

A DESCRIPTIVE LIST OF A COLLECTION OF EARLY STAGES OF JAPANESE LEPIDOPTERA.

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This collection was prepared by Mr. Y. Nawa, of Gifu, Japan, and exhibited at the Louisiana Purchase Exposition in St. Louis, Missouri. Afterwards it was brought to Washington by Mr. U. Nawa and presented to the U. S. Department of Agriculture. The specimens are now in the U. S. National Museum.

Fifty-four species are represented, the adults, with pupæ, larvæ, and eggs of many, at least the larvæ of all. Of many of the species I find no published account of the early stages, and these are therefore described in this paper. Most of the species are of economic importance, being injurious to cultivated plants.

Family PAPILIONIDÆ.

PAPILIO SARPEDON Linnæus.

AOSUJI-AGEHA-CHŌ.

Food plant: *Cinnamomum camphora*.

The larva agrees in general with the excellent figure by Scott,^a but is less diversified in color. It is entirely velvety green, with faint lighter spottings, the thorax being dark green, and not of a different yellowish shade. There is no violet shading subventrally nor on the terminal abdominal segments as in the Australian larva. The subventral and pedal lines are pale yellow. The subdorsal angles of the metathoracic segment are blunt and rounded, not long and pointed as in Scott's figure. They are yellow with a black ring at the base. The scent organ is protruded in the specimen, but has been broken.

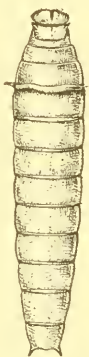


FIG. 1.—PAPILIO SARPEDON, LARVA.

^a Australian Lepidoptera, Australian Museum, Sydney, II, 1891, pl. xvii.

PAPILIO ALCINOUS Klug.

This species is not represented in the Nawa collection, but the U. S. National Museum has it from the collection exhibited at Chicago in 1893, which was presented by Professor Mitsukuri. I refer to it on account of the peculiar larva, which is the most generalized of the three now referred to, namely, *alcinous*, *demetrius*, and *authus*. It is allied to the American *philenor*, and retains in the last stage the peculiar black and white coloration, resembling bird excrement, so characteristic of most all young Papilios. The tubercles are produced into smooth papillæ, all of about equal length, about three times as long as wide at base.



FIG. 2.—PAPILIO ALCINOUS, LARVA.

PAPILIO DEMETRIUS Cramer.

KURO-AGEHA-CHŌ.

Food plant: *Citrus nobilis*.

The young larva resembles bird excrement. It is lilaceous brown, with a white saddle and lateral shades on thorax and abdominal segments 7 and 8. The tubercles show rather prominently at the extremities and are pilose. There are numerous small black markings, of which subdorsal spots on second and seventh abdominal segments are the largest. The shape is normal.

The mature larva is largely green. Head oval, rounded, brown. Meso- and meta-thorax enlarged, swollen, smooth. Bright green; subdorsal ocellar mark on metathorax oval, black, with reddish central dash, reddish ring and fine black line. The pair are joined across the dorsum by a series of eight spots in two rows, black rings on a slightly yellowish field. Subventral region of thorax purplish, the color reaching up into the posterior metathoracic incisure to form a band across; on anterior edge of first abdominal segment a black band. The purple color continues along subventral region of abdomen and rises on the fourth, sixth, and ninth segments in a white triangular blotch, from which a purple and white mottled band runs obliquely backward on segments 4 and 5, joining dorsally on 5 posteriorly; on segment 7 it rises more vertically and forms a subdorsal patch on the posterior edge of the segment. Anal segment whitish and purple. The larva is smooth without traces of tubercles.



FIG. 3.—PAPILIO DEMETRIUS, LARVA.

PAPILIO XUTHUS Linnæus.

AGEHA-NO-CHŌ.

Food plant: *Citrus nobilis*.

The adult has a marked resemblance to *P. machaon* Linnæus; but that this is of no systematic value and is probably mimetic, is shown by the larva, which is nearly allied to that of *demetrius*. The young larva is not preserved in the collection before me, so I can not say whether the primitive coloration persists to the penultimate stage or not, though it apparently does, since Graeser remarks^a on its resemblance to the excrement of birds.

The mature larva is smooth, dark green, the metathoracic ocellar mark much as in *demetrius*, joined by an irregular black line, which is imperfectly broken into ringlets. The subventral coloration is modified from the primitive mottled purple of *demetrius* to a darker shade of green, and the white exists as concrete triangular blotches on the bases of the feet. The four transverse bands of the subventral color in the posterior metathoracic incisure, on abdominal segments 4-5, 7, and 10, respectively, are olivaceous shaded and edged with fine black lines. The positions of the obsolete tubercles are shown by reddish spots.



FIG. 4.—PAPILIO XUTHUS, LARVA.

PAPILIO MACHAON Linnæus.

KI-AGEHA-CHŌ.

Food plant: *Daucus carota*.

This larva is well known in Europe, and Japanese specimens present the characteristic appearance. The larva of the American *P. polyxenes* is marked with the same pattern.

Family PIERIDÆ.

PIERIS RAPÆ Linnæus.

MON-SCIO-CHŌ.

Food plant: *Brassica chinensis*.

The well-known "cabbage worm" of Europe, now spread over the world. The larvæ are normal, as remarked by Pryer.^b

^aBerl. Ent. Zeit., p. 1888, p. 62.

^bLeech, Butt. China, Jap. and Corea, II, 1894, p. 458.

Family NYMPHALIDÆ.

VANESSA XANTHOMELAS Schiffermüller.

HIODOSHI-CHŌ.

Food plant: *Celtis sinensis*.The larva agrees with European specimens as figured by Hofmann.^a

PYRAMEIS CARDUI Linnæus.

HIME-AKATATEHA-CHŌ.

Food plant: *Arcticum lappa*.

The larva of this widespread species is generally known on thistle, but has several other food plants.

Family LYCAENIDÆ.

POLYOMMATUS BAETICUS Linnæus.

URANAMI-SHIJIMI-CHŌ.

Food plant: *Dolichos lablab*.The larva is of the dark form mentioned by Doctor Lang.^b

Family HESPERIIDÆ.

PARNARA GUTTATA Bremer and Grey.

ICHIMOJI-SESERI.

Food plant: *Oryza sativa*.

The larva forms a house of rice blades. The head is high, rounded triangular, vertical suture depressed, whitish, the suture and posterior rim of occiput narrowly black. Body small at joint 2, else robust, cylindrical; transparent whitish, thin skinned, minutely pilose. Cervical shield narrow, transverse, whitish, with a black linear posterior edge.

The pupa is inclosed in the larval house.

Family SPHINGIDÆ.

CEPHNODES HYLAS Linnæus.

O-SUKASHIBA.

Food plant: *Gardenia florida*.The larva is acceptably figured by Nagano.^c^a E. Hofmann, Die Baupen der Gross-Schmett. Europas, 1893, pl. vi, fig. 12.^b Butt. Eur., 1884, p. 99.^c Nawa, Icones Japonicorum Insectorum, 1, 1904, pl. 1, fig. 6.

GURLECA MASURIENSIS Butler, var. SANGAICA Butler.

HIME-HOJAKU.

Food plant: *Paecleria tomentosa*.

The larva is figured by Nagano.^a

THERETRA JAPONICA de l'Orza.

KO-SUZUME.

Food plant: *Vitis vinifera*.

The larva is figured by Nagano,^b but the figure does not bring out the subdorsal ring marks on the anterior abdominal segments prominently enough.

THERETRA OLDENLANDIÆ Fabricius.

SESUJI-SUZUME.

Food plant: *Colocasia antiquarum*.

The larva is figured by Nagano,^c but the specimens before me are more distinctly marked, with larger, brighter ring marks and more distinct yellow thoracic dots.

THERETRA NESSUS Drury.

SUZUME-GA.

Food plant: *Droscorea japonica*.

The larva is well figured by Nagano.^d

PERGESA ELPENOR Linnæus, var. LEWISI Butler.

BENI-SUZUME.

Food plant: *Oenothera biennis*, var. *lamarckiana*.

The larva before me is much darker than Nagano's figure,^e being entirely black and brown, all the green color obscured. It is the dark form which Nagano describes as the "first form."

This species is called by Rothschild and Jordan *Pergesa elpenor*, var. *lewisi* Butler, and they give Japan and China as localities. I can, however, hardly separate it from a specimen of *rivularis* Boisduval (= *fraterna* Butler) from Sikkim, and I think the species is a race of *rivularis* rather than *elpenor*, if these names really represent distinct species.

^aPlate III, fig. 5.

^bPlate I, fig. 3.

^cPlate I, fig. 2.

^dPlate IV, fig. 6.

^ePlate III, fig. 2.

HERSE CONVOLVULI Linnæus.

EBIGARA-SUZUME.

Food plant: *Ipomœa batatas*.

The larva is figured by Nagano,^a who gives the green form. The specimen before me is of the brown one.

ACHERONTIA STYX Westwood, var. CRATHIS Rothschild and Jordan.

MENGATA-SUZUME.

Food plant: *Sesamum indicum*.

The larva is figured by Nagano.^b This form is given a new name, *crathis*, by Rothschild and Jordan. It is the *medusa* of Butler, not of Moore.

PSILOGRAMMA MENEPHRON Cramer, var. INCRETA Walker.

SHIMOFURI-SUZUME.

Food plant: *Paulownia tomentosa*.

The larva is figured by Nagano,^c who gives the green form. One of the specimens before me is like this, the other is heavily spotted with purplish brown.

HYLOICUS CALIGINEUS Butler.

KURO-SUZUME.

Food plant: *Pinus densiflora*.

The larva is figured by Nagano.^d My specimen agrees with the figure, but is rather larger and better fed.

MARUMBA GASCHKEWITCHI Bremer and Grey, var. ECHEPHRON
Boisduval.

MOMO-SUZUME.

Food plant: *Prunus persica*, var. *vulgaris*.

The larva is figured by Nagano.^e

SPHINX PLANUS Walker

UCHI-SUZUME.

Food plant: *Salix* sp.

The larva is figured by Nagano.^f

^a Plate I, fig. 5.

^c Plate II, fig. 3.

^e Plate II, fig. 2.

^b Plate I, fig. 4.

^d Plate II, fig. 4.

^f Plate I, fig. 1.

Family SATURNIIDÆ.

ACTIAS SELENE Hübner, var. ARTEMIS Bremer.

O-AO-GA.

Food plant: *Alnus maritima*.

The larva is green, with tubercles rather large, yellow with black basal rings, the subdorsal ones of joints 3 and 4 and single dorsal one of joint 12 larger than the others. Tubercle hairs black; white secondary hairs scattered over the body. A yellow substigmatal line. Spiracles red with yellow center. Head and joint 2 green, anal plates and tips of anal abdominal feet red brown, edged with yellow.

This form is close to the Asiatic *selene*, but the larva has a distinct lateral line which is not mentioned by Moore for *selene* nor shown in his figure.^a

CALIGULA JAPONICA Moore.

KURI-KEMUSHI.

Food plant: *Castanea vulgaris*, var. *japonica*.

Doctor Packard has described the larva at length, giving all the stages.^b

Family ARCTIIDÆ.

CAMPTOLOMA INTERIORATA Walker.

SARASA-MON-GA.

Food plant: *Quercus serrata*.

Hampson classes this genus among the Arctiidae in his Moths of India (1894) and is followed by Leech;^c but I think it might be better placed in the Noctuidæ. Hampson has in fact omitted the genus from the Arctiidae in the Cat. Lep. Phalænæ (1901). Vein 8 of the hind wings is united to vein 7 for a short distance at base, which is characteristic of the Arctiidae, but the larva is a Noctuid. It does not appear to be a degenerate form, the arrangement of the single hairs appearing primitive. Apparently we have here the origin of the Arctiidae from the Noctuidæ. The eggs are laid in a mass on the back of the leaf, entirely covered by the dark-red scales from the abdomen of the female moth. The specimens before me are shrunken, but appear to have been spheroidal, about one-half as high as wide, evenly rounded, circular from vertical aspect, smooth without prominent sculpture, whitish; diameter about 0.6 mm.



FIG. 5.—CAMPTOLOMA INTERIORATA, LARVA.

^a Lep. Ceylon, II, 1883, p. 124, pl. cxxvi, fig. 1a.

^b Proc. Am. Acad. Arts and Sci., XXXIX, 1904, p. 564.

^c Trans. Ent. Soc. Lond., 1899, p. 164.

Four fully grown larvæ are preserved. The head is elliptical, higher than wide, scarcely bilobed, smooth, black with a few faint whitish reticulated lines, of which one straight across the front above clypeus is most distinct. Body cylindrical, smooth, slightly tapered at the end. Cervical shield large, dull black, quadrate, bisected; thoracic feet, abdominal foot shields and anal plate likewise black. Body dark brown with numerous pale yellowish lines. These are dorsal, addorsal (tubercle i), upper subdorsal, lower subdorsal (tubercle ii), upper lateral, lateral (tubercle iii), stigmatal (tubercle iv), upper subventral (tubercle v), lower subventral (tubercle vi), the lines more or less flexuous, slightly anastomosed, the subventral ones more irregular and confused. Tubercles single, small, dark, with long coarse white setæ; on the abdomen i dorsad to ii, iii suprastigmatal, iv stigmatal posterior, v subventral, vi lower subventral, normal; a hair on the leg shield. On the thorax ia to iib separate, nearly equally spaced, iib rather smaller; cervical shield covering all the six hairs.

The cocoon is a tough, silken sack, cylindrical, sharply compressed at the front end, with an open slip for emergence, covered by loose silk.

The pupa is thick and robust, brown, entirely without cremaster, the abdomen bluntly rounded with a ring of elongate punctures.

These structures indicate an affinity with the Nycteolidæ.

DIACRISIA SUBCARNEA Walker.

HARAAKA-SHIRO-GA.

Food plant: *Morus alba*.

The larva is a large hairy Arctian of the shape of the North American *Estigmene acerata* Drury, lightly colored as in pale specimens of *Diacrisia virginica* Fabricius. The head, thoracic feet and abdominal leg plates are black. Body immaculate, except for broken mottled dark subdorsal and substigmatal stripes.

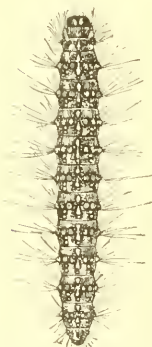


FIG. 6.—DIACRISIA IMPARILIS, LARVA.

DIACRISIA IMPARILIS Butler.

KUWA-KEMUSIII.

Food plant: *Morus alba*.

The eggs are laid in a patch covered by the brownish wool from the abdomen of the female moth.

The larvæ resemble those of *Arsilonche alborenosa* in color, being black with yellow spots and red warts. The hairs are black and white, rather thin and do not obscure the body coloration. Head rounded, bilobed, flat before, shining black, paraclypeus reddish, epistoma and bases of antennæ white. Body cylindrical, normal, with large, elevated, bright-red warts. Wart i small, ii, iii, and v large, iv absent, vi large, black, base of leg broadly hairy. On

the thorax, two warts above the stigmatal wart, normal. Cervical shield densely hairy. Black; a dorsal yellow line, broken into two spots on each segment; fine yellow dottings to a narrow broken subdorsal line; sides more heavily dotted to a waved broken substigmatal line. Feet reddish with black shields.

The cocoon is composed of hair and thin silk. The pupa has the usual Arctian shape.

Family NOCTUIDÆ.

APATELA MAJOR Bremer.

KUWA-NO-SHIRO-KEMUSHI.

Food plant: *Morus alba*.

The larva before me has unfortunately been nearly deprived of hairs, yet a few points may be noted. Head shining black, quadrate bilobed, epistoma and bases of antennæ pale. Body cylindrical, uniform, densely covered with secondary hairs, the warts all obscure and reduced. Pale yellowish, a broad black dorsal band, widened diamond-shape on the segments, forming distinct diamonds on joints 5, 7, 8-9, and 12. Spiracles black, with dark dots, forming a stigmatal line, below which is a diffuse whitish band. Hairs whitish yellow and black, the black apparently tufted subdorsally on the black diamonds, but no pencils. Yellow tufted hairs dorsally on joints 6, 10, and 11; lateral hairs longer, pale. A good specimen would be of interest.

MAMESTRA BRASSICÆ Linnæus.

ENDO-NO-KIRIMUSHI.

Food plant: *Pisum sativum*.

An egg mass, two green young larvæ, two black mature larvæ, and a pupa are preserved. The species is well known and common in Europe.

LEUCANIA UNIPUNCTA Haworth.

AWA-NO-YOTOMUSHI.

Food plant: *Setaria italica*, var. *germanica*.

The well-known "army worm."

HELIOTHIS ARMIGERA Hübner.

TABAKO-NO-AOMUSHI.

Food plant: *Nicotiana tabacum*.

The well-known "boll worm" of the United States.

PLUSIA FESTUCÆ Linnæus.

INE-NO-O-AOMUSHI.

Food plant: *Oryza sativa*.

The larvæ are paler than European specimens, being entirely green, with a white substigmatal stripe, without the black shadings shown in Hofmann's figure.^a

PLUSIA CHRYSITINA Martyn.

TSUMAKIN-GA.

Food plant: *Daucus carota*.

Hampson briefly describes the larva.^b The description applies to the young larva before me, but in the mature ones the markings are modified.

The head is green with a heavy black band on the posterior side from mouth nearly to vertex. Body robust, more slender before, abdominal feet on joints 9, 10, and 13. Green, a geminate, waved, linear dorsal line; traces of a subdorsal line and a narrow broken suprastigmatal one. Tubercle iii black, the rest white. A small black anal plate; cervical shield green. Setae coarse, white, normal. Skin all finely pilose from the produced skin spines.



FIG. 7.—PLUSIA CHRYSITINA, LARVA.

Cocoon a thin white web. Pupa black with brown incisures, a rounded prominence at the end of the wing cases; cremaster hooked.

NARANGA DIFFUSA Walker.

INE-NO-O-AOMUSHI.

Food plant: *Oryza sativa*.

The eggs are shown laid in straight rows of four or five on a rice blade, the larvæ are mounted on young rice plants about four inches high, and the pupa is folded up in a blade.

The larvæ are slender, green, without marks, the tubercles small and concolorous, normal. The feet of joints 7 and 8 are small, the rest well developed.

Hampson's figure of the adult is misleading, as it appears to represent a dark moth with pale bands,^c whereas the species is really pale with dark bands.

^aGros Schmett. Eur., pl. xxxv, fig. 10.

^bMoths of India, II, 1891, p. 573.

^cIdem, II, 1894, p. 333.

Family NYCTEOLIDÆ.

EARIAS CHROMATARIA Walker.

WATA-NO-RINMUSHI.

Food plant: *Gossypium herbaceum*.

If at all abundant, this must be a serious pest for cotton. The young larva is mounted between bracts, the mature one within a boll, the contents of which it has destroyed; another is placed upon a flower.

Head rounded, bilobed, small, withdrawn into joint 2, black, purple on the lobes, reddish on the sides, sutures of clypeus very broadly whitish, clypeus black in the center. Body robust, thick, uniform, with two rows of ciliated papillæ corresponding to tubercles ii

and iv; other tubercles small with long single setæ. Purplish brown, a white subgeminate dorsal band, widened on joints 7-8 and 9-11. Tubercles of joints 2 to 4 broadly ringed with orange; orange spots subdorsally and substigmatally on the abdominal segments. Spiracles black; feet normal; subdorsal papillæ of joints 3, 4, 6, 9, 12 black, the rest white.

Cocoon of white silk with vertical slit for emergence as usual in the family. Pupa without cremaster.



FIG. 8.—EARIAS CHROMATARIA, LARVA.



FIG. 9.—PHALERA FLAVESCENS, LARVA.

Family NOTODONTIDÆ.

PHALERA FLAVESCENS Bremer and Grey.

SAKURA-KEMUSHI.

Food plants: *Pyrus malus*.

Eggs laid in a patch. Shape of two-thirds of a sphere, white and smooth, slightly shagreened; a circular clearer vertical area; diameter, 0.7 mm.

The larva has the structure of the North American genus *Datana*. The young larva (stage iv) is dark-wine red, head, shields, thoracic feet and spiracles black. Traces of longitudinal pale lines on the sides, a subdorsal and a lateral visible. Tubercles black; i, rather large; ii, small; iii, iv, and v, small; iv, behind the spiracle, normal. Hair short, white, nearly lost in the numerous short secondary ones, which are thick subventrally, and obscure tubercle vi. In the last stage the larva is entirely black with scarcely a trace of lines (the subdorsal showing faintly intersegmentally). Hair secondary, the primary tubercles indistinguishable, short, white, tufted subdorsally on the segments. A few long ones, especially anteriorly and subventrally. Head elliptical, higher than wide, slightly bilobed, black, shagreened, with many white hairs.

The pupa is mahogany brown, as in *Datana*, the cremaster with short spines, in two groups.

Family LIPARIDÆ.

PORTHETRIA DISPAR Linnæus, var. JAPONICA Motschulsky.

HANNOKI-KEMUSHI.

Food plant: *Alnus maritima*.

This has been called the same as the European *dispar* Linnæus,^a but the moths are twice the size and the female more dusky colored. I should call it a good geographical race at least. Swinhoe lists it as a distinct species.^b The egg mass, larva, and pupa are preserved, all as in *dispar*, but proportionately larger.

EUPROCTIS CONSPERSA Butler.

CHA-KEMUSHI.



FIG. 10.—EUPROCTIS CONSPERSA, LARVA.

Food plant: *Thea chinensis*.

The larvae are apparently gregarious. Head rounded, pale reddish, immaculate. Body cylindrical, robust, tapering a little on the thorax. Tubercles small, flattened, with weak, but numerous, hairs, longer subventrally. On joints 5 to 12 a circular subdorsal area involving warts i and ii is slightly raised and tufted with hairs. The areas become confluent on joints 5 and 6, but are smaller and separate posteriorly. Dorsal eversible glands of joints 10 and 11 weak, and not contrastingly colored. Dorsum reddish; a broad black subdorsal band separated by a narrow yellowish line from a black lateral one about half the width of the subdorsal. Sides and subventer pale. Subdorsal areas black, weakly tufted with short hairs, which do not form tussocks. Subdorsal wart of joint 2 subpapillose.

PORTHESIA SIMILIS Fuessly, var. XANTHOCAMPA, new variety.

KIN-KEMUSHI.

Food plant: *Morus alba*.

The larva differs strikingly in coloration from its European representative, though it has the same structure and pattern. The subdorsal tubercles of joint 2, subventral ones (tubercle v), and a patch on joint 13 are bright red, but the other markings are yellow. Instead of the double narrow red dorsal line of the European larva there is a broad yellow band covering the whole dorsum to tubercle ii, single, or divided by a reddish dorsal line. The semicircle about the tuft on



FIG. 11.—PORTHESIA XANTHOCAMPA, LARVA.

^aLeech, Trans. Ent. Soc. Lond., 1899, p. 130.

^bTrans. Ent. Soc. Lond., 1903, p. 483.

joint 5 is yellow; sides overspread with yellow; a narrow suprastigmatal and broad substigmatal band partly confluent. Hairs as in the western form.

Type.—Cat. No. 8395, U.S.N.M.

Family LASIOCAMPIDÆ.

MALACOSOMA NEUSTRIA Linnæus, var. **TESTACEA** Motschulsky.

UME-KEMUSHI.

Food plant: *Prunus mume*.

The larvæ differs distinctly from the European one, so that I think a racial name is justified, although Leech sinks *testacea* as a synonym.^a The dorsal stripe is blue (not white), of the color of the lateral shadings, while the lower of the orange subdorsal lines is entirely absent. It much resembles the North American *M. fragilis* Stretch, but the addorsal orange line is straight and concrete, not diffused and mottled.

DENDROLIMUS PINI Linnæus.

MATSU-KEMUSHI.

Food plant: *Pinus densiflora*.

The larvæ before me are in several stages, but none fully grown. They differ from my European specimens in lacking the pale dorsal mottlings which form blotches on the abdomen. These larvæ are uniformly darkly colored.

Family BOMBYCIDÆ.

BOMBYX MANDARINUS Moore.

KUWAGO.

Food plant: *Morus alba*.

Leech states that this is probably the wild form of the cultivated silkworm, *Bombyx mori* Linnæus.^b Both adults and larvæ are much darker in color than the cultivated form.

Family GEOMETRIDÆ.

CISTIDIA COUAGGARIA Guenée.

UME-SHAKUTORI-MUSHI.

Food plant: *Prunus mume*.

The larva has a black head, with a transverse yellow line across the clypeus and a narrow, short, vertical one on the apex of each lobe.



FIG. 12.—MALACOSOMA TESTACEA, LARVA.

^aTrans. Ent. Soc. Lond., 1899, p. 111.

^bIdem., 1898, p. 271.

Body stout, normal; a small pair of functionless feet on joint 8 and a still smaller one on joint 7. Color black and orange. Ground color black; dorsal, subdorsal, lateral, and substigmatal yellow lines, broken into dots, the lateral one nearly all lost, joined by yellow bands on the posterior edges of the segments. A few yellow dots subventrally and on the leg bases. Yellow color extensive in the thoracic incisures. Skin smooth, but numerous annulate tubercles and setæ minute.

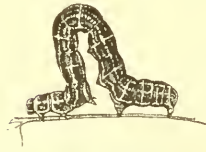


FIG. 13.—*CISTIDIA COUAGGARIA*, LARVA.

The pupa is shown in an open hammock of threads. It is pale, striped and banded with black.

This species was described as *Balthia eurymede* by Motschulsky, placed in the genus *Vithora* by Leech^a and in *Cistidia* by Swinhoe^b Guenée's specific name *couaggaria* is the oldest.

PHTHONANDRIA ATRILINEATA Butler.

EDA-SHAKUTORI-MUSHI.

Food plant: *Morus alba*.

The eggs are distributed on the back of a leaf.

The larva resembles a twig in shape, as the Japanese name implies. Head rounded, slightly bilobed, brown. Thoracic feet large, black lined. Body robust, joint 9 collared dorsally; tubercles ii of joints 5 and 9 elevated, white. Mottled red-brown, blackish, and white without defined pattern. An irregular pale dorsal and subdorsal line and white blotches on joints 5, 8, and 9. A divided black bar before the collar on joint 9 with three white dots below tubercle ii. Pupa in a thin cocoon.

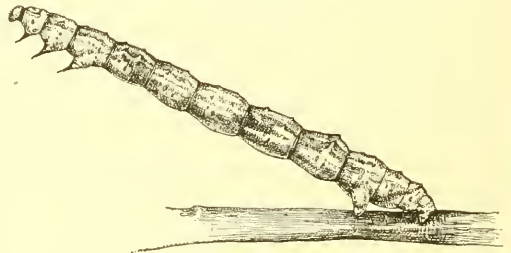


FIG. 14.—*PHTHONANDRIA ATRILINEATA*, LARVA.

PHTHONOSEMA TENDINOSARIA Bremer.

CHA-NO-SHIMOFURI-SHAKUTORI-MUSHI.

Food plant: *Thea chinensis*.

The larva has the head flat before, bilobed, brown with numerous angular black dots. Body robust, uniform, wood brown, annulate, covered with numerous minute black or brown rings, most of which contain white central dots. At the posterior end of joints 5 and 6 are white raised elliptical spots like Tachinid eggs. These are repeated

^aAnn. Mag. Nat. Hist. (6), XIX, 1897, p. 459.

^bCat. Lep. Oxf., II, 1900, p. 307.

on joints 6 to 10, but less extensively, being dorsal only and smaller. Tubercles i of joint 12 approximate, elevated, pointed. A black shade about the spiracle on joint 5. Feet normal, concolorous, black lined.

I have been unable to consult the original figure^a and there exists no subsequent description; consequently the identification is in some doubt. Mr. Nawa's name, *Ophthalmodes cretacea* Butler, is obviously

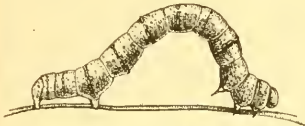


FIG. 15.—PITHONOSEMA TENDINOSARIA, LARVA.



FIG. 16.—PITHONOSEMA TENDINOSARIA, ADULT.

incorrect, since this is synonymous with the European *Ascotis selennaria* Schiffmüller.^b

ACANTHOCAMPA, new genus.

Male antennæ lengthily bipectinate, the pectinations decumbent; of female simple. Palpi not exceeding the frontal hairs, porrect, hairy below. Front with a large, three sided prominence above, pointed and slightly ridged on the angles, largely covered by the vestiture. A tuft of scales on vertex of head; thorax densely hairy; abdomen smooth, short, robust. Legs with long hair posteriorly; hind tibiæ with four spurs, not swollen. In the fore-wing vein 2 before angle of cell, 3-4 stalked, 5 above the middle of the very broad cell, 6 below apex, 7 out of 8, 8 out of 9 near apex, 10 absent, probably coincident with 11; wing long and narrow, costa slightly concave, outer margin convex, very oblique, a little crenulate. Hind

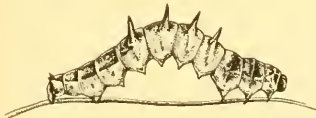


FIG. 17.—ACANTHOCAMPA EXCAVATA, LARVA.



FIG. 18.—ACANTHOCAMPA EXCAVATA, ADULT.

wings with vein 2 before the angle of the cell, 3-4 stalked, 5 absent but with a slight projection on the margin, 6-7 long stalked, 8 very strong, running close to 7, ending in the costa soon after end of cell; wing narrow, costa concave in both sexes, outer margin long, convex, crenulate, the most distinct projection at end of vein 6.

^aBremer, Lep. Ost.-Sib., 1864, p. 73, pl. VII, fig. 17.

^bSwinhoe, Cat. Lep. Oxf., II, 1900, p. 289.

ACANTHOCAMPA EXCAVATA, new species.

TOGE-SHAKUTORI-MUSHI.

Food plant: *Morus alba*.

Head white with vertical tuft brown, thorax gray brown. Wings grayish white overspread with fuscous on the margins and on base of inner margin of fore wings to outer line, with scattered brown irroration. Lines broad, black and brown, both bent in on median vein. A subterminal shade joins the fuscous margin to costa before apex. Hind wing with a broad central band. The fuscous shading is somewhat more extensive and continuous in the male; otherwise the sexes are alike in coloration. Expanse: male, 45 mm., female 55 mm.

This is probably *Zamacra albafasciaria* Leech,^a but I have been unable to consult the original description. The new genus seems justified in any case, as this species differs from *Zamacra* in having four spurs on the hind tibiae, equally developed. I prefer, therefore, to found it on a definite species, even if it prove to be a synonym.

The peculiar larva has long prominences like thorns, as indicated in the Japanese name. In the position of repelling attack, in which one larva is mounted, the head is curved beneath the body and the dorsal thorns project prominently. Body robust, feet normal. Head rather small, dark brown. A small dorsal elevation, carrying tubercles i on joint 5; on joints 6, 7, and 8 a high thorn-shaped papilla. Two slender papillae (tubercle ii) on joint 12. A series of small-pointed subventral papillae on joints 5 to 9. Green, a broad brown dorsal area on joints 2-4 and 9-13, broken, except for slight mottlings, on joints 5 to 8 in the region of the dorsal thorns, edged with white, which becomes white streaks on the bases of the thorns. Traces of a subdorsal pale line; spiracles white, black ringed; thorns dark tipped.

Pupa in an earthen cell.

Type.—Cat. No. 8396, U.S.N.M.

Family COCHLIDIIDÆ.

CNIDOCAMPA^b FLAVESCENS Walker.

IRA-MUSHI.

Food plant: *Diospyros kaki*.

The larva has the general structure of *Miresa*, long subdorsal horns at the extremities, covered with stinging spines and a bright color-

^a Ann. Mag. Nat. Hist., (6) XIX, 1897, p. 322.

^b A new name for *Monema* Walker (1855), not Greville (1829). Staudinger pointed out that this name was preoccupied (Rom. Mem., VI, 1892, p. 301), but did not propose a substitute, as he thought the species referable to *Miresa*. It is, no doubt, derived from *Miresa*, but the pectinations of the male antennae have entirely disappeared and I regard it as a distinct generic type.

tion. The larva is allied also to *Natada*, as I do not detect either caltrops spines or the detachable terminal ones of *Euclea*, but it is not a degenerate form like the North American *Natada nasoni*, since the spines are well developed and the coloration of a warning character rather than adapted for concealment.

Horns of subdorsal row short on joints 3, 12, and 13, longer on 4, very long on 5 and 11, minute on 6 and 10, small on 7 to 9, all spined. Side horns short on joint 3, rather long on 4, absent on 5, with the spiracle moved up, moderate on 6 to 12. Skin subgranular shagreened. The color is partially destroyed in the inflated specimens. Graeser briefly describes it from larvæ which he saw at Chabarofka and Blagoweschtschensk, in Amurland, as "dark green, with a shield-shaped marking covering most of the back of dark red-brown." Interpreting my larvæ by this, they are as follows: Purplish brown dorsally, including a diffuse white dorsal band with dark edges, distinct only centrally. Sides green, just covering the lateral horns of joint 4, reaching up to the subdorsal horns on joints 7 to 9, retreating to the lateral horn on joint 11, but covering joints 12 and 13, and in an angular patch about



FIG. 19.—CNIDOCAMPA FLAVESCENS, LARVA.



FIG. 20.—CNIDOCAMPA FLAVESCENS, COCOONS.

the subdorsal horns of joint 11; green spots below the subdorsal horns of joints 4 and 5. A white broken lateral band with dark edges; subventral edge pale, with a dark line above. The depressed spaces are but little developed and not distinguishable in the specimens.

The cocoon is spun on the twigs of the food plant. It is elliptical, usually white, with strangely shaped broad brown streaks, looking, as Pryer says, like a bird's egg. Some of the cocoons are evenly mixed white and brown. They are firmly attached to the twig, and will often break before they can be detached. Like other Cochlidiæ, it has a variety of food plants, any smooth-leaved tree being acceptable. Under these conditions it is a species most easily imported. I have had specimens from San Francisco, California, brought on young trees from Japan. There is also reported the importation of what was evidently this species to Hamburg, Germany,^a but the species has never become acclimated anywhere that I know of.

^a Kraepelin, Mitth. a. d. Naturhist. Mus. Hamburg, XVIII, 1901, p. 196.

Family PSYCHIDÆ.

CLANIA MINUSCULA Butler.

MINO-MUSHI.

Food plant: *Thea chinensis*.

The bags are shown in various stages, a fully grown larva and the male pupa. The bags and larvæ are so similar to the North American *Thryridopteryx ephemereformis* that a separate description is unnecessary.

Family ZYGAENIDÆ.

ILLIBERIS PRUNI, new species.

HOSHI-HAMAKI-KEMUSHI.

This species was named by Doctor Holland "*Procris nigra* Leech," and Mr. Nawa had the same identification. It is certainly incorrect, as Leech says of *Procris nigra* "female antennæ simple," whereas in the specimens before me they are pectinated in both sexes.



FIG. 21.—ILLIBERIS PRUNI, LARVA.

The specimens agree with Leech's figure of *Northia dirce*, except that there is no black apex to fore wing; they disagree with Butler's figure of *Northia tenuis* in having the abdomen blackish without green tint. I have sixteen specimens without trace of green. They agree partly with *Illiberis consimilis* Leech which is said to be closely allied to *tenuis*, but the costal area

of hind wings not blackish. It is, however, blackish in my specimens. Besides these, Leech mentions from Japan *sinensis* Walker, *nigra* Leech and *psychina* Oberth., but I can not reconcile the descriptions with my specimens. Of course this form has been received from Japan before, but it must have been referred wrongly, if the descriptions are to be relied upon.

Wings hyaline, veins and margin narrowly black, costal and internal areas of fore wings and costal area of hind wings black shaded. Antennæ greenish; thorax and abdomen brown black.

Food plant: *Pyrus communis*.

The larva has the structure of the European species of *Adscita*, the warts low and flattened, with short hairs only. Dorsum pale (green?), subventral region reddish, warts concolorous. A black dorsal band, widened on the segments and a subdorsal round spot on each segment below the subdorsal wart. Head marked with black; cervical shield black dusted.

The cocoon is of white silk and spun among leaves.

Type.—Cat. No. 8397, U.S.N.M.

BINTHA CHINENSIS Felder.

TAKE-KEMUSHI.

Leech^a puts this species in *Arceocera*, but incorrectly, as that genus has the male antennæ simple while they are pectinated in the present species. The specimens are labeled "*Proceris funeralis*" and perhaps really are that species, i. e. *Adscita funeralis* Butler; but Butler's description, though very short, disagrees with the specimens before me. The abdomen is said to be black, the claspers and proboscis horn yellow, while in the form before me the body is leaden bluish as described by Felder, the tongue seems concolorous, and the claspers are entirely concealed. I place the species in *Bintha*, although the palpi are rather short, not exceeding the front, and there are no spots on the wings.

Food plant: *Arundinaria japonica*.

The larva resembles the preceding, but is more elongate and has long hair from the terminal and lateral warts. Pale dorsally, brown subventrally, the warts black, those of joints 3, 4, 12, and 13 enlarged and distinctly black.



FIG. 22.—BINTHA CHINENSIS, LARVA.

Family PYRALIDÆ.

MARGARONIA PYLOALIS Walker.

KUWA-ILAMAKI-MUSHI.

Food plant: *Morus alba*.

Nearly allied to the North American *M. sibirialis* Walker, and with the same food habit. It webs up the leaves of mulberry. Head brown, body green with the small tubercles black. An addorsal and a stigmatal whitish line.

PYRAUSTA POLYGONI, new species.

AI-NO-MUSHI.

The moth looks very much like *P. nubilalis* Hübner, and has probably been confused with it. *P. nubilalis* occurs in Japan. I have a specimen from Professor Matsumura labeled "Stalk borer, injurious to *Panicum* family," which shows that the larva has a different food habit. The present species has the dark streak at base of vein 1 of fore wing, characteristic of the subgenus *Micratia* Warren. The wings are not quite as pointed as in *nubilalis* and veins 4 and 5 of hind wings are farther spaced at origin. The sexes are colored alike, the lines as in the female *nubilalis*, but the outer line is softer and less

^aTrans. Ent. Soc. Lond., 1898, p. 332.

dentate; the subterminal band is a smooth shade only, not visibly dentate. On the hind wings the median shade is more outwardly placed and more dentate, most produced at vein 2; subterminal line close to the margin, rather distinctly dentate in the female specimen before me, more clouded in the male.



FIG. 23.—PYRAUSTA POLY-
GONI, ADULT.

Food plant: *Polygonum tinctorium*.

The larva is shown within a swelling in the stem of the food plant, which is cut off, with a hole at the top. Head marked with brown, the body colorless with rather large pale tubercles.

Type.—Cat. No. 8398, U.S.N.M.

CHILO SIMPLEX Butler.

INE-NO-ZUIMUSHI.

Food plant: *Oryza sativa*.

The larva is shown within the rice stem. It is pale, with subdorsal and lateral purplish bands, the tubercles small, black centered, obscure. Head brown.

Family TORTRICIDÆ.

EXARTEMA MORI Matsumura.

AO-HAMAKI-MUSHI.

Food plant: *Morus alba*.

The larva is shown on the leaves of mulberry. The head is black, shining, the body entirely immaculate, probably green.

EXARTEMA MORIVORA Matsumura.

SHIN-MUSHI.

Food plant: *Morus alba*.

The larva is shown on the very young leaves of mulberry. Head shining black, cordate; cervical shield large, shining brown-black; tubercles small, but decidedly brown-black, the body otherwise pale (green?). Anal plate dark. The larva is about half the size of the preceding species.

Professor Matsumura described this species as *Sericoris morivora*;^a but it seems to me more properly referred to *Exartema*, as the dorsal lobe of hind wing is fully as long as in the preceding species. Lord Walsingham^b calls attention to the presence of the dorsal lobe in a rudimentary state in *Olethreutes* (= *Sericoris*); but this is well developed.

^a Ent. Nachr., XXVI, 1900, p. 195.

^b Ann. Mag. Nat. Hist. (7), VI, 1900, p. 28.