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separated from *Hecabe* by Capt. Watson. We have figured the larva and pupa of the two species. Both species appear to be almost equally common in the N. Kanara District. We have a specimen of *Silhetana* caught in October, in which the ground-colour is pure white instead of yellow, the markings being normal" (J. Bombay N. H. S. 1896, 571).

Mr. L. de Nicéville states that the larva of this species also feeds on "POINCIANA REGIA, N. O. Leguminosæ" (J. A. S. Beng. 1900, 252).

DISTRIBUTION.—Col. C. Swinhoe possesses the *type* specimens of male and female *Wet* form taken at Karwar, Kanara, and a male from Coorg, also a female of the *Intermediate Dry* form from Karwar. In our own possession is a male of both the *Wet* and *Dry* form from the Nilgiris, and a male *Dry* form from Travancore; also both sexes of the *Extreme Dry* form from the Nilgiris, a male from Travancore, and a female from Madras.

Of our illustrations on Plate 570, figs. 1, 1a are from the *type* male and female *Wet* form from Karwar; 1b from the male *Intermediate* form from the Nilgiris, and 1c from female bred by Mr. Aitken in October; fig. 1d, a male *Dry* form from Travancore, and 1e, a female from the Nilgiris; figs. 1, f, g, the male and female *Extreme Dry* form, from the Nilgiris.

#### TERIAS CITRINA.

Plate 571, fig. 1, 1a, b, c, d, ♂ ♀.

*Terias Citrina*, Moore, Lep. of Ceylon, i. p. 119, pl. 45, fig. 4, 4a, ♀ (1881)—*Dry form*.

*Terias Silhetana* (pt.), de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 1). Male. Upperside lemon-yellow. *Forewing* with the outer marginal black band anteriorly broader than in Ceylon specimens of *Hecabe*, the posterior end shorter and its inner edge outwardly oblique. *Hindwing* with a moderately broad black outer band. Underside. Both wings with more or less defined ordinary markings of *Wet* form. *Forewing* with three marks in the cell, in addition to the discocellular. No subapical patch. Female. Not seen.

Expanse,  $2\frac{2}{10}$  inches.

*Intermediate form* (fig. 1a, ♀). Male. Not seen. Female. Upperside. *Forewing* with similar outer band to the *Wet* form. *Hindwing* with a broad black outer marginal band. Underside with slightly-defined ordinary brown markings as in *Wet* form. *Forewing* with a brown subapical patch.

Expanse, ♀  $2\frac{2}{10}$  inches.

*Dry form* (fig. 1 b, c, ♂ ♀). Smaller than in *Wet* form. Male. Upperside. *Forewing* with narrower outer marginal band, its posterior end much smaller. *Hindwing* with a slender outer band. Underside. Both wings with similar

ordinary markings to the Wet-form. *Forewing* with a more or less defined subapical patch.

Female. Upperside. *Forewing* with a broader black outer band than in male. *Hindwing* with a much broader outer band than in male. Underside. Both wings similar to male.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Extreme Dry form* (fig. d, ♀). Male not seen. Female. Upperside. *Forewing* with a broad black outer band, its posterior portion angled obliquely outward from the lower median veinlet. *Hindwing* with a moderately broad outer band. Underside. Both wings with ordinary markings as in Dry form. *Forewing* with a prominent almost complete quadrate apical brown patch.

Expanse, ♀ 2 inches.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, fig. 1 is from a *wet*-season male, and fig. 1a the female of an *intermediate* form, both specimens being in Col. C. Swinhoe's Collection; figs. 1b, c, male and female *Dry*-season form, and fig. 1d, of a female *Extreme Dry* form, in our own possession.

#### TERIAS ROTUNDALIS.

Plate 571, fig. 2, 2a (*Wet*); 2b, c (*Dry*).

*Terias rotundalis*, Moore, Lep. of Ceylon, i. p. 120, pl. 46, fig. 1, 1a, b, ♂ ♀ (1881)—*Wet form*.

*Terias Silhetana* (pt.) de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 2, ♂, 2a, ♀). Male. Upperside bright yellow. *Forewing* with the black outer band similar to, but comparatively narrower than in same sex of *uniformis*, its posterior end slightly angled at the lower median veinlet. *Hindwing* with a very slender outer marginal band, or it is indicated only by linear spots at the vein tips. Underside pale yellow. Both wings with ordinary markings very indistinct. No subapical patch on forewing.

Female. Upperside paler yellow. *Forewing* with broader outer band than in male, the lower end larger and its inner edge extending obliquely outward. *Hindwing* with similar slender outer marginal line. Underside similar to the male.

Expanse, ♂  $1\frac{4}{10}$  to  $1\frac{6}{10}$ ; ♀  $1\frac{4}{10}$  to  $1\frac{8}{10}$  inch.

*Dry form* (fig. 2 b, c, ♂ ♀). Male. Upperside. *Forewing* with the outer band comparatively broader than in male of *Wet* form. *Hindwing* with the outer band slender and broken posteriorly. Underside. Both wings with distinct ordinary marks. *Forewing* with a more or less distinctly formed subapical patch.

Female. *Forewing* with the outer black band broader throughout than in male, its posterior inner end outwardly oblique. *Hindwing* with a narrow

continuous outer band. Underside. Both wings with the ordinary marks, and the subapical patch on forewing distinctly defined.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ ; ♀  $1\frac{6}{10}$  inch.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, figs. 2, 2a are from the *types* of male and female *wet* season form, in our possession; 2b of a *dry*-season form from Kandy, in Col. C. T. Bingham's Collection, and fig. 2c of a female *dry* form taken at Pundaloya by Mr. E. E. Green, in our own collection.

#### TERIAS UNIFORMIS.

Plate 571, fig. 3, ♂ (*Wet*); 3a, b, ♂ ♀ (*Dry*).

*Terias uniformis*, Moore, Lep. of Ceylon, i. p. 120, pl. 46, fig. 2, 2a, b, ♂ ♀ (1881).

*Terias Templetoni*, Butler, Ann. Nat. Hist. 1886, p. 218, ♂ *Wet*. Moore, *l.c.* iii. p. 531 (*Wet*).

*Terias Silhetana* (pt.), de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 3). Male. Upperside bright yellow. *Forewing* with the outer band somewhat broader throughout than in male *Wet rotundalis*, its lower end inwardly oblique. *Hindwing* also with the outer band broader and complete in its entire length. Underside with the ordinary marks more distinct.

Expanse, ♂  $1\frac{7}{10}$  to 2 inches.

*Dry form* (fig. 3, a, b). Male. Upperside paler than in *Wet*. Both wings with similar marginal band. Underside. Both wings with prominent ordinary brown markings, and *forewing* with subapical patch. Female. Upperside. *Forewing* with the marginal band similar to the male. *Hindwing* with the band similar but less defined. Underside. Both wings with somewhat less defined ordinary markings. *Forewing* with a brown, more or less complete, quadrate apical patch.

Expanse, ♂  $1\frac{4}{10}$ , ♀  $1\frac{8}{10}$  to 2 inches.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, fig. 3 is from the male *type* of *Wet*-season form in our own possession; 3a from a male *dry*-season form in Col. C. Swinhoe's Collection, and 3b, the female *dry* form in our own Collection.

#### TERIAS GRANDIS.

Plate 572, fig. 1, 1a, ♂ ♀ (*Wet*); 1b, ♀ (*Dry*).

*Wet form* (fig. 1, 1a). Male. Upperside paler yellow than in male of *Wet* form of *Hecabe* from the same localities. *Forewing* with the black marginal band comparatively broader at the apex, the posterior portion somewhat longer, and its inner edge irregularly rounded and inclined obliquely inward, this latter portion being much longer than in *Wet Silhetana*. *Hindwing* with broader marginal band than in *Wet Hecabe*. Underside. Both wings with indistinct ordinary *Wet* markings. *Forewing* with three cell-marks and the discocellular.

Female. Upperside. *Forewing* with broad marginal band similar to male. *Hindwing* with broader marginal band than in female *Wet Hecabe*. Underside. Both wings with less defined ordinary markings than in male.

Expanse, ♂ ♀ 2 inches.

*Dry form* (fig. 1b). Female. Upperside. *Forewing* with the marginal band as in *Wet*, except that the lower portion has its inner edge more outwardly oblique. *Hindwing* with the marginal band not quite so broad as in *Wet*. Underside. *Forewing* with the discocellular and cell-marks more distinct than in *Wet*, and with a more or less prominent subapical dark brown patch. *Hindwing* with distinct basal, discocellular, and zigzag discal markings. Male not known.

Expanse, ♀  $2\frac{2}{10}$  to  $2\frac{4}{10}$  inches.

HABITAT.—Upper Bengal; Assam; Chittagong.

DISTRIBUTION.—Col. C. Swinhoe possesses the male and female type specimens of the *Wet*-season form from the Khasia Hills and Cherra Punji, Assam, and also a female of the *Dry* form from Maldah, Upper Bengal, the latter taken in June by Mr. Irvine. We possess a female *dry*-season form from Nowgong, Assam, taken by Mrs. Span, and also a female from Chittagong taken in October. Col. C. T. Bingham has a *dry* female from Shillong, Assam, which was reared from pupa, in September, found on an *Acacia* tree.

Of our illustrations on Plate 572, figs. 1, 1a are from the *types* of male and female *Wet* form, 1b from female *Dry* form taken in Nowgong.

#### TERIAS SILHETANA.

Plate 572, fig. 2 ♂ (*Wet*); 2a, b, ♂ ♀ (*Dry*); 2c, d, e (*Extra Dry*).

*Terias Silhetana*, Wallace, Trans. Ent. Soc. 1867, p. 324, ♂ (*Extra Dry*). de Nicéville, Sikkim Gazetteer, 1894, p. 167.

*Terias Heliophila*, Butler, Ann. Nat. Hist. 1885, p. 338, pl. 8, fig. 2, ♂ (*Dry*). Watson, Journ. Bombay N. H. Soc. 1894, p. 511.

*Wet form* (fig. 2). Male. Upperside pale yellow. *Forewing* with a broad black outer marginal excavated band, the lower end much shorter than in *Wet grandis*, and its inner edge outwardly oblique. *Hindwing* with the outer band of moderate but slightly varying width. Underside pale yellow. *Forewing* with three cell-marks, discocellular mark, and also those on *hindwing* slightly defined. Female not seen.

Expanse, ♂ 2 inches.

*Dry form* (fig. 2a, ♂ 2b, ♀) = *Heliophila*. Male. Upperside. *Forewing* with the black band similar to *Wet*, its lower portion being smaller. *Hindwing* with the band comparatively narrower. Underside with similar markings as in *Wet* form, the forewing also having a more or less defined subapical patch.

Female. Upperside. *Forewing* with the black band, throughout, wider than in male. *Hindwing* with a broad outer band. Underside with the ordinary markings, and also the subapical patch on the forewing more distinctly defined than in the male.

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

*Extreme Dry form* (fig. 2c, d, ♂ 2e ♀) = *Silhetana*. Male. Upperside. *Forewing* with the black band comparatively narrower than in the ordinary *dry* form, its lower portion from the upper median veinlet being more or less slender, and in some examples slightly angulated between the lower median and submedian. *Hindwing* with either a slightly indicated marginal thread, or a minute dot at end of the veins. Underside. Both wings with distinct ordinary markings. *Forewing* with a prominent brown almost completely filled-up quadrate apical patch, which has a short streak extending from below its middle.

Female. Upperside. *Forewing* with the black marginal band comparatively broader throughout than in male, its lower portion larger and more angled. *Hindwing* with a marginal slender broken thread. Underside. Similar to the male.

Expanse, ♂  $1\frac{6}{10}$  to 2 inches, ♀  $1\frac{8}{10}$  inch.

HABITAT.—Assam; Lower Sikkim.

DISTRIBUTION.—We possess males of the *wet* and *dry* season form from Assam, taken by Dr. G. Watt, and both sexes of the *dry* form labelled, “Nepal,” taken by General G. Ramsay probably in Lower Sikkim; also male *type* of the *Extra dry* form, named *Silhetana*, by Wallace. Col. C. Swinhoe has males of the *wet* and *dry* form from the Khasia Hills. Col. C. T. Bingham has males of *wet* and *dry* forms from Shillong, Assam, and also males of the *extra dry* form from Sikkim.

Of our illustrations on Plate 572, fig. 2 is from a male *wet*-season form from Silhet, Assam, in our Collection; 2a from a *dry* form from Sikkim in Col. C. Swinhoe's Collection; 2b from a *dry* female from Sikkim, which we also possess; 2c from the *Extra Dry* male, from Silhet—this being the *type* specimen of Wallace's *Silhetana*, from specimens in our possession; 2d, also a male of the *extra dry* form from the Khasia Hills, and fig. 2d, the female of *extra dry* form, from Sikkim, both of which are in Col. Swinhoe's Collection.

#### TERIAS KANA.

Plate 573, figs. 1, 1a, ♂ ♀ (*Wet*), 1b, c, ♂ ♀ (*Dry*), 1d, e, ♂ ♀ (*Extra Dry*).

*Terias Kana*, Moore, Journ. Linn. Soc. Zool. 1886, p. 48, pl. 4, fig. 9, ♂ (*Dry*).

*Terias Sodalis*, Moore, *l.c.* p. 45 (*Extra Dry*).

*Terias Hecabe* (var.), Watson, Journ. Bombay N. H. Soc. 1896, p. 283.

*Terias Kana et Sodalis* (pt.), Butler, Ann. N. H. 1898, p. 73.

*Wet form* (fig. 1, 1a). Male. Upperside clear yellow. *Forewing* with the

black outer marginal band somewhat broader throughout than in male of local *Hecabe*, its lower portion being also broader. *Hindwing* with the marginal band twice as broad as in male of that species. Underside. Both wings with the ordinary markings indistinct. *Forewing* with two cell-marks only in addition to the discocellular.

Female. Upperside. Both wings with similar very broad outer marginal band, as in male; the band on the hindwing being broader than in female *Hecabe*. Underside as in male, the ordinary markings more distinct.

Expanse, ♂ ♀  $1\frac{8}{10}$  inch.

*Intermediate form*. Male. Upperside as in the Wet form. Underside with the markings more distinct. *Forewing* with a slightly defined subapical patch.

Expanse,  $1\frac{8}{10}$  inch.

*Dry form* (fig. 1b, c). Male. Upperside. *Forewing* with the outer marginal band similar shaped to the Wet form, and somewhat narrower throughout. *Hindwing* with narrower outer band than in Wet form. Underside. Both wings with distinctly formed brown ordinary markings, the discocellular mark broad and triangularly dentate. *Forewing* with a prominent brown subapical patch.

Female. Upperside. *Forewing* with slightly broader outer marginal band throughout than in male. *Hindwing* with the outer band half the width of that in female Wet form. Underside similar to the male.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Extreme Dry form* (fig. 1d, e) = *sodalis*. Male. Upperside. *Forewing* with similar, but somewhat broader, outer band, to the Dry form. *Hindwing* also with slightly broader outer band than in Dry. Underside with less-defined markings. *Forewing* with a prominent brown quadrate completely filled-up apical patch, which is dentate on its lower edge; a small slight brown streak is also present before the posterior angle of the wing.

Female. Upperside. *Forewing* with the outer band similar to ordinary Dry form. *Hindwing* with the band slightly broader. Underside. Both wings with less defined markings than in Dry. *Forewing* with quadrate apical patch as in the male, and also a small oblique dusky oblique streak before the posterior angle.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

HABITAT.—Lower Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—We possess both sexes of the *Wet* form, from Rangoon, Pegu, and a male of *Wet* form from Henzada, and *co-type* specimens of both sexes of the *Dry* form (*Kana*) from Mergui, also *co-types* of both sexes of the *Extra-Dry* form (*sodalis*): Dr. J. Anderson obtained the types of *Kana* in “Mergui in January on King Island, in January and February, and on Elphinstone Island in March, also



those of *sodalis* on King Island in February, and on Pataw Island in December" (*l.c.* pp. 44, 46).

Of our illustrations on Plate 573, figs. 1, 1a, male and female *Wet* form, from Rangoon, Pegu; 1b, c, male and female *Dry* form *co-types*, from Mergui; 1d, e, male and female *Extreme Dry* form, *co-types* of *sodalis*, from Mergui, taken in February.

#### TERIAS ANDERSONII.

Plate 573, figs. 2, ♂ (*Wet*), 2a, b, ♂ ♀ (*Dry*).

*Terias Andersoni*, Moore, Journ. Linn. Soc. Zool. 1886, p. 47, pl. 4, fig. 8, ♂ (*Dry form*). Watson, Journ. Bombay N. H. Soc. 1896, p. 282.

*Wet form* (fig. 2, ♂). Male. Upperside. *Forewing* with the outer marginal band moderately broad, the medial portion inclined slightly inward, and the lower portion very slightly inclined obliquely-outward. *Hindwing* with a moderately broad outer band. Underside with slightly defined ordinary markings. *Forewing* with two cell-marks, basal obsolescent. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (fig. 2a, b). Male. Upperside similar to the *Wet* form. Underside with the ordinary markings distinct. *Forewing* with a medial cell mark, and a more or less well-defined subapical patch.

Female. Upperside paler. *Forewing* with slightly broader outer band. *Hindwing* with a moderately broad outer band. Underside similar to the male.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  to  $1\frac{6}{10}$  inch.

HABITAT.—Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens of both sexes on "Sullivan Island, Mergui, in January, and on Elphinstone Island in March" (*l.c.* p. 48). We possess a male of the *Wet* form, and *co-type* of both sexes of the *Dry* form.

Of our illustrations on Plate 573, fig. 2 is from a male *Wet* form, and fig. 2a, b, *co-types* of male and female *Dry* form, in our possession.

#### TERIAS MERGUIANA.

Plate 573, figs. 3, ♂ (*Wet*), 3a, b, ♂ ♀ (*Dry*), 3c, d, ♂ ♀ (*Extr. Dry*).

*Terias Merguiana*, Moore, Journ. Linn. Soc. Zool. 1886, p. 47, pl. 4, fig. 7, ♂ (*Wet*).

*Terias Hecabe* (var.), Watson, Journ. Bombay N. H. Soc. 1896, p. 283.

*Wet form* (fig. 3, ♂). Male. Upperside yellow. *Forewing* with the outer marginal band less angled at upper median than in *Andersoni*, its posterior portion curving obliquely outward. *Hindwing* with the band narrower. Underside. Both

wings with slightly defined ordinary markings. *Forewing* with two cell-marks. Female not seen.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Dry form* (fig. 3a, b, ♂ ♀). Male. Upperside similar to Wet form. Underside with similarly defined ordinary markings. *Forewing* with pale ill-defined brownish subapical patch.

Female. Upperside. *Forewing* with the outer band comparatively broader than in male, its lower portion somewhat longer and distinctly curved outward. *Hindwing* with the outer band slightly broader than in male. Underside with the ordinary markings, and subapical patch as in male.

Expanse, ♂ ♀  $1\frac{8}{10}$  inch.

*Extreme Dry form* (fig. 3c, d, ♂ ♀). Male. Upperside. *Forewing* with the outer band similar to the ordinary Dry form, its lower portion slightly smaller. *Hindwing* with the band slender and almost macular. Underside. Both wings with similar ordinary markings to the Dry form. *Forewing* with three cell-marks, and a broad brown almost completely filled-up quadrate apical patch, with a short dentation from below its middle.

Female. Upperside. *Forewing* with the outer band slightly narrower than in ordinary Dry female, its lower portion being much smaller. *Hindwing* with the outer band slender. Underside with the ordinary markings more defined, the apical quadrate patch on forewing, as in the male, but less complete.

Expanse, ♂  $1\frac{7}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  to 2 inches.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui in November and December, at Zeduwon in December, on Kisserang Island in December, Elphinstone Island in January and March, and on Sullivan Island in January” (*l.c.* p. 47). We possess *co-types* of both sexes from Mergui, and also both sexes from Bhamo, taken in November by Dr. L. Fea. Col. C. Swinhoe has specimens from the Younzaleen Valley, taken in November.

Of our illustrations on Plate 573, fig. 3 is from male *co-type* *Wet* form from Mergui; figs. 3a, male of *Dry* form from Younzaleen, and fig. 3b, a female *Dry* form from Bhamo; fig. 3c, a male *Extreme Dry* form from Younzaleen Valley, and 3d, a female from Bhamo.

#### TERIAS FRATERNA.

Plate 574, fig. 1, ♂ (*Wet*), 1a, b, ♂ ♀ (*Dry*).

*Terias fraterna*, Moore, Journ. Linn. Soc. Zool. 1886, p. 46, pl. 4, fig. 6, ♂ (*Dry*).

*Terias Hecabe* (var.), Watson, J. Bombay N. H. S. 1896, p. 282.

*Wet form* (fig. 1, ♂). Male. Upperside. *Forewing* with the outer band more

sinuous than in *Merquiana*, its posterior portion broader and less outwardly oblique. *Hindwing* with the band of similar width, or slightly broader. Underside with slightly defined ordinary markings, two in cell of forewing. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (fig. 1a, b, ♂ ♀). Male. Upperside. *Forewing* similar to wet form. *Hindwing* with the outer band somewhat narrower. Underside with the ordinary markings broader and more distinctly defined. *Forewing* with two cell-marks and a brown subapical patch.

Female. Upperside. *Forewing* with the outer band similar to male, its lower portion slightly broader. *Hindwing* with the band somewhat broader and more definitely dentated. Underside similar to the male.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  inch.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui, December; King Island in February, and on Elphinstone Island in March” (*l.c.* p. 46). We possess *co-types* from Mergui.

Of our illustrations on Plate 574, fig. 1 is from a male of the *Wet* form, and figs. 1a, b, male and female of the *Dry* form from Mergui.

#### TERIAS PATRUELIS.

Plate 574, figs. 2, ♂ (*Wet*), 2a, b, ♂ ♀ (*Dry*), 2c, ♂ (*Inter. Dry*), 2d, ♂ (*Extra Dry*).

*Terias Patruelis*, Moore, Journ. Linn. Soc. Zool. 1886, p. 46, pl. 4, fig. 5, ♂ (*Dry*).

*Terias Silhetana*, Moore, *l.c.* p. 45. (*Extreme Dry*).—*nec* Wallace.

*Wet form* (fig. 2, ♂). Male. Upperside. *Forewing* with the black outer band of similar width to that in *fraterna*, the posterior end being smaller, and its inner edge slightly inclined obliquely inward. *Hindwing* with a narrow outer band. Underside. Both wings with indistinct ordinary markings. *Forewing* with two marks in the cell. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (figs. 2, a, b, ♂ ♀). Male. Upperside. *Forewing* with the outer band similar to *Wet* form, its posterior end inclined obliquely inward. *Hindwing* with narrow outer band. Underside. Both wings with slightly defined ordinary markings. *Forewing* with two cell-marks and a more or less defined subapical patch.

Female. Upperside. *Forewing* with slightly broader outer band than in male, its lower portion being comparatively longer. *Hindwing* with band narrower. Underside. Both wings as in the male.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Intermediate Dry form* (fig. 2c, ♂). Male. Upperside. *Forewing* with the band narrower than in the ordinary *Dry* form from below the upper median, and only slightly angled at the lower median. *Hindwing* with a more or less slightly-indicated marginal slender thread or obsolescent tip to the veins. Underside. Both wings with less-defined ordinary markings, and a similar subapical patch on the *forewing*.

Expanse, ♂  $1\frac{9}{10}$  inch.

*Extreme Dry form* (fig. 2d). Male. Upperside similar to the *Intermediate Dry* form. *Forewing* with the band slightly narrower from below the upper median. *Hindwing* with similar slender marginal line. Underside. Both wings with the ordinary markings more distinct. *Forewing* with a quadrate almost completely filled-up brown apical patch.

Expanse, ♂  $1\frac{9}{10}$  inch.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui, in December; Elphinstone Island in March, and Pataw Island, in January” (*l.c.* p. 46). We possess a male of *Wet* form from Chittagong, and both sexes of the *Dry* form, and male of *Extra Dry* form from Mergui, and Bhamo, the latter taken by Dr. L. Fea in November, also a male of *Dry* form from Tounghoo, and *Intermediate Dry* male from Mergui and Bhamo; also *Extreme Dry* male from Moulmein. Col. C. Swinhoe also has the latter form from Moolai, Tenasserim.

Of our illustrations on Plate 574, fig. 2 is from a male *Wet* form from Chittagong; figs. 2a, b, from a male and female (*co-types*) of *Dry* form from Mergui; fig. 2c, a male of *Intermediate Dry* form; and fig. 2d, male of *Extreme Dry* form.

#### TERIAS NIKOBARIENSIS.

Plate 574, figs. 3, 3a, b, ♂ ♀ (*Wet*), 3c, ♂ (*Dry*).

*Terias Nikobariensis*, Felder, Verh. Zool. Bot. Ges. Wien. 1862, p. 480, ♂. Moore, Proc. Zool. Soc. 1877, p. 590. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 236; *id. l.c.* 1882, p. 18.

*Wet form* (fig. 3, 3a, b, ♂ ♀). Male. Upperside yellow. *Forewing* with the black outer marginal band comparatively narrower throughout than in specimens of *Hecabe* from the same locality, its inner edge more evenly curved apically, less angular at upper median, the posterior portion smaller, and inclined obliquely inward. *Hindwing* with the outer band also somewhat narrower. Underside paler than upper; the ordinary markings slightly defined. *Forewing* with two cell-marks.

Female. Upperside sulphur-yellow. *Forewing* with the outer band com-

paratively narrower than in same sex of local *Hecabe*, its inner edge somewhat more angled at the upper median than in the male. Underside as in the male.

Expanse, ♂  $1\frac{2}{10}$  to  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  inch.

*Dry form* (fig. 3c, ♂). Male. Upperside paler yellow. *Forewing* with the black outer band more irregular and angled apically, the posterior portion slightly excavated on its inner edge. *Hindwing* as in wet form. Underside with distinctly defined ordinary markings. *Forewing* with two marks in the cell, and a prominent brown subapical patch.

Expanse, ♂  $1\frac{8}{10}$  inch.

HABITAT.—Nicobar and Andaman Islands.

DISTRIBUTION.—Little and Great Nicobar; Car Nicobar; Nankoury; Andamans.

Of our illustrations on Plate 574, fig. 3 is from a male *Wet* form from Little Nicobar, exactly the same as Felder's *type* specimen, now in the Collection of Mr. Walter Rothschild; fig. 3a is also a *Wet* male, from Great Nicobar, and fig. 3b, a female *Wet* form from Nicobars; fig. 3c is from a male of the *Dry* form from the Andamans.

#### TERIAS BLAIRIANA.

Plate 575, fig. 1, ♂, 1a, ♀.

*Dry form*. Male. Upperside pale yellow. *Forewing* with comparatively broader black outer band than in *Andamana* and *Rœpstorffi*, the posterior portion being also broader and larger, quadrate in shape, with its inner edge uneven. *Hindwing* with a minute black point at end of the veins, which are slenderly connected by marginal scales. Underside. Both wings with slightly defined ordinary markings. *Forewing* with a medial and smaller subbasal zigzag mark in the cell; also a slightly-defined broken greyish-black scaled subapical patch.

Female. Upperside. *Forewing* with similar broad outer band, its posterior portion projecting further inward. *Hindwing* with marginal black marks as in male. Underside similar to the male; the subapical patch on forewing more defined.

Expanse, ♂ ♀ 2 inches.

HABITAT.—Andamans.

The *type* of both sexes, from Port Blair, are in Col. C. T. Bingham's Collection.

#### TERIAS ANDAMANA.

Plate 575, fig. 2, ♂ (*Wet*); 2a, b, ♂ ♀ (*Dry*), 2c, ♀ (*Extr. Dry*).

*Wet form* (fig. 2, ♂). Male. Upperside pale yellow. *Forewing* with the

black outer band of normal width apically, and with a prominent dentation projecting between the second and third subcostals, the portion at posterior end being slightly convexly-inclined obliquely outward. *Hindwing* with a narrow black distinctly formed marginal band. Underside. Both wings with very indistinct ordinary markings, the veins and intermediate folds with a black point at their end.

Expanse, ♂  $1\frac{6}{10}$  inch.

*Dry form* (2a, b, ♂ ♀). Male. Upperside pale lemon yellow. *Forewing* with black marginal band as in Wet form. *Hindwing* with a slender black marginal thread, which is continuous and slightly dentated. Underside. Both wings with distinct ordinary markings. *Forewing* with a single subbasal mark in the cell; and a prominent slaty-black more or less complete apical patch, also a slight oblique streak near posterior angle, and a smaller spot above it.

Female. Upperside as in male. Underside as in male, the apical patch on *forewing* being more complete, and purplish-black.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{6}{10}$  inch.

*Extreme Dry form* (fig. 2c, ♀). Female. Upperside. *Forewing* with the outer band broader than in *Dry form*. *Hindwing* with the outer band also somewhat broader, and its inner edge irrorated with black scales. Underside with similar distinct ordinary markings. *Forewing* with a single cell-mark, and a more completely filled-up quadrate apical patch, below which a slight squamous streak extends to the two near the posterior angle.

Expanse, ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

HABITAT.—Andamans.

Described from specimens in our possession, and in the collection of Col. C. T. Bingham.

#### TERIAS RÆPSTORFFII.

Plate 575, figs. 3, ♂, 3a, ♀.

*Dry form* (fig. 3, ♂, 3a, ♀). Larger than *Andamans*. Male. Upperside pale lemon yellow. *Forewing* with the outer black band comparatively narrower, its posterior end smaller, and slightly concavely-inclined obliquely outward. *Hindwing* with a slender ill-defined squamous marginal broken thread. Underside with the ordinary markings not prominent. *Forewing* with three marks within the cell in addition to the discocellular; a subapical pale brown patch.

Female. Upperside. *Forewing* with similar outer band to male, its posterior end being broader. *Hindwing* with a broader squamose outer band than in male. Underside as in male.

Expanse, ♂ ♀ 2 inches.

HABITAT.—Andamans; Nicobars.

The male *type* specimen is in the Collection of Col. C. Swinhoe, from the Andamans. We possess the *type* of female, from the Nicobars.

#### TERIAS CADELLII.

Plate 575, figs. 4, ♂, 4a, ♀.

*Dry form* (fig. 4, ♂, 4a, ♀). Male. Upperside pale lemon yellow. *Forewing* with the black outer band similar in shape, but narrower throughout than in *Rapstorffii*. *Hindwing* with indistinctly defined black marginal tip to the veins, or a very slender squamous thread. Underside similar to *Rapstorffii*. *Forewing* with three cell-marks.

Female. Upperside. *Forewing* similar to male. *Hindwing* with an ill-defined slender squamous marginal band. Underside similar to male.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  inch.

HABITAT.—Andamans; Nicobars.

The male *type* from Port Blair, Andamans, and the female from Nankoury Nicobars, are in Col. C. T. Bingham's Collection.

#### TERIAS MOOREI.

Plate 575, fig. 5, ♂.

*Terias Moorei*, Butler, Annals Nat. Hist. 1886, p. 216, pl. 5, fig. 1, ♂; *id. l.c.* 1898, p. 72, ♂.

*Wet form*. Male. Upperside light yellow. *Forewing* with the costal base slightly irrorated with minute black scales; costa slenderly edged with black from the base to end of second subcostal, from thence narrowly widening apically, and then decreasing marginally to the posterior angle, its inner edge dentate-sinuate, the strongest denticles being at the anterior veinlets, and decreasing hindward. *Hindwing* with a minute black marginal dot at end of the veins, which are more or less very slenderly connected by grey scales. Abdomen above grey. Underside clear yellow. *Forewing* with the posterior border pale sulphur-yellow; a black dot near base of cell, followed by two slender zigzag marks, and then a double lined discocellular mark; the anterior veins marginally ending in a black dot. In some specimens (probably Dry form) a trace of an incipient subapical patch is visible. *Hindwing* with a small black ringlet mark in middle of cell, a double lined discocellular mark, a basal dot and a small subbasal circlet above the cell, a constricted circlet below the cell, and a discal zigzag series of squamous sinuous marks; the veins with a marginal black point at the tip. Female unknown.

Expanse, ♂  $1\frac{8}{10}$  to  $2\frac{2}{3}$  inches.

HABITAT.—Nicobars (Nankoury; Great Nicobar).

INDO-MALAY, INDO-CHINA, JAPAN, AND PHILIPPINE SPECIES :—

*Terias Suava*, Boisduval, Spec. Gén. Lep. i. p. 670 (1836). This species is undeterminable from the description, and the locality "Bengal," as given for the type, is doubtless erroneous. Boisduval's Collection has passed into the possession of Mons. C. Oberthür, who has kindly sent me the (*presumed*) type for verification. This specimen has an original locality label "*Ban*," not "Bengal," the latter locality, as given by Boisduval, being undoubtedly erroneous. This specimen is certainly *not identical* with any known Indian species. "*Ban*" may be an abbreviation for Banda, or Banka Island.

*Terias Blanda*, Boisduval, Spec. Gén. Léop. i. p. 672 (1836). *Habitat.* Java.

*Terias Phanospila*, Felder, Reise Novara, Lep. ii. p. 209, ♂ (1865)—*Dry form*. T. Nicobariensis (pt.). Butler, Ann. Nat. Hist. 1898, p. 71. *Habitat.* Java.

*Terias Sari*, Horsfield, Catal. Lep. Mus. E. I. Compy., p. 136, ♀ (1829)—*Extr. Dry form*). Moore, *id. l.c.* i. p. 64 (1857). Distant, Rhop. Malay. p. 305, pl. 25, fig. 3, pl. 26, figs. 3 and 7, ♂ ♀ *Extr. Dry* (1885). Snellen, Mid. Sumatra, Lep. p. 23, pl. 2, figs. 8, 9, ♂ *Extr. Dry* (1892). T. Hecabe, var. A; Boisd. Sp. Gén. Léop. i. p. 669 (1836). T. Sari (pt.), Butler, Ann. Nat. Hist. 1898, p. 73. ? *Terias vallivolans*, Distant, *l.c.* p. 306, pl. 26, fig. 17, ♂ (*Wet*). *Habitat.* Java; Sumatra; Malay Peninsula; Borneo.

*Terias Toba*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 496, ♂ ♀. T. Hecabe, var. 1, Snellen, Mid. Sumatra, Lep. pl. 2, figs. 10, 11, ♀ *Dry form* (1892). ? T. Senna, Distant, Rhop. Malay. p. 307, pl. 26, fig. 13, ♂; pl. 25, fig. 14, ♀ (1885). *Habitat.* Sumatra; Malay Peninsula.

*Terias Snelleni* (*Terias Hecabe*, var. 3, Snellen, Mid. Sumatra, Lep. pl. 2, figs. 12, 13, ♂ *Wet form* (1892). T. Silhetana, de Nicéville, *l.c.* 1895, p. 498. *Habitat.* Sumatra.

*Terias Tecmessa*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 498, ♂. T. Sari, var. a, Distant, Rhop. Malay. p. 305, pl. 26, fig. 3, ♀ (1885). *Habitat.* Sumatra; Penang.

*Terias latilimbata*, Butler, Ann. Nat. Hist. 1886, p. 221; ♂ ♀, pl. 5, fig. 5, ♂ (*Wet form*); *id. l.c.* 1898, p. 74. de Nicéville, Journ. As. Soc. Beng. 1895, p. 499. *Habitat.* Sumatra.

*Terias semifusca*, Butler, Ann. Nat. Hist. 1886, p. 222, pl. 5, fig. 8, ♀ (*Intermed. Dry*). de Nicéville, *l.c.* 1895, p. 499. *Habitat.* Sumatra.

*Terias bidens*, Butler, Ann. Nat. Hist. 1886, p. 222, ♂ ♀, pl. 5, fig. 7, ♀ (*Dry form*). de Nicéville, *l.c.* 1895, p. 499. *Habitat.* Sumatra.

*Terias Ada*, Distant, Ann. Nat. Hist. 1887, p. 271, ♀. *Habitat.* Borneo.

*Terias gradiens*, Butler, Ann. Nat. Hist. 1886, p. 223, pl. 5, fig. 9, ♂ (*Wet*); *id. l.c.* 1898, p. 78. *Habitat.* N. Borneo.



*Terias Tilaha*, Horsfield, Catal. Lep. Mus. E. I. Compy., p. 136 ♀ (1829). Boisd. Sp. Gen. Lep. i. p. 668. Moore, Catal. Lep. Mus. E. I. C. i. p. 64 (1857). Distant, Rhop. Malay. p. 303, pl. 25, fig. 8, ♂ *Dry* (1885). de Nicéville, Journ. As. Soc. Beng. 1895, p. 495. Butler, Ann. N. H. 1898, p. 79. *Habitat.* Java, Sumatra, Malay Peninsula; Borneo.

*Terias Nicévillei*, Butler, Ann. Nat. Hist. 1898, p. 79, ♂ ♀. *Habitat.* N.E. Sumatra.

*Terias Rahel* (Pap. Rahel, Fabricius, Mant. Ins. ii. p. 22 (1787); *id.* Ent. Syst. iii. p. 204 (1793). Butler, Catal. Fabr. Lep. Brit. Mus. p. 227 (1869); *id.* Ann. N. H. 1898, p. 79. Staudinger & Schatz, Exot. Schmett. ii. p. 28, pl. 16, ♂ (1892). *Habitat.* Borneo.

*Terias Sinensis*, Lucas, Rev. Zool. 1852, p. 429. Wallace, Tr. Ent. Soc. 1867, p. 325. Butler, Ann. N. H. 1898, p. 78. *Habitat.* China (*Lucas*). Sulu Archipelago (Butler).

*Terias unduligera*, Butler, Proc. Zool. Soc. 1880, p. 668 (*Wet*); *id.* Ann. N. H. 1898, p. 68. *Habitat.* Foo-Chow; N. Formosa.

*Terias Hobsoni*, Butler, Proc. Zool. Soc. 1880, p. 668 (*Wet*). *Habitat.* Formosa.

*Terias Æsiope*, Menétries, Catal. Mus. Petrop. Lep. i. p. 85, pl. 2, fig. 3, ♀, *Dry form* (1855). Butler, Ann. Nat. Hist. 1886, p. 219. *Syn.* T. subdecorata, Moore, Proc. Zool. Soc. 1878, p. 699, ♀ *only*. T. Hecabe, Butler, Ann. N. H. 1898, p. 69. Male. *Dry form*. Upperside. *Forewing* with the black marginal band as in Menétries' figure, except that its posterior end is slightly larger. *Hindwing* with a slight marginal tip at end of the veins. Underside. Both wings with the same shaped large discocellular mark and other markings, and forewing with subapical patch as in his figure. Female (= subdecorata, ♀). This agrees exactly with Menétries' figure, on upperside and underside, and also in size. *Expanse*, ♂ 2, ♀ 2 to 2 $\frac{2}{10}$  inches. *Habitat.* S.E. China. Hainan; Formosa.

*Terias subdecorata*, Moore, Proc. Zool. Soc. 1878, p. 699, ♂ *only* (*Dry form*). *Syn.* T. arcuata, Moore, *l.c.* p. 700, ♂ (*Dry*). *Habitat.* Hainan.

*Terias attenuata*, Moore, Proc. Zool. Soc. 1878, p. 700, ♂ (*Dry form*). *Habitat.* Hainan.

*Terias Anemone*, Felder, Wien. Ent. Monats. 1862, p. 23. Pryer, Ent. M. Mag. 1877, p. 52. Elwes, P. Z. S. 1881, p. 881. Butler, Trans. Ent. Soc. 1880, p. 199, pl. 6, figs. 8-11. *Habitat.* Ningpo; Chekiang, S.E. China; Nikko, Japan.

*Terias Mariesii*, Butler, Trans. Ent. Soc. 1880, p. 198, pl. 6, figs. 1-6, ♂. Leech, Butt. China, p. 428 (1893). *Habitat.* Nikko, Japan.

*Terias Mandarina*, De Lorza, Lep. Japan, p. 18 (1869). Butler, Tr. Ent. Soc. 1880, p. 196, pl. 6, figs. 13-17. Elwes, P. Z. S. 1881, p. 881. Leech, Butt. China,

p. 428, 1893. Walker, Tr. Ent. Soc. 1895, p. 465. *Habitat.* Japan; Hong Kong; Shanghai; Chusan.

*Terias Hybrida*, Butler, Tr. Ent. Soc. 1880, p. 199, pl. 6, fig. 7. Leech, *l.c.* p. 428. *Habitat.* Nikko, Japan.

*Terias connexiva*, Butler, Tr. Ent. Soc. 1880, p. 199, pl. 6, fig. 12. Leech, *l.c.* p. 428 (1893). *Habitat.* Nikko, Japan.

*Terias Luzoniensis* (Pap. Luzoniensis, Linnaeus, Mus. Ulr. [text P. Hecabe], p. 249 (1764). = Petiver, Gazoph. pl. 28, fig. 9 (1702). T. Hecabe, Semper, Reis. Phil. Lep. p. 255, pl. 41, figs. 13, ♂ fig. 14, ♀ *Entr. Dry* (1891). *Habitat.* Mindanao; Luzon.

*Terias Vallivolans*, Butler, Ann. Nat. Hist. 1883, p. 420. Semper, Reis. Philip. Lep. p. 253, pl. 41, figs. 3, 4, ♂ *Wet*, 5, ♀ (1891). *Habitat.* Mindanao, Samar; Manila, Philippines.

*Terias simulatrix*, Semper, Reis. Philip. Lep. p. 253, pl. 41, figs. 7, 8, 9, *Dry* (1891). *Habitat.* Philippines.

*Terias Sarilata*, Semper, *l.c.* p. 254, pl. 41, figs. 10. ♂ *Entr. Dry*, 11, 12 ♀ (1891). Butler, Ann. N. H. 1898, p. 73. *Habitat.* Mindanao; Davao, Philippines.

*Terias diversa*, Wallace, Tr. Ent. Soc. 1867, p. 324; Semper, *l.c.* p. 255, pl. 41, figs. 15-17 (1891). *Habitat.* Manila; Mindoro; Mindanao.

*Terias Alitha*, Felder, Wien. Ent. Monats. 1862, p. 289 (1862). Semper, *l.c.* p. 256, pl. 41, figs. 21-24, ♂ ♀ (1891). Butler, Ann. N. H. 1898, p. 81. *Habitat.* Mindanao; Davao, Philippines.

*Terias invida*, Butler, Ann. N. H. 1883, p. 418, ♂. Semper, *l.c.* p. 256, pl. 41, figs. 18-20, ♂ ♀ (1891). *Habitat.* Sulu Islands; Samar; Camotes.

#### Genus CATOPSILIA.

*Catopsilia*, Hübner, Verz. bek. Schmett. p. 98 (1816). Scudder, Syst. Rev. Amer. Butt. 37 (1872). Moore, Lep. Ceylon, i. p. 121 (1881). Distant, Rhop. Malay. p. 295 (1885). Staudinger and Schatz, Exot. Sch. p. 154 (1883). Semper, Reis. Phil. Lep. p. 257 (1891). Leech, Butt. China, ii. p. 423 (1893). Kirby, Allen's Nat. Libr. Lep. ii. p. 225 (1896).

*Murtio* Hübner, Verz. bek. Schmett. p. 98 (1816).

*Callidryas* (pt.), Boisduval; Doubleday, Butler.

*Colias* (pt.), Godart; Horsfield.

Wings broad. *Forewing* subtriangular; costal vein extending to two-thirds the margin; subcostal vein much arched at the base, first branch emitted at more than one-half before end of the cell, and extending close alongside the costal, second branch from end of the cell, third trifold, the fifth at one-third beyond the cell; discocellulars slightly oblique, both angled inward, the radial from their middle; the middle median veinlet at one-fourth, and lower at one-half before end of

the cell; submedian vein slightly waved. *Hindwing* broadly obconical; precostal vein very short; costal vein bent upward at the precostal; first subcostal branch at one-third before end of the cell; the cell very broad; discocellulars very oblique, lower bent near the middle, the radial from the angle; middle median branch at nearly one-fifth, and lower at nearly one-half before end of the cell; submedian vein straight, internal vein slightly curved. *Body* stout; thorax clothed with long silky hairs; palpi porrect, projecting one-third beyond the head, second joint laxly squamose, third short; legs slender; antennæ gradually thickened to end, tip blunt. Male. *Forewing* beneath with an elongated brush-like tuft of long, fine silky hairs extending along the edge of the posterior margin, from the base to near one-half its length, this tuft is either recumbent and flattened, along the margin of the wing, or, it is sometimes exerted and outspread, and is then projected in its entire length, along the *upperside* of the wing. *Hindwing* above with a conspicuous elongated-oval raised patch of *glandular* scales extending above the subcostal vein to its first branch, this patch being visibly opaque on holding the wing up to the light.

LARVA.—Cylindrical, slender, granulated; green or grey, with black dots, and a lateral pale line. Feeds on Cassia (*Leguminosæ*). PUPA moderately stout, pointed at each end, dorsally humped.

TYPE.—C. Crocale.

MIGRATORY HABITS: IN CEYLON.—Dr. N. Manders writes: “*Catopsilia Pyranthe* occurs in Ceylon under many different forms, three of which, besides *Pyranthe*, have received names, *Ilea*, *Chryseis*, and *Gnoma*. The latter is usually called the *dry-season* form, and *Chryseis* the *wet*, and though *Gnoma* is certainly more common in the dry, it is by no means confined to the dry months, neither is *Chryseis* confined to the *wet*. It may be said that all the forms occur indiscriminately all the year round, and my first object was to ascertain which was the *dry* form and which the *wet*, and what would be the several effects of heat, moisture, &c., on the larvæ and pupæ. The first thing was to ascertain the proportion of each variety, and this I left in Mr. Wickwar’s hands, and in the month of February, 1903, during a migratory flight, he captured sixty specimens, the weather at the time being very *dry* and hot. He mentions that 75 per cent. were males, . . . . and quite independently we had observed that the *wet-season* flight in November and December were almost all females. I cannot account for this further than to say that possibly during the dry months, owing to a more scanty and drier foliage, the female larvæ succumbed; whereas with the damper and more luscious foliage of the wet months they had no difficulty in surviving. The mystery of these migrations may be explained, to some extent, by this preponderance of the sexes during the different flights. By a coincidence, a migratory flight of butterflies was in full swing on the day

I landed in Ceylon, October 25th, 1895, and I certainly thought that I had stepped into a land of butterflies. The harbour, streets, and large promenade, the Galle Face of the seashore, was alive with butterflies, and, being mostly composed of *Catopsilias*, looked like a snow-storm. In order to gain some idea of their numbers, I selected two points, one at the edge of the sea and the other twenty yards from it, and then counted them as they flew past. The result of my calculation, and that of my companion, taken separately, gave 14,000 insects between 10 a.m. and 2 p.m. The flight usually lasts about a week; we have therefore 98,000 butterflies passing through a space sixty feet broad in twenty-eight hours. In round numbers 100,000. . . . . The butterflies, in whatever part of the island they happen to be hatched, immediately begin to migrate, so that on the same day the migration is as vigorous in one part of the island as in another. As the butterflies hatch in Colombo they immediately fly north, and their places are promptly filled by the insects coming up from Galle, the Galle ones by those from Hambantotte, and so on, round to Trincomalee, beyond which, in the uninhabited country to the north, I have been unable to trace them. The proof that the insects on the Trincomalee side really do follow the coast, and come to Colombo, is shown by the fact that it is only during the flights that certain butterflies, otherwise confined to that portion of the island, *Papilio Jason*, for instance, occur at Colombo, and are there seen migrating in the same frantic haste as their companions. On one occasion, on December 2nd, i.e. in the *wet-season*, I was observing the flight from Fort Frederick, Trincomalee. The butterflies came from the northern shore straight across the sea to the end of the peninsula on which Fort Frederick is built; several bushes of the food-plant of *Catopsilia Pyranthe* were growing there, and these were literally covered with eggs, as many as half a dozen on a single leaf; the bushes were so speckled with the multitude of eggs that they looked as if handfuls of sago had been scattered over them. The flights in November and December on both sides of the island undoubtedly comprise a majority of females, but scarcely a single larva out of this multitude of eggs could possibly have come to maturity; there was not enough food for half of them, and on a previous migration the bushes not far off were completely stripped by the larvæ. The insects comprising the coast flight are almost entirely *Catopsilias*, two species of *Appias*, *Euplæa Asela* and *Montana*, in the Hill districts, and *Danaïis septentrionis* irregularly. I should have mentioned that the process of laying eggs was totally contrary to what one usually observes—there was no attempt to choose a suitable leaf, no deliberation displayed about the operation at all, but every female seemed possessed with the one idea of getting rid of her eggs with the utmost expedition, utterly regardless of the fate of the future larvæ, and then madly continuing her flight. When in full migration they fly with great rapidity, and can give points to *Colias edusa*.

They select the sea-coast, I feel sure, simply to avoid obstacles. The road between Trincomalee and Kandy, which runs through dense forest, is also largely used by the migrating insects. When travelling south they have the N.E. monsoon behind them, but when turning north they meet a stiff wind which really seems to drive them to a faster flight. The breadth of the flight is usually not more than a quarter of a mile.

“The reason for these flights is at present very obscure; it was probably originally a question of food-supply. This instinct might have arisen from the necessity for constantly seeking new feeding-grounds for the larvæ. As the species increased, this tendency to expand would not only preserve the species, but would cause in time its very material increase; the necessity for constantly enlarging the feeding-grounds would in time produce an inherited tendency to migrate. But in due course, when all available feeding-grounds were occupied, as they soon would be, in a small island like Ceylon, some check would be required to keep the enormous number of resulting butterflies within due bounds, otherwise the species would be in danger of annihilation from their very numbers. This appears to me to be effected in the following manner:—The insects of the *wet-season* migration are mostly composed of females, and provided that the males can successfully impregnate more than one female, the result would be an enormous number of eggs laid, and this I have shown to be the case. The migratory instinct is so strong that the females are precluded from taking any precautions for their future offspring, as the females of most butterflies do; and the result is that the struggle for existence among the multitude of larvæ subsisting on the food-plant, which is quickly diminishing by their voracity, and also slowly by the heat and dry weather, is so great that the larvæ which would produce female butterflies succumb, and a great majority of males are produced which form the dry-weather flights. This majority of males would also be another factor in checking the increase of the species. During the intervening portion of the year the species would gradually increase, until the wet months at the fall of the year favour a luxuriant vegetation, and all the female larvæ then survive, and possibly being stronger crowd out the male larvæ. These larvæ produce the overwhelming proportion of females in the next *wet-season* flight, with the result shown above. This migratory instinct, originally due to a necessity for the increase of the species, is now become a means of preventing its undue propagation.” (Trans. Ent. Soc. Lond. 1904, pp. 701-6.)

MIGRATORY HABITS: IN BURMA.—Col. C. T. Bingham writes whilst “returning down the Salween to Moulmein, on a hot steamy day in October, and when below Shwegon, I noticed clouds of butterflies, chiefly *Catopsilias*, migrating, crossing the Salween from East to West in a continuous stream” (Tr. Ent. Soc. 1902, 363).

## CATOPSILIA CROCALE.

Plate 576, fig. 1, 1a, ♂ ♀ (*Wet*); 1b, larva and pupa; 1c, d, ♀ (*Extreme Wet*); 1e, f, ♂ ♀ (*Dry*); 1g, h, ♀ (*Extreme Dry*).

*Papilio Crocale*, Cramer, Pap. Exot. i. pl. 55, fig. C, D, ♀ (1775).

*Catopsilia Crocale*, Hübner, Verz. bek. Schmett. p. 98 (1816). Moore, Lep. of Ceylon, i. p. 122, pl. 48, fig. 1, 1a, b, ♂ ♀, larva and pupa (1881). Wood-Mason and de Nicéville, Journ. As. Soc. Beng. 1881, p. 251. Kheil, Rhop. Nias, p. 35 (1884). Swinhoe, Proc. Zool. Soc. 1884, p. 511; *id.* 1885, p. 140; *id.* 1886, p. 432; *id.* J. Bombay N. H. S. 1887, p. 279. de Nicéville, J. As. Soc. Beng. 1885, p. 50; *id.* Sikkim Gaz. 1894, p. 166. Distant, Rhop. Malay. p. 296, pl. 25, figs. 11, 12, ♂ ♀ (1885). Doherty, J. As. Soc. Beng. 1886, p. 135. Moore, Journ. Linn. Soc. Zool. 1886, p. 49. Elwes, Tr. Ent. Soc. 1888, p. 411. Hampson, J. As. Soc. Beng. 1888, p. 361. Taylor, Butt. of Orissa, p. 14 (1888). Semper, Reise Phil. Lep. p. 257 (1891). Ferguson, J. Bomb. N. H. Soc. 1891, p. 444. Davidson and Aitken, J. Bomb. N. H. Soc. 1890, p. 360; *id.* 1896, p. 570. Leech, Butt. of China, ii. p. 423 (1893). de Nicéville, J. As. Soc. Beng. 1895, p. 490; *id.* 1899, p. 211; *id.* 1900, p. 251. Mackinnon, J. Bombay N. H. Soc. 1898, p. 586. Walker, Tr. Ent. Soc. 1895, p. 464. Adamson, List Burm. Lep. p. 41 (1897). Dixey, Proc. Ent. Soc. 1902, p. xvi. Butler, Ann. Nat. Hist. 1904, p. 413.

*Callidryas Crocale*, Boisd. Spéc. Gén. Léop. p. 625 (1836). Butler, Lep. Exot. i. p. 22, pl. 9, figs. 1—6, ♂ ♀ (1871). Druce, P. Z. S. 1873, p. 355. Moore, P. Z. S. 1878, p. 837.

*Papilio Alcmeone*, Cramer, Pap. Exot. ii. pl. 141, fig. E, ♂ (1777)—*Wet form*.

*Colias Alcmeone*, Godart, Enc. Méth. ix. p. 97 (1819). Horsfield, Catal. Lep. Mus. E. I. Compy. p. 131 (1829).

*Callidryas Alcmeone*, Boisd. Sp. Gén. Léop. i. p. 627 (1836). Moore, Catal. Lep. Mus. E. I. C. i. p. 56, pl. 1, figs. 7, 7a, larva and pupa (1857); *id.* P. Z. S. 1865, p. 493. Wallace, P. Z. S. 1866, p. 357.

*Catopsilia Alcmeone*, Hübner, Verz. bek. Schmett. p. 98 (1816).

*Papilio Jugurtha*, Cramer, Pap. Exot. ii. pl. 187, fig. E, F, ♀ (1777)—*Wet form*.

*Colias Jugurthina*, Godart, Enc. Méth. ix. p. 96 (1819). Horsfield, *l.c.* p. 132 (1829).

*Catopsilia Jugurthina*, Butler, Ann. Nat. Hist. 1888, p. 202.

*Papilio Catilla*, Cramer, Pap. Exot. iii. pl. 229, figs. E, F, ♀ (1779)—*Extreme Dry form*.

*Colias Catilla*, Godart, Enc. Méth. ix. p. 95 (1819).

*Callidryas Catilla*, Butler, Lep. Exot. i. p. 24, pl. 9, figs. 7-10, ♂ ♀ (1871).

*Catopsilia Catilla*, Moore, Lep. Ceylon, i. p. 122, pl. 47, figs. 3, 3a, ♂ ♀ (1881). Distant, Rhop. Malay. p. 297, pl. 25, figs. 15, 16, ♂ ♀ (1885). Elwes, Tr. Ent. Soc. 1888, p. 411. Manders, *id. l.c.* 1890, p. 533. Swinhoe, P. Z. S. 1885, p. 140; *id.* 1886, p. 432; *id.* Tr. Ent. Soc. 1893, p. 309. Adamson, List Burm. Lep. p. 41. (1897).

*Papilio Hilaria*, Cramer, Pap. Exot. iv. pl. 339, figs. A, B, ♂ (1781)—*Dry form*.

*Catopsilia Hilaria*, Hübner Verz. bek. Schmett. p. 98 (1816).

*Colias Hilaria*, Godart, Enc. Méth. ix. p. 97 (1819).

*Callidryas Hilaria*, Boisd. Sp. Gén. Léop. i. p. 626 (1836).

*Catopsilia Heera*, Swinhoe, Proc. Zool. Soc. 1885, p. 140, ♂ ♀.

*Catopsilia Pomona* (pt.), Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 273. Butler, Ann. Nat. Hist. 1904, p. 413—*nec* Fabr.

? *Pap. Lalage*, Herbst, Nat. Syst. Ins. v. p. 163, pl. 106, fig. 1, 2, ♂ (1792).

*Wet form* (figs. 1, 1a, ♂ ♀). Male. Upperside. Both wings white, the basal areas sulphur-yellow. *Forewing* with the costal edge anteriorly, and the exterior margin slenderly black bordered, the inner edge of the border being slightly sinuous at the apex. Underside pale yellow. *Forewing* with the lower discal area white. *Hindwing* sometimes with a slightly-defined small ochreous streak on upper discocellular veinlet. *Forewing* beneath with an elongated brush-like tuft of long, fine silky hairs, extending along the edge of the posterior margin, from base to near half its length, this tuft being either recumbent and flattened, along the margin, or, it is sometimes exerted and outspread, and is then projected along the upperside of the wing in its entire length. *Hindwing* above with a conspicuous elongated-oval raised patch of *glandular* scales extending above the subcostal vein to its first branch, this patch being visibly opaque on holding the wing up to the light.

Female. Both wings with the basal yellow tint more widely extended, and sometimes pervades the entire wing. *Forewing* with the black costal band extending broadly from near the base to upper end of the cell, where it is more or less confluent with a round black discocellular spot, from whence it runs outwardly more narrowly, then widening apically, and continues sinuously down the exterior margin to posterior angle, the anterior portion being subapically traversed by three or four white spots, and lower disconnected inwardly-oblique sinuous black streaks. *Hindwing* with a broad sinuous-edged continuous black band. Underside similar to the male. Antennæ in both sexes greyish-black above, pinkish-grey below.

Expanse, ♂ ♀  $2\frac{4}{10}$  to 3 inches.

*Intermediate or Extreme Wet form* (fig. 1, c, d, ♀). Female. Upperside. Both wings either very faintly yellow-tinted basally, or white throughout. *Forewing* with the extreme base sometimes grey-tinted; with broader subbasal-costal black band and its continuous discocellular patch, apical and marginal band enclosing its subapical white spots, the sinuous or sometimes diagonal marks below the latter extending to the lower median interspace. *Hindwing* with a broad marginal band, and more or less defined confluent submarginal diffused lunules. Underside similar to *Ordinary Wet* female.

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

*Ordinary Dry form* (fig. 1e, f, ♂ ♀). Male. Upperside. Both wings with the basal yellow tint more restricted than in ordinary *Wet* form. *Forewing* with the outer marginal band more or less slightly macular posteriorly. Underside more uniformly paler than in *Wet* form. *Forewing* with a lower discocellular nacreous-centred red spot, a very indistinctly-defined reddish transverse subapical inwardly-oblique narrow sinuous fascia, and a slight fascia bordering the apex of wing. *Hindwing* with a similar lower discocellular nacreous spot, which is outwardly ringed by a slender red line, and is accompanied by a smaller more or less defined similar

ringed contiguous spot placed outwardly above it. Tuft on *forewing*, and glandular patch on the *hindwing*, as in ordinary *Wet* male.

Female. Upperside. Both wings with the ground-colour either as in the male, or uniformly pale yellow-tinted throughout. *Forewing* with a large black lower discocellular spot (which is either round, diagonal, or lobate); the marginal black band broader, more sinuous-edged, and generally broken posteriorly, the anterior portion accompanied by a more or less defined subapical series of five or six dentate lunules, and, generally, two lower less apparent spots, those from the lower subcostal veinlet being disposed obliquely inward. *Hindwing* with a marginal row of blackish dentate lunules. Underside more or less pale or brighter yellow than in male. *Forewing* with the posterior area white; discocellular reddish spot larger, the subapical sinuous fascia generally more defined, and apical band broader. *Hindwing* with the discocellular nacreous-centred spots larger, beyond which is a discally-curved zigzag series of more or less apparent reddish-scaled dentate lunules, and a marginal dot at tip of the veins. Antennæ in both sexes pinkish-grey.

Expanse, ♂  $2\frac{4}{10}$  to  $3\frac{2}{10}$ , ♀  $2\frac{6}{10}$  to  $3\frac{2}{10}$  inches.

*Extreme Dry form* (fig. 1g, h, ♀). Female. Upperside uniformly whitish or pale yellow-tinted. Both wings similar to ordinary *Dry* female. Underside brighter yellow than in ordinary *Dry* form. *Forewing* with the discocellular spot more or less obscured, and generally surrounded by a large reddish-brown angle-edged patch; the subapical sinuous fascia prominent and reddish-brown edged outwardly, the apical band less defined. *Hindwing* with the two nacreous discocellular spots very prominent, and generally very broadly surrounded by a large angle-edged reddish-brown upper-medial patch extending from within base of the cell to costal vein, its outer edge forming the outline of upper-discal zigzag marks; the lower-discal zigzag marks being more or less defined.

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

HABITAT.—Western, Central, Eastern Himalayas; Upper and Lower Continental India; Ceylon; Andaman and Nicobar Islands; Burma; Tenasserim; Siam; Tonkin; Annam; Formosa; C. and S.E. China; Malay Peninsula; Sumatra; Java; Borneo; Philippines.

LARVA.—“ (*Catilla*). Colour green, with a spiracular white band touched with bright yellow on segments two to five, and these segments, especially the third and fourth, are distinctly flanged on the spiracular line as in the larva of *Hebomoia australis*, though not to so great an extent. The head is round, green, the clypeus edged with brown, covered with small, shiny, black tubercles, which are not very large, and do not hide the colour of the head; the anal flap is rounded, but looks square at the extremity, and is covered with small tubercles, not black, but green, each bearing a short hair; the body is covered with rows of small black tubercles,



of which only the row along the spiracular line is conspicuous; the spiracles are oval, shiny and white. Length 51 mm."

PUPA.—"The pupa has the dorsal line of the thorax absolutely parallel to the longitudinal axis for two-thirds its length; consequently the hinder part just before the margin is perpendicular to this parallel part, i.e. is raised suddenly though very slightly above the front margin of segment four, and the front end of this parallel dorsal line is at an angle, and a sharpish angle, with the front slope of the thorax; the shoulder, too, is distinctly angled, the point where the lateral line of the head and segment two meet that of the wings—the front margins of segments nine and ten in the dorsal line—when looked at sideways show a minute peak overhanging the hinder margins of segments eight and nine; the cremaster is distinctly bifid at the extremity, and has some shiny, very short, black suspensory hooks dorsally as well as at the extremity. There is a dorsal rugose black tip to the snout terminating the head, which snout is cylindrical in its apical half; there is no black line round the eyes, and there is a dark green-blue dorsal line, which is yellow on the thorax, as well as the supra-spiracular yellow line. Length 34 mm." (T. R. Bell and de Nicéville, Butt. of Kanara, J. Bombay N. H. Soc. 1900, 251.)

EGG.—"Single, on leaf. Pale yellowish-white, sharply pointed at each end, and attached by one point to the leaf. Larva, when emerged from the egg, is pale green, the head larger than any succeeding segment." (Capt. A. M. Lang, Umballa, MS. Notes, Sept. 2nd, 1861.)

FOOD-PLANTS.—"We have found the larva of *Crocale* on several species of *Cassia*, all arboreal, such as *C. fistula* and *Sumatrana*, but never on the humble and ill-smelling *C. occidentalis*, the food-plant of *C. Pyranthe*. We have found it abundantly in the Kanara District of Bombay, at the end of the rainy season, and also in April." (J. Davidson and E. H. Aitken, *l.c.* 1890, 360.)

DISTRIBUTION, HABITS, &c.—In the North-Western Himalaya Capt. A. M. Lang "found the butterfly frequenting the *Cassia fistula*, which is indigenous to the lower slopes of the outer ranges, 2,000 to 5,000 feet elevation, but an introduced plant in gardens in the plains of N. India" (Ent. Mo. Mag. 1864, 103). Mr. P. W. Mackinnon records *C. Cascale* and *Catilla*, as "occurring commonly in Masuri, N.W. Himalaya, from July to October, and in Dehra Dun throughout the warmer months of the year" (J. Bombay N. H. Soc. 1898, 586). Major J. W. Yerbury obtained it in N.W. India, at "Hassan Abdal, 1,600 feet above sea level, in June; at Chittar, between Tret and Barracoo, Murree road, 2,500 to 5,000 feet, in October; and at Hurripur, in October" (Ann. Nat. Hist. 1888, 202). Mr. W. Doherty obtained it at "Bagheswar, Ranibagh, Jakula Kali Valley, from 1,000 to 6,000 feet, in Kumaon" (J. As. Soc. Bengal, 1886, 135).

Capt. A. M. Lang, writing from Umballa, Sept. 2nd, 1861, says, "*C. alcmeone*

in considerable numbers have been flying over the trees of *Cassia fistula* during the end of August. I captured many in my garden, and found the eggs and larvæ in all stages. The egg, laid singly, on leaf, is pale yellowish-white, sharply pointed at each end. The largest larva found on Sept. 2nd was  $2\frac{1}{2}$  inches long, of a uniform breadth throughout, except at the head and last segment; colour deep grass-green, darkest along the back, and shading slightly lighter towards the lateral stripe, which is a creamy yellowish white; the green is shagreened by transverse ridges of points, their minute extremities being black; both the lateral stripe and the part of the dark green occupying the space between it and the legs is glazed; stigmata scarcely perceptible, creamy-white, and lying partly in, partly below lateral stripe; abdomen very bright cream, almost white; the abdominal and true legs of the same colour and a shade deeper; head grass-green, irrorated with minute black points; immediately above the lateral stripe, in large specimens, the irrorations become larger black points, and form a more or less uninterrupted line of black points distinguishable above the stripe. The larva feeds on the upper surface of the leaf, generally lying along the midrib." (MS. Notes.)

Col. C. Swinhoe records *C. Crocale*, "taken at Mhow, Central India, in July, and *Catilla*, common, from September to April" (P. Z. S. 1886, 432). Col. Swinhoe also records taking "a single female in Karachi, in 1879, and another female was taken in July, 1882 (*id. l.c.* 1884, 511), and in the District of Bombay and the Deccan," he obtained *Crocale* at Poona, in June and October; Ahmednuggur, in June; Belgaum, September; Bombay, August to November. The form named *Heera* having been taken at Belgaum in September, and at Poona in November and December, and *Catilla* being "common all the year round; the larvæ found feeding on the Sumatran *Cassia*, length  $1\frac{1}{2}$  to 3 inches in the hot weather, and from  $2\frac{1}{2}$  to 3 inches in the rains; larval stage being from 18 to 22 days" (*id. l.c.* 1885, 140). Messrs. J. Davidson and E. H. Aitken record it as being "found abundantly, in the Kanara District of Bombay, at the beginning and end of the rainy season, and also in April. We found the larva on several species of *Cassia*, all arboreal, such as *fistula* and *Sumatrana*. They refuse *C. occidentalis*—the food of *C. Pyranthe*. The larvæ are most plentiful in April, June, and September, but the butterfly may be seen any month in the year" (J. Bombay N. H. Soc. 1890, 360; *id.* 1896, 570). Mr. G. F. Hampson enumerates the forms *Crocale*, *Catilla Gnoma*, and *Ilea*, as being found in the Nilgiris (J. As. S. Beng. 1888, 361). Mr. H. S. Ferguson "found *Crocale* and *Catilla* in abundance together, in Travancore, in the dry-weather, in the low country, and up to 2,000 feet on the Hills" (J. Bombay N. H. S. 1891, 444). Mr. W. C. Taylor records it as "very common at Khorda, in Orissa" (List, p. 14 (1888). Mr. L. de Nicéville "obtained it in the neighbourhood of Calcutta, the larva feeding on *Cassia fistula*" (J. A. S. Beng. 1885, 50). Col. C. Swinhoe has

received each named form from the Khasia Hills (Tr. Ent. Soc. 1893, 309). Mr. H. J. Elwes records it as "not uncommon, in Sikkim, up to 3,000 feet from March to December; and I have it from Nepal and Bhotan" (Tr. Ent. Soc. 1888, 411). Mr. L. de Nicéville also records it from Sikkim, "being a common species at low elevations almost throughout the year. It is not, I think, seasonably dimorphic, the innumerable varieties which are found in both sexes occurring at all times" (Sikkim Gazetteer, 1894, 166). We possess specimens of the *Wet* and *Dry* form from Nepal, taken by the late General G. Ramsay. In Ceylon, Mr. F. M. Mackwood obtained it "principally in the lower and middle ranges. In the flights along the sea-coast, beginning generally in November, this species of *Catopsilia* forms about a third of the number, always travelling to the north; the flights lasting for days, thousands of them passing in an hour." Capt. Hutchinson found it "everywhere, in the Plains and Hills up to 6,000 feet, in forest and cultivated land; have taken them at almost all times. Flight strong and quick; sits in crowds on damp spots of roadside" (Lep. Ceylon, i. 122). Col. C. H. E. Adamson records it as being "common throughout Burma. Sometimes met with in immense quantities after the first shower of rain in April" (List, Burm. Butt. p. 41, 1897). Dr. N. Manders found it "the most abundant of the Pierinæ in the Shan States, and found everywhere" (Tr. Ent. Soc. 1890, 533). Mr. O. Limborg obtained it in "Upper Tenasserim, at Hatseiga, Nathoang, and Moolai, 3,000 to 6,000 feet" (P. Z. S. 1878, 837). Dr. J. Anderson obtained *Crocale* and *Catilla* at "Thaing, King Island, Mergui Archipelago, in January; and *Catilla* also at Elphinstone Island in March, and in Mergui, in December" (J. Linn. Soc. Zool. 1886, 49). We possess it from the Andaman and Nicobar Islands, taken by Mr. F. de Rœpstorff. Mr. H. Druce received it from "Siam" (P. Z. S. 1873, 355). Mr. J. H. Leech obtained it at Kukiang, C. China. Mr. H. Fruhstorfer has received it from "Siam, Annam, and Tonkin" (D. Ent. Zeit. 1902, 273). Mr. W. Distant obtained it from "Province Wellesley and Malacca, Malay Peninsula, and Penang" (Rhop. Malay. 296). In Sumatra Dr. L. Martin observed "*Crocale* to be the commonest species of *Catopsilia*: I have bred it, and *Catilla*, from found larvæ, and have failed to discover any differences in the larva and pupa. *Crocale* is enormously common, and occurs throughout the year. The males are fond of flowers, and especially of the *Hibiscus rosa-sinensis*. The larva feeds on the leaves of *Cassia florida*, and sometimes in company with *Cat. Pyranthe*, on *Cassia alata*. *Crocale* is far the commoner form, occurring on roads, near houses and gardens, and is never found in the forest. It sometimes appears in great numbers, in which case the larvæ are very destructive, as in January, 1893, near the Pœngei Estate, they destroyed in a short time a fine plantation of young iron-wood trees, *Cassia florida*, valued at least at \$3,000, by eating up all the leaves and suffocating the plants. All the grass, and every low

shrub near the plantation was covered with the pupæ, and after the butterflies had emerged, the whole place looked as if there was a heavy snow-storm in progress, the air being full of large flakes of snow. I took there many hundreds of both sexes, but amongst them was not a single *Catilla*." . . . "*Catilla* is found only in the forest, the males on forest roads on wet spots together with *Lycænidæ* and *Papilioninæ*, but they form the larger number of the congregations, and often occur in such crowds that cart-horses get frightened on approaching one of these white spots on the road, which all at once flutters up into the air with an audible sound. If driven away from these favourite spots, they fly rapidly in Indian file up and down the forest roads, and fall in again on the same spot when the danger is passed. *Catilla* appears never to be a destructive insect as is *Crocale* at times" (J. As. Soc. Bengal, 1895, 490). We possess specimens of *Crocale* from Java, Borneo, and Formosa. It is also recorded from the Philippines, by Dr. Semper; from Kukiang, C. China, by Mr. J. H. Leech, and Hong Kong, by Commander J. Walker.

#### CATOPSILIA PYRANTHE.

Plate 577, figs. 1, 1a, ♂ ♀ (*Wet*); 1b, *larva* and *pupa*; 1c, d, ♂ ♀ (*Dry*); 1e, f, g, ♂ ♀ (*Extreme Dry*).

*Papilio Pyranthe*, Linnæus, Syst. Nat. x. ed. p. 469 (1758); *id.* Mus. Ulr. p. 245 (1764); *id.* Syst. Nat. xii. ed. p. 763 (1767)—*Wet form.*

*Colias Pyranthe*, Godart, Enc. Méth. ix. p. 97 (1819). Horsfield, Catal. Lep. Mus. E. I. Compy. p. 129 (1829).

*Callidryas Pyranthe*, Boisduval, Spéc. Gén. Lép. i. p. 611 (1836). Moore, Catal. Lep. Mus. E. I. Compy. i. p. 56, pl. 1, figs. 8, 8a, *larva* and *pupa* (1857). Butler, Catal. Lep. Fabr. p. 224 (1869); *id.* Lep. Exotica, i. p. 35, pl. 15, figs. 8, 9, 10, ♂ ♀ (1871).

*Catopsilia Pyranthe*, Moore, Lep. of Ceylon, i. p. 124, pl. 47, fig. 2, 2a, ♂ ♀ (1881). Swinhoe, Proc. Zool. Soc. 1884, p. 511; *id.* l.c. 1885, p. 139; *id.* 1886, p. 433; *id.* J. Bombay N. H. Soc. 1887, p. 279. Davidson and Aitken, Journ. Bombay N. H. Soc. 1890, p. 360; *id.* 1896, 570. de Nicéville, Journ. As. Soc. Bengal, 1885, p. 50; *id.* 1899, p. 211. Doherty, J. As. Soc. Beng. 1886, p. 135. Hampson, J. As. Soc. Beng. 1888, p. 361. Taylor, Butt. of Orissa, p. 14 (1888), Elwes, Tr. Ent. Soc. 1888, p. 411. de Nicéville, Sikk. Gazetteer, 1894, p. 166. Marsden, Tr. Ent. Soc. 1890, p. 538. Swinhoe, Tr. Ent. Soc. 1893, p. 308. Mackinnon, J. Bombay, N. H. S. 1898, p. 586.

*Catopsilia Pyranthe* (pt.), Butler, Ann. Nat. Hist. 1904, p. 414. de Nicéville, J. As. Soc. Bengal, 1895, p. 492. Fruhstorfer, D. Ent. Zeit. 1902, p. 271.

*Papilio Gnoma*, Fabricius, Syst. Ent. p. 828 (1776) ♂—*Extra Dry*.

*Catopsilia Gnoma*, Butler, Lep. Exotica, i. p. 43, pl. 16, figs. 1-4, ♂ ♀ (1871), *id.* Ann. Nat. Hist. 1888, p. 203. Moore, Lep. of Ceylon, i. p. 123, pl. 48, fig. 2, a, b, ♂ ♀, *larva* (1881); *id.* Journ. Linn. Soc. Zool. 1886, p. 49. Elwes, Trans. Ent. Soc. 1888, p. 411.

*Papilio Minna*, Herbst, Nat. Schmett. v. p. 74, pl. 89, fig. 1, 2 (1792)—*Wet*.

*Mancipium F. Murtia Minna*, Hübner, Samml. Exot. Schmett. plate, figs. 1, 2, ♂, 3, 4, ♀ (1806-16).

*Murtia Minna*, Hübner, Verz. bek. Schmett. p. 98 (1816).

- Catopsilia Minna*, Butler, Ann. Nat. Hist. 1888, p. 203.  
*Papilio Philippina*, Cramer, Pap. Exot. iv. pl. 361, fig. C, D, ♀ (1781)—*Ectra Dry*.  
*Colias Philippina*, Hübner, Verz. bek. Schmett. p. 99 (1816). Godart, Enc. Méth. p. 196 (1819).  
 Horsfield, Catal. Mus. E. Ind. Compy. p. 130 (1829).  
*Callidryas Philippina*, Boisd. Sp. Gén. Lép. i. p. 609 (1836). Moore, Catal. Lep. Mus. E. I. C. i.  
 p. 56, pl. 12, figs. 8, 8a, larva and pupa (1857).  
*Catopsilia Philippina*, Aurivillius, Kongl. Vet. Akad. Handl. 1882, p. 57. Swinhoe, P. Z. S. 1884,  
 p. 511; *id. l.c.* 1885, p. 139; *id.* 1886, p. 432; *id.* Journ. Bombay N. H. S. 1887, p. 279.  
*Callidryas Thisorella*, Boisd. Spéc. Gén. Lép. i. p. 609 (1836), ♂—*Dry*.  
*Catopsilia Thisorella*, Swinhoe, P. Z. S. 1884, p. 511; *id. l.c.* 1885, p. 139; *id.* Trans. Ent. Soc. 1893,  
 p. 309.  
*Papilio Ilea*, Fabricius, Ent. Syst. Suppl. p. 421, ♂ (1778)—*Dry*.  
*Catopsilia Ilea*, Moore, Lep. Ceylon, i. p. 124, pl. 47, figs. 1, 1a, b, ♂ ♀, larva (1881). Swinhoe,  
 P. Z. S. 1885, p. 139; *id.* J. Bombay Nat. Hist. Soc. 1887, p. 279; *id.* Tr. Ent. Soc. 1893,  
 p. 308.  
*Callidryas Chryseis* (pt.), Butler, Catal. Fabr. Lep. B. M. p. 224 (1869). Distant, Rhop. Malay.  
 p. 300 (1885). Adamson, List Butt. Burma, p. 41 (1897).

*Wet form* (figs. 1, 1a, ♂ ♀) = *Pyranthe*. Male. Upperside pale bluish-white. *Forewing* with a moderately broad black apical marginal band, which decreases narrowly hindward, and ends generally at lower median veinlet, its inner edge being more or less sinuous; a small linear black mark on lower discocellular veinlet. *Hindwing* with a very slightly indicated black point at marginal tip of the veins. Underside with the costal and apical area of *forewing*, and the entire *hindwing* pale olivaceous-yellow, and numerous covered with short transverse slender indistinctly-defined grey strigæ; a small, slightly apparent pale spot on lower discocellular veinlet. *Forewing* with the posterior area bluish-white, its extreme edge furnished with the normal elongated tuft of fine silky hairs, and the *hindwing* above with the glandular patch of scales.

Female. Upperside bluish-white. *Forewing* with the black apical marginal band broader than in male, and terminating at posterior angle, the band inwardly accompanied by, or partly anteriorly-merged into, a subapical series of dentate lunules; the discocellular spot large, oval, or diagonal. *Hindwing* with a more or less slightly apparent marginal row of blackish-scaled lunular spots, or larger almost confluent spots. Underside similar to the male, the strigæ more distinct; the discocellular spot more distinct than in male, pale reddish with white centre, that on the *hindwing* sometimes accompanied by a very slightly indicated similar upper outer spot. Antennæ in both sexes pinkish-grey.

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

*Dry form* (figs. 1, c, d, ♂ ♀) = *Thisorella*. Male. Upperside similar to *Wet form*, except that the *forewing* has the apical marginal band conspicuously narrower, and generally macular from below the apex, the discocellular spot small and short.

Underside also similar, the strigæ generally more distinct, the discocellular spot more prominent and white. Normal tuft, and glandular patch, similar.

Female. Upperside. *Forewing* with the outer band comparatively narrower than in female of *Wet* form, the subapical confluent lunules anteriorly restricted and less defined, the discocellular spot similar. *Hindwing* with a more or less slightly-apparent dentate dot at tip of the veins. Underside brighter yellow-tinted, and the strigæ more apparent. Both wings with the discocellular spot more distinctly defined, that on the *hindwing* always accompanied by a similar upper spot, and a small nacreous-centred ringlet within the upper end of the cell; a very slightly apparent upper subapical transverse series of pale reddish dentate lunules on *forewing*, and a curved discal series of similar lunules on the *hindwing*. Antennæ as in *Wet* form.

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

*Extreme Dry form* (figs. e, f, g, ♂ ♀). Larger than ordinary *Dry* form. Male. Upperside either bluish-white or olivescient-white. *Forewing* with a narrow black apical marginal band, which is macular from below the apex; the discocellular spot more or less slender. Underside pale olivescient-yellow, the strigæ more distinct than in ordinary *Dry* form, and the discocellular spot more prominent; a subapical lunular fascia on *forewing*, and a discal fascia on *hindwing* more or less slightly apparent.

Female. Upperside olivescient-white, and tinted outwardly with pale, olivescient-yellow. *Forewing* with the marginal band broader, and more dentate than in male, or macular from below the apex; discocellular spot larger than in ordinary *Dry* female. Underside. Both wings brighter olivescient-yellow than in male, the strigæ more apparent; the extreme marginal edge of wings red-tinted. *Forewing* with a prominent large single or duplex-reddish-centred discocellular spot, and distinct reddish upper discal dentate-lunular fascia. *Hindwing* with two (sometimes one only) prominent discocellular dark-red bordered nacreous centred spots, and a much larger similar spot within upper end of the cell, the discal series of dentate lunules also distinct.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{8}{10}$ , ♀  $1\frac{8}{10}$  to  $2\frac{8}{10}$  inches.

HABITAT.—Western, Central, Eastern Himalayas; Upper and Lower Continental India; Ceylon; Burma; Tenasserim; Siam; Annam; Malay Peninsula; Sumatra; Java; Borneo; Formosa; Hainan.

LIFE HISTORY.—“*Egg*.  $\frac{3}{4}$  line long; fusiform; attached to the leaf, on which larva feeds, by one end. Colour clear glossy-white. Solitary as regards position, several, however, under one leaf of *Cassia*.

*Larva*.—When hatched  $1\frac{1}{2}$  line long. Colour deep rich glossy-green; lateral line yellowish-white, bordered above by a black dotted line. The whole of the back

and head most closely and thickly dotted with raised black spots, giving the larva a rugose appearance; abdomen pale green, slightly dotted with black. Legs green. Head green, and very round in front. Stigmata black, circled with green. *After last moult.* Length 1 inch. Cylindrical, as after first moult, though a little darker. Feeds on *Cassia occidentalis*. Habits sluggish. Changed into chrysalis on August 28th. *Pupa*.—Green; angles marked with yellow lines.

*Imago*.—Emerged on September 5th. Very common in Lucknow" (Capt. H. L. Chaumette. MS. Notes, 1860).

Messrs. Davidson and Aitken, in their "Notes on the Butterflies of the N. Kanara District of Bombay, describe the larva as being "long, somewhat depressed, rough, green, with a white lateral line, and above it a black line, more or less conspicuous, formed by minute, flat, shining, black tubercles, being like a big specimen of *Terias Hecabe*. The pupa is much stouter, and the keel formed by the wing cases is much less pronounced. The normal colour is pale green, with a yellow lateral line. We have never found it on any plant except *Cassia occidentalis*. It habitually rests on the upperside, along the midrib, like almost all Pierine larvæ.

DISTRIBUTION, HABITS, &c.—In the N.W. Himalayas this species was taken by Capt. A. M. Lang, and also in the Plains. "Larva reared on *Cassia Tora*" (Ent. Mo. Mag. 1864, 103). Mr. P. W. Mackinnon records it as "not very common in Masuri during the rains, the dry-season form, *Gnoma*, even less so. In the Dehra Dun both forms are common in their respective seasons. The larva feeds in the Dun, on *Cassia Tora*, N. O. Leguminosæ" (J. Bombay N. H. S. 1898, 586). Mr. W. Doherty obtained it at "Bagheswar, Kali Valley, up to Dharchula, 2,000 to 4,000 feet, Kumaon" (J. As. Soc. Beng. 1886, 135). Col. C. Swinhoe records *Pyranthe* as being "common in Mhow, Central India, all the year round, and *Philippina* from September to April" (P. Z. S. 1886, 432). Col. Swinhoe also records "a few specimens of *Pyranthe* from Karachi, taken in March, May, June, and December; *Thisorella* being common from March to May, and *Philippina* from September to January" (*l.c.* 1884, 511), and "*Pyranthe* also common everywhere in Bombay and the Deccan, all the year round; *Thisorella* at Poona from November to June, Ahmednuggur, October to November; *Ilea* at Poona from November to June, Ahmednuggur, Sept. and October; and *Philippina* at Poona from October to April, Ahmednuggur, November; and Bombay, March, July, and October" (*l.c.* 1885, 139); in Karachi. "*Pyranthe* was common from May to August, *Ilea*, May and June; and *Philippina* from Sept. to January" (*id.* J. Bombay N. H. Soc. 1887, 279).

Messrs. J. Davidson and E. H. Aitken obtained and described the larva, as found in the Kanara District of Bombay. "The butterfly being common everywhere and all the year round. The only food-plant, as far as our present knowledge

goes, is *Cassia occidentalis*” (J. Bombay N. H. Soc. 1890, 360; 1896, 570). Mr. G. F. Hampson obtained it in the Nilgiris (J. A. S. Beng. 1888, 361). We possess male and female from Madras, reared from larvæ by the late Sir W. Elliot, feeding on *Cassia occidentalis* and *C. auriculata* in August and September. Mr. H. S. Ferguson records it as “common in the low country and the Hills, in Travancore” (J. Bomb. N. H. S. 1891, 444). In Ceylon, Mr. F. M. Mackwood found it “in all parts, but more numerous in the low country than in the upper. A few occur in the low country flights. Dr. Thwaites obtained and describes the larva and pupa; found on *Cassia fistula*” (Lep. Ceylon, i. 123). Dr. N. Manders notes “that as far as his observations in Ceylon go, the forms of *Pyranthe* are not dependent on season, but appear indiscriminately nearly throughout the year, those flying in the dry-season from February to April being a little smaller than those found during the rest of the year” (J. As. Soc. Beng. 1899, 211). Mr. W. C. Taylor cites it as “very common at Khorda in Orissa” (List, 14, 1888). Mr. L. de Nicéville notes it as being found in the neighbourhood of Calcutta (J. As. Soc. Beng. 1885, 50).

Col. Swinhoe has received *Pyranthe*, *Ilea*, *Thisorella*, and *Philippina* “from the Khasia Hills” (Tr. Ent. Soc. 1893, 308). Mr. H. J. Elwes records it as “common in Sikkim, up to 3,000 feet elevation, from March to December” (Tr. Ent. Soc. 1888, 411).

In Burma, observes Col. C. H. E. Adamson, “this is a very common insect throughout the year” (List, Burm. Butt. 41 (1897). Dr. N. Manders found it “abundant all over the Shan States, at all elevations” (Tr. Ent. Soc. 1890, 533). Dr. J. Anderson obtained it at “Thaing, King Island, and Mergui, in February and March” (J. Linn. Soc. Zool. 1886, 49). Mr. W. L. Distant records it from the Malay Peninsula (Rhop. Malay. p. 300). We possess specimens from Sumatra, Java, Borneo, Hainan, Formosa.

#### CATOPSILIA ALCYONE.

Plate 578, figs. 1, ♂, 1a, b, ♀ (*Wet form*).

*Papilio Alcyone*, Cramer, Pap. Exot. i. pl. 58, fig. A, B, C, ♂ ♀ (1779).

*Catopsilia Chryseis*, Butler, Trans. Linn. Soc. Zool. i. p. 551 (1877). Moore, Proc. Zool. Soc. 1877, p. 591. Wood-Mason and de Nicéville, J. As. Soc. Beng. 1881, p. 252. Moore, Lep. Ceylon, i. p. 125, pl. 48, figs. 3, 3a, ♂ ♀ (1881). Distant, Rhop. Malayana, p. 300, pl. 25, fig. 2, ♂ (? fig. 1, ♀); *id.* pl. 26, fig. 20, ♀ (1885). Moore, Journ. Linn. Soc. Zool. 1886, p. 49.

*Callidryas Chryseis* (pt.), Butler, Cat. Fabr. Lep. B. M. p. 224 (1869).

*Catopsilia Chryseis* (pt.), Adamson, List Burm. Lep. p. 41 (1897).

*Catopsilia Pyranthe* (pt.), Semper, Reise Phil. Lep. p. 258 (1891). de Nicéville, Journ. As. Soc. Bengal, 1895, p. 492. Fruhstorfer, D. Ent. Zeit. 1902, p. 271.

*Wet form* (figs. 1, 1a, b, ♂ ♀). Male. Upperside bluish-white. *Forewing* with a black apical marginal band similar to, but broader throughout its length, and less



acutely-sinuated than in *Wet* form of *Pyranthe*; the discocellular spot small, slender. *Hindwing* with, or without, a minute point at tip of the veins. Underside. *Forewing* with the anterior half, and the entire *hindwing* pale olivescens-yellow, crossed between the veins by numerous pale greyish-ochreous strigæ. Both wings with a slightly-apparent small pale reddish discocellular spot. Posterior half of *forewing* bluish-white; veins of *hindwing* basally whitish.

Female. Upperside bluish-white. *Forewing* with the costal border from base black scaled, merging into the black apical marginal band, which is broader than in female *Dry* form of *Pyranthe*, having its upper portion to middle median veinlet entirely black, and including the subapical lunules which are present in the latter species; discocellular spot larger. *Hindwing* with a narrow, more or less macular, marginal band. Underside brighter yellow than in male, the strigæ more distinct, the submarginal lunular fascia slightly apparent. *Forewing* with the discocellular spot more distinct; the *hindwing* with two small pale-centred discocellular spots, and a similar spot within upper end of the cell.

Expanse, ♂  $2\frac{6}{10}$ , ♀  $2\frac{4}{10}$  to  $2\frac{6}{10}$  inches.

*Dry form.* Male. Upperside similar to *Wet* form. *Forewing* with the discocellular spot more distinct. *Hindwing* with slightly-apparent marginal narrow blackish-scaled spots. Underside similar to *Wet* form. Both wings with a more or less distinct small pale-centred reddish discocellular spot.

Female. Upperside bluish-white. *Forewing* with the marginal band as in *Wet* form, the anterior portion not having any subapical whitish interspaces; some specimens also show traces of black-scaled lunules from the middle median veinlet to the submedian vein; discocellular spot prominent. *Hindwing* with a black, broad marginal continuous band, and two or three inner upper-submarginal, less distinct partly-confluent lunules. Underside brighter yellow, the strigæ more apparent, the discocellular spots more distinct, and the submarginal lunular fascia more apparent.

Expanse, ♂ ♀,  $2\frac{6}{10}$  to  $2\frac{8}{10}$  inches.

HABITAT.—Ceylon?; Mergui, S. Tenasserim; Malay Peninsula; Penang; Sumatra; Billitong; Philippines.

DISTRIBUTION.—We possess a male from Capt. Hutchison, reputed to be from Ceylon (*vide* Lep. Ceylon, i. pl. 48, fig. 3); also both sexes from Mergui, taken by Dr. J. Anderson, and others from Malay Peninsula, Sumatra, and Billitong.

Of our illustration on Plate 578, figs. 1, 1a, b, ♂ ♀ are from Mergui specimens.

#### CATOPSILIA SCYLLA.

Plate 578, figs. 2, ♂, 2a, b, ♀.

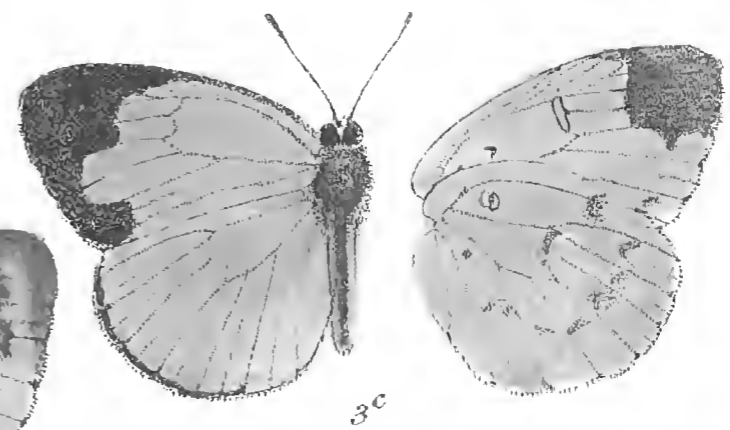
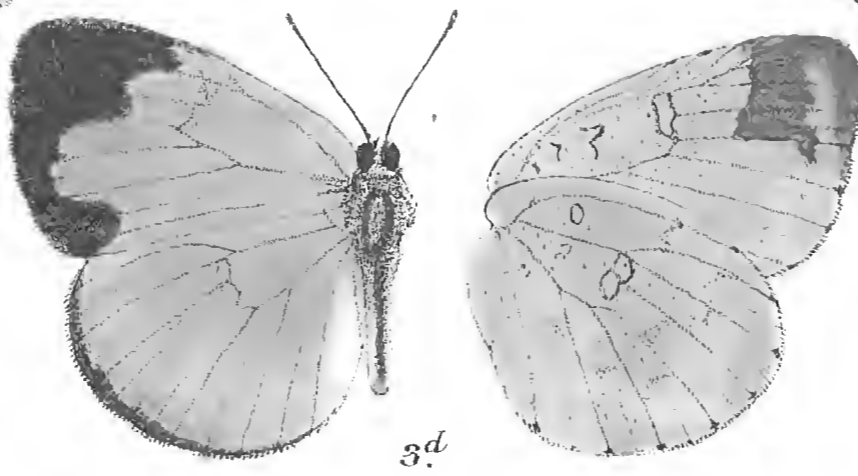
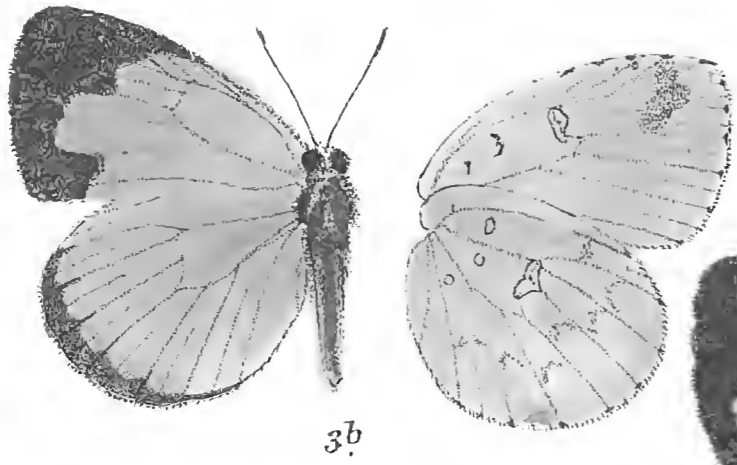
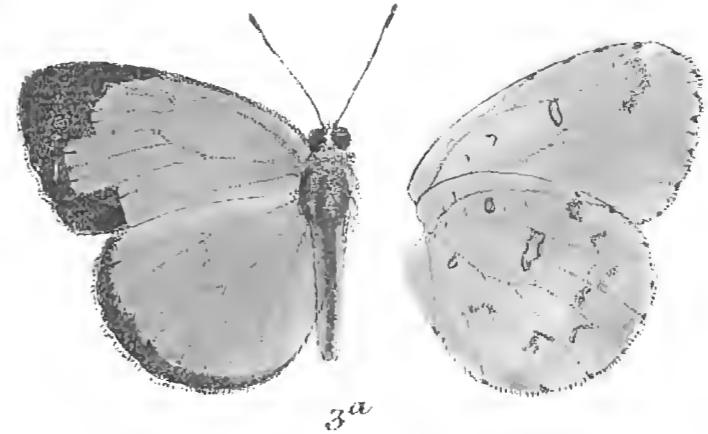
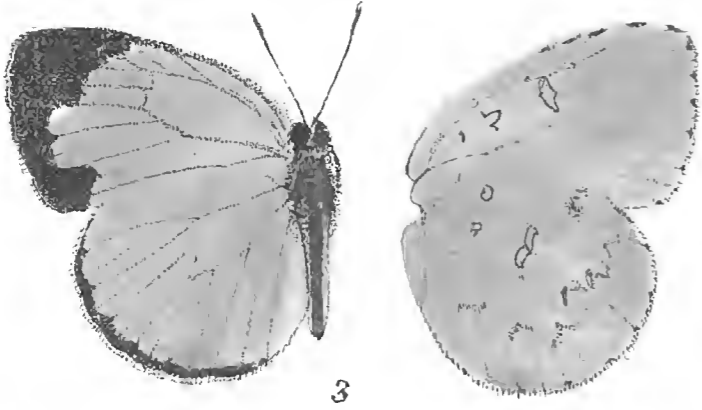
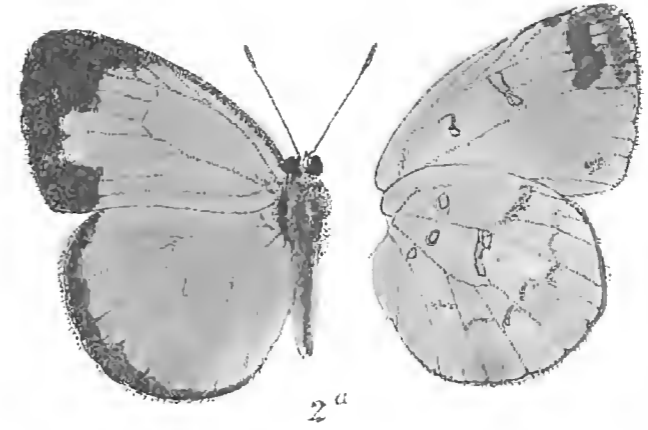
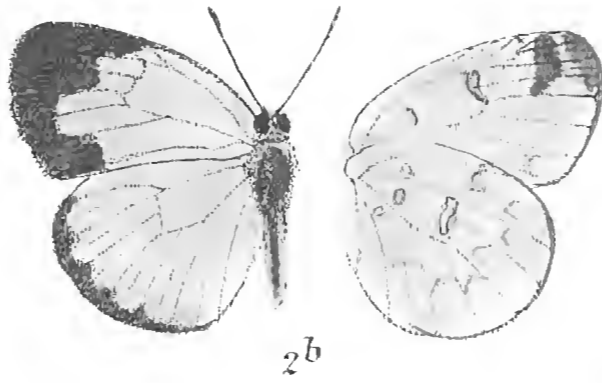
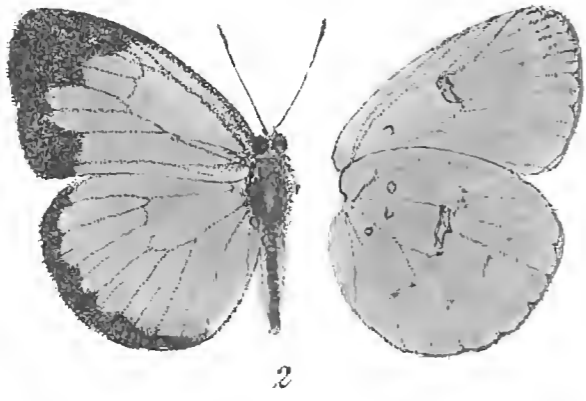
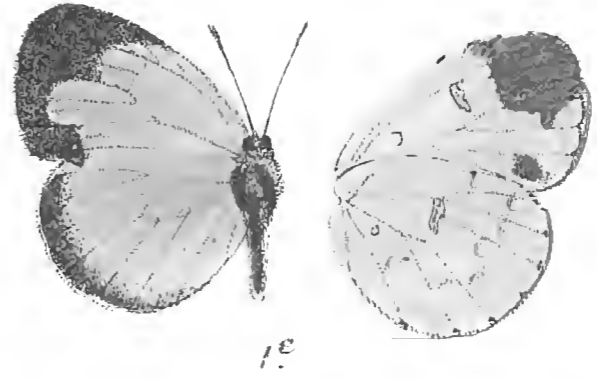
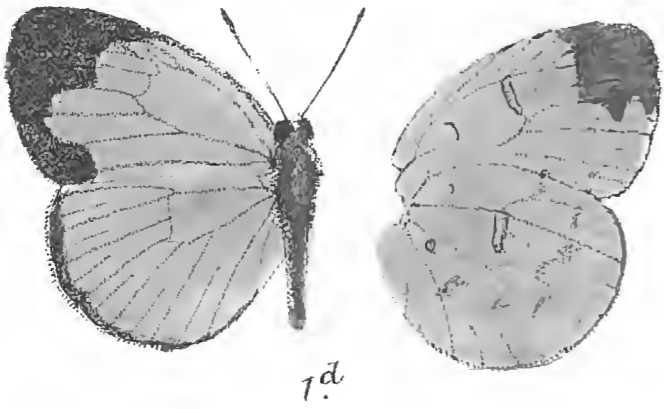
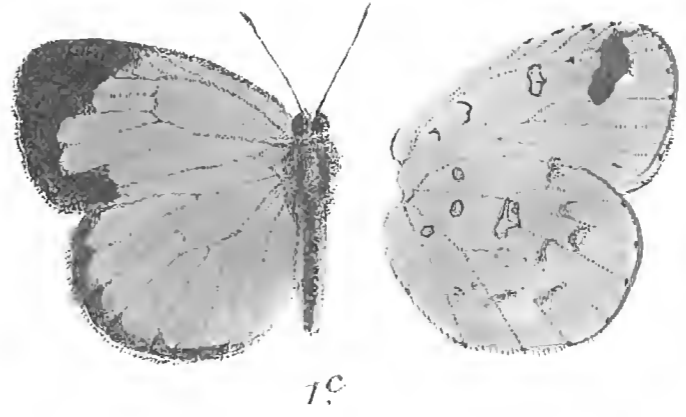
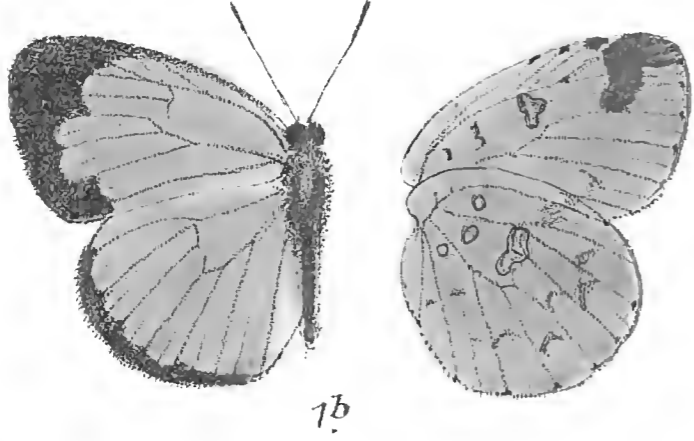
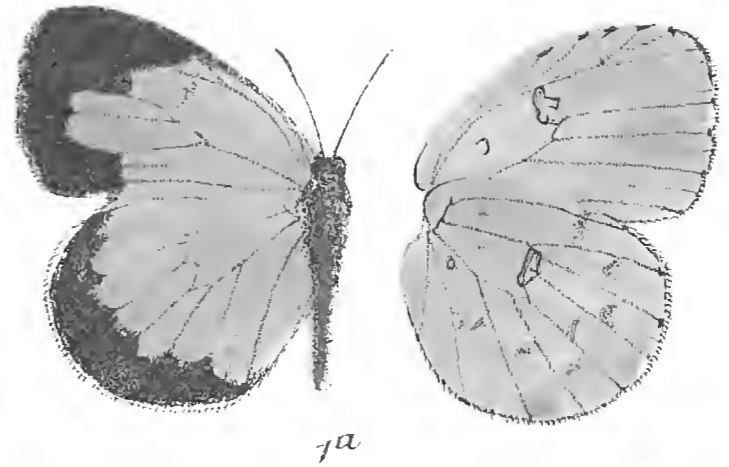
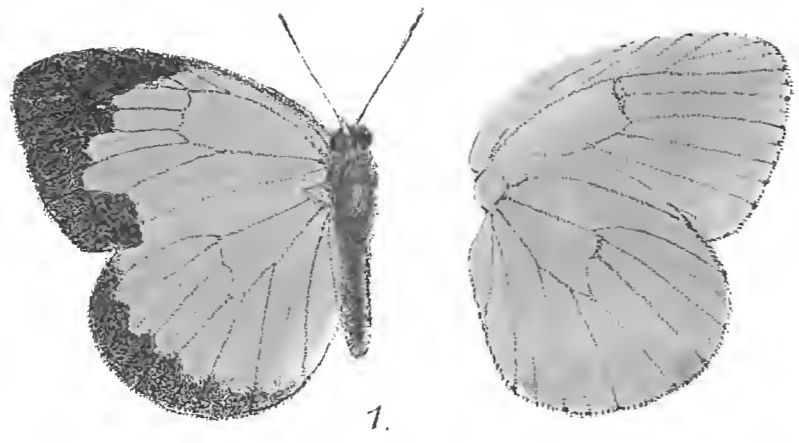
*Papilio Scylla*, Linnæus, Cent. Inst. p. 20 (1763); *id.* Mus. Ulr. p. 242 (1764); *id.* Syst. Nat. xii. ed. p. 763 (1767). Johan. Amoen. Acad. vi. p. 404 (1764). Cramer, Pap. Exot. i. pl. 12,

- fig. C, D (1775). Sulzer, *Gesch. Ins.* p. 143, pl. 15, fig. 6 (1776). Meerburgh, *Afb.* pl. 16, fig. ♂ (1775). Donovan, *Ins. Ind.* pl. 28, fig. 3 (1800).
- Colias Scylla*, Hübner, *Verz. bek. Schmett.* p. 99 (1816). Godart, *Enc. Méth.* ix. p. 95, pl. 14, fig. 3, ♂ (1819). Horsfield, *Catal. Lep. Mus. E. Ind. Compy.* p. 133, pl. 4, fig. 6, 6a, *larva* and *pupa* (1829).
- Callidryas Scylla*, Boisd. *Sp. Gén. Léop.* i. p. 631 (1836). Lucas, *Lep. Exot.* p. 80, pl. 40, fig. 1, ♂ (1845). Moore, *Catal. Lep. E. I. Compy.* i. p. 58, pl. 1, fig. 9, 9a, *larva* and *pupa* (1857). Butler, *Catal. Fabr. Lep. B. M.* p. 220 (1869); *id.* *Lép. Exotica*, i. p. 31, pl. 12, figs. 5-8, ♂ ♀ (1870). Snellen, *Mid Sumatra, Lep.* p. 23 (1880).
- Catopsilia Scylla*, Aurivillius, *Kongl. Vet. Akad. Handl.* 1882, p. 55. Semper, *Reise Philip. Lep.* i. p. 257 (1891). Distant, *Rhop. Malayana*, p. 298, pl. 24, figs. 1, 2, ♂ ♀ (1885). de Nicéville and Martin, *J. As. Soc. Bengal*, 1895, p. 493. Fruhstorfer, *D. Ent. Zeit.* 1902, p. 275; *id.* *Soc. Ent.* 1903, p. 25.
- Papilio Cornelia*, Fabr. *Mant. Ins.* ii. p. 21 (1787).
- Callidryas Gorgophone*, Doubleday, *Gen. D. Lep.* pl. 9, fig. 2 (*nec* Boisd.).

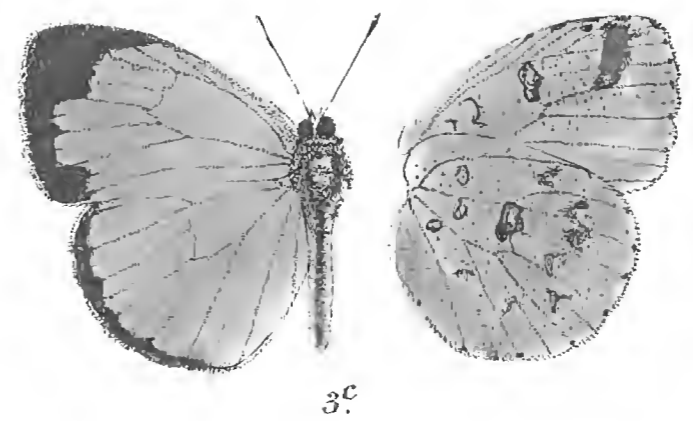
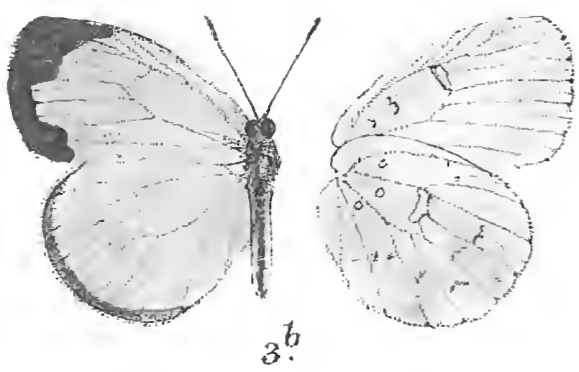
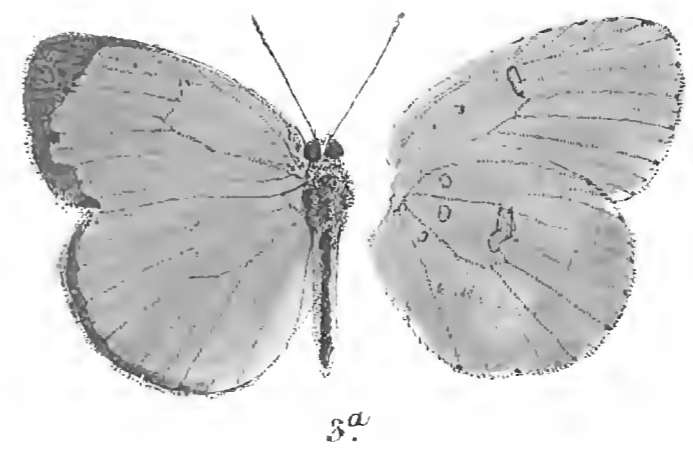
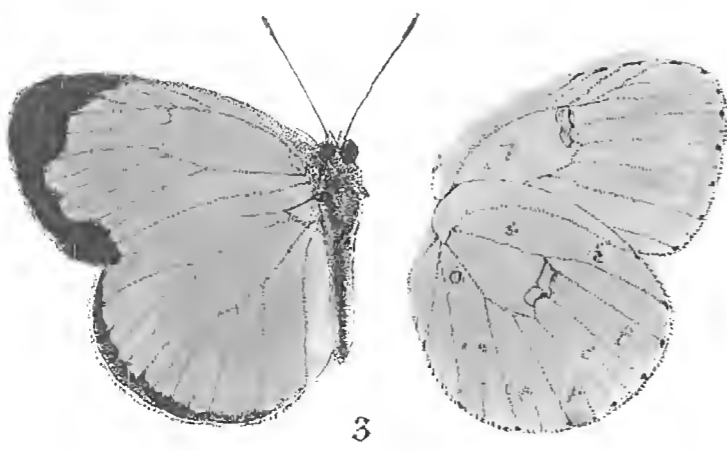
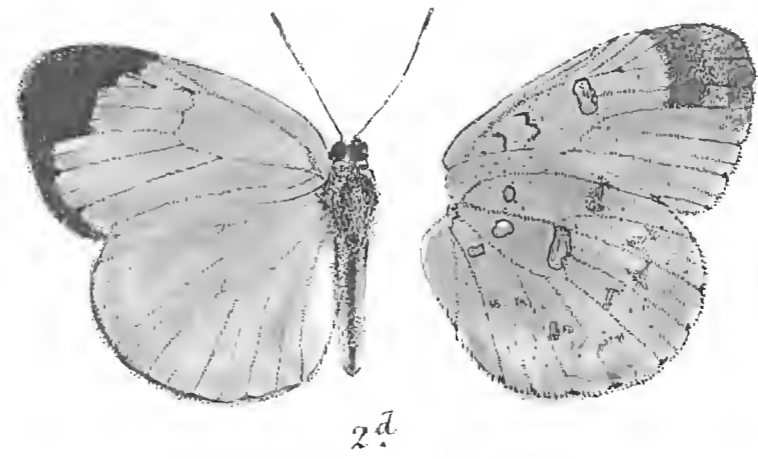
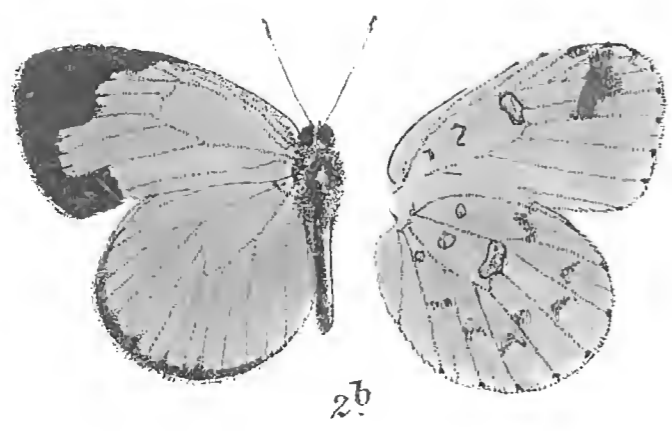
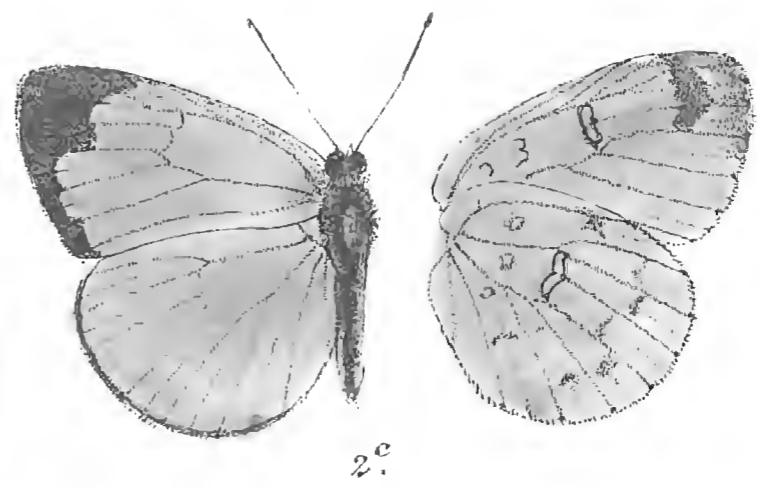
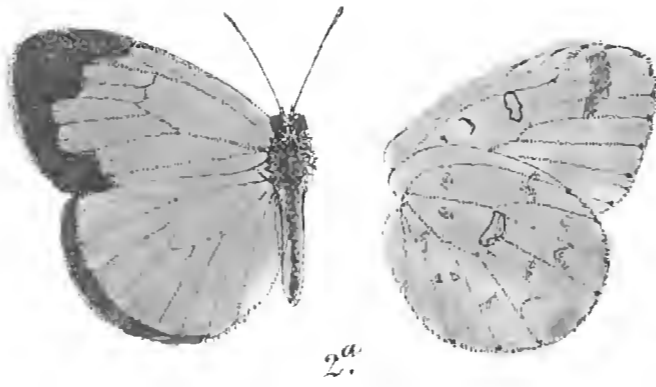
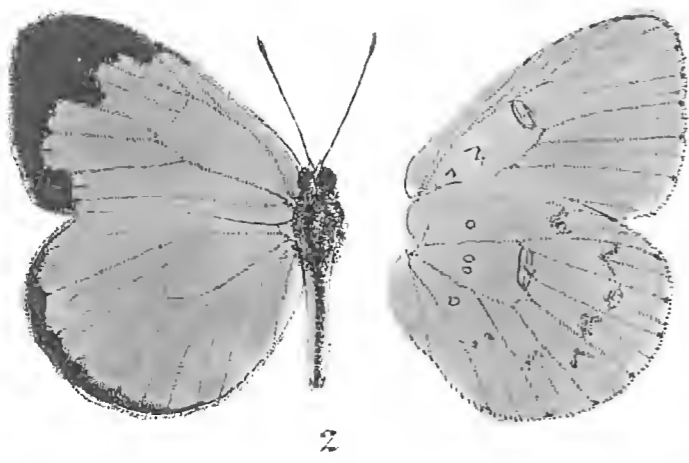
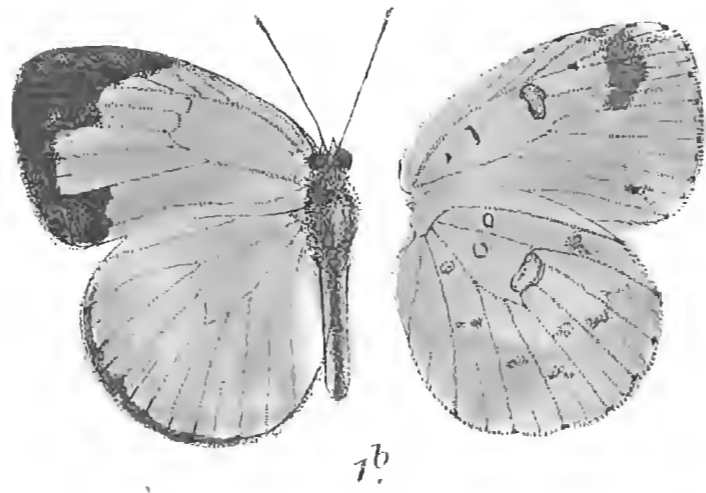
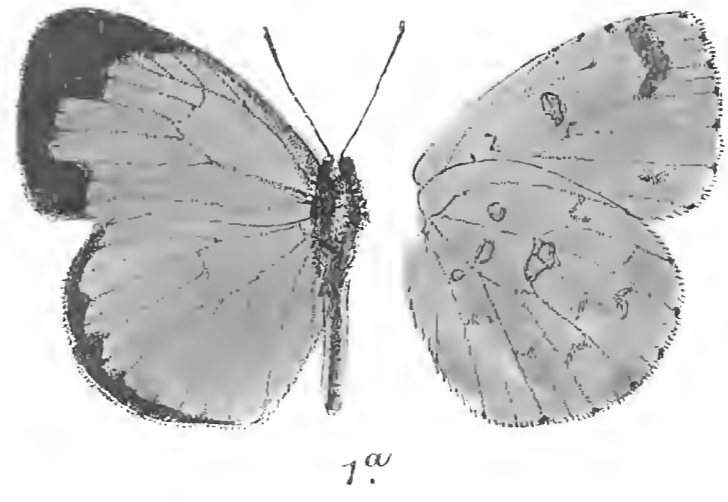
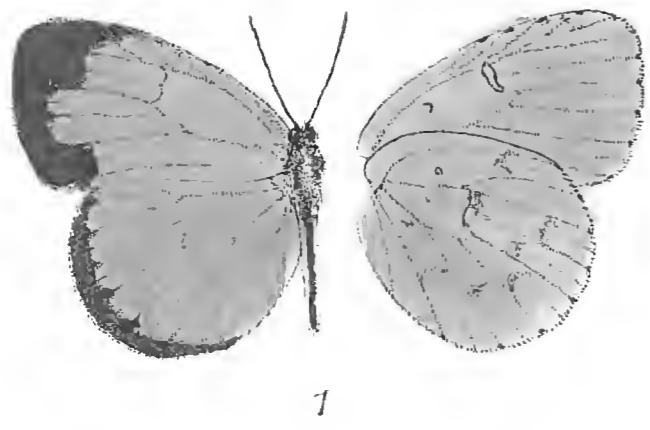
Male. Upperside. *Forewing* olivescence-white; costal margin basally, slenderly, and apex and outer margin broadly, black, its inner-edge from the first subcostal branch sinuous; a small blackish-scaled discocellular spot more or less slightly apparent. *Hindwing* bright ochreous-yellow, the abdominal margin being pale yellow; with a more or less slightly apparent, or, a distinct marginal row of small blackish-scaled dentate spots. Underside pale yellowish-ochreous. *Forewing* with the posterior margin broadly white; a single, small, or, a larger duplex, reddish or blackish-scaled discocellular ringlet spot, and a discal upper series of more or less defined black-scaled dentate lunules. *Hindwing* with a small upper discal ringlet-spot, a small spot at base of the cell, and one above it, also two similar smaller spots below the junction of lower median veinlet; also a discal transverse zigzag series of black-scaled lunules, also a slight similar-scaled tip at end of the veins.

Female. Upperside. *Forewing* olivescence-white, with a somewhat broader, similar costal and outer black band, the latter inwardly accompanied by a more or less defined black submarginal dentate-lunular fascia, the anterior portions of which are partly confluent with the outer band; the costal band sometimes extending outward broadly towards the discocellular; spot similar to that in *Crocale*; a slightly-apparent, or well-defined, discocellular mark. *Hindwing* paler ochreous-yellow, and the blackish marginal spots larger than in male, and a more or less apparent series of blackish-scaled submarginal lunules. Underside brighter yellow than in male. *Forewing* with a similar but more prominent duplex discocellular spot and submarginal lunules, than in male. *Hindwing* also with a duplex discocellular spot, also a spot within base of the cell, two below it, and one above it, all more defined than in the male.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{6}{10}$ , ♀  $2\frac{6}{10}$  inches.





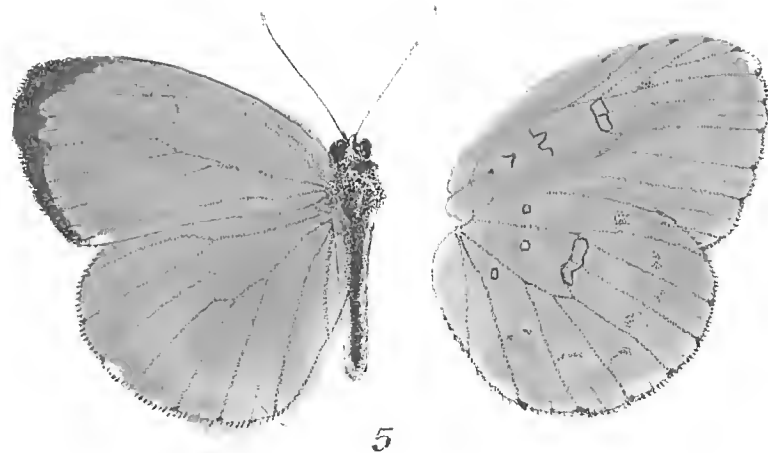
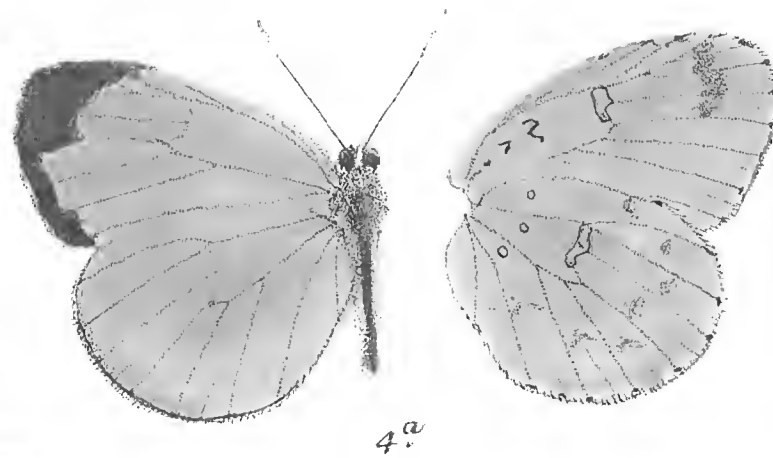
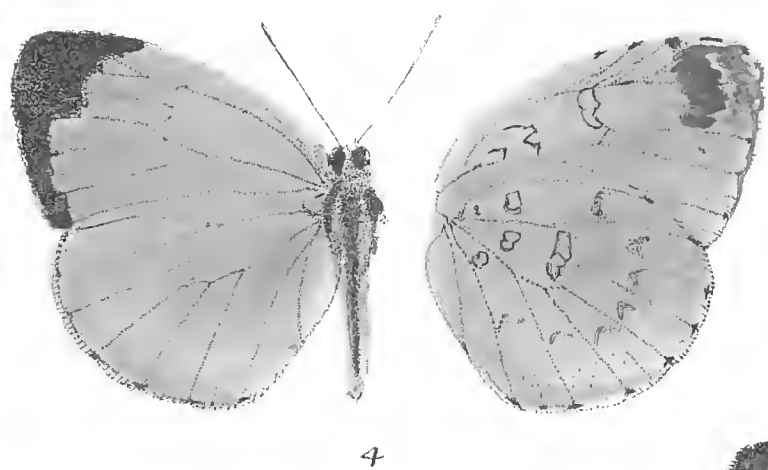
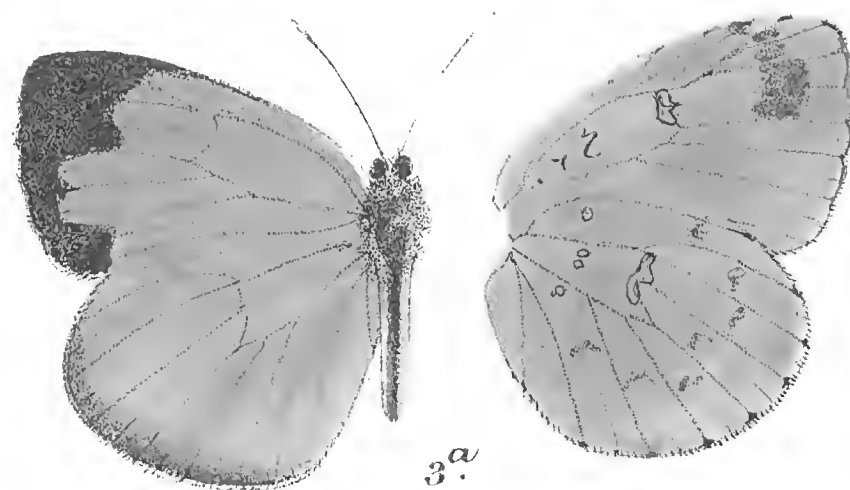
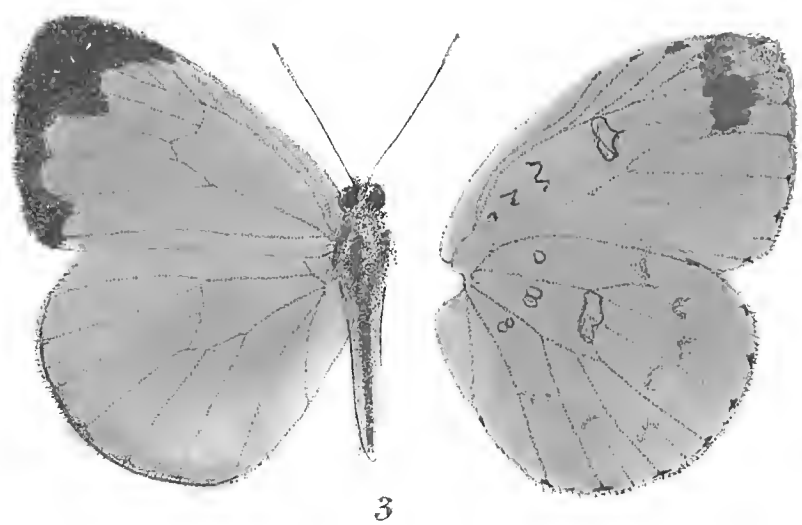
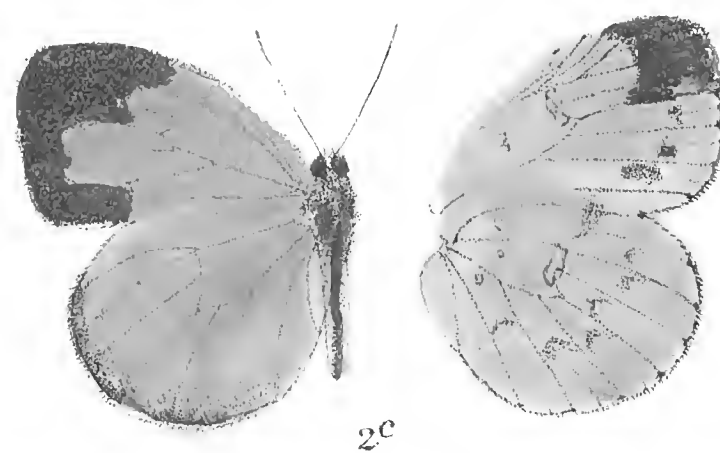
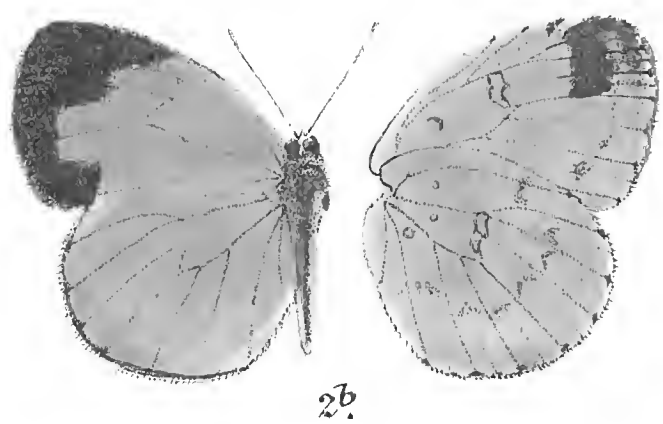
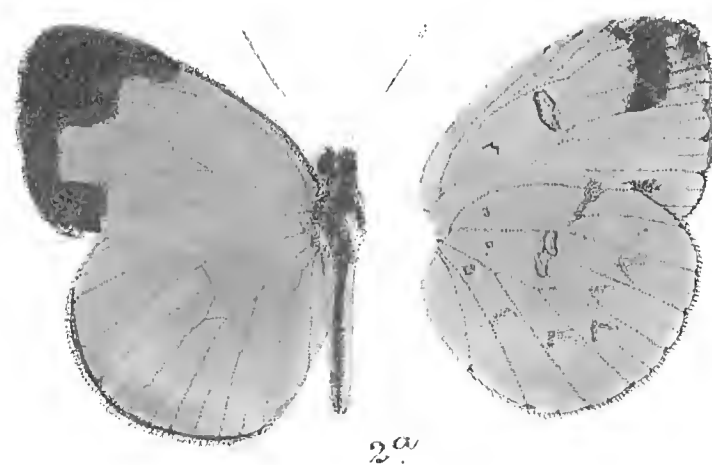
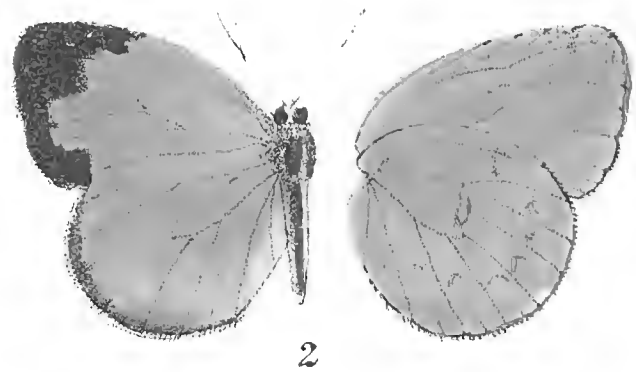
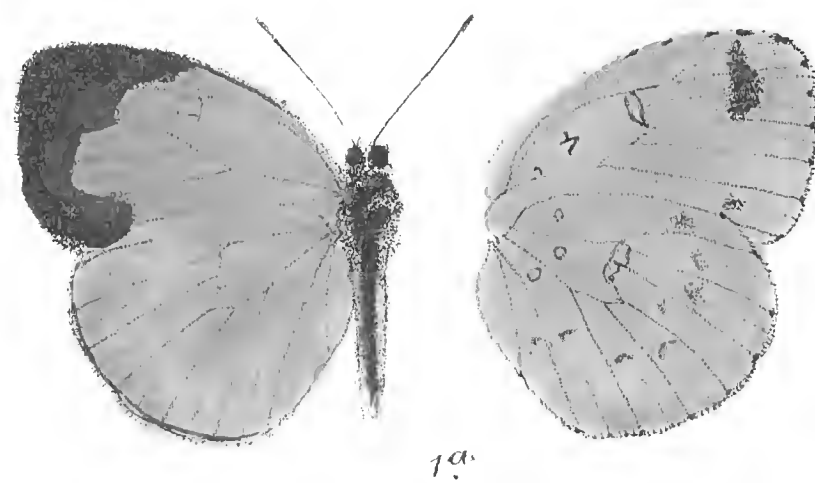
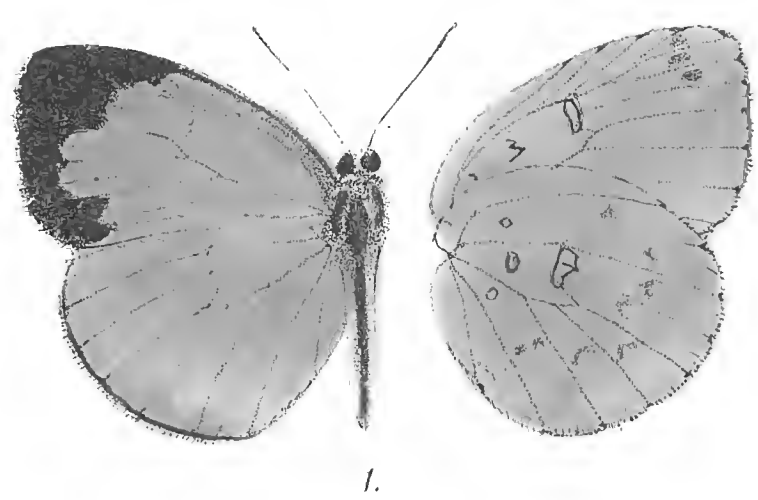


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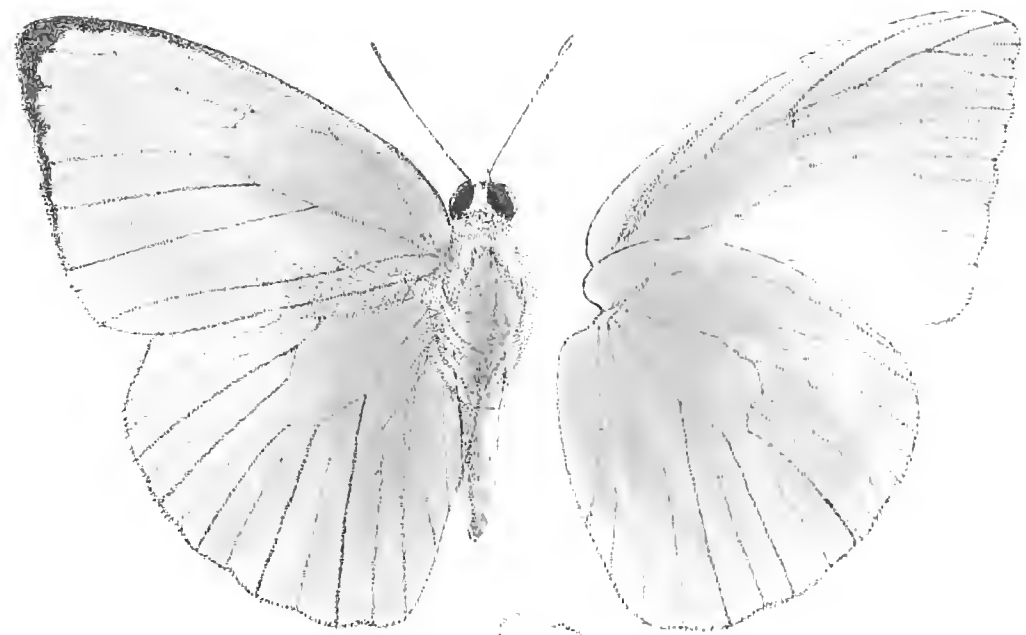
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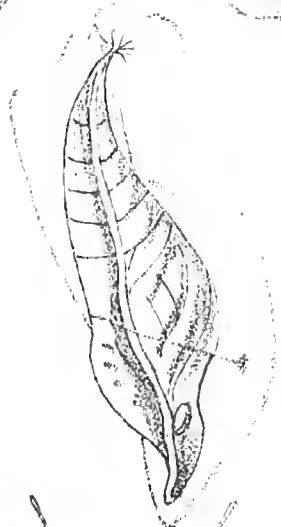




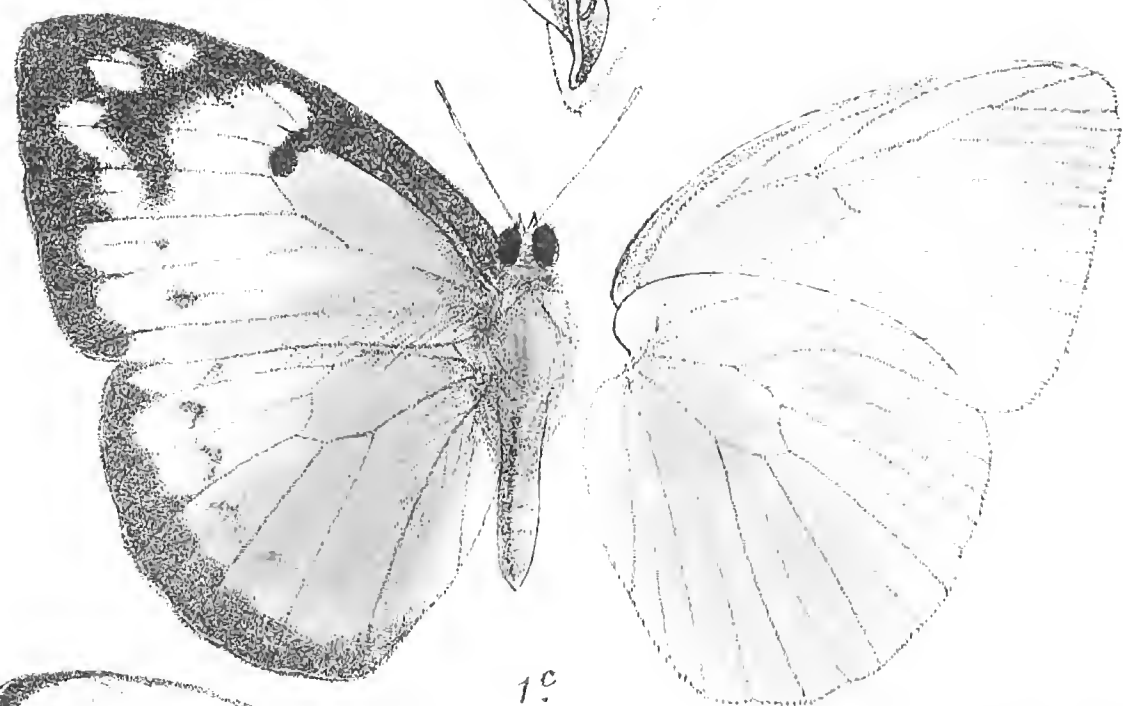
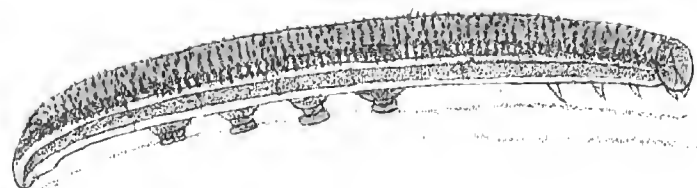
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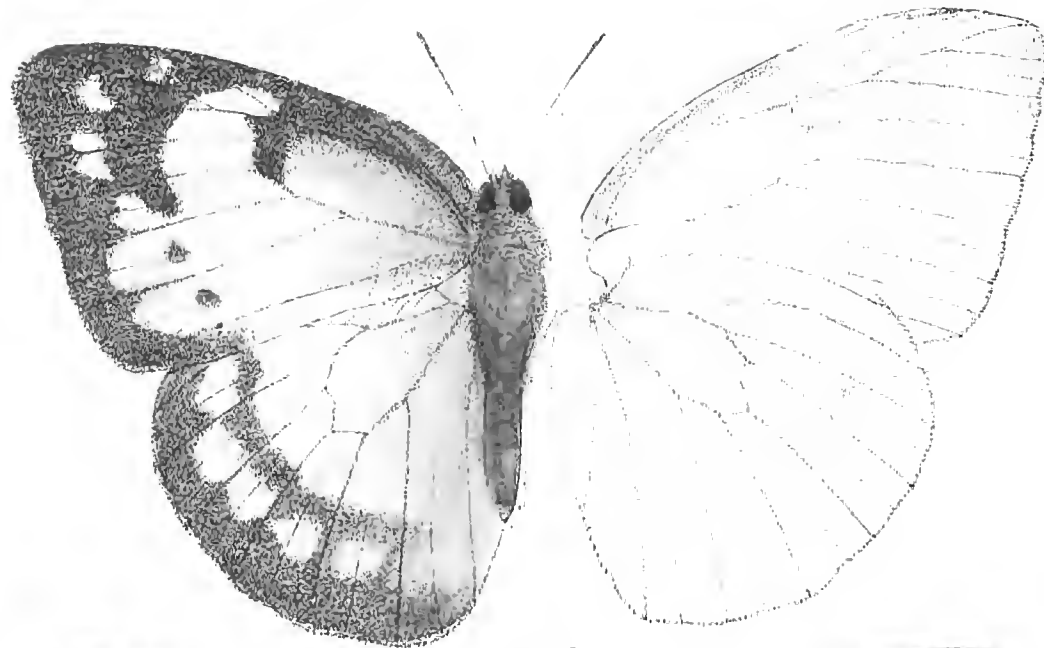
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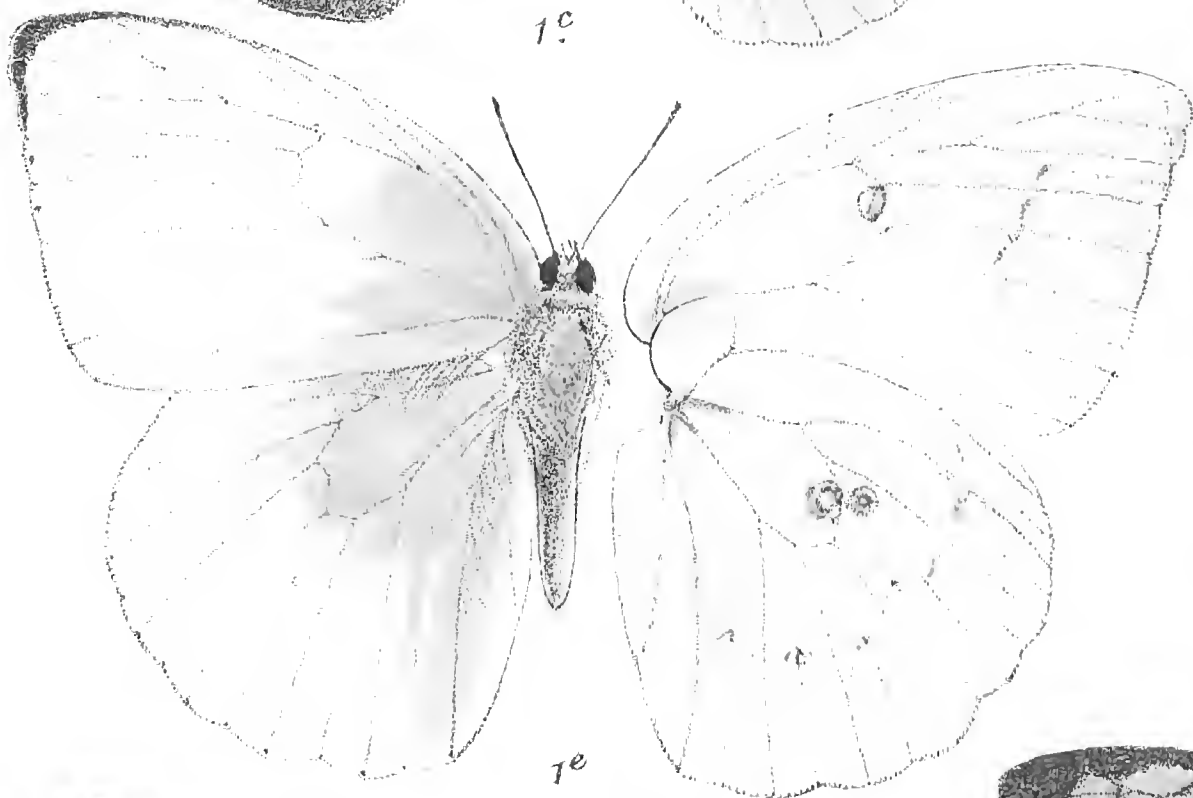
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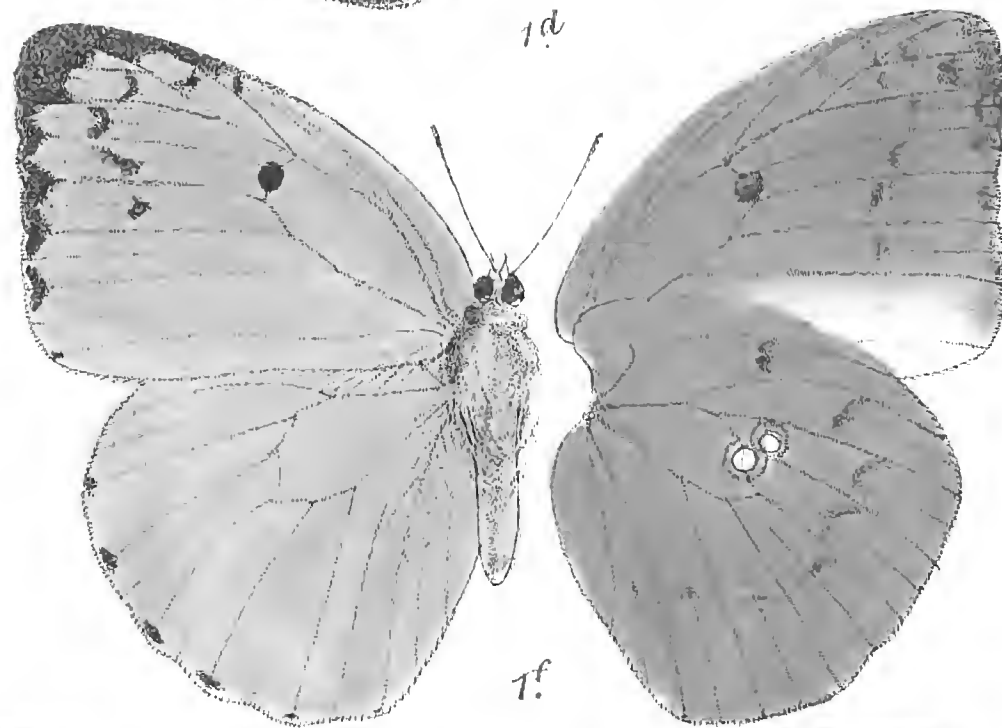
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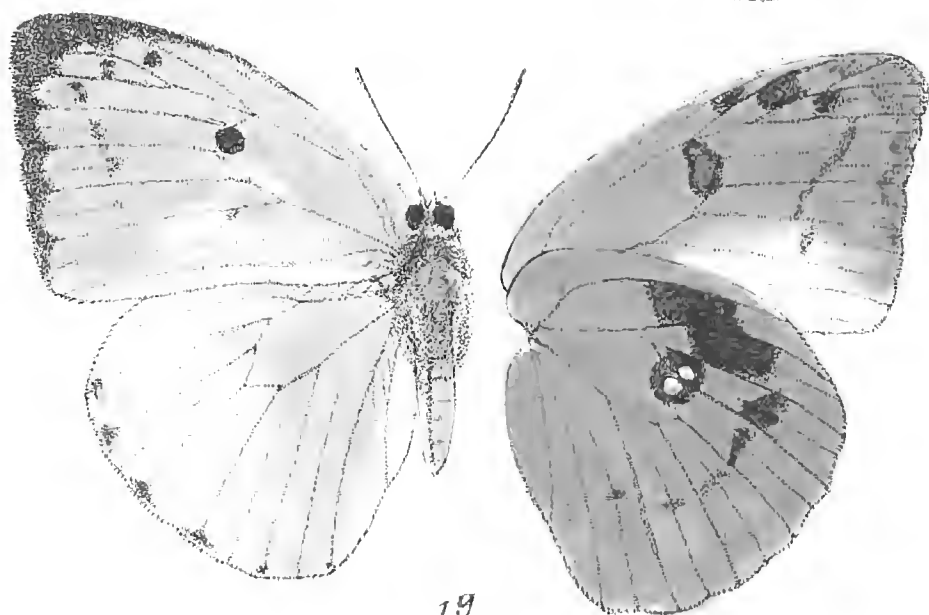
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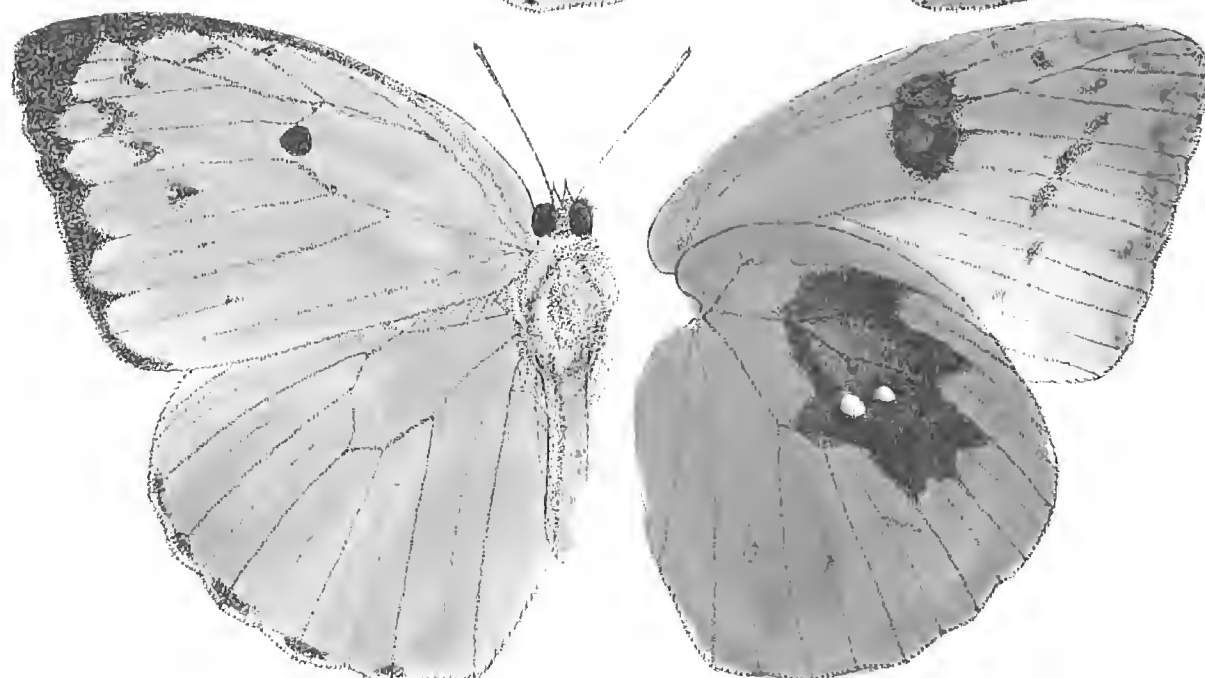
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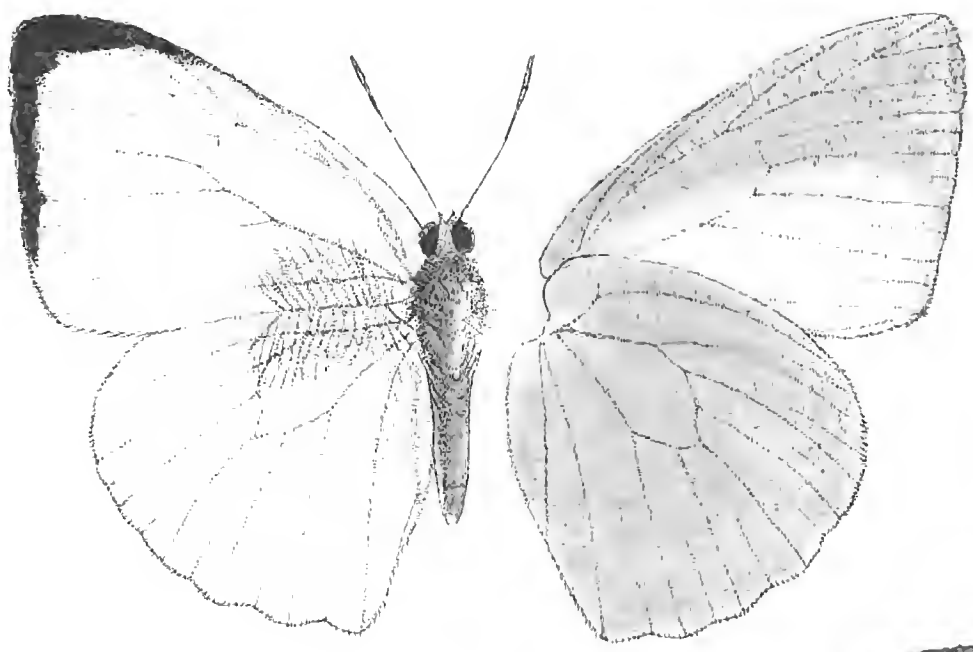


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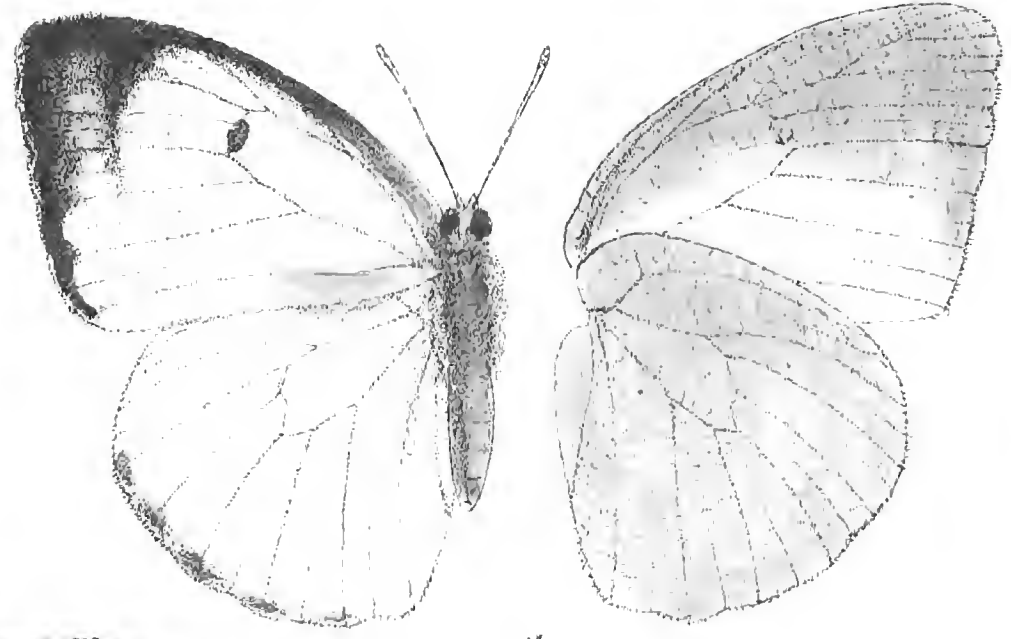


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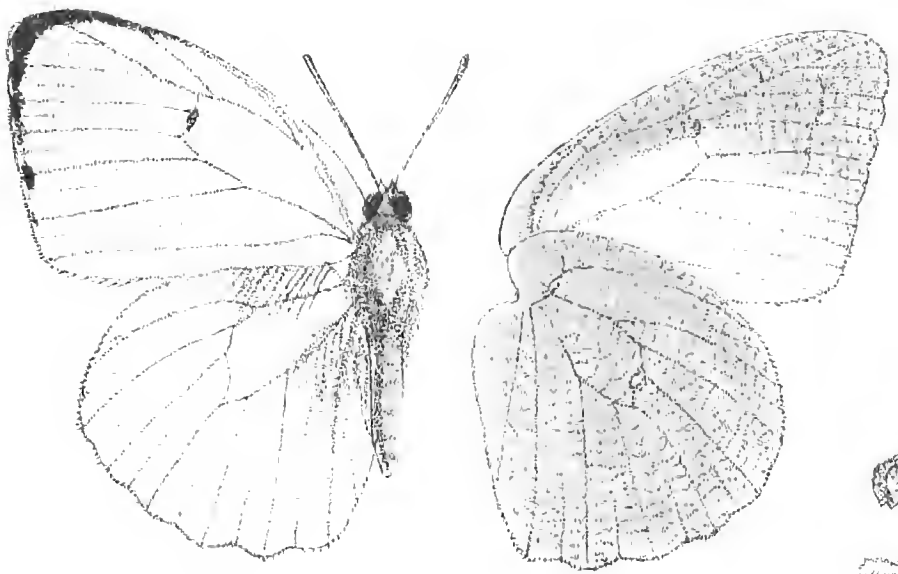




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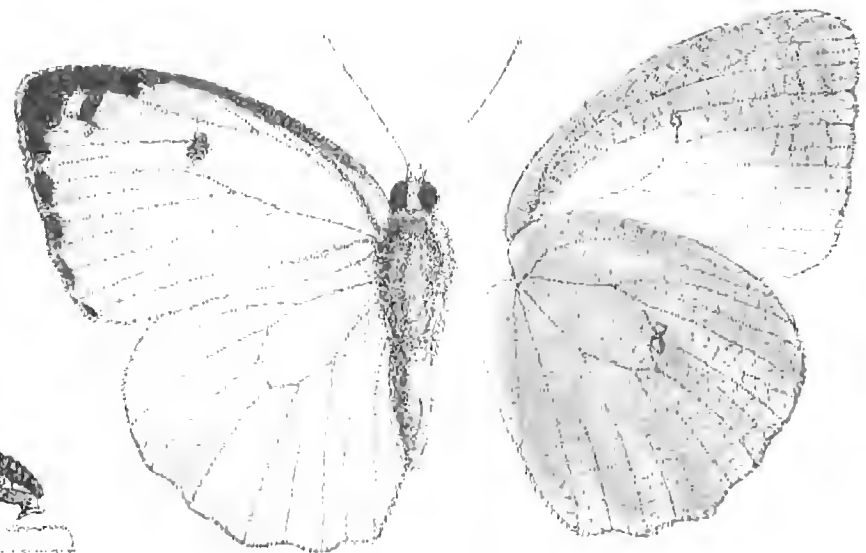


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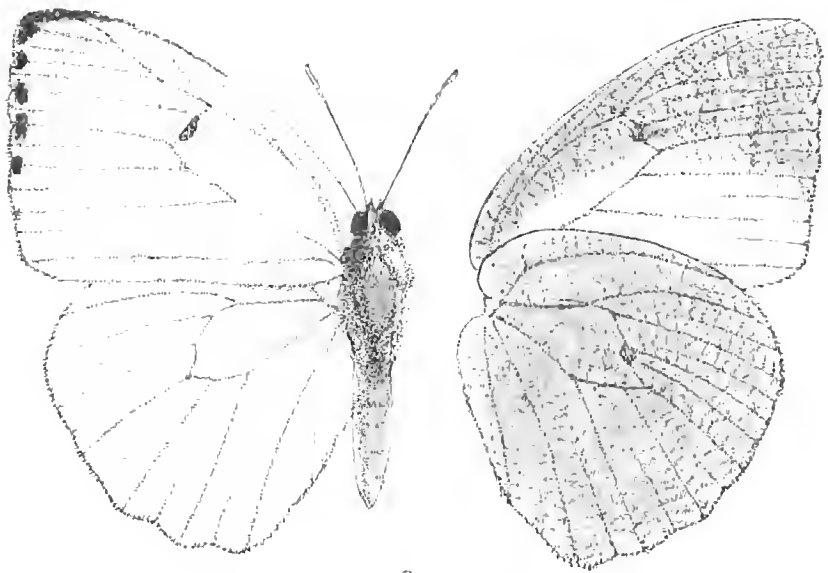
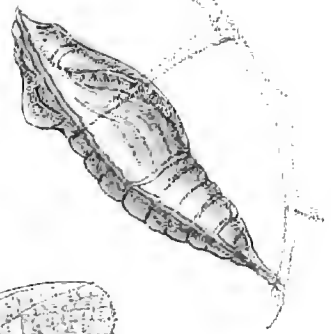


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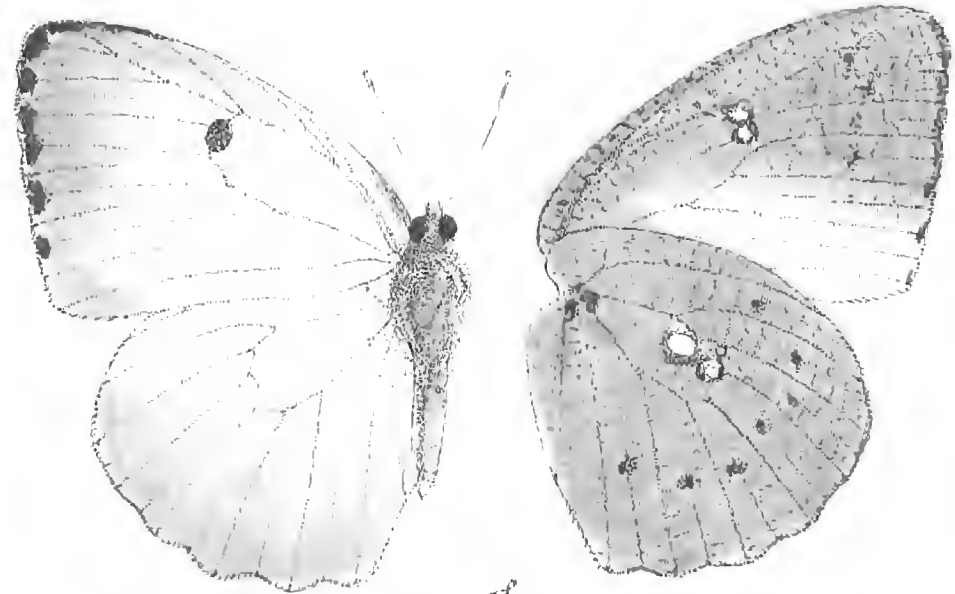
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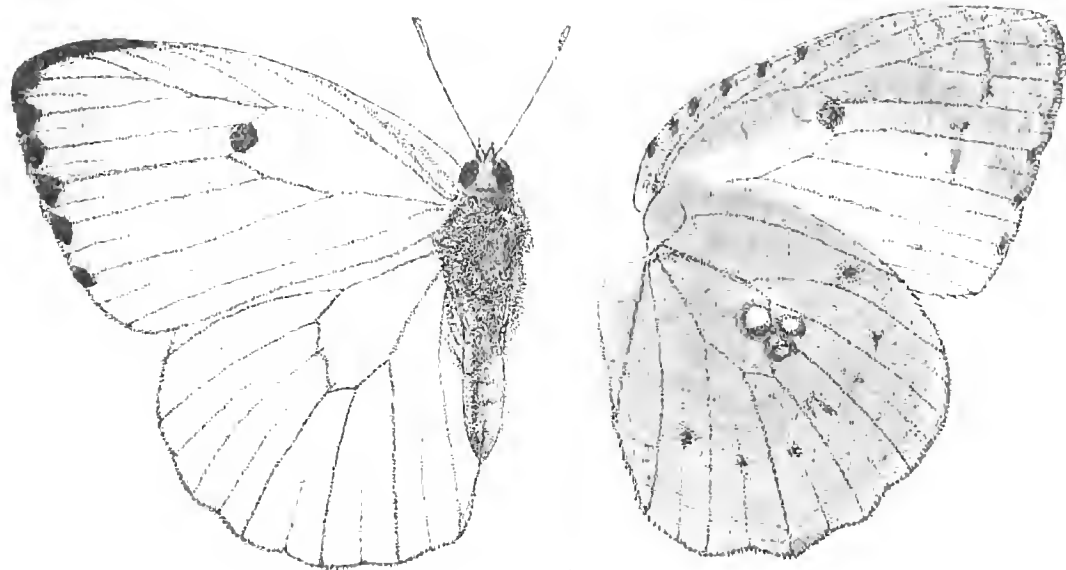
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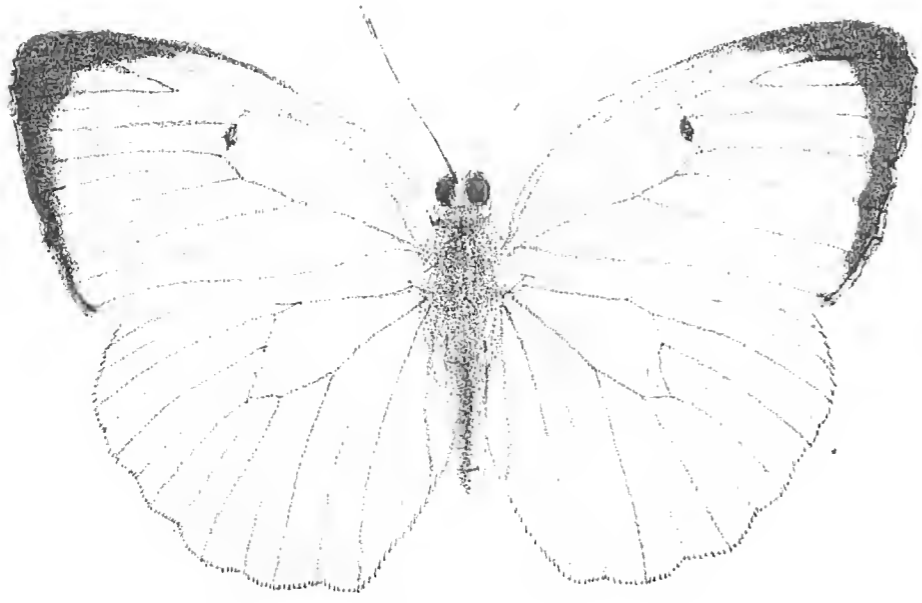


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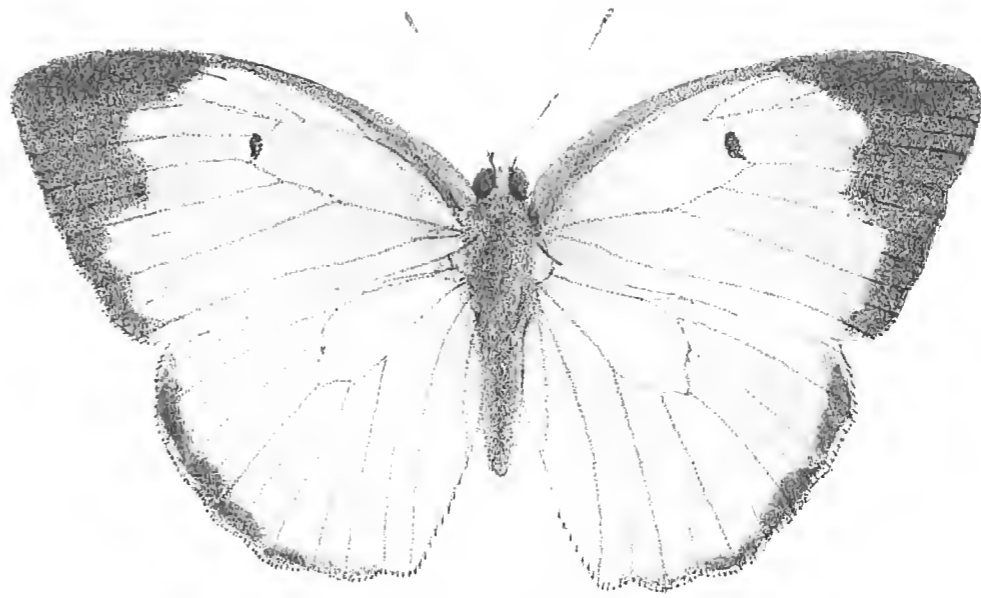


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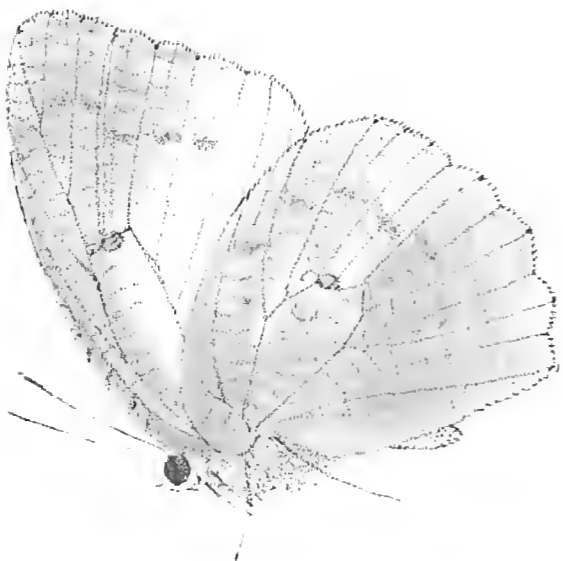




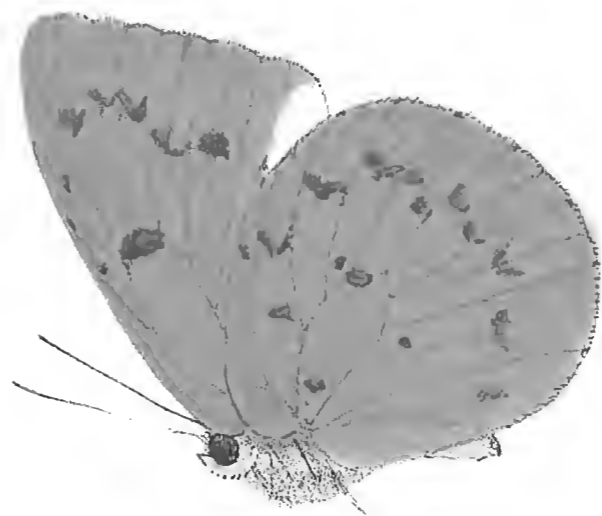
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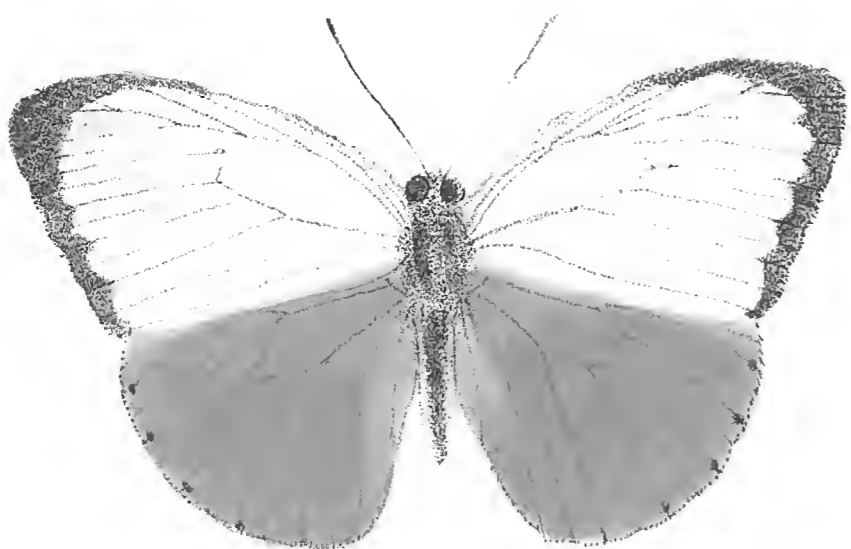
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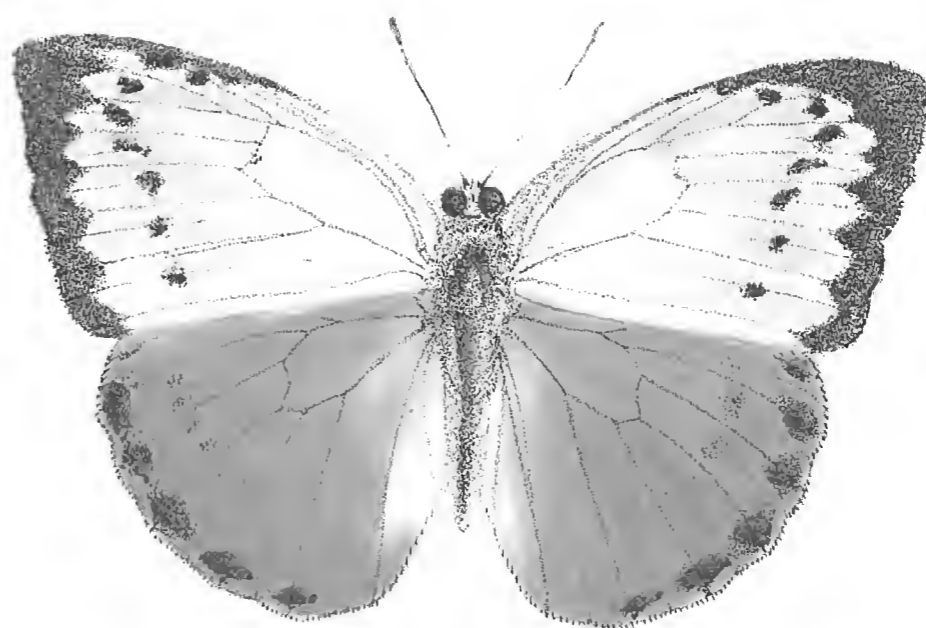
1<sup>b</sup>



2<sup>b</sup>



2



2<sup>a</sup>



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