewing* short, triangular; costa considerably arched from the base, apex and posterior angle rounded, exterior margin oblique; costal vein short; subcostal vein arched to end of the cell, four-branched, the first and second branches free and arising at equal distance apart before end of the cell and terminating on the costa before the apex; third branch bifid, bent slightly at some distance beyond end of the cell, at its middle, and again immediately before its termination before the apex, the fourth and upper radial each starting respectively below from these angles, the fourth branch being very short, the lower radial also emitted from the subcostal at some distance beyond end of the cell (in the female the lower radial starts either from the upper end of the cell, or at some distance beyond as in the male). Cell broad; discocellular oblique, slightly bent inward in its middle; median vein three-branched, the branches at equal distances apart; submedian curved. *Hindwing* rather long, somewhat oval, slightly broader than the forewing; apex and exterior margin very convex, the abdominal margin long; costal vein short; subcostal two-branched; cell broad; discocellulars oblique, upper shortest, the radial from their angle; median three-branched; upper submedian nearly straight, lower short. *Body* small; abdomen short, compactly scaled; thorax and front of head clothed with long lax hairs; palpi very long, slender, densely hairy beneath; legs short, claws bifid; femora fringed beneath with long lax hairs; antennæ short, the club large, rather long, spatulate, and compressed.

TYPE.—B. Shawii.

BALTIA SHAWII (Plate 522, fig. 2, 2a, ♂, 2b, c, ♀).

Mesapia Shawii, Bates, Henderson and Hume's, Lahore to Yarkand, p. 305, ♀ (1873). Staudinger and Schatz, *Exot. Schmett.* ii. p. 59 (1886).

Baltia Shawii, Moore, Ann. and Mag. Nat. Hist. 1878, p. 288, ♂ ♀; *id.* Sci. Results Yarkand Exp. Lep. p. 3, pl. 1, fig. 5, ♂ (1879). Kirby, Entom. 1894, p. 100; *id.* Allen's Nat. Libr. Butt. ii. p. 156 (1896).

IMAGO.—Male. Upperside white; base of both wings densely black scaled. *Forewing* with the costal edge ochreous and slightly black speckled; a black large triangular oblique spot at end of the cell, a short transverse subapical black band, and a marginal row of black decreasing triangular spots. *Hindwing* with a very slender slightly black streak at end of the cell, an indistinct curved discal band formed by sparsely speckled minute greyish-black scales. Underside. *Forewing* with markings as above, the costa and exterior margin being tinged with ochreous. *Hindwing* sparsely speckled with minute black scales, which are more densely packed at the base, and also form an indistinct narrow curved discal and a marginal macular band; a slender black-speckled streak at end of the cell. *Body* black; palpi ochreous above, fringed with black hairs beneath; abdomen beneath white; legs black above, white beneath; antennæ black, the stem white ringed.

Female. Upperside sparsely speckled with minute black scales. *Forewing* with the black cell spot slightly larger, the discal and marginal band being continued across the wing. *Hindwing* with the cell streak broader, the discal black scaled macular band more distinct, these black scales also form an ill-defined macular marginal band. Underside similar to the upper.

Expanse, ♂ $1\frac{3}{10}$ to $1\frac{5}{10}$, ♀ $1\frac{4}{10}$ inch.

HABITAT.—Extreme North-Western Himalayas; Ladak.

DISTRIBUTION.—The type specimen, described by Mr. H. W. Bates, was taken by Mr. R. B. Shaw on the Chang Lung Pass, Ladak, at 18,000 feet elevation, during the Yarkand Expedition of 1870. A male was taken at Ak Tagh, north of Karakoram Pass, at 15,000 feet, in June, 1874, by Dr. F. Stoliczka. Specimens of both sexes from North Kashmir are in the Collection of Mr. W. Rothschild and of Mr. H. Grose-Smith. In Mr. J. H. Leech's Collection are several specimens of both sexes from the Karakoram, 18,000 feet, taken in July by Capt. H. McArthur.

BALTIA BUTLERI (Plate 522, fig. 3, 3a, ♂, 3b, ♀).

Synchlœ Butleri, Moore, Proc. Zool. Soc. Lond. 1882, p. 256, pl. xi. fig. 6, 6a, ♂.

Baltia Butleri, Kirby, Entom. 1894, p. 100; *id.* Allen's Nat. Libr. Butt. ii. p. 156 (1896).

IMAGO.—Male. Upperside white; basal area of both wings deeply black scaled. *Forewing* with a black narrow bar at end of the cell, a short subapical discal band and an apical-marginal row of more or less distinctly-formed small dentate spots. *Hindwing* with a black broken streak at end of the cell, a very indistinct sparsely black-scaled curved discal macular fascia and marginal marks—indicating those of

the underside. Underside. *Forewing* with the costal edge and the interspaces longitudinally between the apical bands very pale reddish-ochreous; the black cell-bar and apical bands paler than on upperside, the marginal marks being divided by the pale vein ends. *Hindwing* very pale reddish-ochreous, with blackish streaks bordering the veins, these streaks outwardly-forming on the disc and on the outer margin a series of short duplex streaks, each pair being divided by the pale vein; broken cell streak larger. *Body* black; front of head pale reddish-ochreous; palpi whitish and fringed with blackish hairs; legs whitish; abdomen white beneath; antennæ black, shaft ringed with white.

Female. Upperside white. *Forewing* with the black cell-bar slightly broader, the discal transverse band and the marginal spots extending to the submedian vein, their apical portions being more or less slightly coalescent along the veins. *Hindwing* with the black cell-streak broader and less broken, the basal area and the cell borders more broadly black-scaled, the discal curved macular band distinctly black, and the marginal marks blackish-scaled. Underside similar to the male, except that on the *forewing* the outer bands extend to the submedian vein.

Expanse, $1\frac{5}{10}$ to $1\frac{6}{10}$ inch.

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—The type specimen was obtained in Lahoul by the Rev. J. H. Hocking. We possess a male from Ladak. Mr. W. Rothschild has several examples of both sexes from N. Kaschmir. Mr. H. Grose-Smith also has it from the same locality. In Mr. J. H. Leech's Collection are both sexes from the Digha Pass, N. side, 15,000 feet, June; Kardong Pass, 15 to 17,000 feet, August; and Karakoram, 18,000 feet, July, all taken by Capt. H. McArthur.

ALLIED SPECIES.—*Baltia Baitalensis* (Pieris Shawi, Gr.-Grshimailo, Rom. Mem. Lep. iv. p. 222, pl. 10, fig. 2a, b, ♂ ♀ (1890).—*nec* Bates. *Habitat*. Ak Baital, Kara Koul, Turkestan.

Baltia Potanini (Pieris Potanini, Alpheraky, Stett. Ent. Zeit. 1888, p. 66). *Syn*. P. Butleri, Alpheraky, Rom. Mem. Lep. v. p. 99, pl. 5, fig 2, a, b, ♂ ♀ (1889). Male. Larger than same sex of *Butleri*. Upperside. *Forewing* with similar black discocellular bar and apically-dilated anterior veins only, the contiguous upper-discal short black band being absent. *Hindwing* with the black discocellular bar less defined and its two ends distinctly, medially disconnected; the dusky shades bordering the outer veins being either less distinctly interrupted across the disc or continuous from their base to tip. Underside. *Forewing* with the black cell-bar broken in its middle, with similar apical vein-borderings, but no upper-discal fascia apparent. *Hindwing* with the black bordering to the veins, but those of the outer series being either less interrupted or entire—and thus form a more linear unbroken series of streaks. *Female*. Upperside either white or tinted with very

pale yellow. Both wings similar marked as in *Butleri*, the markings being comparatively broader. Underside similar to the male. Expanse, ♂ $1\frac{5}{10}$ to 2 inches, ♀ $1\frac{8}{10}$ inch. *Habitat.* Nian-Chan, Koko Nor, W. China.

Genus MESAPIA, Gray, List. Lep. Ins. Brit. Mus. i. p. 92 (1856). Kirby, Catal. D. Lep. p. 510 (1871); *id.* Allen's Nat. Libr. Butt. ii. p. 154 (1896). Schatz, Exot. Schmett. ii. p. 59 (1886). Leech, Butt. of China, ii. p. 659 (1894).—*Mesapia Peloria* (Pieris Peloria, Hewitson, Exot. Butt. i. pl. 2, fig. 15, 16 (1853). Kirby, Entom. 1894, p. 101; *id.* Allen's Nat. Libr. Butt. ii. p. 155 (1896). Leech, Butt. of China, ii. p. 659 (1894). Jordan, Nov. Zool. v. p. 381 (1898). Aporia Peloria, Fixsen, Rom. Mem. Lep. v. p. 97 (1889). *Syn.* Aporia Lama, Alpheraky, Rom. Mem. Lep. ii. p. 404 (1887). *Habitat.* N.E. Tibet.

Genus DAVIDINA, Oberthür, Etudes Ent. iv. pp. 19, 108 (1878). Schatz, Exot. Schmett. ii. p. 59 (1886). Leech, Butt. of China, ii. p. 474 (1894). Kirby, Allen's Nat. Libr. Butt. ii. p. 156 (1896).—*Davidina Armandi*, Oberthür, *l.c.* pp. 19, 108, pl. 2, fig. 1 (1878-9). Leech, *l.c.* p. 474, pl. 33, fig. 9, ♂ (1893). Kirby, *l.c.* p. 157 (1896). *Habitat.* Central China.

Genus PIERIS.

Heliconius, Barbut, Gen. Ins. Linné, p. 109 (1781). *nec* Linnæus.

Pieris (sect. 3, pt.), Schrank, Fauna Boica, ii. 1, pp. 152, 160 (1801).

Pieris (pt.), Latreille, Sonn. Buff. xiv. p. 111 (1805); *id.* Gen. Cr. et Ins. iv. p. 203 (1809). Lamarek, Hist. Nat. Anim. iv. p. 30 (1816). Boisduval, Spec. Gén. Léop. i. p. 434 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 42 (1847).

Pieris, Jermyn, Butt. Coll. Vade Mecum, pp. 43, 66 (1824). Stephens, Illust. Brit. Ent. Haust. i. p. 25 (1827). Curtis, Brit. Ent. pl. 360 (1831). Rennie, Consp. p. 5 (1832). Westwood, Intr. Class. Ins. ii. Gen. Syn. p. 87 (1840).

Aporia, Hübner, Verz. bek. Schmett. p. 90 (1816). Stephens, Catal. Brit. Lep. B. M. p. 3 (1850). Stainton, Manual Brit. Butt. i. p. 17 (1857). Kirby, Eur. Butt. p. 8 (1863); *id.* Allen's Nat. Libr. Butt. ii. p. 139 (1896). Schatz, Exot. Schmett. ii. p. 60 (1886). Scudder, Proc. Amer. Acad. A. and Sci. 1875, p. 116. Tutt, Brit. Butt. p. 225 (1896). Grote, Proc. Amer. Phil. Soc. 1900, p. 26.

Ganoris (pt.), Dalm. Vet. Akad. Handl. 1816, pp. 61, 86.

Pontia (pt.), Samouelle, Ent. U. Comp. p. 236 (1819).

Leuconea, Donzel, Ann. Soc. Ent. Fr. vi. p. 80 (1837). Duponchel, Catal. Méth. Lep. Eur. p. 24 (1844). Rambur, Catal. Lep. Andal. p. 54 (1858).

Pontia, Butler, Cistula Entom. i. pp. 38, 50 (1870); *id.* Proc. Zool. Soc. 1872, p. 58.

IMAGO.—Wings uniformly covered with very minute closely-adpressed scales; almost subdiaphanous; cilia almost obsolete. *Forewing* elongated, triangulate, apex and posterior angle rounded, exterior margin slightly oblique; subcostal vein four branched, first branch free and emitted at about one-fifth before end of the

cell, second immediately before the end, and third from end of cell, third with a short fork near its end, the upper radial being emitted from the subcostal at fully two-thirds beyond the cell; the cell broad, longest in the male; discocellulars oblique, very slightly concave, upper short, the lower radial from their angle; middle and lower median much the widest apart; submedian vein well recurved. *Hindwing* broadly oval, somewhat prolonged apically, and very slightly obtusely-angular at end of lower subcostal branch in the male, the angulation being more apparent in the female; cell long, broad across the middle and truncate at its end; discocellulars very oblique; first subcostal branch short; submedians long. *Thorax* densely clothed with fine hairs; abdomen of male above compactly scaled laterally, with a dorsal ridge of short fine hairs, and a similar series beneath; palpi short, hairy beneath, terminal joint slender, as long as the second; antennæ with a lengthened fusiform compressed club.

LARVA.—Stout, cylindrical, clothed with short fine hairs. When young living gregariously under a common silken web. Feeds on Hawthorn, Sloe, and various Fruit trees.

PUPA.—Rather stout; head obtusely pointed in front; thorax dorsally convex.

TYPE.—P. Cratægi.

PIERIS SORACTA (Plate 523, fig. 1, *larva* and *pupa*; 1a, b, c, d, ♂, 1e, f, ♀).

Aporia Soracta, Moore, Catal. Lep. Mus. E. I. Company, i. p. 83 (1857). Lang. Ent. Mo. Mag. 1864, p. 102. Moore, P. Z. S. 1865, p. 489; *id.* Proc. Zool. Soc. 1882, p. 256, pl. 11, fig. 5, *larva*. Doherty, Journ. As. Soc. Bengal, 1886, p. 135. Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 589.

Pontia Soracta, Butler, Proc. Zool. Soc. Lond. 1878, p. 58.

IMAGO.—Male. Upperside white; extreme outer margin and cilia black, edged with grey. *Forewing* with the costal-edge and the veins slenderly black lined, more distinctly so along their outer end; a black variable slender or moderately-broad streak at end of the cell, this streak sometimes extending more slenderly at both ends, from the base of first subcostal branch to the lower median branch, its outer edge being also angled at base of each veinlet except the lower median, and sometimes also prominently extending along the upper and middle median to, and coalescing with the transverse band; a black transverse discal sinuous band from the costa to lower median veinlet, this band is very variable, being either almost obsolete, or slightly, or prominently defined, the outer margin of the wing being narrowly black and inwardly angled at the veins, these two bands, in the prominently marked specimens, enclosing a series of submarginal oval spaces. *Hindwing* with the veins entirely white and unmarked or with the veins black lined

for some distance from their outer end, and with a discal curved series of intervening blackish-speckled points. Underside. *Forewing* white; veins and markings similar to the upperside, but less prominent. *Hindwing* either white, with the base of costa yellow, with the veins slenderly black-lined, or the ground-colour is discally tinted with pale yellow and the veins more broadly black lined than on upperside, and the discal row of black points present. *Body* blackish; thorax, head, and palpi whitish haired; antennæ black, with the tip white; legs black, femora white streaked.

Female. Upperside white, with the veins slenderly black lined. *Forewing* with less defined blackish cell streak, transverse discal and marginal markings. *Hindwing* unmarked. Underside similar to the upperside, the veins on hindwing more distinctly black lined.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{3}{4}$, ♀ $2\frac{3}{4}$ inches.

HABITAT.—N.W. Himalayas.

LIFE HISTORY.—“Larva found at Masuri, 7,000 feet elevation, in the latter half of April and beginning of May, feeding in large numbers, socially, on *Berberis*.”

ADULT LARVA.—“Length 1 inch. Uniformly cylindrical, pubescent; yellowish-grey, with a broad black dorsal band, which contains two fine longitudinal yellow lines, this black dorsal band extends from the second to eleventh segment inclusive, it is bordered with a narrow yellow margin, below which the sides are pale lilac-grey minutely irrorated with darker. An interrupted yellow line above the feet, margined above and below with black dots; from above the feet project horizontal and decumbent white hairs, forming a continuous decumbent fringe above the feet. Head blackish with yellowish pubescence; legs and prolegs fuscous; spiracles and incisions of segments inconspicuous.”

PUPA.—“Length 9 lines. Braced. Usual Pieridan form; angulated; vertex acutely pointed, sternum produced into a nasiform protuberance; creamy-white on dorsal and pale lavender-grey on ventral surface; an interrupted yellow lateral line separating these two colours; speckled with black points forming more or less interrupted longitudinal lines; wing-cases clear white, with narrow margins and submarginal series of spots on exterior margin; also median vein and two spots adjacent, black; margins of the eyes, palpi, legs, antennæ, and apex of nasiform sternal projection also black.”

IMAGO.—“Emerged on May 15th and following days” (Capt. A. M. Lang, MS. Notes).

DISTRIBUTION.—“A Himalayan species, and may be seen in some abundance in forests, at altitudes of 6,000 to 8,000 feet. It is essentially a forest insect, not affecting gardens or grassy slopes” (Cap. A. M. Lang, P. Z. S. 1865, 489). Col. J. W. Yerbury obtained it at Kala Pani and at Thundiani in May. In the British Museum Collection is a male from Gilgit, N. of Kashmir, taken by Col. Biddulph,

a male from Dalhousie, taken by Col. Harford in May, and in Mr. J. H. Leech's Collection are both sexes from Huttee, 4,000 feet, taken in May; from Murree, 6,000 feet, in May; Kujiar, 6,000 feet, April; Dana, N. of Dalhousie, in June and August; and from Kardong, 14,000 feet, S. of Leh, Ladak, taken by Capt. H. McArthur. Capt. H. B. Hellard took it at Masuri. Mr. W. Doherty records it from "Pindari Valley, 9,000 feet, N.W. Kumaon" (*l.c.* 135). The Rev. J. H. Hocking records it from "Dharmasala, the larvæ being found feeding on the Kusmul (*Berberis*) on April 6th, and changing to pupæ on May 8th (P. Z. S. 1882, 256). Capt. Lang found and reared the larva at Masuri, in April and May. Mr. P. W. Mackinnon records it as "occurring in vast numbers for a very short time in April and May in Masuri and in the interior. The larva feeding on *Berberis Lycium*. It is of a brown colour, covered with fine and soft hairs. The pupa varying much in colour, some being reddish-brown, others almost white" (*l.c.* 589).

Of our illustrations on Plate 523, fig 1 is from the larva reared by Mr. Hocking, and the pupa from Capt. Lang, 1a, b, a male from Thundiani, 1c, d, a male from Masuri, and 1d, e, a female from Simla.

PIERIS LEECHII.

IMAGO.—Male and female. Smaller than typical *Soracta*. Upperside. *Forewing* with the black discocellular-bar much broader, the submarginal band also broader and is continuous in its course from the costa to the lower median veinlet, the enclosed series of white spots are also complete. Underside. *Forewing* with the outer veins broader black, as on the upperside, than in *Soracta*, the submarginal band complete and well defined, the apex tinted with pale yellow. *Hindwing* uniformly pale yellow, with all the veins broadly black, the discal zigzag black band also broader and well-defined.

Expanse, ♂ ♀ $1\frac{3}{4}$ to $2\frac{1}{4}$ inches.

HABITAT. Skoro La, N. of Skardo, Ladak; Gilgit.

Described from several specimens of both sexes, taken by Mr. J. H. Leech at Skoro La, 12,000 ft. elevation, in July, 1887. Col. C. T. Bingham has recently received several specimens from Gilgit.

PIERIS BELUCHA.

Aporia Belucha, Marshall, Proc. Zool. Soc. Lond. 1882, p. 760. Swinhoe, Trans. Ent. Soc. 1885, p. 342. Grose-Smith, Rhop. Exot. i. p. 7, *Pieris* pl. 2, fig. 8, 9, ♂ (1889).

Metaporis Sorex, Grose-Smith, Ann. Nat. Hist. 1887, p. 129.

? *Pieris Leucodice*, Bienert, Lep. Reise in Persien, p. 26 (1869).

IMAGO.—Male. Smaller than *Soracta*. Upperside white. *Forewing* with the

veins slenderly black lined, the black cell-streak broader, the transverse discal and its marginally-united black band also broad, with the enclosed series of white spots more sharply defined. *Hindwing* with the end of the outer veins distinctly black-lined; a discal curved row of blackish speckled points, and a few black scales edging the discocellular veinlet. Underside. *Forewing* similar to the upperside, except that the outer bands are narrower. *Hindwing* pale yellow, the base of costa chrome-yellow; all the veins black bordered; the curved series of discal points prominent.

Expanse, ♂ $1\frac{8}{10}$ inch.

HABITAT.—Beluchistan; ? Persia.

DISTRIBUTION.—Mr. H. Grose-Smith's type specimen is recorded from Quetta. Capt. A. M. Lang obtained it in the Ziarut Pass, Kwass Valley, at 8,000 feet altitude, in June. In Mr. J. H. Leech's Collection are specimens labelled "Persia," which are probably referable to this species.

PIERIS NABELLICA (Plate 524, fig. 1, ♂, 1a, b, ♀).

Pieris Nabellica, Boisduval, Spec. Gén. Lep. i. p. 509 (1836). Lang, Ent. Mo. Mag. 1868, p. 33.

Metaporis Nabellica, Butler, Proc. Zool. Soc. 1878, p. 61.

Aporia Nabellica, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 589.

IMAGO.—Male. Upperside greyish-black; cilia edged with grey. *Forewing* with an upper discal series of very slightly apparent whitish-scaled short longitudinal streaks beyond the cell, and a submarginal transverse curved row of prominent white-scaled spots. *Hindwing* with the veins, basally, slenderly white lined, and a submarginal row of inwardly-indented quadrate white spots. Underside. *Forewing* black, the discal and marginal white spots prominent, those at the apex being yellow tinted; interior of cell whitish scaled. *Hindwing* pale yellow; the costal base bright yellow; all the veins broadly black bordered, enclosing a pale yellow elongated cell streak, a subcostal streak, a discal series of streaks, and then an outer marginal row of indented quadrate spots. *Body* black; thorax and front clothed with fine greyish silky hairs; abdomen beneath greyish-white; antennæ black, the tip of club ochreous-white; legs black.

Female. Upperside similar to the male, except that on the *forewing* the cell and lower base is more or less greyish-white scaled, the discal spots as prominently white as the marginal, those of the former extending more or less diffusedly to the posterior margin, and on the *hindwing* the cell and disc is more or less prominently interspaced with white streaks. Underside similar to the male, except that on the *forewing* the discal spots extend to the posterior margin.

Expanse, 3 to $3\frac{1}{4}$ inches.

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—Capt. A. M. Lang records it as “occurring but sparingly in Kunawur, where I captured it at altitudes of about 9,000 or 10,000 feet, in the Wungur, Kazhang, and Buspa Valleys. It has a slow, heavy flight, and is fond of pitching on the late Umbelliferous plants, which arise above the dense masses of flowers carpeting the glades in these wooded valleys during the rainy months of July and August. Specimens from Kaschmir appear to be lighter in colour than those from Kunawur” (Ent. Mo. Mag. 1868, 33). Capt. H. B. Hellard obtained it in “Pangi, Busahir, in July and August, in the Rajdiangan Pass, and in Gulmurg, in Kaschmir, in August and September” (MS. Notes). Mr. P. W. Mackinnon records it as “very rare, obtained only at 12,000 or 13,000 feet elevation, on the slopes of the Hills above the Buspa Valley and on the Borenda Pass, in July and August” (J. Bombay N. H. Soc. 1898, 589). Mr. E. T. Atkinson took it in the Rupin Pass, Spiti. In Mr. J. H. Leech’s Collection are specimens from Goorais Valley, Kashmir, taken in September; Kukti, 8,500 feet, in July; Dugi Pass, 12,000 feet, August and September, taken by Capt. Thompson. Mr. A. Grote possessed a specimen taken at Naini Tal.

PIERIS HARRIETÆ (Plate 524, figs. 2, 2a, ♂, 2b, ♀).

Metaporis Harrietæ, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1892, p. 341, pl. I., figs. 3 ♂, 4 ♀;
id. Sikkim Gazetteer, 1894, p. 168.

IMAGO.—Male. Upperside black. *Forewing* with a white slender streak at base of the costa, a creamy-white large broad streak occupying the basal three-fourths of the cell, its outer end being pointed, a discal transverse series of more or less oval spots, and a large elongated slightly-divided lower streak beneath the cell, followed by an outer marginal row of small whitish duplex-spots. *Hindwing* with a creamy-white basal costal streak, a streak almost filling the cell, a curved inner-discal series of small oval spots and slender elongated lower and abdominal-marginal streaks, and then an outer marginal row of small whitish duplex-spots. Underside duller black. *Forewing* with white markings as above, except that the marginal duplex-spots are more elongated. *Hindwing* with markings, as on upperside, tinted with pale yellow, the basal spot being chrome-yellow, the marginal duplex-spots all elongated and closely approximating to the discal spots.

Female. Upperside paler black than in the male. Both wings with similar markings, the marginal duplex-spots being more elongated. Underside similar to the male.

Expanse, ♂ $2\frac{3}{4}$, ♀ 3 inches.

HABITAT.—Bhotan.

Described by Mr. L. de Nicéville, from a single pair obtained in Bhotan by Mr. F. A. Möller's native collectors.

CHINESE SPECIES.—*Pieris Cratægi* (Pap. Cratægi, Linnæus, Syst. Nat. x. ed. i. p. 467 (1758); *id.* Faun. Suec. p. 269 (1761); *id.* S. N. xii. ed. i. 2, p. 758 (1767). Esper, Schmett. i. p. 47, pl. 2, fig. 3 (1777). Heliconius Cratægi, Barbut, Gen. Ins. Linn. p. 169, pl. 10, fig. 70 (1781). *Pieris Cratægi*, Schrank, Fauna Boica, ii. 1, p. 164 (1801). Jermyn, Butt. Coll. Vade Mecum, pp. 43, 60 (1824). Stephens, Illust. Brit. Ent. Haust. i. p. 25 (1827). Menetriés, Schrenck's Reis. Amur. ii. p. 16 (1859). Bremer, Lep. Ost-Siber. p. 7 (1864). *Aporia Cratægi*, Hübner, Verz. bek. Schmett. p. 90 (1816). Buckler, Larvæ of Brit. Butt. i. pl. 2, fig. 1a, b, c, larva and pupa (1866). Pryer, Rhop. Nipon, p. 5, pl. 3, fig. 7 (1886). Leech, Butt. of China and Japan, ii. p. 473 (1894). *Syn.* Pap. nigronervosus, Retz. Gen. Spec. Ins. p. 30 (1783). *Habitat.* Europe; Siberia; Amurland; Mongolia; China; Corea; Japan.—*Pieris Hippia*, Bremer, Bull. Acad. Petrop. iii. p. 464 (1861); *id.* Lep. Ost-Siber. p. 7, pl. 3, fig. 1 (1864). *Aporia Hippia*, Leech, *l.c.* p. 471. *Syn.* Leuconea Cratægoides, Lucas, Ann. Soc. Ent. Fr. 1866, p. 503, pl. xi, fig. 11. *Habitat.* Amurland; N. and W. China.—*Pieris Bieti*, Oberthür, Etudes Ent. ix. p. 12, pl. 1, fig. 7, 8, ♂ ♀ (1884). *Aporia Bieti*, Leech, Butt. of China, ii. p. 471, pl. 36, fig. 2 (1894). *Syn.* *Pieris sulphurea et fumosa*, Oberthür, *l.c.* *Habitat.* Amurland; Mongolia; N. and W. China.—*Pieris Martineti*, Oberthür, Etud. Ent. ix. p. 12, pl. 1, fig. 5 ♂ (1881); *id.* xiii. p. 38, pl. 9, fig. 98 ♀ (1890). *Aporia Martineti*, Leech, *l.c.* p. 470 (1894). *Syn.* *Pieris Kreitneri*, Friv. Term. Fuz. x. p. 39, pl. 4, fig. 1, 2 (1886). *Habitat.* W. China; Yunnan.—*Pieris Potanini* (*Aporia Potanini*, Alpheraky, Rom. Mem. Lep. v. p. 96 (1889); Leech, *l.c.* p. 659. *Syn.* *Ap. Martineti*, Alph. *l.c.* pl. 5, fig. 1. *Habitat.* W. China.—*Pieris Delavayi*, Oberthür, Etud. Ent. xiii. p. 37, pl. 9, fig. 97 (1890). *Metaporia Delavayi*, Leech, *l.c.* p. 466. *Habitat.* W. China.—*Pieris Leucodice* (*Pontia Leucodice*, Eversmann, Bull. Mosc. 1843, p. 541, pl. 7, fig. 2, a, b). Herr. Schæff. Eur. Schmett. i. fig. 619-20 (1852). *Habitat.* Siberia; Amur.—*Pieris Procris* (*Aporia Procris*, Leech, Entom. 1890, p. 191; *id.* Butt. of China, ii. p. 469, pl. 33, fig. 10, ♂. *Syn.* *Pieris Halisca*, Oberthür, Et. Ent. xv. p. 7, pl. 3, fig. 23 (1891). *Habitat.* W. China.—*Pieris Lhamo*, Oberthür, Et. Ent. xviii. p. 13, pl. 2, fig. 27 (1893). *Aporia Lhamo*, Leech, *l.c.* p. 658. *Habitat.* E. Tibet.—*Pieris Goutellei*, Oberthür, Et. Ent. xi. p. 15, pl. 2, fig. 11 (1886). *Metaporia Goutellei*, Leech, *l.c.* p. 465. *Habitat.* W. China.

Genus METAPORIA.

Metaporia, Butler, Cistula Entom. i. pp. 38, 51 (1870); *id.* Proc. Zool. Soc. 1878, p. 61. Leech Butt. of China, ii. p. 460 (1894). Kirby, Allen's Nat. Libr. Butt. ii. p. 158 (1896).

IMAGO.—*Forewing* more elongated than in *Pieris Cratægi*, exterior margin more convex; first and second subcostal branches both emitted further from before the end of the cell, and the fourth branch much further from the apex below the third; cell broader. *Hindwing* more elongated apically; cell broader and less pointed at the end; lower discocellular less oblique. Palpi stouter, more densely hairy beneath; antennæ longer; abdomen compactly scaled.

TYPE.—*M. Agathon*.

HABITS OF LARVA.—According to the observations of Mr. P. W. Mackinnon, made in Masuri, the "larvæ of *M. Caphusa* are gregarious, spinning a joint feeble web, under which they lie in communities of ten or more. The pupa is also gregarious."

MIMICRY.—*M. Caphusa*, *Ariaca*, and *Agathon* are fair mimics of the common Limnaine butterfly *Parantica melanoïdes*.

METAPORIA PHRYXE (Plate 525, fig. 1, 1a, ♂, 1b, ♀).

Peris Phryxe, Boisduval, Spec. Gén. Lep. i. p. 446 (1836). Blanchard, Jacquemont's Voy. Inde iv.,

Ins. p. 16, pl. 2. fig. 1 (1844).

Metaporia Phryxe, Butler, Proc. Zool. Soc. 1878, p. 61. Moore, P. Z. S., 1882, p. 256.

Aporia Phryxe, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 589.

IMAGO.—Male. Upperside pale yellowish-white, veins black lined; cilia greyish-black. *Forewing* with a black slender costal edge, a broad discocellular patch at end of the cell, the black also bordering the outer veins and expanding in their middle, thence dilating at their marginal end. *Hindwing* with black-bordered veins, the black of the outer veins being medially expanded and then marginally dilated as on the forewing. Underside. *Forewing* white. *Hindwing* pale yellowish-white, with the base of costa chrome-yellow. Both wings with black vein-markings as on the upper-side. Body above black; thorax and head clothed with intermixed fine silky black and greyish hairs; legs black, femora and tibiæ white streaked; antennæ black.

Female. Upperside duller yellowish-white. Both wings with similar, but duller black and somewhat broader vein-markings than in the male. Underside with similar duller black markings as on the upperside, the ground-colour of the hind-wings being also duller yellow tinted than in the male.

Expanse, ♂ 3 to $3\frac{1}{4}$, ♀ $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—W. Himalayas.

DISTRIBUTION.—Mr. P. W. Mackinnon records this as "somewhat rare in Masuri, much more so than *Caphusa*, but occurs at the same time—May and June" (J. Bombay N. H. Soc. 1898, 589). We possess both sexes from Simla, and a female from Kunawur, taken by Capt. A. M. Lang. In the British Museum collection are

specimens from Dalhousie, taken in June by Capt. Harford, and from Kulu by Capt. G. Young.

METAPORIA CAPHUSA (Plate 525, fig. 2, larva and pupa, 2a, b, ♂, 2c, ♀).

Metaporia Caphusa, Moore, Proc. Zool. Soc. Lond. 1872, p. 564, ♂ ♀ ; *id. l.c.* 1882, p. 256.

Aporia Caphusa, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 589, pl. v. fig. 20, a, b, c, larva and pupa.

Aporia Agathon, Lang, Ent. Mo. Mag. 1864, p. 102. Moore, P. Z. S. 1865, p. 489.

IMAGO.—Male. Upperside brownish-black. *Forewing* with a greyish-white speckled broad elongated cell-streak, a discal and a submarginal transverse series of greyish-white short narrow streaks, the three lowest pair each being indistinctly coalescent, and the lowest of the discal series broad and elongated ; below the latter is also a slender posterior marginal streak. *Hindwing* with a greyish-white basal costal spot, a broad costal streak, a broad cell streak, and a discal and submarginal series of short narrow pointed-streaks, the three or four lowest pairs each being slightly coalescent ; the abdominal margin also broadly white. Underside duller black. *Forewing* with markings as above, but whiter. *Hindwing* with markings as above, but of a pale yellowish tint, except the basal spot, which is chrome yellow ; the discal and submarginal series not being coalesced posteriorly.

Female. Upperside dull black ; the markings on both wings pale yellowish-white, as in the male ; the cell streak on the forewing being also prominent. Underside similar to the male, except that the markings of the hindwing are of a darker yellow tint.

Expanse, ♂ $2\frac{6}{10}$ to 3, ♀ 3 to $3\frac{4}{10}$ inches.

LARVA AND PUPA.—“ Resembles that of *A. Soracta*. It is dichroic, one form is reddish-brown, the other is green. Our figure 20b was drawn from a specimen preserved in glycerine, which had greatly shrunk, it should have been as long and slender as fig. 20a. The larvæ feed on *Berberis nepalensis* ; they are gregarious, and spin a joint feeble web, and lie together in communities of ten or more. They feed at night only. When full-grown the colour is dirty-brown, head black, each segment with a dorsal longitudinal dark brown stripe ; the larva is thinly covered with weak white hairs. Just before pupation the colour turns to a light green, with the head and stripes as before ; and to pupate burrow under the leaves at the foot of their food-plant. The pupa is also gregarious ” (P. W. Mackinnon, *l.c.* 589).

HABITAT.—W. Himalayas.

DISTRIBUTION.—Capt. A. M. Lang says “ this is a mountain-insect, frequenting forests and shady glens. At Simla I saw it in considerable numbers in June. Its flight much resembles that of *Danaüs Chrysippus*, and it is of easy capture. It appears local, as I have seen it only at Simla, and in some richly-wooded glens

upwards of 100 miles in the interior of the Himalayas" (Ent. Mo. Mag. 1864, 102). We possess both sexes from Masuri, 7,000 feet altitude, and a female from Kunawur, taken by Capt. Lang.

Mr. L. de Nicéville remarks (Journ. As. Soc. Bengal, 1883, p. 65) that "when capturing the Nymphaline butterfly *Hestina Zella* [=Nicévillei, Moore] it at once struck me that it was an excellent mimic, both in the slow and sailing mode of its flight, and in general appearance, of *Metaporia Caphusa*, which is an exceedingly common Pierine butterfly in the spring in many parts of the Outer N.W. Himalayas, and which latter is, doubtless, a protected species." Mr. P. W. Mackinnon records this butterfly as "occurring at Masuri in enormous numbers, during May and June, on the tops of the Hills and in shady ravines" (J. Bombay N. H. Soc. 1898, 589).

METAPORIA ARIACA (Plate 526, fig. 1, 1a, ♂, 1b, ♀).

Metaporia Ariaca, Moore, Proc. Zool. Soc. Lond. 1872, p. 564, ♂.

Aporia Agathon, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 590.

IMAGO.—Male. Upperside. Differs from *M. Caphusa* in the ground-colour being blacker. *Forewing* with the dusky cell-streak broader, the discal and submarginal white streaks narrower and smaller, sharply defined and more prominent, and with a wider transverse interspace between the two series; the lower discal streak traversed by a black-scaled line, and the posterior marginal streak is absent. *Hindwing* also with the discal and submarginal white streaks narrower and shorter, the two series being also widely separated. Underside also differs from *Caphusa*, as on the upper-side, in the widely separated discal and submarginal streaks.

Female. Upperside duller black than in the male. Both wings with the discal and submarginal streaks also widely separated.

Expanse, ♂ 3 to 3 $\frac{1}{4}$, ♀ 3 $\frac{1}{2}$ inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—We possess specimens of both sexes of this butterfly from the Western Himalayas, and a female from Naini Tal, Kumaon. In the British Museum collection is a specimen from Runeket, Kumaon.

METAPORIA AGATHON (Plate 526, fig. 2, 2a, ♂, 2b, ♀).

Pieris Agathon, Gray, Zool. Misc. p. 33 (1832); *id.* Lep. Ins. Nepal, p. 8, pl. 8, fig. 1 (1846). Boisduval, Spec. Gén. Lep. i. p. 447 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 48 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 83 (1857).

Metaporia Agathon, Butler, Cistula Entom. i. p. 51, pl. 3, fig. 10, *id.* Proc. Zool. Soc. 1878, p. 61. Swinhoe, Trans. Ent. Soc. 1893, p. 309. de Nicéville, Sikkim Gaz. 1894, p. 168. Kirby, Allen's Nat. Libr. Butt. ii. p. 128 (1896).

Pieris (Aporia) Agathon, Elwes, Trans. Ent. Soc. 1888, p. 415.

IMAGO.—Male. Upperside deep black. *Forewing* with a greyish-white scaled elongated narrow cell streak, and two similar-scaled basally-united slender streaks below the cell; a transverse discal and a submarginal series of slender short white streaks. *Hindwing* with a white basal spot, a narrow elongated costal streak, a broad cell streak medially traversed by a slight blackish line, a discal series of small slender short streaks, and a submarginal series of more oval-shaped short streaks; the abdominal border also being white. Underside, purpurescent brownish-black. *Forewing* with all the markings, as above, prominently white. *Hindwing* with all the markings, as above, tinted with olivescient-yellow, the basal spot being chrome-yellow. *Body* above, legs, and antennæ black; thorax above clothed with long silky grey hairs; thorax, collar, palpi, and legs beneath, white streaked.

Female. Upperside duller black, with similar markings. Underside also with similar markings, those on the hindwing and the apical on the forewing of a darker tint of yellow.

Expanse, ♂ $3\frac{1}{4}$ to 4, ♀ $3\frac{3}{4}$ inches.

HABITAT.—Eastern Himalayas; Khasia and Naga Hills.

DISTRIBUTION.—We possess specimens of both sexes from Nepal, taken by the late General G. Ramsay. Specimens are recorded from “Bhotan, taken by Major R. B. Pemberton during the Mission in 1837-8” (Catal. Lep. E. I. C. i. p. 83). Mr. H. J. Elwes records “a single specimen of this species was brought by my native collectors from the interior towards Bhotan in 1883, but it has not been obtained certainly in Sikkim” (Tr. Ent. Soc. 1888, 415). Mr. L. de Nicéville says “Mr. Möller received a single male from his native collectors, probably from the same locality” (Sikk. Gaz. 1894, 168). Col. C. Swinhoe records it as “very common in the Khasia Hills” (Tr. Ent. Soc. 1893, 309). In the collection of the late Mr. W. S. Atkinson were specimens from the Naga Hills.

CHINESE SPECIES.—*Metaporis Largeteauui* (Pieris Largeteauui, Oberthür, Etudes Ent. vi. p. 12, pl. 7, fig. 1 (1881). Leech, Butt. of China, ii. p. 461, pl. 36, fig. 9, ♀ (1894). *Habitat.* W. and C. China.—*Metaporis Oberthüri* (Pieris Oberthüri, Leech, Entom. 1890, p. 46. Oberth. Etud. Ent. xvi. p. 5, pl. 1, fig. 2 (1892). Leech, Butt. of China, ii. p. 462, pl. 36, fig. 7, ♂. *Habitat.* C. China.—*Metaporis Hastata* (Pieris Hastata, Oberthür, Et. Ent. xvi. p. 5, pl. 1, fig. 6 (1892). *Habitat.* Yunnan.—*Metaporis Paracræa*, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1900, p. 171, pl. EE, fig. 19, ♂. *Habitat.* W. China.—*Metaporis Larraldei* (Pieris Larraldei Oberthür, Et. Ent. ii. p. 19, pl. 1, fig. 2 a, b (1876). Leech, *l.c.* ii. p. 464. *Syn.* P. Melania, Oberth. *l.c.* xvi. p. 5, pl. 1, fig. 5 (1892); P. Nutans, Oberth. *id.* p. 6, pl. 1, fig. 3. *Habitat.* C. China; Yunnan.—*Metaporis Lotis* (Pieris Lotis, Leech, Entom. 1890, p. 192); Butt. of China, ii. p. 463, pl. 36, fig. 6, ♂ (1894). *Habitat.* C. China.—

Metaporis Acræa (*Pieris Acræa*, Oberthür, Bull. Soc. Ent. Fr. 1885, p. 226. *id.* *Etud. Ent.* xi. pl. 2, fig. 7). Leech, *l.c.* ii. p. 453. *Habitat.* W. China.

Genus ANAPHÆIS.

Anapheis, Hübner, Verz. bek. Schmett. p. 93 (1816).

Pinacopteryx (Sect. 1), Wallengren, Rhop. Caffr. p. 7 (K. Svenka Vet. Akad. Handl. 1857) *id.* 1858. p. 75.

Belenois, Moore, Lep. of Ceylon, i. p. 137 (1881).—*Nec* Hübner.

IMAGO.—Male. *Forewing* triangular; costal edge smooth (not serrated as in type of *Belenois*) exterior margin slightly uneven; costal vein extending to two-thirds the margin; subcostal vein four branched, first subcostal branch emitted at about one-fourth before end of the cell and partly anastomosed to the costal vein at some distance before its end, second branch at one-eighth before end of the cell, third bifid, the upper discocellular being emitted at one-third beyond the cell; discocellulars oblique, upper shortest and slightly incurved, lower radial from their angle; middle median at two-fifths, and lower at one-fifth before end of the cell; submedian vein slightly recurved. *Hindwing* broadly oval; exterior margin slightly scalloped; precostal vein short, curved, emitted at some distance beyond base of costal vein; first subcostal branch at more than half before upper end of the cell; upper discocellular very oblique, shortest, lower less oblique; cell fusiform; middle median at one-fifth and lower at nearly one-half before end of the cell; submedian long, straight; internal vein slightly recurved. *Body* moderate; thorax clothed with fine silky hairs; abdomen compactly scaled; palpi long, very laxly hairy beneath, second joint extending beyond the eyes, third joint long and slender; antennæ with a lengthened spatulate club.

TYPE.—A. Creona.

ANAPHÆIS MESENTINA (Plate 527, fig. 1, larva and pupa; 1a, b, c, ♂, 1d, ♀; 1e, ♂, 1f, g, h, ♀).

Papilio Mesentina, Cramer, Pap. Exot. iii. pl. 270, fig. A, B (1782).

Pieris Mesentina, Godart, Encyc. Méth. ix. p. 130 (1819). Boisduval, Spec. Gén. Lep. i. p. 501 (1836). Kollar, in Hügel's Kaschmir, iv. 2, p. 409 (1844). Doubleday and Hewitson, Gen. D. Lep. i. p. 46 (1847). Moore, Catal. Lep. Mus. E. I. C. i. p. 72, pl. 12, fig. 9, 9a, larva and pupa (1857). Lang, Ent. Mo. Mag. 1864, p. 102; Chaumette, *id. l.c.* 1865, p. 37. Moore, P. Z. S. 1865, p. 489. *id.* 1882, p. 255. Butler, Catal. Fabr. Lep. B. M. p. 204 (1869). Bienert, Lep. Ergeb. Reise Persien, p. 26 (1869-70). Swinhoe, P. Z. S. 1884, p. 511; *id.* Tr. Ent. Soc. 1885, p. 343. Elwes, Trans. Ent. Soc. 1888, p. 417.

Pontia Mesentina, Horsfield, Catal. Lep. Mus. E. I. C. p. 142 (1829).

Belenois Mesentina, Butler, Ann. Nat. Hist. 1880, p. 223; *id.* 1882, p. 4; *id.* Proc. Zool. Soc. 1880, p. 409, pl. 39, fig. 6, pupa. de Nicéville, Journ. As. Soc. Bengal, 1885, p. 51. Swinhoe, P. Z. S.

1885, p. 136; *id.* 1886, p. 430. Hampson, Journ. As. Soc. Beng. 1888, p. 363. Ferguson, Journ. As. Soc. Beng. 1891, p. 444. de Nicéville, Sikkim Gaz. 1894, p. 168. de Nicéville and Aitken, Journ. As. Soc. Beng. 1896, p. 575. Mackinnon, Journ. Bombay Nat. Hist. Soc. 1898, p. 590. Watson, Journ. Bombay, N. H. Soc. 1898, p. 8.

Papilio Aurota, Fabricius, Ent. Syst. iii. 1, p. 197 (1793).

Pieris Lordaca, Walker, Entomologist, v. p. 48 (1870).—*Dry form.*

Belenois Lordaca, Butler, Proc. Zool. Soc. 1886, p. 375.

Belenois Aurigena, Butler, Proc. Zool. Soc. 1886, p. 374, ♀; *id.* Ann. Nat. Hist. 1888, p. 203.—*Wet form.*

IMAGO.—Male. Upperside greyish white. *Forewing* with a black excurved bar at end of the cell, which extends slenderly from base of first subcostal branch and then widens outward to the upper median veinlet; beyond is a broad apical marginal band enclosing six white spots, the three upper being somewhat elongated, the lower short and small, the inner-edge of the band is sinuous. *Hindwing* with either a more or less ill-defined, or a prominent-black outer-marginal band enclosing a series of four rounded white spots; in some specimens a slightly-defined black-scaled costal spot and a slender streak on middle of the discocellular is present, and the dark vein-borders of the underside indicated. Underside. *Forewing* with black markings as on upperside, the black extending to base of the subcostal, and in some specimens the series of apical spots are more or less tinted with yellow. *Hindwing* with the veins more or less slightly, or prominently, black bordered, the marginal spotted border complete, and all the interspaces of the wing are either white or tinted with pale or dark ochreous-yellow.

Female. Upperside. *Forewing* with the cell bar broader than in male and extending inward to near base of the costa; the apical marginal band also broader, with its enclosed spots smaller and either less prominent, or indistinctly defined. *Hindwing* either with slightly-defined or prominent markings, as in the male, or with the veins more or less indistinctly black lined and the spots of the marginal band indistinct or partly obsolescent. Underside. *Forewing* with the base yellow-tinted, a broader cell-bar and outer band, the enclosed spots of the latter being more or less yellow tinted. *Hindwing* with all the veins black bordered, and the discal interspaces only are white or all are uniformly tinted with pale or dark ochreous-yellow. *Body*, palpi, and legs greyish-white; antennæ black above, whitish annulated beneath.

Expanse, ♂ ♀ $1\frac{3}{4}$ to $2\frac{1}{2}$ inches.

HABITAT.—E. Africa; E. Arabia; Persia; Beluchistan; Afghanistan; W. and E. Himalayas; Continental India.

LIFE HISTORY.—EGG.—“Half a line long, semi-conical, bright yellow. About twenty-five in number, very close to each other, but not touching, placed on the upper surface of the leaf.”

LARVA.—“When hatched, a line long, olive colour, with a distinct glossy jet-

black head. *After first moult*.—One-fourth inch long; grass green; dorsal line very distinct, dark green; lateral line very broad, plum colour and mottled, dentated into the ground-colour on the last two segments on its upperside; a small white spot on either side of dorsal line on each segment; a yellow spot on each segment on the lateral line on either side; abdomen glossy green; ventral line distinct, rather interrupted, grass green; all the legs green, hairy; head shiny-black, with a green triangular mark in front, covered with stiff whitish hairs; stigmata dark coloured; sides greyish-green, slightly wrinkled transversely; the portion of ground-colour between lateral and dorsal line slightly powdered with yellow; hair whitish-grey; anal segment black and hairy; first segment rather swollen in front. *After last moult*.—Length one and a quarter inch long; cylindrical, broader towards the head, slightly tomentose on back, hairy on the sides; otherwise as after first moult. Habits not lively. *Food Plant*.—Feeds on the Pea-leaved Caper (*Capparis pycifolia*). Changed to chrysalis April 1st, 1861."

PUPA.—"Succincta; five-eighths inch long, transparent pale cream colour. In front a longish tubercle directed forwards, with a black mark on each side, and a smaller one on either side of fourth segment, perfectly black; a lateral line of pale plum colour, on which is a longitudinal row of yellow round dots, one on each segment, and a transverse row of dots on each segment; dashed and marked with black, particularly on the abdomen. After the escape of the imago, the fifth and sixth segment of the pupa becomes blood red."

IMAGO.—"Emergèd on April 7th, 1861."

Habits of Imago.—"Fond of woods, where it flies about pretty dodgingly, then settles for a moment, and off again. Common at Lucknow from January onwards" (Capt. H. L. Chaumette MS. Notes).

According to the observations of Messrs. Davidson and Aitken (Journ. Bombay N. H. Soc. 1896, 575) "the larvæ are gregarious throughout their existence, the eggs being laid in batches of from 10 to 40."

DISTRIBUTION (Within our Area).—Col. C. Swinhoe records "a pair taken at Much in the Bolan Pass, Beluchistan, in October, 1879" (Ann. N. H. 1880, 223), and found it "occurring very commonly in Quetta, N. Beluchistan, from February to May, and in November and December" (P. Z. S. 1881, 611). Col. Swinhoe also took it at "Chaman in March; in Quetta, March to May, and in September; Ispingil in June; Karain in June; Kandahar in April, June, October, and November. Very common" (Tr. Ent. Soc. 1885, 136). Capt. H. B. Hellard obtained it at "Rawul Pindi, Allahabad, Simla, and Kasauli" (MS. Notes). The type specimen of *aurigena*, Butler, a female, was taken by Col. J. W. Yerbury at "Campbellpur at the end of May" (P. Z. S. 1886, 375). The male of the pale form (*Lordaca*) was also taken at Campbellpur on June 11th, and females at Chittar Pahar, 2,000 to 3,000 feet elevation,

in November. Col. Yerbury records it as common in May, June, and July, and again in October and November, a few being seen also in December. The spring brood is much the darkest. The caterpillar feeds on *Capparis* (? *C. horrida*)" (P. Z. S. 1886, 375). Mr. P. W. Mackinnon found it "rare in Masuri in May; taken on the Nag Tiba at 10,000 feet elevation in November. It is very common throughout the warmer months and the autumn in Dehra Dun" (J. Bombay N. H. Soc. 1898, 590). Mr. W. Doherty took it at "Ranebagh, 1,000 feet altitude, in Kumaon" (J. As. Soc. Beng. 1886, 135). Capt. A. M. Lang obtained it at "Wangtoo, N. W. Himalaya, on the road to the Chinese frontier village of Shipkee" (MS. Notes). Capt. Lang also records it from "Kasauli, 6,000 feet elevation, on the first plainwards range of the Himalayas" (P. Z. S. 1865, 489), and in his MS. Notes says "abundant in Oudh and at Umballa, in the Plains, the larva feeding on *Capparis sepiaria*." Capt. H. L. Chaumette took it at "Lucknow in January, and reared it from the egg, the larva feeding on *Capparis pycifolia*" (MS. Notes). Col. C. Swinhoe records "the pale form, as appearing plentifully in Kurrachi, from February to May" (P. Z. S. 1884, 511); also that it is "common at Mhow, in Central India, all the year round" (P. Z. S. 1886, 430), and "common everywhere in Bombay and the Dekkan" (P. Z. S. 1885, 136). Messrs. Davidson and Aitken say "this butterfly is not common in Kanara generally, but we have met with it at the northern end of the coast, on the borders of the Portuguese territory (in which it is plentiful), and also on one of those rocky islands not far from the shore. The larva feeds on the Caper (*Capparis divaricata*), and in the form of the larva and pupa shows a decided approximation to those of *Delias Eucharis*. The larva is cylindrical and sparingly clothed with long white hairs springing from small tubercles, its colour is yellow-ochre and purplish-brown. The pupa is green and yellow. The larvæ are gregarious throughout their existence, the eggs being laid in batches of from ten to forty" (J. Bombay N. H. Soc. 1896, 575). Mr. G. F. Hampson obtained it in the Nilgiris, at "1,000 to 8,000 feet elevation; *aurigena* being the wet-season form, and *Lordaca* the dry-season form from dry localities and high elevations" (J. As. Soc. Beng. 1888, 363). Mr. H. S. Ferguson records it as "not common in Travancore, from 2,000 to 4,000 feet elevation" (J. Bombay N. H. Soc. 1891, 444). Capt. E. Y. Watson obtained it in "Madras, from March to August. Very common" (J. As. Soc. Bengal, 1890, 268), "and obtained numerous specimens at Nittur, in Mysore" (J. Bombay N. H. Soc. 1890, 8). Mr. W. S. Taylor found it "common at Khorda, in Orissa, Lower Bengal" (List 15). Mr. L. de Nicéville records it "common in the neighbourhood of Calcutta, the larva feeding on *Capparis horrida*" (J. As. Soc. Beng. 1885, 51). Mr. H. J. Elwes writes, it is "not common in the inner hills of Sikkim, but I have taken it in tea gardens about 3,000 feet, in July, and it occurs from April to October" (Tr. Ent. Soc. 1888, 417). Mr. G. C. Dudgeon obtained it in Bhotan.

In the British Museum Collection are specimens from Durbunga and Maunbhoom, Bengal, and in Mr. J. H. Leech's Collection from Sultanpur, Kulu, taken by Capt. G. Young, from Narkunda, and Kujiar, 6,000 feet, N.W. Himalaya, taken in April by Capt. McArthur.

Of our illustrations on Plate 527, fig. 1, *larva* and *pupa*, are from Mr. A. Grote's original drawing made in Calcutta; fig. 1, a, b, c, ♂, 1d, ♀, of *dry-season* form, and fig. 1e, ♂, f, g, h, ♀, of *wet-season* form.

ANAPHÆIS TAPROBANA (Plate 527, fig. 2, 2a, ♂, 2b, c, ♀).

Pieris Taprobana, Moore, Proc. Zool. Soc. Lond. 1872, p. 565.

Belenois Taprobana, Moore, Lep. of Ceylon, i. p. 137, pl. 53, fig. 3, 3a, b, ♂ ♀ (1881).

Belenois Mesentina, de Nicéville, Journ. As. Soc. Bengal, 1899, p. 216.

Belenois Mesentina subsp. *fervidior*, Fruhstorfer, Berl. Ent. Zeit. 1897, p. 326.

IMAGO.—Male. Upperside greyish-white. *Forewing* with a broader black outer marginal band than in Continental Indian examples of *A. Mesentina*; this band extends to the posterior angle, the three, or four, subapical enclosed white spots are very small and slender. *Hindwing* with a broad black marginal band traversed by very small slender white spots; the black costal spot and lunule beneath being prominent. Underside. *Forewing* with the base ochreous tinted, the broad marginal band, as above, the subapical spots small and ochreous tinted. *Hindwing* with the vein-borders and outer band dark vinous-brown, their interspaces and the small marginal spots being bright ochreous.

Female. Upperside of both wings basally suffused with pale ochreous, the marginal black bands somewhat broader, and without any traversing white spots. Underside similar to the male.

Expanse, 2 to 2 $\frac{1}{4}$ inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Mr. F. M. Mackwood records it as inhabiting the low country, appearing, apparently, in certain years only, as, for two or three years together, scarcely one is to be seen, and then in the next year they appear in great numbers. Capt. Hutchison obtained it in gardens and open cultivated ground about Colombo, from October to end of the year. Its flight is slow, settling on the ground. It is very uncertain in its appearance; only observed during two out of five years' collection. Capt. Wade found it in Colombo, Hambantotte, and Galle (Lep. Ceylon, i. 137). Dr. N. Manders states that "it is uncertain in its appearance, but is abundant in the low country when it does occur, and then joins in the migratory flights, in June and July, and again in November and December" (Journ. As. Soc. Bengal, 1899, 216).

MALAY SPECIES.—*Anaphæis Java* (Pap. Java, Sparrm. Amœn. Acad. vii. p. 504 (1767). Linn. S. N. iii. App. Anim. p. 225 (1768). Belenois Java, Fruhst. Berl. Ent. Zeit. 1903; p. 108. *Syn.* Pap. Coronea, Cramer, Pap. Exot. i. pl. 68, fig. B, C (1779); *id.* iv. pl. 361, fig. G, H (1782). *Habitat.* Java.

Genus DELIAS.

Delias, Hübner, Verz. bek. Schmett. p. 91 (1816). Butler, Cistula Entom. i. p. 40 (1870). Moore, Lep. Ceylon, i. p. 139 (1881). Distant, Rhop. Malay, p. 289 (1885). Schatz, Exot. Schmett. ii. p. 63 (1886). Mitis, Iris, vi. p. 97 (1893). Kirby, Allen's Nat. Libr. Butt. ii. p. 165 (1896). Grote, Proc. Amer. Phil. Soc. 1900, p. 33.

Pieris (sect. i. pt.), Doubleday and Hewitson, Gen. D. Lep. i. p. 44 (1847).

Thyca (sect. i. pt.), Wallengren, K. Vet. Akad. Förh. xv. p. 76 (1858).

Thyca (pt.), Wallace, Trans. Ent. Soc. Lond. 1867, p. 344.

IMAGO.—Wings large. *Forewing* elongated, triangular, narrow; apex rounded, exterior margin very oblique; costal vein extending to more than two-thirds the margin; subcostal vein three-branched, the first branch emitted at one-fifth before end of the cell, second bifid, the third being thrown off from the second at fully one-fourth from the apex, and the upper radial at about one-fifth beyond end of the cell; cell extending to more than half-length of the wing, very broad; discocellulars both slightly concave and oblique, lower radial from their angle; middle median at one-third and lower beyond half before end of cell; submedian recurved. *Hindwing* oval, somewhat lengthened; precostal vein straight, curved outward at tip; costal vein much arched; first subcostal branch emitted at one-third before end of the cell; discocellulars very oblique, slightly concave, radial from their angle; cell very long, lower part extending two-thirds the wing; middle median at one-fifth and lower at nearly half before end of the cell; submedian straight, internal vein curved. *Body* moderately stout, abdomen compactly scaled, slightly hairy dorsally; thorax and head hairy; palpi extending beyond the front, very laxly hairy beneath, third joint long, slender; legs long, slender; antennæ with a stout grooved-club.

TYPE.—*D. Egialea*.

MIMICS.—The species of the Elymniine genus *Mimadelias* (Lep. Ind. ii. pp. 165-8, pl. 142-3) are excellent mimics of certain species of *Delias* and also of *Piccarda*.

DELIAS SANACA (Plate 528, fig. 1, 1a, b, ♂, 1c, d, e, ♀).

Pieris Sanaca, Moore, Proc. Zool. Soc. Lond. 1857, p. 103, pl. 44, fig. 4 (err. 6), ♀; *id.* Catal. Lep. Mus. E. I. Company, i. p. 79 (1857). Lang, Ent. Mo. Mag. 1864, p. 102. Moore, Proc. Zool. Soc. 1865, p. 491.

- Delias Sanaca*, Moore, Proc. Zool. Soc. 1882, p. 256. de Nicéville, Trans. Ent. Soc. 1889, p. 343.
 Elwes, Ann. Nat. Hist. 1886, p. 159. Mitis, Iris, vi. p. 133 (1893).
Delias flavalba, Marshall, Proc. Zool. Soc. 1882, p. 759.
Delias Belladonna (pt.), Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898,
 p. 585.

IMAGO.—Male. Upperside greyish-white. *Forewing* with the costa, discocellulars, median branches, and outer margin slightly bordered with blackish scales, or all the veins and veinlets from their base; the discocellulars and the outer margin more broadly black bordered (varying to still greater width in certain specimens, and in which the ground-colour should be termed greyish-black and the markings white), thus leaving a whitish broad cell area, a discal transverse series of narrow elongated streaks and an outer marginal row of small lanceolate marks, the two latter series being more or less perceptibly coalescent. *Hindwing* with the subcostals and median slenderly black lined, and their outer marginal ends more broadly dilated with black scales; and a slightly-defined similar scaled subapical streak, or, the subcostals, the median and its branches basally, are broadly black scaled, thus broadly enclosing the white central area of the cell; beyond is a more or less slightly-defined submarginal blackish-scaled diffused narrow lunular line extending from near the apex to lower median, and a slender marginal line, thus enclosing a more or less apparent row of extreme-marginal whitish broad conical spots; these spots are quite differently placed, on both the upper and underside, to those in *D. Horsfieldii* and *Belladonna*,—in these two latter species their position is submarginal, the entire series being disposed inwardly and at some distance away from the extreme outer margin; base of costa chrome-yellow, and anal area broadly diffused with paler yellow. Underside greyish-white. Both wings with similarly disposed blackish markings, those on the hindwing being vinaceous-black. *Hindwing* with the cell area, costal, discal, and marginal white interspaces, each centrally clouded with yellow. *Body* above blackish scaled; abdomen beneath greyish-white; thorax beneath, palpi, antennæ, and legs black; femora and tibiæ slenderly white streaked.

Female. Upperside. Both wings with broader and more prominently black markings than in the darkest male, the white interspaces being thus more restricted and sharply defined, the yellow of the anal area on the hindwing is also paler and more diffused. Underside similar to the male, the dark portions of the hindwing more vinaceous-black.

Expanse, ♂ ♀ $3\frac{1}{4}$ to $3\frac{3}{4}$ inches.

HABITAT.—W. Himalayas.

DISTRIBUTION.—Capt. A. M. Lang records this butterfly as "very rare. Obtained only in one richly-wooded glen near Dharin, far in the interior of the

Western Himalayas. There it flew very strongly and fast, now under the Horse-Chestnut trees, now in the sunlight over the rocky bed of the stream. I caught one or two in June, resting or fluttering over the margins of the stream" (MS. Notes, 1864). "There seems to be two forms of *Sanaca*, one dark, answering to your description, from Masuri, the other almost white, from Kunawur" (*id.* Epist. Nov. 13th, 1869). In a subsequent letter, to the late Mr. W. S. Atkinson, dated Nov. 18th, 1874, Col. Lang writes: "*Sanaca* is an early summer insect, and I think local. At my house in Masuri, in May, 1868, I could always see half a dozen in the air, always at a great height, looking like Swifts or Swallows, until your eye was focused and recognized their size and distance; rarely coming within reach of the longest net, and never settling unless on tree-tops. This species varies in depth and breadth of black markings, and, like all the *Thycas*, it is scented like Jargonelle pears." Mr. L. de Nicéville (Trans. Ent. Soc. Lond. 1889, p. 343) says "through the kindness of Mr. P. W. Mackinnon I have received fourteen males and five females of *D. flavalba* and *Sanaca* from Masuri, and have also before me six males of these two species, also from Masuri, and five males and one female *flavalba* (which constitute the type specimens of that species) from Kunawur, contained in Col. Lang's Collection, captured by himself many years ago. As regards these latter specimens, Col. Lang in discriminating them and Major Marshall in describing them as distinct species, were quite justified, though both the Masuri and Kunawur groups of specimens are very variable in the amount of black markings they exhibit, on both surfaces, there is no connecting link between them. My fresh specimens from Masuri supply this link. When arranged in a graduated series from the lightest marked specimen to the darkest, at no point can you draw the line dividing them into two species. Mr. Mackinnon writes me: 'I am sure the dark and light coloured ones belong to the same species, as I got dozens of all shades in *one* place, and in *one* forenoon. They were all chasing each other, at times six or seven together. Mine were all caught in open places in forests of Mouroo Oak (*Quercus dilatata*) at Nag Tiba, near Masuri, 5,000 feet altitude, in the latter half of May and beginning of June, and at Tehri Gurhwal, near Masuri, 8,500 feet, in June. I have seen them often in Masuri, but captured them very seldom.' I should remark of the female from Masuri that none of them are as light coloured as the palest male *flavala*; in fact, they vary too, but not so much as the male, the lightest specimens equal *flavalba*, the darkest equal *Sanaca*." We possess specimens of both sexes of *Sanaca* from Masuri, taken by the late Capt. T. Hutton. A female from Masuri is in the British Museum Collection, and a male of the pale form (*flavalba*) in the Hewitson Cabinet.

Of our illustrations on Plate 528, figs. 1, 1a, b, are from the Masuri males, and 1c, d, e, from W. Himalayan females.

DELIAS HORSFIELDII (Plate 529, fig. 1, 1a ♂ ♀, 1b ♂, 1c ♀, 2 ♂, 2a, ♀.)

- Pieris Horsfieldii*, Gray, Zool. Misc. p. 32 (1831). Boisduval, Spéc. Gén. Léop. i. p. 448 (1836).
Kollar, Hügel's Reise Kaschmur, iv. 2, p. 408 (1844).
- Pieris Belladonna*, Gray, Lep. Ins. of Nepal, p. 7, pl. 8, fig. 2 ♂ (1846) Moore, Catal. Lep. Mus. E. I. Company, i. p. 78 (1857); *id.* Proc. Zool. Soc. 1865, p. 758.
- Thyca Belladonna*, Wallace, Trans. Ent. Soc. Lond. 1867, p. 348.
- Delias Belladonna*, Elwes, Proc. Zool. Soc. 1882, p. 401. Doherty, Journ. As. Soc. Bengal, 1886, p. 348. de Nicéville, Trans. Ent. Soc. 1889, p. 343; *id.* Sikkim Gazetteer, 1894, p. 165. Mackinnon and de Nicéville, Journ. Bombay N. Hist. Soc. 1898, p. 585, pl. V. fig. 19, *pupa*.
- Delias Belladonna*, var. *Horsfieldii*, Elwes, Trans. Ent. Soc. 1888, p. 408, pl. 10, fig. 3, ♀. Manders, Trans. Ent. Soc. 1890, p. 533.
- Delias Hearseyi* et Boyleæ, Butler, Ann. Nat. Hist. 1885, p. 58, ♂; *id. l.c.* 1897, p. 161.
- Delias Belladonna*, vars. *Surya* et *Amarantha*, Mitis, Iris, vi. pp. 132, 133, pl. 2, fig. 3 ♂ (1893).

IMAGO.—Male. Upperside black. *Forewing* with more or less indistinctly defined greyish-white scaled longitudinal streaks within the cell, these streaks in some specimens ending before its apex in a more or less apparent or well-defined whiter oblique bar; beyond is a discal transverse series of more or less defined whitish-grey scaled spots, the lowest being generally elongated and divided by a black line, followed by a submarginal series of similar-scaled lanceolate spots. *Hindwing* with a more or less apparent whitish-grey scaled small divided spot, or a distinct short narrow streak before the apex of the cell, a discal series of white irregularly-quadrate shaped spots, and then a submarginal row of broad lunularly-lanceolate spots; base of abdominal margin broadly greyish-white, the anal area being broadly bright yellow; the costal interspace also bright yellow. Underside. *Forewing* duller black, the white markings more prominent, the apical spots being yellow. *Hindwing* vinaceous-black, the broad cell-streak, basal costal spots, and submarginal spots bright yellow, the discal spots white, the three median being partly yellow and the anal border broadly yellow.

Female. Upperside duller black. *Forewing* with markings similar to the male, except that they are less distinct, and the cell apical-bar only apparent. *Hindwing* also similar to the male, with an elongated cell-streak and full-sized discal spots, basal costal interspace paler, and the anal area much less suffused with pale yellow, or the cell-streak is short and apically restricted or more or less obsolete, the discal and submarginal spots smaller, and the anal area almost or quite white. Underside similar to the male. Occasionally a male occurs (see fig. 2), in which the basal costal interspace and the anal area of the upperside, and all the underside markings are red, and a female (fig. 2a) with dark ochreous-yellow basal costal interspace and whitish anal area of the hindwing on the upperside, and similar dark ochreous-yellow markings on the underside.

Expanse, ♂ $3\frac{1}{4}$ to $3\frac{3}{4}$, ♀ $3\frac{1}{2}$ to $3\frac{3}{4}$ inches.

HABITAT.—W. Himalayas; Nepal; Sikkim; Bhotan; Burma; Shan States.

DISTRIBUTION.—Baron von Hügel's specimens are recorded as having been taken in the "neighbourhood of Masuri" (Kollar, *l.c.* p. 408). Capt. A. M. Lang, in his MS. Notes, dated 1868, writes that he took "*Belladonna* at Masuri, at 7,000 feet elevation, in April, May, and June." Mr. W. Doherty obtained it at "Sargii, Kali, and Gori Valleys, 2,000 to 5,000 feet elevation, in Kumaon" (Journ. As. Soc. Bengal, 1886, 135). Mr. P. W. Mackinnon writes: "*Belladonna* is exceedingly common on the Nag Tiba range, north of Masuri, at about 8,000 feet elevation, from April to July. In Masuri it is usually a rare insect, but in May, 1888, May, 1894, and May, 1895, it was very plentiful. In a few minutes, specimens of all shades of colour, from very dark, almost black examples (typical *Belladonna*), through yellowish-white ones (typical *Sanaca*) to the palest form (*flavulba*) could be caught. It may be noted here that the two last-named forms are strictly confined to the Western Himalayas. Mrs. Robson found the larva feeding on the leaves of *Loranthus longiflorus*, and Mr. Mackinnon found it on *L. vestitus*, N. O. Loranthaceæ. Males are more often caught than females, and may usually be easily distinguished from the females by the bright yellow inner margin of the hindwing on the upperside, which coloration is absent in the opposite sex" (Journ. Bombay N. H. Soc. 1898, 585). Col. Swinhoe (Tr. Ent. Soc. 1893) does not record it from the Khasia Hills. There are specimens in the British Museum of both sexes from Kulu, Kali Valley, Nepal, Sikkim, and from Moolayet, Burma, taken by Col. C. T. Bingham. In Mr. J. H. Leech's Collection are specimens from Sultanpur, Kulu, taken by Capt. G. Young. We possess both sexes from the W. Himalayas, Nepal, Sikkim, Bhotan, Moulmein, and the Karen Hills, Burma. Mr. W. Rothschild possesses it from Haundraw, Burma, and the N. Shan States.

Of our illustrations on Plate 529, figs. 1, 1a are from a W. Himalayan male and female; 1b, c, from Nepal male and female; fig. 2, a male, and 2a a female from the Eastern Himalayas.

DELIAS ITHIELA (Plate 530, fig. 1, 1a ♂, 1b, c ♀).

Thyca Ithiela, Butler, Ann. and Mag. Nat. Hist. 1869, p. 242, ♂; *id.* Lep. Exotica, p. 62, pl. 24, fig. 1, ♂ (1871); *id.* Ann. Nat. Hist. 1885, p. 339.

Delias Ithiela, Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 310. Mitis, Iris, vi. p. 129 (1893). Adamson, List Burm. Butt. p. 41 (1897). Watson, Journ. Bombay Nat. Hist. Soc. 1897, p. 669.

Delias Belladonna, var. *Ithiela*, Elwes, Trans. Ent. Soc. Lond. 1888, p. 409, pl. x. fig. 2, ♀. Butler, Ann. Nat. Hist. 1897, p. 162. Adamson, List Burm. Butt. 1897, p. 41.

Thyca Berinda, Moore, Proc. Zool. Soc. Lond. 1872, p. 566, ♀. Waterhouse, Aid, i. pl. 12, ♀ (1880).

IMAGO.—Male. Upperside deep black. *Forewing* with the markings less defined than in typical *Horsfieldii*. *Hindwing* with the discal and outer spots smaller, the cell streaks indistinct or quite obsolete, the abdominal margin very dark grey scaled, or almost black, and in some anally sprinkled with yellow scales. Underside blacker than in *Belladonna*. *Forewing* with the markings smaller and less defined. *Hindwing* with the cell mark small and short, the discal and submarginal markings smaller, the abdominal margin either uniformly black, or more or less slightly anally-speckled with yellow scales.

Female. Upperside duller black. *Forewing* with much less defined markings than in male. *Hindwing* also with the markings much less defined, the cell streak either elongate or obsolete, the abdominal margin slightly dark grey-scaled. Underside vinaceous-black, with similar markings to the male.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Sikkim; Khasia, Jaintia, and Naga Hills, Assam; Chin Hills, Upper Burma.

DISTRIBUTION AND HABITS.—Mr. H. J. Elwes writes: "I found the dark form, *Ithiela*, most common in Sikkim from May to August, at low elevations, 2,000 to 4,000 feet, where it frequents the banks of streams in hot, thoroughly tropical valleys, and flies slowly about the water-side, resting sometimes on mud and pebbles almost in the water. Some specimens of the variety with yellow on the abdominal margin occur here with the pure black one, and some have white or only a yellow tinge in the same part of the hindwing. But neither Möller nor I have ever taken females with the males in these places, and all the five females I possess of this form were procured from native collectors, and vary in the same particulars as the males. I never saw a typical *Horsfieldii* at these low elevations. In the Khasia Hills I was fortunate enough to find *Belladonna* in its breeding-places, which are small patches of natural forest left on the higher parts of the hills at from 4,000 to 6,400 feet elevation. Here it is in some places abundant, and I found the females almost as plentiful as the males. In the wood which crowns the summit of the Shillong Peak, I had several opportunities of observing the habits of the insect, which are quite different from what I saw in Sikkim. They fly on sunny days about the tops of the trees, and make little excursions into the open country round, always returning to the shelter of the wood, and frequently descending to settle on the flowers of a species of *Euonymus*, and of a large species of *Scabiosa* which grew on its outskirts. The flight is slow, graceful, and soaring, and the butterflies are not at all shy. Here I found hardly any variation in the insects, all being true *Ithiela*, excepting two specimens, which were slightly tinted with yellow on the abdominal margin. I figure a female of the Khasia form=*Berinda*, Moore" (Tr. Ent. Soc. 1888, 408). We possess males from Sikkim, and the female type of *Berinda*, from

the Khasias. Col. C. Swinhoe records it as being "common in the Khasia Hills" (Tr. Ent. Soc. 1893, 310). Mr. Ernest Swinhoe has also received both sexes from his native collectors in the Jaintia Hills. In the British Museum is a female from Runghi, Sikkim, taken in April by Mr. G. C. Dudgeon, a male from the Naga Hills, taken in June by Mr. W. Doherty, and both sexes from Lushai Hills in Mr. P. Crowley's Collection. Col. C. H. E. Adamson possesses "a single female specimen of this butterfly taken at Tiddim, N. Chin Hills, Upper Burma, in October, 1893" (List Burm. Butt. 1897, 41). A female, also from the Chin Hills, is in the British Museum Collection. Capt. E. Y. Watson records "a single quite typical male, taken in the N. Chin Hills at 3,500 feet elevation, in the rainy season" (Journ. Bombay N. H. Soc. 1897, 669). A male from Upper Burma, taken by Mr. T. A. Hauxwell, is in Mr. H. Grossmith's Collection.

Of our illustrations on Plate 530, figs. 1, 1a, are from a Sikkim male, and 1b, c, from the type female named *Berinda*, from the Khasias.

DELIAS AGLAIA (Plate 531, fig. 1 larva and pupa, 1a, b, ♂, 1c, d, ♀).

Papilio Aglaia, Linnæus, Syst. Nat. x. ed. i. p. 465 (1758).

Pieris Aglaia, Kirby, Trans. Ent. Soc. Lond. 1870, p. 138.

Delias Aglaia, Kirby, Syn. Catal. D. Lep. Suppl. p. 795 (1877). de Nicéville, Sikkim Gaz. 1894, p. 165. Butler, Ann. Nat. Hist. 1897, p. 162. Adamson, List Burm. Butt. p. 40 (1897). Watson, Journ. Bombay Nat. Hist. Soc. 1897, p. 669. de Nicéville, Journ. As. Soc. Bengal, 1902, p. 25. Fruhstorfer, Deuts. Ent. Zeit. Iris, 1902, p. 270.

Papilio Pasithoe, Linnæus, Syst. Nat. xii. ed. i. 2, p. 755 (1767). Fabricius, Ent. Syst. iii. 1, p. 179 (1793). Donovan, Ins. China, pl. 30, fig. 2, ♂ (1798).

Pieris Pasithoe, Godart, Encyc. Méth. ix. p. 148 (1819). Boisduval, Spéc. Gén. Léop. i. p. 451 (1836).

Delias Pasithoe, Hübner, Verz. bek. Schmett. p. 91 (1816). Moore, Proc. Zool. Soc. 1878, p. 839. Elwes, Trans. Ent. Soc. 1888, p. 407. Watson, Journ. Bombay Nat. Hist. Soc. 1888, p. 25; *id. l.c.* 1891, p. 51. Manders, Trans. Ent. Soc. 1890, p. 532. Swinhoe, Trans. Ent. Soc. 1893, p. 311. Pryer and Cator, Brit. N. Borneo Herald, 1894, p. 285. Walker, Trans. Ent. Soc. 1895, p. 463.

Thyca Pasithoe, Wallace, Trans. Ent. Soc. 1867, p. 345. Butler, Catal. Fabr. Lep. B. M. p. 208 (1869). Moore, Proc. Zool. Soc. 1878, p. 701.

Papilio Dione, Drury, Illust. Exot. Ent. ii. pl. 8, fig. 3, 4, ♂ (1773).

Papilio Porsenna, Cramer, Pap. Exot. i. pl. 43, fig. D, E, ♂ (1776); *id. l.c.* iv. pl. 352, fig. A, B, ♀ (1782).

Delias Dione, Butler, Trans. Linn. Soc. 1877, p. 550. Moore, Journ. Linn. Soc. Zool. 1886, p. 50. Distant, Rhop. Malay. p. 290, pl. 24, fig. 5, 6, ♂ ♀ (1885). Bartlett, Zool. Note Book, Sarawak, p. 157 (1896).

IMAGO.—Male. Upperside black. *Forewing* with a bluish-grey more or less defined medial cell streaked-patch, and then a prominent greyish-white small spot at the lower apex of the cell and crossed by the lower discocellular veinlet, beneath

which are two lower-discal bluish-grey elongated streaks, the lowest being much the longest, followed by an outer-discal series of prominent greyish-white sagittate marks, of which the upper three or four are elongated and narrow. *Hindwing* with the red tint of the subbasal band of the underside slightly apparent; a bluish-grey transverse broad band extending from middle of the costa and widening across middle of the cell to base of the lower median interspace, beyond which is a prominent greyish-white small oblique spot on the lower discocellular veinlet, followed by an outer discal curved series of five more or less prominent similar-coloured narrow sagittate marks, the submedian and abdominal interspace to near both their ends being pale yellow. Underside duller black. *Forewing* with prominently greyish-white medial-cell bar, lower-discocellular spot and a contiguous upper-discocellular broken spot, the lower-discal outwardly oblique streaks, and the outer discal transverse series of marks. *Hindwing* with a crimson band curving from base of the costa across the cell beyond its base to the abdominal margin, followed by a prominent pale yellow apical cell patch—of which its upper inner end is sometimes broken, upper-discal spots and then a submarginal curved series of spots—of which the upper are oval, the lower elongated, the two lowest being united from the lower median to the abdominal margin.

Female. Upperside dull black. *Forewing* with the cell-bar and lower-discal streaks whitish, and as well-defined as the discocellular spot, and the outer discal series of streaks, the two lower discal being, generally, short and broad. *Hindwing* with the transverse medial-band with its conjoined discocellular spot, broad abdominal area and discal series of streaks, all uniformly whitish, the latter streaks being occasionally dusky scaled. Underside similar to the male.

Expanse, ♂ $2\frac{1}{2}$ to $3\frac{1}{4}$, ♀ 3 to $3\frac{1}{2}$ inches.

HABITAT.—Nepal; Sikkim; Assam; Khasia Hills; Burma; Tenasserim; Shan States. Malay Peninsula; Siam, Annam; Tonkin; Hong Kong; S. China; Hainan; Formosa; Borneo.

LARVA AND PUPA (Plate 531, fig. 1).—"Larva feeds on the parasitic plant of the Roghu tree (*Nauclea Cadamba*), congregating together, closely packed. Pupa formed February 1st, 1880; imago emerged Feb. 18th" (Mrs. E. M. Span, MS. Notes, Nowgong, Assam).

DISTRIBUTION.—We possess specimens of both sexes from Noakote, Nepal, taken by the late Gen. G. Ramsay; also from Sikkim, Cachar, and Silhet. Mr. H. J. Elwes records it as "not uncommon in Sikkim, up to about 3,000 feet elevation, from April to December" (Tr. Ent. Soc. 1888, 407). Mr. L. de Nicéville says that "it occurs in Sikkim, in the low hot valleys commonly throughout the year, except perhaps in the two coldest months" (Sikk. Gaz. 1894, 165). Col. C. Swinhoe has specimens from Cherra Punji in Assam, and from the Khasia Hills. In the British

Museum are specimens from Shillong, Cachar, and Silhet, Assam. Col. C. H. E. Adamson found it "common throughout Burma, especially in November" (List Burm. Butt. 1897, 40). Capt. E. Y. Watson records it "common at Beeling, Upper Tenasserim, from January to April" (J. Bombay, N. H. Soc. 1888, 25), and found it "fairly common at Tilin from December to May" (*id.* 1891, 51), it also being "common in the Upper Chindwin District in April and May, and was also obtained at 3,500 feet elevation in the rainy season" (*id.* 1897, 669). Dr. Leonardo Fea took it at Bhamo in November. Mr. O. Limborg obtained it at "Ahsown, 2,000 feet elevation, and at Taoo, 3,000 feet, Upper Tenasserim, in March" (P. Z. S. 1878, 839). Dr. N. Manders records it "common in the Shan States, nearly all the year round. I have found it up to 5,000 feet elevation" (Tr. Ent. Soc. 1890, 532). In Mr. W. Rothschild's Collection are both sexes from Muong Gnou, Shan States. Dr. J. Anderson took it in Mergui in December, January, and March; on Pataw Island in January, and on Elphinstone Island in March" (J. Linn. Soc. Zool. 1886, 50).

Mr. W. L. Distant records it from the Malay Peninsula, Penang, and Borneo (*l.c.* 290). We possess both sexes from S. China. It occurs also in "Siam, Annam, and Tonkin. Col. C. Swinhoe has both sexes from Tonkin. Mr. J. J. Walker, R.N., records it from Hong Kong" (Tr. Ent. Soc. 1895, 463). The late Consul R. Swinhoe obtained it in Hainan (P. Z. S. 1878, 701).

Of our illustrations on Plate 531, fig. 1, *larva* and *pupa*, is copied from Mrs. Span's original drawing; figs. 1, 1a, from a Nepal male, and 1c, d, from a Chittagong female.

DELIAS THYSBE (Plate 532, fig. 1, 1a, ♂, 1b, c, ♀).

Papilio Thysbe, Cramer, Pap. Exot. iii. p. 70, pl. 233, fig. C, ♀ (1782).

Pieris Thisbe, Boisduval, Spéc. Gén. Léop. i. p. 449 (1836). Doubleday and Hewitson, Gen. D. Lep. i. p. 44 (1846). Gray, Lep. Ins. of Nepal, p. 8, pl. 7, fig. 1, ♀ (1846).

Thyca Thisbe, Wallace, Trans. Ent. Soc. Lond. 1867, p. 347.

Delias Thysbe, Butler, Ann. Nat. Hist. 1897, p. 165.

Pieris Acalis, Godart, Encyc. Méth. ix. p. 148 (1819).

Thyca Pyramus, Wallace, Trans. Ent. Soc. Lond. 1867, p. 347.

Delius Pyramus, Distant, Rhop. Malay. p. 465, pl. 42, fig. 14 ♂ (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 407. de Nicéville, Sikkim Gaz. 1894, p. 165. Watson, Journ. Bombay Nat. Hist. Soc. 1891, p. 51; *id. l.c.* 1897, p. 668. Adamson, List Burm. Butt. p. 40 (1897). Butler, Ann. and Mag. Nat. Hist. 1897, p. 165. Fruhstorfer, Iris, 1902, p. 270.

IMAGO.—Male. Upperside black. *Forewing* with grey-scaled basal cell longitudinal streaks, and an oblique bar at its apex, with two contiguous outer discocellular small spots, two lower-discal streaks, the lowest of which is elongated, and then an outer-discal series of longitudinal lengthened streaks, which latter decrease in length to the posterior angle, and are more sharply defined and pointed

at their inner end. *Hindwing* with a subbasal broad crimson band extending from the costal vein to the submedian across basal half of the cell and traversed by black veins, and its outer edge slightly bordered with grey scales; beyond is an outer-discal series of longitudinal posteriorly-lengthening grey-scaled streaks extending from the costal apex to the lower median—of which the fourth streak enters the apex of the cell, followed by a longer ochreous-yellow submedian interspace, and then a greyish-white abdominal area. Underside. *Forewing* duller black, with the grey markings more defined. *Hindwing* deeper black, with a small ochreous-yellow basal spot; the crimson subbasal band extending to the abdominal margin; the outer streaks more defined, the upper paler grey, the lower paler yellow. Body above greyish-black; thorax clothed with grey hairs; abdomen beneath greyish-white; thorax beneath, palpi, and legs black, grey streaked; antennæ black, annulated beneath with grey.*

Female. Upperside. *Forewing* similar to the male; the cell-streaks medially restricted, the two lower discal streaks shorter. *Hindwing* similar to the male, except that the crimson band is not outwardly grey scaled, and the outer streaks from the lower subcostal to submedian are ochreous-yellow. Underside similar to the male.

Expanse, ♂ ♀ $3\frac{1}{2}$ to 4 inches.

HABITAT.—Nepal; Sikkim; Bhotan; Assam; Khasias; Burma; Tenasserim; Malay Peninsula; Tonkin.

DISTRIBUTION.—We possess specimens of both sexes from Nepal, taken by the late Gen. G. Ramsay; from Sikkim, taken in April and May; Dhunsari, Assam. Mr. L. de Nicéville records it as “common in Sikkim, at low elevations, from April to December” (Sikk. Gaz. 1894, 165). Mr. Ernest Swinhoe has received it from the Khasia Hills. Capt. E. Y. Watson obtained “a single specimen at Tilin, in December, during the Chin-Lushai Expedition of 1889-90” (J. Bombay N. H. Soc. 1891, 51); he also records “a specimen taken in the N. Chin Hills, at 3,500 feet elevation, in the rainy season” (*id. l.c.* 1897, 668). Col. C. H. E. Adamson obtained it at “Bhamo, in November, and in the Attaran Valley, Upper Tenasserim, in March” (List Burm. Butt. 1897, 40). Signor L. Fea took it at Mateleo, Karen Hills, in August and September, and at Bhamo in September. In the British Museum Collection are specimens from Sikkim, taken by Dr. Pilcher; Bhotan, taken by Mr. G. C. Dudgeon, and from E. Pegu, taken by Mr. W. Doherty.

* A variety of the male, from the Khasia Hills, in Mr. W. Rothschild's Collection, has the markings of both wings on the upperside more sharply defined, the hindwing having the broad subbasal band entirely white, instead of crimson, the anal interspaces from the lower median being also white, with the faintest possible tinge of very pale yellow. On the underside of the hindwing the subbasal band and anal area is also white.

Mr. W. L. Distant records it from "Perak, Malay Peninsula" (*l.c.* 465). It also occurs in Tonkin (Fruhstorfer, *l.c.*). Cramer gives China as the habitat of his specimen.

Of our illustrations on Plate 532, figs 1, 1a, are from a male from Assam, and figs. 1b, c, a female from Nepal.

DELIAS KANDHA.

Delias Kandha, Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 262.

IMAGO.—"Male and female. A local form of *D. Thisbe*, Cram. Allied to *D. Pyramus*, Wallace, from Sikkim. In *Kandha* the ochreous anal area of the hindwing is replaced by pale cream; the light discal areas on the hindwing below, which, in *Pyramus*, are ochreous anally and whitish apically, are, in *Kandha*, of an almost uniform bright yellow hue, inclining to lemon; the ochre spot at the base of the costa of the hindwing below is much larger and more distinct; the apical grey streaks of the forewing above are obscurely tinged with ochreous. All the pale marks are larger, and the black areas smaller and better defined. The female hardly differs from the male. Expanse, 98 millimetres."

HABITAT. Madras.

Described by Mr. W. Doherty from "four males and three females, taken on the Pottingi Pass in the Vizagapatam District, Madras Presidency, and the adjoining Jaipur State, at from 3,000 to 5,000 feet elevation, on the Eastern Ghâts" (*l.c.* p. 262).

CHINA AND INDO-MALAY SPECIES.—*Delias Belladonna* (Pap. *Belladonna*, Fabricius, Ent. Syst. iii. p. 180 (1793). Donovan, Nat. Rep. i. pl. 35, ♀ (1823). Jones' Icones, pl. 37, fig. 2. *Pieris Belladonna*, Boisduval, Spéc. Gén. Lép. i. p. 447 (1836). *Thyca Belladonna*, Butler, Catal. Fabr. Lep. B. M. p. 209 (1869). *Delias Belladonna*, Elwes, Ann. Nat. Hist. 1886, p. 158. Leech, Butt. of China, ii. p. 418, pl. 37, fig. 3, 4, ♂ ♀ (1893). *Syn.* *Delias Zelima*, Mitis, Iris, vi. p. 131 (1893). *Habitat.* W. China.

Delias Patrua, Leech, Entom. 1890, p. 46; *id.* Butt. China, ii. p. 442, pl. 37, fig. 1, 2, ♂ ♀ (1893). *Delias Bell. var. Patrua*, Butler, Ann. Nat. Hist. 1897, p. 162. *Habitat.* C. China.

Delias Lativitta (*Delias Patrua var. lativitta*. Leech, Butt. of China, ii. p. 422, pl. 35, fig. 1, ♂ (1893). *Habitat.* Moupin, W. China.

Delias Adelma, Mitis, Iris, vi. p. 130 (1893). Leech, *l.c.* p. 421, pl. 37, fig. 5, 6, ♂ ♀. *Habitat.* C. China.

Delias subnubila (*Del. Sanaca var. subnubila*. Leech, *l.c.* p. 421, pl. 37, fig. 7, 8, ♂ ♀ (1893). *Habitat.* W. China.

Delias Chrysorrhæa (*Pieris Chrysorrhæa*, Vollenhoven, Monogr. Pierides, p. 6,

pl. 2, fig. 4, ♂ (1865). Del. Belladonna, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 487. *Habitat.* Sumatra.

Delias Ninus (Thyca Ninus, Wallace, Trans. Ent. Soc. Lond. 1867, p. 347, pl. 6, fig. 5, 5a, ♂. *Delias Parthenope*, Distant, Rhop. Malay, p. 291, pl. 24, fig. 4, ♂ (1885). *Delias Ninus*, Butler, Ann. Nat. Hist. 1897, p. 165. de Nicéville, J. As. Soc. Bengal, 1895, p. 486. *Habitat.* Malacca; Sumatra.

Delias Parthenope (Thyca Parthenope, Wallace, Trans. Ent. Soc. 1867, p. 347, pl. 7, fig. 1, ♂). Butler, Ann. Nat. Hist. 1897, p. 163. de Nicéville, J. As. Soc. Bengal, 1895, p. 486. D. Ninus, Distant, *l.c.* p. 291, fig. 98, ♂ (1885). *Habitat.* Singapore; Sumatra.

Delias Tobahana, Rogenhofer, Verh. Z. B. Ges. Wien. 1893, p. 571. Mitis, Iris, vi. p. 102, pl. 2, fig. 1, ♀ (1893). de Nicéville, Journ. As. Soc. Bengal, 1895, p. 487. *Syn.* D. Derceto, de Nicéville, J. Bombay Nat. Hist. Soc. 1893, p. 52, pl. L, fig. 4 ♂. *Habitat.* Sumatra.

Delias Pandecta, Staudinger, Iris, 1889, p. 23. Butler, Ann. Nat. Hist. 1897, p. 163. *Habitat.* Palawan.

Delias Pandemia (Thyca Pandemia, Wallace, Tr. Ent. Soc. 1867, p. 346, pl. 6, fig. 4, 4a, ♂. Butler, Ann. Nat. Hist. 1897, p. 163. *Habitat.* Borneo.

Delias Henningia (Pontia Henningia, Esch. Kotzeb. Reise, iii. p. 214, pl. 9, fig. 20, a, b, ♀ (1821). Butler, *l.c.* p. 163. Thyca Hen. Wallace, *l.c.* p. 345, ♂ ♀. *Vars.* Thyca Lucerna et ochreopicta, Butler, Ann. Nat. Hist. 1869, pp. 243-4; *id.* Lep. Exot. pp. 62-3, pl. 24, figs. 2-5 (1871). *Habitat.* Philippines.

Delias Ottonia, Semper, Reis Phil. ii. v. p. 235, pl. 34, fig. 7-9 (1890). Butler, *l.c.* 1897, p. 164. *Habitat.* Philippines.

Delias Egialea (Pap. Egialea, Cramer, Pap. Exot. ii. pl. 189, fig. D, E, ♂ (1779). Butler, Cist. Ent. i. p. 40, pl. 1, fig. 2, *id.* *l.c.* 1897, p. 164. Thyca Egialea, Wallace, *l.c.* p. 346. *Habitat.* Java.

Delias Crithoe (Pieris Crithoe, Boisd. Spéc. Gén. Lép. i. p. 450 (1836). Vollenhoven, Mon. Pier. p. 7 (1865). Thyca Crithoe, Wallace, *l.c.* p. 346. Butler, *l.c.* 1897, p. 164. *Habitat.* Java.

Delias Bromo, Fruhstorfer, Ent. Nachr. 1893, p. 335. Butler, *l.c.* 1897, p. 165. *Syn.* *Delias Dymas*, de Nicéville, J. As. Soc. Bengal, 1894, p. 44, pl. 5, fig. 7. *Habitat.* Java.

Delias Parthenia, Staudinger, Iris, v. p. 449 (1892). Butler, *l.c.* 1897, p. 165. *Habitat.* N. Borneo.

Delias Blanca (Pieris Blanca, Felder, Wien. Ent. Mon. 1862, p. 284; *id.* Reise Nov. Lep. ii. p. 160, pl. 24, fig. 6, 7 (1865). *Habitat.* Luzon.

Delias Orphne (Thyca Orphne, Wallace, Tr. Ent. Soc. 1867, p. 361, pl. 8, fig. 2). Distant, Rhop. Malay. p. 293, fig. 101 (1885). Butler, *l.c.* 1897, p. 166. *Habitat.* Malay Peninsula.

Delias Georgina (*Pieris Georgina*, Felder, W. E. M. 1861, p. 298; *id.* Reise Nov. Lep. ii. p. 160, pl. 24, fig. 4, 5 (1865). Butler, *l.c.* 1897, p. 166. Thyca *Georgina* Wallace, *l.c.* p. 361. *Habitat.* Luzon.

Delias Cinerascens, Mitis, Iris, vi. p. 126, pl. 2, fig. 2, ♀ (1893). Butler, *l.c.* p. 166. *Habitat.* N. Borneo.

Delias Simanabum, Hagen, Iris, vii. p. 34, pl. 1, fig. 3, ♀ (1894). Butler, *l.c.* p. 166. *Habitat.* Sumatra.

Delias Momea (*Pieris Momea*, Boisd. Spéc. Gén. Lép. i. p. 477 (1836). Butler, *l.c.* p. 166. Thyca *Momea* Wallace, *l.c.* p. 360. *Habitat.* Java.

Delias Hageni, Rogenhofer, Verh. Z. B. Ges. Wien. 1892, p. 572. Mitis, Iris, 1893, p. 113, pl. 3, fig. 5, ♂. de Nicéville, Journ. As. Soc. Bengal, 1895, p. 489. *Syn.* *Delias Datames*, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1893, p. 53, pl. L, fig. 8, ♂. *Habitat.* Sumatra.

Genus PICCARDA.

Piccarda, Grote, Proc. Amer. Phil. Soc. xxxix. p. 32 (1900).

Pontia, Hübner, Verz. bek. Schmett. p. 92 (1816).

Pieris (pt.), Doubleday and Hewitson, Gen. D. Lep. i. 42 (1847).

Thyca (sect. i., pt). Wallengren, K. Vet. Akad. Förh, xv. p. 76 (1858). Wallace, Tr. Ent. Soc. Lond. 1867, p. 344.

Delias (pt.), Auctorum.

IMAGO.—Wings comparatively broader than in typical *Delias*. Venation similar. Forewing less triangular; cell longer. Hindwing cell longer. Antennæ with a lengthened slender club; abdomen very densely and compactly scaled.

TYPE.—*P. Eucharis*.

PICCARDA EUCHARIS (Plate 534, fig. 1, larva and pupa, 1a, b, ♂, 1c, d, ♀).

Papilio Eucharis, Drury, Illust. Exot. Ent. ii. pl. 10, fig. 5, 6, ♂ (1773). Cramer, Pap. Exot. iii. pl. 201, fig. B, C, ♂; pl. 202, fig. G, ♀ (1779).

Pontia Eucharis, Hübner, Verz. bek. Schmett. p. 92 (1816).

Pieris Eucharis, Doubleday and Hewitson, Gen. D. Lep. i. p. 44 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 80, pl. 1, fig. 1, 1a, larva and pupa (1857). Lang, Ent. Mo. Mag. 1864, p. 102.

Thyca Eucharis, Wallace, Trans. Ent. Soc. Lond. 1867, p. 351. Rothney, Ent. Mo. Mag. 1882, p. 35.

Delias Eucharis, Moore, Lep. of Ceylon, i. p. 140, pl. 54; fig. 1, 1a, ♂ ♀, 1b, larva and pupa (1881); *id.* Proc. Zool. Soc. 1882, p. 256. Swinhoe, P. Z. S. 1885, p. 139; *id.* *l.c.* 1886, p. 431. de Nicéville, Journ. As. Soc. Bengal, 1885, p. 51; *id.* *l.c.* 1899, p. 210. Elwes, Trans. Ent. Soc. 1888, p. 407. Hampson, J. As. Soc. Beng. 1888, p. 363. Taylor, List of Orissa Butt. p. 88 (1888). Watson, Journ. As. Soc. Beng. 1890, p. 268; *id.* Journ. Bombay N. H. Soc. 1890, p. 8.

Davidson and Aitken, J. Bombay N. H. S. 1890, p. 358; *id.* 1896, p. 569. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 445. de Nicéville, Sikkim Gaz. 1894, p. 166. Kirby, Allen's Nat. Libr. Butt. ii. p. 167, pl. 56, fig. 1, 2 (1896). Butler, Ann. Nat. Hist. 1897, p. 144. Mackinnon, Journ. Bombay, Nat. Hist. Soc. 1898, p. 586.

Piccarda Eucharis, Grote, Proc. Amer. Phil. Soc. 1900, p. 32.

Pieris Epicharis, Godart, Encyl. Méth. ix. p. 153 (1819). Boisduval, Spéc. Gén. Lép. i. p. 456 (1836).

Papilio Hyparete, Herbst, Nat. Schmett. v. pl. 101, figs. 3, 4, 5, ♂ ♀ (1792).

IMAGO.—Male. Upperside creamy-white. *Forewing* with all the veins black lined; crossed by an outer-discal black narrow band, the black expanding on each vein and then dilating outwardly—thus forming a marginal band enclosing a submarginal series of white outwardly-pointed conical spots. *Hindwing* with a similar but less defined black outer-discal slender band and marginal dilated end to the veins, enclosing a row of pale pink broad cordate spots. Underside. *Forewing* similar to the upperside, except that the veins are broader black bordered. *Hindwing* with all the veins black bordered; the outer-discal black narrow band and marginal end of the veins prominent, enclosing a series of bright scarlet cordate spots edged with white; the inner area from base to discal band pale lemon-yellow, or sometimes ochreous-yellow, except anteriorly, where it is white.

Female. Upperside creamy-white. Both wings with all the veins broader black bordered than in the male; on the *hindwing* the discal and marginal band is also broader, and the pink cordate spots more defined. Underside similar to the male.

Expanse, ♂ ♀ $2\frac{3}{4}$ to $3\frac{1}{4}$ inches.

LARVA.—Subcylindrical; head small; body sparsely clothed with fine long hairs; colour ochreous-brown, minutely white spotted; head and legs black.

PUPA.—Thick anteriorly; with a frontal short spine and dorsal row of short black spines; colour yellow, spotted with black.

HABITAT.—Lower Himalayas; Continental India; Ceylon.

LARVA; HABITS, ETC.—“The larva may be found in the Kanara District of Bombay, from the beginning of August, everywhere, on the common ‘Mistletoe’ (*Loranthus longiflorus*), from which it will drop and hang by a thread if the tree is shaken; we have never found it feeding on anything else. The larva is long, cylindrical and smooth, with an oily gloss; two subdorsal rows of long white bristles springing from minute white tubercles; head, sides and back sparsely clothed with short white bristles; colour brown, head and feet black. Unlike most butterflies, this species lays as many as 20 or 30 eggs on the underside of one leaf, in parallel rows, with equal intervals, and the larvæ continue in some measure gregarious to the last, so that a large number of pupæ are often found, at little distance from each other, on a wall, or the trunk of a tree. The pupa is closely attached by the tail and

by a band, generally to a vertical surface, with the head upwards. It is moderately stout, with a short snout, two small tubercles on the head, a sharp but not prominent dorsal ridge on the thorax, continued in a row of tubercles on the abdominal segments; below these are two partial subdorsal rows; colour bright yellow; tubercles and a row of spots defining the wing cases black. Large numbers are destroyed by a Dipterous parasite, very like a common house-fly" (J. Davidson and E. H. Aitken, *l.c.* p. 358).

The late Mr. S. N. Ward, in his MS. Notes on Kanara butterflies, writes, "The larva of *P. Eucharis* is social in its habits, and feeds on the *Hibiscus chinensis*. Remains in the pupa state about ten days, head upwards."

DISTRIBUTION.—Mr. W. Doherty records it "from Almora, Ranibagh, at from 1,000 to 5,000 feet elevation, in Kumaon" (J. As. Soc. Beng. 1886, 135). Capt. H. B. Hellard obtained it at "Allahabad" (MS. Notes). Mr. P. W. Mackinnon records it as being "very common in the Dehra Dun, from July to February" (J. Bombay N. H. S. 1898, 586). Capt. A. M. Lang records its capture in "Oudh and Umballa" in the Plains (Ent. Mo. Mag. 1864, 102). Capt. H. L. Chaumette, in his MS. Notes writes, "This butterfly may be seen in Lucknow, Oudh, in numbers, towards the close of the year to March, at which latter period it will be seen flying round the Mango trees in search of the parasitic plant (*Ioranthus longiflora*) on which to deposit its eggs." Capt. Chaumette also records it "very common at Saugor, also in Calcutta, and from Bombay to Saugor. Flies from December to August" (Ent. M. Mag. 1865, 37). Col. C. Swinhoe found it "common everywhere in Bombay and the Dekkan all the year round. The larva feed on *Santalum album*, length one and a half inch, colour greenish-brown. Pupa pale yellow, spotted with black, suspended by a thread round the body; they are much troubled by the Ichneumon, and of 15 pupæ found on a gate-post at Poona, only one had escaped, the Ichneumon larvæ being clearly visible through the skin of the pupa, there being from 2 to 7 larvæ in each pupa" (P. Z. S. 1885, 139). Dr. R. W. Forsayeth writes, "Mhow, November 22nd; found one larva of this butterfly just fastened up, and about to change to pupa. The pupæ are, however, generally found on leaves of *Butea frondosa*. The pupæ are fastened by a thoracic brace and a caudal ligature to the underside of leaves, and are of two colours" (Tr. Ent. Soc. 1884, 385). Messrs. Davidson and Aitken record it as "very common in Kanara District of Bombay at all seasons, except during the two or three months when the rainfall is heaviest" (J. Bombay N. H. S. 96, 569). Capt. E. Y. Watson took it in Mysore, at Arsikari, Kadur, and Kathlekan, in November; also at Sagar in January" (J. Bomb. N. H. Soc. 1890, 8). Mr. G. F. Hampson obtained it in the "Nilgiris at 1,000 to 7,000 feet" (J. As. Soc. Beng. 1888, 363). Mr. H. S. Ferguson found it "very common in Travancore, both in the low country and up to 3,000 feet in the Hills" (J. Bomb. N. H. S. 1891, 445).

In Ceylon, Dr. Thwaites found the larva feeding on *Loranthus*. Mr. F. M. Mackwood records it as being common throughout the low country, and up to 4,000 feet altitude; at times a few occur higher up. The larvæ feed on the parasitic *Loranthus*, sometimes in thousands, but fortunately Ichneumons destroy the greater number" (Lep. Ceylon, i. 140, 1881). In Madras Capt. E. Y. Watson "took it in July and August" (J. As. Soc. Beng. 1890, 268). Mr. W. C. Taylor records it "very common at Khorda, Orissa" (List, p. 15, 1888). Mr. L. de Nicéville states that it "swarms in the neighbourhood of Calcutta in the winter; specimens are to be met with throughout the year" (J. As. Soc. Beng. 1885, 51). Mr. J. Rothney says "it is the commonest butterfly in Barrackpur Park, near Calcutta; it occurs in numbers from April to October" (Ent. M. Mag. 1882, 35).

In Sikkim, writes Mr. H. J. Elwes, "it occurs at low elevations from April to October" (Tr. Ent. Soc. 1888, 407).

We possess specimens from Kasauli, W. Himalaya; Nepal, taken by Genl. G. Ramsay; Bombay, Nilgiris, and Ceylon; also a male, labelled "Burmah," but which locality is doubtless incorrect.

Of our illustrations on Plate 534, fig. 1 larva and pupa, is copied from Mr. A. Grote's Calcutta drawing; 1a, b, a W. Himalayan male, and 1c, d, a Nepal female.

PICCARDA HIERTE (Plate 532, fig. 2, 2a, ♂, 2b, c, ♀; Plate 533, fig. 1, 1a, ♂, 1b, c, ♀).

Pontia Hierte, Hübner, Zuträge Exot. Schmett. i. p. 17, fig. 77, 78, ♂ (1818); *id.* Verz. bek. Schmett. p. 92 (1818).

Pieris Hierte, Moore, P. Z. S. 1865, p. 758.

Delias Hierte, Druce, P. Z. S. 1874, p. 108. Watson, Journ. Bombay N. H. Soc. 1888, p. 25; *id.* l.c. 1891, p. 51; *id.* 1897, 668. Manders, Tr. Ent. Soc. 1890, p. 533. Swinhoe, Trans. Ent. Soc. Lond. 1893, p. 311. de Nicéville, Sikkim Gaz. 1894, p. 166. Adamson, List Burm. Butt. p. 41 (1897). Butler, Ann. Nat. Hist. 1897, p. 144. Fruhstorfer, Iris, 1902, p. 270.

Thyca Hierte, var. *Indica*, Wallace, Trans. Ent. Soc. Lond. 1867, p. 351, ♂ ♀. Elwes, *id.* l.c. 1888, p. 408.

Delias Indica, Moore, Proc. Zool. Soc. Lond. 1878, p. 839.

Thyca Devaca, Moore, Proc. Zool. Soc. Lond. 1872, p. 566, ♀.

IMAGO.—Male. Upperside greyish-white. *Forewing* with the veins either only slenderly greyish-black lined and the black scales obscurely expanding on each side of the veins obliquely before the apex, and then dilating at their end from the subcostal to lower median, thus enclosing an apical series of ill-defined whitish streaks, or the veins are also broadly black bordered, with their subapical expansion and dilated end also broader and more prominently black, and the cell streaks of the underside slightly visible. *Hindwing* with the veins greyish-white, the submarginal scarlet spots and dark marginal band of the underside being faintly indicated; in

some specimens the marginal end of the outer veins is also very slightly and obscurely speckled with minute black scales. Underside white. *Forewing* with all the veins broadly black bordered, the apical white streaks being more defined; also with more or less distinctly defined black longitudinal cell-streaks. *Hindwing* with all the veins narrowly black bordered; the basal area to, or more or less beyond, the cell, either pale or dark yellow, with a submarginal series of bright scarlet spots increasing in size from the apex, followed by a bordering outer marginal black uneven band.

Female. Upperside. *Forewing* greyish-black, with either moderately well-defined white or greyish-white cell-streaks and narrow discal and apical streaks, or all these streaks are obscurely defined and narrow, and are more or less nearly obliterated by black scaling. *Hindwing* either white, with all the veins broadly greyish-black bordered and widening outwardly and dilated on the margin, with pale pink indications of the submarginal scarlet spots of the underside, or, dull-white, with the veins outwardly more broadly but less prominently blackish bordered, their ends more broadly diffused and with dusky-reddish indications of the spots of the underside. Underside similar to the male, except that on the *forewing* the black bordering to the veins is broader, and the upper apical streaks are sometimes yellow-tinted, and on the *hindwing* the veins sometimes are broader black, the scarlet spots broader, and the yellow filling up the entire discal area, and, more rarely, as in *Devaca*, the costal interspace and the cell area is dark scarlet.

EXpanse, ♂ ♀ 3 to 3½ inches.

HABITAT.—Kumaon; Nepal; Sikkim; Khasia Hills; Lower Bengal; Burma; Upper Tenasserim; Siam; Saigon; Tonkin.

DISTRIBUTION.—A male from Rhaniket, Kumaon, Western Himalayas, taken in May, is in Mr. W. Rothschild's Collection. We possess both sexes from Nepal, taken by the late Genl. G. Ramsay. Mr. H. J. Elwes records it as "not uncommon in Sikkim, at low elevations, and up to 3,000 feet, from March to December" (Tr. Ent. Soc. 1888, 408). Mr. L. de Nicéville says "it is a rare species in Sikkim, and occurs only in the low valleys and outer slopes of the hills" (Sikk. Gaz. 1894, 166). Col. C. Swinhoe records it from the Khasia Hills (Tr. Ent. Soc. 1893, 311). Mr. de Nicéville, "a single male taken in Calcutta in February" (J. As. Soc. Beng. 1885, 51). Capt. E. Y. Watson obtained it at "Tilin, in March, during the Chin-Lushai Expedition of 1889-90" (J. Bombay N. H. Soc. 1891, 51), and also at Rangoon (*id. l.c.* 1888, p. 25). Capt. Watson also found it "common in the Upper Chindwin District, Burma, in May; also obtained up to 6,500 feet in the Hills" (*l.c.* 1897, 668). Mr. O. Limborg took it "above Ahsown; Moulmein to Meetan, and at Moolai, 3,000 to 6,000 feet elevation" (P. Z. S. 1878, 839). Col. C. H. E. Adamson remarks that it is "common in all Burma" (List, 1897, 41). Dr. L. Fea obtained

it at Meteleo in August, Cobaga, and at Bhamo in November. Dr. N. Manders found it "not uncommon in the Shan States, occurring also in Eastern Karenee" (Tr. Ent. Soc. 1890, 533).

Of our illustrations on Plate 532, fig. 2, 2a, 2b, c, are from a Nepal male and female. On Plate 533, fig. 1, 1a, 1, b, c, are from a Burmese male and female.

PICCARDA ETHIRE.

Delias Ethire, Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 268, ♂ ♀. Taylor, Butt. of Orissa, p. 15 (1888). Butler, Ann. and Mag. Nat. Hist. 1897, p. 144.

IMAGO.—"Male and female. The male closely resembles *Delias Hierte*, var. *Indica*. It is a whiter insect, the apex being but slightly clouded with grey, the subapical band distinctly marked, being grey, with the spaces beyond it partly of almost pure white. The cell of the forewing is white above and hardly touched with grey below. The upper two or three apical pale spaces tinged with yellowish. Hindwing immaculate except for the grey terminations of two or three of the veins. The scarlet spots of the hindwing below are transmitted through the wing as a pink band. Below, the disc, base and abdominal margin of the hindwing are bright lemon-yellow, becoming whitish outwardly on the disc, the scarlet submarginal band is rather narrow and even. Female. Like the male, and has little resemblance to the female of *Hierte*; it is white, all the veins accentuated with black, the extreme apex and the subapical band of the forewing dark grey, leaving a whitish band tinged with ochreous across the apex. Below, the female is like the male, the apex of the forewing is more distinctly marked with lemon-yellow, and the veins and subapical band are darker, the cell marked with perceptible grey lines. The brilliant lemon and scarlet hues of the hindwing are transmitted through the wing, appearing above as creamy and pink. The two lower discocellulars of the forewing are less oblique and more angled outwardly than in *Hierte*, resembling those of *Eucharis*. A local form of *Hierte*."

"Expanse, 98 millimetres."

HABITAT.—Madras; Orissa; Lower Bengal.

DISTRIBUTION.—"Common in the Vizagapatam District, Madras Presidency, at Bobbili, Parvatipuram, the Potingi Ghát, etc., and in the Jaipur State, probably extending to the Godavari; scarce in the Ganjam District, Mahendragiri; also seen in Southern Orissa, where it is probably rare" (Doherty, *l.c.* 263). A male and female from Berhampur, Madras, are in the British Museum. A male, from the Sunderbunds, Lower Bengal, is in Col. C. Swinhoe's Collection. "Very common at Khorda, in Orissa" (W. C. Taylor, *l.c.*)

PICCARDA METARETE (Plate 533, fig. 2, 2a, ♂, 2b, c, ♀).

- Delias Metarete*, Butler, Trans. Linn. Soc. Lond. 1879, p. 550; *id.* Ann. Nat. Hist. 1897, p. 145.
 Moore, Journ. Linn. Soc. Lond. Zool. 1886, p. 49.
Delias Hyparete, var. *Metarete*, Distant, Rhop. Malayana, p. 292, pl. 24, fig. 13, 14, ♂ ♀ (1885).

IMAGO.—Male. Upperside similar to *P. Hierte*. *Forewing* with more uniformly grey-scaled apical interspaces. *Hindwing* with distinctly-defined black-scaled marginal border. Underside. *Forewing* similar to *Hierte*. *Hindwing* with the yellow colour more basally restricted; the submarginal scarlet spots inwardly black bordered, the two anal spots also being larger.

Female. Upperside duller greyish-black than in *Hierte*. *Forewing* with obscurely-defined markings, the discal series comparatively broader. *Hindwing* with broader black outer border, enclosing the dusky reddish indications of the spots. Underside. Similar to the male.

Expanse, ♂ ♀, 3 to 3½ inches.

HABITAT.—Lower Tenasserim; Malay Peninsula; Penang; Sumatra;? Borneo.

DISTRIBUTION.—We possess specimens of both sexes from Dr. J. Anderson, taken in “Mergui, in December and January; Elphinstone Island in March, and on King Island in January” (J. Linn. Soc. Zool. 1886, 49).

Of our illustrations on Plate 533, fig. 2, 2a, and 2b, c, are from Mergui male and female.

PICCARDA AGOSTINA (Plate 535, fig. 1, 1a, ♂, 1b, c, ♀).

- Pieris Agostina*, Hewitson, Exot. Butt. i. *Pieridæ*, pl. 1, fig. 1, 2, ♂ (1852). Moore, Catal. Lep. Mus. E. I. Company, i. p. 81, ♂ (1857).
Thyca Agostina, Wallace, Trans. Ent. Soc. Lond. 1867, p. 353.
Delias Agostina, Elwes, Tr. Ent. Soc. Lond. 1888, p. 408. Watson, Journ. Bombay Nat. Hist. Soc. 1888, p. 25; *id. l.c.* 1891, p. 51; *id.* 1897, p. 668. Manders, Tr. Ent. Soc. 1890, p. 533. de Nicéville, Sikkim Gaz. 1894, p. 166. Swinhoe, Tr. Ent. Soc. 1893, p. 311. Adamson, List Burm. Butt. 1897, p. 41. Butler, Ann. Nat. Hist. 1897, p. 159.
Pieris Nesba, Lucas, Rev. Zool. 1852, p. 324, ♀.

IMAGO.—Male. Upperside. *Forewing* greyish-white; costal margin speckled with greyish-black scales; an apical-marginal blackish-scaled band enclosing five or six white spots. *Hindwing* creamy-white with the marginal dark border of the underside slightly apparent. Underside. *Forewing* with all the veins broadly black, the apical spotted-band as above. *Hindwing* rich chrome-yellow; with a narrow black marginal band traversed by white lunular spots. *Body* greyish white; legs black, streaked with white; antennæ above black, beneath annulated with white.

Female. Upperside. *Forewing* greyish-black; with indistinct greyish-white

scaled cell area, discal elongate streaks, and subapical small linear spots. *Hindwing* sullied pale chrome-yellow; the base sparsely irrorated with minute grey-black scales; a greyish-black marginal band enclosing ill-defined greyish-white marks. Underside similar to the male, except that the black vein-borders of the forewing are broader. *Body* above greyish-black, beneath greyish-white.

Expanse, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Nepal; Sikkim; Assam; Khasia Hills; Burma.

DISTRIBUTION.—We possess specimens of the male from Nepal, taken by the late Genl. G. Ramsay. Mr. H. J. Elwes records it as “not uncommon in Sikkim in the lower valleys, from March to December” (Tr. Ent. Soc. 1888, 408). Col. C. Swinhoe says it is “very common in the Khasia Hills” (*l.c.* 1893, 311). In Burma, Capt. E. Y. Watson took “one male in the N. Chin Hills, at 7,000 feet altitude in May, and a female at the foot of the Hills in April” (J. Bombay N. H. Soc. 1897, 668). Capt. Watson also took a “single pair at Tilin in November and March, during the Chin-Lushai Expedition of 1889-90” (*l.c.* 1891, 51); he also found it “common at Beeling, Upper Tenasserim, from May to September, and at Paungadaw, Upper Burmah, in October and November” (*l.c.* 1888, 25). Col. C. H. E. Adamson “caught only three specimens of this butterfly, in April, October, and December respectively, two in Arakan, and one in Upper Chindwin” (List Burm. Butt. 1897, 41). Dr. L. Fea obtained it at Moolayet in March, and in the Karen Hills. Dr. N. Manders found it “widely distributed in the Shan States at low elevations, being abundant in the Mone Valley” (Tr. Ent. Soc. 1890, 533). We possess males from the Upper Mekong, Shan States, taken by Mr. R. Roberts, C.E.

PICCARDA AGORANIS (Plate 535, fig. 2, 2a, ♂).

Delias Agoranis, Grose-Smith, Ann. Nat. Hist. 1887, p. 266; *id.* Rhop. Exot. ii. *Del.* pl. 1, fig. 7, 8, ♂ (1893). Adamson, List Burm. Butt. 1897, p. 40. Butler, Ann. Nat. Hist. 1897, p. 156.

Delias Agostina subsp. *infumata*, Fruhstorfer, Iris, 1902, p. 174.

IMAGO.—Male. Upperside white. *Forewing* with the costal border broadly greyish-black scaled, these scales also extending along upper edge and end of the cell, and from thence outward to the marginal blacker band, which latter is traversed by a series of small narrow whitish spots. *Hindwing* with a marginal row of ill-defined black-scaled triangular spots, the three lower of which are most distinct. Underside. *Forewing* with black-bordered veins. The upper discal white intervening-streaks short and widely separated from the white cell area. *Hindwing* pale lemon-yellow; the black marginal band broader and enclosing six broad white spots.

Female. Upperside. *Forewing* fuliginous-black; cell area and elongated streak between the veins sullied greyish-white. *Hindwing* white with fuliginous-black

outer marginal border, and submarginal greyish-white interspaces. Underside. *Forewing* with broader blackish vein-borders than in the male. *Hindwing* as in the male.

Expanse, ♂ ♀ $2\frac{3}{4}$ inches.

HABITAT.—Tenasserim, Burma.

DISTRIBUTION.—The type specimen of this species was taken by Col. C. H. E. Adamson at "Tounggya Sekkan, Middle Tenasserim, in April, 1880" (*l.c.* 40). In the British Museum collection is a male from Mergui, and a female from Tavoy Valley.

Our illustration on Plate 535, fig. 2, 2a, are from the type specimen.

PICCARDA DESCOMBESI (Plate 536, fig. 1, 1a, ♂, 1b, c, ♀).

Pieris Descombesi, Boisduval, Spéc. Gén. Léop. i. p. 465 (1836). Doubleday and Hewitson, Gen. D.

Lep. i. p. 45 (1846). Moore, Catal. Lep. Mus. E. I. Company, i. p. 81 (1857).

Thyca Descombesi, Wallace, Trans. Ent. Soc. Lond. 1867, p. 350.

Delias Descombesi, Moore, Proc. Zool. Soc. 1878, p. 839. Butler, P. Z. S. 1872, p. 34. Distant, Rhop. Malay, p. 466, pl. 42, fig. 16, ♂ (1886). Elwes, Journ. As. Soc. Bengal 1886, p. 433. Trans. Ent. Soc. 1888, p. 408. Manders, Tr. Ent. Soc. 1890, p. 532. Watson, Journ. Bombay Nat. Hist. Soc. 1891, p. 51. Swinhoe, Trans. Ent. Soc. 1893, p. 310. de Nicéville, Sikkim Gaz. 1894, p. 166. Adamson, List Burm. Butt. p. 41 (1897). Butler, Ann. Nat. Hist. 1897, p. 148. Fruhstorfer, Iris, 1902, p. 270.

IMAGO.—Male. Upperside greyish-white. *Forewing* with the costal border and an apical-marginal band black scaled. *Hindwing* with the outer margin edged with black scales. Underside. *Forewing* greyish-black, the costal, subcostal, the median and its branches, and submedian vein basally bordered with greyish-white scales, those on the medians and submedian forming longitudinal streaks; a broad greyish-white discocellular oblique-bar which is sometimes more or less broken; beyond is a submarginal series of greyish-white spots, of which the four upper are elongated, and the lower somewhat cordate. *Hindwing* rich deep chrome-yellow, with a black-edged broad crimson streak in the costal interspace, and a black marginal inner-dentated band enclosing a series of six diffusely-formed lunate spots, which latter are either yellowish-white or of a uniformly chrome-yellow. *Body* greyish-white; palpi and legs black streaked; antennæ black.

Female.—Upperside. *Forewing* greyish-black; costal, medians, and submedian vein narrowly bordered with greyish-white scales; a broad greyish-white complete or broken discocellular-bar, and a submarginal curved-row of spots. *Hindwing* greyish-white or pale yellowish-white, basally irrorated with pale greyish-black scales; a broad greyish-black marginal inner-dentated band enclosing a series of ill-defined whitish hastate marks. Underside. *Forewing* similar to the male. *Hindwing* also similar to the male, except that the ground-colour is either almost

white or of various shades of paler yellow, and the cell and lower basal area irrorated with blackish scales.

Expanse, ♂ $2\frac{1}{2}$ to $3\frac{1}{2}$, ♀ 3 to $3\frac{1}{2}$ inches.

HABITAT.—Sikkim; Bhotan; Khasia Hills; Burma; Tenasserim; Malay Peninsula; Siam; Annam; Cochin China.

DISTRIBUTION.—Mr. H. J. Elwes records it “common in Sikkim at low elevations, and up to 3,000 feet, from March to December. Fond of settling on the sweet-scented flowers of *Cinchona Ledgeriana* in the lower plantations at Mongpo” (Tr. Ent. Soc. 1888, 408). Mr. L. de Nicéville says it is “common in Sikkim from March to December. It is an early riser, and commences to fly soon after sunrise” (Sikk. Gaz. 1894, 166). Mr. G. C. Dudgeon obtained it in Bhotan. Col. C. Swinhoe has received “several specimens from the Khasia Hills” (Tr. Ent. Soc. 1893, 310). Col. C. H. E. Adamson records it as “very common in Burma from March till November” (List Burm. Butt. 1897, 41). Capt. E. Y. Watson obtained “two males at Tilin in December and May, during the Chin-Lushai Expedition of 1889-90” (J. Bombay N. H. Soc. 1891, 51). Mr. O. Limborg took it “at Ahsown; Moolai, at 3,000 to 6,000 feet elevation, Upper Tenasserim” (P. Z. S. 1878, 839). Dr. L. Fea obtained it at Toungoo in January. Dr. N. Manders records it as “very common in the Shan States” (Tr. Ent. Soc. 1890, 532). Mr. H. J. Elwes records “a single female taken in Tavoy” (J. As. Soc. Beng. 1886, 433).

INDO-MALAY SPECIES.—*Piccarda Hæmorrhœa* (*Pieris Hæmorrhœa*, Vollenhoven, Monogr. Pier. p. 10, pl. 2, fig. 5 (1865). *Thyca Hæm.* Wallace, Tr. Ent. Soc. Lond. 1867, p. 352. *Delias Hæm.* Butler, Ann. Nat. Hist. 1897, p. 145. *Habitat.* Banca.

Piccarda Niasana (*Delias Niasana*, Kheil, Rhop. Nias. p. 35, pl. 4, fig. 22, 23 (1884). Butler, *l.c.* 1897, p. 146, *var. D.* *Amarilla*, Kheil, *l.c.* p. 35. *Habitat.* Nias Island.

Piccarda Hyparete (*Pap. Hyparete*, Linn. Syst. Nat. x. ed. i. p. 469 (1758); *id.* Mus. Ulr. p. 247 (1764); *id.* S. N. xii. ed. i. p. 763 (1767). Clerck, Icones, ii. pl. 38, fig. 2 (1764). Sulzer, Gesch. Ins. p. 143, pl. 15, fig. 8 (1776). Herbst, Nat. Schmett. v. p. 131, pl. 101, fig. 6, 7, ♀ (1792). *Pieris Hyparete*, Boisd. Spéc. Gén. Lép. i. p. 455 (1836). Vollenhoven, Monog. Pier. p. 91 (1865). Snellen, Tijd. v. Ent. 1876, p. 15 t. *Thyca, Hyp.* Wallace, Trans. Ent. Soc. 1867, p. 352. *Delias Hyp. Aurivillius*, K. Svensk. Vet. Akad. Handl. 1882, p. 59. de Nicéville, Journ. As. Soc. Bengal, 1895, p. 488. Butler, Ann. Nat. Hist. 1897, p. 146. *Syn.* *Pap. Antonoe*, Cramer, Pap. Exot. ii. p. 138, pl. 187, fig. C, D, ♂ (1779). *Habitat.* Penang; Singapore; Sumatra; Java; Borneo.

Piccarda Luzoniensis (*Pieris Luzoniensis*, Felder, Wien. Ent. Monats. 1862, p. 285. *Thyca Luzon.* Wallace, *l.c.* p. 352 (1867). *Delias Luzon.* Butler, *l.c.* p. 146.

Var. Delias Palawanica Staudinger, *Iris*, ii. p. 24 (1889). *Var. D. Mindanaensis*, *Mitis*, *Iris*, vi. p. 139, pl. 2, fig. 4, 5 (1893). *Habitat.* Philippines; Formosa.

Piccarda Lucina (*Delias Lucina*, Distant, *Ann. Nat. Hist.* 1887, p. 270. *Butler*, *l.c.* p. 147. *Syn. D. Joloana*, Staudinger, *Iris*, ii. p. 24 (1889). *Habitat.* Sulu Archipelago.

Piccarda Simplex (*Delias simplex*, *Butler*, *Ann. Nat. Hist.* 1897, p. 147, ♂. *Habitat.* Sumatra.

Piccarda Stollii (*Delias Stollii*, *Butler*, *Proc. Zool. Soc.* 1872, p. 32, *id.* *Ann. Nat. Hist.* 1897, p. 147. *Syn.* *Pap. Antonoe*, *Stoll*, *Cramer's Pap. Exot.* v. pl. 33, fig. 2, 2b (1790). *Habitat.* China.

Piccarda Belisama (*Pap. Belisama*, *Cramer*, *Pap. Exot.* iii. pl. 258, fig. A-D. (1782). *Pontia Bel.* *Horsfield*, *Catal. Lep. Mus. E. I. Company*, pl. 4, fig. 10, 10a, *larva* and *pupa* (1829). *Pieris Bel.* *Boisd. Spéc. Gén. Léop.* i. p. 464 (1836). *Moore*, *Catal. Lep. Mus. E. I. C.* i. p. 82, pl. 1, fig. 14, 14a, *larva* and *pupa* (1857). *Vollenhoven*, *Mon. Pier.* p. 16 (1865). *Thyca Bel.* *Wallace*, *l.c.* p. 349 (1867). *Delias Bel.* *Butler*, *l.c.* p. 149 (1897). *Kirby*, *Allen's Nat. Libr.* ii. p. 166, pl. 57, fig. 1, ♀ (1896). *Vars.* *Delias Nakula*, *Grose-Smith and Kirby*, *Rhop. Exot.* i. *Del.* pl. 1, fig. 1-4, ♂ ♀ (1889). *Del. aurantia*, *Doherty*, *Journ. As. Soc. Bengal*, 1891, p. 189. *Del. Belisar*, *Staudinger*, *Iris*, 1891, p. 78. *Grose-Smith and Kirby*, *l.c.* ii., *Del.* pl. 2, fig. 6, 7 (1893). *Del. Vestalina*, *Staudinger*, *Iris*, 1891, p. 79. *Del. erubescens*, *Staudinger*, *l.c.* p. 80. *Habitat.* Java.

Piccarda Eumolpe (*Delias Eumolpe*, *Grose-Smith*, *Ann. Nat. Hist.* 1889, p. 312. *Pryer and Cator*, *Brit. N. Borneo Herald*, 1894, p. 285. *Habitat.* N. Borneo.

Piccarda Glauce (*Pieris Glauce*, *Butler* *Proc. Zool. Soc.* 1865, p. 431, pl. 25, fig. 2. *Thyca Glauce*, *l.c.* p. 439 (1867). *Delias Glauce*, de *Nicéville*, *Journ. As. Soc. Beng.* 1895, p. 488. *Butler*, *Ann. N. H.* 1897, p. 150. *Habitat.* Sumatra; Borneo.

Piccarda Diaphana (*Delias Diaphana*, *Semper*, *Verh. Hamb.* iii. p. 114 (1878); *id.* *Reise Phil.* v. p. 228, pl. 34, fig. 3-6 (1890). *Butler*, *l.c.* p. 150 (1897). *Habitat.* Philippines.

Piccarda Peribœa (*Pieris Peribœa*, *Godart*, *Encycl. Méth.* ix. p. 154 (1819). *Thyca Per.* *Wallace*, *l.c.* p. 354. *Delias Per.* *Butler*, *l.c.* p. 153 (1897). *Syn.* *Del. Wallacei*, *Rothschild*, *Iris*, v. p. 441, pl. 5, fig. 2 (1892). *Habitat.* Java.

Piccarda Altivaga (*Delias Altivaga*, *Fruhstorfer*, *Ent. Nachr.* 1893, p. 333; *id.* *Stett. Ent. Zeit.* 1894, p. 121, pl. 4, fig. 8. *Butler*, *l.c.* p. 155 (1897). *Habitat.* Java.

Piccarda Themis (*Pieris Themis*, *Hewitson*, *Exot. Butt.* ii. *Pieris*, pl. 5, fig. 31, 32 (1861). *Thyca Themis*, *Wallace*, *l.c.* p. 354, ♀ (1867). *Delias Themis*, *Butler*, *l.c.* p. 156 (1897). *Habitat.* Philippines.

Piccarda Singapura (Thyca Singapura, Wallace, *l.c.* p. 353, pl. 7, fig. 2, ♂ (1867).
Delias Sing. Distant, Rhop. Malay. p. 293, fig. 100 (1885). de Nicéville, Journ. As.
 Soc. Beng. 1895, p. 489. Butler, *l.c.* p. 156 (1897). *Habitat.* Singapore; Sumatra;
 Borneo.

Piccarda Dives (*Delias Dives*, de Nicéville, Journ. As. Soc. Bengal, 1897, p. 562,
 pl. 1, fig. 1, ♂. *Habitat.* Penang.

Piccarda Cathara (*Delias Cathara*, Grose-Smith, Ann. Nat. Hist. 1893, p. 34; *id.*
 Rhop. Exot. ii. *Del.* pl. 5, fig. 7, 8 (1895). Butler, *l.c.* p. 156 (1897). *Habitat.*
 Borneo.

Piccarda Nausicaa (*Delias Nausicaa*, Fruhstorfer, Berl. Ent. Zeit. 1899, p. 60 ;
id. Stett. Ent. Zeit. 1902, p. 358. *Habitat.* Borneo.

Piccarda Annamitica (*Delias Agostina Annamitica*, Fruhstorfer, Soc. Entom.
 1901, p. 98 ; *id.* Iris, 1902, p. 173. *Habitat.* S. Annam.

Piccarda Baracasa (*Delias Baracasa*, Semper, Reise Phil. Lep. p. 230, pl. 34,
 fig. 2 (1890). Butler, *l.c.* p. 156 (1897). *Habitat.* Philippines.

Piccarda Danala (*Delias Danala*, de Nicéville, Journ. Bombay Nat. Hist. Soc.
 1893, p. 51, pl. L, fig. 9 ♂ ; *id.* J. As. Soc. Bengal, 1895, p. 489. Butler, *l.c.* p. 157
 (1897). *Syn.* *Delias* Karo, Hagen, Iris, vii. p. 33, pl. 1, fig. 4 ♂ (1894). *Habitat.*
 Sumatra.

Piccarda Vishnu (*Pieris Vishnu*, Moore, Catal. Lep. Mus. E. I. Company, i. p. 83,
 pl. 2a, fig. 5, ♂ (1857). *Delias Vishnu*, Butler, *l.c.* p. 153 (1897). *Habitat.*
 Java.

Genus PRIONERIS.

Prioneris, Wallace, Trans. Ent. Soc. Lond. 1867, p. 383. Watson, Lit. and Phil. Soc. Manchester,
 1867, p. 260. Butler, Cistula Entom. i. p. 39, pl. 1, fig. 1 (1870); *id.* Proc. Zool. Soc. 1872,
 p. 27. Moore, Lep. of Ceylon, i. p. 140 (1881). Schätz, Exot. Schmett. ii. p. 64 (1886). Kirby,
 Allen's Nat. Libr. Butt. ii. p. 171 (1896). Fruhstorfer, Berl. Ent. Zeit. 1899, p. 105.

Pieris (Sect. i. pt.), Doubleday and Hewitson, Gen. D. Lep. i. p. 44 (1847).

IMAGO.—Wings large. *Forewing* triangular; costa much arched from the base,
 apex obtusely-pointed, exterior margin very oblique, uneven; costal margin in the
 male, thickened and minutely serrated; costal vein extending nearly two-thirds its
 length; subcostal vein four-branched, its first branch emitted at nearly one-half and
 second at one-fourth before end of the cell, third bifid, the fourth being thrown off
 at one-third before the apex, and the upper radial at one-fourth from beyond the
 cell; upper discocellular very oblique, lower less oblique, lower radial from their
 angle; cell broad, extending to nearly two-thirds length of the wing; middle median
 at one-fourth and lower one-half before end of the cell; submedian vein slightly

concave near the base. *Hindwing* broadly oval; exterior margin uneven; basal area from the subcostal to internal vein very hairy; precostal vein curved; costal vein arched; first subcostal emitted at one-half before end of the cell; discocellulars very long and outwardly oblique, upper slightly concave, radial from their angle; cell extending to two-thirds length of the wing; middle median at nearly one-fourth and lower at one-half before end of the cell; submedian vein straight, internal recurved. *Body* stout; abdomen compactly scaled above, finely hairy basally, beneath finely hairy from base to claspers; thorax and head hairy; palpi long, very laxly hairy beneath; legs long; antennæ long, with a gradually thickened club.

TYPE.—*P. Thestylis*.

MIMICRY.—Mr. A. R. Wallace writes, "The species of *Prioneris*, in several cases, seem to mimic those of the genus *Thyca*. The male of *P. Thestylis*, on the underside, most strikingly imitates *Thyca Belladonna*, while the female resembles it on the upperside as well. *P. Sita* is a perfect representation of *T. Eucharis*. The species of *Thyca* are very abundant and are weak, slow-flying insects, while the species of *Prioneris* that mimic them are rare, and the pairs which resemble each other inhabit the same district" (*l.c.* 383). Mr. L. de Nicéville says that the *P. Sita* of Ceylon "is a splendid mimic in both sexes, of the highly protected *Delias Eucharis*, but its more rapid and somewhat darting flight makes it easily distinguishable when on the wing" (*Journ. As. Soc. Bengal*, 1899, 210).

The species of this genus, according to the examinations made by Mr. J. Watson (*l.c.* 1867, 259) do not possess androconial scales.

PRIONERIS THESTYLIS.

Wet-season form (Plate 538, fig. 1, 1a, ♂, 1b, c, d, e, ♀; 539, 1, 1a, ♀).

Pieris Thestylis, Doubleday, Gray's Zool. Misc. p. 76, ♂ (1842); *id.* Gen. D. Lep. i. p. 44, pl. 6, fig. 2, ♂ (1847). Moore, Catal. Lep. Mus. E. I. Company, i. p. 78 (1857); *id.* Proc. Zool. Soc. Lond. 1865, p. 759.

Prioneris Thestylis, Wallace, Trans. Ent. Soc. Lond. 1867, p. 384, ♂ ♀. Butler, Cistula Entom. i. p. 39 (1870); *id.* Proc. Zool. Soc. 1872, p. 27. Staudinger and Shatz, Exot. Schmett. ii. p. 64, pl. 6 (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 410, ♂ ♀. Swinhoe, *id. l.c.* 1893, p. 310 de Nicéville, Sikkim Gaz. 1894, p. 166. Kirby, Allen's Nat. Libr. Butt. ii. p. 171 (1896). Adamson, List Burm. Butt. p. 41 (1897). Watson, Journ. Bombay Nat. Hist. Soc. 1897, p. 669. Fruhstorfer, Berl. Ent. Zeit. 1899, p. 107.

Pieris Seta, Moore, Catal. Lep. Mus. E. I. Company, i. p. 78, ♀ (1857); *id.* Proc. Zool. Soc. Lond. 1857, p. 102, pl. 44, fig. 3, ♀. Fruhstorfer, *l.c.* p. 108 (1899).

IMAGO.—Male. Upperside greyish-white. *Forewing* with the median vein and its branches basally black-lined; the costal border black, the black curving obliquely outward across end of the cell, thence broadly bordering the outer veins to the

margin and enclosing a series of greyish-white upper-discal streaks and a submarginal row of spots, the upper of both series are slender and elongated, the next two lower pairs being each slightly coalescent, and the next lower large and broad; the cell area with grey streaks indicating the dark markings on the underside. *Hindwing* with grey indications of the dark markings of the underside; with a black outer marginal dentated band, the angles of which extend more or less up the veins, and a more or less apparent submarginal narrow lunular band, thus enclosing a series of either slightly-defined or prominent, white, broad outwardly-pointed spots. Under-side. *Forewing* greyish-black including the cell area; the discal and marginal markings, similar to the upperside, white, except those at the apex, which are yellow, the cell area also being marked with white basal streaks and anterior spots. *Hindwing* vinaceous-black, with lemon-yellow broad elongated cell-streak, basal costal spot, a discal series of spots increasing in size and length to the abdominal margin, followed by a marginal row of rounded spots. *Body* above greyish-white; thorax in front, collar, front, and palpi black, streaked with white; thorax beneath black; legs black and streaked with white; antennæ black.

Female. Upperside dull vinaceous-black or deep black. *Forewing* with ill-defined whitish or prominent white slender basal streaks and small anterior spots within the cell, a discal series of small narrow spots, two elongated slender basal streaks below the cell, and a submarginal row of smaller and narrower spots; the upper of each row being elongated and the next pairs slightly coalescent. *Hindwing* with an ill-defined whitish narrow elongated streak within the cell, a discal curved series of small narrow spots, which increase in size from the costal to the lower median interspace, from whence the whitish area broadly expands upward to the base and outward to the abdominal margin, this lower broad area being either sullied yellowish-white or pale clear yellow. Under-side. *Forewing* greyish-black, with white markings, as on the upperside, except that the apical streaks are tinted with yellow, the duplex streak below the cell is wider, and the veins are also slenderly-edged with greyish-white. *Hindwing* olivescens-black, with markings, as on the upperside, prominent, and all yellow including a streak at base of the costa. In some females, the upperside has more prominent markings, the hindwing a broad white cell-streak, larger discal spots, which latter, from the middle median, are also more elongated and of a deep diffused yellow colour, and are sometimes coalescent with the opposite marginal white spots. And, on the underside, the ground-colour is dark vinaceous-black or vinaceous-brown, with the markings of the hindwing deeper yellow, the cell streak and the middle discal spots bordered with white. *Body* greyish-black; abdomen beneath greyish-white; collar, front, palpi, and legs, white streaked.

Expanse, ♂ $3\frac{3}{4}$ to $4\frac{1}{2}$, ♀ $3\frac{1}{2}$ to 4 inches.

Dry-season form (Plate 539, fig. 2, 2a, ♂, 2b, c, ♀).

Prioneris Watsoni, Hewitson, Trans. Ent. Soc. Lond. 1868, p. 100, ♀. Butler, Proc. Zool. Soc. 1872, p. 28. Moore, Proc. Zool. Soc. 1878, p. 839. Adamson, List Burmese Butt. 1897, p. 41. Fruhstorfer, Berl. Ent. Zeit. 1899, p. 110.

Prioneris Seta, Wallace, Trans. Ent. Soc. Lond. 1867, p. 384, ♂.

MALE and FEMALE. Smaller in size than the *wet-season form*. MALE. Upperside similar. *Forewing* differs in the black apical portions being narrower, and the cell area showing less indications of the dark markings of the underside. *Hindwing* with a very slender black marginal border only, or, in some, this border is very slightly dentate at the end of the veins; the yellow colour of the underside being indicated by a delicate flush within the cell and outer interspaces. Underside. *Forewing* similar to the upperside, except that the dark portion is purplish-brown or pale purplish-black, including the upper half of the cell area; the spots at the apex of the wing are smaller and yellow, or sometimes obsolescent. *Hindwing* with the basal dark portions purplish-brown, the middle of the cell, the basal spot, and outer interspaces being chrome-yellow with white borders, the discal and marginal spots being also confluent within each interspace.

Female. Upperside white, approximating to the male. *Forewing* with the cell area and outer veins broadly black bordered; the cell area with black longitudinal streaks and anteriorly-enclosed white spots. *Hindwing* with a narrow black marginal dentated band, and a lower discal broad diffused chrome-yellow patch. Underside. *Forewing* as in the male, except that the cell area is black and enclosing white basal streaks and anterior spots. *Hindwing* with the basal dark portions and marginal border purple-brown, with chrome-yellow markings, as in the male.

Expanse, ♂ $2\frac{1}{2}$ to 3, ♀ 3 to $3\frac{1}{4}$ inches.

LARVA.—Unknown.

HABITAT.—Sikkim; Bhotan; Assam; Burma; Upper Tenasserim; Shan States.

DISTRIBUTION.—Mr. H. J. Elwes records "the males not uncommon in Sikkim, up to 4,000 or 5,000 feet elevation, throughout the season; the female rarer. I have also a male from Buxa, Bhotan" (*l.c.* 410). Mr. L. de Nicéville says it is "a common species in Sikkim at elevations below 5,000 feet all through the warm weather. The females are very rare. It is strongly affected by the seasons; the dry-season form found early in the year has been named *Watsoni*" (*l.c.* 66). Col. C. Swinhoe records it as being "common in the Khasia Hills" (*l.c.* 310). Mr. W. Rothschild possesses specimens of both sexes from "Sadarghat, Assam." Col. C. H. E. Adamson took "three specimens of *Thestylis*, in March and April, on the Lampha Choung, near Taoo, Middle Tenasserim, and two of *Watsoni* in February at Thounggya Sekkan" (List Burm. Butt. 1897, 41). Capt. E. Y. Watson obtained "a

single specimen of the dry-season form (*Watsoni*) at the foot of the Chin Hills, in March" (*l.c.* 669). Mr. O. Limborg records taking *Watsoni* on the road from "Moulmein to Moetan, and at Houngduran, Upper Tenasserim" (*P. Z. S.* 1878, 839). Dr. N. Manders writes, "I have specimens of *Thestylis* from Fort Stedman and Bernardmyo, Shan States. The females are mimics of *Delias Belladonna*. I have not taken *Watsoni* in the Shan States, and but rarely in Karenee" (*Tr. Ent. Soc.* 1890, 533). We possess both sexes of *Thestylis* from Sikkim, males from the Khasias; Manipur; Upper Tenasserim taken by Col. C. T. Bingham in April; Upper Mekong, Shan States, taken by Mr. J. Roberts, C.E.; and of *Watsoni*, males from Sikkim, Silhet, Moulmein, and Upper Mekong.

Of our illustrations on Plate 538, fig. 1, 1a, and 1b, c, are from a *wet-season* male and female from Sikkim; fig. 1d, e, from a Khasia female. On Plate 539, fig. 1, 1a, are from a *wet-season* female from Sadarghat, Assam; fig. 2, 2a, are from a *dry-season* male, from the Khasias, and fig. 2b, c, the female, the latter taken from Hewitson's type specimen of *Watsoni*.

PRIONERIS SITA (Plate 536, fig. 2, ♂, 2a, b, ♀, 2c, *pupa*).

Pieris Sita, Felder, Reise Novara, Lep. ii. p. 161, pl. 25, fig. 12, ♂ (1865).

Prioneris Sita, Wallace, Trans. Ent. Soc. Lond. 1867, p. 385. Butler, *P. Z. S.* 1872, p. 28. Moore, Lep. of Ceylon, i. p. 141, pl. 54, fig. 2, ♂ (1881); *id. l.c.* iii. p. 532, *larva* (1887). de Nicéville, Journ. As. Soc. Bengal, 1899, pp. 173, 210. Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 570. de Nicéville, Journ. As. Soc. Bengal, 1900, p. 250. Fruhstorfer, Berl. Ent. Zeit. 1899, p. 110.

IMAGO.—Male. Upperside greyish-white. *Forewing* with the costa and all the veins black-lined, the black on the outer veins expanding at their end and forming a very narrow marginal border, the submarginal narrow band of the underside very slightly indicated by a few minute black scales. *Hindwing* with the outer veins black only at their end, where it more or less expands and forms a slender black marginal border; a submarginal very slightly defined slender sparsely black-scaled band, the enclosed marginal interspaces being flushed with pale pink and indicating the spots of the underside. Underside. Both wings with all the veins black-lined, and the submarginal black narrow band distinct. *Forewing* with slightly apparent slender black longitudinal cell-streaks, and the apical interspaces pale yellow. *Hindwing* with the basal area to the submarginal band yellow, the outer marginal interspaces being scarlet, each bordered with white.

FEMALE. Upperside with all the veins broader black-lined and the submarginal lunular band more distinctly formed; cell areas with slender slightly defined black linear streaks. Underside similar to the male.

Expanse, ♂ ♀ $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

LARVA.—“ Colour dull blue-green. Head and all the segments closely dotted with minute blue tubercles, those on the head and sides black tipped; dorsal surface pubescent; a lateral fringe of soft white hair below the spiracles. Feeds on *Capparis*.”

PUPA.—“ Bright green. Sharply pointed at the head; with two strong lateral points and keeled on dorsal surface of thoracic segments; an interrupted yellow lateral line, and a short curved crimson line on each side just below thoracic segments bordering a small white irregular black speckled spot ” (E. E. Green, MS. Note, July, 1886).

HABITAT.—Ceylon; S. India.

DISTRIBUTION.—In Ceylon, Mr. F. M. Mackwood says this species occurs in the “ Hills from 2,000 to 6,000 feet elevation, and is comparatively scarce ” (Lep. Ceylon, i. 141). Mr. L. de Nicéville records it as “ fairly common in Ceylon at moderate elevations. Dr. N. Manders has taken it in Punduloya in January, and has noted its occurrence, amongst other places, at Haputale, 5,000 feet, Koslande, 2,500 feet, Behilul, 2,200 feet, and Wellaway, 500 feet. It is a splendid mimic in both sexes of the highly protected *Delias Eucharis*, Drury, but its more rapid and somewhat darting flight makes it easily distinguishable when on the wing; the acutely-pointed apex of the forewing is also a noticeable feature even in flight. The female is very rare ” (Journ. As. Soc. Bengal, 1899, 210.) In the British Museum Collection is a male from Kandy taken in July by Col. J. W. Yerbury.

Of its occurrence in the Kanara District, South India, Messrs. Davidson, Bell, and Aitken write, “ It cannot be distinguished from *Delias Eucharis* on the wing, unless a very close and clear view is obtained; so doubtless we have seen more than we know, but we have only caught seven specimens in all. Of these, two were caught at the Gairsoppa Falls, or on the way to them, but we know that it occurs as far north as Karwar ” (*l.c.* 1896, 570). Mr. T. R. Bell “ has seen a female laying eggs on a plant which is probably *Capparis tenera*. The eggs hatched out, but the larva failed to reach maturity ” (J. As. Soc. Beng. 1900, 270). A male labelled “ Nilgiris ” is in Mr. P. Crowley’s Collection.

MIMICRY.—“ This butterfly is a splendid mimic of the highly protected *Piccarda Eucharis*, but its more rapid and somewhat darting flight makes it easily distinguishable when on the wing ” (L. de Nicéville, J. As. Soc. Beng. 1899, 210).

Of our illustrations on Plate 536, fig. 2, 2a, b, are from a Ceylon male and female, and fig. 2c, the *pupa*, copied from Mr. E. E. Green’s original drawing.

PRIONERIS CLEMANTHE (Plate 537, fig. 1, 1a, b, c, ♂, 1d, e, f, ♀).

Pieris Clemanthe, Doubleday, Ann. and Mag. Nat. Hist. 1846, p. 23.

Prioneris Clemanthe, Wallace, Trans. Ent. Soc. Lond. 1867, pp. 385-6, ♀. Butler, Proc. Zool. Soc

1872, p. 28. Moore, Proc. Zool. Soc. 1878, p. 839; *id.* Journ. Linn. Soc. Zool. 1886, p. 50. Elwes, Journ. As. Soc. Beng, 1886, p. 433; *id.* Trans. Ent. Soc. Lond. 888, p. 411. Swinhoe, *id. l.c.* 1893, p. 310. de Nicéville, Sikkim Gaz. 1894, p. 166. Fruhstorfer, Iris, 1902, p. 271.

Pieris Berenice, Lucas, Rev. Zool. 1852, p. 324.

Pieris Helferii, Felder, Reise Novara, Lep. ii. p. 161, pl. 25, fig. 10, 11 (1865).

IMAGO.—Male. Upperside greyish-white. *Forewing* with the veins basally slenderly black lined, the costal border and the outer veins more broadly black bordered, the upper veins slightly expanding obliquely before the apex and then outwardly dilating to the margin. *Hindwing* basally flushed with pale yellow; with the end of the outer veins and marginal edge slenderly black bordered, the submarginal line of the band on the underside being also sometimes indicated. Underside. *Forewing* white, with all the veins more broadly black bordered; three longitudinal slender black lines within the cell. *Hindwing* chrome-yellow, the outer border white, the precostal interspace bright crimson; veins black lined, the outer veins more or less submarginally expanded and then outwardly dilated, thus forming an ill-defined incomplete marginal band enclosing a series of white spots.

FEMALE. Upperside. *Forewing* black, with greyish-white scaled longitudinal apically dilated cell-streaks, a discal series of streaks and short submarginal streaks, the lower of the two latter beingsometimes slightly coalescent. *Hindwing* white, basally flushed with pale yellow; the outer veins broader black lined than in the male, the marginal black border also broader and preceded by a more or less defined blackish-scaled submarginal slender lunular band, thus enclosing a series of greyish-white spots. Underside. *Forewing* black, with markings as on the upperside. *Hindwing* similar to the male.

Expanse, 3 to 3½ inches.

HABITAT.—Sikkim; Bhotan; Assam; Khasias; Burma; Tenasserim; Siam; Annam; Tonkin.

DISTRIBUTION.—Mr. H. J. Elwes records it as “occurring, but not commonly, in the lower valleys of Sikkim, from April to October, the female, however, seems quite rare” (Tr. Ent. Soc. 1888, 411). Mr. L. de Nicéville says it is “quite rare in Sikkim, and occurs from April to October at low elevations. In many years’ collecting, Mr. Otto Möller obtained two females only” (Sikk. Gaz. 1894, 166). Mr. G. C. Dudgeon obtained it in Bhotan. A male from Shillong, Assam, taken by Mr. J. P. Rawlins, is in the British Museum. Col. C. Swinhoe records it as “very common in the Khasias” (Tr. Ent. Soc. 1893, 310). In Burma it was obtained by Mr. O. Limborg at “Houngduran and Naththoung to Paboga, Upper Tenasserim” (P. Z. S. 1878, 839). Dr. J. Anderson took it in “Mergui, and on Elphinstone Island in March” (J. Linn. Soc. Z. 1886, 50). “Several males were taken in Tavoy, Ponsekai, and the Hills on the Siamese frontier” (Elwes, J. As. Soc.

Beng. 1886, 433). Col. C. H. E. Adamson took it in "Moulmein and Tenasserim, but not commonly, in February and March" (List, 1897, 41). Dr. L. Fea obtained it in the Karen Hills, in August. In the British Museum are specimens from the Thoungyeen Valley taken in January, and the Yoonzaleen Valley in November, by Col. C. T. Bingham; E. Pegu, March and April by Mr. W. Doherty, and a female from the S. Chin Hills, 7,000 feet, by Capt. E. Y. Watson.

It also occurs in Siam, Annam, and Tonkin.

INDO-MALAY SPECIES.—*Prioneris Malaccana* (*Prioneris Thestylis Malaccana*, Fruhstorfer, Berl. Ent. Zeit. 1899, p. 108; *id.* Soc. Ent. 1902, p. 81. *Habitat.* Perak.

Prioneris Formosana, Fruhstorfer, Berl. Ent. Zeit. 1903, p. 109, ♂. *Habitat.* Formosa.

Prioneris Vollenhovii, Wallace, Trans. Ent. Soc. Lond. 1867, p. 386, ♂. Fruhstorfer, B. E. Z. 1899, p. 111. *Habitat.* Sarawak, Borneo.

Prioneris Cornelia (*Pieris Cornelia*, Vollenhoven, Mon. Pier. p. 5, pl. 2, fig. 2). Wallace, *l.c.* p. 386. Fruhst. *l.c.* 1899, p. 109. *Habitat.* Borneo.

Prioneris Themana (*Pr. Clemanthe subsp.* *Themana*, Fruhstorfer, Soc. Ent. 1903, p. 35. *Pr. Clemanthe*, Distant, Rhop. Malay. p. 295, pl. 24, fig. 16, ♂ (1885). Hagen, Iris, 1894, p. 36. de Nicéville, Journ. As. Soc. Beng. 1895, p. 489. Fruhst. B. E. Z. 1899, p. 109. *Habitat.* Sumatra; Malay Peninsula; Singapore.

Prioneris Euclemanthe (*Pr. C. Euclemanthe*, Fruhstorfer, Soc. Ent. 1903, p. 35. *Pr. Clemanthe*, Crowley, Proc. Zool. Soc. Lond. 1900, p. 508. *Habitat.* Hainan.

Prioneris Philonome (*Pieris Philonome*, Boisduval, Spéc. Gén. Lép. i. p. 453, ♂ (1836). Wallace, *l.c.* p. 387. Fruhst. *l.c.* 1899, p. 108. *Habitat.* Java.

Prioneris Hysipyle, Weymer, Stett. Ent. Zeit. 1887, p. 12, pl. 1, fig. 1, ♂. de Nicéville, Journ. As. Soc. Bengal, 1895, p. 489. Fruhst. *l.c.* 1899, p. 106. *Habitat.* Sumatra.

Prioneris Autothisbe (*Delias Autothisbe*, Hübner, Samm. Exot. Schmett. ii. pl. 123 (1816-23). Wallace, *l.c.* p. 387. Fruhst. *l.c.* 1899, p. 106. *Pieris Auto.* Boisd. *l.c.* p. 452 (1836). Vollenhoven, *l.c.* p. 20, pl. 3, fig. 5, ♀ (1865). *Habitat.* Java.

Prioneris Orientalis (*Pr. Autothisbe subsp.* *Orientalis*, Fruhstorfer, Soc. Ent. 1903, p. 35. *Habitat.* E. Java.

Genus APPIAS.

Appias, Hübner, Verz. bek. Schmett. p. 91 (1816). Butler, Cistula Entom. i. pp. 37, 49 (1870). *id.* Ann. Nat. Hist. 1898, p. 392. Moore, Lep. Ceylon, i. p. 134 (1881). Kirby, Allen's Nat. Libr. Butt. ii. p. 172 (1896).

Appias (pt.), Distant, Rhop. Malay. p. 310 (1885). Watson, Journ. Bombay N. H. Soc. 1894, p. 497. VOL. VI.—April 17th, 1905. c c

IMAGO.—Male. *Forewing* triangular, less so in the female; apex obtuse, costal vein extending to two-thirds the margin; subcostal vein four branched, first branch emitted at one-fourth and second at one-eighth before end of the cell, third bifid at one-third before the apex; upper radial emitted at one-fourth beyond the cell; upper discocellular obliquely-concave, lower straight, the lower radial from their angle; cell more than half length of the wing; middle median at one-fourth, lower at more than half before end of the cell; submedian vein waved. *Hindwing* short, broadly-oval; exterior margin convex hindward; precostal vein nearly straight; costal vein curved; first subcostal at one-third before end of the cell; upper discocellular very oblique, lower less oblique, radial from their angle; cell broad; middle median at one-fifth and lower at near half before end of the cell; submedian vein straight, internal recurved. *Body* moderate; thorax stout, hairy; palpi porrect, hairy beneath, second joint extending half beyond the head, third joint long, slender; antennæ with a lengthened spatular club. Anal valves of male elongated, provided with a tuft of long rigid hairs on each side of the base beneath.

LARVA [Libythea].—Cylindrical, slightly tapering at each end; anal segment slightly bifid.

PUPA.—Head with a short frontal snout; a thoracic dorsal acute prominence, a medial-abdominal lateral angular-process on each side.

TYPE.—A. *Zelmira*.

SEASONAL VARIATION, ETC.—“This is shown in the *rainy-season* forms being larger and more profusely marked than the *dry-season* ones. The latter also having the ground-colour of the underside tinged with ochreous instead of being pure white. *A. Zelmira* is a species which shows the transition from the extreme of one form to the extreme of the other more clearly than any other species known to me, and it is by no means difficult to obtain a series of males showing every stage from one extreme—with all the veins on the underside of the hindwing broadly black, to the other extreme—in which the whole hindwing is of a uniform, slightly ochreous tint, the only marking being a few greyish scales across the end of the cell.” (Watson, J. Bombay N. H. S. 1894, 497.)

APPIAS HIPPOIDES.

- Appias Hippoides*, Moore, Trans. Ent. Soc. Lond. 1881, p. 312, *id.* Journ. Linn. Soc. Zool. 1886, p. 49.
 de Nicéville, Journ. As. Soc. Bengal, 1885, p. 51; *id. l.c.* 1886, p. 372. Taylor, List Butt. of Orissa, p. 15 (1888). Doherty, Journ. As. Soc. Beng. 1889, p. 120. de Nicéville, Sikkim Gazetteer, 1894, p. 169. Adamson, List Butt. of Burm. p. 43 (1897).
Tachyris Hippoides, Elwes, Trans. Ent. Soc. 1888, p. 418.
Catophaga Hippoides, Watson, Journ. Bombay N. H. Soc. 1894, p. 501.

Pieris Hippo (pt.), Moore, Catal. Lep. Mus. E. I. C. i. p. 71 (1857). Wallace, Tr. Ent. Soc. 1867, p. 366.

Tachyris Hippo, Manders, Tr. Ent. Soc. 1890, p. 534.

Appias Hippo, Watson, Journ. Bombay N. H. Soc. 1897, p. 670.

Tachyris Lyncida Hippo (pt.), Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 288.

Wet-season Brood (Plate 540, fig. 1, 1a, ♂, 1b, c, ♀).

Male. Upperside greyish-white. *Forewing* with the subcostal branches finely black-lined, the costal-margin and borders of the apical-veinlets bluish-grey scaled; an exterior-marginal black narrow dentated band. *Hindwing* with a similar marginal narrow black dentate band, which is inwardly broadly bordered by bluish-grey scales. Underside. *Forewing* greyish-white, with a broad cuprescent-brown costal band and a continuous exterior-marginal band, the latter being broader than on the upperside; a subapical prominent gamboge-yellow and a similar minute spot either above or below it. *Hindwing* gamboge-yellow, with a broad exterior marginal cuprescent-brown band—the inner edge of which is sinuated.

Female. Upperside dark sepia-brown. *Forewing* with two upper and two lower discal greyish-white longitudinal streaks, and generally an intermediate more or less obscurely-defined medial-discal streak, the lower discal streak being bifid externally; and also an obsolescent streak extending inward from apex of the cell. *Hindwing* with the base and lower-discal area to the submedian vein pale sullied greyish-brown, the anterior-discal area between the veins, the outer portion of the cell, and the abdominal margin greyish-white streaked, these streaks extending pointedly outward into the marginal band. Underside. *Forewing* paler brown, with the cell-streak, two upper and three lower discal broad streaks and the posterior margin greyish-white, the apex also being very slightly sullied-white streaked. *Hindwing* yellow, the disc sometimes whitish; the veins brown-lined; the cuprescent-brown exterior marginal band broader than in male.

Expanse, ♂ $2\frac{8}{10}$, ♀ $2\frac{4}{10}$ to $2\frac{8}{10}$ inches.

Intermediate Wet Brood (Plate 540, fig. 1d, e ♂, 1f, g ♀).

Male. Upperside similar to *wet form*. Underside. *Forewing* also similar, except that the costal and outer band is paler, and the apical spot is white. *Hindwing* much paler yellow, the outer marginal band somewhat narrower and paler.

Female. Upperside paler sepia-brown than in *wet form*. *Forewing* with the discal white streaks less prominent, the cell-streak obsolete. *Hindwing* with the discal streaks less defined. Underside. *Forewing* paler sepia-brown than in *wet form*, the cell-streak and discal streaks less prominent. *Hindwing* greyish-white, the veins brown-lined but less defined, the marginal band paler.

Expanse, ♂ $2\frac{6}{10}$ to $2\frac{8}{10}$, ♀ $2\frac{8}{10}$ inches.

Dry-season Brood (Plate 541, fig. 1, 1a, ♂, 1b, c, ♀).

Appias Vacans, Butler, Trans. Ent. Soc. Lond. 1870, p. 490, ♀. *id.* Lep. Exotica, p. 90, pl. 34, fig. 5, 6, ♀ (1872). Moore, Proc. Zool. Soc. 1878, p. 839; *id.* Journ. Linn. Soc. Zool. 1886, p. 49.

Appias Epicæna, Swinhoe, Proc. Zool. Soc. 1889, p. 398, ♂ ♀.

Male. Smaller than *wet-season* form. Upperside similar, except that on the *hindwing* the marginal black band is narrower and less sinuous and its submarginal grey border also less apparent. Underside. *Forewing* similar to the *wet-season* form. *Hindwing* yellow, generally of a deeper tint; the marginal band much narrower, usually about half the width of the wet form.

Female. Also smaller than the *wet* form. Upperside. *Forewing* with two upper and three lower-discal broader greyish-white streaks, the posterior margin also being white-streaked. *Hindwing* greyish-white, slightly flushed with very pale yellow, the dark outer band restricted to the margin. Underside. *Forewing* with broader white areas. *Hindwing* uniformly yellow, including the veins, the marginal band much narrower than in the wet form.

Expanse, ♂ $2\frac{2}{10}$ to $2\frac{4}{10}$, ♀ $2\frac{2}{10}$ to $2\frac{6}{10}$ inches.

Extreme Dry-season (typical *vacans*, Butler). Male. Upperside similar to the ordinary dry form. Underside. *Forewing* with white apical spot. *Hindwing* uniformly paler yellow than in ordinary dry form, the marginal band narrow.

Female. Upperside. *Forewing* with the black band restricted to the costal border and exterior margin, and on the latter not reaching the cell along the upper median veinlet. *Hindwing* with the black marginal band narrower than in ordinary dry form. Underside. *Forewing* with the costal and exterior band restricted as on the upperside, but paler. *Hindwing* uniformly pale or clear yellow; the band narrower than in ordinary dry form.

Expanse, ♂ $2\frac{4}{10}$, ♀ $2\frac{2}{10}$ to $2\frac{4}{10}$ inches.

HABITAT.—N.E. India; Burma; Tenasserim; Siam; Tonkin.

DISTRIBUTION, HABITS, ETC.—Mr. W. C. Taylor records it as being “common in some localities in Orissa, Lower Bengal” (List, 1888, 15). Mr. L. de Nicéville “captured a single male in a garden at Sealdah near Calcutta, in November” (J. As. Soc. Beng. 1885, 51). Col. C. Swinhoe has both sexes of the dry-season form from Maldah, Upper Bengal, taken by Mr. N. Irvine, and which he has described as *A. Epicæna*. Mr. W. Doherty, in his “Notes on Assam Butterflies” (Journ. As. Soc. Bengal, 1889, 120), writes, “The normal form of the female, of *Appias Hippoides*, is dark above and below, and but slightly clouded with whitish and dirty yellow. It was usually taken in the forest, moving slowly about in the deep shade, or lying *perdue* among the leaves. The other was almost as brightly coloured with

pure white and rich yellow as the male, differing chiefly in the absence of the subapical yellow spot on the forewing below. Like the male it was always fitting up and down the sunny paths at the edges of the wood, only alighting from time to time for a moment or two. Intermediate specimens occurred, and there was no possibility that the species could be different; but the forms were so unlike that they might almost claim to be called dimorphic." Mr. H. J. Elwes records it as "very common in Sikkim at low elevations, from 2,000 to 5,000 feet, from March to November" (Tr. Ent. Soc. 1888, 418). Mr. L. de Nicéville says it is "one of the commonest butterflies in Sikkim, at low elevations, and flies from March to December" (Sikk. Gaz. 1894, 169). Of the *wet-season* form we possess specimens from Manipur, taken by Dr. G. Watt; Nowgong, Assam (Mrs. Span); Cachar, taken in June; Sikkim and Bhotan (G. C. Dudgeon); Nepal (Gen. G. Ramsay); Bassein, Burma, April; Chittagong, October; Moulmein (W. S. Atkinson); Bhamo, November (Dr. L. Fea); and of the *dry-season* form (*Vacans*) both sexes from Sikkim; males from Chittagong, Burma, taken in January; Moulmein, January; a Bhamo female, November (Dr. L. Fea); Chindwin, December; Col. C. H. E. Adamson took it at Mogoung, Burma, in January; Dr. J. Anderson obtained it in "Mergui, December; Thaing and King Islands in February" (J. Linn. Soc. Zool. 1886, 49). In the British Museum are specimens of the *wet-season* form from Jorehat, June, Shillong and Sibsagar, Assam; Manipur; Bhamo, Pegu, Moulmein, Burma; and of the *dry-season* form (*Vacans*) from Maldah, Upper Bengal; Modah, Irriwaddy, Burma, March; Toungoo, March. Dr. N. Manders records "both sexes of the *wet-season* form from Sawlon, but was not taken in the Shan States" (Tr. Ent. Soc. 1890, 534). Col. Adamson records the sexes of both forms as "exceedingly common in Burma" (List, 1897, 43). Mr. J. Wood-Mason records "both sexes numerous in forests, in Cachar, from April to September" (J. As. Soc. Bengal, 1886, 372).

The allied species "*Hippo*, Cramer, in Sumatra," write Mr. L. de Nicéville and Dr. L. Martin, "is a constant species, and does not exhibit the great seasonal dimorphism which is found in the Indian forms. It is found throughout the year, but only in or near the forest. The males often assemble twenty or thirty together on a small puddle on the road, the female is found in the forest hunting for flowers for herself, or for the food-plant of her larva. Dr. Martin has often seen them on the same flower that is frequented by the female of *Udaiana Cynis*. He has bred the butterfly from the larvæ found feeding on a small shrub called by the Battaks 'Daoen Tangla,' which grows on the banks of rivers. The larva superficially does not greatly differ from the larvæ of the *Catopsilius*, but in shape is more slender. The pupa, however, is quite different, with a stellar indented thorax. The imago emerges in seven days" (J. As. Soc. Beng. 1895, 501).

APPIAS NICOBARICA.

Male. Upperside similar to *A. Hippoides*. *Forewing* with the inner edge of the marginal dentated black band distinctly grey-scaled. *Hindwing* with the marginal black band very narrow and almost even, the submarginal grey bordering broader and more distinctly defined. Underside. Similar to wet-season form of *Hippoides*. *Hindwing* clear gamboge-yellow, with the outer marginal band less sinuated on its inner edge.

Female. Upperside. *Forewing* with two upper and three lower-discal greyish-white streaks. *Hindwing* paler, being more uniformly sullied throughout with very pale greyish-brown scales. Underside similar to dry-season form of *Hippoides*, the hindwing being greyish-white.

Expanse, ♂ ♀ $2\frac{6}{10}$ inches.

HABITAT — Nicobars.

Described from specimens received by Col. C. T. Bingham.

APPIAS TAPROBANA.

Wet-season Brood. (Plate 541, fig. 2, 2a, ♂, 2 b, c, ♀.)

Appias Taprobana, Moore, Proc. Zool. Soc. Lond. 1879, p. 143; *id.* Lep. of Ceylon, i. p. 135, pl. 52, fig. 1, 1a, b, c ♂ ♀, and *larva* and *pupa* (1881). de Nicéville, Journ. As. Soc. Bengal, 1899, p. 218.

WET-SEASON BROOD. Male. Upperside similar to wet-season *Hippoides*. *Forewing* with the black dentated exterior marginal band comparatively broader, the black scales distinctly extending along the lower subcostals, and thus forming the lower intervening white portion into an insulated spot. *Hindwing* also with a broader black dentated marginal band and distinctly darker grey-scaled inner border. Underside. *Forewing* with cuprescent-brown costal and dentated exterior band, the point on the latter at the upper-median extending slightly along the veinlet to the base of middle median within the cell; apical spot yellow. *Hindwing* bright yellow; the costal and subcostals slenderly lined with brown scales; exterior band broad, cuprescent-brown, with a sinuous inner edge.

Female. Upperside dark sepia-brown. *Forewing* with two upper and three lower discal longitudinal greyish-white streaks, the middle streak being less defined, a more or less ill-defined streak extending within the cell from its apex. *Hindwing* with the basal area greyish-white, merging into the broad dark marginal dentated band, the costal vein and subcostals brown lined. Underside similar to same sex of wet-season *Hippoides*. *Forewing* with broader white cell and discal streaks. *Hindwing* yellow; the veins brown lined, marginal sinuous-edged band broad.

DRY-SEASON BROOD.

Appias vacans, Moore, Lep. of Ceylon, i. p. 135, pl. 52, fig. 2, 2a ♂ (1881).

Appias Aperta, Butler, Ann. Nat. Hist. 1886, p. 188. Moore, Lep. Ceylon, iii. p. 532 (1887).

Male. Upperside similar to wet-season; marginal band on the hindwing somewhat narrower. Underside. *Forewing* with white or pale yellow apical spot. *Hindwing* paler yellow, including the veins; marginal band narrower.

Expanse, ♂ $2\frac{4}{10}$, ♀ 2 to $2\frac{4}{10}$ inches.

LARVA.—Cylindrical, dark green, minutely black-dotted; a whitish sublateral line; beneath pale green.

PUPA.—Pale pinkish olivescient-green; head acutely pointed in front, thorax and anterior abdominal segments dorsally angulated; wing-cases also angled laterally.

HABITAT.—Ceylon.

DISTRIBUTION.—“Found in the low country, generally in the months of September to December. Larva feeds on *Cratæva religiosa*” (F. M. Mackwood). Capt. Hutchinson obtained it at “Colombo; in open waste ground from October to end of the year. Flight quick; alights on shrubs. Shy, but when driven off generally returns to the same spot. Only appeared one year, and then tolerably plentiful” (Lep. Ceylon, i. 135).

APPIAS LATIFASCIATA.

(Plate 541, fig. 3, 3a, ♂, 3b, ♀ (*wet form*)).

Appias latifasciata, Moore, Trans. Ent. Soc. Lond. 1881, p. 312, ♂ ♀.

Catophaga latifasciata, Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 501.

Appias vacans, Hampson, Journ. As. Soc. Beng. 1888, p. 362. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 444.

Catophaga Hippo, Watson, J. Bombay N. H. Soc. 1890, p. 8, ♀ (*dry form*).

Appias (Catophaga) Hippoides, Davidson and Aitken, Journ. Bombay N. H. Soc. 1897.

Appias Taprobana, de Nicéville, Journ. As. Soc. Bengal, 1900, p. 254.

IMAGO.—Male. Larger than *A. Taprobana*. Upperside with similar broad black outer marginal dentated band. Underside also similar. *Forewing* with the apical spot yellow in the wet-season form, white in the dry-season. *Hindwing* deep yellow in wet form, paler in the dry form, exterior marginal band broader, costal and subcostal vein densely brown-scaled, these brown scales also broadly bordering the subcostal and its branches from their base, thus forming a prominent fascia; the discal interspaces between the subcostal and radial being more or less whitish.

Female. Upperside fuliginous-black. *Forewing* with slightly-defined whitish cell-streak, two white upper-discal streaks and entire lower-discal area or lower discal streaks. *Hindwing* with olivescient yellowish-white basal area, and broad fuliginous-black sinuous marginal band. Underside fuliginous-brown. *Forewing* similar to

upperside. *Hindwing* yellow; costal and subcostals brown lined; marginal band broad, its inner edge deeply sinuous.

Expanse, ♂ $2\frac{8}{10}$, ♀ $2\frac{4}{10}$ to $2\frac{6}{10}$ inches.

HABITAT.—South India.

DISTRIBUTION, HABITS, LARVA.—We possess males from Kanara, taken by the late Mr. S. N. Ward. Col. C. Swinhoe has both sexes from Karwar. Messrs. Davidson and Aitken record it as being “found in the forests on the slopes and crest of the Ghâts, and is common, but seems to come out more during the rainy-season. We have bred it from December to May, on the Caper (*Cratævia religiosa*). The eggs are laid in clusters. The larva and pupa are not very different from *A. Libythea*, the pupa may be distinguished from it by the second segment being produced laterally into a tongue-like process, which embraces the shoulder” (J. Bombay N. H. S. 1896, 574). Mr. G. F. Hampson found it “rare in the Nilgiris, at from 1,000 to 3,000 feet elevation” (*l.c.* p. 362). Mr. H. S. Ferguson records it as “not uncommon in the low country of Travancore from April to August. Rare in the Hills, 2,000 to 4,000 feet (*l.c.* p. 444). Capt. E. Y. Watson obtained a female, probably of a dry-season form, at “Kathlekan, Madras, in December” (*l.c.* 1890, p. 8). In the British Museum are specimens from the Nilgiris; Borsippa Falls, September (Watson); Malabar (*ex* Coll. P. Crowley); and Trevandrum, Travancore.

Of our illustrations on Plate 541, fig. 3, 3a are from a Malabar male, and 3b from a Karwar female.

APPIAS ZELMIRA.

Wet-season Brood (Plate 542, fig. 1, 1a, ♂, 1, b, c, ♀).

Papilio Zelmira, Cramer, Pap. Exot. iv. pl. 320, fig. C. D. ♀ (1782).—*nec* fig. E. F.)

Appias Zelmira, Hübner, Verz. bek. Schmett. p. 91 (1816). Butler, Cistula Ent. i. p. 49 (1870); *id.* Ann. Nat. Hist. 1898, p. 392. Moore, Proc. Zool. Soc. 1878, p. 839; *id.* Journ. Linn. Soc. Zool. 1886, p. 49. de Nicéville, Journ. As. Soc. Beng. 1885, p. 50; *id.* 1886, pp. 372—432. Swinhoe, Trans. Ent. Soc. 1893, p. 309. Watson, Journ. Bombay N. H. Soc. 1894, p. 497-8, pl. 2, fig. 1—5, ♂; *id. l.c.* 1897, p. 670. Kirby, Allen's Nat. Libr. Butt. ii. p. 173 (1896). Adamson, List Burm. Butt. 1897, p. 44.

Pieris Zelmira, Boisduval, Spéc. Gen. Lep. i. p. 533, ♀ (1836).

Tachyris Zelmira, Butler, Catal. Fabr. Lep. B. M. p. 210 (1869). Kirby, Syn. Catal. D. Lep. p. 465 (1871).

Pieris Nerissa, Boisduval, Spéc. Gen. Lep. i. p. 535 (1836), *nec* Fabricius.

Tachyris Nerissa, Wallace, Tr. Ent. Soc. 1867, p. 364.

Appias Libythea (pt.), Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 293; *id.* Soc. Ent. 1903, pp. 26, 41.

Appias Libythea, de Nicéville, Sikkim Gazetteer, 1894, p. 169.

WET-SEASON BROOD (Plate 542, fig. 1, 1a ♂, 1b, c ♀).

Male. Upperside greyish-white. *Forewing* with the costal border sprinkled with grey scales; a prominent black exterior marginal decreasing dentated band, the black extending along the subcostals, radials, and upper and middle medians, on each of which it dilates, and thus forms a more or less incomplete excurved subapical fascia enclosing the apical white elongated streaks. *Hindwing* with a prominent black exterior marginal dentated band, the inner points of which are each prolonged acutely for some distance along the veins; the subcostal and medial fascia of the underside being slightly visible. Underside greyish-white. *Forewing* with similar but much less prominent marginal band, the vein portions being more narrowly lined. *Hindwing* with all the veins—except the base of the median, upper discocellular, and base of radial, and entire lower submedian—distinctly black lined, each vein also being slightly edged on both sides with blackish scales, these scales being more broadly sprinkled along the subcostal from its base to apex; a black scaled speckled-fascia also extends across the middle of the wing from lower subcostal to the submedian vein.

Female. Upperside fuliginous greyish-black. *Forewing* with a sullied or greyish-white broad subapical oblique patch, a discal patch extending pointedly inward below the cell towards the base, sinuously outwards to posterior angle and then for some distance below the submedian; also four or five apical more or less distinct white small narrow ovate spots. *Hindwing* with a white upper-discal broad patch extending from the subcostal across outer half of the cell, and a lower-discal series of spots increasing in size posteriorly and obsolescent anally. Underside with similar but much less-defined markings as on upperside. *Forewing* with the dark portions much paler, being either fuliginous or dark fuliginous-grey, the apical area more or less olivescence-yellow tinged, and the spots more or less obsolescent, the cell-area also either dark grey or olivescence tinted. *Hindwing* with the dark portions, as on upperside, much less defined, and of a more or less olivescence-yellow tint, the base of the costa being bright yellow.

Expanse, ♂ ♀ $2\frac{4}{10}$ to $2\frac{6}{10}$ inches.

INTERMEDIATE FORM (Plate 542, fig. 1d, e ♂, 1f ♀).

Appias Olferna, Swinhoe, Ann. Nat. Hist. 1890, p. 358, ♂ ♀.

Male. Upperside. *Forewing* with similar but somewhat narrower, and much paler defined outer marginal markings than in the wet-form. *Hindwing* also with very slightly-defined or obsolescent outer-marginal vein-points. Underside. *Forewing* white, the apical area very faintly flushed with pale yellow; marginal markings either obsolescent or obsolete. *Hindwing* almost white or very faintly flushed with

pale yellow; base of costa pale yellow; veins not lined, the subcostal and medial fascia only being very slightly apparent.

Female. Upperside similar to same sex of wet form, but with the dark markings less prominent, the white portions being either clear or faintly flushed with very pale yellow. Underside with paler and much less defined markings than in wet form. *Forewing* with paler yellowish-tinted apex. *Hindwing* with the veins clear or obsolescently lined, the subcostal and medial fascia slightly apparent, the costal and outer border and medial fascia paler than in wet form; base of costal edge bright yellow.

Expanse, ♂ ♀ $2\frac{2}{10}$ to $2\frac{4}{10}$ inches.

DRY-SEASON BROOD.

Appias Irvinii, Swinhoe, Ann. Nat. Hist. 1890, p. 359, ♂ ♀.

Upperside. *Forewing* with the black outer marginal band showing a much less-defined series of white streaks, which are either slender or obsolescent. *Hindwing* with very slightly-defined outer marginal vein-points. Underside. *Forewing* with the apical area very faintly yellow tinged, the inner-edge of the marginal band being very obscurely indicated. *Hindwing* very faintly yellow tinged, the medial fascia only being very slightly indicated.

Female. Upperside. *Forewing* with somewhat narrower black markings than in the intermediate form; the connection from the cell to the outer band much narrower, and in some almost obsolete, the white slender streaks on the outer band less defined or obsolescent. *Hindwing* with an outer-marginal row of blackish spots of more or less small size, and a few dusky scales very faintly indicating the discal fascia, or in specimens of the *extreme dry form*, this wing is entirely unmarked. Underside. *Forewing* with similar but paler-defined markings as in the intermediate form, the connecting streak from the cell narrower, the apex tinged with very pale yellow. *Hindwing* as in the male.

Expanse, ♂ $2\frac{2}{10}$ to $2\frac{4}{10}$, ♀ 2 to $2\frac{4}{10}$ inches.

HABITAT.—Upper and Lower Bengal; Assam; Lower Sikkim; Burma; Tenasserim; Siam; Tonkin.

DISTRIBUTION.—Cramer gives "Coromandel" for the locality of his *Zelmira*, fig. C, D, which is doubtless erroneous, as our present species does not occur so far south. Mr. L. de Nicéville (J. As. Soc. Bengal, 1885, p. 50) writes, "I have seen a single male specimen of *Zelmira* taken in Calcutta." Mr. W. S. Atkinson, in his MS. Notes, says it is "common in the plains of Bengal. Also taken at Dacca and Silhet." Col. C. Swinhoe's types of *Olferna* and *Irvinii* were both taken at Maldah, Upper Bengal, by Mr. N. Irvine, in March, April, and May—which we have verified by the type labels and reference to the describer's register. Col. Swinhoe records it

as being "common in the Khasia Hills" (Tr. Ent. Soc. 1893, 309). Mr. L. de Nicéville records it (as *A. Libythea*) from Sikkim, as "occurring rather rarely at 2,000 feet elevation, in May" (Sikk. Gaz. 1894, 169). In Burma, according to the observations made by Col. C. H. E. Adamson, "the form *Zelmira* appears in the rainy-season and changes imperceptibly, as the cold and dry seasons follow each other, into the form known as *Irvinii*. In my series of many males and females, although I have extreme forms of each variety, yet it is quite impossible to divide the two when a large number are seen together. I have also taken undoubted males of *Zelmira* in *coitû* with both varieties of females. The insect is common in Upper Burma from October to April" (List Burm. Butt. 1897, 44). Capt. E. Y. Watson obtained it during the Chin-Lushai Exped. of 1889-90 at "Pauk, in September and October, at Pokoko, in September, and at Tilin, in December. Very common" (J. Bombay N. H. Soc. 1891, 53). Capt. E. Y. Watson took the "wet form (his fig. 1) at Pokoko, Upper Burma, in October, the intermediate form (his figs. 2 and 3) in the Upper Chindwin District, Upper Burma, in May, and the dry form (his fig. 4) in the Yaw District, Upper Burma, in January, and (fig. 5) in Toungoo, Lower Burma, in January" (J. Bombay N. H. Soc. 1894, 498). Mr. O. Limborg captured it on the road from Moulmein to Meetan, Upper Tenasserim" (P. Z. S. 1878, 839). Mr. L. de Nicéville records it from Ponekai, and the Hills on the Siamese frontier" (J. As. Soc. Beng. 1886, 432). Dr. J. Anderson obtained it on "Elphinstone Island, Mergui, in March" (J. Linn. Soc. Zool. 1886, 49).

We possess a specimen of both sexes from Bauleah near Calcutta, from Mr. A. Grote's collection; males from Assam, Sikkim, both sexes from Burma and Tenasserim.

APPIAS LIBYTHEA.

Papilio Libythea, Fabricius, Syst. Ent. p. 471 (1775); Spec. Ins. p. 41 (1781); Mant. Ins. p. 19 (1787). Ent. Syst. iii. 1, p. 190; ♀ (1793). Jones, Icones, pl. 54, fig. 2 ♀. Donovan, Ins. India, pl. 27, fig. 3, ♀ (1800).

Pieris Libythea, Doubleday and Hewitson, Gen. D. Lep. p. 46 (1847). Moore, Proc. Zool. Soc. 1865, p. 759.

Tuchyris Libythea, Butler, Catal. Fabr. Lep. B. M. p. 210 (1869). Kirby, Syn. Catal. D. Lep. p. 465 (1871).

Appias Libythea, Moore, Lep. of Ceylon, i. p. 134, pl. 52, fig. 3, 3a ♂ ♀ (1881). Swinhoe, Proc. Zool. Soc. 1885, p. 138, *id.* 1886, p. 431. Hampson, J. As. Soc. Beng. 1888, p. 362. Davidson and Aitken, Journ. Bombay N. H. Soc. 1890, p. 258; *id.* 1896, p. 573. Taylor, Butt. of Orissa, 1888, p. 16. de Nicéville, Journ. Bombay N. H. Soc. 1898, p. 591; *id.* J. As. Soc. Beng. 1900, p. 254; *id. l.c.* 1899, p. 218. Watson, J. As. Soc. Beng. 1890, p. 268; *id.* J. Bombay N. H. Soc. 1894, pp. 497-8.

Appias Libythea (pt.), Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 293; *id.* Soc. Ent. 1903, p. 26

Papilio Zelima, Cramer, Pap. Exot. iv. pl. 320, fig. E. F. ♀ (*nec* fig. C. D.).

Pieris Libitina, Godart, Enc. Méth. ix, p. 133 (1819). Boisduval, Spéc. Gen. Lep. p. 499 (1836).
Pieris Rouxii, Boisd. Spéc. Gen. Lep. p. 481, ♂ (1836).
Appias retexta, Swinhoe, Ann. Nat. Hist. 1890, p. 360, ♂ ♀.

Wet-season Brood (Plate 542, fig. 2 ♂, 2a, b ♀).

IMAGO.—Male. Upperside greyish-white. *Forewing* with black costal edge, and grey-black scaled irrorated basal costal border; a black-scaled very narrow exterior marginal dentated band decreasing from the subcostal to the submedian. *Hindwing* with very small indistinct blackish-scaled marginal vein-points, which are obsolete in some specimens that probably emerged near the dry season. Underside white. *Forewing* with the costal and outer edge slightly blackish; a few greyish-black scales along the base of costa. *Hindwing* unmarked.

Female. Upperside greyish-white. *Forewing* with greyish-black costal edge, a broad longitudinal band from base of the costa and filling up the cell—with the exception of a thin streak above the median vein, this black cell-band more or less thinly extends along the upper median veinlet and joins a broad outer-marginal decreasing band extending sinuously from before the apex to posterior angle, enclosing the white subapical oblique quadrate patch, the outer band showing faint traces of paler intervening streaks; a less intense greyish-black fascia extends pointedly outward from below the cell to the disc in extreme wet-season specimens. *Hindwing* with a greyish-black marginal macular band composed of large confluent spots, or, of more or less slightly separated spots paling diffusely to the anal angle, and connected by similar coloured scales along the veins from the lower subcostal to a discal curved paler fascia, which latter becomes obsolete posteriorly. Underside white. Both wings with dark-grey similar disposed markings. *Forewing* with the outer band traversed by white interspaced streaks, or this band is white and its inner edge only defined by dark grey. *Hindwing* with the outer-marginal macular band indistinct or obsolescent; base of costa pale yellow. Some *intermediate* specimens of this sex (Plate 542, fig. 2a)—which agree with the Fabrician *type* specimens of *Libythea*—emerged probably near the dry season, vary on the upperside, in the *forewing*, in the connecting black streak along the upper-median to the outer band, and also the lower basal fascia, being either obsolescent or obsolete, and in the *hindwing*, the marginal spots are smaller and more or less well separated, the discal fascia with its connecting veins is also obsolescent or more generally entirely absent. On the underside, the markings are much less defined; on the *forewing* the outer band is very faintly indicated by the greyish inner-edge, the apical area being entirely white or very faintly tinged with pale yellow, and on the *hindwing* the ground-colour is either white or very faintly tinged with pale yellow, the discal fascia being faintly indicated, and the marginal spots absent.

Expanse, ♂ ♀ 2 to $2\frac{4}{10}$ inches.

Dry-season Brood (Plate 542, fig. 3 ♂, 3a, b ♀).

Appias Ares, Swinhoe, Proc. Zool. Soc. 1885, p. 138, ♂ ♀.

Male. Upperside. *Forewing* with a diffused broader grey-black scaled outer-marginal band. *Hindwing* unmarked. Underside with the apical area of forewing, and entire hindwing tinted with very pale yellow.

Female. Upperside. *Forewing* with the cell-band and the marginal band somewhat narrower than in specimens of the *intermediate* form, the connecting streak being entirely absent. *Hindwing* unmarked. Underside. *Forewing* with the cell-band and marginal band faintly indicated, the apical area pale yellow tinted. *Hindwing* pale yellow tinted; the discal fascia faintly indicated.

Expanse, ♂ ♀ 2 to 2 $\frac{2}{10}$ inches.

LARVA.—Cylindrical, slightly tapering at each end, anal segment slightly bifid; colour, green.

PUPA.—Attached to a leaf. Head with a short frontal snout; a thoracic-dorsal acute prominence, a medial-abdominal lateral angular process on each side (described from Sir W. Elliot's drawing, Madras, 1854).

HABITAT.—North-Western, Central, South-Eastern, and South India; Ceylon.

Note. The Fabrician type specimens, female, of *A. Libythea*, are preserved in the Banksian Collection at the British Museum.

DISTRIBUTION, HABITS, LARVA, ETC.—Mr. L. de Nicéville records "a single female in Col. A. M. Lang's collection, taken at Masuri, W. Himalaya, on June 17th, 1868, at 7,000 feet elevation" (J. Bombay N. H. Soc. 1898, 591). We possess two females labelled "Punjab." A male from Delhi is in the Calcutta Museum. Mr. W. S. Atkinson, in his MS. Notes, writes, "Plains of Bengal; not common." We possess a male from Balasore, Lower Bengal, taken by Mr. Arthur Grote. Mr. W. C. Taylor records it as "common at Khorda in Orissa" (List, p. 15). The late Sir W. Elliot "found the larva in Madras feeding on *Cratæva Roxburghii*, in July, 1854, changing to pupa July 25th, the imago emerging July 29th." Capt. E. Y. Watson found it "not uncommon in Madras, from May to August" (J. Bombay N. H. Soc. 1890, 268). Col. C. Swinhoe obtained "*Libythea* in Bombay, from July to December, in Poona October to April; the form *Ares* in Poona from November to March" (P. Z. S. 1885, 138), also *Libythea* in Mhow, June, and *Ares* also in Mhow, in January" (*id. l.c.* 1886, 431), his types of *retexta* being taken in "Bombay and Poona from July to December" (Ann. N. H. 1890, 360). Messrs. J. Davidson and E. H. Aitken write, "We did not get this butterfly in Kanara, but reared a good many in Bombay during April and May, on *Capparis horrida*. The larva is long, green, somewhat depressed, and has the rough surface and general aspect of a *Terias*, or a *Catopsiliu*, but the anal extremity tapers a little and is slightly but

distinctly bifid. The *pupa* is of quite a different type from *Terias* and *Catopsilia*. It is closely attached to a leaf, and the wing-cases do not form a keel, but there is an acute dorsal prominence just behind the head, and a transverse dorsal ridge in the middle connecting two angular lateral processes; the head ends in a short snout; the colour is variable, and probably depends on situation" (J. Bombay N. H. S. 1890, 358). "The butterfly is very common in the forests and on the slope and crest of the Ghâts throughout the dry season. Wherever a patch of moist sand presents itself in the bed of a mountain stream, they form a quivering white cloud, tinged with yellow by specimens of *Appias Hippoides*, and speckled with green by *Papilio Sarpedon*. We have not seen the butterfly much about Karwar, and conclude that it is little on the wing during the rainy season. In the *pupa*, the band is short, so that the vertical side is applied close to the surface to which the pupa is attached, the thorax is stout and not compressed or keeled, segment No. 7 bears on the back a sharp transverse ridge ending in pointed lateral processes. *Capparis horrida* seems to be the favourite food of this species; it is also commonly found on *Cratæva religiosa*. Eggs laid singly" (*id. l.c.* 1896, 573). Mr. G. F. Hampson found it "rare in the Nilgiris, from 1,000 to 3,000 feet elevation" (J. As. Soc. Beng. 1888, 362). In Ceylon Mr. F. M. Mackwood obtained it in the "low country, so far found only in the Kurunegalla country. Capt. Wade took it at Hambantotte in June and July, and Mr. Pole at Puttalam" (Lep. Ceyl. i. 134).

INDO-MALAY SPECIES — *Appias Hippo* (Pap. Hippo, Cramer, Pap. Exot. iii. pl. 195, fig. B. C. ♀ (1782). Herbst, Pap. v. p. 137, pl. 102, fig. 4, 5 ♀ (1792). Pieris Hippo, Godt. Encyc. Méth. p. 143 (1819). Boisd. Spéc. Gén. Lep. i. p. 534, ♀ (1836). *Appias Hippo*, Distant, Rhop. Malay. p. 311, pl. 25, fig. 4, 5, ♂ ♀ (1885). *Catophaga Hippo*, de Nicéville, Journ. Asiatic Soc. Bengal, 1895, p. 301. *Tachyris Lyncida Hippo* (pt.), Fruhstorfer, D. Ent. Zeit. 1902, p. 289. *Habitat.* Malacca, Singapore, Sumatra.

Appias Lyncida (Pap. Lyncida, Cramer, Pap. Exot. ii. pl. 131, fig. B, ♂ (1779). *Habitat.* Java.

Appias Enarete (Pieris Enarete, Boisd. Spéc. Gén. Lep. i. p. 480 (1836). *Tach. Lyncida Enarete*, Fruhst. *l.c.* p. 289. *Habitat.* Borneo.

Appias Formosana (Pieris Formosana, Wallace, Proc. Zool. Soc. 1866, p. 356. *Tachyris Form.* Wallace, Trans. Ent. Soc. 1867, p. 366. Fruhst. *l.c.* p. 289. *Habitat.* Formosa.

Appias inornata, Moore, Proc. Zool. Soc. 1878, p. 700. Holland, Trans. Amer. Ent. Soc. 1887, p. 121. *Tach. Lyncida inornata*, Fruhst. *l.c.* p. 289. *Habitat.* Hainan.

Appias Andrea (*Colias Andrea*, Esch. Kotzeb. Reise iii., p. 215, pl. 23, fig. a, b, (1821), ♂. *Tachyris Andrea*, Wallace, Trans. Ent. Soc. 1867, p. 366, ♀. *Appias Andrea*, Semper, Reise Phil. Lep. p. 242, pl. 39, fig. 6. *Habitat.* Philippines.

Genus HUPHINA.

Huphina, Moore, Lep. of Ceylon, i. p. 136 (1881). Watson, Journ. Bombay, Nat. Hist. Soc. 1894, p. 494.

Appias (pt.), Distant, Rhop. Malay. p. 310 (1885).

Huphina (pt.), Butler, Ann. Nat. Hist. 1899, p. 201.

IMAGO.—Wings broader and shorter than in typical *Appias*. *Forewing* less triangular, costa much arched from the base, apex almost rounded; costal vein extending to half the margin; upper discocellular veinlet deeply concave, not oblique, lower veinlet less concave; cell shorter. *Hindwing* broader; cell narrower and longer; discocellulars more oblique. Antennal club slender. No tufts to anal valves.

LARVA.—“Cylindrical; anal segment sloped and slightly bifid; segments pubescent, the lateral hairs soft and longest; colour, green” (S. N. Ward, MS. Notes).

PUPA.—Head with a frontal projecting point; thorax laterally and dorsally produced and angled; abdomen laterally ridged, and anteriorly transversely-produced, the posterior segments with slight dorsal points.

TYPE.—*H. Coronis*, Cram.

SEASONAL VARIATION.—“In this genus seasonal variation is shown in the greater prominence of all the dark markings on the upperside and in the much richer coloration of the underside in the *rainy-season* forms, the general tone of the underside of the *dry-season* forms being, in most species, of a much greyer shade; the difference in size is also very marked” (Watson, *l.c.* p. 494).

HUPHINA CORONIS.

Plate 543.

Papilio Coronis, Cramer, *l.c.* i. pl. 44, fig. B, C, ♀ (1776)—*Wet form*. Jones, *Icones, ined.* pl. 9, fig. 2, 2a, ♀.

Pieris Coronis, Lang, Ent. Mo. Mag. 1864, p. 102.

Papilio Phryne, Fabricius, Syst. Ent. p. 473, ♂ (1775).

Pieris Phryne, Butler, Catal. Fabr. Lep. B. M. p. 202 (1869). Elwes, Trans. Ent. Soc. 1888, p. 417.

Huphina Phryne, Moore, Lep. of Ceylon, i. p. 136, pl. 53, fig. 1, 1a, b, ♂ ♀, *larva* (1881). de Nicéville, Journ. As. Soc. Beng. 1885, p. 50, *id. l.c.* 1886, p. 372. *id.* Sikkim Gaz. 1894, p. 168. Swinhoe, Proc. Zool. Soc. 1886, p. 431. *id. l.c.* 1885, 137. *id.* Trans. Ent. Soc. 1893, p. 309. Ferguson, J. Bombay, N. H. Soc. 1891, p. 440. Watson, Journ. Bombay N. H. Soc. 1894, pp. 495, 527, pl. 1, fig. 7 to 12 ♂ ♀. Davidson and Aitken, Journ. Bombay N. H. Soc. 1896, p. 574. Butler, Ann. Nat. Hist. 1899, p. 211.

Huphina Phryne (pt.), Adamson, List Burm. Butt. p. 45 (1897).

Papilio Evagete, Cramer, Pap. Exot. iii. pl. 221, fig. F. G. ♀ (1782)—*Dry form*.

Appias Evagete et Zeuxippe, Rothney, Ent. Mo. Mag. 1882, p. 35.

Papilio Zeuxippe, Cramer, *l.c.* iv. pl. 362, fig. E. F. ♀ (1782)—*Intermediate form*.

Pieris Zeuxippe, Butler, *Catal. Fabr. Lep. B. M.* p. 201 (1869).

Huphina Zeuxippe, de Nicéville, *Journ. As. Soc. Bengal*, 1885, p. 50. Swinhoe, *Proc. Zool. Soc.* 1885, p. 137, ♂ ♀; *id. l.c.* 1886, p. 431. Moore, *Lep. Ceylon* iii. p. 522 (1887). Hampson, *Journ. As. Soc. Beng.* 1888, p. 362.

Papilio Cassida, Fabr. *Ent. Syst. Suppl.* p. 427 (1798).

Huphina Cassida, Swinhoe, *Proc. Zool. Soc.* 1885, p. 137, ♂ ♀; *id. l.c.* 1886, p. 431—*Dry form*.

Pieris Hira, Moore, *Proc. Zool. Soc.* 1865, p. 490, pl. 31, fig. 17, ♂—*Extreme dry form*.

Huphina Hira, de Nicéville, *Journ. As. Soc. Beng.* 1885, p. 50.

Huphina pallida, Swinhoe, *Proc. Zool. Soc.* 1885, p. 137, ♂ ♀—*Extreme dry form*.

Huphina Nerissa, de Nicéville, *Journ. Bombay Nat. Hist. Soc.* 1898, p. 590. *id.* *Journ. As. Soc. Bengal*, 1899, p. 219. Butler, *Ann. Nat. Hist.* 1899, p. 212. Fruhstorfer, *D. Ent. Zeit.* 1902, p. 276; *id. Soc. Ent.* 1903, p. 25.

Wet-season Brood (Plate 543, fig. 1, 1a, ♂, 1b, ♀, 1c, d, ♂, 1e, ♀).

IMAGO.—Male. Upperside greyish-white. *Forewing* with the base of costa irrorated with greyish-black scales; a black outer marginal band decreasing from beyond one-third from the apex to posterior angle, the black slightly extending inward along the veins for some distance and also more prominently along the subcostal and the two upper medians, enclosing two or three subapical white speckled slender short streaks and a triangular spot between the upper medians; between the lower median and submedian a slightly-defined lunular cluster of blackish scales is generally present, these scales sometimes extending to the posterior margin. *Hindwing* with a black upper outer marginal macular—or sometimes a continuous dentated band, the lower margin being dark grey scaled and having a submarginal series of similar grey or blackish scaled sagittate confluent marks. Underside. *Forewing* white, the costa and apical interspaces olive-yellow, the veins blackish-bordered, darkest and broadest within the cell, along the subcostal, the median and its two upper branches, including the two lower discal bars. *Hindwing* olive-yellow, with the veins broadly, and the submarginal sagittate confluent-marks, blackish scaled.

Female. Upperside white. *Forewing* with the costa, borders of the cell and the outer veins more or less broadly brownish-black, the medial area of cell, discal streaks, and submarginal spots only being white, the apical spots sometimes being yellow-tinted. *Hindwing* with the costal border, subcostal, median and its upper branch, a discal more or less broad sagittate band and a partly confluent outer-marginal band brownish-black, the medial area of cell, the discal streaks and lower submarginal interspaces only being white or greyish-white, the anal area sometimes being ochreous tinted. Underside similar to the male, except that on the hindwing the medial area of the cell and lower discal streaks are whitish.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{3}{4}$, ♀ $2\frac{1}{4}$ to $2\frac{1}{2}$ inches.

Intermediate Form (Plate 543, fig. 1, f, g ♂; 1h ♀).

Male. Upperside similar to the *wet-season* form, except that on the *forewing* the black outer band is more marginally restricted, and the lower-discal cluster of speckles generally absent, and the *hindwing* with a marginal upper series of black spots only.

Female. Upperside. *Forewing* with duller black markings, broader white cell area and discal streaks, posterior border and submarginal spots. *Hindwing* with narrower marginal blackish dentate band and lower submarginal sagittate confluent marks. Underside of both sexes similar to *Wet* form, except that the apex of forewing, and the hindwing, is of a paler yellow tint.

Expanse ♂ ♀ $2\frac{1}{4}$ inches.

Dry-season Brood (Plate 543, fig. 2, 2a ♂, 2b ♀).

Smaller than the *Intermediate* form (*Zeuippe*). Male. Upperside. *Forewing* with the black outer band well-defined, the lower-discal speckles absent. *Hindwing* with smaller marginal spots.

Female. Upperside similar to *Intermediate* form, but with all the black markings less prominent. Underside. *Forewing* with fainter blackish cell-borders and discal spots, the costa and apex paler yellow. *Hindwing* uniformly pale yellow, unmarked, or with very faint traces of the ordinary vein markings.

Expanse, ♂ ♀ 2 inches.

Extreme Dry form (Plate 543, fig. 2c ♂, 2d ♀).

Smaller than ordinary *Dry-season* form (*Cussida*). Male. Upperside. *Forewing* with the black outer band similar, its enclosed spots small or obsolete. *Hindwing* either immaculate, or with faint traces of a few marginal blackish scales.

Female. Upperside similar to *Dry form* (*Cassida*) except that the *hindwing* is either immaculate, or with faint traces of a few marginal blackish scales. Underside of both sexes similar to *Cassida*, except that the costa and apex of the forewing, and the entire hindwing is of a very pale ochreous-yellow.

Expanse, ♂ $1\frac{4}{10}$ to $1\frac{8}{10}$, ♀ $1\frac{5}{10}$ to $1\frac{8}{10}$ inch.

LARVA.—“Cylindrical; anal segment sloped and slightly bifid; segments pubescent, the lateral hairs soft and longest. Colour, green.” (S. N. Ward, Kanara MS. Notes.) Feeds on Capparis.

PUPA.—Head with a frontal projecting point; thorax laterally and dorsally produced and angled; abdomen laterally ridged and anteriorly transversely produced, the posterior segments with slight dorsal points. Colour, green.

HABITAT.—Lower Ranges of W. and E. Himalayas; Continental India; Ceylon.

DISTRIBUTION AND HABITS.—In the Western Himalaya, as observed by Mr. P. W.

Mackinnon, "it is rare in Masuri; but very common in the Dhoon almost throughout the year, especially the rains brood which flies in August and September" (J. Bombay, N. H. S. 1898, 590). Capt. A. M. Lang found it "abundant in Oudh. I have seen none in the Hills" (Ent. Mo. Mag. 1864, 103). Mr. H. J. Elves records *Phryne* as being "common in Sikkim, up to 5,000 feet elevation, throughout the season" (Tr. Ent. Soc. 1888, 417). Mr. L. de Nicéville says it is "a common species in the low valleys of Sikkim and up to 5,000 feet. It is subject to very great seasonal variability; the form flying in the spring is small and very pale, that in the rains is very large, dark, and richly coloured" (Sikkim Gaz. 1894, 168). Mr. R. Hunter found the larva and reared the imago of the dry-season form (Hira) at Saugor in March, the larva feeding on the "Koringe" (MS. Note). At Allipore, near Calcutta, Mr. Arthur Grote found and reared the larva. It fed on *Zizyphus scandens* and *Napeia scabra*. Mr. J. Rothney records it as being "common in Barrackpur Park, near Calcutta, in the rainy-season, being fond of flowers, especially of *Duranta Plumieri*" (Ent. Mo. Mag. 1882, 35). Mr. L. de Nicéville also records it as "common in the neighbourhood of Calcutta, the larva feeding on *Capparis horrida*" (J. As. Soc. Beng. 1885, 50). In Orissa, Mr. W. C. Taylor found it "very common at Korda" (List, 1888, p. 15). Col. C. Swinhoe records *Phryne* from the Khasias (Tr. Ent. Soc. 1893, 309). "A single male *Phryne* was taken at Silcuri, Cachar, in July" (J. As. Soc. Beng. 1886, 372). Col. C. Swinhoe records *Phryne* as "common everywhere in Bombay and the Dekkan; *Zeuxippe* at Poona from April to June, and at Belgaum; *Cassida* at Poona from October to April; *pallida* at Poona in January and February, and in Bombay also in February" (P. Z. S. 1885, 137). Col. Swinhoe also obtained "*Phryne* at Mhow from September to November; *Zeuxippe* from April to June, and *Cassida* from November to May" (l.c. 1886, 431). Messrs. Davidson and Aitken record the butterfly as "very common in the N. Kanara District, S. India, but much less so in the monsoon than in the dry-season. The larva is green, and the pupa green with brown and white edgings. Feeds on *Capparis*" (J. Bombay N. H. S. 1896, 574). Mr. G. F. Hampson records it from the Nilgiris (J. As. Soc. Beng. 1888, 362). Mr. H. S. Ferguson found it "common in Travancore, both in the low country and Hills" (J. Bomb. N. H. Soc. 1891, 444). In Ceylon, Mr. F. M. Mackwood obtained it "in low country and Hills; chiefly from 2,000 to 4,000 feet elevation, not frequently beyond. Capt. Hutchison took it in Colombo and on the road from Kandy to Trincomalie. Plains, both in cultivated land and forest. Not at all common. Has a slow uncertain flight" (Lep. Ceylon, i. 136). Dr. N. Manders says "*H. Nerissa* is very common in Ceylon, although scarcer in some seasons than in others, and occurs at all elevations. It is highly seasonally dimorphic, and the larva feeds on *Capparis*" (J. As. Soc. Beng. 1899, 220).

Of our illustrations on Plate 543, fig. 1, 1a, b are from a Darjiling *wet-season* male and female, 1c, d, e from a Bombay male and female, 1f a male from Assam, 1g from a Sikkim male, 1h from a Calcutta female; fig. 2 from a *dry-season* male taken in Maumbhoom, Bengal, fig. 2a from a Mhow male, 2b from a N. W. Indian female, 2c, d from a Poona male and female of the *extreme dry form*, taken in December.

HUPHINA COPIA.

Plate 544, fig. 1, 1a ♂, 1b ♀ (*Wet*), 1c, d ♂, 1e ♀ (*Dry*), 1f, g ♂, 1h ♀ (*Extreme Dry*).

Pieris Copia, Wallace, Trans. Ent. Soc. Lond. 1867, p. 340, ♂—*Dry form*.

Appias Dapha, Moore, Proc. Zool. Soc. Lond. 1878, p. 838, ♂—*Extreme Dry form*.

Huphina Dapha, Watson, Journ. Bombay Nat. Hist. Soc. 1894, pp. 495, 527, pl. 1, fig. 1 to 6, ♂ ♀—*Wet and Dry forms*.

Pieris Phryne (pt.), Elwes, Tr. Ent. Soc. 1885, p. 417.

Huphina Phryne (pt.), de Nicéville, Sikkim Gaz. 1894, p. 168. Adamson, List. Burm. Butt. p. 45 (1897).

Wet-season Brood (Plate 544, fig. 1, 1a ♂, 1b ♀).

IMAGO.—Male. Upperside similar to *wet season* *Coronis*. *Forewing* with comparatively narrower and apically more uniformly or entirely black outer marginal band. *Hindwing* with smaller marginal spots.

Female. Upperside. *Forewing* with the apical area of the marginal band entirely black. Underside. Both sexes with the costa and apex of forewing paler yellow, and on the hindwing the yellow is restricted to the basal area.

Expanse, ♂ 2 to $2\frac{1}{4}$, ♀ $2\frac{1}{4}$ inches.

Dry-season Brood (Plate 544, fig. 1c, d ♂, 1e ♀)

Male. Upperside similar to *wet form*, except that on the hindwing the marginal spots are less defined and smaller. Female. Upperside with duller black markings than in *wet form*, the apical area of marginal band on forewing entirely black. Underside of both sexes with faintly indicated ordinary dusky borders to the veins, the costa and apex of forewing and the base of hindwing being almost white or tinged with extremely pale yellow.

Expanse, ♂ ♀ $2\frac{1}{4}$ to $2\frac{1}{2}$ inches.

Extreme Dry Brood (Plate 544, fig. 1f, g ♂, 1h ♀).

Male. Upperside. *Forewing* with the marginal band narrower than in ordinary *dry form*, the contiguous discal spot in the upper median interspace obsolescent or obsolete. *Hindwing* with the marginal spots very indistinct or obsolete. Female. Upperside white, with less prominent and more restricted markings than in ordinary *dry* or *wet form*, the band on forewing being also, apically, entirely black. Underside

of both sexes white, with very faint ordinary dusky vein borders, the apex of forewing being also slightly dusky-grey.

Expanse, ♂ ♀ 2 to 2 $\frac{1}{4}$ inches.

HABITAT.—Sikkim; Assam; Burma.

DISTRIBUTION.—We possess the male type specimen described by Mr. Wallace as *P. Copia*, from "Bengal," and also the male type of *P. Dapha*, from Moulmein; *wet* and *dry-season* male from Sikkim, taken by Mr. G. C. Dudgeon; *wet-season* male from Burma, taken by Col. Adamson in September; *dry-season* males from Moulmein, Pegu, and Ava—taken by Col. Adamson; Bhamo, November; taken by Signor L. Fea; extreme *dry-season* male from Lower Chindwin Hills taken in February by Col. Adamson. Mr. W. Rothschild has a *wet-season* female from Bassein, Burma, and both sexes of the *dry-season* form from Sikkim taken in October and November by Mr. Möller. Col. C. Swinhoe possesses a *wet-season* male from Mandalay, and also *dry-season* male from Cherra Punji and Sikkim. Capt. E. Y. Watson writes, "This form (*Dapha*) is very common throughout Burma, and extends as far as Sikkim, being replaced in the rest of the Indian region by *H. Phryne* (J. Bombay N. H. Soc. 1894, 495). Capt. Watson also figures (*l.c.* plate 1, fig. 1 and 2) a pair of the extreme *wet-season* form, taken in *coitu* at Thayetmyo, Lower Burma, in August; in fig. 3, 4 a pair, of an *intermediate* seasonal form, taken in *coitu*, at Pokoko, Upper Burma, in October, and in fig. 5, 6 a pair of the extreme *dry-season* form, also taken in *coitu*, at Toungoo, Lower Burma, in January" (*l.c.* p. 496). Col. C. H. E. Adamson writes, "I have taken a large series of *H. Phryne* throughout Burma; the seasonal forms vary in a similar manner to those of *Zelmira*. It is one of the commonest insects in Central Burma" (List, p. 45). Signor L. Fea obtained it at Bhamo in October. Dr. N. Manders, under *Hira*, says it is "very common in the Shan States and widely distributed" (Tr. Ent. Soc. 1890, 534).

Of our illustrations on Plate 544, fig. 1, 1a are from a male taken by Col. Adamson in September, fig. 1b from a Burma female, in Mr. W. Rothschild's collection; fig. 1, c, d, the male type of *Copia*; fig. 1, e, a female from Sikkim, taken in November by Mr. Möller; fig. 1f, g, the male type of *Dapha*, from Moulmein, and fig. h, a female Burma, taken by Col. Adamson.

HUPHINA LICHENOSA.

Plate 544, fig. 2, 2a ♂, 2b ♀.

Pieris Lichenosa, Moore, Proc. Zool. Soc. Lond. 1877, p. 591.

Huphina Lichenosa, Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 495. Butler, Ann. Nat. Hist. 1899, p. 212. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 277.

IMAGO.—Male. Upperside. Differs from *H. Copia*, on the forewing, in having a more uniformly black and somewhat broader outer marginal band. Underside. *Forewing* with broader blackish bordering to the veins, the costal border and apical veins being of a dusky olivescens-yellow with pale interspaces. *Hindwing* with all the vein-borders, discal, and marginal band uniformly broader, and of a dusky olivescens-yellow, with pale interspaces.

Female. Upperside. *Forewing* with the broad outer band more uniformly black than in the male. *Hindwing* with blackish marginal band similar to the male, but with an inner apical streak. Underside similar to the male, but with less-defined pale interspaces on apex of the forewing and in disc of the hindwing.

Expanse, ♂ ♀ $2\frac{1}{2}$ inches.

HABITAT.—Andaman Islands.

HUPHINA LEA.

Plate 545, fig. 1, 1a ♂, 1b ♀.

Pieris Lea, Doubleday, Ann. and Mag. Nat. Hist. 1846, p. 23; *id.* Gen. D. Lep. i. p. 45 (1847).

Huphina Lea, Moore, Journ. Linn. Soc. Zool. 1886, p. 49. Watson, Journ. Bombay N. H. Soc. 1888, p. 25; *id. l.c.* 1891, p. 53, *id.* 1894, p. 494. Butler, Ann. Nat. Hist. 1899, p. 208. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 279.

Appias Lea, Moore, Proc. Zool. Soc. 1878, p. 838. Adamson, List Burm. Butt. 1897, p. 44.

Pieris Clemanthe, Doubleday and Hewitson, Gen. D. Lep. i. p. 45, pl. 6, fig. 3 ♂ (1847).

IMAGO.—Male. Upperside white. *Forewing* with the costa and median vein slightly black scaled; a black outer-marginal narrow band extending decreasingly inward along the borders of the veins from about apical-half of the costa to posterior angle, the portion bordering the upper median generally being the broadest and reaching the lower discocellular veinlet. *Hindwing* with a black narrow outer-marginal band, the black extending inwardly slightly up the veins from the subcostal to middle median, the anal area to near the upper median with a broad deep chrome-yellow patch paling broadly to sulphur-yellow. Underside. *Forewing* white, the costal border, margins of the cell black, the apex and outer-margin dark vinous-brown, enclosing a series of upper-discal and lower submarginal white spots, and three or four small obliquely superposed subapical yellow spots, the base of costa being also tinged with yellow. *Hindwing* bright sulphur-yellow, the anal area and abdominal margin being tinged with deep chrome-yellow; the costal vein, subcostals, median vein, and a broad outer-marginal band varying in width being deep vinous-brown, the latter enclosing a large sulphur-yellow apical spot and sometimes a smaller spot below it, and also, in some specimens, two, or three, lower obscure chrome-yellow scaled narrow lunular spots.

Female. Upperside. *Forewing* white, the base more or less dusky; with broader black costal border, median vein and outer-marginal bordering, the latter enclosing upper-discal small white streaks and lower spots. *Hindwing* white, tinged with pale sulphur-yellow basally; the chrome-yellow anal patch more anally restricted and of a darker or more dusky tint, the outer-marginal band being broader than in the male, and irregularly-sinuous inwardly. Underside similar to the male, except that, on the hindwing, the markings on the outer-marginal band are complete and more defined.

Expanse, ♂ 2 to $2\frac{1}{2}$, ♀ $2\frac{1}{4}$ to $2\frac{1}{2}$ inches.

HABITAT.—Southern Burma.

DISTRIBUTION.—“Common in the mountains east of Moulmein in January” (W. S. Atkinson, MS. Notes). Col. C. H. E. Adamson writes, “I have caught this butterfly commonly near Rangoon, but it appears to be local, as I have not met with it elsewhere in Burma” (List, p. 44). Capt. E. Y. Watson records it as “a common species in Southern Burma” (J. Bombay N. H. S. 1894, 495). Mr. O. Limborg obtained it in “Moolai, from 3,000 to 6,000 feet elevation” (P. Z. S. 1878, 838). Dr. J. Anderson took it on “Sullivan Island in January, and on Elphinstone Island, Mergui Archipelago, in March” (J. Linn. Soc. Zool. 1886, 49).

HUPHINA NADINA.

Plate 545, fig. 2, 2a, b (*Wet*), 2c, d, e (*Dry Brood*).

Pieris Nadina, Lucas, Rev. et. Mag. Zool. 1852, p. 333, ♂ *only*. Wallace, Tr. Ent. Soc. 1867, p. 341.

Huphina Nadina, de Nicéville, Sikkim Gazetteer, 1894, p. 168. Adamson, List Burm. Butt. p. 44 (1897). Watson, Journ. Bombay N. H. Soc. 1897, p. 670. Butler, Ann. Nat. Hist. 1899, p. 213. Fruhstorfer, D. Ent. Zeit. 1902, p. 277; *id.* Soc. Ent. 1903, p. 26.

Pieris Nama, Moore, Catal. Lep. Mus. E. I. Company, i. p. 76, ♂ ♀ (1857); *id.* Proc. Zool. Soc. 1857, p. 102, pl. 44, fig. 1, 2 ♂ ♀ (*Wet form*). Wallace, Tr. Ent. Soc. 1867, p. 340. Elwes, Tr. Ent. Soc. 1888, p. 417.

Huphina Nama, de Nicéville, Journ. As. Soc. Beng, 1886, p. 372. Watson, Journ. Bombay, N. H. Soc. 1891, p. 53; *id. l.c.* 1894, pp. 495, 527, pl. 2, fig. 6 ♂ (*Wet*), fig. 7 ♂ (*Dry*). Swinhoe, Tr. Ent. Soc. 1893, p. 309.

Appias Nama, Moore, Proc. Zool. Soc. 1878, p. 838.

Pieris Amba, Wallace, Tr. Ent. Soc. 1867, p. 340, ♂ (*Dry form*).

Appias Amba, Moore, Proc. Zool. Soc. 1878, p. 839.

Huphina Amba, Swinhoe, Tr. Ent. Soc. 1893, p. 309.

Pieris Amboides, Moore, Journ. As. Soc. Bengal, 1884, p. 46, ♂ (*Dry form*).

Wet-season Brood (Plate 545, fig. 2, 2a ♂, 2b ♀).

Male. Upperside white. *Forewing* with the base of costa slightly greyish-black

scaled; a grey-black outer-marginal band curving from middle of costa and decreasing to the posterior angle, its inner edge being crenated, and the apical portion slightly irrorated with white scales between the veins. *Hindwing* with a narrow outer marginal obscurely-defined greyish-black band, the end of the anterior veins being dilatedly-bordered with more distinct black scales forming marginal spots. Underside. *Forewing* with the costal band extending broadly from the base along upper area of the cell, and the continuous but broader outer band dusky olivescient-yellow irrorated with blackish scales, its lower end being blackest, enclosing a submarginal oblique superposed series of small pale olivescient-yellow spots and also a lower whitish spot in the upper median interspace. *Hindwing* dusky olivescient-yellow, with the borders of the costal, subcostals, median vein, and an ill-defined inner-discal and an outer-marginal band, irrorated with blackish scales, leaving the costal and subcostal interspace, and submarginal macular interspaces—and sometimes the abdominal margin—pale olivescient-yellow; a prominent pale olivescient-yellow streak extending along the medial area of the cell, this streak also extending outwardly beyond the cell and sometimes coalesces with the second submarginal spot in the subcostal interspace, the outer portion and also the coalesced spot generally being of a paler tint, or sometimes white.

Female. Upperside blackish-brown; cilia white. *Forewing* with three medial longitudinal white streaks, the upper one broad and extending from a point near base of the cell to the lower discocellular veinlet, from thence decreasing to a point in the discal interspace beyond where it is sometimes joined to a very slender shorter upper streak, followed below by two medial-discal similar white streaks, the upper of which is short, the lower lengthened and outwardly pointed; below the end of the latter is a small white streaky-spot near the posterior angle and then a slender short streak along the posterior margin. *Hindwing* with two medial conjoined longitudinal white streaks, the upper being discally placed beneath the lower subcostal veinlet, the lower extending from near base of the cell to beyond the lower discocellular veinlet. Underside similar to the male, except that, in the *forewing*, there is a lower-discal blackish spot and the posterior margin from the base is broadly blackish, and in the *hindwing*, the medial streaks are white from near base of the cell.

Expanse, ♂ ♀ $2\frac{1}{2}$ to 3 inches.

Dry-season Brood (Plate 545, fig. 2c, d ♂, 2e ♀).

Male. Upperside. *Forewing* with similar but somewhat narrower outer black band than in *wet form*. *Hindwing* also with narrower obscure blackish-grey outer margin, the black vein-ends being more distinctly macular. Underside. *Forewing* with the costal border and apical band very pale brownish-ochreous. *Hindwing* also

very pale brownish-ochreous, with faint dusky subcostal and median vein-borders and discal band. In the *extreme dry form* (*Amboides*) the upperside of the forewing has the apical band narrower, and the hindwing is entirely white, without any trace of marginal markings. The *forewing* has the costal border and apical band, and the *hindwing*, pale yellowish-ochreous, the hindwing showing but very faint traces of the subcostal and median dusky borders, the discal band being entirely absent.

Female. Upperside. *Forewing* with the medial white streaks broader than in *wet form*, and confluent, the lower extending to beneath the lower median veinlet, below which is a slight streak along posterior margin. *Hindwing* with the medial white streaks broader than in the *wet form*, the lower basal and discal area being also greyish white. Underside similar to the *wet form* except that the costal and apical border of the forewing, and the hindwing is of a pale ochreous-brown.

Expanse, ♂ 2 to $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ inches.

HABITAT.—N.E. India; Burma; Tenasserim.

DISTRIBUTION.—We possess specimens of the *wet-season* form from Sikkim, Silhet, Khasias, Manipur, Burma, and the Shan States, and of the *dry-season* form, the male types of *Amba* and *Amboides*. Capt. E. Y. Watson writes, "This species (*Nama*) with its dry-season form (*Amba*) occurs fairly common throughout N.E. India, and Burma" (*J. Bombay N. H. S.* 1894, 496). Mr. H. J. Elwes records it as being "common in Sikkim up to 3,000 or 4,000 feet elevation, nearly all the year round. The specimens found in the cold weather from December till March have the underside of a pale greyish-brown with hardly any green tint, and the markings almost obsolete" (*Tr. Ent. Soc.* 1888, 417). Mr. L. de Niceville writes, "It is common in Sikkim at low elevations from March to December. The spring or dry-season form, named *Amba*, is much smaller and paler than the rains form, having the underside pale greyish-brown instead of rich green" (*Sikk. Gaz.* 1894, 168). Col. C. Swinhoe records it from the Khasias (*Tr. E. Soc.* 1893, 309). Col. C. H. E. Adamson obtained it in "Bhamo and Upper Tenasserim. It varies much in size and in the tone of the colouring of the underside" (*List*, 1897, 44). Mr. O. Limborg took it in "Houngduran; Taoo at 3,000 to 5,000 feet, in March; Moolai and Moolat, 3,000 to 6,000 feet" (*P. Z. S.* 1878, 838). Capt. Watson (*l.c.* pl. 2, fig. 6) figures the male of rainy-season form, taken in the N. Chin Hills, Upper Burma, in April, and (fig. 7) from the Yaw District, taken in December" (*J. Bombay N. H. S.* 1894, 496).

Of our illustrations on Plate 545, fig. 2, 2a are from a male and 2b a female of the wet-season form from E. Bengal; fig. 2c, d from the male type of the *dry-season* form *Amba*, and 2e from a Sikkim female.

HUPHINA ANDAMANA.

Plate 546, fig. 1, 1a ♂, 1b ♀.

Huphina Nama, var. *Andamana*, Swinhoe, Proc. Zool. Soc. Lond. 1889, p. 398. Butler, Ann. Nat. Hist. 1899, p. 213.

Pieris Nama, Moore, P. Z. S. 1877, p. 591.

IMAGO.—Male. Upperside similar to *wet form* of *Nadina*. Underside. *Forewing* also similar to *Nadina*, except that the cell streak is restricted to the apex across the lower discocellular, and, with its contiguous portion at base of upper discocellular interspace, is very short, both portions being white or pale yellow tinted; the inner area of the cell being filled up with dusky olivescient green.

Female. Upperside. *Forewing* with the three medial white streaks broader than in female *Nadina*, the cell portion shorter, the spot at posterior angle is larger, and the streak below it broader; the lower medial streak sometimes extending beneath the lower median and is partly coalescent with the posterior spot. *Hindwing* with the basal area of the cell, and lower area beneath it from the base to the disc, is grey, and merging into the white streak from the apex of cell, and its outer portions; the lower outer-margin is numerously grey or olive-grey scaled, leaving an obscure indication of a submarginal lunular band. Underside. *Forewing* similar to *Nadina*. *Hindwing* similar to the male.

Expanse ♂ $2\frac{1}{2}$ to $2\frac{3}{4}$, ♀ 2 to $2\frac{3}{4}$ inches.

HABITAT.—Andaman Islands.

HUPHINA REMBA.

Plate 546, fig. 2, 2a, b ♂ ♀ (*Wet*), 2c, d, e ♂ ♀ (*Dry form*).

Pieris Remba, Moore, Catal. Lep. Mus. E. I. Company, i. p. 75 ♂ (1857), *wet form*. Wallace, Trans. Ent. Soc. 1867, p. 340 ♀.

Huphina Remba, Hampson, Journ. As. Soc. Bengal, 1888, p. 363. Ferguson, J. Bombay N. H. S. 1891, p. 444. Watson, Journ. Bombay Nat. Hist. Soc. 1894, pp. 496, 523. Davidson and Aitken, *id. l.c.* 1896, p. 575. Butler, Ann. Nat. Hist. 1899, p. 214. de Nicéville, Journ. As. Soc. Beng. 1900, p. 256.

Huphina liquida, Swinhoe, Ann. Nat. Hist. 1890, p. 361, ♂ ♀—*Dry form*.

Pieris Nama, var. Hewitson, Exot. Butt. ii. P. pl. 6, fig. 37 ♂.

Wet-Season Brood (Plate 546, fig. 2, 2a ♂, 2b ♀).

IMAGO.—Male. Upperside greyish-white; base of wings greyish. *Forewing* with the costal border to or close to the subcostal vein black, the black continuing outward and forming a broad exterior marginal band decreasing hindward from the discocellulars to the posterior margin, the inner edge of the band being sinuous; the band in some specimens is very sparsely sprinkled with minute grey scales between

the anterior veins, when the traversing veins are more prominently black-lined. *Hindwing* with a black-scaled exterior marginal sinuated posteriorly-decreasing band, the posterior portion being broadly grey-scaled. Underside. *Forewing* with the blackish costal band broader and extending from within the base and along upper half of the cell area, the connected outer band being apically speckled with greenish-yellow scales and with a subapical greenish-yellow streak crossed by subcostal veinlets; base of costal border also slightly sulphur-yellow scaled. *Hindwing* with the basal half greenish-yellow, crossed by the blackish-scaled veins, the subcostal being also broadly bordered by similar scales; the outer half of the wing blackish, traversed by an obscurely-defined curved discal and an outer marginal series of greenish-yellow spots, of which series the upper discal spot is most distinct. *Body* above dark grey; front of head, palpi, and thorax beneath greenish-yellow, palpi above blackish; abdomen beneath white; femora yellow; tibiæ and tarsi black, tibiæ whitish speckled above; antennæ black, annulated with white.

Female. Upperside brownish-black. *Forewing* with the basal ground-colour paler than the outer and somewhat grey-scaled; a greyish-white medial oblique irregular-shaped patch extending across anterior half of the cell to lower median, its outer edge being sinuous; in some specimens the basal area is greyer, the white medial area broader and extending brokenly hindward to the posterior margin. *Hindwing* with the basal and outer posterior submarginal area dark grey scaled; a greyish-white medial patch occupying the outer half of the cell and basal interspaces from the lower subcostal and the upper median; in some specimens this patch is larger and its edges less defined, the outer posterior submarginal grey scales more thickly clustered. Underside similar to the male, except that, on the forewing, there is a short blackish-scaled oblique streak on middle of the posterior margin.

Expanse, ♂ $2\frac{2}{10}$ to $2\frac{5}{10}$, ♀ $2\frac{2}{10}$ to $2\frac{4}{10}$ inches.

Dry-season Brood (Plate 546, fig. 2c, d ♂, 2e ♀).

Smaller than *Wet form*. Upperside similar. *Forewing* with the outer band somewhat narrower and more attenuated posteriorly. *Hindwing* with the outer band much narrower. Underside with similar markings to the *wet form*, but generally paler and duller coloured.

Female. Upperside greyish-white; somewhat like the male. *Forewing* with black outer-marginal band similar to that of the male, but more attenuated below the middle median. *Hindwing* with an almost similar outer-marginal band, the anterior portion being somewhat broader. Underside similar to the male, with the markings on both wings paler and the coloration duller.

Expanse, ♂ ♀ 2 to $2\frac{2}{10}$ inches.

HABITAT.—South India.

DISTRIBUTION.—“This is a forest butterfly, and is found in the N. Kanara District, wherever there is heavy forest, at all seasons. In its rainy-season dress it is a very richly-coloured butterfly, the female being more black than white on the upperside, and on the underside rich greenish-yellow mingled with smoky-brown. The larva and pupa are scarcely distinguishable from those of *H. Phryne*, and feed on the same plants” (Davidson and Aitken, J. Bombay N. H. Soc. 1896, 575). In the Nilgiris it is “common on the western slopes, but a rare straggler throughout the rest of the district” (Hampson, J. As. Soc. Bengal, 1888, 363).

HUPHINA CINGALA.

Plate 546, fig. 3, 3a ♂, 3b ♀.

Huphina Remba, Moore, Lep. of Ceylon, i. p. 137, pl. 53, fig. 2, 2a ♂ (1881). de Nicéville, Journ. As. Soc. Beng. 1899, p. 220.

IMAGO.—Male. Upperside similar to Remba. *Forewing* with the costal black-scaled edge extremely slender, the outer marginal black band narrower than in *Remba*, its inner anterior edge being at some distance from the discocellulars and the posterior end much attenuated. *Hindwing* with the marginal black band very narrow, in some being almost macular in its course; the grey posterior edging being also much narrower and less apparent. Underside similar to Remba. *Forewing* with the costal border and outer band narrower, as on the upperside. *Hindwing* with the markings more obscurely defined and the coloration much duller.

Female. Upperside similar to palest examples of Remba. *Forewing* with the outer band narrower and not extending to the discocellulars. *Hindwing* with the grey basal area extending to the costa, its outer edge prolonged between the lower subcostal and radial, the outer marginal area not speckled with submarginal clusters of grey scales. Underside similar to the male.

Expanse, ♂ $2\frac{2}{10}$ to $2\frac{5}{10}$, ♀ 2 inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Mr. F. M. Mackwood records it as “rare in the Hills, from 2,000 to 4,000 feet elevation” (Lep. Ceylon, i. p. 137). “An uncommon insect in Ceylon, and of speedy flight, consequently difficult to catch. It is found in the hill country between 2,000 and 4,000 feet, and is common at Pundaloya” (de Nicéville, J. As. Soc. Bengal, 1899, p. 220).

INDO CHINA AND MALAYAN SPECIES.—*Huphina Nerissa* (Pap. Nerissa Fabricius, Syst. Ent. p. 471, ♂ (1775). *Pieris Nerissa*, Butler, Catal. Fabr. Lep. Brit. Mus. p. 202 (1869). *Syn.* Pap. Amasene, Cramer, Pap. Exot. i. pl. 44, fig. A, ♂ (1776). *Habitat.* South China; Hainan.

Huphina Andersoni. (Appias Andersoni, Distant, Ann. Nat. Hist. 1885, p. 146 ;

id. Rhop. Malay. p. 315, pl. 33, fig. 2, ♂ (1885). Butler, Ann. N. H. 1899, p. 213. *Habitat.* Malay Peninsula.

Huphina Sumatrana (Hagen, 1896). Butler, Ann. N. H. 1899, p. 212. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 277. H. Nerissa, de Nicéville, J. As. Soc. Beng. 1895, p. 506. *Habitat.* Sumatra.

Huphina Corva (Pieris Corva, Wallace, Trans. Ent. Soc. 1867, p. 339). Butler, *l.c.* p. 212. Fruhstorfer, *l.c.* p. 277. Pontia Coronis, Horsfield, Catal. Lep. Mus. E. I. Company, p. 144, pl. 4, fig. 9, 9a, larva and pupa (1829). P. Coronis (part), Moore, Cat. Lep. E. I. C. i. p. 76, pl. 1, fig. 12, 12a, larva and pupa (1857). *Habitat.* Java.

Huphina Fawcetti, Butler, Ann. Nat. Hist. 1899, p. 213, ♂. *Habitat.* Sumatra.

Huphina Olga (Pieris Olga, Eschscholtz, Kotzeb. Reise, iii. p. 214, pl. 9, fig. 21a, b (1821). Semper, Reise Phil. Lep. 238, pl. 37, fig. 1 to 11, ♂ ♀ (1890). Butler, *l.c.* p. 210. Fruhst. *l.c.* 1902, p. 278. *Habitat.* Philippines.

Huphina Olgina (Pieris Aspasia var. Olgina, Staudinger, Deuts. Ent. Zeit. Lep. 1889, p. 19. Butler, *l.c.* p. 210. Fruhst. *l.c.* 1902, p. 282. *Habitat.* Palawan.

Huphina Judith (Papilio Judith, Fabricius, Mant. Ins. ii. p. 22 (1787). Donovan, Ins. India, pl. 27, fig. 2 (1800). Pieris Judith, Butler, Cat. Fabr. Lep. B. M. p. 203 (1869), *id.* Ann. N. H. 1899, p. 209. de Nicéville, J. As. Soc. Beng. 1895, p. 507, Fruhst. *l.c.* 1902, p. 281. *Habitat.* Java.

Huphina Selma (Pieris Selma, Weymer, Stett. Ent. Zeit. 1885, p. 269, pl. 2, fig. 5). Butler, *l.c.* 1899, p. 209. Fruhst. *l.c.* 1902, p. 281. *Habitat.* Nias Island.

Huphina Ethel, Doherty, Journ. As. Soc. Bengal, 1891, p. 29. Butler, *l.c.* 1899, p. 209. Fruhst. *l.c.* 1902, p. 281, *id.* Berl. E. Z. 1904, p. 200, pl. 2, fig. 3a, b ♀. *Habitat.* Engano Island.

Huphina Hespera, Butler, Ann. Nat. Hist. 1899, p. 208. Fruhst. *l.c.* 1902, p. 279. *Habitat.* Sarawak; Labuan.

Huphina Montana, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 279. *Habitat.* N. Borneo.

Huphina Meridionalis, Fruhstorfer, *l.c.* 1902, p. 279. *Habitat.* S. Borneo.

Huphina Amalia (Pieris Amalia, Vollenhoven, Mon. Pier. p. 23, pl. 3, fig. 6 ♂ (1865). Wallace, Tr. Ent. Soc. 1867, p. 336. Distant, Rhop. Malay. p. 314, pl. 33, fig. 1 ♂ (1885). *Huphina* Lea (pt.), de Nicéville, J. As. Soc. Beng. 1895, p. 506. Fruhst. *l.c.* 1902, p. 279. *Habitat.* Malay Peninsula; Singapore; Sumatra.

Huphina Siamensis, Butler, Ann. Nat. Hist. 1899, p. 208, ♂ ♀. Fruhst. *l.c.* 1902, p. 279. *Habitat.* Siam.

Huphina Pactolica (Pieris Pactolica, Butler, Proc. Zool. Soc. 1865, p. 455, pl. 26, fig. 1 ♂); *id.* Ann. N. H. 1899, p. 207. *Habitat.* Borneo.

Huphina Malaya (H. Lea var. *Malaya*, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 279.

Habitat. Singapore.

Huphina Boisduvaliana (Pieris Boisd. Felder, Wien. Ent. Monats. 1862, p. 287; *id.* Reise Nov. Lep. ii. p. 168, pl. 24, fig. 8, 1865. Semper, Reise Phil. Lep. p. 237, pl. 37, fig. 12). Butler, *l.c.* 1899, p. 205. Fruhst. Berl. Ent. Zeit. 1903, p. 106. *Syn.* P. *Semperi et Balbagona*, Semper, *l.c.* p. 238, pl. 37, fig. 13-15; pl. 38, fig. 2, 3 (1890). *Habitat.* Philippines.

Huphina Rachel (Pieris Rachel, Boisduval, Spéc. Gén. Lép. i. p. 469 (1836). Butler, *l.c.* 1899, p. 203. Fruhst. Berl. Ent. Zeit. 1903, p. 104. *Habitat.* Java.

Huphina Cardena (Pieris Cardena, Hewitson, Exot. Butt. ii. P. pl. 3, fig. 17, 18 (1861). Vollenhoven, Monog. p. 25. Tachyris Cardena, Wallace, Tr. Ent. Soc. 1867, p. 363. Appias Cardena, Distant, Rhop. Malay. p. 316, pl. 33, fig. 3, ♂ (1885). Hyposcritia Cardena, de Nicéville, J. As. Soc. Beng. 1895, p. 504. *Syn.* Pieris Hagar, Vollen. Monog. Pier. p. 38, pl. 4, fig. 6 (1865). *Habitat.* Borneo (type); Sumatra; Malay Peninsula.

Huphina Eunama, Fruhstorfer, Berl. Ent. Zeit. 1903, p. 110. *Habitat.* S. Formosa.

Genus UDAIANA, Distant, Rhop. Malayana, pp. 286, 300 (1885). *Udaiana Cynis* (Pieris Cynis, Hewitson, Exot. Butt. iii. P. pl. 8, fig. 54, ♂ (1866). Wallace, Tr. Ent. Soc. 1867, p. 341. Distant, *l.c.* p. 301, pl. 26, fig. 5 ♂, 6 ♀ (1885). de Nicéville, Journ. As. Soc. Bengal, 1895, p. 494, ♂ ♀. Butler, Ann. Nat. Hist. 1899, p. 214. *Syn.* U. Pryeri, Distant, *l.c.* p. 301, ♂. U. Androides, Hagen, Iris, 1894, p. 32. *Habitat.* Malay Peninsula; Sumatra; Borneo.

Genus HYPOSCRITIA.

Hiposcritia, Geyer, in Hübner's *Zuträge Exot. Schmett.* iv. p. 16 (1832). Moore, Lep. of Ceylon, i. p. 133 (1881).

Tachyris (sect. D.), Wallace, Trans. Ent. Soc. 1867, pp. 363, 381.

Hyposcritia, Butler, Ann. and Mag. Nat. Hist. 1898, p. 392.

IMAGO.—Male. *Forewing* less triangular than in *Catophaga*; costa more arched, exterior margin slightly crenulated anteriorly. *Hindwing* with the costa straighter and oblique, the exterior margin obliquely-convex; costal vein much arched at the base. Antennal club lengthened. Anal tufts prominent; intromittent organ generally exerted. Males somewhat similar in pattern of markings to the females of the species of *Catophaga*.

TYPE.—H. Pandione.

HYPOSCRITIA LALAGE.

Plates 547 and 548.

Pieris Lalage, Doubleday, Gray's Zool. Misc. p. 76, ♀ (1842), *id.* Gen. D. Lep. i. pl. 6, fig. 5, ♀ (1847). Moore, Proc. Zool. Soc. 1865, p. 759.—*Wet form.*

Tachyris Lalage, Wallace, Trans. Ent. Soc. 1867, p. 382. Elwes, *ib. l.c.* 1888, p. 419. de Nicéville, Sikkim Gazetteer, 1894, p. 169.

Hiposcritia Lalage, Butler, Ann. and Mag. Nat. Hist. 1885, p. 340, ♂. Adamson, List Burm. Butt. 1897, p. 44.

Hyposcritia Lalage, Butler, *ib. l.c.* 1898, p. 394.

Appias Lalage, Mackinnon and de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 591.

Pieris Durvasa, Moore, Catal. Lep. Mus. E. I. Company, i. p. 73 (1857); *id.* Proc. Zool. Soc. 1857, p. 103, pl. 44, fig. 6, ♂.

Hiposcritia Durvasa, Butler, Ann. Nat. Hist. 1885, p. 340, ♂.

Wet-season Brood (Plate 547, fig. 1, 1a, c, d ♂, 1e, f ♀).

IMAGO.—Male. Upperside greyish-white; basal area of forewing glossy. *Forewing* with the base of costal border thickly irrorated with grey-black scales, these scales are also more or less scattered along upper area of the cell to the discocellular black spot, the black then extending costally into a broad outer marginal decreasing band, which latter ends abruptly at the lower median, and in some specimens black scales are more or less scattered obliquely-inward to the posterior margin, thus enclosing a white spot at the angle, similar to that in the female, the anterior inner-edge of the band curves sinuously outward from the costal border above end of the cell to upper median, below which it extends quadrately-inward and then outward to the lower median, the band enclosing two small white subapical obliquely-disposed spots, sometimes also an obscure upper spot, and a large angular spot between the upper and middle median; a more or less large black spot is also present on the lower discocellular veinlet, this spot being generally slenderly or broadly joined to the outer band along the upper median veinlet. *Hindwing* with a black outer-marginal narrow band, which is almost macular, and, generally, with a connecting submarginal zigzag series of blackish scales, extending inward from the lower subcostal to the upper median, and in some these scales from thence are obscurely and broadly scattered posteriorly. Underside. *Forewing* greyish-white, the black discocellular spot and outer marginal band as on upperside, the band being narrowed anteriorly, the apical area being ochreous-yellow; from the lower end of the band some distinctly-apparent blackish scales generally extend inward towards the posterior margin. *Hindwing* uniformly ochreous-yellow, with slightly apparent blackish scaled submarginal zigzag slender fascia and a similar but less apparent medial fascia; a distinct black dot on the discocellular veinlet.

Female. Upperside greyish-white. *Forewing* with the base of costa and basal two-thirds of the cell dark grey-black scaled, the black outer border broader than in

male, extending hindward to the posterior angle and from thence decreasingly inward along the margin to base of the wing, its projecting portion between the upper and middle median extending broadly obliquely-inward, encompassing the discocellular spot across anterior half of the cell, thus only leaving a white narrow outwardly-oblique recurved upper band, and a broad lower white band, the basal portion of which is sometimes glossy; the extreme edge of posterior margin of the wing and its cilia being also white; subcostal spots and a medial white spot, as on upperside, the latter being smaller, and there is also a white spot at posterior angle. *Hindwing* greyish-white, the basal area sometimes very faintly flushed with pale yellow; a prominently black outer-marginal band and connected submarginal zigzag fascia, the latter becoming broadly continuous and more or less confluent posteriorly. Underside. *Forewing* with duller black markings similar to upperside, except that the apex is broadly pale greyish ochreous-yellow or glossy grey, with the subapical spots slightly indicated; the base of cell and costa being pale yellow. *Hindwing* paler yellow than in male, or greyish-white and slightly glossy, the yellow being more clearly defined along the vein borders and extreme outer margin, with slightly apparent dusky-scaled submarginal and medial zigzag fascia, and discocellular black dot, as in the male, the outer marginal interspaces being whitish and somewhat glossy. *Body* greyish-white; front and abdomen above dark grey; antennæ black above, white beneath in the male; anal tufts blackish; intromittent organ sometimes exerted.

Expanse, ♂ ♀ 3 inches.

Intermediate form (Plate 547, fig. 1b ♂).

Male. Upperside. *Forewing* with the black outer band somewhat narrower, the projecting discal portion and the discocellular spot generally smaller, the latter being usually isolated; three subapical white spots are sometimes present; the median interspaced white spot is larger. *Hindwing* with narrower black outer-marginal macular band, or its spots are slenderly defined only at end of the veins. Underside. *Forewing* similar to the upperside, the apex paler yellow than in *wet* form. *Hindwing* similar to *wet* form, but generally of a paler yellow.

Female. Upperside. *Forewing* similar to the *wet* form, except that the black outer band is less intensely black from the lower median and extends obsolescently inward to about half the posterior margin. *Hindwing* with the black outer-marginal band less intense than in the *wet* form, more macular, its connected submarginal zigzag fascia less defined and becomes obsolescent posteriorly from the upper median. Underside similar to *wet* form. *Forewing* with the outer band less defined posteriorly from the lower median. *Hindwing* pale yellow; marginal interspaces whitish, but not glossy.

Expanse, ♂ $2\frac{1}{2}$ to $2\frac{3}{4}$, ♀ $2\frac{3}{4}$ inches.

Dry-season Brood (Plate 548, fig. 1, 1a ♂, 1b, c, d, e ♀).

Catophaga Pseudolalage, Moore, Proc. Zool. Soc. 1879, p. 142, ♂ ♀.

Hiposcritia Pseudolalage, Butler, Ann. Nat. Hist. 1885, p. 340.

Hiposcritia Argyridina, Butler, Ann. Nat. Hist. 1885, p. 340, ♂.

Male. Smaller than *wet* form. Upperside. *Forewing* with the base glossy, the black outer band somewhat narrower, and its discal portion more or less disconnected, its posterior end always terminating at the lower median; the discocellular spot smaller and always isolated. *Hindwing* either with a slight black linear tip to the upper veins, or entirely white. Underside. *Forewing* with the black outer band less prominent than in *wet* form, also narrower and its course broken, the apical area being pale greyish-ochreous and slightly irrorated with brown scales, the discocellular spot isolated. *Hindwing* pale brownish-ochreous, more or less slightly irrorated with brown scales, the submarginal and discal zigzag brownish-scaled fascia slightly defined, the discocellular black dot distinct.

Female. Smaller than *wet* form. Upperside. *Forewing* with the base glossy; the black outer band similar, its lower end terminating either at the lower median or with some scattered scales inwardly-disposed before the posterior angle; the discocellular spot either slightly extending along upper median, or broadly joined to the discal portion of the outer band, and inwardly along upper area of the cell. *Hindwing* with the black outer marginal band macular and decreasing obsolescently hindward, or the band is more continuous and with a more or less slightly apparent blackish-scaled submarginal zigzag fascia. Underside. *Forewing* with similar black markings as on upperside, the apical area being greyish-ochreous and brown-scaled, the base of the cell flushed with greyish-ochreous. *Hindwing* pale greyish-ochreous and numerously irrorated with brown scales except in the outer-marginal interspaces where these scales are less apparent, the discal and submarginal darker-scaled zigzag fascia and black discocellular dot distinct.

Expanse, ♂ 2 to $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Western and Eastern Himalayas; Assam; Naga Hills; Manipur; Burma, Shan States; Tenasserim.

DISTRIBUTION.—The late Mr. L. de Nicéville, in his MS. Notes on Pierinæ, writes, “*Lalage* has a wide range, extending from the Western Himalayas eastward through Kumaon, Nepal, Sikkim, Bhotan, Assam, to Indo-China, and southwards through Manipur and Upper Burma to Tenasserim, where it meets *Lagela*. It is, as far as is known, found only in the mountains, where it is usually not uncommon, and has been found at an elevation of over 10,000 feet. In the Khasia Hills it occurs on the highest peak on the Shillong plateau, 6,400 feet.” Mr. P. W. Mackinnon found it “very common in Masuri, Western Himalayas, and on the adjoining Hills, in April

and May. The sexes here differ but slightly, the dry-season form of the female being alone found. The butterflies seem always to be flying from east to west, this observation having been made at two places more than twenty miles apart" (J. Bombay N. H. S. 1898, 591). Mr. H. J. Elwes records it as "common in Sikkim at low elevations from April to October. The females, which are rarer than the males in their proper habitat, have the habit of flying up to great heights on the mountains. I took females on Tonglo at 8,500 feet, on the Rishila in Bhotan at 10,400 feet, and in the Khasia Hills at the highest peak on the Shillong plateau, 6,400 feet; but saw no males in any of these places" (Tr. Ent. Soc. 1888, 419). Mr. L. de Nicéville says it "occurs in Sikkim from the level of the Terai to over 10,000 feet elevation, and flies from April to October" (Sikk. Gaz. 1894, 169). Col. C. Swinhoe records it as "common in the Khasia Hills, also Shillong and Cherra Punji" (Tr. Ent. Soc. 1893, 310). Dr. G. Watt obtained it at Manipur, and *argyridina*, the dry form, was taken in January, in the valley of the Khoonah Khong, Eastern Manipur" (Ann. N. H. 1885, 340). Col. C. H. E. Adamson says, "I have caught this butterfly not uncommonly in Upper Burma, but only a single specimen in Lower Burma. The upper side varies in colour from shining white to a rich cream colour; the black markings also vary considerably in intensity" (List, p. 44). Dr. N. Manders found it "common in the Shan States at 3,000 feet elevation" (Tr. Ent. Soc. 1890, 534).

We possess specimens of the wet and dry form from Sikkim, Bhotan, N. E. Bengal, the Khasias, and Manipur; also the types of *pseudolaluge*, and both sexes of the *dry* form from the Karen Hills.

Of our illustrations on Plate 547, fig. 1, 1a are from a *wet-season* Sikkim male, and 1e, f, a Khasia female; fig. 1b, male of the *intermediate* form, from Sikkim. On Plate 548, fig. 1, 1a, 1b are from a *dry-season* Sikkim male and female types of *pseudolaluge*; 1c, a Silhet female; and 1d, e, a Sikkim female.

HYPOSCRITIA LAGELA.

Plate 548, fig. 2, 2a ♂, 2b, c ♀.

Catophaga Lagela, Moore, Proc. Zool. Soc. 1878, p. 838, pl. 52, fig. 4, ♀.

Hypocritia Lagela, Adamson, List Burm. Butt. p. 44 (1897).

Hypocritia Lagela, Butler, Ann. Nat. Hist. 1898, p. 394.

Hypocritia Pandione, var. *Lagela*, Fruhstorfer, Iris, 1902, p. 284.

Appias Lagela, Distant, Rhop. Malay. p. 467, pl. 41, fig. 11, ♀ (1886).

Appias Lalage, Watson, Journ. Bombay Nat. Hist. Soc. 1891, p. 53; *id. l.c.* 1897, p. 670.

Wet-season Form. Male and female. Smaller than *Lalage*. Upperside. *Forewing*. Differs in the black apical border terminating, in both sexes, before reaching

the posterior angle, the medial portion being partly excavated outside the lower end of the cell, and thence extending across the end to its base. *Hindwing* with a broad marginal continuous band, similar to that in *Pandione*. Underside. *Forewing* with the black band terminating as on the upperside, the apex greyish-ochreous speckled with brownish scales and with slightly-defined whitish subapical spots. *Hindwing* pale yellowish-ochreous or greyish-ochreous in the male, more greyish in the female, speckled with brownish scales, and with a darker-scaled discal and submarginal zigzag fascia.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ inches.

HABITAT.—Tenasserim; Malay Peninsula.

DISTRIBUTION.—The type specimens were taken by Mr. Otto Limborg at "Moolai, Upper Tenasserim, 3,000 to 6,000 feet elevation" (P. Z. S. 1878, 838). Col. C. H. E. Adamson obtained a "single male, in Upper Tenasserim, in March" (List, p. 44). Col. C. Swinhoe possesses a male from Perak.

Of our illustrations on Plate 548, fig. 2, 2a are from a male in Col. Adamson's collection; fig. 2b, c, from the Moolai type in our possession.

HYPOSCRITIA INDRA.

Wet-season Brood (Plate 549, fig. 1, 1a ♂, 1b, c ♀).

Pieris Indra, Moore, Catal. Lep. Mus. E. I. Company, i. p. 74 (1857); *id.* Proc. Zool. Soc. 1857, p. 103, pl. 44, fig. 5, ♀. Wallace, Tr. Ent. Soc. 1867, p. 381.

Hypocritia Indra, de Nicéville, Journ. As. Soc. Bengal, 1885, p. 372. Fruhstorfer, Deuts. Ent. Zeit. "Iris," 1902, p. 283; *id.* Soc. Ent. 1903, p. 26.

Tachyris Indra, Elwes, Tr. Ent. Soc. 1888, p. 419.

Hypocritia Indra, Butler, Ann. Nat. Hist. 1898, p. 392. Swinhoe, Tr. Ent. Soc. 1893, p. 310. de Nicéville, Sikkim Gaz. 1894, p. 169.

Pieris Colimba, Boisduval MS. Moore, P. Z. S. 1865, p. 759.

Hypocritia Shiva, Moore, Journ. Linn. Soc. Zool. 1886, p. 49. Butler, Ann. Nat. Hist. 1895, p. 341.

Wet-season.—Male. Upperside greyish-white. *Forewing* with the base of costal border grey-black scaled and merging into a black broad apical outer-marginal decreasing band, which terminates narrowly at the lower median veinlet, the band curving outward from the costal border to upper median, then extends inward more or less quadrately in the next interspace, and again outward narrowly to the lower median; three or four white spots before the apex, the upper and lower the smallest; a minute black dot is generally present on the lower discocellular veinlet. *Hindwing* with a few black scales slenderly disposed anteriorly along outer margin and on tip of the veins, and a minute dot on upper end of the discocellular veinlet.

Underside. *Forewing* greyish-white; with the outer black band subapically restricted and narrow, the apical area being pale yellow, the spots of upperside being slightly indicated, the black discocellular dot also visible. *Hindwing* pale yellow, with more or less very slightly-defined brownish-scaled discal and submarginal zigzag fasciæ, and a distinct black discocellular dot.

Female. Upperside fuliginous-black. *Forewing* with a central longitudinal greyish-white patch, its outer edge being sinuous and its basal area dark grey scaled; two small oblique subapical white spots; cilia white posteriorly. *Hindwing* with the basal and discal area greyish fuliginous-brown and the veins greyish-white lined, the cell and abdominal area with long fine grey hairs; two upper submarginal small greyish-white spots; cilia white. Underside. *Forewing* with similar black outer border, shaped as on upperside, the apex being ochreous-yellow, and the white spots less defined; discal area greyish-white, the base suffused with sulphur-yellow. *Hindwing* ochreous-yellow, very sparsely irrorated with minute brown scales, irregularly traversed by a discal and submarginal zigzag brown-scaled fasciæ, and outer marginal white interspaces; a brown discocellular dot.

Expanse, ♂ $2\frac{1}{2}$ to 3, ♀ $2\frac{1}{2}$ to 3 inches.

Dry-season Brood (Plate 549, fig. 1e, f, g, h ♂, 1d ♀).

Appias Mahana, Moore, Ann. Nat. Hist, 1877, p. 48, ♂. Adamson, List of Burm. Butt. 1897, p. 43.

Hiposcritia Mahana, Butler, Ann. Nat. Hist. 1885, p. 341, ♂.

Hiposcritia imbecilis, Moore, Journ. As. Soc. Bengal, 1884, p. 46, ♂. de Nicéville, *ib.* 1885, p. 51.

Tachyris indigis, Weymer, Stett. Ent. Zeit. 1887, p. 11, pl. 1, fig. 3, ♂.

Male. Somewhat smaller than *wet-season* form. Upperside. Similar. *Forewing* with narrower and less prominent black outer band, which ends usually above the lower median veinlet, and its enclosed white spots generally larger, there being usually five in number. *Hindwing* unmarked. Underside. *Forewing* with the outer black band narrower than in *wet* form and obsolescent posteriorly, or entirely absent, its position indicated only by a few dark scales, the apex being pale yellowish-white speckled with brownish scales. *Hindwing* pale yellowish-white, more or less speckled with minute brown scales and traversed by a discal and submarginal zigzag fascia, but in some specimens these brown scales and fasciæ are almost obsolete; the discocellular black dot always present.

Female. Upperside. *Forewing* with broader greyish-white area and less black-scaled posterior border than in *wet* form. *Hindwing* with the basal and discal area greyish-white, the outer black border enclosing a submarginal row of large whitish irregular-shaped spots. Underside similar to *wet* form. *Forewing* with the black outer band somewhat narrower and with a white spot at the posterior angle. *Hindwing* more numerous brown scaled.

Expanse, ♂ $1\frac{3}{4}$ to $2\frac{1}{2}$, ♀ $2\frac{3}{4}$ inches.

HABITAT.—Eastern Himalayas (Nepal, Sikkim; Bhotan); Assam; Lower Bengal; Manipur; Burma; Tenasserim; Malay Peninsula; Singapur; Cochin China.

DISTRIBUTION.—Mr. L. de Nicéville, in his MS. Notes on Pierinæ, writes, “It is very common in the Sikkim Hills, probably also in Nepal, the Bhutan Hills, throughout Assam, inhabiting Silhet, Cachar, and Manipur, throughout Burma as far south as Tavoy. It is very rarely found in the Plains of Bengal, I have two males taken in Calcutta and in Bholahat, Maldah District, in February, both these specimens being the extreme dry-season form named *Mahana* and *imbecilis*.” We possess a male from Nepal, taken by the late Gen. G. Ramsay, both sexes from Darjiling, Silhet, Assam, males from Manipur, taken by Dr. G. Watt, and a male from Calcutta taken by Mr. W. S. Atkinson. In the British Museum Collection are both sexes of the *wet* form from Sikkim, a male from Bhotan, both sexes from Shillong, Assam, the Khasias, males from Manipur (Dr. Watt), a male from Salween Valley, Burma, taken in November by Col. C. T. Bingham, and of the *dry* form males from Sikkim, Cherra Punji, Silhet, Assam, and Manipur. Mr. H. J. Elwes records it from Sikkim, “the male is not uncommon at low elevations from April to October, but the female seems much rarer, and I have not seen more than two or three in Möller’s collection” (Tr. Ent. Soc. 1888, 419). Col. C. Swinhoe records it from “Shillong and the Khasias” (Tr. Ent. Soc. 1893, 310). Dr. G. Watt obtained it at “Manipur and the borders of Assam” (Ann. N. H. 1885, 341). Col. C. H. E. Adamson writes, “Taken abundantly in the Arakan Hills in April, also in Tenasserim in December. It has a habit of flying about the tops of trees, whence it descends to imbibe moisture from the damp sandy beds of streams” (List, p. 43). Dr. J. Anderson obtained “a single specimen of the female at Owen Island, Mergui, in January” (J. Linn. Soc. Zool. 1886, 49). It is also recorded from Singapore (Weymer, *l.c.*), also from Annam and Tonkin (Fruhstorfer, *l.c.*).

HYPOSCRITIA NARENDRA.

Plate 550.

Appias Narendra, Moore, Ann. and Mag. Nat. Hist. 1877, p. 48, ♂; *id.* Lep. of Ceylon, i. p. 134, pl. 51, fig. 4, 4a ♂ ♀ (1881). Butler, Proc. Zool. Soc. 1881, p. 611, ♀. de Nicéville, Journ. As. Soc. Bengal, 1899, p. 216.

Hypocritia Narendra, Hampson, J. As. Soc. Beng. 1888, p. 362. Ferguson, J. Bombay N. H. Soc. 1891, p. 444.

Hypocritia Narendra, Butler, Ann. Nat. Hist. 1898, p. 393.

Wet-season Brood (Plate 550, fig. 1, 1a ♂, 1b, c ♀).

Male. Upperside greyish-white. *Forewing* with a black broad apical band,

angulated on its inner edge, decreasing hindward to beyond the lower median veinlet, and enclosing two small oblique subapical white spots. *Hindwing* with a very narrow outer marginal black-scaled denticulated band. Underside. *Forewing* greyish-white, with a broad black subapical band, its inner edge as on upperside, the apex ochreous-yellow and brown-scaled, with indistinct paler spots. *Hindwing* ochreous-yellow, densely irrorated with brown scales and traversed by an ill-defined discal and submarginal zigzag fascia, the outer-marginal interspaces being less brown scaled; a discocellular black dot visible.

Female. Upperside greyish-white. *Forewing* with broader black apical band; its lower end reaching the posterior angle; two subapical white spots. *Hindwing* with a broader black marginal band and more or less slightly-indicated lower submarginal black lunularly-disposed scales. Underside similar to the male. *Forewing* with broader black subapical band, and darker brown apical scaling. *Hindwing* darker brown scaled, the submarginal interspaces paler, in some specimens almost white.

Expanse, ♂ ♀, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

Dry-season Brood (Plate 550, fig. 1d, e ♂, 1f ♀).

Male. Somewhat smaller than *wet* form. *Forewing* with the black band somewhat narrower posteriorly, the portion projecting between the upper and middle median being more pointed. *Hindwing* with the marginal band slenderly indicated by a few black scales and vein tips. Underside similar. *Forewing* with the band narrower, as on upperside.

Female. Upperside. *Forewing* with the black band comparatively narrower, and more abruptly indented beyond the cell. Underside. *Forewing* with the band narrower, as on upperside. *Hindwing* more uniformly brown scaled.

Expanse, ♂ ♀ $2\frac{1}{4}$ inches.

Extreme Dry Form (Plate 550, fig. 1g, h, i ♂ ♀).

Hiposcritia Shiva, Swinhoe, Proc. Zool. Soc. 1885, p. 138, pl. 9, fig. 1, 2 ♂ ♀. Butler, Ann. Nat. Hist. 1898, p. 393. Fruhstorfer, Soc. Ent. 1903, p. 26.

Male. Upperside. *Forewing* with the black band somewhat narrower than in ordinary dry form, and sometimes having either three or four subapical white spots, the upper and lower being smaller and less distinct. *Hindwing* quite unmarked. Underside. *Forewing* with narrow black band, the apex paler than in ordinary dry form. *Hindwing* also much paler, the brown scaling distinct.

Female. Upperside. *Forewing* similar to the ordinary dry form, the black band being comparatively narrower. *Hindwing* with the marginal band narrower, less defined and almost or quite macular. Underside. *Forewing* with the black band narrower than in ordinary dry form, the apex and the *hindwing* paler, as in the male.

Expanse, ♂ $1\frac{6}{10}$ to $2\frac{2}{10}$, ♀ $1\frac{6}{10}$ to 2 inches.

HABITAT.—South India; Ceylon.

DISTRIBUTION.—We possess both sexes of the *wet-season* form from S. India, Nilgiris, Travancore, and the male type from Ceylon, also of the *dry-season* form from Poona, Bombay. In the British Museum Collection are specimens from Poona, Nilgiris, Anamally Hills, and Ceylon. Col. C. Swinhoe has a typical female of the *wet* form taken in Poona in September, and records the *dry* form (Shiva) from "Parbutti Hill, Poona, being very plentiful from December to April, but confined entirely to this Hill" (P. Z. S. 1885, 138). Mr. G. F. Hampson obtained it in Nilgiris, from "2,000 to 4,000 feet elevation" (J. As. Soc. Beng. 1888, 362). Mr. H. S. Ferguson found it "very abundant in the Travancore Hills, from 2,000 feet upwards" (J. Bombay N. H. Soc. 1891, 444). In Ceylon, Mr. F. M. Mackwood took it in the "Hills, from 2,000 to 4,000 feet" (Lep. Ceyl. i. 134).

INDO-CHINA AND MALAY SPECIES.—*Hyposcritia Pandione* (H. Pandione, Hübner, Zutrage, Exot. Schmett. fig. 651-2, ♂ (1832). Butler, Ann. Nat. Hist. 1898, p. 393. de Nicéville, J. As. Soc. Bengal, 1895, p. 502. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 283. Tachyris Pandione, Wallace, Trans. Ent. Soc. 1867, p. 381. *Habitat.* Java; Sumatra.

Hyposcritia Whiteheadi (Appias Whiteheadi, Grose-Smith, Ann. Nat. Hist. 1887, p. 434; *id.* Rhop. Exot. i. P. pl. 2, fig. 4, 5 (1889). Whitehead, Exp. N. Borneo, p. 118 (1893). Butler, *l.c.* 1898, p. 393. *Habitat.* Borneo.

Hyposcritia Leptis (Pieris Leptis, Felder, Reise Novara, Lep. ii. p. 163 (1865). Wallace, *l.c.* p. 373. Butler, *l.c.* p. 393. *Habitat.* Java.

Hyposcritia plana (Appias plana, Butler, Tr. Linn. Soc. Zool. i. p. 551 (1879). Distant, Rhop. Malay. p. 314, pl. 25, fig. 9 ♀). de Nicéville, Journ. As. Soc. Beng. 1895, p. 503. Tachyris Leptis, Kheil, Lep. Nias, p. 34 (1884). *Habitat.* Malay Peninsula; Sumatra; Nias.

Hyposcritia Montana (Appias montanus, Rothschild, Nov. Zool. iii. p. 325 (1896). Butler, Ann. Nat. Hist. 1898, p. 394. *Habitat.* Philippines.

Hyposcritia Phæbe (Pieris Phæbe, Felder, Wien. Ent. Monats. 1861, p. 299; *id.* Reise Nov. ii., p. 163, pl. 25, fig. 5 (1865). Semper, Reise Phil. Lep. p. 248, pl. 39, fig. 5 ♂). Butler, *l.c.* p. 294. Tachyris Phæbe, Wallace, Tr. Ent. Soc. 1867, p. 382. *Habitat.* Philippines.

Hyposcritia Lageloides (Hip. Lageloides Crowley, Proc. Zool. Soc. 1900, p. 509, pl. 35, fig. 2. Hip. Lalage, Fruhstorfer, Iris, 1902, p. 284; *id.* Soc. Ent. 1903, p. 26. *Habitat.* Hainan; Tonkin.

Hyposcritia Nupta (Hip. Lalage, *var.* Nupta, Fruhstorfer, Ent. Nachr. 1897, p. 63. *Habitat.* Nias.

ADDENDA.

Page 144. Genus **BALTIA**.

BALTIA SIKKIMA, Fruhstorfer, *Iris*, xvi. p. 50 (1903). "Male. Smaller than *Butleri* and *Shawii*, and with more pointed form of wing. The black spot at apex of the cell wider than in *Butleri*. All the wings bear above as well as below, a row of four or five grey-black marginal spots, and a narrow black submarginal band. Also the cell of the hindwing is bounded above with black. On the underside the base of all the wings is scaled with black. The apical portion of the front wings, and the hindwings, are ornamented with yellow lines between the veins, moreover there is a yellow stripe through the cell" (*Fruhst. l.c.*).

HABITAT. Upper Sikkim ; June and July (1902), at 12,000 to 15,000 feet.

Page 203. **APPIAS LIBYTHEA**. By the kindness of Mons. Charles Oberthür—who now possesses the Collection of Lepidoptera described by Dr. Boisduval in the "Spec. Gen."—we have (June, 1905) examined and verified the type specimen of *Pieris Rouxii* as being identically the same as the male of *Libythea*, as we had herein placed it.



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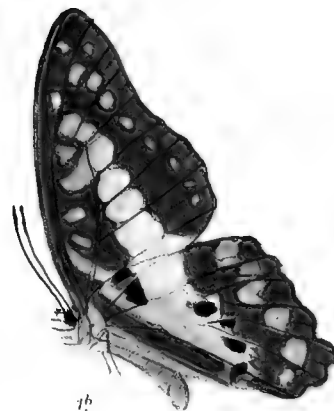
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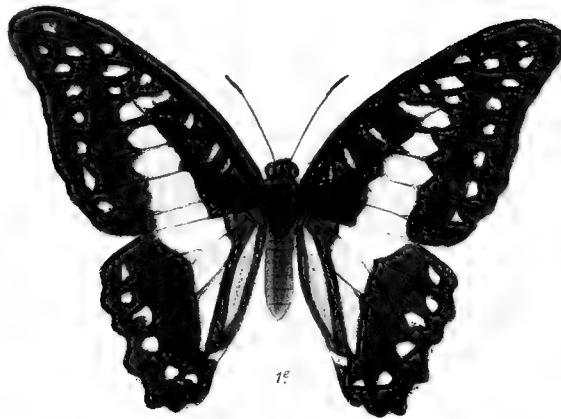
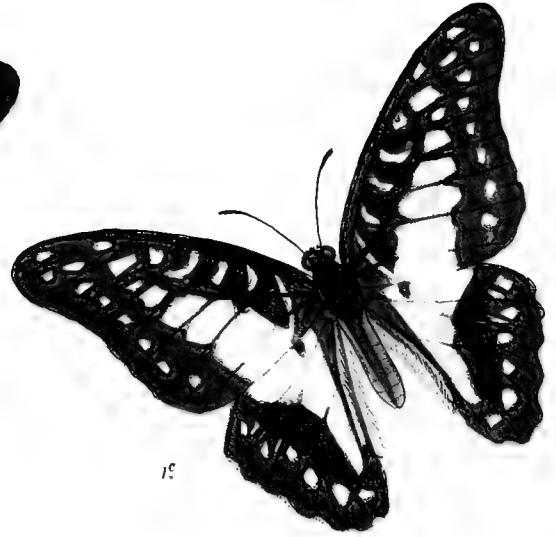
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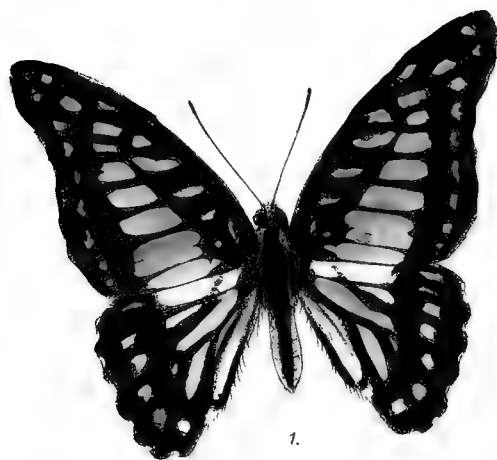
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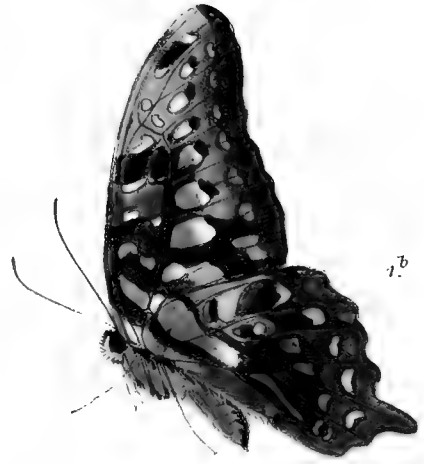


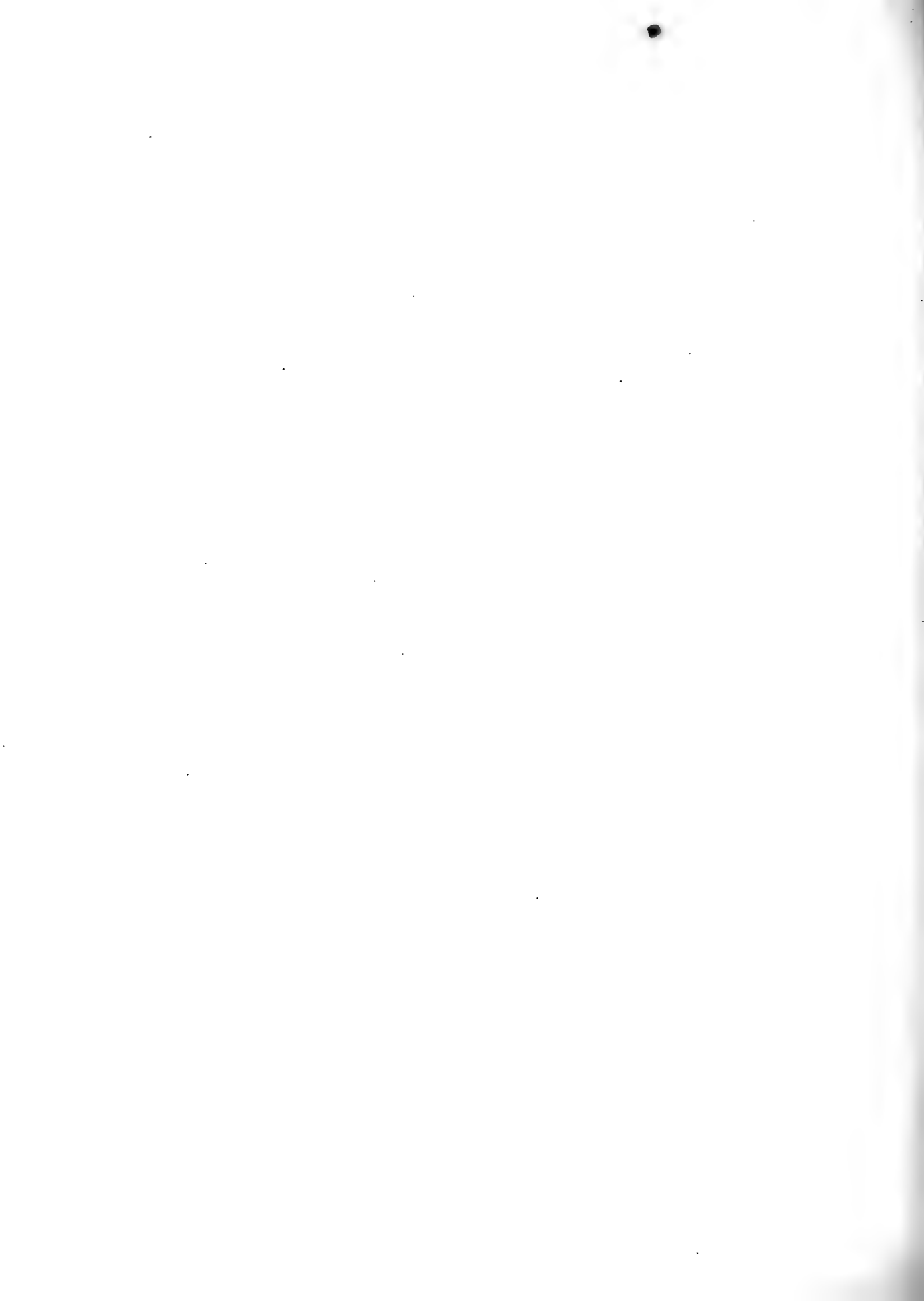
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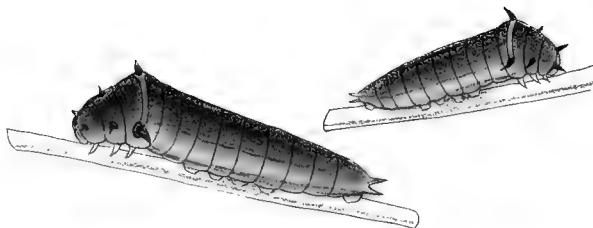
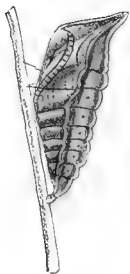




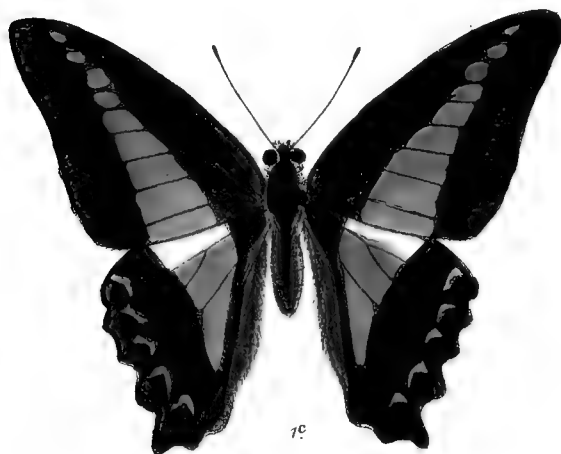
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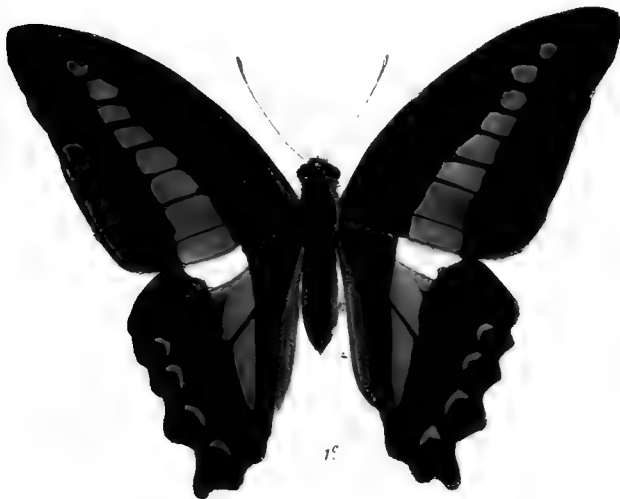
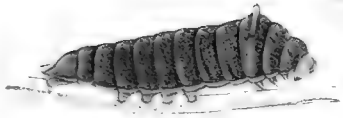
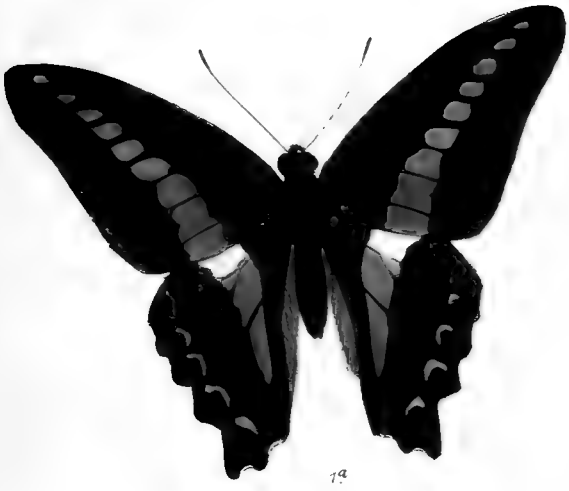


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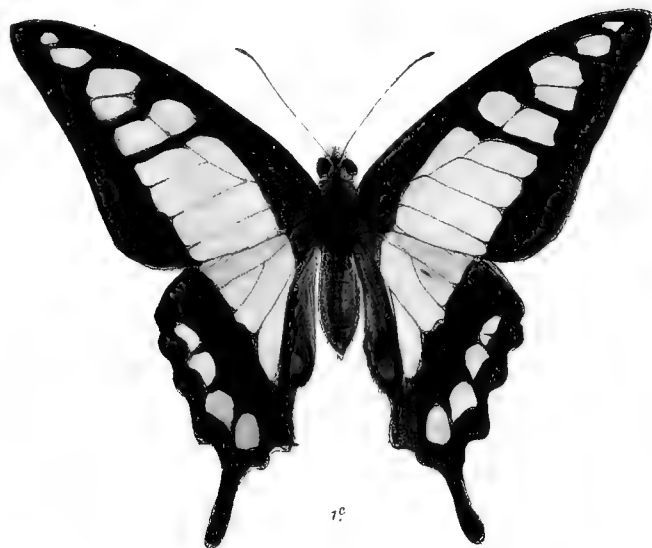


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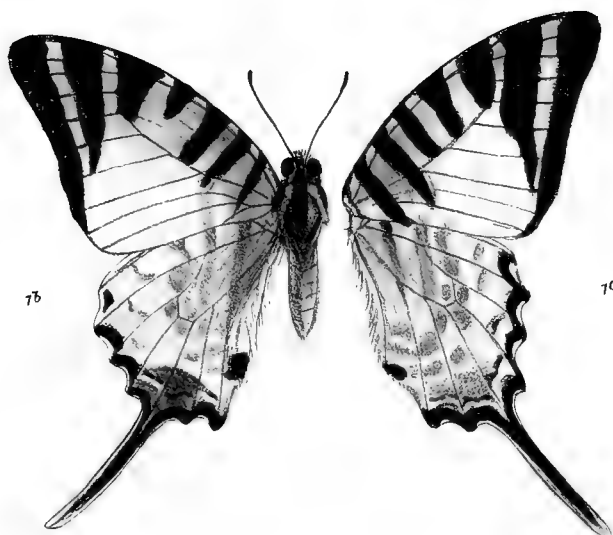






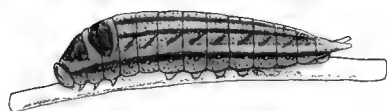




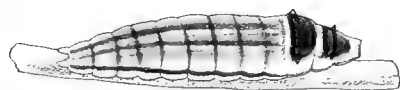


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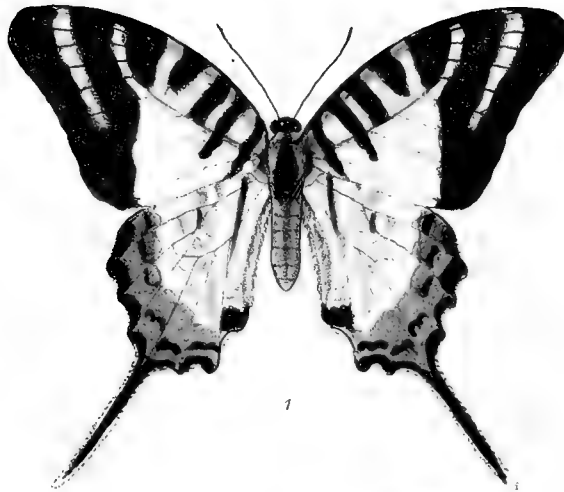


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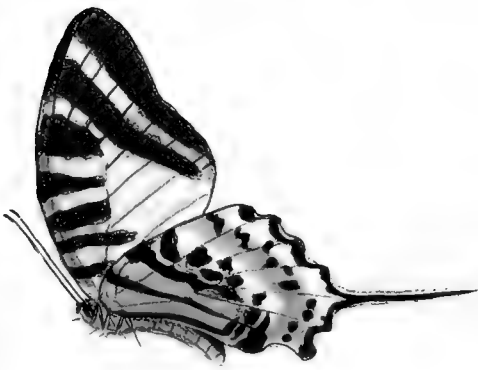


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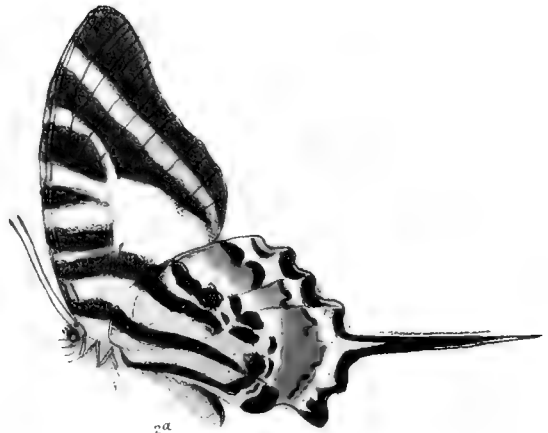




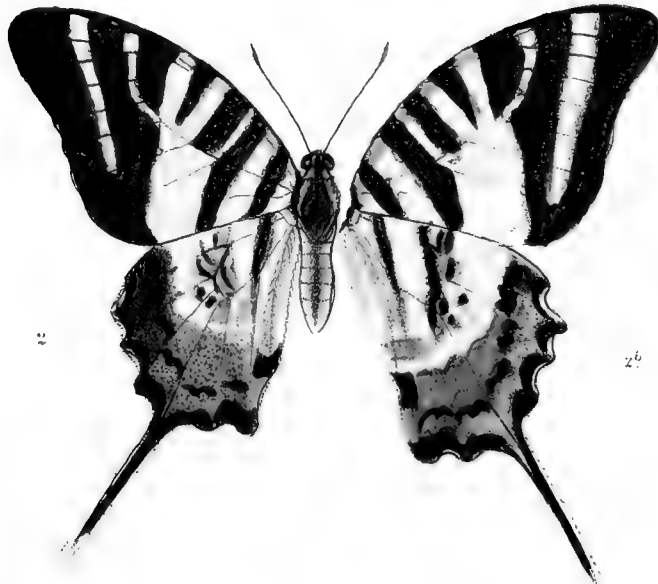
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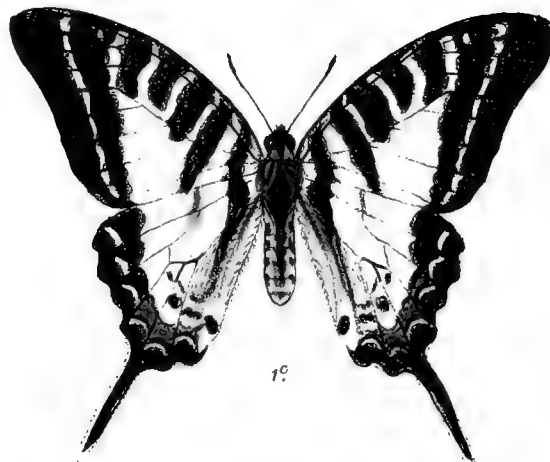
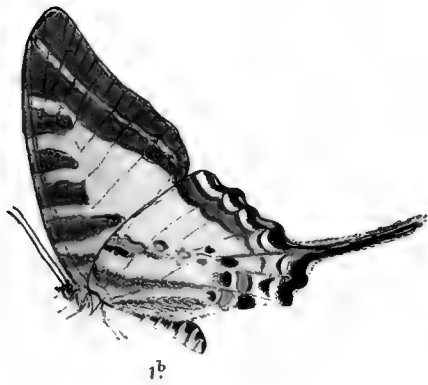
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2^b

F. C. Moore del et lith

Vincent Brooks, Day & Son Lith'g Imp

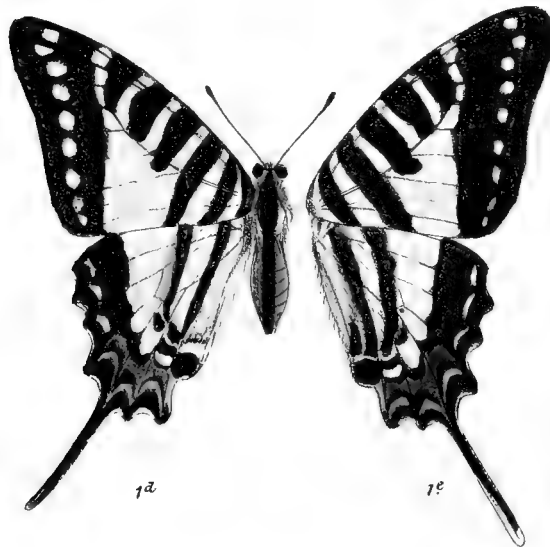
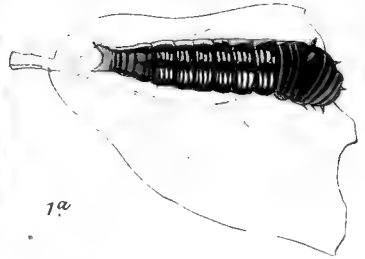




F.C. Moore del. et lith.

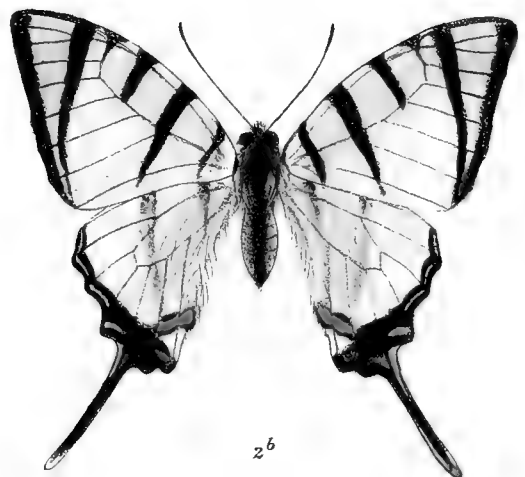
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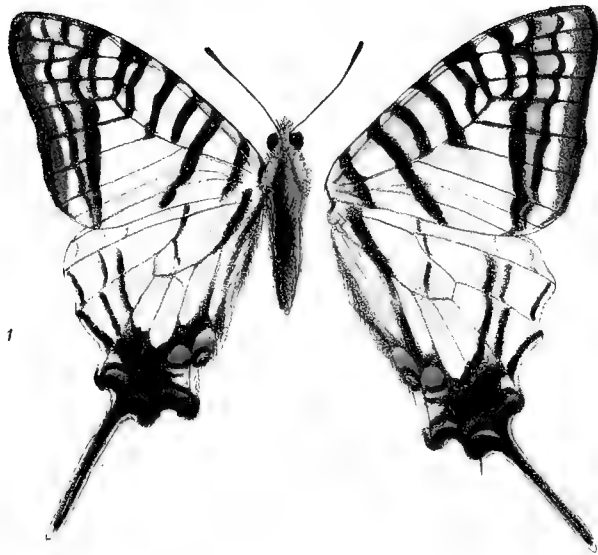


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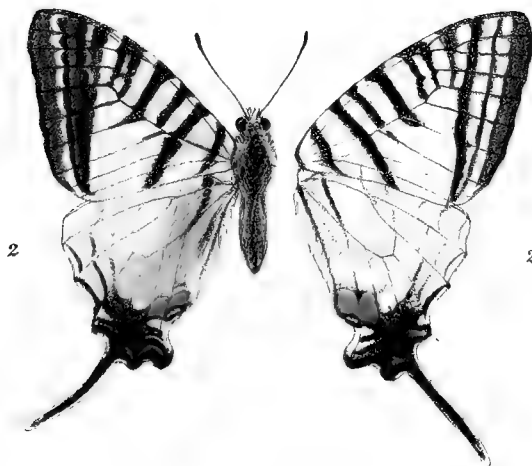
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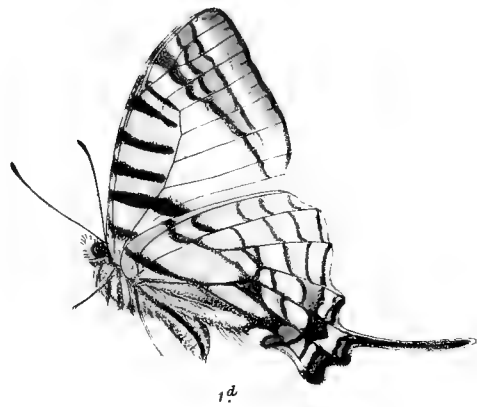
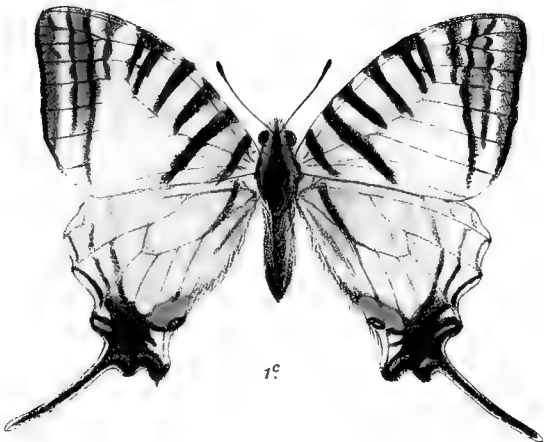
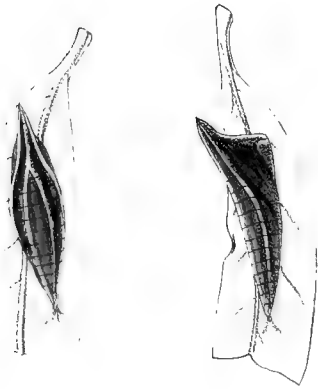
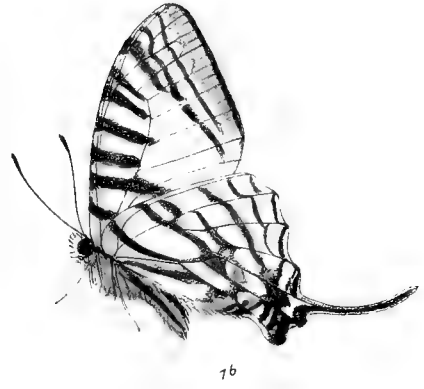
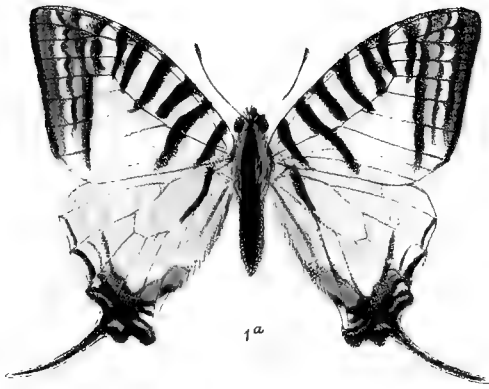
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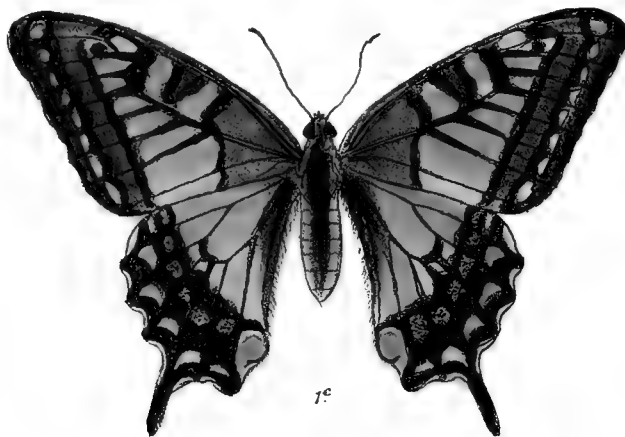
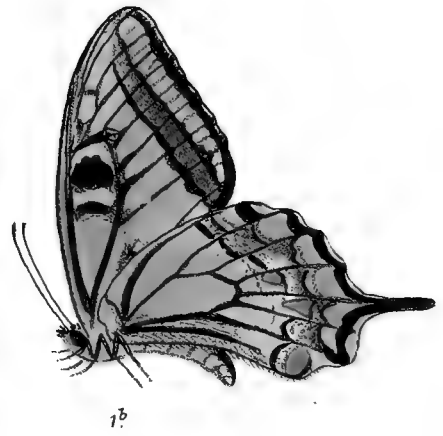
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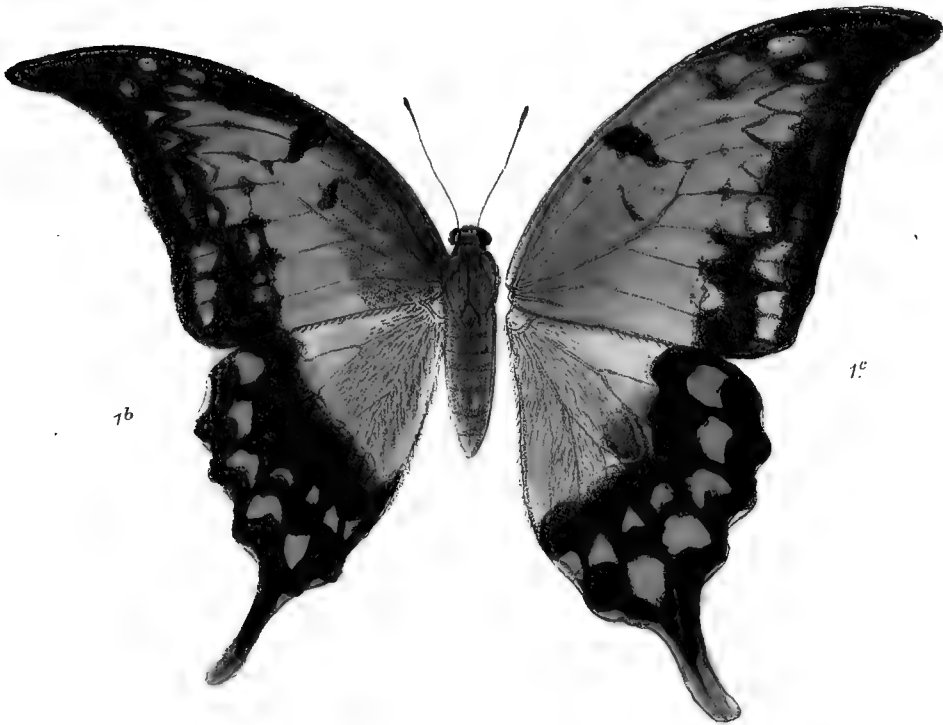




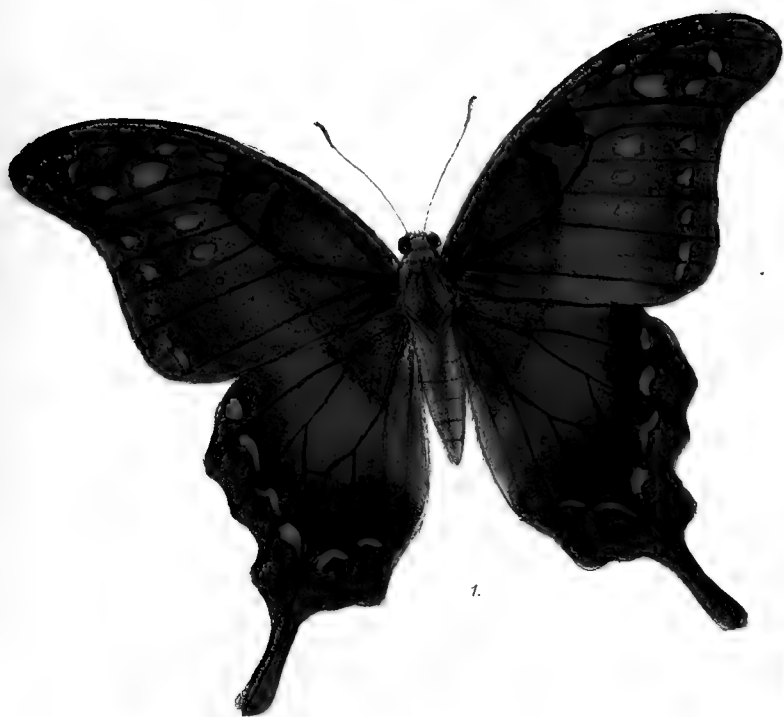




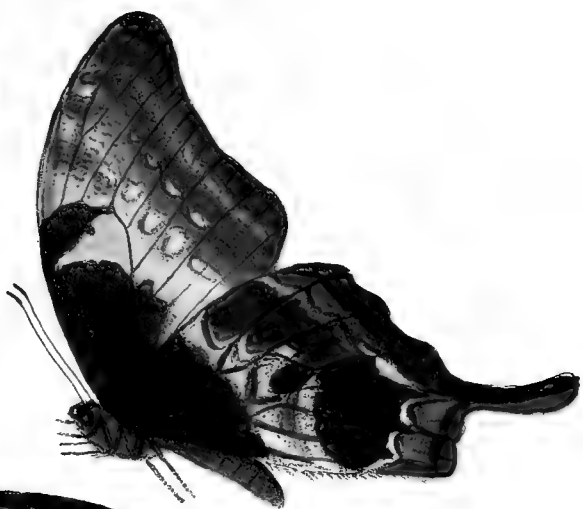








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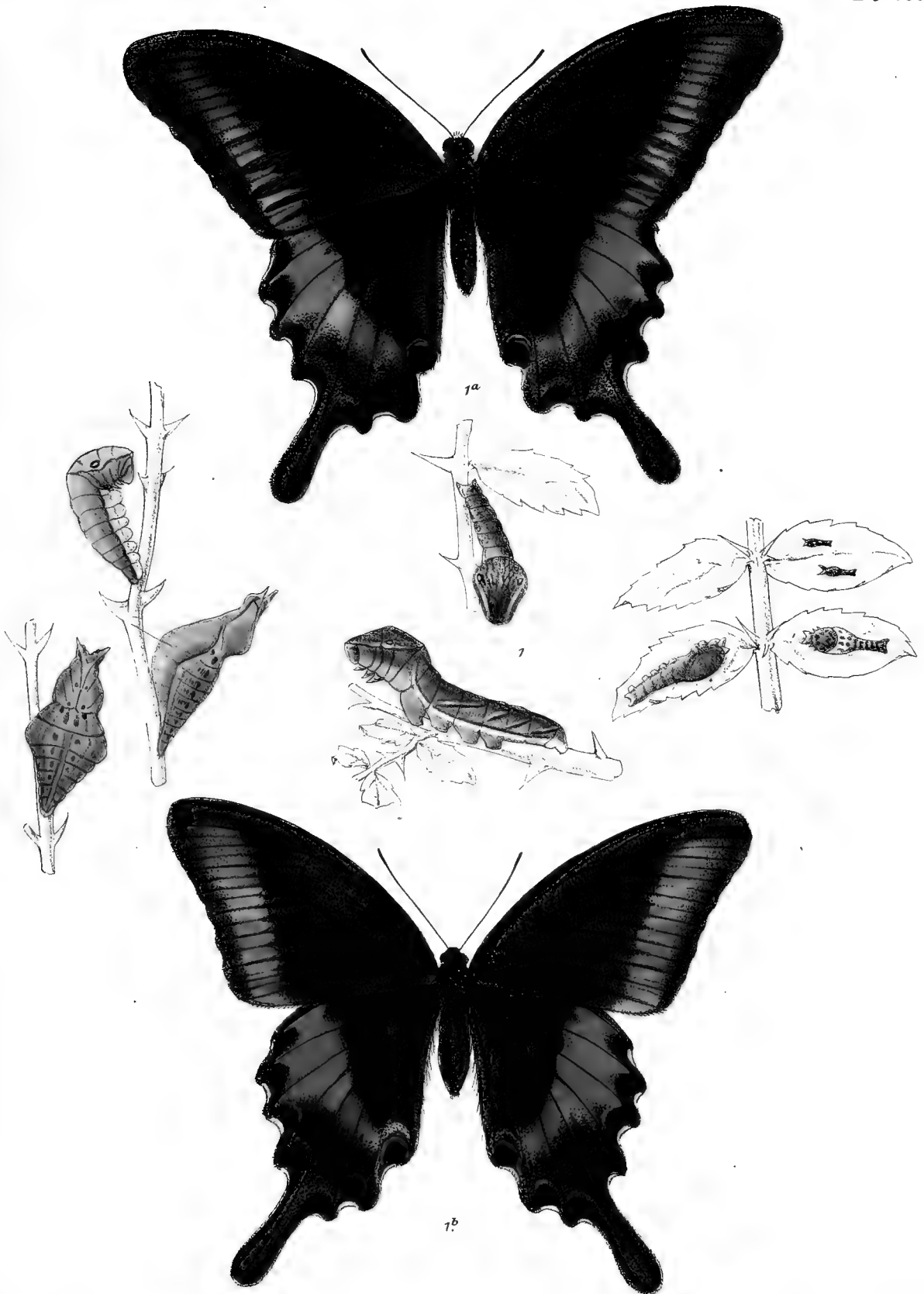


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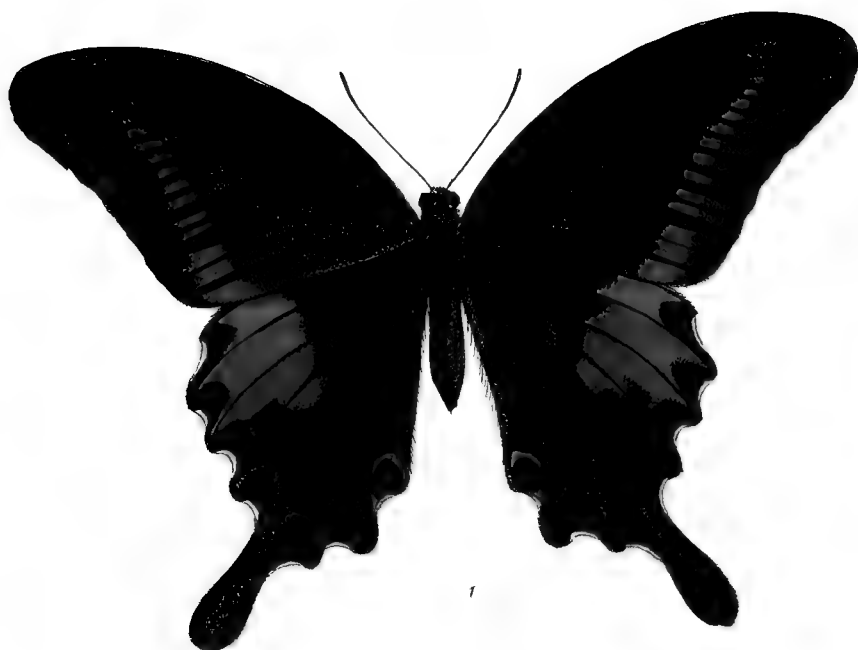


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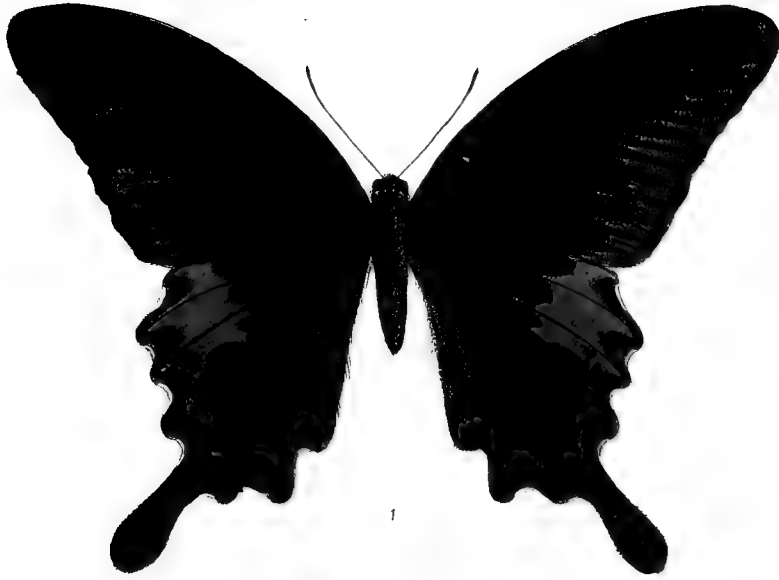


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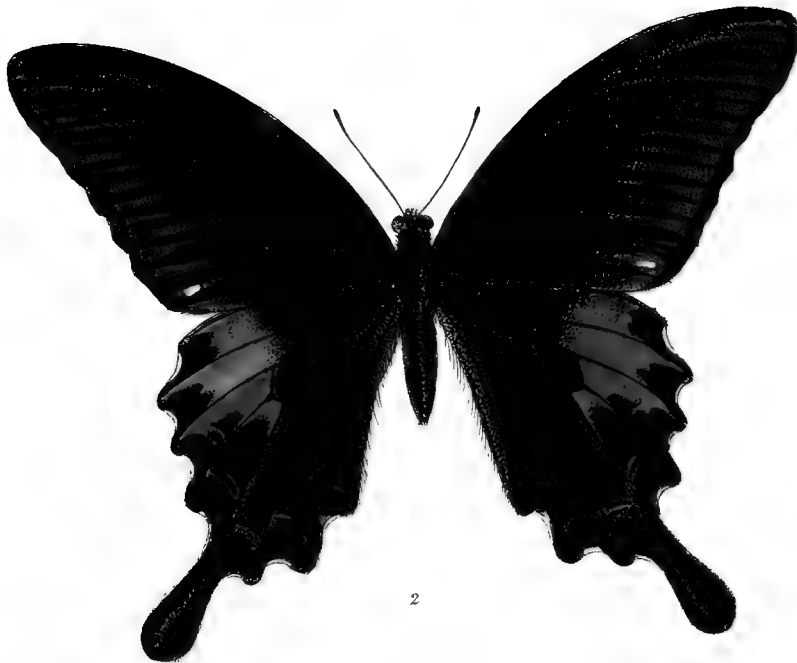








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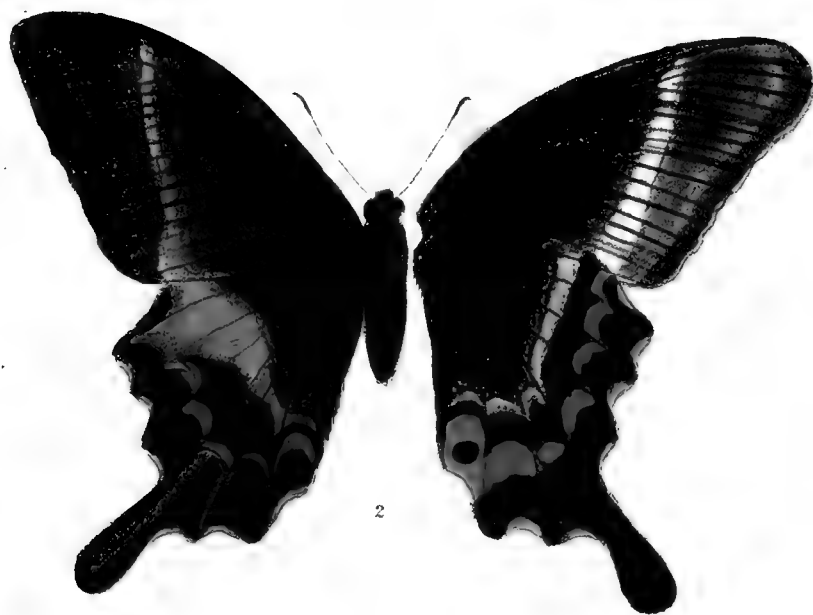
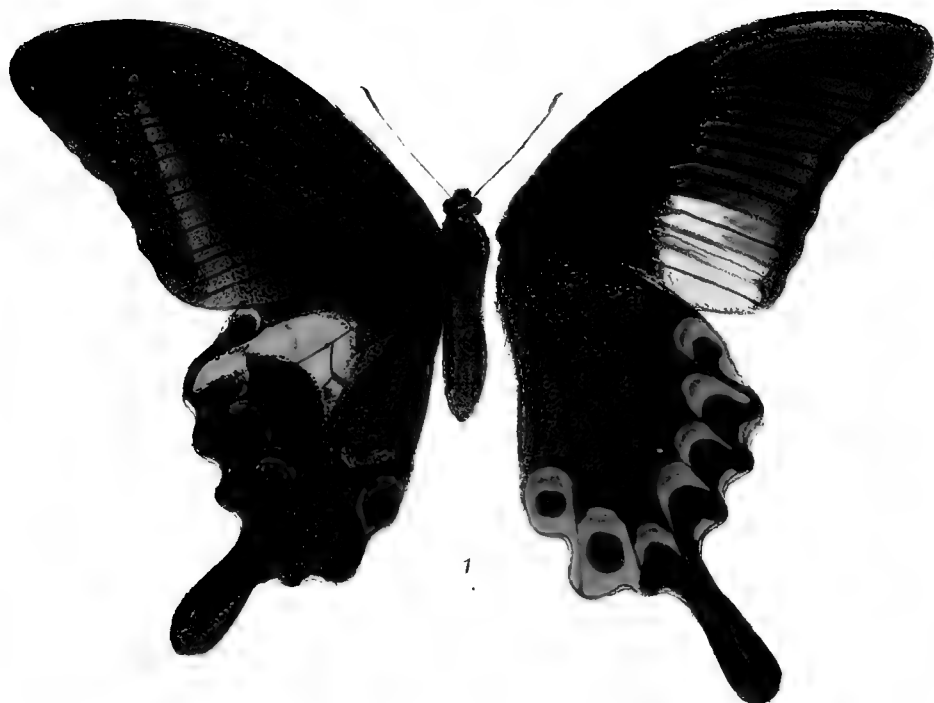


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Vincent Brooks, Day & Son Lith'g

L. Reeve C^o London.

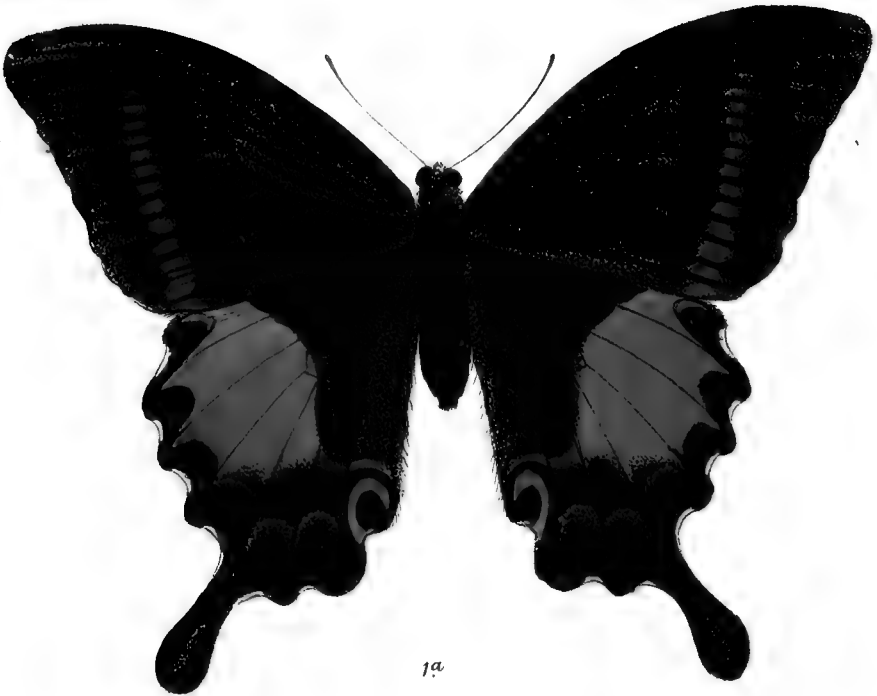
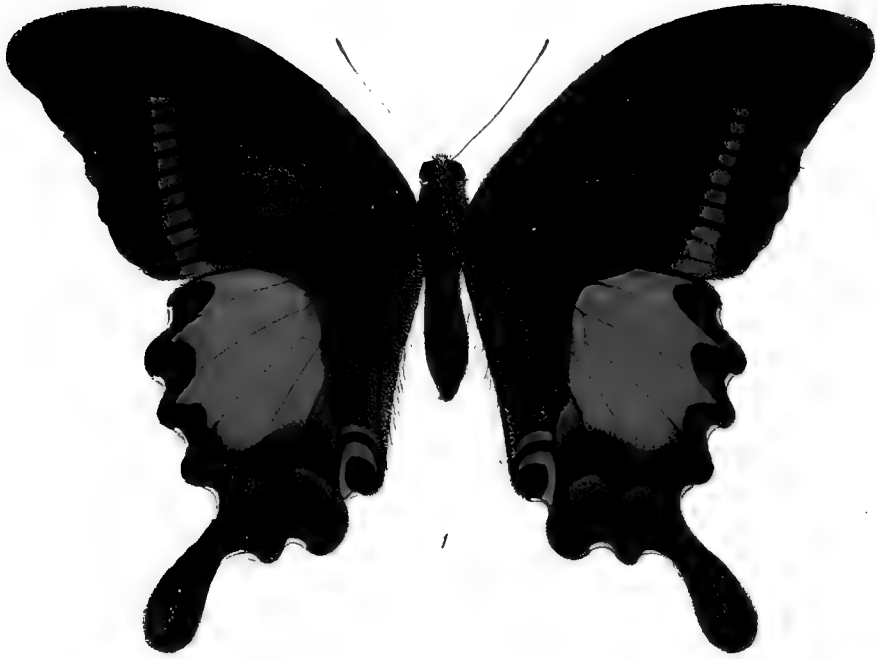






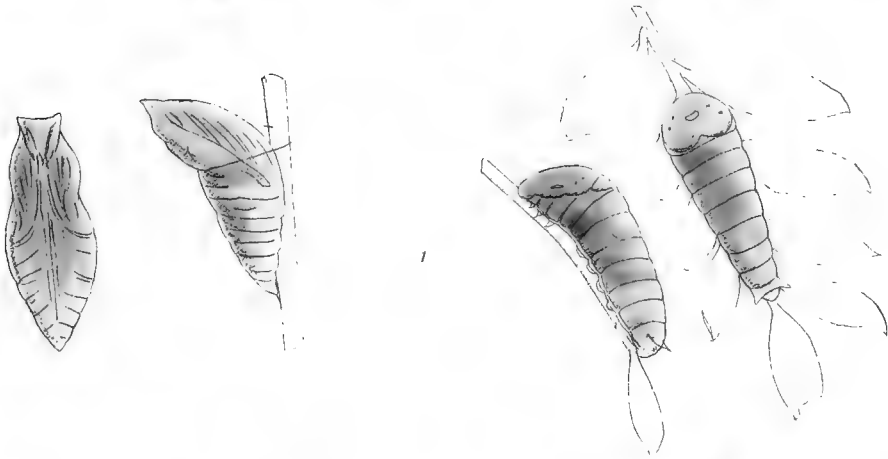
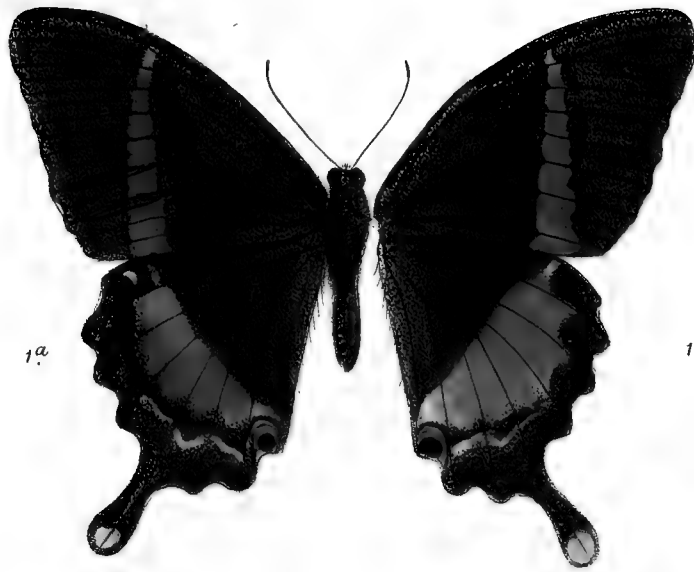






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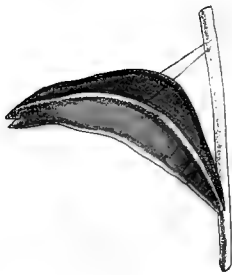




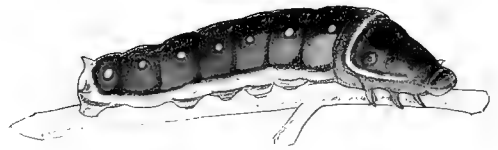


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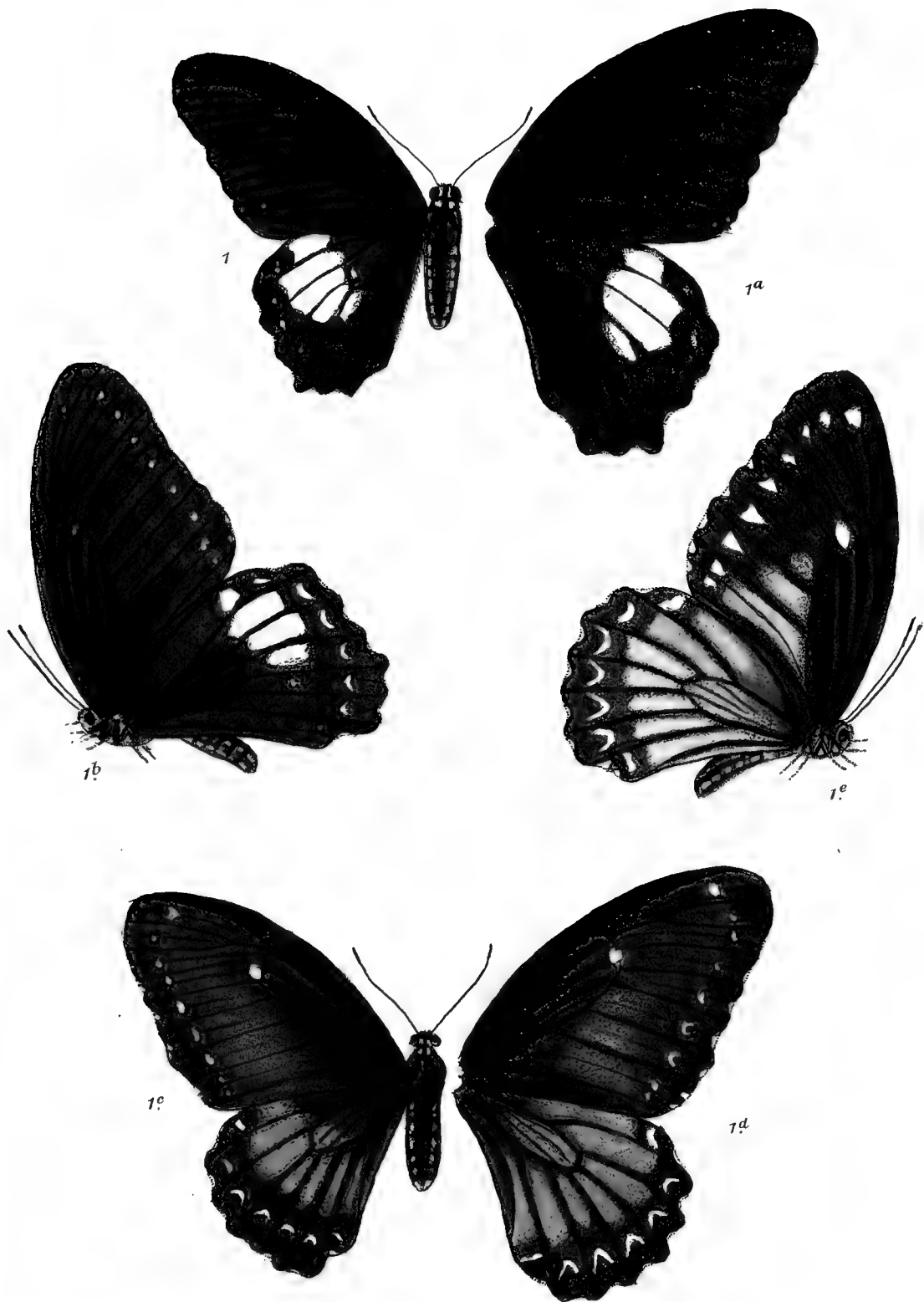


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F.C. Moore del et lith.

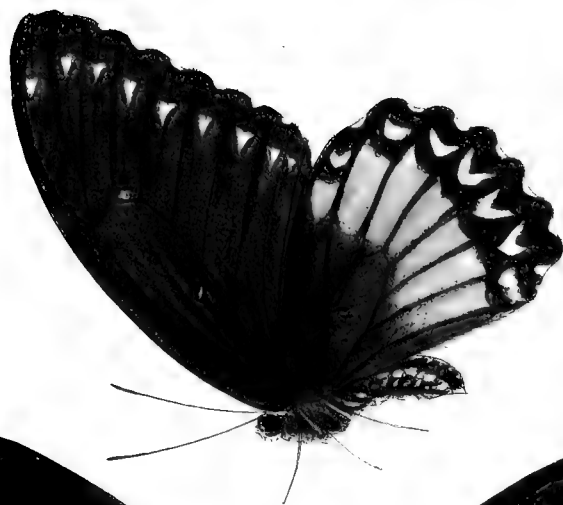
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L. Reeve & C^o London





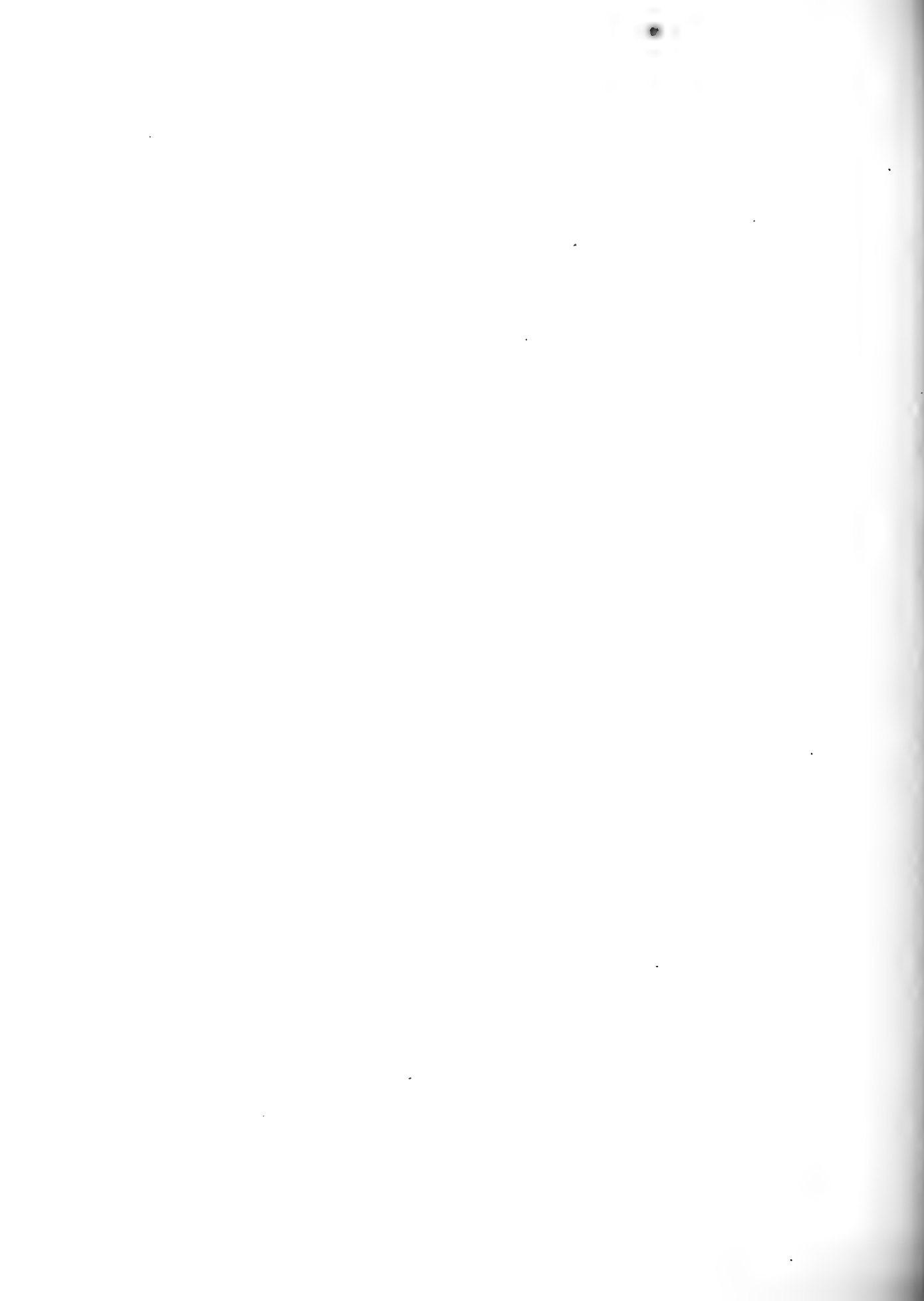
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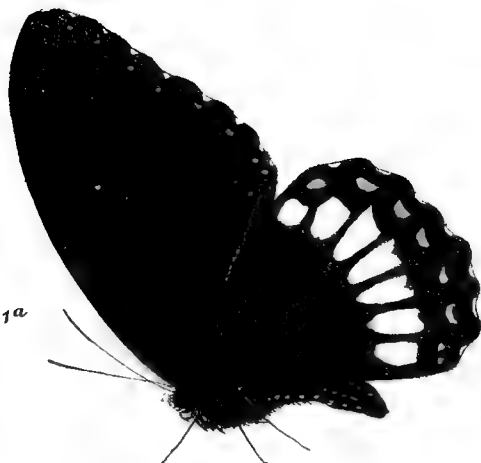


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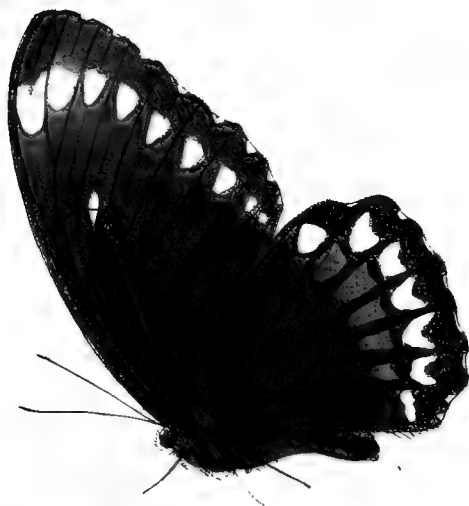




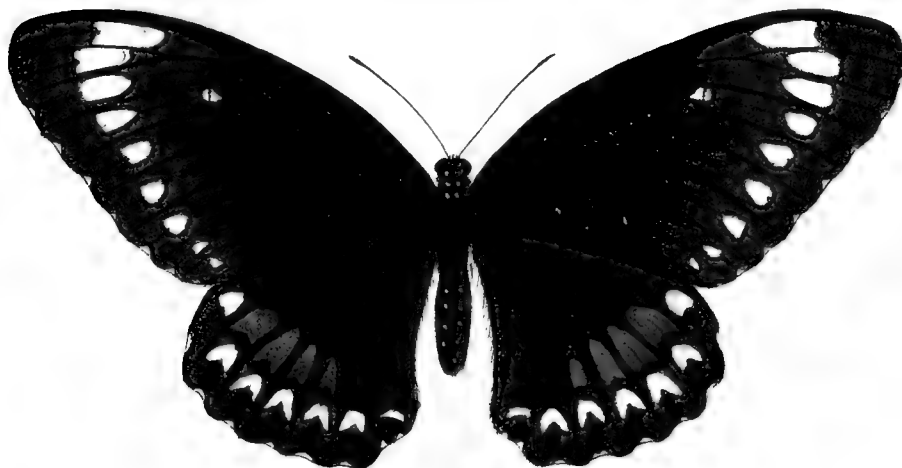
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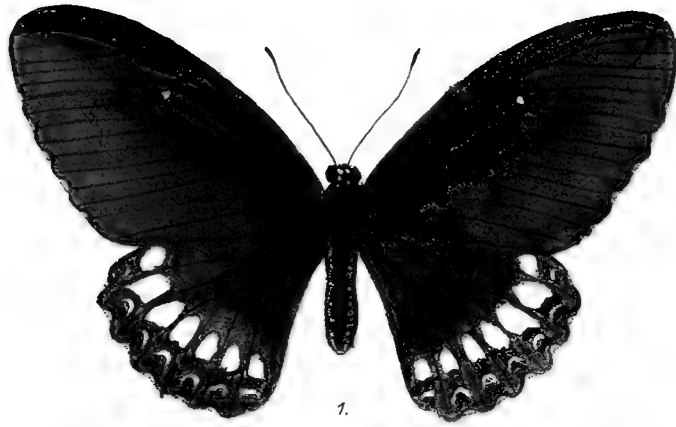


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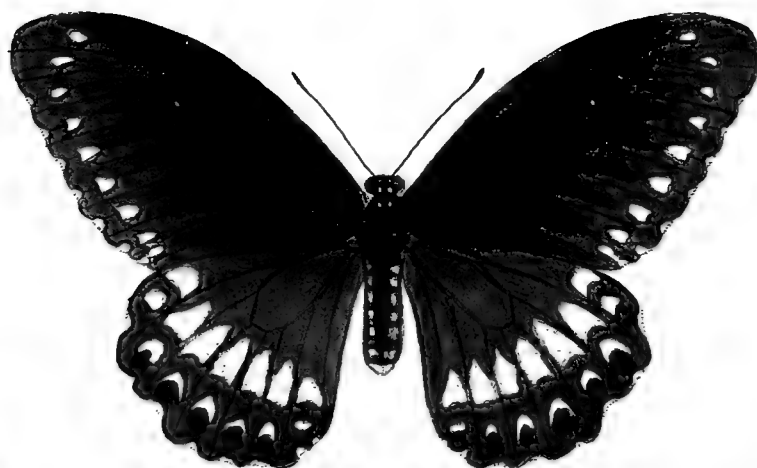


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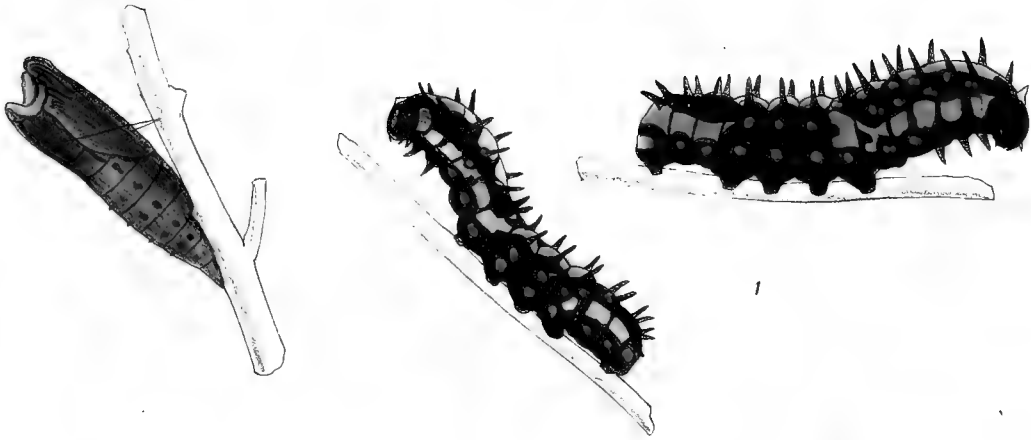


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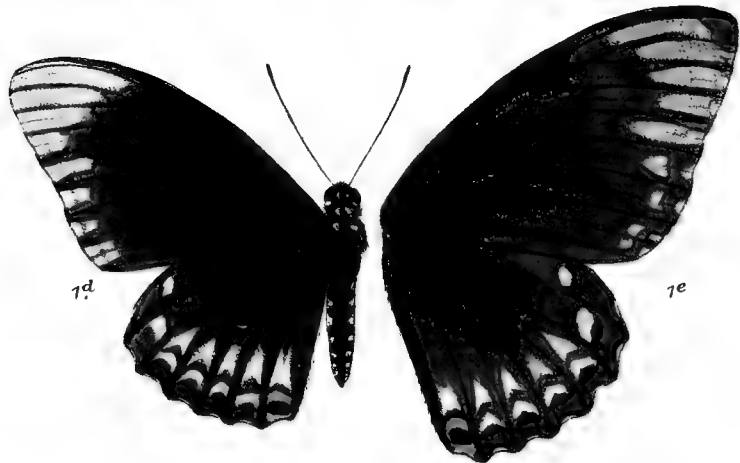


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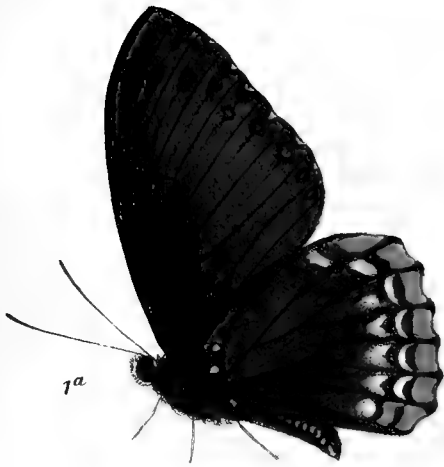








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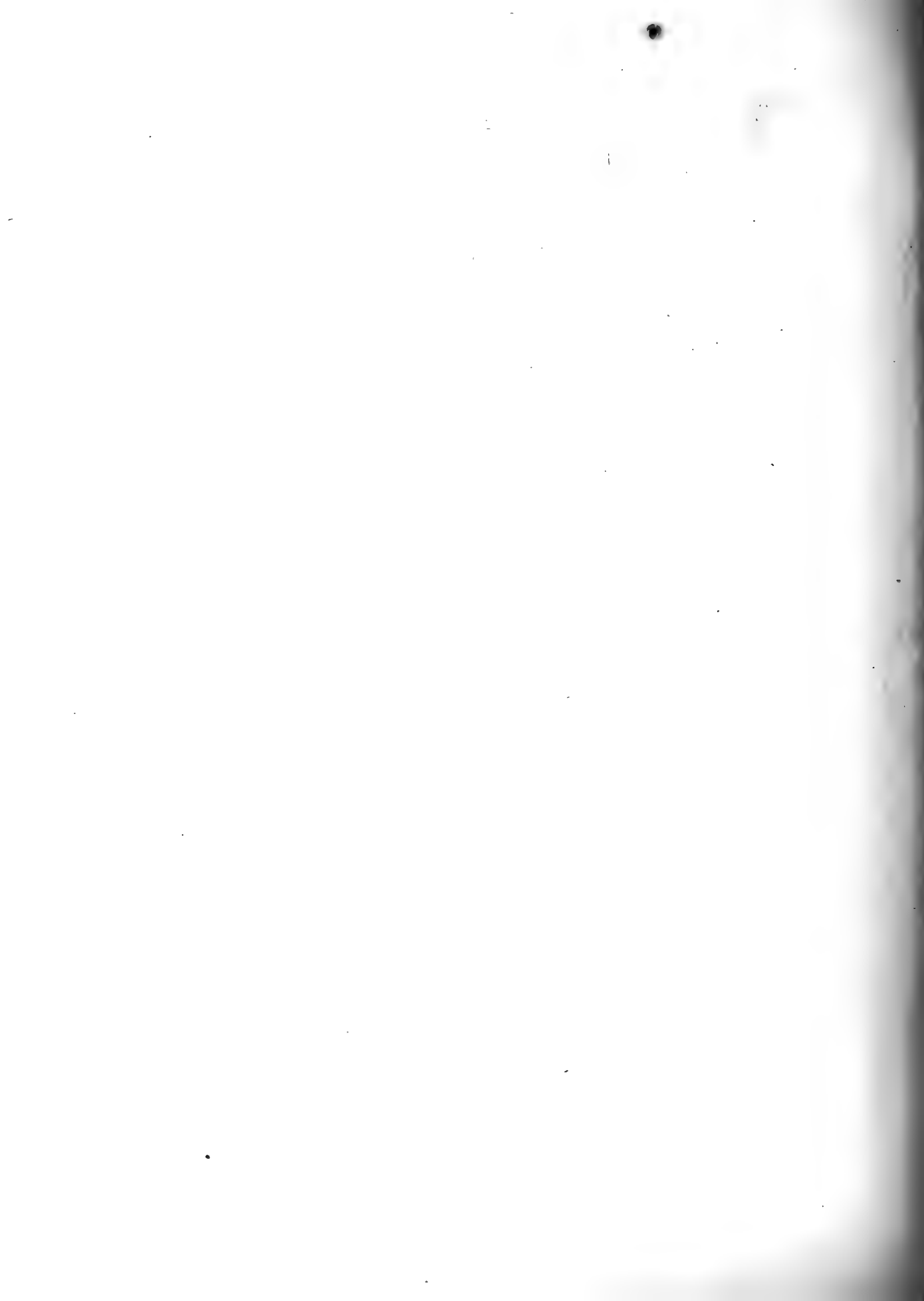
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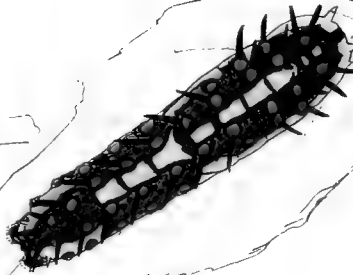
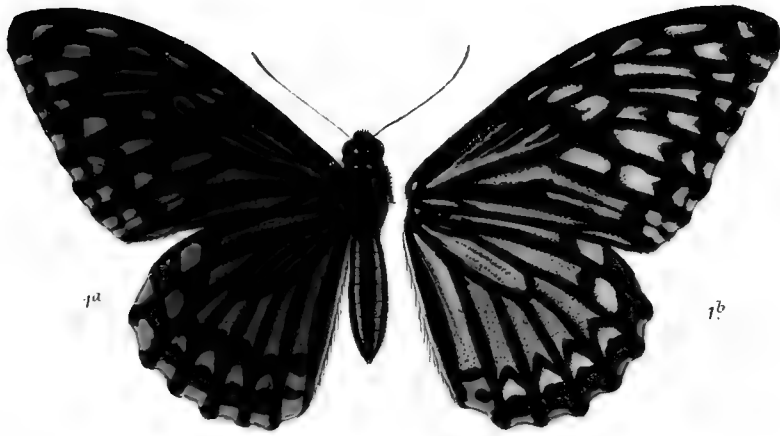


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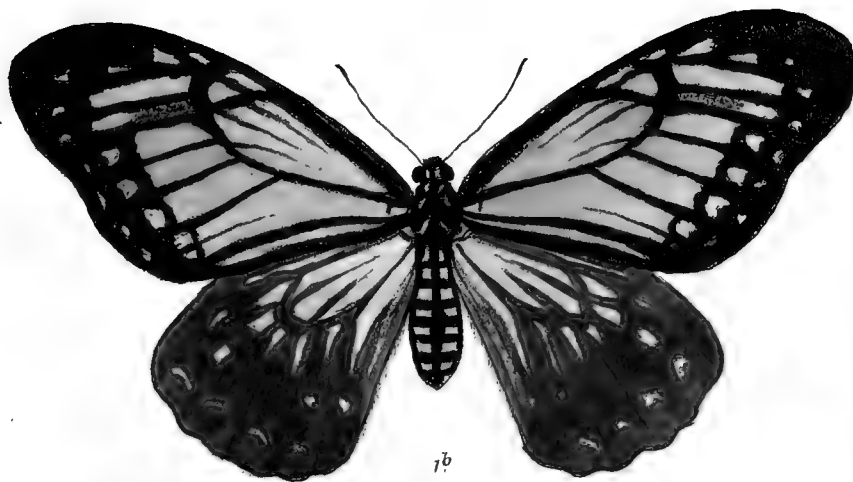
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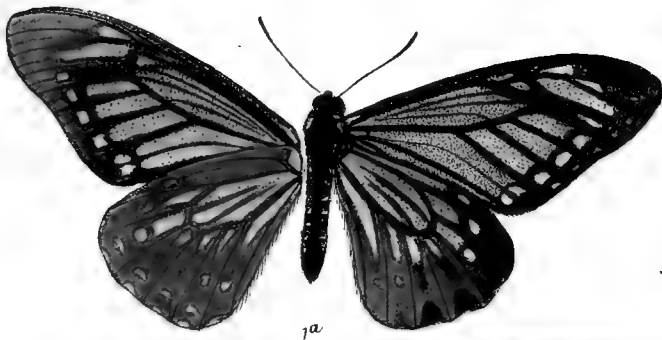


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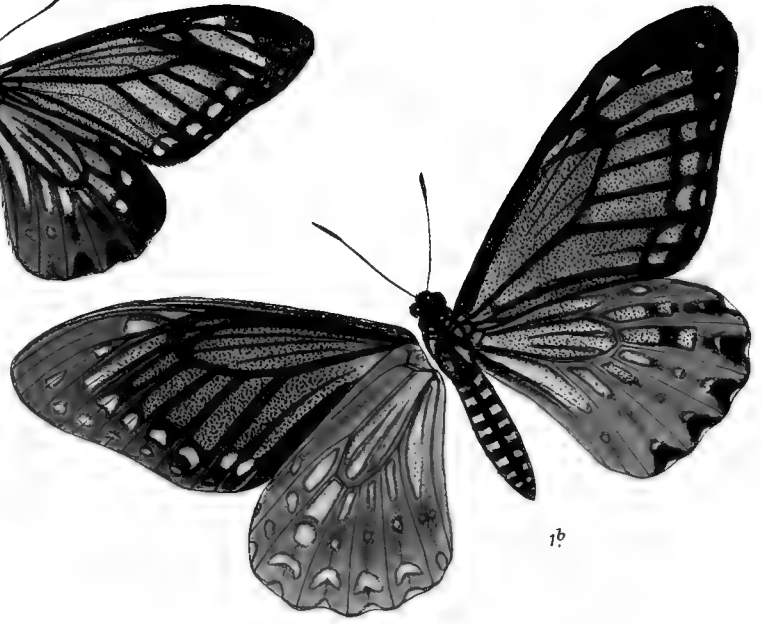


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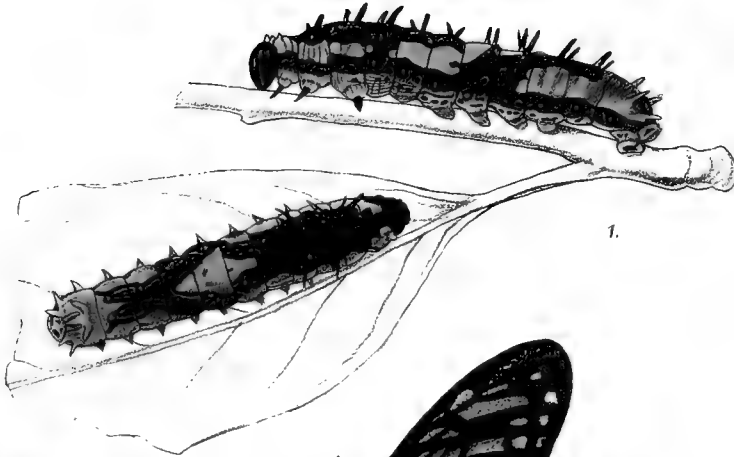




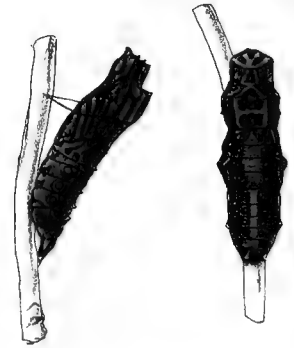
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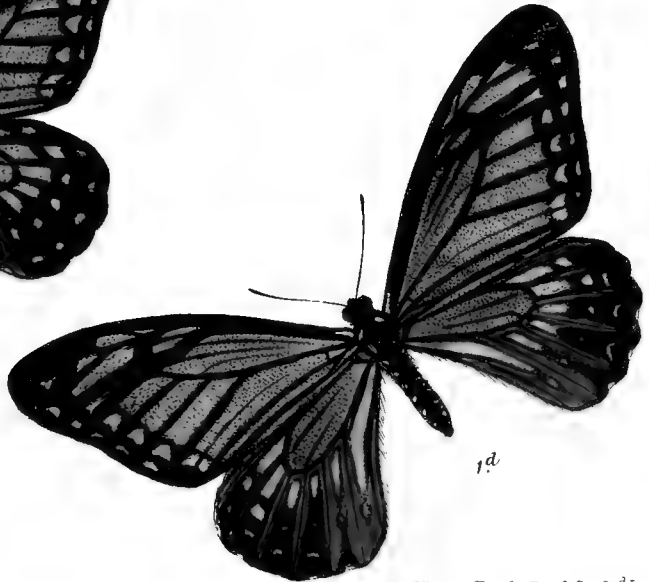
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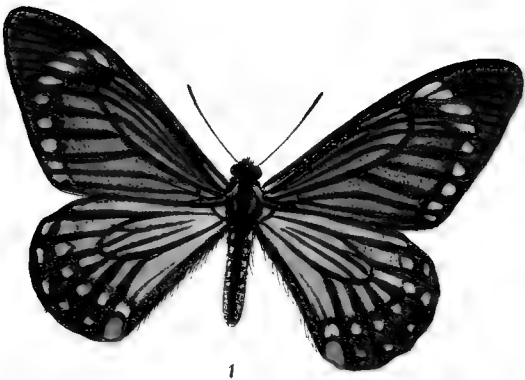


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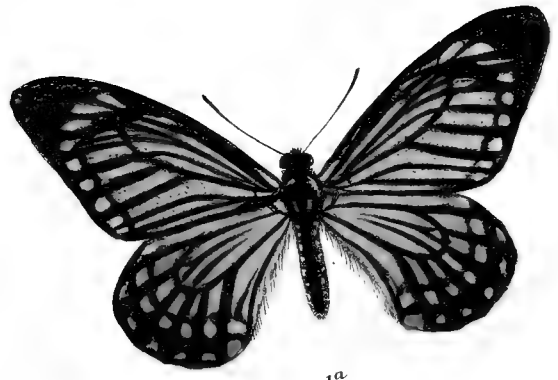


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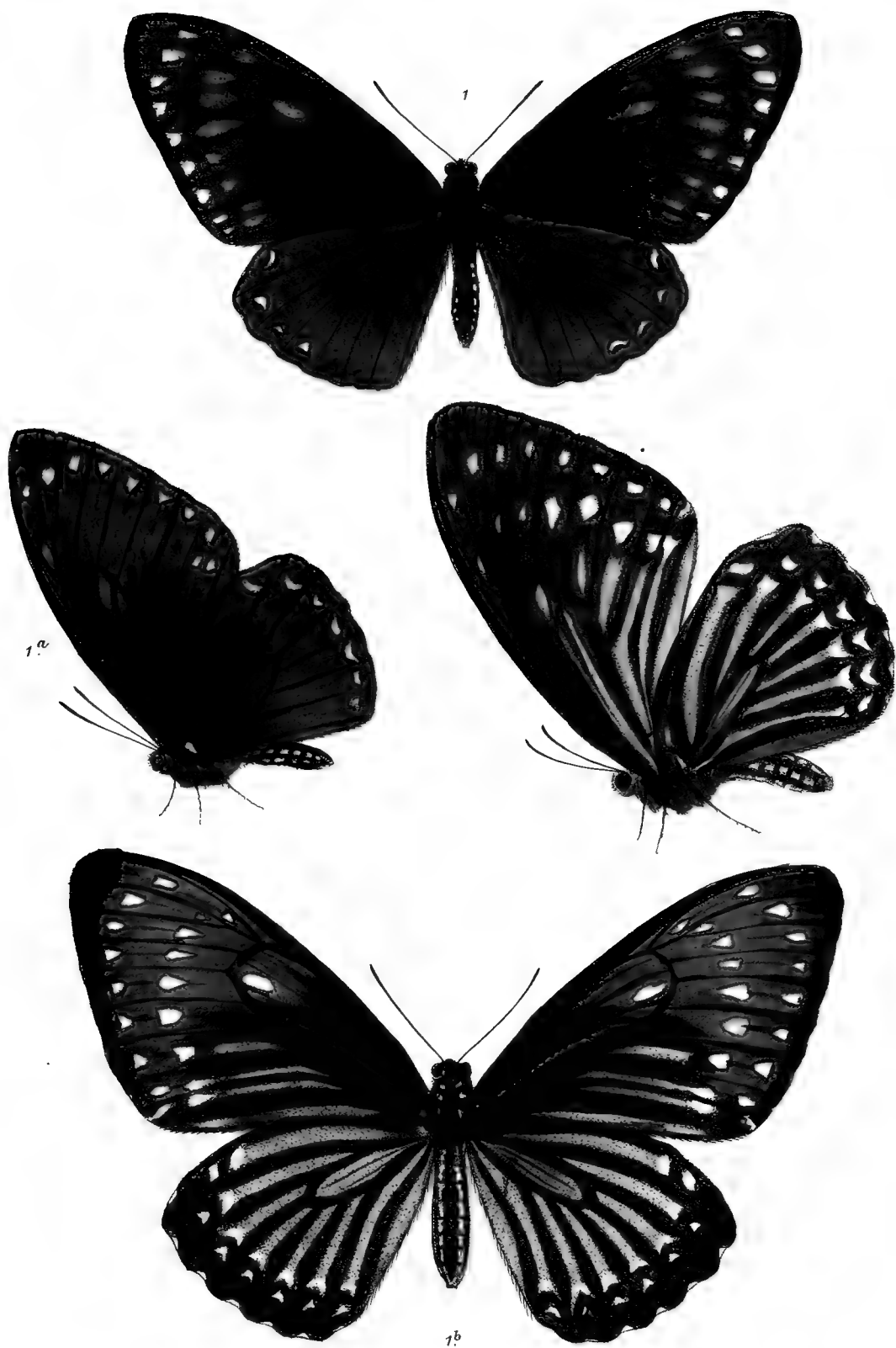
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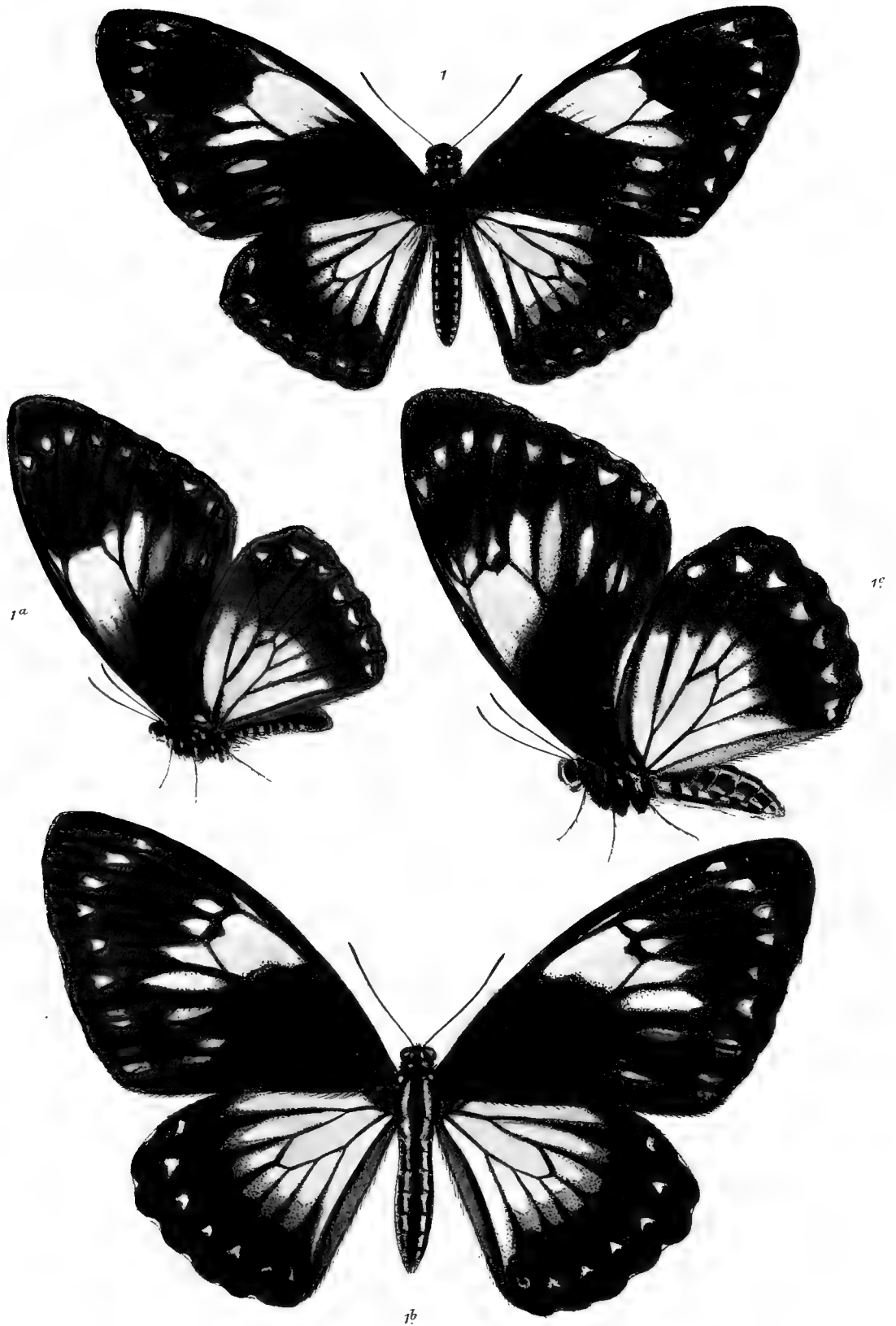
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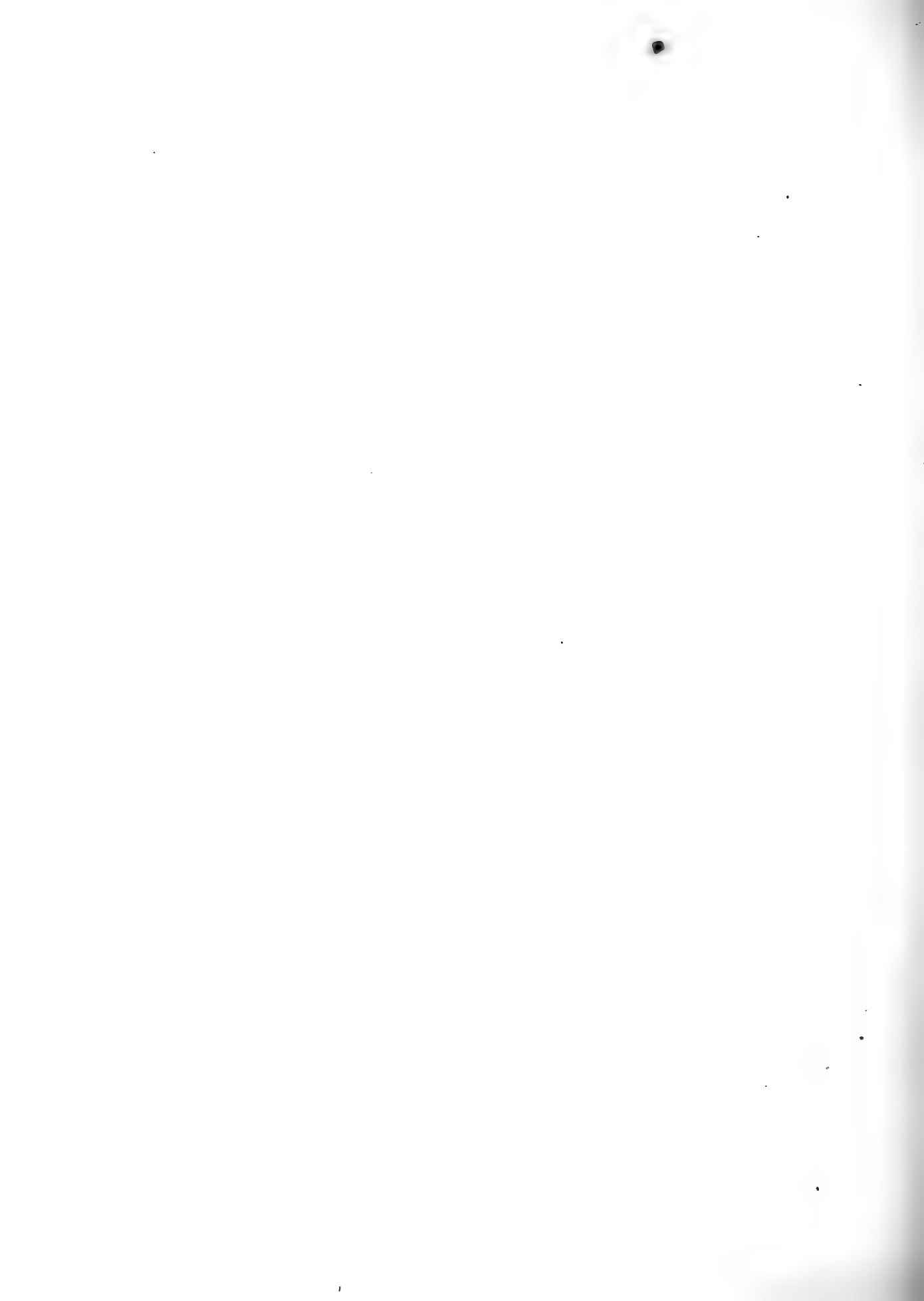


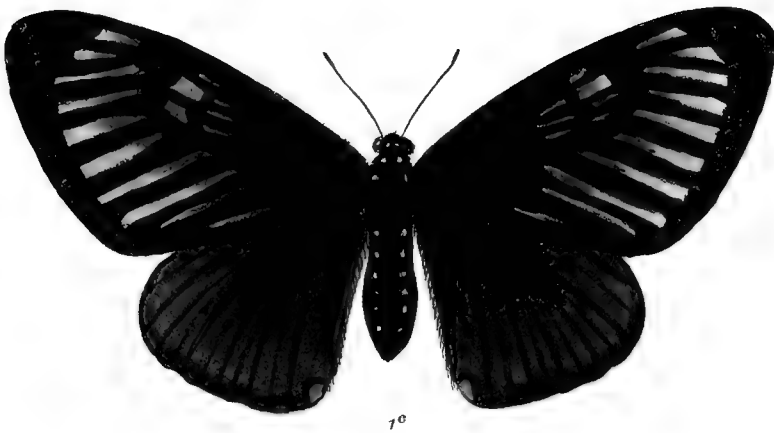
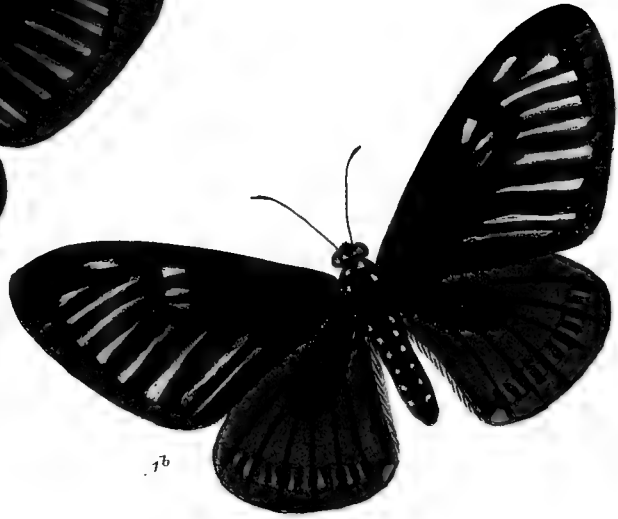
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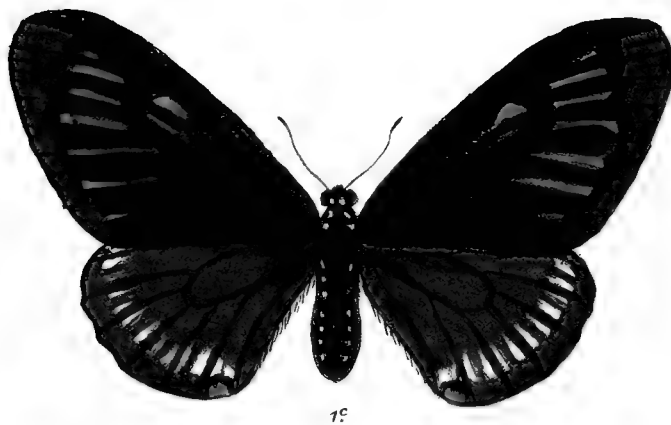
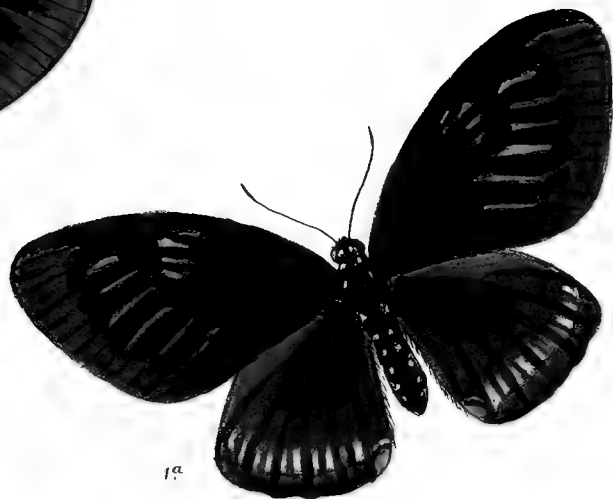




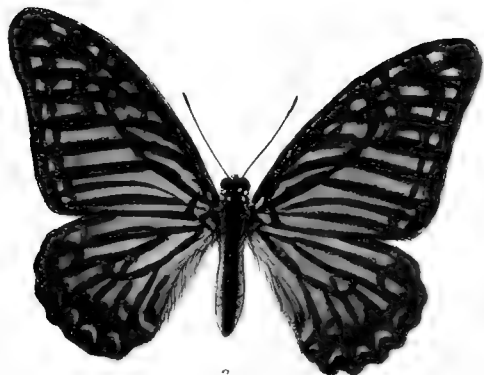


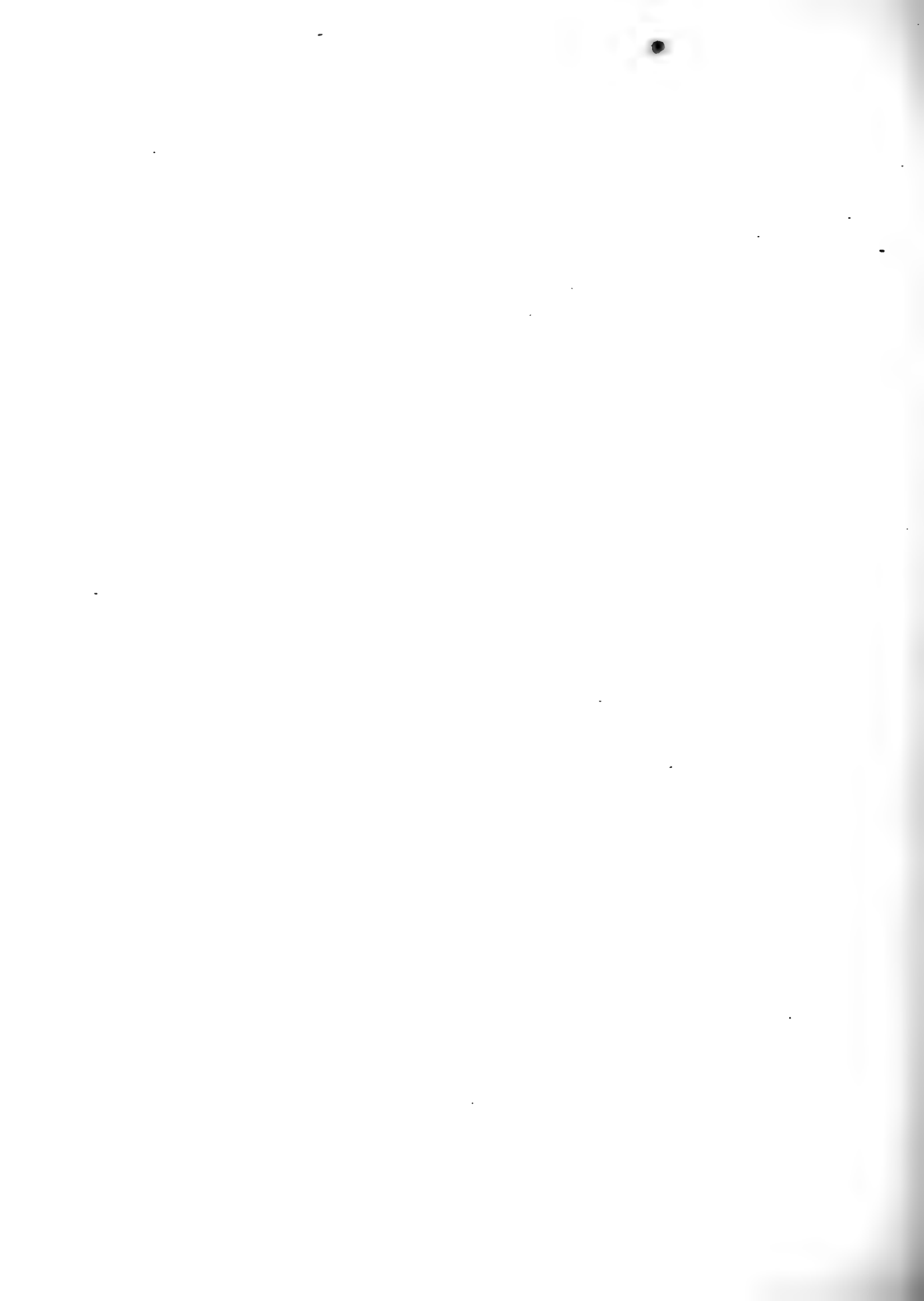


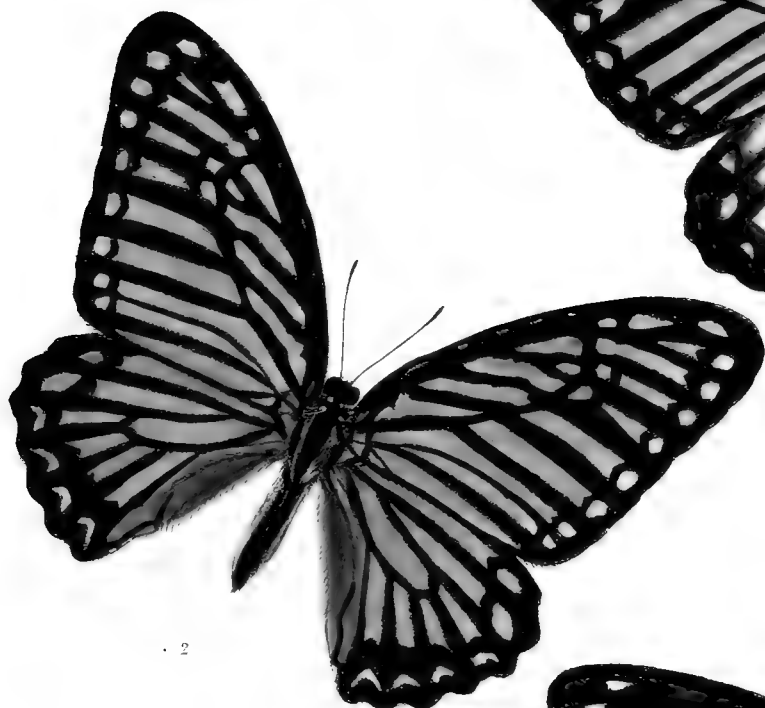




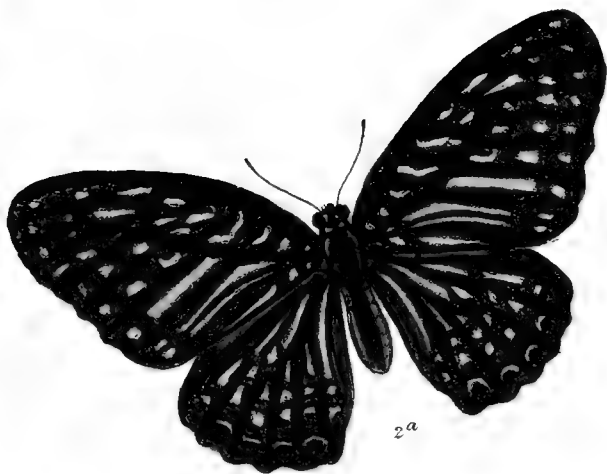
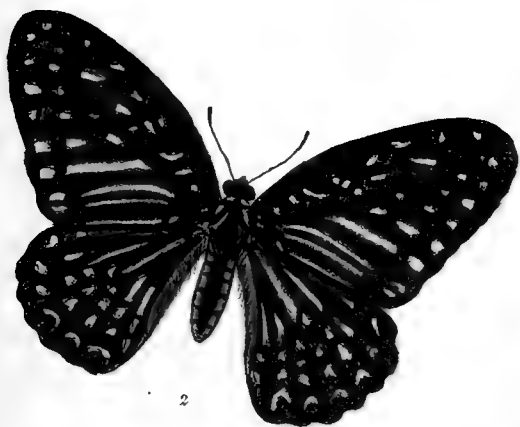
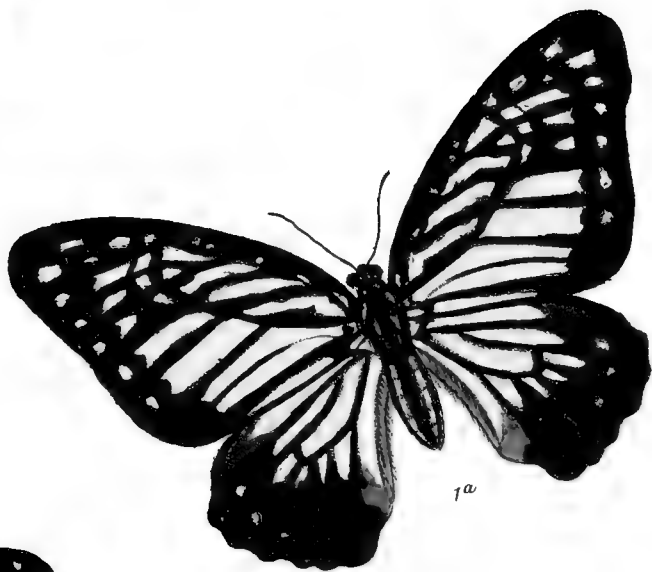




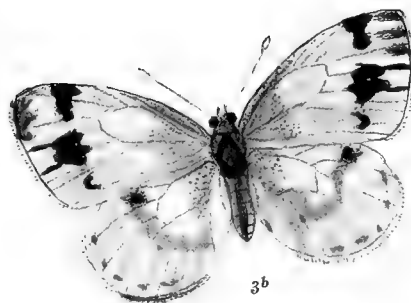
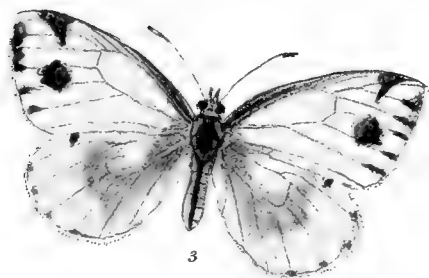
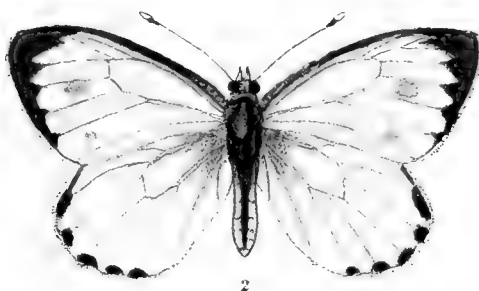








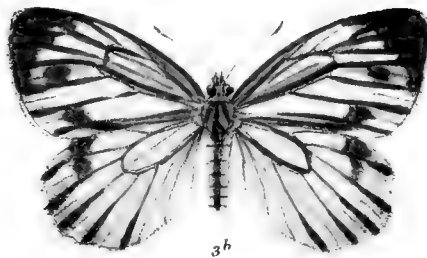
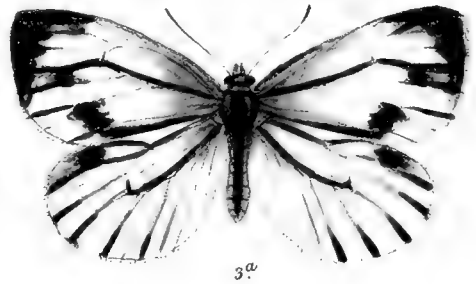
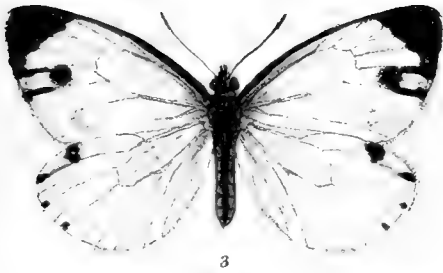
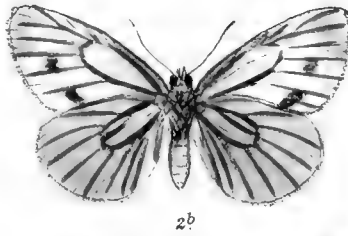
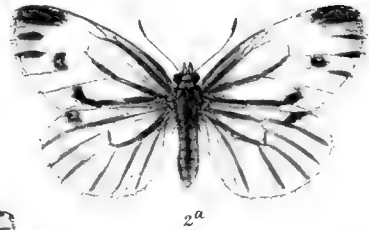
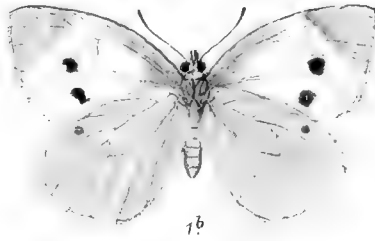
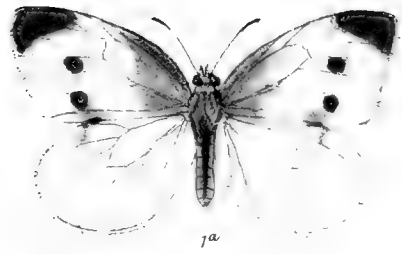
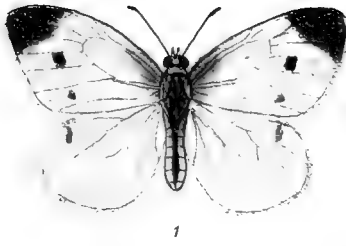




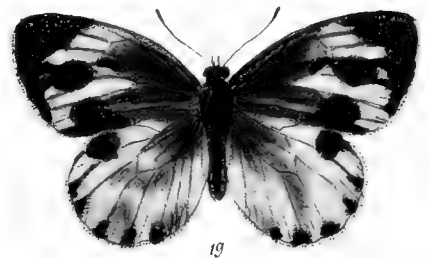
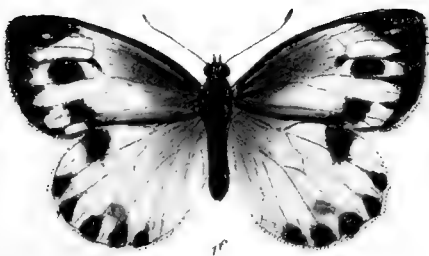
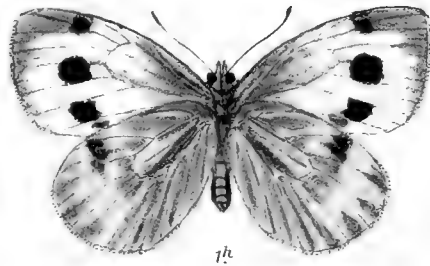
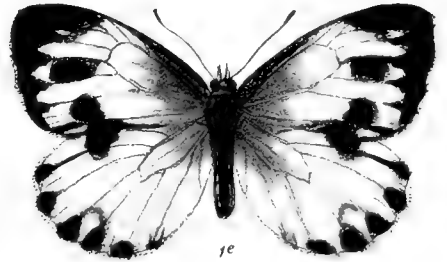
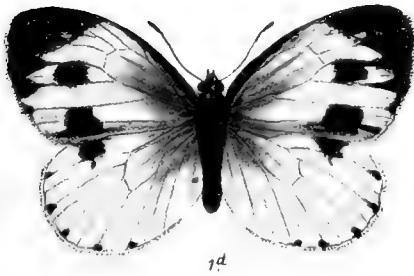
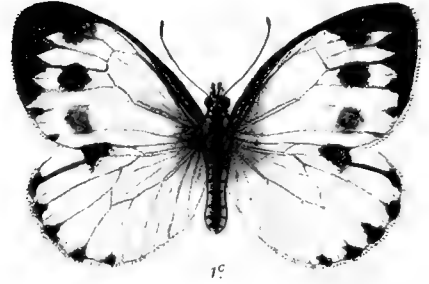
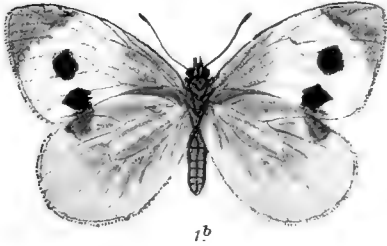
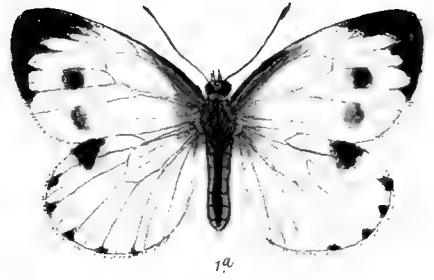
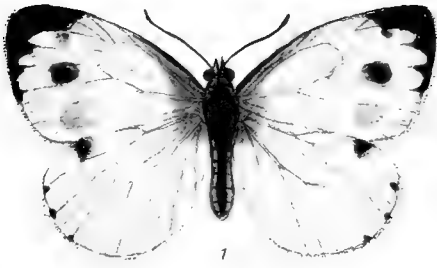
F.C.Moore del et lith.

Vincent.Brooks,Day & Son.Lth.Imp.





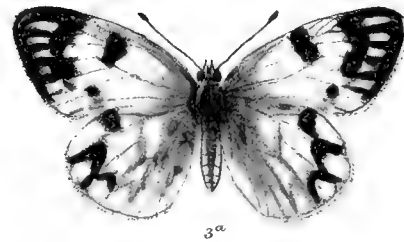
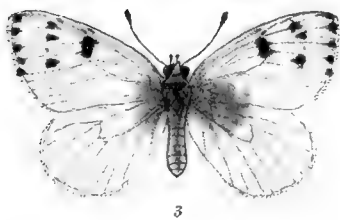
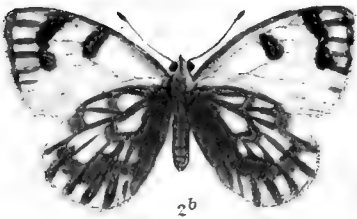
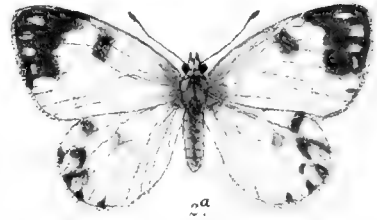
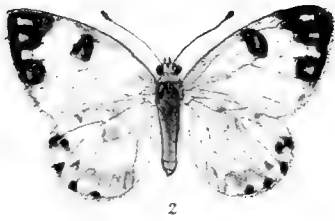
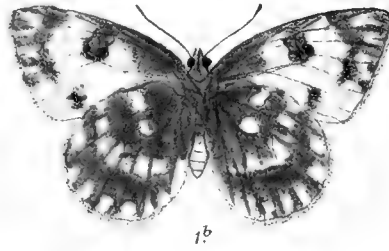
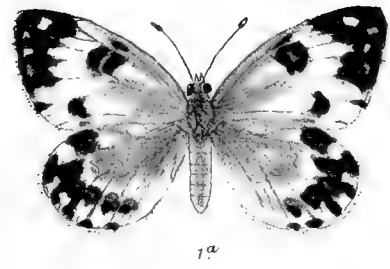
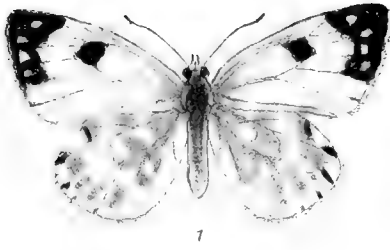




F.C. Moore del. et lith.

Vincent Brooks Day & Son Ltd. Imp.

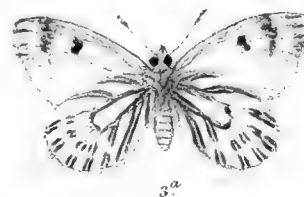
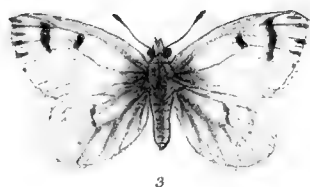
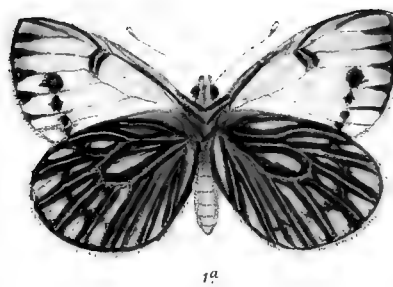
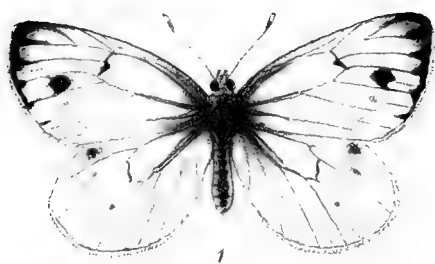




F.C. Moore del et lith.

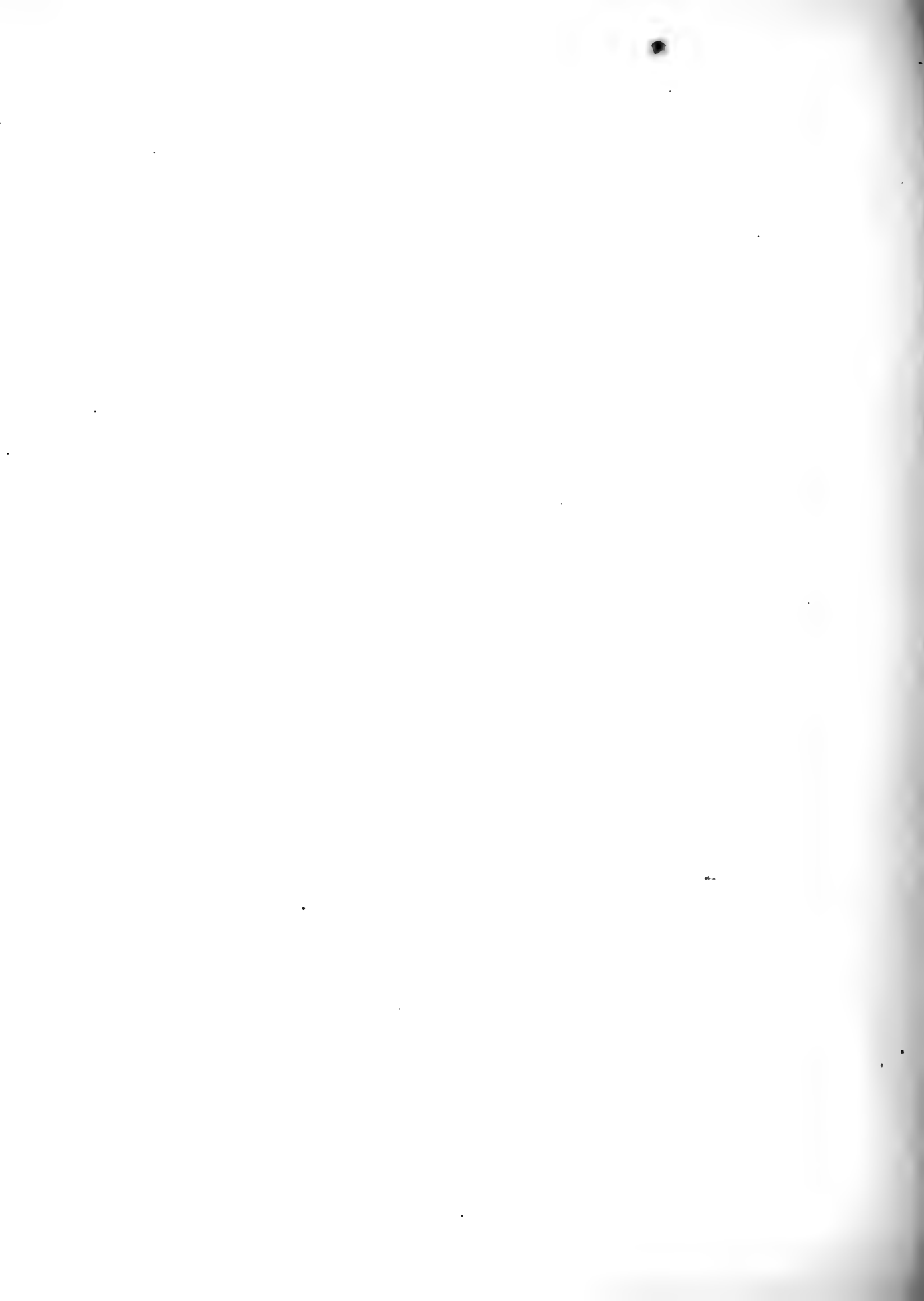
Vincent Brooks, Day & Son Ltd Imp

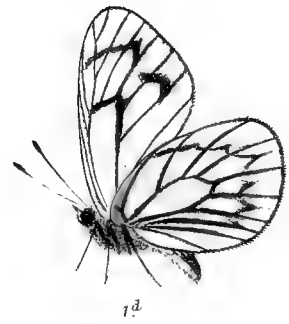
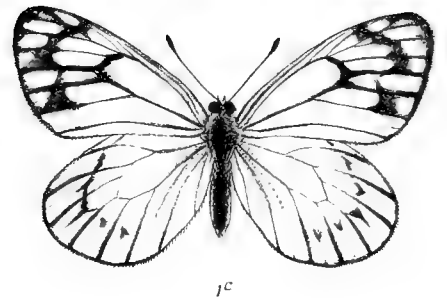
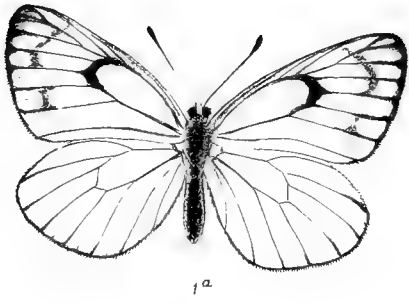




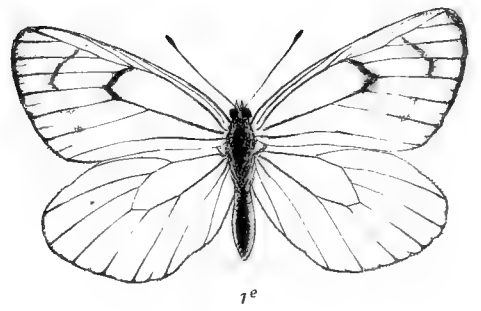
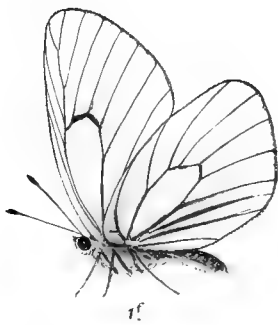
F.C. Moore del et lith.

Vincent Brooks Day & Son L^{td} Imp





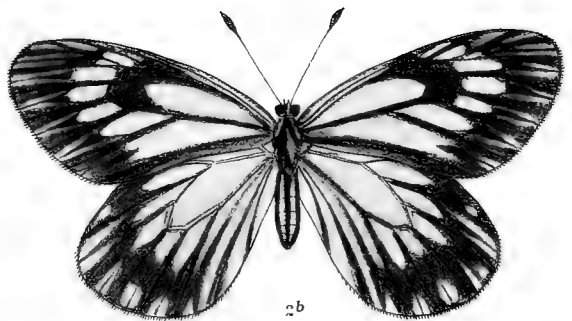
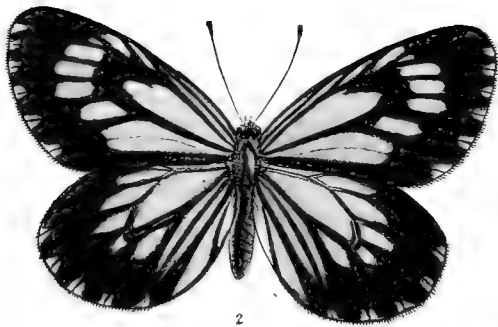
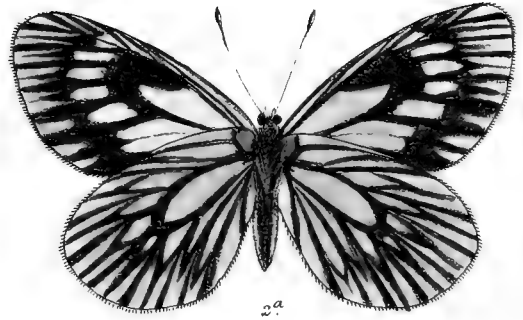
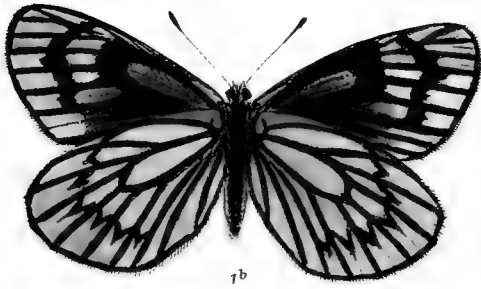
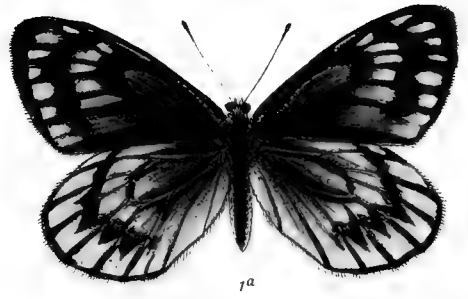
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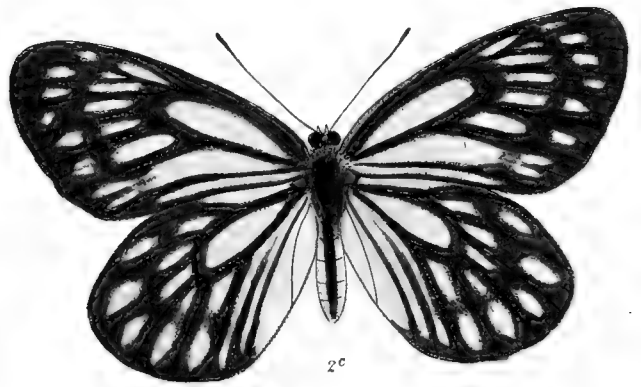
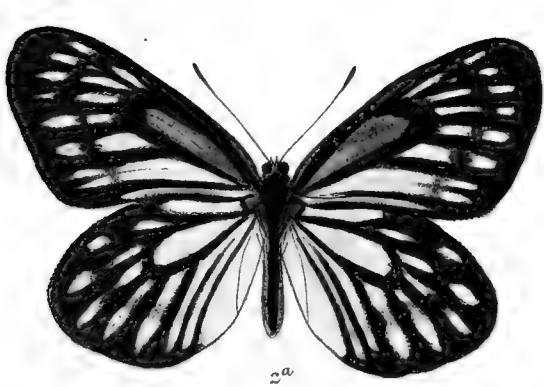
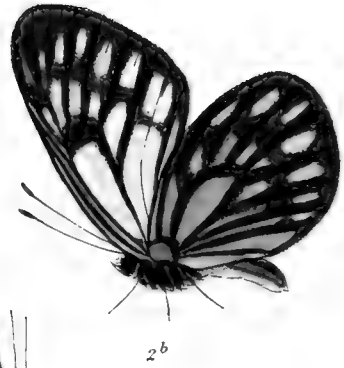
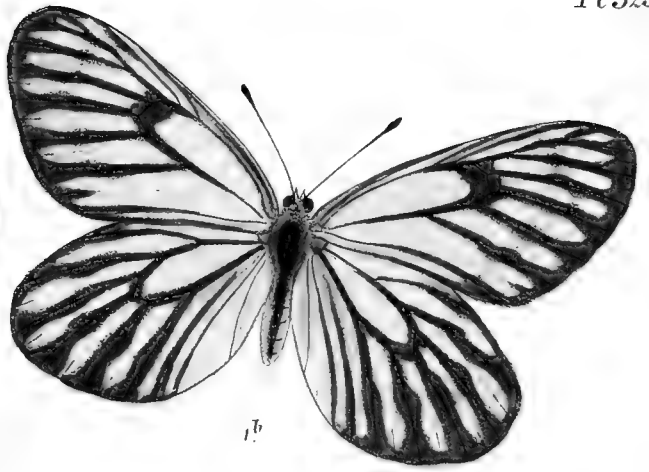
J.N.Fitch del., et lith.

Vincent Brookes, Day & Son, 10th Imp.





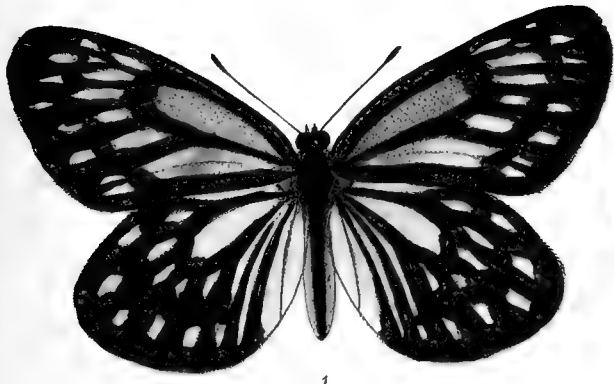




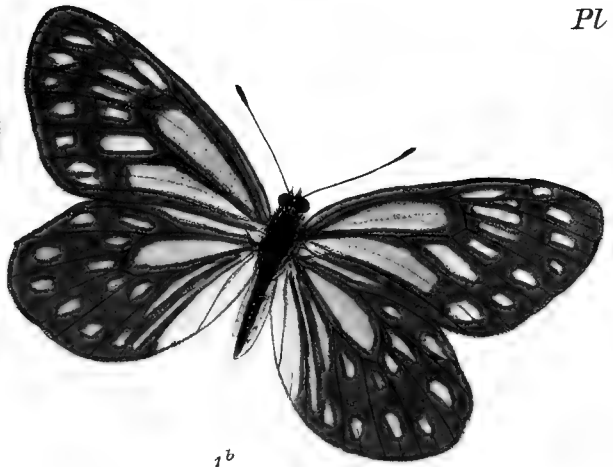
J.N. Fitch del et lith.

Vincent Brooks, Day & Son, Lith. Imp.





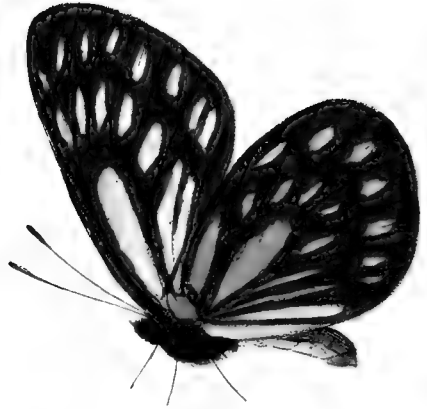
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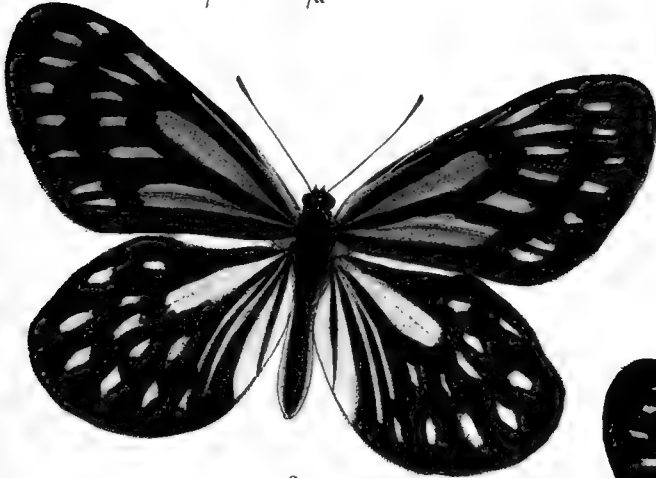
1b



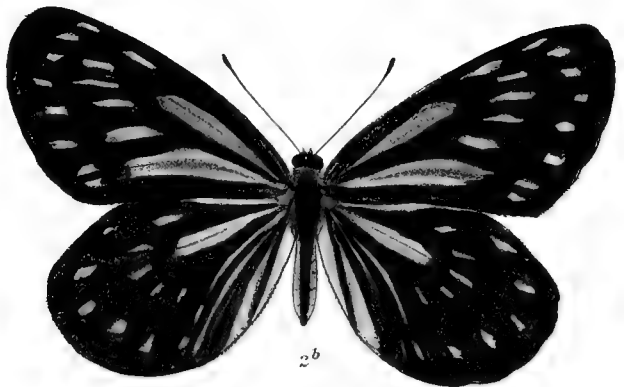
1a



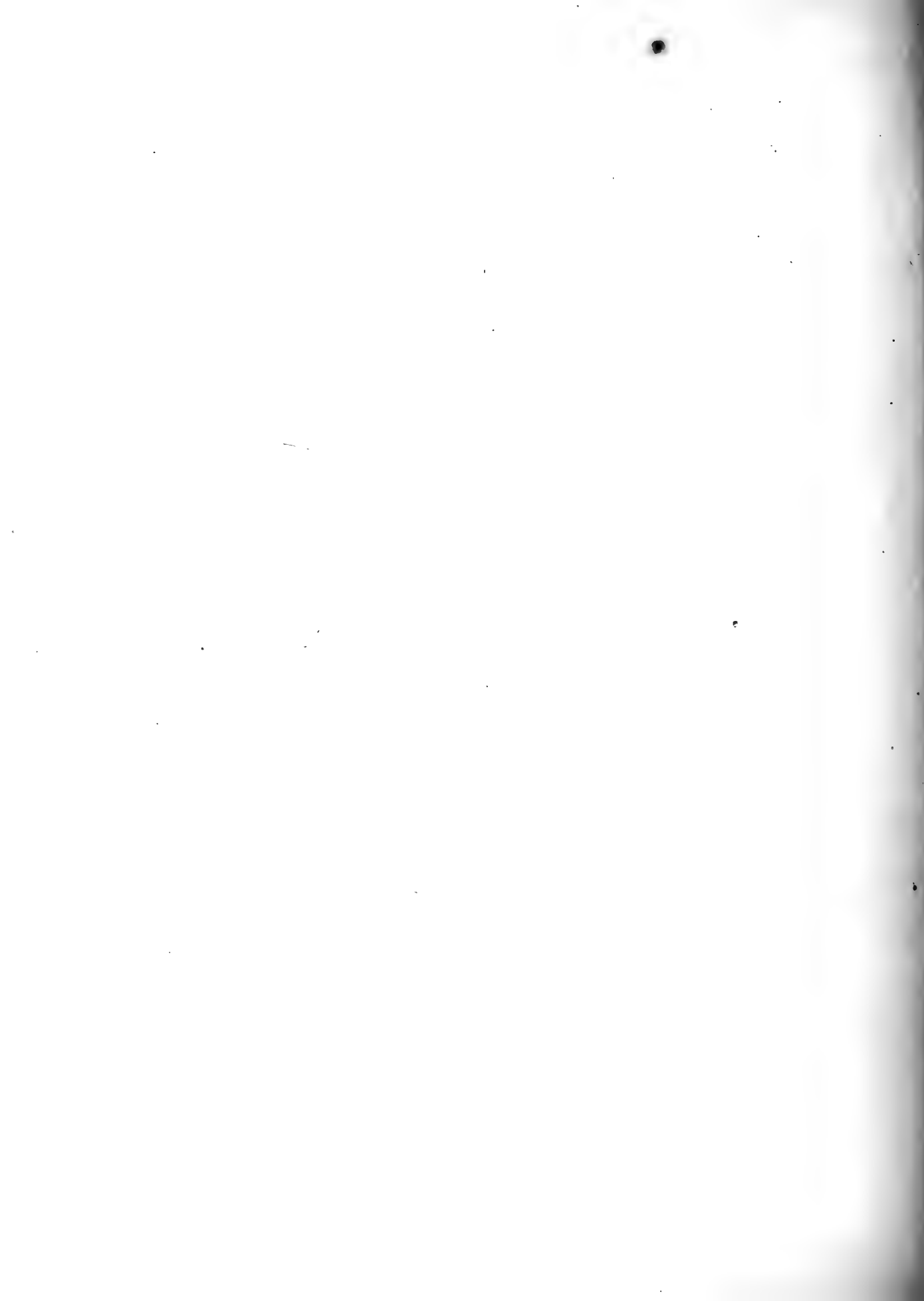
2a

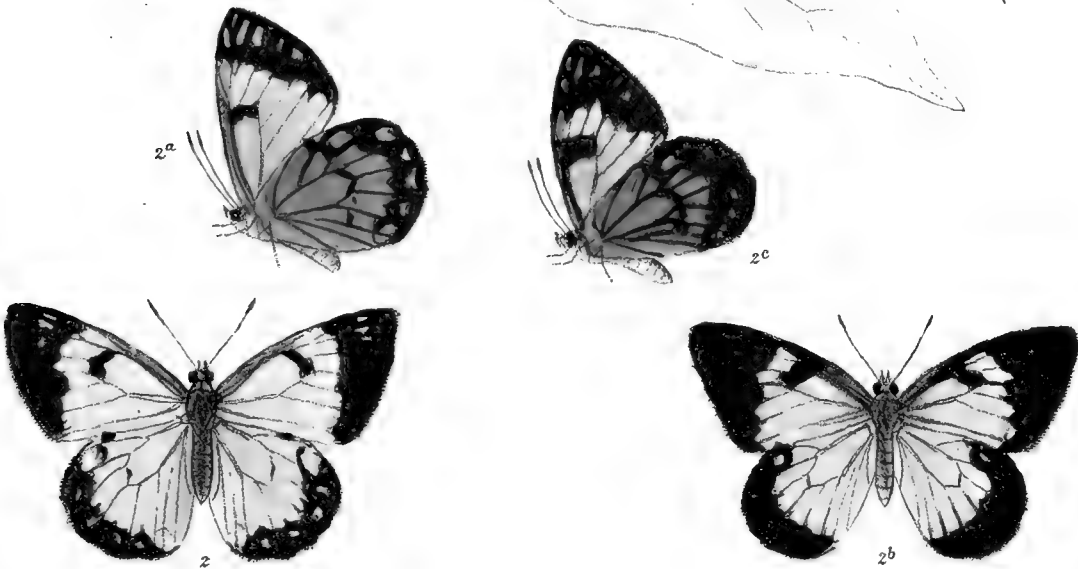
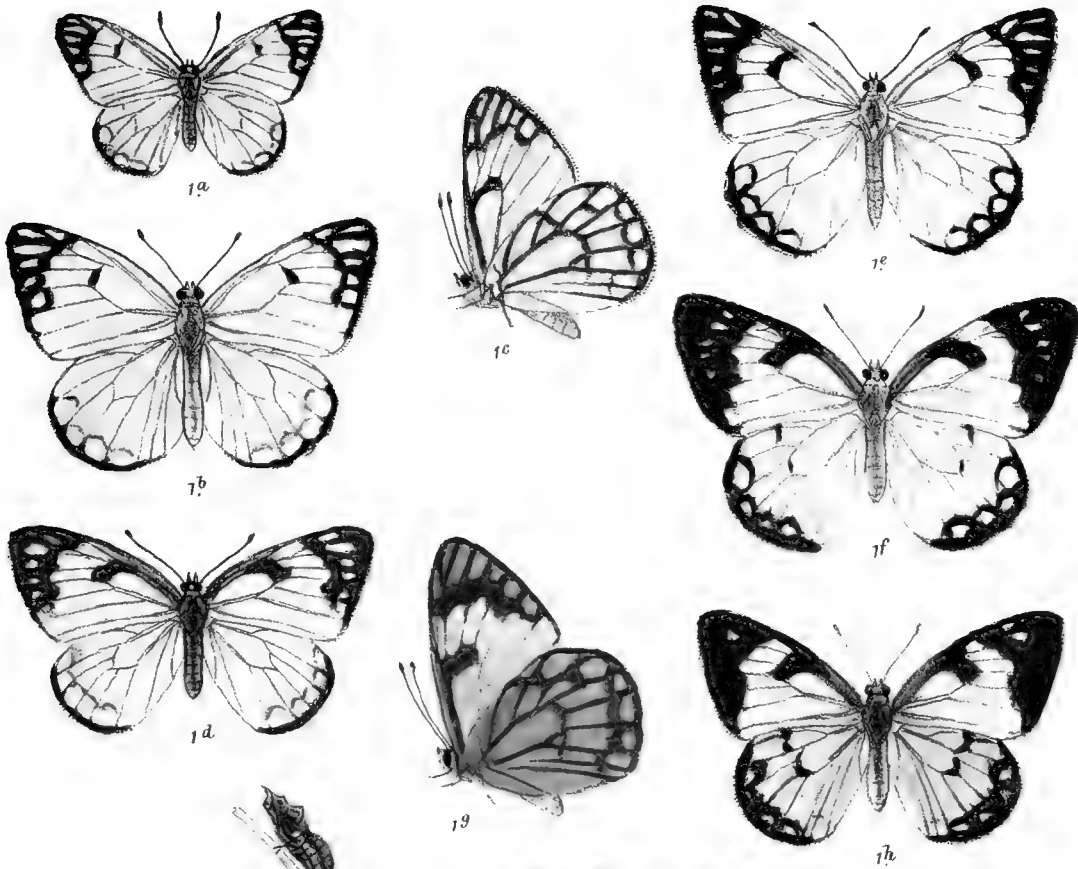


2



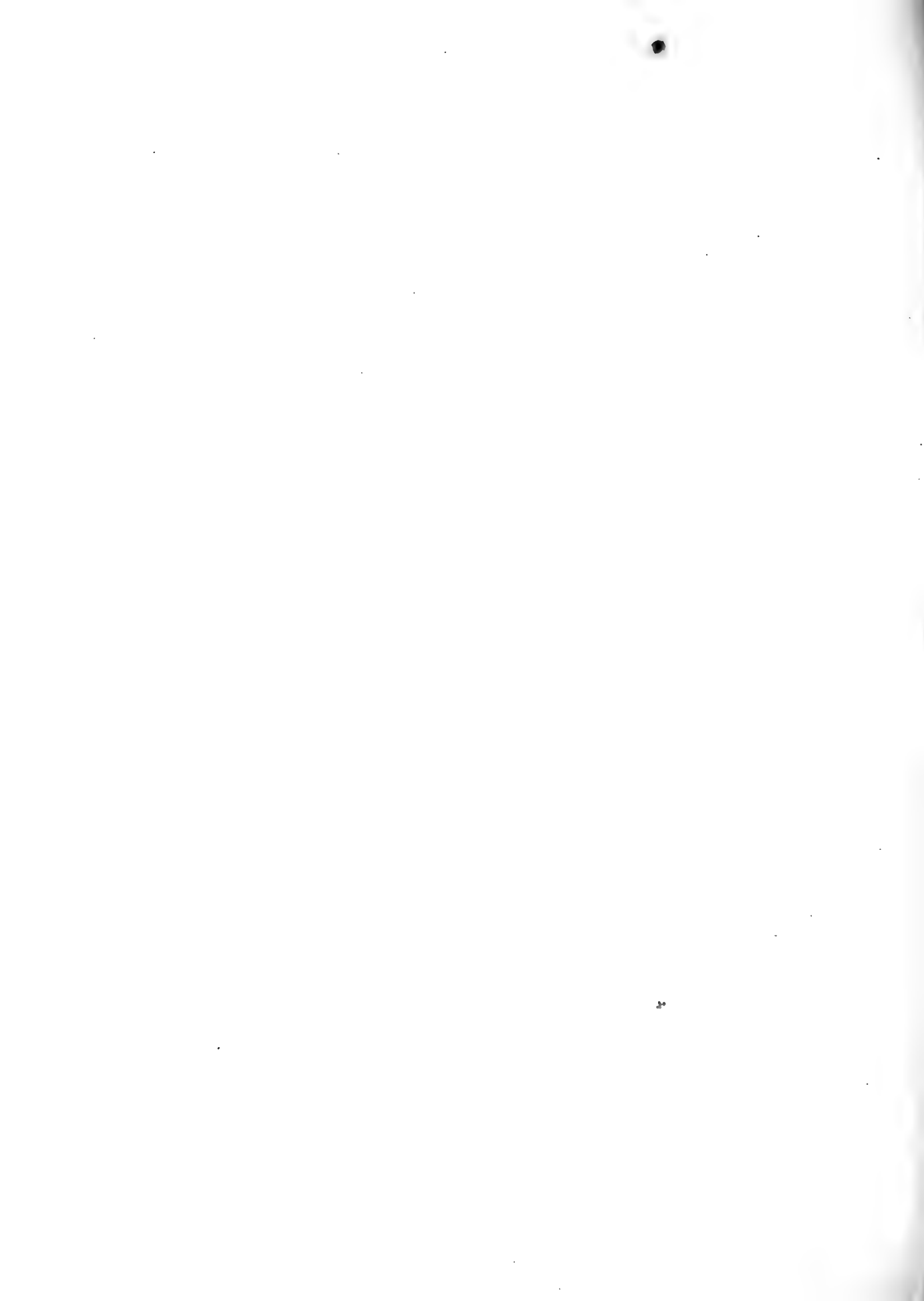
2b





F.C. Moore del et lith.

Vincent Brooks Day & Son Ltd Imp

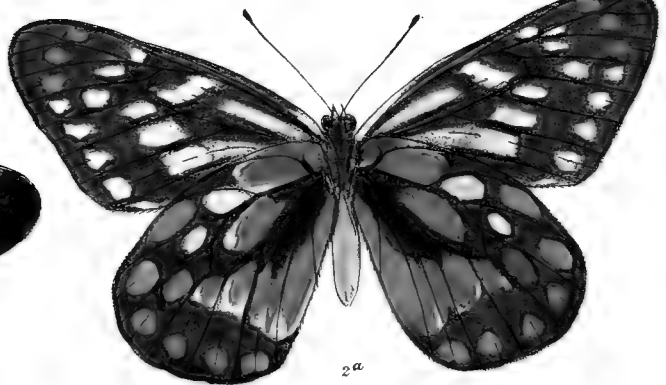
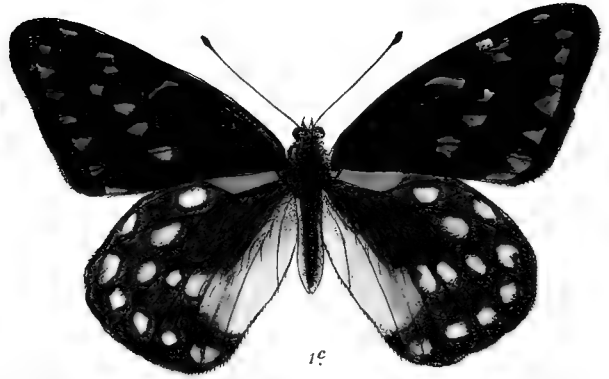
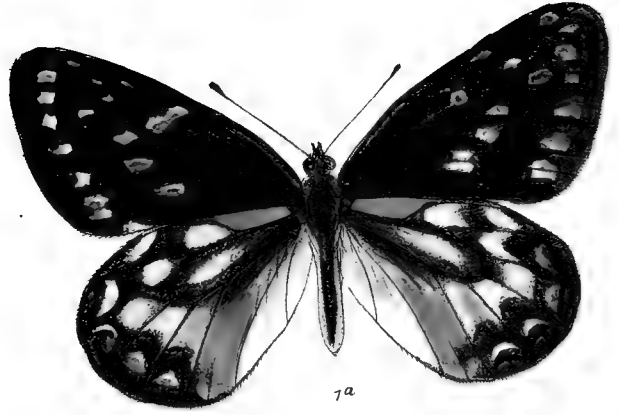
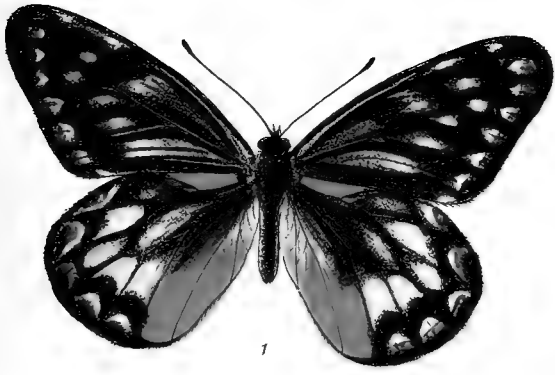




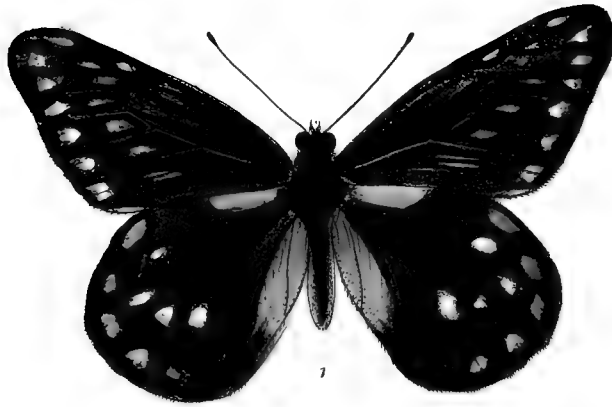
F.C. Moore del et lith.

Vincent Brooks, Day & Son, Ltd. Imp.

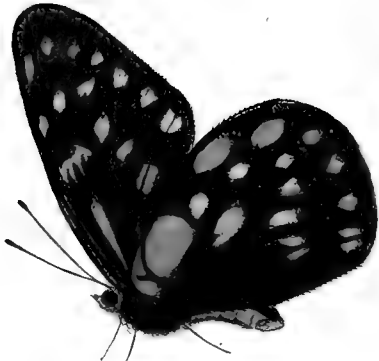








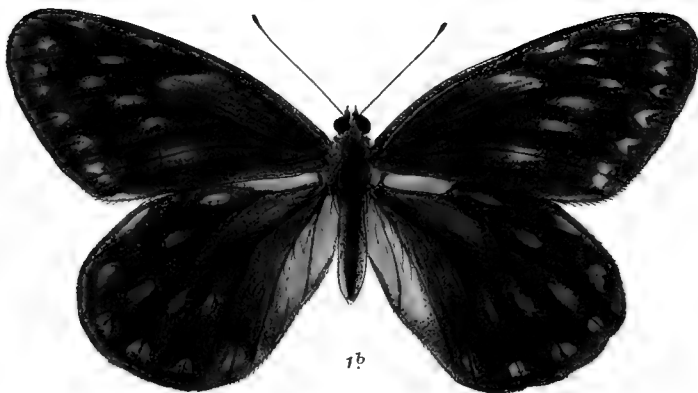
1



1^a

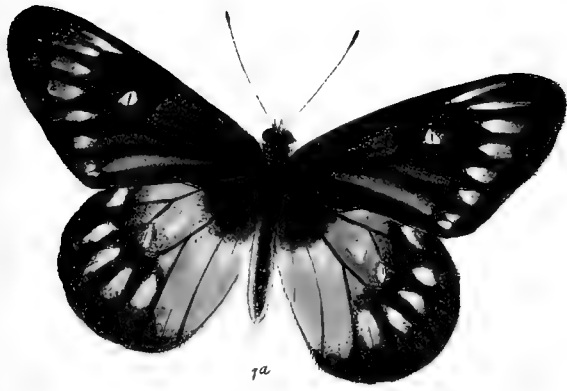


1^c



1^b

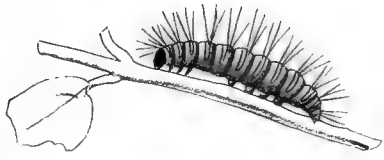




7a



7b



7

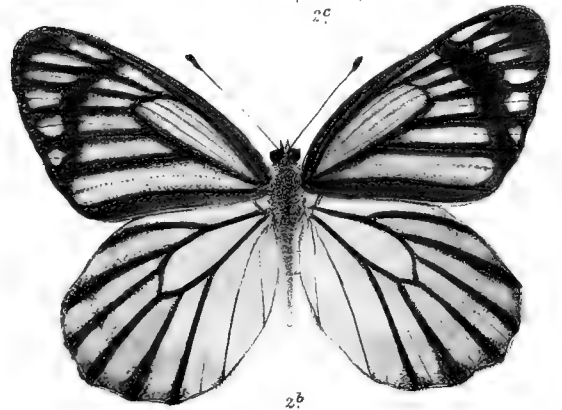
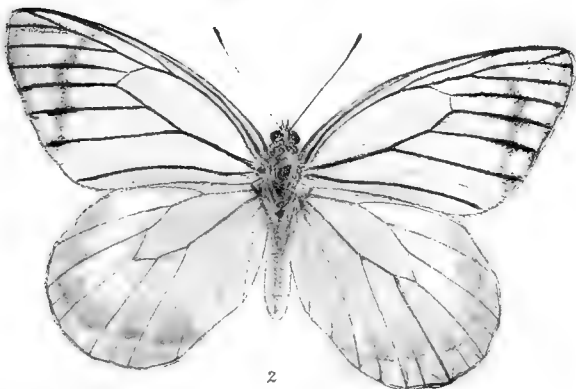
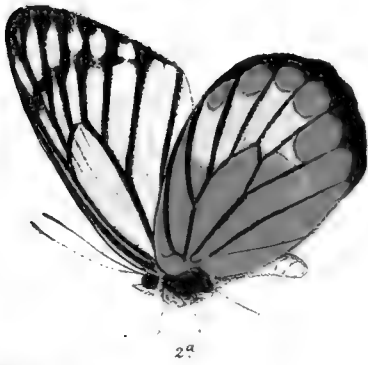
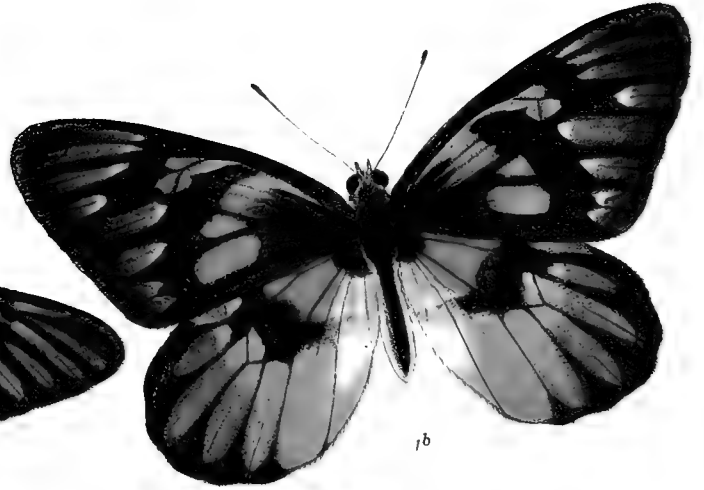


7c

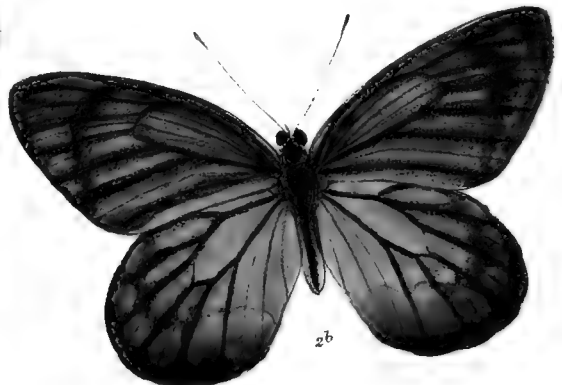
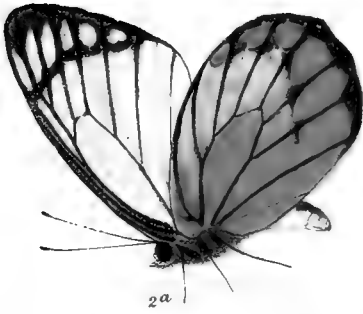
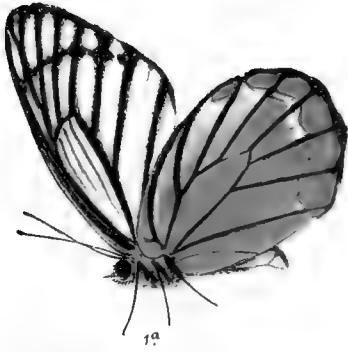
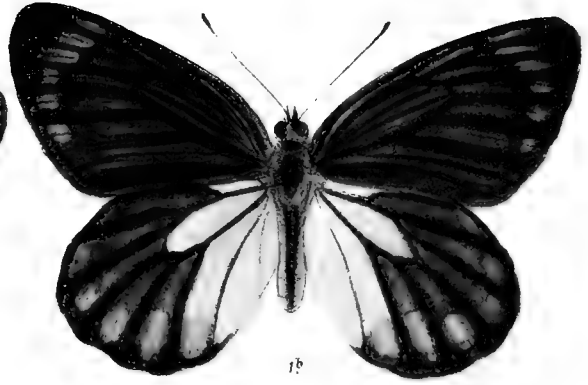


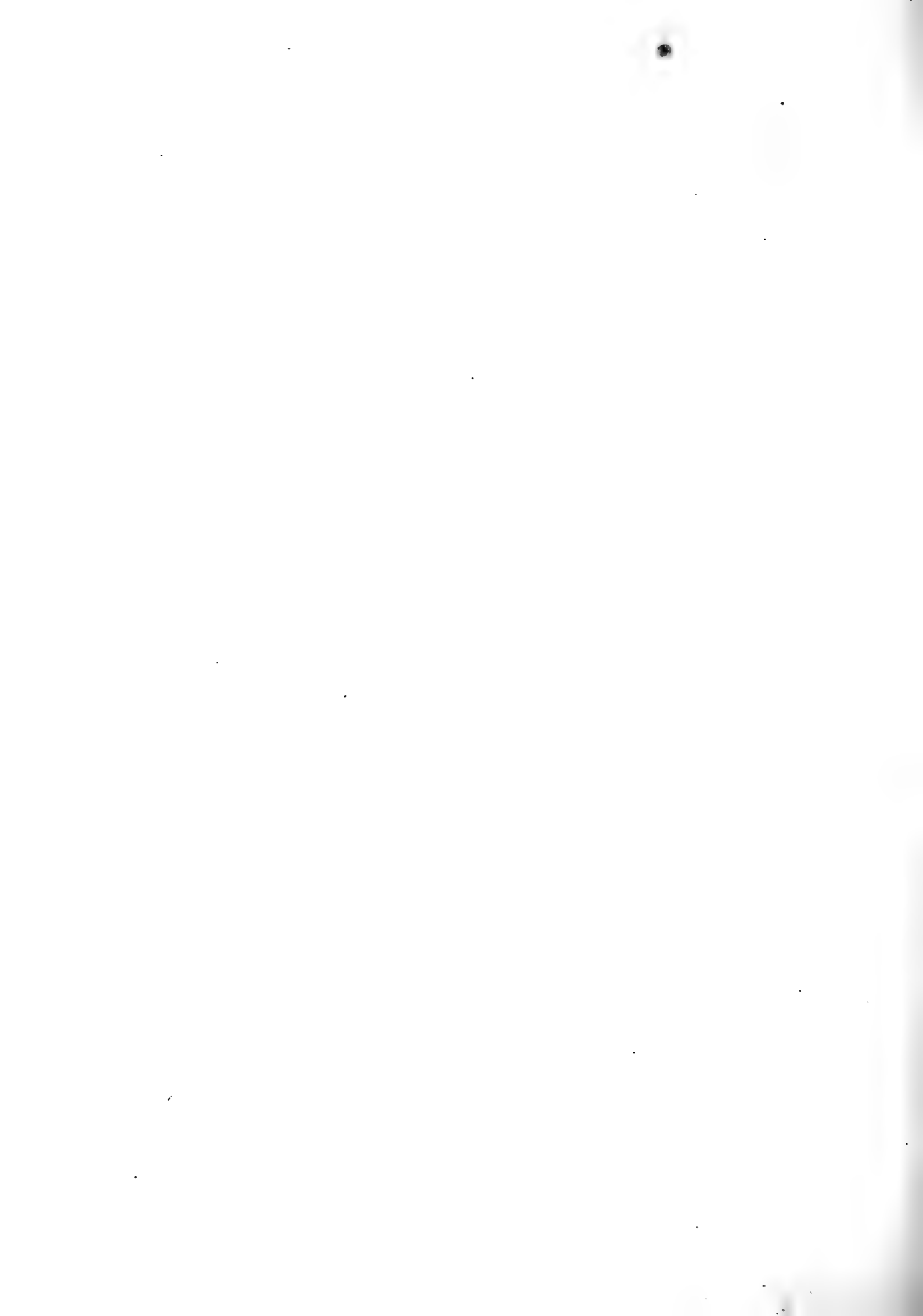
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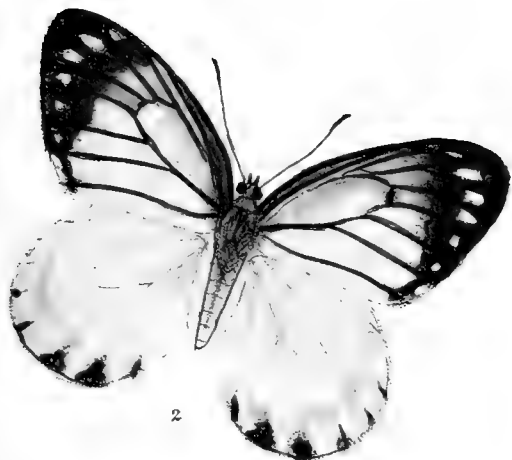
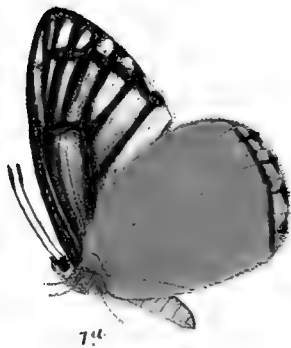






Vincent Brooks, Day & Son Ltd. Imp.

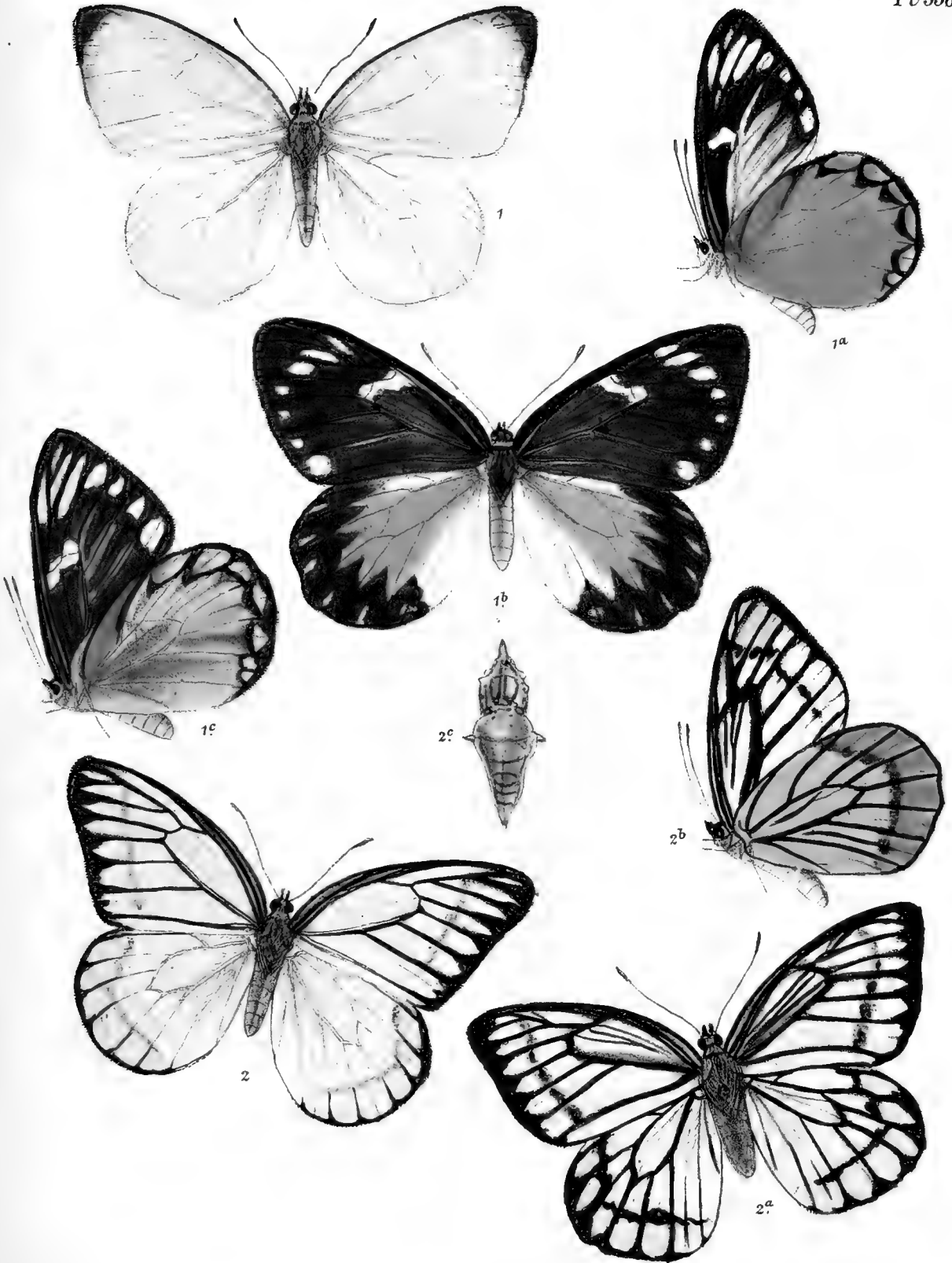




F.C. Moore del, et lith.

Vincent Brooks, Day & Son, Ltd. Eng.

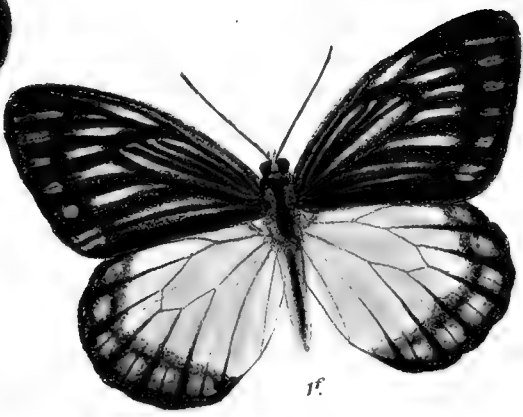
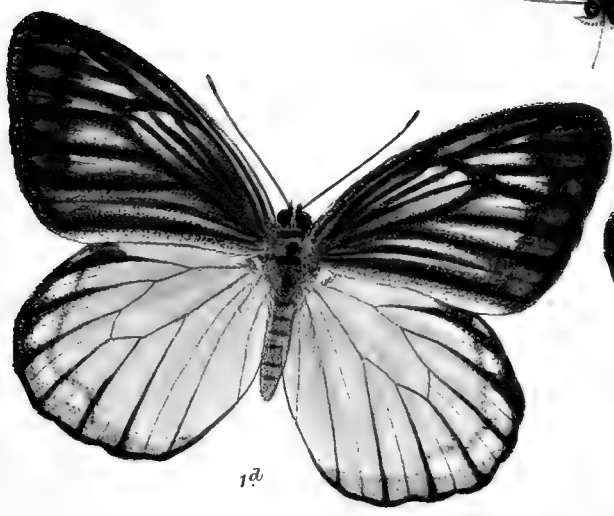
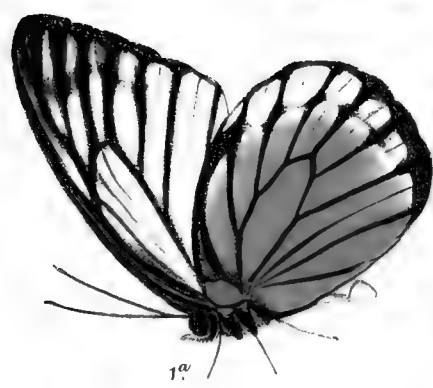
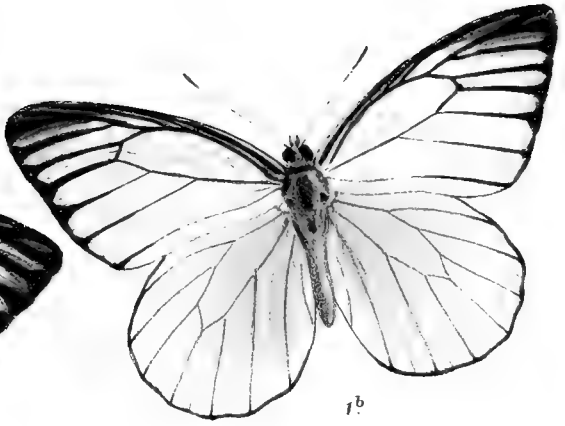




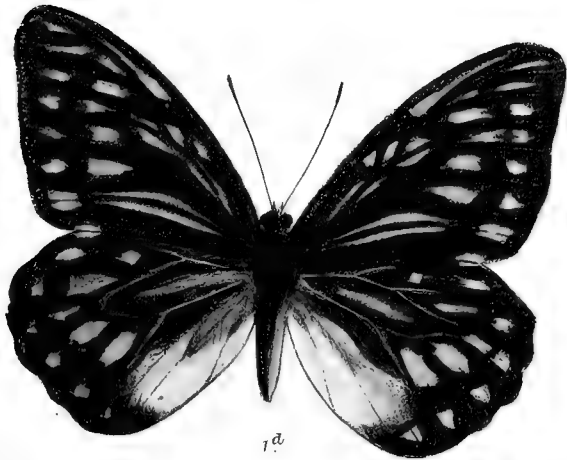
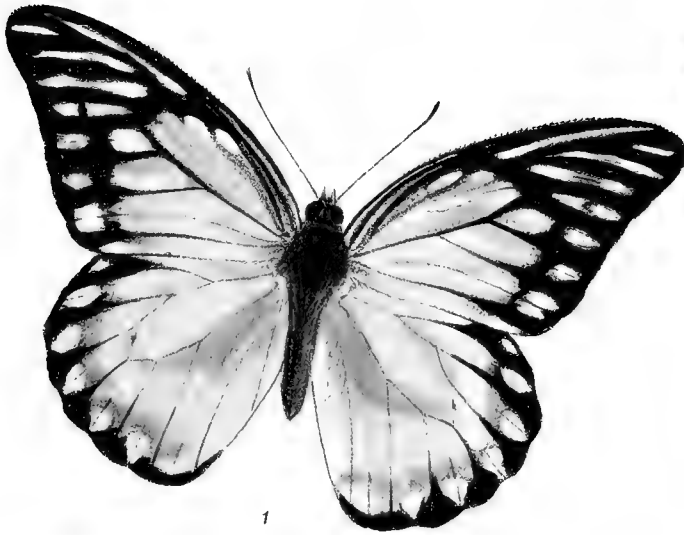
F.C. Moore del, et lith

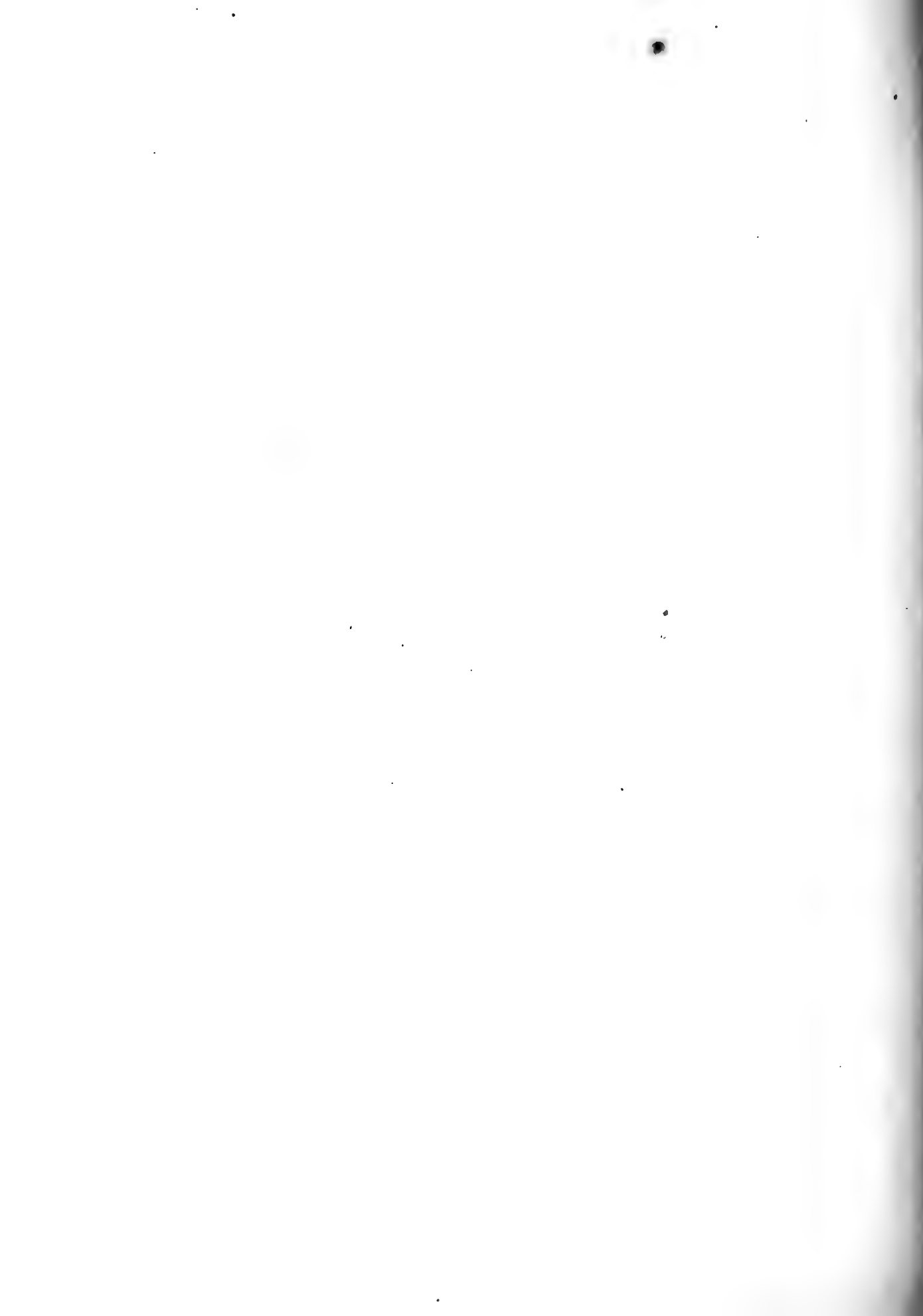
Vincent Brooks, Day & Son, Lit^{rs} Imp





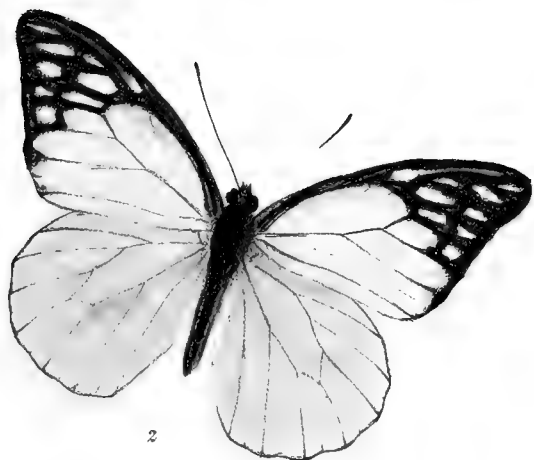








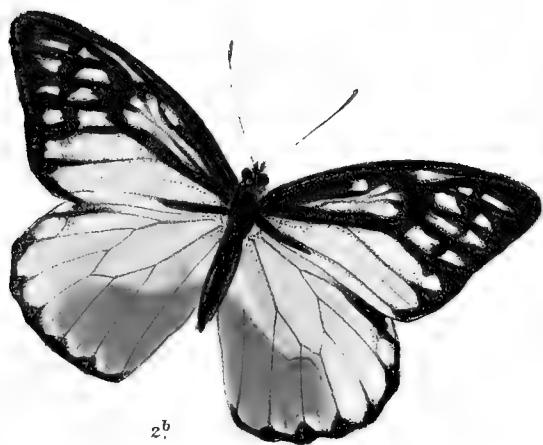
7^a



2



2^a

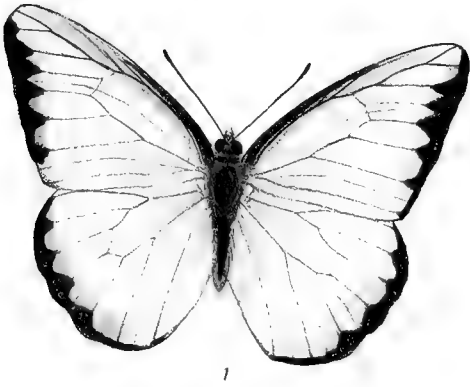


2^b



2^c

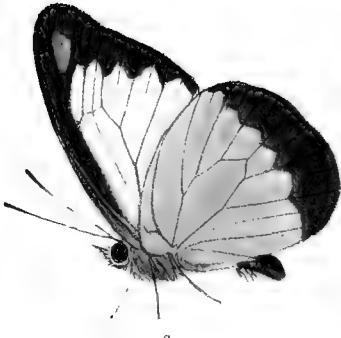




1



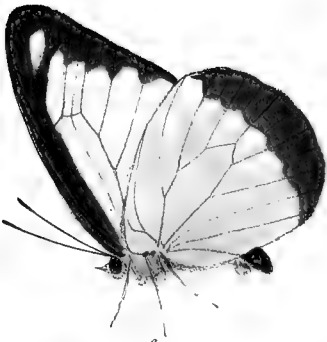
1b



1a



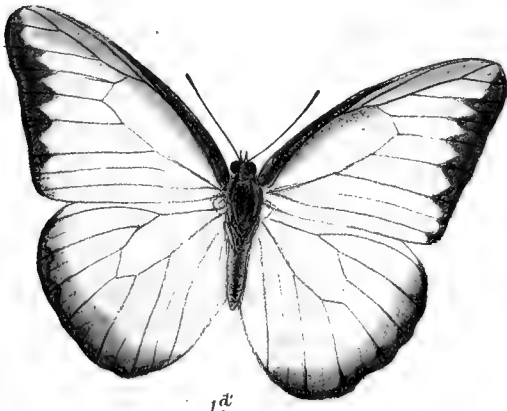
1c



1e



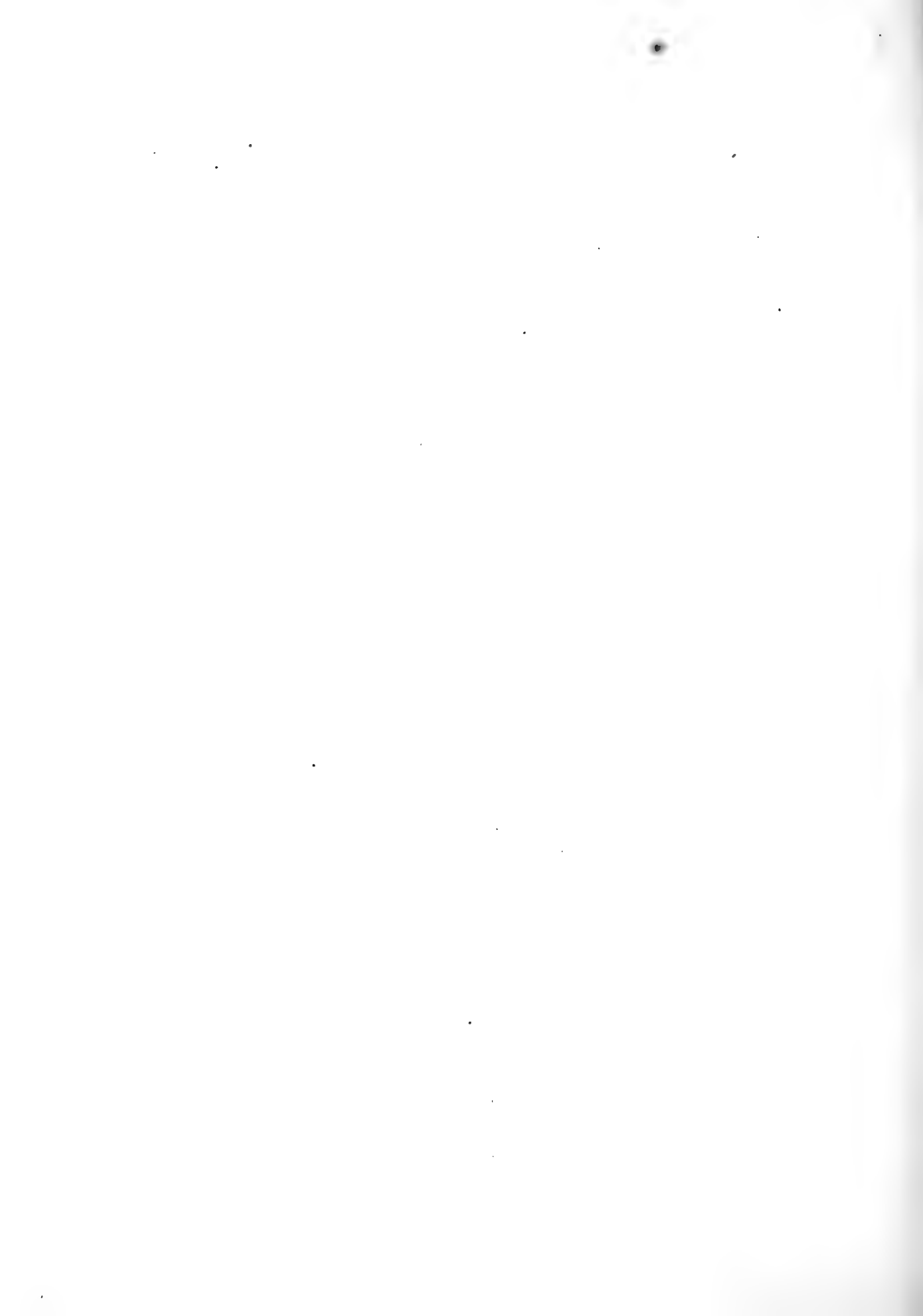
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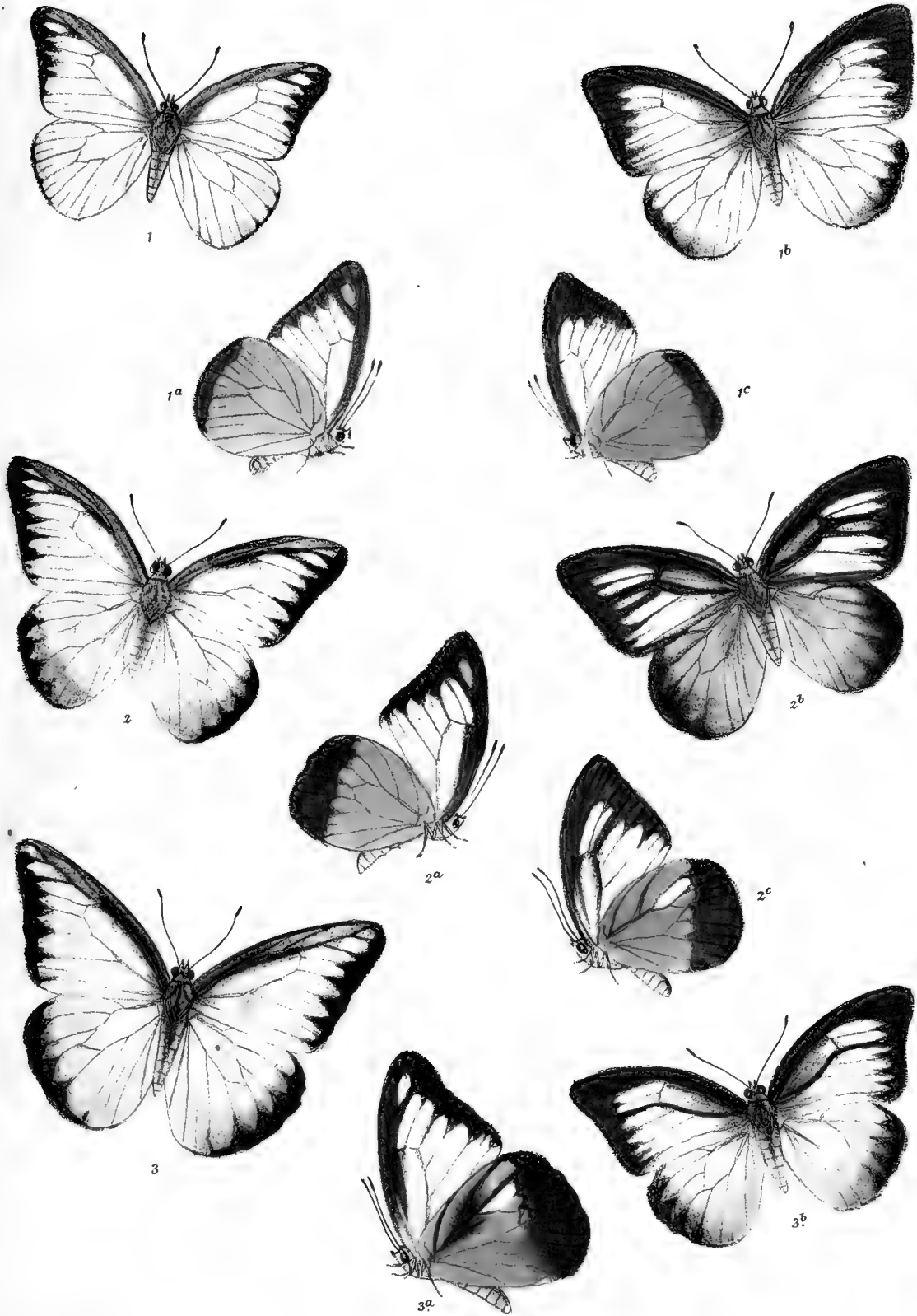


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1f

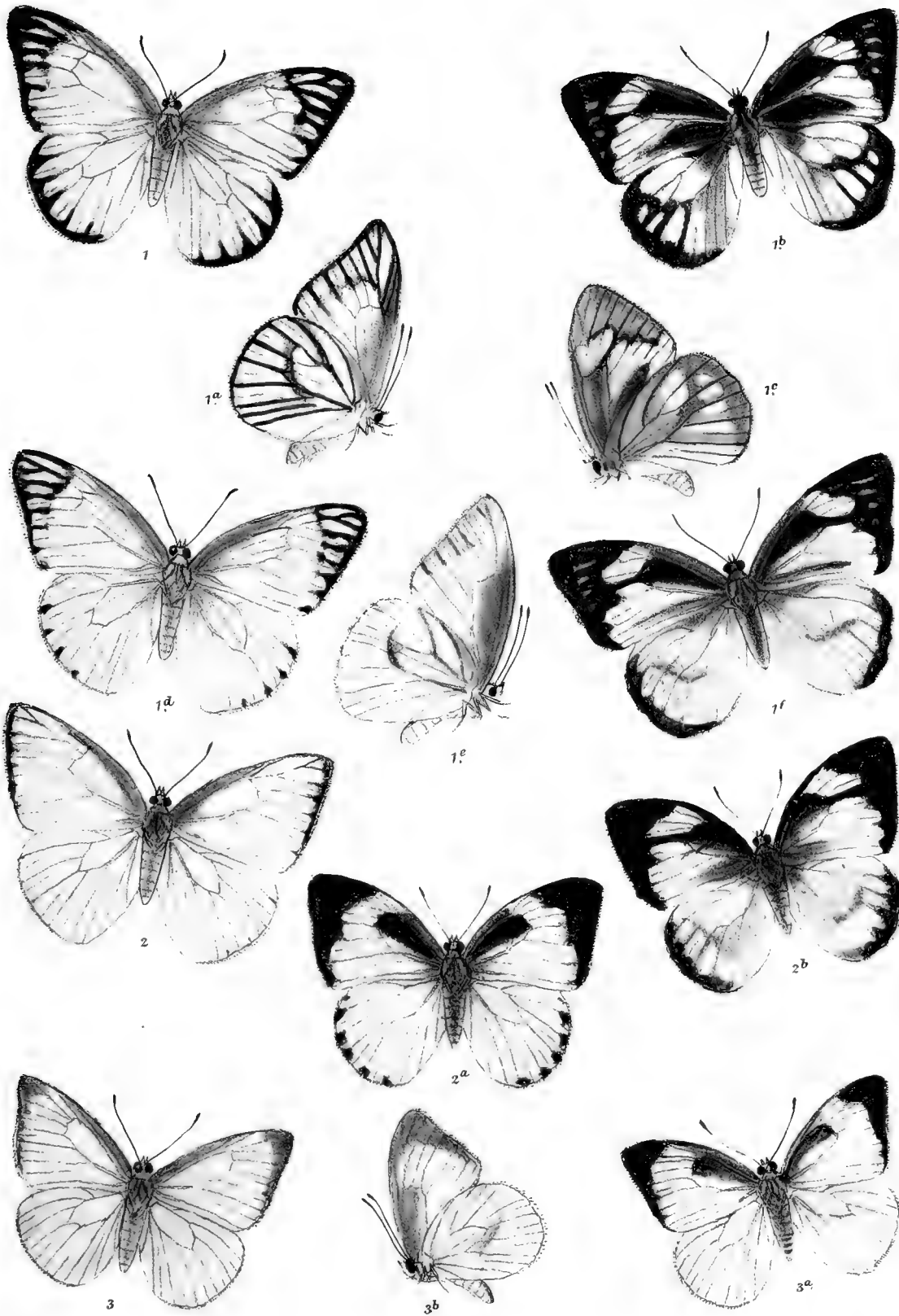




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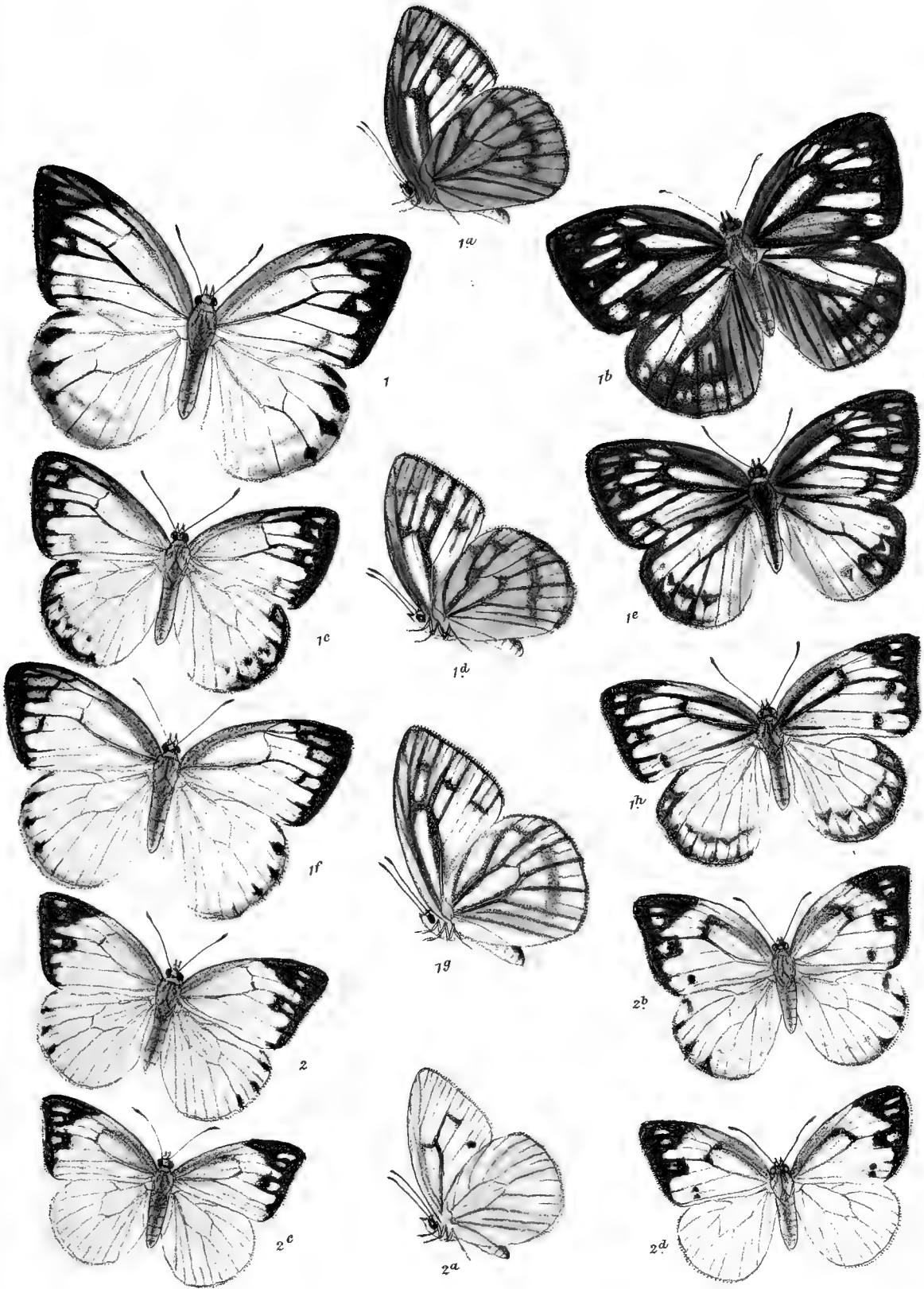




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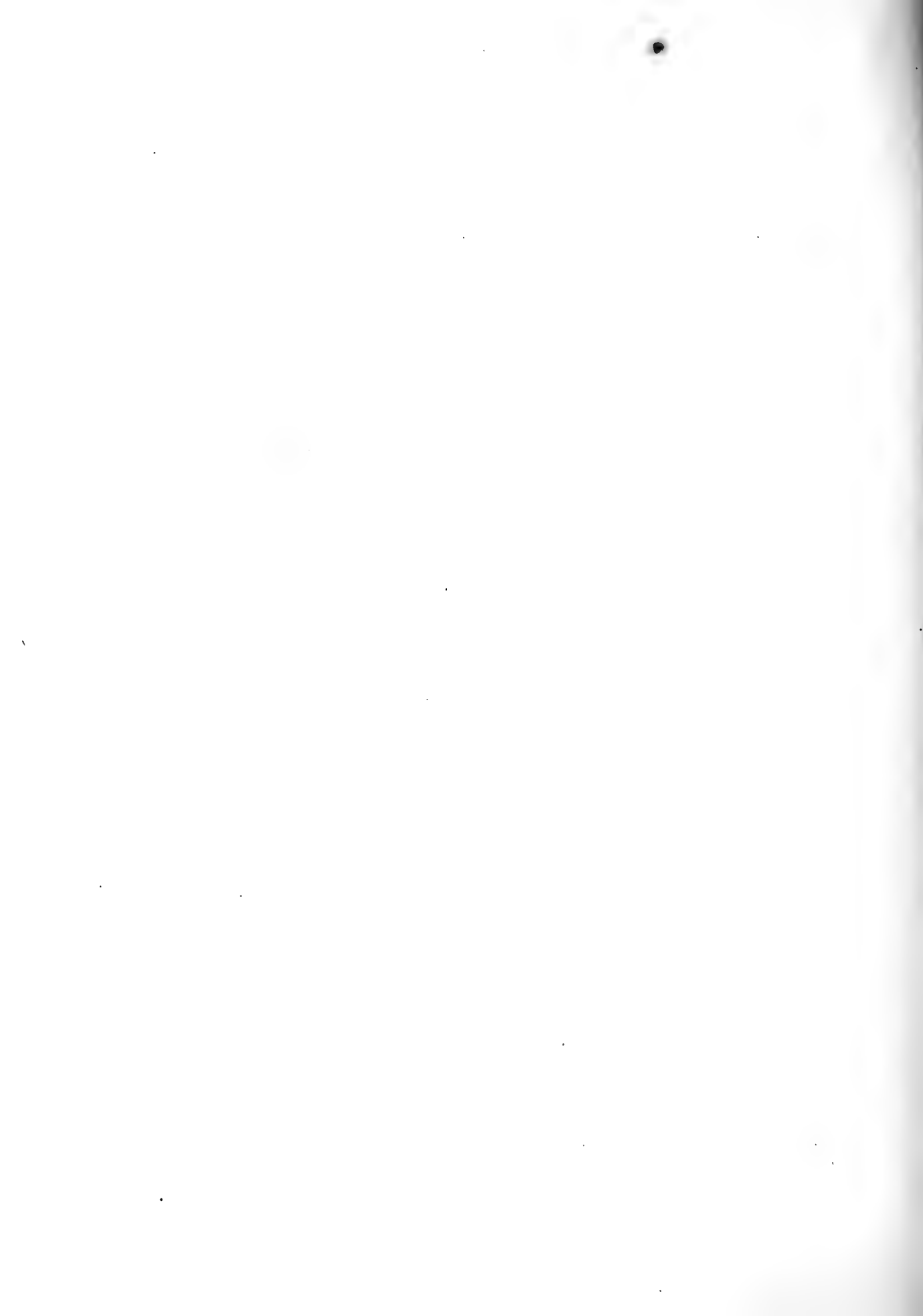


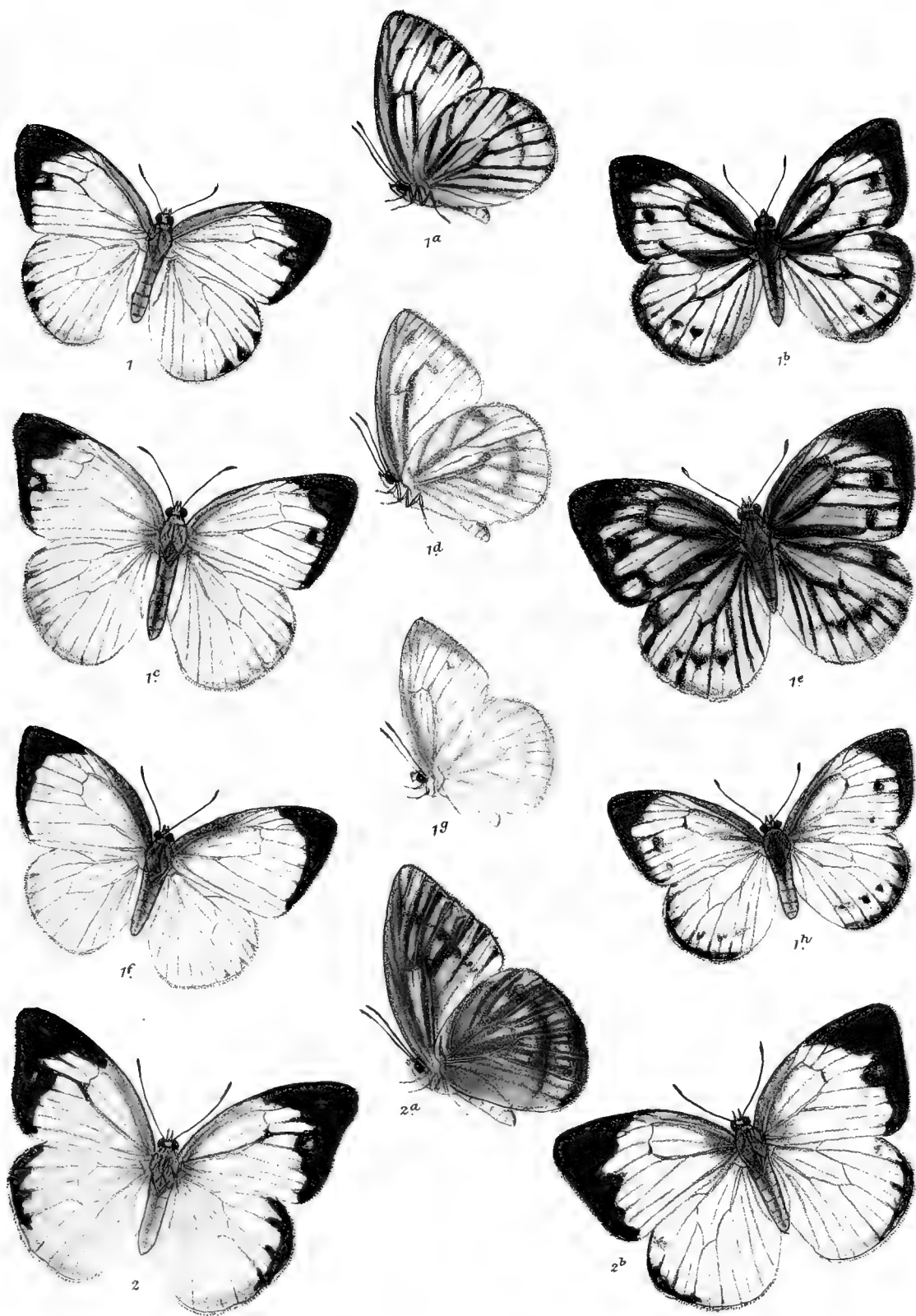


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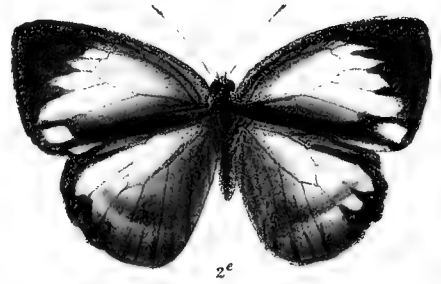
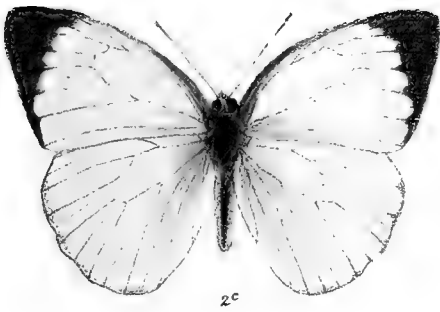
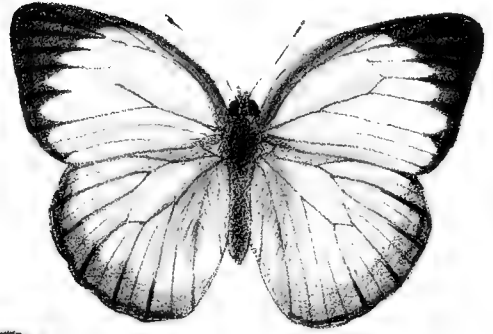
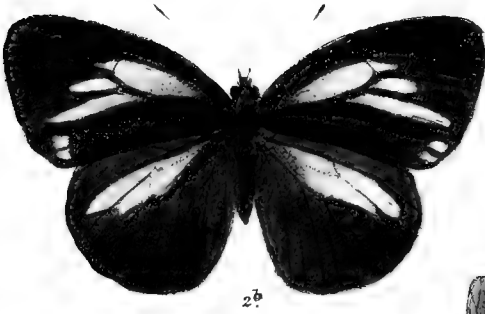
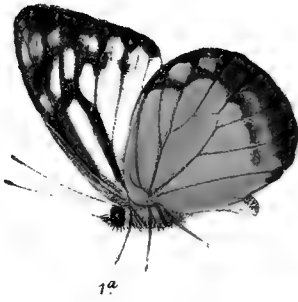
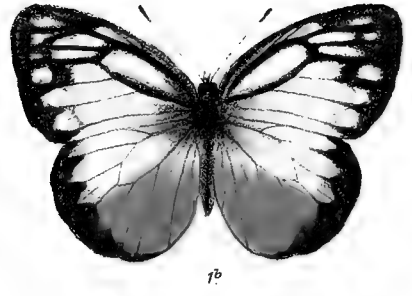
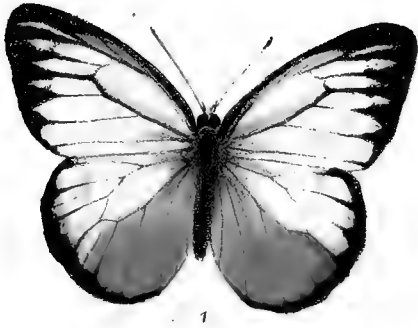


F.C. Moore del, et lith

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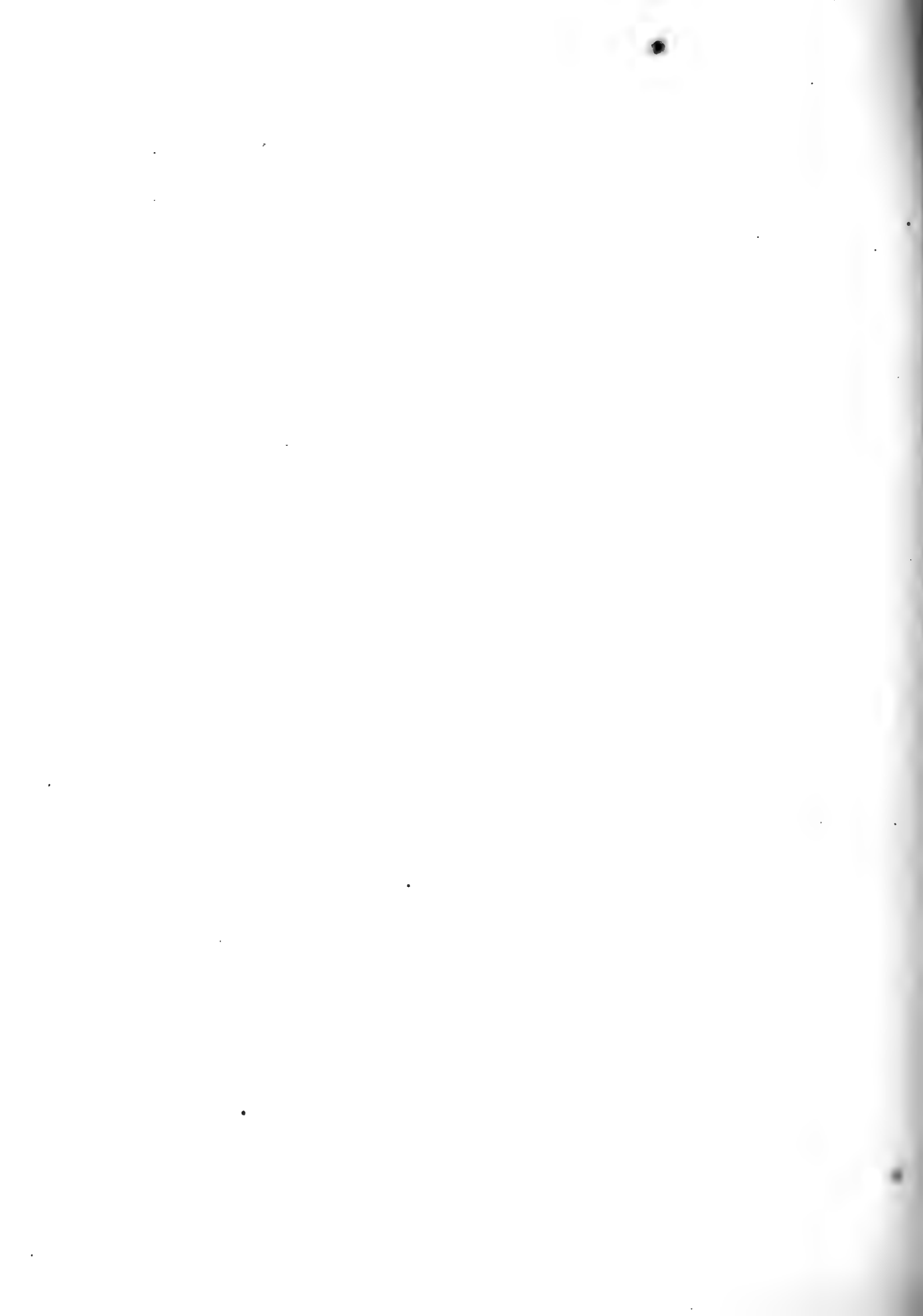
L. Reeve & Co. London

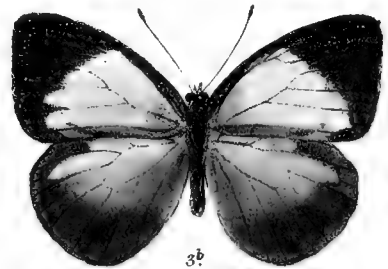
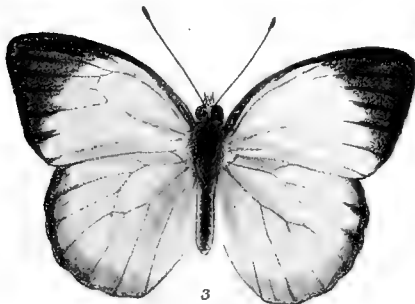
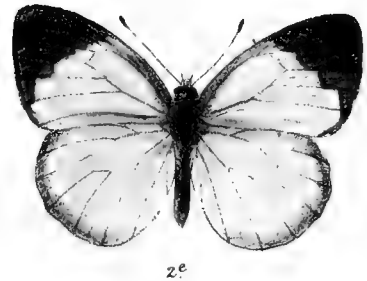
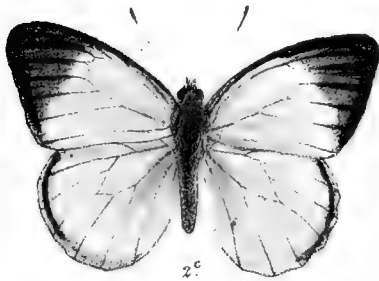
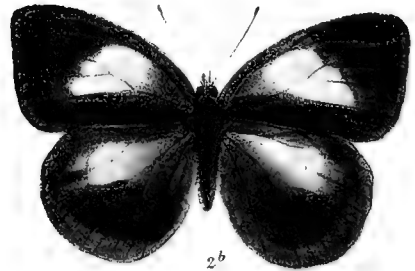
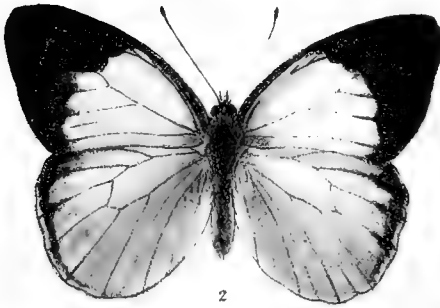
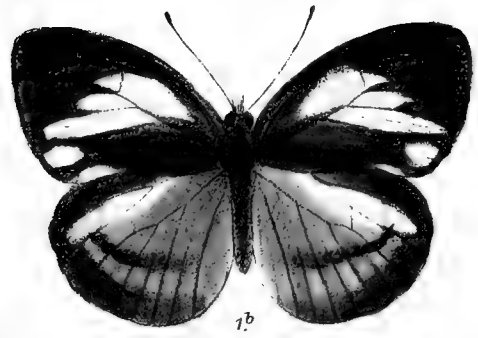
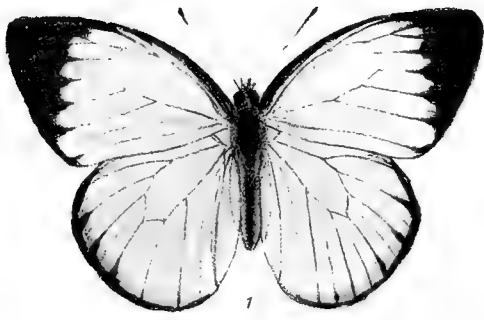




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