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AUSTRALIAN LEPIDOPTERA

AND THEIR TRANSFORMATIONS,

Drawn from the Life,

BY

HARRIET AND HELENA SCOTT;

WITH

Descriptions, General and Systematic,

BY

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AUSTRALIAN LEPIDOPTERA.

VOL. I.

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By W. J. RAINBOW, F.L.S., Entomologist, Australian Museum, Sydney, 1899.

NOTE.—Species are distinguished by having the *Generic* name in capital and small capital letters, and the *Specific* name in italics, thus: ANTHERÆA *eucalypti*; Synonyms are printed in full italics: *Phloioopsyche venusta*; names of food plants, Entomogenous Fungi, and general terms in Roman: *Evodia micrococca*, *Hepialus*, *Sphæria Robertsii*, etc.

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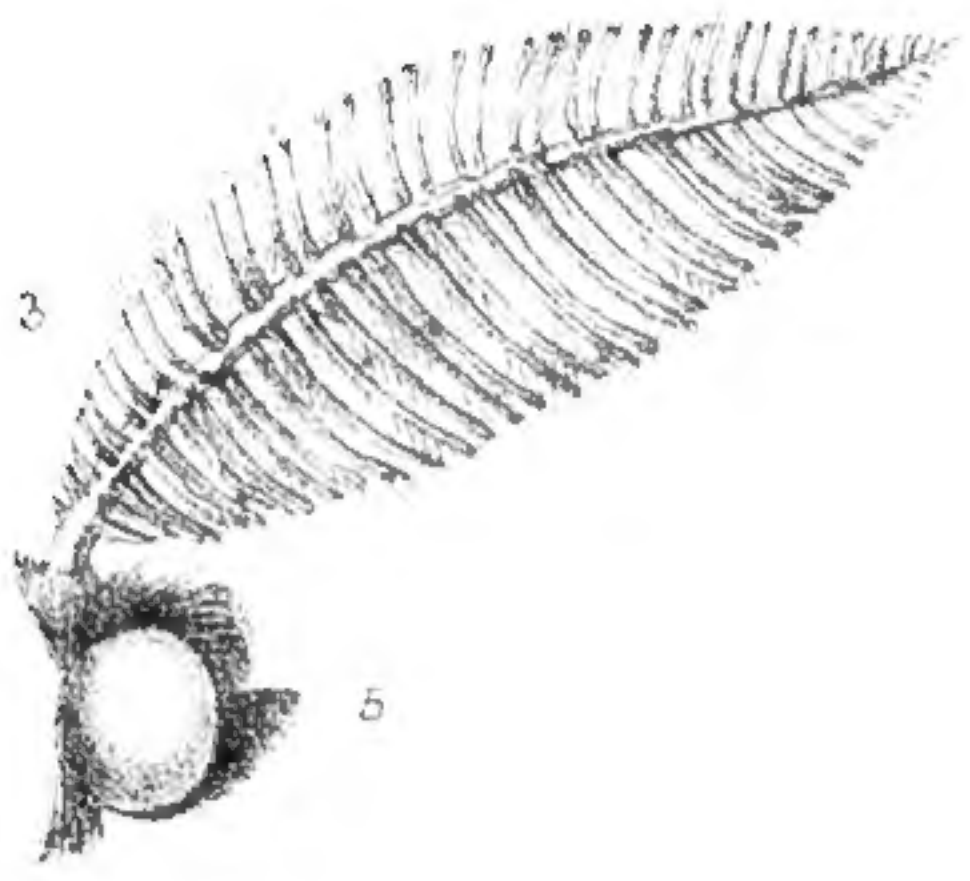
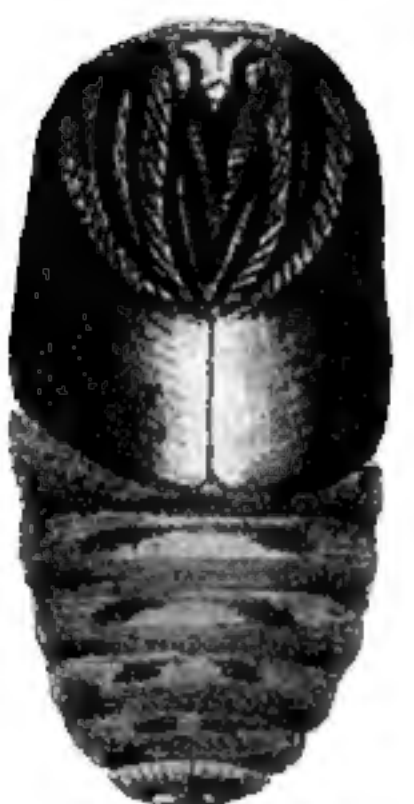
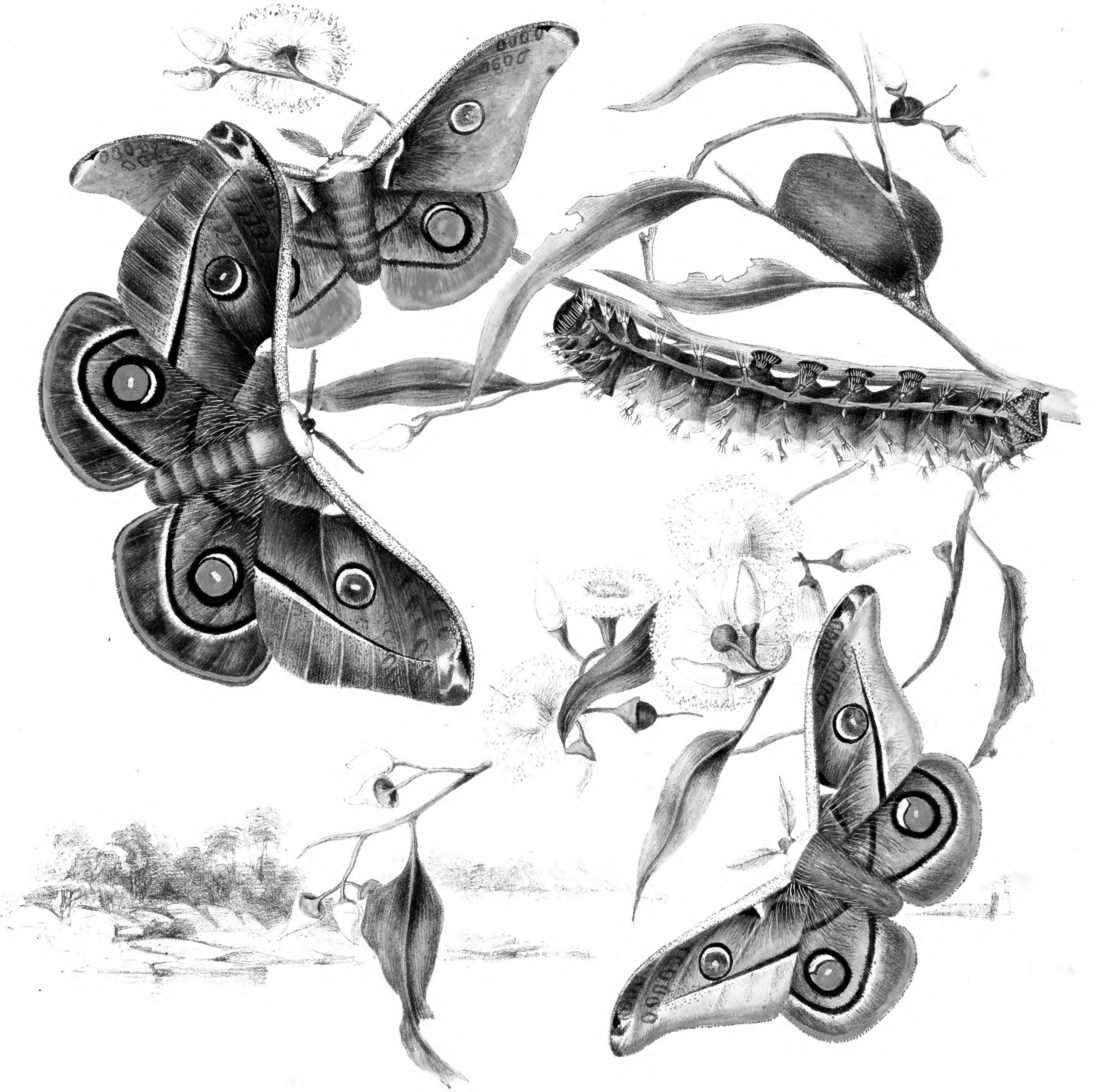
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ERRATUM.

Page 19, eleventh line from bottom, for *speciocissima* read *speciosissima*.



From Nature by Harriet Scott

Antheraea Eucalypti.

on Stone by E Thomas.

AUSTRALIAN LEPIDOPTERA

AND THEIR

TRANSFORMATIONS.

ANTHERÆA.

Australian Group, Brit. Mus. Cat. Lep. Het., p. 1252.

Antheræa, Hubner.

Saturnia, Boisd., Westwood.

Corpus robustum. Alæ amplæ, ocello partim vel omnino vitreo; lineis alternis vicibus undulatis inter ocellos marginesque posteriores; anticæ plerumque falcatæ, presertim in maribus. Thorax utrinque uncino valido armatus. Lingua spiralis, obsoleta. Pedes, pilosi, robusti, tibiis posterioribus duobus parvis calcaribus instructis. Antennæ articulis 4-pectinatis. Larva magna, decora, tuberculata, et arboricola. Folliculus coriaceus, lentus, unius et ejusdem ubique generis.

Body stout. Wings ample, each with an ocellus, whose disc is partly or wholly vitreous; space between ocelli and posterior borders undulating; fore wings, principally in the males, falcate. Thorax furnished on each side with a strong hook. Spiral tongue, obsolete. Legs pilose and robust; second and posterior pairs with two small spurs on tibiæ. Antennæ 4-pectinated on each joint. Larva large, showy, tuberculated and inhabiting trees. Cocoon, coriaceous, tough, of even texture throughout.

SPECIES 1st.—ANTHERÆA EUCALYPTI.—(PLATE I.)

Varieties β & γ ? of *Antheræa Helena*, Brit. Mus. Cat. Lep. Het. p. 1254.

The aromatic leaves of the noble Eucalyptus furnish food for the caterpillars of this species of *Antheræa*, and to which, as far as our experience extends, they exclusively attach themselves; out of the numbers we have met with, not any have been found living upon the foliage of any other plant, although the wanderings of the mature larvæ will lead them to adopt resting-places quite foreign to their previous existence, and thus their cocoons may be seen not only on the stems and bark of neighbouring trees, but also on walls and palings in frequent proximity to those of the *Chelepteryx Collesi* and many other insects, possessing similar dispositions. In some of our *Antherææ*, however, this exclusiveness to one particular kind of food does not appear to hold, as the Larvæ of the same species inhabit dissimilar plants; and we ourselves have reared those of *A. Janetta* on the leaves of the *Podocarpus spinulosus*, *Egiceras fragrans*, *Olea paniculata* and *Geigera salicifolia*. In December the caterpillars of the *A. Eucalypti* may be procured in considerable numbers, even in the immediate vicinity of Sydney, and they are easily discernable by their size and beauty. When adult the prevailing color is of a light shining velvety green, merging into blue along the back. Each segment is encircled by six elongated, equidistant saturnine tubercles, tipped by cobalt blue, and emitting star-shaped tufts of yellow hairs. These tubercles become paler and yellower towards the head of the caterpillar, and are preceded by a whorl of long setæ. A yellow dorsal tubercle, more prominently developed than those described, proceeds from the penultimate segment. A band of yellowish green runs immediately above the legs, of which the abdominal are green with brown terminations, distinctly ciliated above; whilst the caudal are brown, spotted with white. The head, furnished with red mandibles, is of a shining brownish green. The length of the female caterpillar, when full fed, is 5 inches; that of the male smaller.

The Cocoon is composed of a tough coriaceous substance, of equal thickness and strength throughout; roundish oval in form, dark brown in color, and about $1\frac{3}{4}$ inch in length.

The Chrysalis (fig. 1, female) measures $1\frac{3}{8}$ inch. The head and wing cases shining black, abdominal segments reddish brown, the form ovoid and robust in proportion to its length.

Although the perfect insects take wing frequently during different portions of our summer, yet February, probably the hottest month, seems to be the destined period for their production in the greatest abundance. It was at this time, our attention being directed to the care of the numerous specimens in our possession emerging from the cocoons, was naturally attracted by the peculiar and loud noise produced by the imago in that operation for freeing itself, which led to a more careful observation and to the discovery that the sound thus created was caused by two powerful hooked appendages of a horny substance (fig. 2, magnified) placed one on each side immediately at the junction of the base of the anterior wing to the thorax, while in the act of tearing and destroying the strong fibrous texture of the nest, previously, however, moistened by a solvent fluid, until a rude and irregular aperture was made. During this action the insect maintained a slow rotatory motion, until the hooks were plainly visible to us, appearing and disappearing alternately and quickly, and irresistibly recalling to mind the sound produced by the gnawing of that domestic torment—the rat. The knowledge of the existence of these instruments on our insect caused us to search for similar ones on all the Colonial Antherææ in our collection; the more so as their cocoons have the like formations and firm textures, possessing neither the weak portions nor artful construction necessary for the easy egress of the Imago, as exhibited in many of the nocturnal Lepidoptera; and we found them all furnished with these weapons to enable them to extricate themselves effectually from their strongly built cells: thus the *A. Janetta*, *A. Helena*, and *A. simplex* were as well supplied as the *A. Eucalypti*, and we may add that on the two foreign species of Saturniidae, which we had an opportunity of inspecting, viz., the *Tropæa Luna* and *Telia Polyphemus*, these hooks were fully developed.

The female of the perfect insect measures in expanse 6 inches, the male an inch smaller.

The *Antennæ* ...are 4-pectinated on each joint; the pectinations in the male (fig. 3) being long and fringed with delicate hairs; while those of the female (fig. 4) are small, slightly hairy and terminated by several minute bristles.

The *Labial Palpi* (fig. 5, male) distinct: 3-jointed, hairy, and curving upwards.

The *Legs*densely pilose. In the male (fig. 7, anterior leg) so much so that the tarsi are not visible in front. 2nd and posterior pairs (fig. 6, female) have two small spurs at their apices. Tarsi 5-jointed and terminated by strong claws, and pulvilli.

The wings at rest are horizontal, and the moth nocturnal.

The plumage of the Antherææ *Eucalypti* varies so much in coloring that it would be tedious to enumerate the different shades, but the specimens figured, one female and two males, will afford a fair sample of the diversity of tints, which, however, does not interfere with the main and distinguishing features of this species; and the three may be described as follows:—the general color of the upper surface of the female is pale reddish brown; on the middle of each wing there is a large ocellus, consisting on the superior, of a reddish pupil merging exteriorly into dull green, with a small diaphanous spot in the centre; over this there is a semicircle of white, and the whole surrounded by a narrow dark brown ring; on the inferior, the ocelli are larger, and the pupils bright orange yellow, paler at the edges, and a central diaphanous spot; over this a crescent of light blue, and a broad ring of jet black round the whole. On the apices of the anterior wings are waved rose-colored patches, with small triangular spots of black and white adjoining; the space towards the ocelli being much crumpled between the nervures. Two transverse dark bands, the outer ones running parallel to the posterior margins, and having whitish borders, divide each wing into three unequal parts, the central division containing the ocelli. The marginal borders of the under wings are fringed with brown, with a yellow band above. The collar and part of the adjoining costa, hoary; thorax and base of the primary wings fulvous, and a distinct subcostal dental mark.

The males are much falcated, and of the two represented, the one is of a light brownish saturnine; the other, delicate greenish-drab, with a broad yellowish band on the hinder margin of the posterior wings. The ocellar spots of both, bear a general resemblance to those before described in the female, but partake, more or less, of the variations of hue so peculiar to this species. The same remarks hold good with respect to the transverse bands, which are consequently seen either purple, brown, or pink, in accordance with the prevailing color of any particular specimen: but the white subcostal tooth-shaped mark, and the crumpled appearance towards the posterior edge remain unaltered.

The under sides of both sexes are more subdued in hue, but the ocellar spots are larger and brighter on the anterior than those on the posterior wings, being the reverse to the arrangement exhibited on the upper surface.

The eggs are of an uniform pale drab color, flattened oval form, and hard.

The frequency of this species, enhanced by its beauty, must necessarily render the insect an object of interest and desire to the collector, and consequently numerous specimens undoubtedly occur in the many cases transmitted from time to time to Europe, and we can scarcely imagine, therefore, that the cabinets of the British Museum are deficient in examples of this common kind; yet, after a careful comparison with the descriptions of this group contained in their list, we cannot satisfy ourselves regarding its identity with any one of these four Australian species, unless we except the varieties β and γ of the *A.*

Helena. Indeed we possess three out of the four species catalogued, viz., the *A. Helena*, *A. Janetta*, and *A. simplex*, with all their transformations complete; from the remaining one, the *A. Astrophela*, the species now under consideration differs by the ocelli on the hind wings being much larger than those on the fore; by the broad black borders encircling them, and by the disparity in size of the insect. The *A. Astrophela*, however, corresponds so accurately with our female of the *A. simplex* that we entertain the opinion they are the same species; the more particularly as the female of the *A. simplex*, and the male of the *A. Astrophela* were (judging from the absence of all notice in the catalogue) probably unknown to Mr. Francis Walker, the scientific author of that useful publication, and we also beg to express our conviction that the varieties β and γ of the *A. Helena*, belong to the same species as our present insect, conforming with it in every respect, and differing widely from all the examples we have seen of the *A. Helena*. The larvæ of the *A. Eucalypti* and *A. Helena* feed on the same plant, but are unmistakeably distinct in character, and produce perfect insects whose markings are equally well defined and obvious. We may remark that the moths of the *A. Helena* are not subject to variations in color to any extent, so that when once known they are easily recognized and grouped.

The sketch at the foot of the plate is taken from a spot on the southern shore of Port Jackson, and exhibits Fort Denison at a distance. Many years ago it was in this and adjoining localities that some of our finest entomological acquisitions were first procured, and at a time when the present beautiful residences, with their ornamental grounds, were represented by the wild bush; the more interesting, however, to the Botanist and Entomologist from the numerous lovely and fragrant species of the Australian Flora abounding there, and from the diversity of insect life luxuriating on their flowers and foliage.

The plate depicts a branch of a species of *Eucalyptus* in bloom, with the larva, cocoon, and three perfect insects, a female and two males, of the *Antheræa Eucalypti*.

CHARAGIA.

Charagia, Walker.

Hepialus, Lewin; Doubleday, Boisd., Stephens' MSS.

Phloiopsyche, mihi on plate 2. Aust. Lep.

Alæ longæ, sat latæ, leviter falcatæ, apice acuminatæ, angulis analibus valde rotundatis. Caput porrectum. Oculi magni, prominuli. Antennæ brevissimæ, aliquantulum moniliformes, leniter ciliatæ. Palpi labiales, distincti, porrecti, triarticulati. Maxillæ obsoletæ. Abdomen elongatum, alas posticas superans, lateraliter modice compressum, omnibus partibus ejusdem magnitudinis, apice flabellatum. Pedes excalcariti, anteriores magni, validi, tibiis tarsisque dense pilosis; postici parvi, graciles, tibiis hirsutis, in maribus externe scopatis; tarsi 5-articulatis, fere glabris. Larva carnosa, elongata, cylindrica, ad caput incrassata, capite segmentoque anteriori corneis; in ligno habitans, plerumque librivora. Pupa lactiflora, antice squamosa, postice mollis, elongata, annulis serratis.

Wings long, moderately broad, slightly falcate, pointed at the tips and much rounded at the hinder angles. Head projecting. Eyes large and prominent. Antennæ minute, somewhat moniliform, delicately ciliated. Labial palpi distinct, porrected in front, 3-jointed. Maxillæ obsolete. Body elongated, reaching beyond the wings, slightly flattened laterally, nearly of an equal thickness throughout, with the extremity fan-shaped. Legs spurless; anterior and 2nd pairs large and powerful, tibiæ and tarsi densely pilose; posterior pairs small, weak, with long hairs on the tibiæ, forming in the males a large brush exteriorly, tarsi 5-jointed, almost naked. Larvæ fleshy, elongated, cylindrical, stoutest anteriorly, with head and first segment horny, living in the interior of trees and subsisting principally upon the bark. Chrysalis yellowish-white, anterior portion squamose, abdominal soft and elongated, with serrated rings.

From *Hepialus*, to which it has hitherto been attached, this group differs by the projecting head and prominent eyes, distinct palpi, lengthened abdomen, beauty of the gaily colored upper surface, and by the habits and formation of the larvæ, which are widely dissimilar.

Before entering upon the details of this beautiful group, we feel bound to offer a few explanatory remarks regarding the generic names of *Phloiopsyche* and *Rhizopsyche* attached respectively to Plates 2 and 4 of this work, and trust these will be taken in a kindly spirit by the entomologists at home. So far back as 1851 we sent our manuscript and drawings of the

Australian Lepidoptera, sufficient for one large volume, to London for publication, but owing to the very expensive nature of the undertaking, coupled with the uncertainty of success, this design had to be abandoned, and after remaining in England for a term of seven years (latterly under the kind care of Dr. Gray, of the British Museum) they were, at our request, returned. On their arrival here, in November, 1858, we still determined to proceed with the publication, although we felt that in this young country it could only be accomplished principally by our own exertions, and consequently would be a work of time. Thus, under great disadvantages, without our being in possession of modern works and periodicals for reference, and at irregular times, some of the plates were struck off with generic names attached, and the original drawings on stone were destroyed. The plates mentioned above were two of these, and, therefore, the names formerly conferred are still retained, and it is but lately upon the catalogue of the British Museum coming into our possession, that we have discovered that similar insects were described therein in 1856, as forming the genera of *Charagia* of Walker, and *Pielus* of Stephens' MSS. We may further remark that long prior to the transmission home of our manuscript in 1851, we had found it necessary to separate certain of the Australian lignivorous lepidoptera from the genera of *Cossus* and *Hepialus*, under which they were then known, giving at the time our reasons for so doing; and we bestowed upon the new genera thus created, names derived from the habits of the larvæ; thus three of these lignivorous lepidoptera bore our appellations of *Phloiopsyche*,¹ *Premnopsyche*,² *Rhizopsyche*³—the larvæ of the first deriving their principal nutriment from the *bark* of trees, those of the second existing in the interior of the *lower* portions of the *trunk*, and the last living underground and feeding upon the *roots*. Without insisting upon the greater appropriateness of our own nomenclature, we have unhesitatingly rejected these generic names, and, in our text adopted those subsequently given in the catalogue of the British Museum, but, for the reasons enumerated, these unintentional infringements upon the law of priority are now too late for correction in the plates.

With these few remarks, we shall proceed to describe the habits of this interesting genus.

As we possess five distinct species, varying from 2 to 6 inches in expanse of wings, we are enabled to afford a tolerably accurate account of the habits and metamorphoses of the *Charagia*, and as these are remarkably consistent in all, one general description will suffice for the group.

On this Island for instance, whether we take a walk in the more open uncultivated spots which the *Casuarinæ* and *Melaleucæ* frequent, indicating a low and damp soil; or in the rich, dense, brushes favorable to the growth of shrubs and climbers, we may perceive, from a bag-like substance, inflated, and consisting of triturated portions of wood and bark held together by silken threads, that the stems and branches of the *Casuarina paludosa* in the former, and of those of the *Acmena elliptica*, *Dodonæa angustifolia*, *Jasminum gracile*, *Tecoma Australis*, and *Cupania xylocarpa* in the latter, have been injured by the larvæ of some insect. On closer inspection we have the gratification to find that these larvæ are lepidopterous, and of a size worthy our attention and regard. By taking the precaution of placing the end of the cut limb in damp sand, or in a shallow pan of water, to keep the wood moist and to prevent the contraction in drying which otherwise inevitably occurs, we at length succeed in rearing a few to the perfect state, and are rewarded by the acquisition of these lovely inhabitants of the woods. Our exertions become redoubled, more favorable habitats are found, and specimens and species more numerous and diversified repay our toils. To us the *Charagiæ* are now no rarity, and their habitations, once so eagerly sought for, are passed by with comparative indifference.

If we wish to obtain the larvæ we select those nests the outer covering of which is unbroken; if, however, we desire the chrysalis for the sake of perfect specimens, we choose the nests that have the web torn in front and apparently deserted; but if fine threads of silk are seen woven about and around the aperture of the cell, which the larva had excavated in the centre of the wood, and if by the gentle insertion of any probe a resistance from a close web is met with about a quarter of an inch down, we are certain that the pupa is within, but without these indications nothing will be found but an empty nest, for the moth has flown. The Caterpillar on feeling the approach of maturity, ruptures in front that fabric which it had so ably constructed for its security and comfort in its younger days, and in lieu thereof weaves a rather slight web a little below the entrance, retiring within to await the final change.

The chrysalis possesses in a more remarkable degree than other lignivorous lepidoptera the power of locomotion within its tubular dwelling, and it is indeed an interesting sight to observe the instinct and agility it displays shortly before it rends its puparium.⁴ It then ascends to the mouth of the aperture, forcing the frail barrier of silken tissue aside with its horny head,

¹ *Charagia*, Walker, Brit. Mus. Cat., Lep. Het., p. 1569.

² *Zeuzera*, Latreille.

³ *Pielus*, Stephens' MSS., Brit. Mus. Cat., Lep. Het., p. 1576.

⁴ We take our description from the *Charagia Ramsayi*, mihi MSS., the largest of the group in our possession, as its movements were more palpable and striking in consequence of its superior size.



From Nature and on Stone
by Helena Scott

Philopsephe Venusta

Philopsephe Splendens

Allen & Wigley Engravers Sydney

and remains motionless (unless disturbed) for a considerable time, apparently as if to satisfy itself respecting the fitness of time and place for the ultimate venture. We often amused ourselves with watching this peculiar instinct, and although we approached on tip-toe and with the greatest caution, yet it would take the alarm and swiftly disappear—the quickness of the action, and the intelligence of aspect (figuratively speaking) imparted by the large and prominent eye cases, would almost lead to the deceptive belief that the pupa was endued with active auditory or visual organs. To observe, therefore, effectually the last transformations, we were compelled to remain motionless at convenient distances—the pupa would then reappear, after a while slowly thrust nearly half its body out, with the back downwards, take a moment of rest, then with a few violent jerks the skin is rent from the head down the thorax, and the imago attaching the front feet to the bark above, crawls heavily to some place convenient for suspension, leaving the exuviae exerted.

At rest, these insects are invariably pendent, secured by the feet of the first and second pairs of powerful legs, stretched out in full overhead; the bodies of the smaller species only, gracefully recurved—the wings fold close to the body with their tips meeting at some distance from, and underneath, the abdomen.

The flight of the *Charagia* is of extreme velocity, resulting in an early destruction of the plumage, and we may further remark that no insects fade after death more quickly or more effectually than those now under consideration, so that it is scarcely possible to imagine that the pallid cabinet specimens were ever the brilliant beings we have seen in the freshness of their beauty. We have often regretted that no means could be devised to perpetuate their colors, for we can safely assert that no adequate idea can be entertained, nor correct description given, unless taken from the living examples.

In Dr. Bennett's "Gatherings of a Naturalist in Australasia" we find at page 288 the following passages, on which we feel bound to make some observations, more especially as they relate to the particular group now under consideration:—

"In the Wattle trees the pink grub is found, which is the larva of a moth of the genus *Charagia*; it is eaten by the Natives, and Europeans who have tasted it say it is not disagreeable."

In a note he states: "The *Sphæria Robertsii* of New Zealand is found growing on the caterpillar of the moth named *Charagia virescens*. Miss Scott mentioned to me that she had seen the caterpillar of a species of *Charagia* in Australia with a *Sphæria* growing upon it."

Respecting this last statement, we must say that the learned Author has misunderstood, or more probably forgotten, the tenor of the casual conversation to which he alludes, for such an expression of our opinion would have been totally at variance with our experience in regard to the *Charagia*. We have for many years asserted that the caterpillars of that genus are *not* afflicted by any of the numerous kinds of *Sphæria* hitherto discovered in this Colony, or in Victoria, Tasmania, or New Zealand.

The attention of the reader is requested to our description of the genus *Pielus*, which will appear in Part II. of this work, and in which we endeavour, at some length, to maintain our views as to the precise class of Caterpillars subject to the attack of the sporules of this peculiar fungus.

The pink grub, mentioned by Dr. Bennett, belongs probably to the genus *Zeuzera*, several species of which are found abundantly in the larva state (one of a pinkish color) in our neighbourhood, existing in the trunks of the *Acacia affinis*, and *Acacia floribunda*, commonly known as wattles; and these caterpillars are eaten at certain seasons with considerable relish by the Aborigines and even by some Europeans.

SPECIES 1.—CHARAGIA LIGNIVORA.—(PLATE II.)

Hepialus Lignivorus, Lewin, Lep. Ins., New South Wales, pl. 16.

Phloiopsyche Venusta, Scott, on plate 2, Aus. Lep., and in original MSS.

Charagia Lignivora, Walker, Cat. Brit. Mus., Lep. Het., p. 1570.

From several of the colored copies of Lewin's "Lepidopterous Insects of New South Wales," extant in Sydney, we found that his "*Hepialus Lignivorus*" ♀ differed materially from the female of the *Phloiopsyche Venusta* of our plate and original manuscript—his insect possessing the head and thorax green, whereas, in ours, the former is silver-grey and the latter yellowish-red, with other material differences. We, therefore, entertained the belief that the two insects were of distinct species. Upon comparison, however, with the specific characters of the *Charagia Lignivora*, as detailed in the catalogue of the British Museum, we have arrived at the conclusion that the two may be considered identical, although incorrectly colored in the copies referred to.¹

The sexual difference in the coloring of the smaller species of *Charagia* has hitherto been of a fixed character, the male invariably of a lively green adorned with silver, whereas the female as invariably is purple and green, devoid of the silver markings, clearly illustrated in the two examples now laid before the public. This dissimilarity would naturally lead those unacquainted with the history of this group to separate the sexes and describe them as different species, an error which we are of opinion has been committed in regard to the *Charagia Lamberti* ♂ and *Charagia Lewinii* ♀, Brit. Mus. Cat., p. 1570, as these

¹ Lewin has figured and described two females, evidently under the mistaken idea that the sexes were alike, as he alludes, inaccurately, to the antennæ of the male. He certainly would not have omitted to mention the marked sexual difference which exists in the *Charagiæ*, had he been fully acquainted with the subject.

are undoubtedly male and female of the same species. We have bred numerous specimens, and they exactly correspond with the details given of each in the catalogue alluded to, and we feel convinced that our assertions will be borne out when, in a future number, we figure the *Charagia Lewinii*.

We have found in December, the larvæ of the *C. Lignivora* in considerable abundance inhabiting the interior of the saplings of *Casuarina*, *Callistemon*, *Eucalyptus*, *Dodonæa*, *Acmena*, &c., &c. They rather exceed 2 inches in length, are fleshy, cylindrical, muscular, of a dark cream color, with the segmental divisions well defined. The segments which contain the true feet are partly squamose, the anterior one wholly so, and shining brown. Dorsal and lateral rows of small horny plates arranged in pairs and darker in tint than the ground color are continued along the remaining segments. Head black-brown, rough, with a few scattered hairs. This caterpillar subsists chiefly on the bark, destroying it to a considerable extent, and concealing the damaged part, at the same time affording protection to itself, by means of a web rendered thick and consistent (almost equal to a coarse manufactured fabric) by a coating of the fine triturated portions. The tubular cavity in the wood, which has been constructed solely for its habitation, and the space within the woven fabric described above, are never left by the larva until the whole of its changes have been perfected; the chrysalis being formed in January, and the moth taking its final departure in the February following.

The Chrysalis (fig. 1) is cream colored throughout, pointed and horny at the anterior portion, the remaining part soft, elongated; abdominal annuli, armed with small recurved spines; in length, somewhat more than $1\frac{1}{2}$ inch.

The female exceeds in expanse $2\frac{1}{2}$ inches, the male 2 inches.

The *Antennæ*of both sexes, minute, slightly moniliform and moderately pubescent. In the male (fig. 2) gradually tapering to the point, in the female somewhat thickened in the middle.

The *Labial palpi* (fig. 3, female, 4, male, divested of hair) are small, porrected forwards, 3-jointed, the middle one longest, being about half as long again as the basal, and inflated posteriorly; terminal one minute, rounded at the apex—the whole set with longish hairs.

The *Legs*spurless, anterior and second pairs (fig. 5, female) long and powerful, densely and compactly clothed with hair, so that the joints of the tarsi are scarcely observable. The posterior pairs small, pilose; in the male (fig. 6) tibiæ furnished exteriorly with a dense tuft of long hairs—tarsi 5-jointed.

The upper surface of the anterior wings of the male is of a vivid emerald green, inclining in some specimens to yellowish, chastely relieved with brilliant silver, arranged in bands; one of these proceeds along the costa till it unites with another running across the wing, a little beyond the middle and parallel to the exterior margin. The inner margin within this transverse band is occupied by two short oblique silver bands, converging to, but interrupted near, the base of the discoidal cell. The under wing is of a greenish-white, tinted with yellow exteriorly, with two short indistinct bars towards the tip. The head and collar yellowish-white; the thorax tufted, and of an emerald green; the upper portion of the abdomen greenish-white, the central delicate purple, and terminal emerald green with fan-shaped appendages.

The whole under surface pale greenish-white, possessing a sunny-gloss towards the tips of the wings.

Of the female the middle of each superior wing is occupied by a large, bright, light-green triangular-shaped patch, close to which a broad band of a similar color extends from the tip half way down the exterior border; these markings are delicately veined by short irregular transverse lines of scarlet. The remaining parts of the wing are of a mottled purplish-red, relieved occasionally by brighter spots, the purple deepening at the hinder angle, with spots and waves of a dusky hue. The inferior wings and abdomen are throughout light yellowish-red; the thorax brighter, with tufts of silver-grey, of which color the collar and head are also composed.

The under surface uniformly pale yellowish-red.

A branch of the *Evodia micrococca* is exhibited in the plate, as if torn asunder, in order that the caterpillar might be seen in its cylindrical habitation. Immediately above are the male and female of the *Charagia Lignivora*, the former being on the left hand.

SPECIES 2.—*CHARAGIA SPLENDENS*.—(PLATE II.)

Phloiopsyche splendens, Scott, on plate 2, Aus. Lep., and in original Manuscript.

This beautiful insect, named from the metallic lustre of the male, we believe, has not been figured or described in any work, although in its larva state it is by no means uncommon. In all its primary stages this species bears so strong a resemblance to the preceding one, that we consider it would be mere repetition to dilate further upon a subject already so fully exemplified; we shall, therefore, confine ourselves to a few general observations, requesting the reader's attention to the previous pages.

Like the *C. Lignivora*, with whom it may be found dwelling in juxta position, this caterpillar is polyphagous, and bears so great a resemblance in markings, color, and formation, that we are unable to point out any peculiarity by which the one might be distinguished from the other, with the exception only of greater size. In reference to both of these insects, we may here remark, that when they take possession of small stems either of climbing plants as the *Tecoma Australis* in the plate, or of the *Acmena elliptica*, the form of the bag-like covering is of a long oval, produced at each end, whereas, in larger plants, it assumes that irregular form shewn in the preceding species.

The Chrysalis (fig. 1, female) is precisely similar to, but a little larger than, that of the previous species.

The male measures in expanse $2\frac{1}{10}$ inches, the female slightly over $2\frac{3}{4}$ inches, although we have occasionally procured specimens fully half an inch larger.

The *Antennæ* (fig. 2, female, shewing the slight thickening in the middle; fig. 3, portion of male) exhibit the same formation as species 1.

The *Labial palpi* (figs. 4 and 5, denuded of hair) 3-jointed, basal and 2nd joints almost equal in length to each other, terminal minute.

The *Legs* (fig. 6, 2nd leg; and 7, posterior leg of the female; 8, posterior leg of the male; 9, a hair taken from the brush on the tibiæ) assimilate to those before-described.

The male is on the upper surface of the fore wing of an emerald green, thickly set over with various silvery bands, the costal and transverse ones arranged as in the male *C. Lignivora*; those on the inner margin more connected and zigzag in character. Over the disc is a V-shaped mark of silvery-blue, the adjoining space occupied by various transverse lines and dots of darker green. Beyond the silver transverse band are others running parallel to the exterior margin; of these the inner are bluish, the outer silvery. The under wing and abdomen lustrous bluish-white; the extremity of the latter contains an oblong mark of green, of which color the thorax is also composed, but the tufts upon it, together with the collar and head, are of silver.

The under surface throughout is of a light, shining, greenish-white, glossed at the tips by pale golden-yellow.

The centre of each upper wing of the female contains a large triangular-shaped marking of vivid, light, satin-green, deepening exteriorly, and having under the costa three distinct notches. From the apex to about half of the exterior margin, runs a broad band with a deep indentation on the inner side: this, together with three spots, one near the outer angle, and two approaching the base, is of the same intense green as the discal mark before-described. The remaining portion of the wing consists of dark-purple, deepening in relief towards the green markings. Under wings and abdomen, pale purplish-red, with a dark shade over the hinder angles of the former, and extremity of the latter. Thorax and head dark-brown. The pale-red of the hind wings pervades the whole of the under surface, including the legs.

In the plate, our caterpillar is exhibited as if about to repair the broken web, which it has constructed upon the *Tecoma Australis*; on the long trailing stems of which several of these curious habitations, close to each other, are frequently met with. Three perfect insects are figured, one, a female at rest, to shew the peculiarity of the position adopted by this group in general.

CRYPTOPHASA.

Cryptophasa, Lewin.

Alæ anticæ, longæ, angustæ, sericæ, incumbentes; costa arcuata. Corpus crassum, pilosum, abdomine alas posticas superante, apice in maribus cirrato; in feminis rotundato. Palpi divergentes, usque ad verticem recurvi, articulo terminali, gracili et acuminati; secundo dimidia parte majori; basali minuto. Antennæ in maribus aut bipectinatæ aut subtus setacæ. Pedes antici, minimi; intermedii majores, calcaribus duobus apicalibus armati; postici magni, validi, quatuor calcaribus longis; tibiis dense pilosis. Larva agilis, mollis, cylindrica, variegata plerumque latera et dorsum maculis ornata, paucisque setis delicatis, capite et segmento anteriore squamosis; sexdecim pedibus instructa; in ligno solitaria habitans, et folia illata in crypta depascens. Pupa, elongata antice aliis cornea, aliis spinosa; unâ quidem specie eminet e collo asperum quoddam tuber bifurcatum et recurvum; segmentis abdominalibus annulis serratis plus minusve armatis.

Fore wings long, narrow, glossy, with the costa arched, and decumbent in repose. Body stout, pilose; abdomen extending beyond the hind wings, tufted in the male, rounded in the female. Palpi divergent, recurving to nearly the top of the head;

terminal joint thin and pointed, 2nd joint about half as long again, basal small. Antennæ, male either bipectinated or with tufts of ciliations beneath, female setaceous. Legs, anterior very small, 2nd pairs larger, with 2 apical spurs; posterior large and powerful, with 4 long spurs and densely pilose on tibiæ. Larvæ, soft, cylindrical, variously colored, generally ornamented with dorsal and lateral macular marks, and a few fine setæ; head and 1st segment squamose; inhabit interior of wood solitarily, feeding upon leaves taken to their dwellings; 16 feet; and active in their movements. Chrysalis, elongated, with the anterior portion in some simply horny, in others spiny, and in one example with a singular shagreened projection from the neck, bifurcate and recurved; abdominal segments armed more or less with serrated rings.

SPECIES 1.—CRYPTOPHASA ALBOCOSTA.—(PLATE III.)

Cryptophasa albocosta, Lewin, Lep. Ins., New South Wales, pl. 11.

The larva of the *C. albocosta* was found early in December, located in a branch of the *Banksia serrata*, but this common species is abundant at other seasons and exists upon plants unconnected with the *Banksiæ*. The pervading color is that of a light French grey, finely striated transversely with black lines; on each segment, with the exception of those containing the true feet, is a reddish band bearing light spots, each emitting a seta: the first segment squamose and shining reddish, the two succeeding ones partially covered with triangular reddish patches: head black, rough, setigerous. Caterpillar of the male measures about $1\frac{3}{4}$ inch, that of the female larger.

These caterpillars, while they dwell in a tubular cell excavated by themselves in the heart of the wood, yet subsist entirely upon the leaves of the plant in which they have fixed their abode, displaying considerable instinct in procuring their food from outward sources, and consuming it under shelter, within their solid habitations, in comparative comfort. In addition to these provident measures, they endeavour to protect the orifice left for their transit, by constructing, in front, a coarse spun web, secured at the upper edge to the tree, but leaving the lower one free; to this web is attached the debris of their food, presenting a similitude to the fabric used by the *Charagia* for a similar purpose, with this difference, however, that in the latter it is composed of much finer particles, more compact, and with the margins adherent to the bark, whereas, in the present instance, it hangs in front more in the manner of a screen.

Of its further habits, Lewin, who was the first to describe the economy of this group in 1805, says, "Our specimen (the *C. Albocosta*) had formed a deep cylindrical cell in a large stem of the *Banksia serrata* at the setting off of a branch, where it had bored into the main wood, sallying out only by night, and bringing to its dwelling whole leaves of the broad foliage of this tree with dexterity and great labour, exhibiting many marks of sagacity in its progress, and when it arrived at the entrance of its retreat, it raised up the covering with its hinder parts and slipped down its cell backwards, dragging the leaf after it, the extreme end of the stalk of which it held artfully in its jaws, and did not quit it until it was safely and almost wholly within its cell, where it fastened it down together with the covering of the entrance, by a web. On leaves thus provided the larva feeds at leisure and in security." To this description we may add that we have frequently seen the larva seeking for, and obtaining its food during the day time as well as at night.

The caterpillar, changed to the pupa state within the first week in January, securing the front of the entrance by a silken tissue, leaving, however, a minute circular hole in its centre; when uncared for, the outer coarse covering drops off, and leaves the aperture so far unobstructed.

The Chrysalis (fig. 1, male) is from 1 to $1\frac{1}{4}$ inch in length, elongated in form, and reddish-brown; the wing cases long, the head armed with short black spines, the abdominal annuli serrated, which enable the chrysalis to move with celerity within its dormitory.

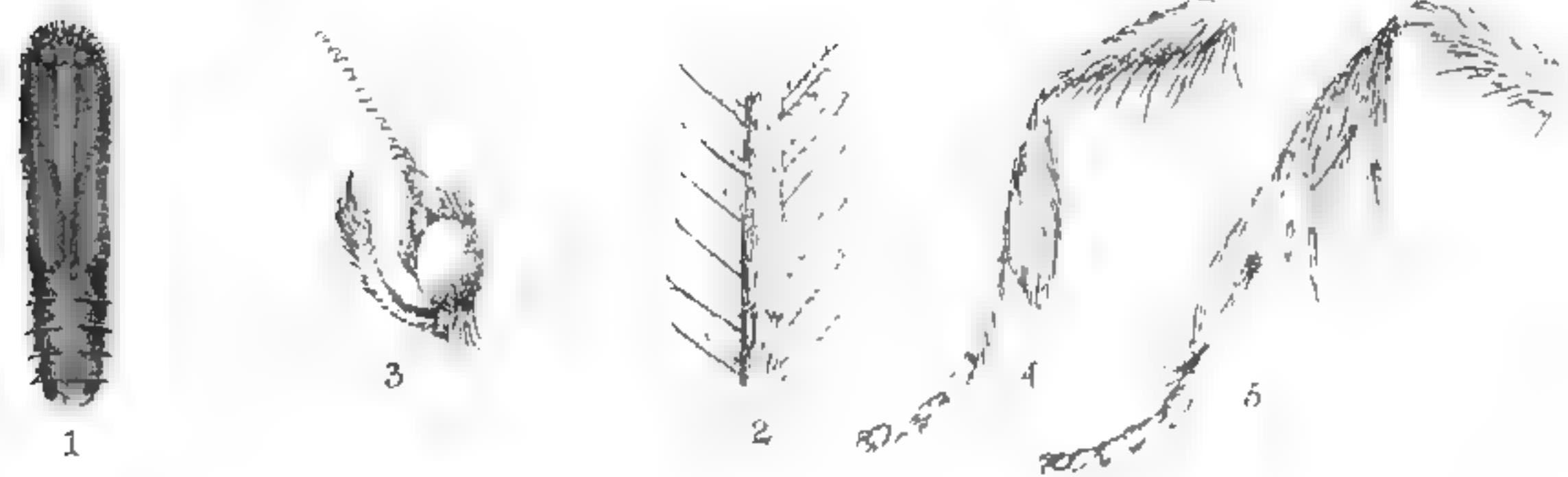
The perfect insect took wing in February—the male, figured in the plate, is in expanse of wings $1\frac{1}{2}$ inch, the female exceeding 2 inches.

The *Antennæ* ... (fig. 2, male) bipectinated, the pectinations ciliated. Female setaceous.

The *Labial palpi* (fig. 3) recurved to about the top of the head, basal joint short, 2nd about 4 times the length and robust, terminal thin and pointed.

The *Legs* anterior pair (fig. 4) small, 2nd pair larger, with 2 apical spurs on tibiæ; posterior pairs (fig. 5) very long, with 4 spurs; all the tibiæ hairy.

Wings, deflexed at rest. Moth, nocturnal.



Cryptophasa albocosta



Cryptophasa immaculata



Cryptophasa bipunctata

From Nature and on Stone }
by Harriet Scott.



Cryptophasa spilonota



The upper surface of the superior wings of both sexes, is silvery-grey; the anterior margin and a transverse band close to the exterior margin, silvery-white; beyond this latter is a faint macular hazel band, fringed outwardly with grey. The centre of the wing contains a kidney-shaped dusky stigma. The whole upper surface of the insect is very lustrous.

Posterior wings and abdomen brown, merging into silvery-white at the outer margins, which are fringed; thorax, head, and antennæ, silvery-white.

The under side is throughout of a dusky hue, bordered with white.

In the representation of this species, the caterpillar is shewn in search of food.

SPECIES 2.—CRYPTOPHUSA IMMACULATA.—(PLATE III.)

The habits and metamorphoses of this chaste little species, and of the two succeeding ones, the *C. bi-punctata* and *C. spilonota*, are very similar to those just described of the *C. albocosta*, and, therefore, it will be only incumbent upon us to notice such characteristics as to render the specific distinctions apparent.

The larvæ of *C. immaculata* are very abundant, and readily met with on the *Banksiæ* at all seasons of the year. In length less than an inch, they are of a creamy-white color, with four dorsal black macular marks on each segment, with the exception of the first three, the anterior one of which is squamose, encircled by a row of black dots; the two others contain triangular black patches. Head shining brown.

The Chrysalis (fig. 1) is light-brown, elongated, sharp and pointed towards the head, which is destitute of spines; and in length rather more than $\frac{1}{2}$ an inch.

Our perfect insects were produced at the latter end of October, the male measuring from tip to tip of wings nearly 1 inch, the female $\frac{1}{6}$ larger.

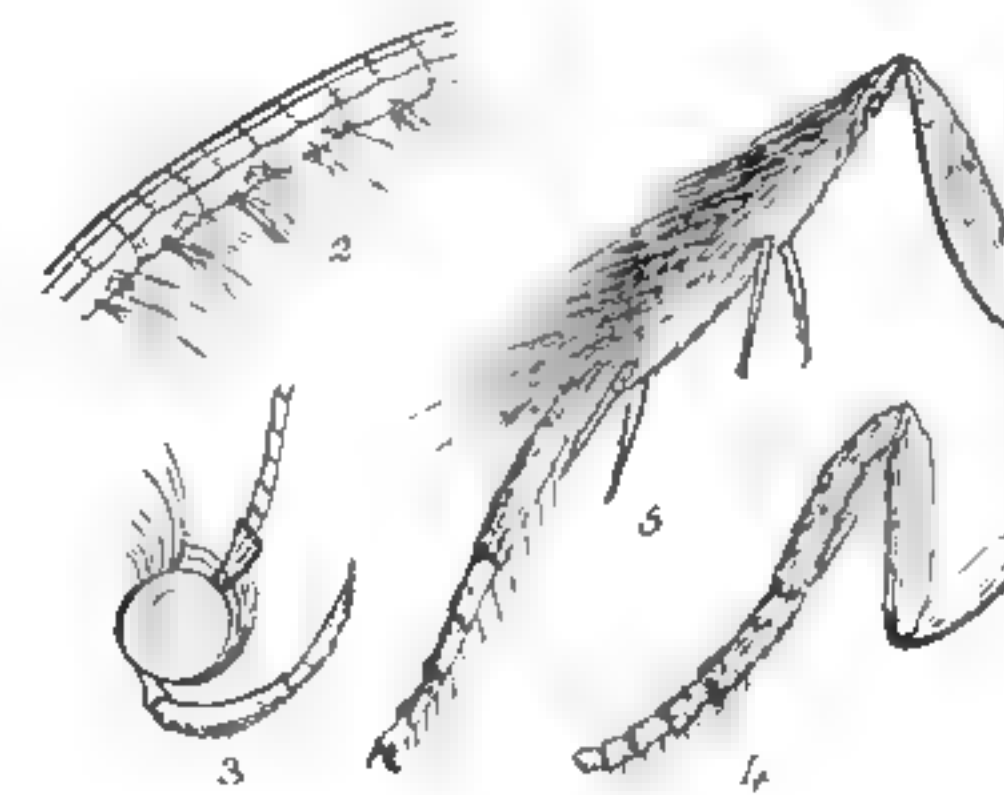
¹The *Antennæ* ...male (fig. 2) with tufts of ciliations beneath, female setaceous.

The *Labial palpi* (fig. 3), terminal joint thin and pointed, 2nd stout, and about equal in length, basal small; the whole curving upwards to about the top of the head and covered by scales.

The *Legs*,anterior pairs (fig. 4) small, 2nd pairs larger, with 2 apical spurs on tibiæ; posterior pairs (fig. 5) long and stout, tibiæ hairy, with 4 spurs.

The whole insect, above and below, is of a glossy silvery-white; the costæ and antennæ, only, having a yellowish tinge.

The female moth is seen in the drawing, with a sprig of the *Banksia integrifolia* cut open in order to exhibit the caterpillar; the screen-like covering is above, at the entrance to the cavity.



SPECIES 3.—CRYPTOPHUSA BI-PUNCTATA.—(PLATE III.)

The caterpillar of the *C. bi-punctata* is the only one of this genus we have as yet obtained, whose body is of that uniform pale tint which usually characterizes the majority of those of the lepidopterous lignivora. It may be more minutely defined as being of a creamy-white throughout, with a slight pinkish dorsal line; the 1st segment yellowish and horny, the ultimate one and the head reddish. At maturity it attains to the length of $1\frac{1}{2}$ to 2 inches.

We collected our larvæ in August: early in the following month they changed to chrysalids, which were in length from $\frac{3}{4}$ to 1 inch, light shining brown, with anterior portion destitute of spines.

The perfect insects having remained about 6 weeks in the pupa state, were on the wing in the latter week of October, and measured in expanse from $1\frac{3}{4}$ to $2\frac{1}{4}$ inches, according to sex, although we have occasionally obtained specimens of the female moth fully $\frac{1}{4}$ inch larger.

¹ The magnified portions of the perfect insect having been omitted in the illustration are here inserted.

The *Antennæ* ... (fig. 1) setaceous, the male minutely ciliated in tufts beneath.

The *Labial palpi* (fig. 2) terminal joint thin and pointed, 2nd somewhat longer and more robust, basal small; the whole recurved in front to even with the head.

The *Legs*, anterior pairs small, 2nd pairs larger, with 2 apical spurs on tibiæ; posterior pairs (fig. 3) long and large, with 4 long spurs on tibiæ.

Of both sexes the anterior wings, thorax, and head, consist of a pure glistening-white, with a distinct black discal spot on each wing. The under wings are of a pale dusky hue, and glossy; abdomen yellowish, ringed with black; legs yellowish.

The male perfect insect, the caterpillar and chrysalis are shewn in the accompanying drawing.

SPECIES 4.—CRYPTOPHUSA SPILONOTA.—(PLATE III.)

We are indebted to the *Banksia serrata* for providing us with many examples of this species, for, like their predecessors, they are by no means rare. Although no diversity can be discerned in the formation of their habitations, or in the choice of any favored locality (for several species will inhabit the same tree) yet these caterpillars vary greatly in their coloring from the ones we have described; they have the head black, the first segment yellowish, darker anteriorly and squamose; the remaining portion of the body deep neutral tint, each segment possessing four spots along the back, the two front ones yellowish, the two hind ones white; and a lateral row of yellow spots, all emitting setæ.

The larva is in length about $1\frac{1}{2}$ inch.

The chrysalis (fig. 1) light reddish-brown, with the head black and spinose.

In expanse of wings the perfect insect is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch, and was developed in November.

The *Antennæ* ... male (fig. 2) with small tufts underneath, female setaceous.

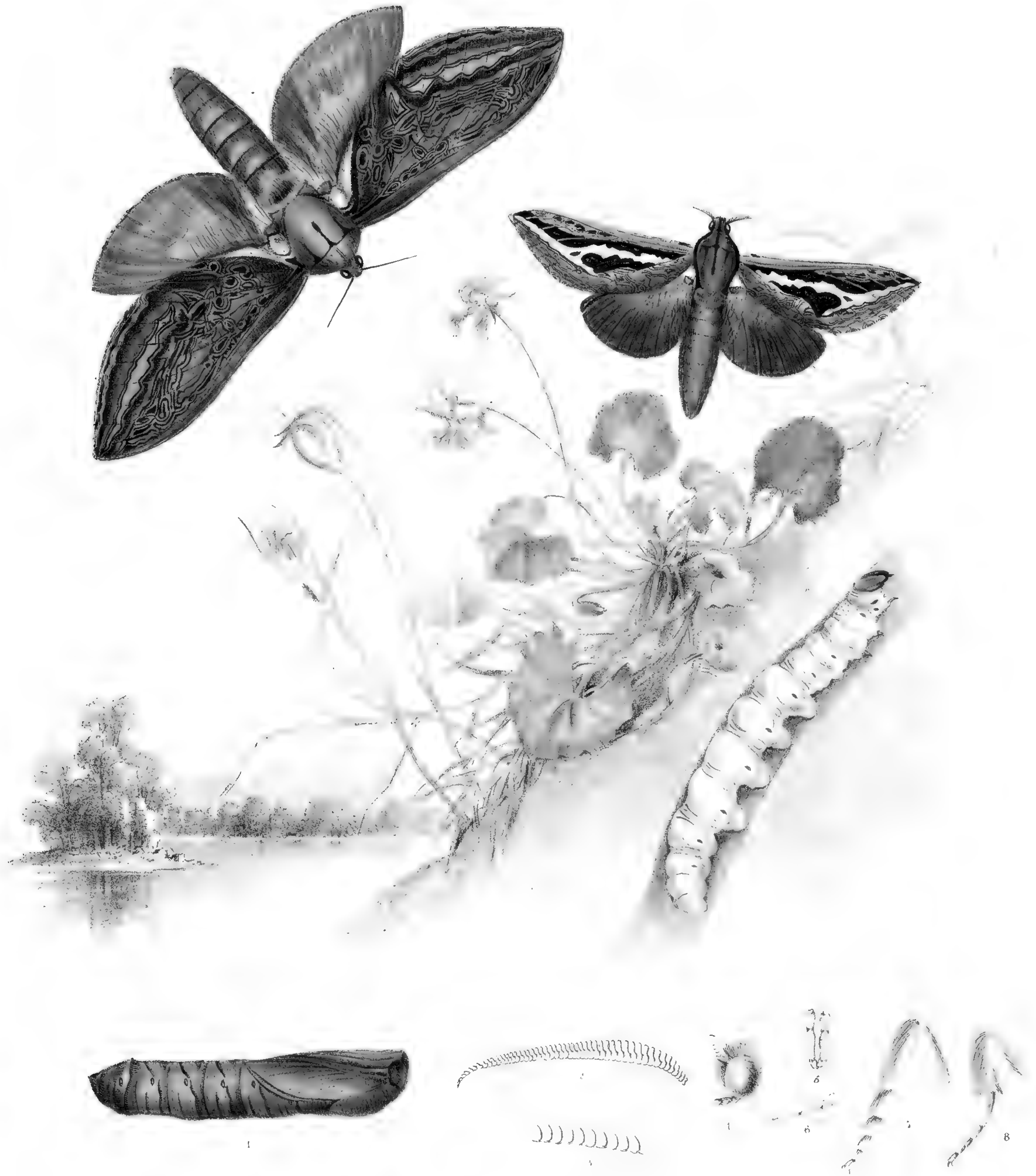
The *Labial palpi* (fig. 3) recurving in front to about the top of the eyes; terminal joint thin and pointed, 2nd joint somewhat longer and more robust, basal small, about $\frac{1}{4}$ the length of the 2nd.

The *Legs*, anterior pair small; 2nd pairs (fig. 4) larger, with 2 apical spurs on tibiæ; posterior pairs long, with 4 large spurs.

The entire upper surface of the insect is pearly-white, the anterior wings speckled with minute black dots, and along the costa a yellowish tinge; the posterior wings have a slight pinkish hue.

The moth and larva are depicted with a small limb of the *Banksia serrata*.





From Nature by Helena Scott.

Rhizopsyche Swatsoni

On Stone by E. Thomas.

PIELUS.

Cossus, Donovan, Boisduval.

Epiolus, Herr Schæff.

Pielus, Stephens, MSS., Brit. Mus. Cat., p. 1576, Lep. Het.

Rhizopsyche,¹ mihi, on Plate 4, Aust. Lep., and in original MSS.

Alæ elongatæ, sublanceolatæ, versus apicem acuminatum subrotundatæ, costâ subrectâ, margineque exteriore multis perobliquo; anticæ signaturis multis labyrinthicis, in maribus fasciis argenteis ornatis. Caput parvum. Palpi labiales distincti, porrecti, articulo primo secundoque subæqualibus, robustis, terminali minuto. Maxillæ obsoletæ. Antennæ longiuseulæ, pectinatæ, nonnunquam tripectinatæ. Pedes exalcarati, antici robusti, postici parvi. Larva lactiflorea, longa, cylindrica, carnosâ, segmentis bene indicatis, primo capiteque squamosis; involucrum subterraneum habitans et radices depascans. Pupa fusca, elongata, capite, thorace, abdomineque posticè scabris corneis, segmentis abdominalibus annulatis, porcis duris nigris.

Wings elongate, somewhat lanceolate, costa straightish, slightly rounded towards the tip, which is pointed; exterior margin very oblique, uniting with the interior by a gentle curve; superior wings with numerous lines disposed labyrinthically; relieved in the males by broad bands of silver. Head small. Labial palpi distinct, porrected forwards, 1st and 2nd joints about equal and robust; terminal minute. Maxillæ obsolete. Antennæ moderately long, in some pectinated, in others tripectinated. Legs spurless, 1st and 2nd pairs robust, posterior small. Larva cream-coloured, long, cylindrical, fleshy, muscular, with the segmental divisions well defined; head and 1st segment squamose. Lives underground at some depth, within a tubular dwelling, and feeds upon the roots of plants. Chrysalis brown, elongated; head, thorax, and posterior portion of the body rough and corneous; abdominal segments, with hard annular black ridges.

From *Hepialus*, this genus may be readily known by the distinct palpi, pectinated antennæ, smooth head and thorax, spurless legs, and the absence of the long tuft of hair on the tibiæ of the posterior legs of the male.

From *Zeuzera*, by the antennæ being pectinated almost to the tips, and the larva being subterranean.

From *Cossus*, by the wide difference of outline of the wings and abdomen, spurless legs, the larva being destitute of dorsal scales, and living underground.

SPECIES 1.—PIELUS SWAINSONI. —(PLATE IV.)

Rhizopsyche Swainsoni, mihi, on Pl. 4, Aust. Lep., and in original MSS.

We have much pleasure in presenting our readers with the metamorphoses of this conspicuous insect, believing that they have not hitherto been fully described. This insect, moreover, possesses an additional interest from the larva being liable to the attacks of that peculiar fungus, the "Sphæria" of Hooker.

Over a great extent of this country, in the far interior particularly, and also in the adjacent Colonies, at certain seasons, great numbers of the exuvie of large lepidopterous chrysalids are seen with the anterior portion protruding above the surface of the ground. Having obtained a few of these for examination, we arrived at the conviction that they closely approached the genus *Hepialus*, and our anxiety was incited to obtain the larvæ, in order to derive correct information with respect to the habits of an insect of such magnitude. Most fortunately, shortly afterwards, a few remains of a similar kind were discovered by us on Ash Island, and by digging carefully around the spot, we happily succeeded, at a depth averaging from 2 to 3 feet, in procuring fine living specimens of the larvæ and chrysalides, and also some of the former whose bodies were completely occupied by a species of *Sphæria*; thus affording us information of the two preparatory stages of the insect, and putting us, at the same time, unexpectedly, into the possession of one species of our Australian Lepidoptera on which that singular fungus is produced. By these operations, cautiously conducted, we ascertained that the caterpillars lived upon the outer portions of the roots of trees, either recent, or partially decayed, and from which to the surface of the ground, they had constructed through the soil a gallery, internally coated with a slight brownish-coloured silken tissue, and of just sufficient width to permit the passage of their bodies; this gallery was continued somewhat horizontally underground, and led from one root to another, and in its progress sometimes passed through clay saturated with water from recent rains. The spot upon which we pursued our investigations was originally covered by a thick brush, but had been partially cleared for a few years, leaving the space open, grassy, and but thinly timbered, so that the dead and living roots crossed each other in some abundance where the present caterpillars were discovered.

¹ See the explanatory remarks to the genus *Charagia*, p. 3, Part I.

At maturity, the Caterpillar attains to about $1\frac{1}{2}$ inches in length, being of a thick creamy-white, with the exception of the head and 1st segment, which are yellowish-brown and hard; the adjoining segment bears, anteriorly, a triangular shield speckled with brown. The segments are muscular and well developed, particularly those containing the abdominal feet; from these segments the body becomes attenuated towards the caudal feet, which are so united with the ultimate segment that they might be mistaken for a small additional one.

The Chrysalis (fig. 1, female) is $3\frac{1}{2}$ inches in length, darkish-brown, with head, thorax, and posterior portions of the body covered by minute horny striations, and on the abdomen annular black ridges, which enable the chrysalis, like others of its kind, to force through the coarse and dirty-looking cocoon at the foot of the tube in which it had undergone its change, and to ascend to the mouth of its dwelling when on the point of final emergence.

In the month of April, the perfect insects appeared with us, and they may then occasionally be seen at sundown with deflexed wings upon adjacent trees, the bark of which they greatly resemble in colour, preparatory to taking their flight at dusk. This season of the year, we perceive, agrees nearly with that stated by Mr. Hawkes, of Van Diemen's Land, with respect to "a large grey moth," whose caterpillar is subterranean and subject to the attack of the *Sphaeria Gunni*, and this moth will prove (so we think) upon further investigation to be another species of the genus *Pielus*.

The female of the perfect insect is $6\frac{1}{2}$ inches in expanse of wings; the male about $1\frac{1}{2}$ inches.

The *Antennae*, ...moderately long, pectinated in both sexes, with the exception of the two terminal articulations, and naked; of the male (fig. 2) pectinations rather long and obtuse at their tips; of the female (fig. 3) very small, much rounded at their tips, appearing to the naked eye as if setaceous.

The *Labial palpi* (fig. 4, male, 5 from below) project a little beyond the head, covered thinly with hair-like scales; 3-jointed, in the male (fig. 6) terminal joint small, the other two much larger, the middle joint being rather the longest; in the female the basal and 2nd joints are about equal.

The *Legs*,spurless; anterior pairs (fig. 7) long and robust, posterior ones (fig. 8) small; 2nd pairs of an intermediate size; anterior and 2nd pairs have their tibiae and tarsi clothed thickly with hair, posterior pairs have only the tibiae fringed exteriorly, with the tarsi almost naked.

The ground colour of the upper surface of the female is throughout of a rich light brown, brightening along the disc of the superior wings, which also possess a broad light-coloured band with a silvery hue, running obliquely from the tip to near the inner margin, edged on both sides by a double undulating line of black, shaded around by blackish brown. The remaining portion of these wings is occupied by numerous wavy circular and contorted dark brown lines, forming a labyrinthic mass of irregular figures. The costa is broadly developed, the tips acuminate; the exterior and abdominal margins united by a uniform and gentle curve.

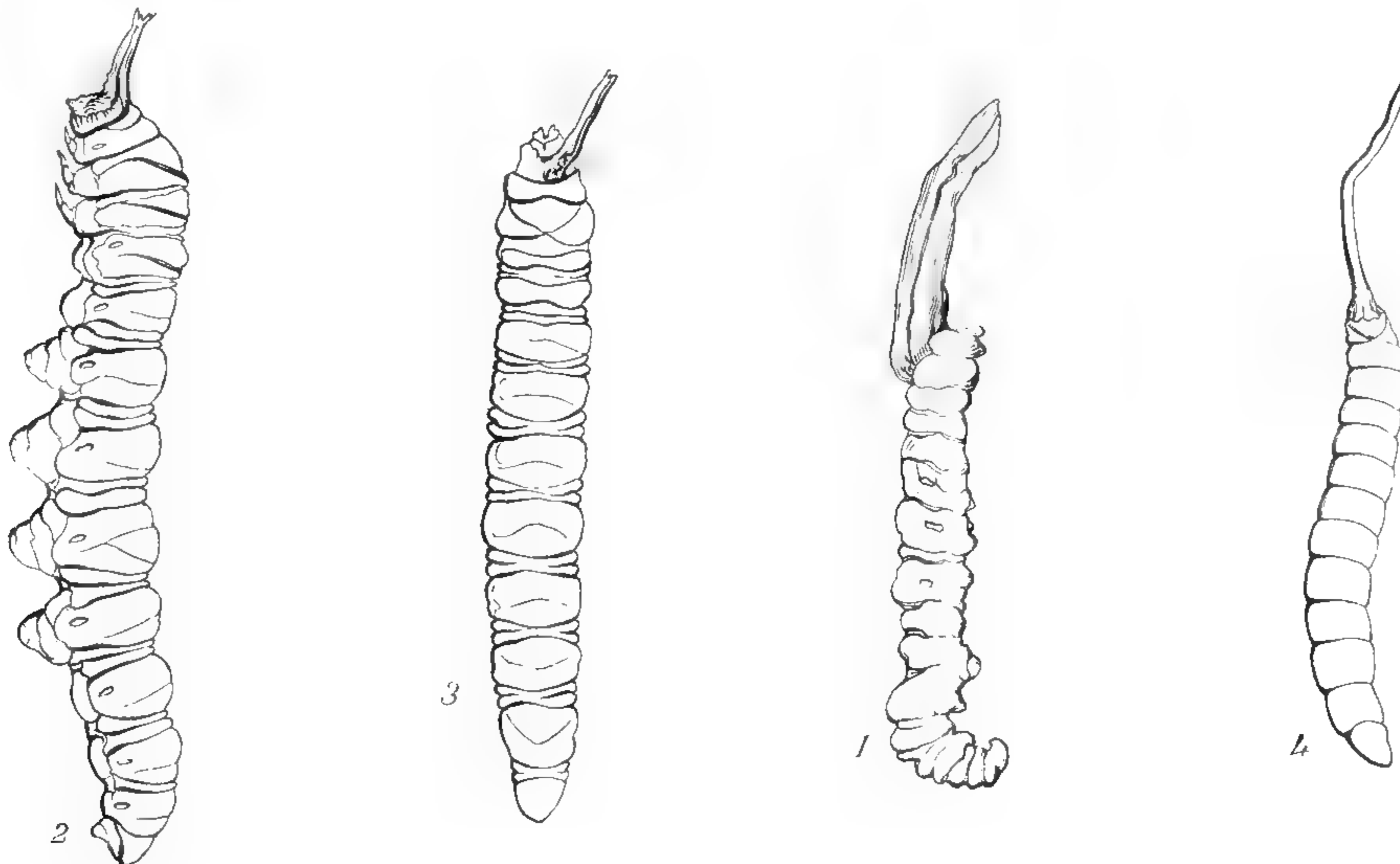
The superior wing of the male is distinguished by a distinct flexuous marking of bright silver, formed by two irregular bands, the one proceeding from the apex towards the anal angle, and the other from the base along the centre of the wing, thus meeting each other obliquely, the outer one being slightly prolonged beyond the junction. These silver bands are frequently found disunited from each other, or broken in various parts. A dark and broad shading of velvety brown towards the centre adds much to their relief, while the parts adjoining all the marginal borders are of paler colour and silky appearance, covered over with delicate irregular darker lines forming themselves into graceful figures. The inferior wings and body are throughout of a rich pale brown.

When we were first in possession of these insects we concluded that they were identical with the *Cossus Argenteus* and *Cossus Labyrinthicus* of Donovan, but upon a careful examination of the original specimens from which he made his drawing, still in the possession of Mr W. S. MacLeay, we found that these insects were tripectinated in the antennae, whereas ours, male and female, are simply pectinated, the markings on the upper wings being different and readily distinguishable. Subsequently a friend connected with the British Museum, has suggested that our *Pielus Swainsoni* is the *Pielus atripalpis* of Stephens, MSS., British Museum Catalogue, p. 1577; to which we have to observe that our species does not possess black palpi; and moreover, the upper wings of both sexes are impressed with the labyrinth-like marks, the absence of which in the *P. atripalpis*, is so particularly insisted upon.

We are induced, as being applicable to the matter now in hand, to offer a few observations respecting those Australasian Lepidopterous Caterpillars afflicted by the *Sphaeria* which have come under our notice; conceiving that this subject has hitherto been treated more in a botanical light than the one interesting to the entomologist; and to do so more effectually, it is necessary to exhibit clear outlines of some of the larvæ with which we are acquainted. By comparing these with the one similarly affected which

¹ "Sea and River-side Rambles in Victoria," 1860.

we obtained here, and also with the delineation on the plate of the living larvæ, together with the appended observations of several writers, a fair conclusion can be arrived at respecting the genus of the moth which in its two preparatory states is liable to the fatal attacks of this fungus. In order, therefore, to carry out the necessary comparison, we copy a lignified larva found at the Barrabool Hills, Victoria,¹ and the well-known New Zealand species.² To these we have added sketches of one obtained near Sydney by Mr Shepherd, and another by ourselves at the Hunter River.



Referring then to the outlines given above, it will be seen that the specimen from the Barrabool Hills, (fig. 1), and that from the vicinity of Sydney (fig. 2) approximate in a remarkable manner to the one found by us on Ash Island, (fig. 3), and to the recent larva depicted in Plate 4; possessing the large muscular abdominal segments and feet, and becoming gradually attenuated towards the extremities; leading, as far as these examples are concerned, to the reasonable conclusion that they are so closely allied as to belong to the same family. Their habits also, in the living state, are described in every respect as a counterpart of our *Pielus Swainsoni*, living and going through their changes underground, and connected by a tubular passage through the soil to the surface. As bearing further upon the views we entertain upon this subject, we beg to quote the concise descriptions of the economy of similar fungus-bearing Lepidoptera inhabiting Tasmania and the Murrumbidgee, N. S. Wales, as given by Mr W. H. Hawkes and Mr John Allen. Mr Hawkes of Franklyn Villa, Launceston, writes of the *Sphæria Gunnii* :—

“It is found generally under Wattles or Gums, immediately after the first Autumnal rains, (about March). The fungus with one to five stems, but generally with only one, usually shoots from the nape of the neck, in rare instances from other parts of the body, very seldom from the neck and tail, (in thousands of specimens four or five of these only have come before me). The chrysalis found too with one stem from the upper part, and sometimes also encircled with rings of fungus. The *burrow* made by the larva is about 18 inches deep, the direction inclined; at the mouth the larva and chrysalis may be seen on the least alarm to retreat with precipitation. The perfect insect is a *large gray moth* coming forth in April or May.”

From Mr Taylor's communication to the *Tasmanian Journal*, we extract as follows :—

“A plant of a similar kind³ was presented to me in 1837 by a Mr John Allen, who discovered it growing in abundance on the banks of the Murrumbidgee in a rich black alluvial soil. The insect, in some specimens, was 6 inches long, and the plant about the same, springing like the New Zealand one from the nape of the neck. This plant is quite different from the other, being a thick stem formed by the close union of several stalks which unite at the top and are surrounded by a fringe, which, when expanded, assumes the appearance of a full blown flower upon the surface of the soil, the rest being buried in the ground—this top has a brown velvety texture. Many similar ones were found in the same locality, which is the only part of New Holland in which they have hitherto been seen. Numerous *empty shells* and *holes* were discovered in the vicinity, and at night the number of *large brown moths* were so great as more than once to extinguish my friend's lamp.”

With respect to the New Zealand example of the lignified larva⁴ (fig. 4), it is evident that in form it partakes more of the characteristics of the *Hepialus Humuli*, (a true underground insect) as figured by Hubner, Harris, and others, than any of the

¹“Sea and River-side Rambles in Victoria, 1860.”

²Rev. R. Taylor's account of the “Bulrush Caterpillar,” published in Vol. I., p. 307 of the *Tasmanian Journal* for 1842.

³*Sphæria innominata* of Taylor.

⁴We have much larger and finer specimens from New Zealand in our possession.

species of the Australian Charagiæ, although it is asserted,¹ and generally believed, that the Sphæria Robertsii is engendered in the larva of the Charagia Virescens² of New Zealand, said to feed on the roots of the Rata (*Metrosideros perforata*); but this, it may be observed, is a mere supposition, as no naturalist has from his own experience figured or described the habits and transformations of this fungus-bearing Caterpillar. We think it probable that the stems and trunks of the *Metrosideros* furnish sustenance for the larvæ of the Charagia Virescens; but these live and undergo their metamorphoses *within* the wood, effectually protected against injury from this particular fungus; and it is equally probable that the *external* portions of the finer roots of the same or neighbouring plants afford nutriment to the larvæ of such genera as pass their lives wholly in the earth, a state of existence which would render them exposed to the attacks of the Sphæria. We are borne out in our assertions, being in possession of the entire metamorphoses of the Charagia Virescens, and by careful notes made from personal observation during a recent visit to New Zealand by our friend Mr Edward Ramsay of Dobroyd. This gentleman writes:—

“Charagia Virescens I found in abundance near the town of Auckland, New Zealand, at the end of November, 1861, inhabiting various trees, among others the *Melicytus ramiflorus*, or “Mahoe” of the Natives. Some of the larger trees had as many as 30 habitations of the larvæ in them, the but being literally studded with their abodes. Some were in the chrysalis state with the bagging over the hole torn away, and the entrance sealed up, as with our Australian Charagiæ; but the greater number were in the larva state. Those that were brought on to Sydney in the chrysalis state took wing in the middle of January, 1862. The formation of the covering to the habitation, and the way in which many of the larvæ have their tubular excavations running almost side by side, agree closely with the Ch. Ramsayi. All the larvæ found were in the trunk and branches of the trees, *never* in the roots. Mr Huntley, residing at Wellington, and a great collector of insects, asserts that the Sphæria Robertsii is produced from the larva of a *large brown moth*.”

To these observations we may add that the caterpillar of the Ch. Virescens differs as widely in form from that bearing the Sphæria Robertsii, as do the large “*gray or brown moths*” mentioned in connection with this subject by all the authorities we have quoted, and corresponding with our own experience, from the brilliant and beautifully coloured Charagiæ. We, therefore, entertain the opinion that an error exists in associating the larva of the Ch. Virescens with the Sphæria Robertsii, and that it will be found hereafter, that this peculiar fungus only attacks the caterpillar whose existence is passed underground, as in the case of the *Pielus*, *Hepialus*, and a few others.

Shortly after obtaining this interesting insect, we were visited by that distinguished naturalist, the late Mr Swainson, F.R.S., whose scientific works, particularly on Ornithology, have now a world-wide fame; and while expressing our deep sense of gratitude for the interest he took in the progress of our work, we beg to name our insect after him, in commemoration of our esteem and respect for his memory.

The Caterpillar, the male and female Imago, and a view of frequent occurrence in our river scenery, are shewn in the Plate.

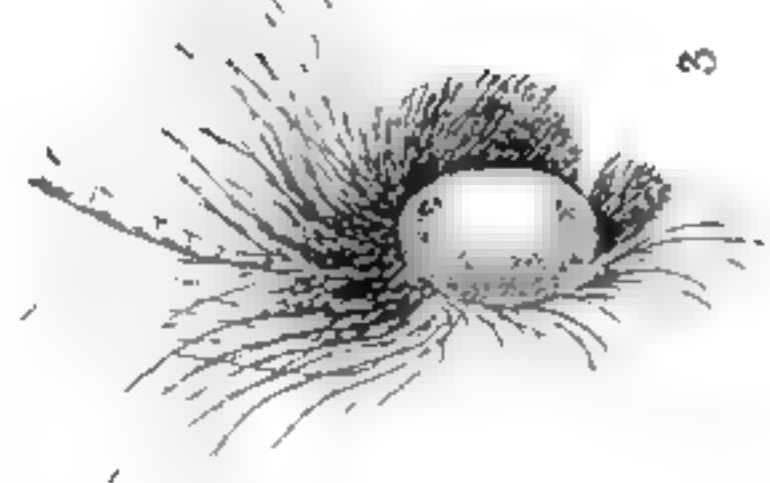
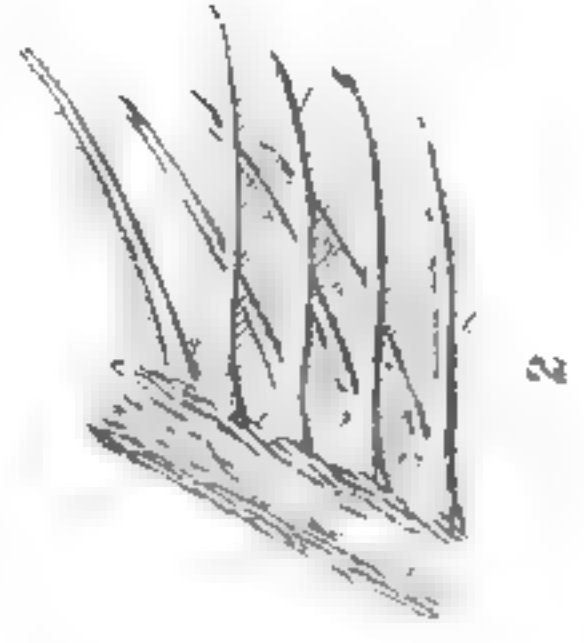
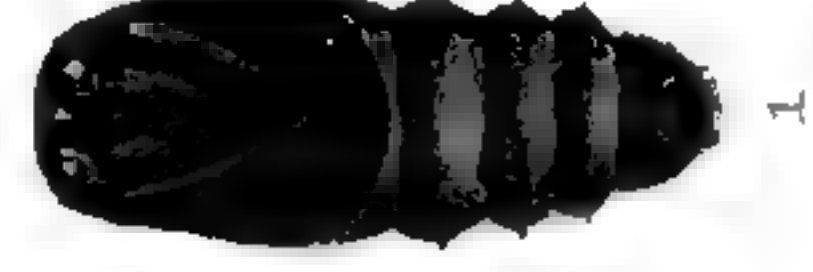
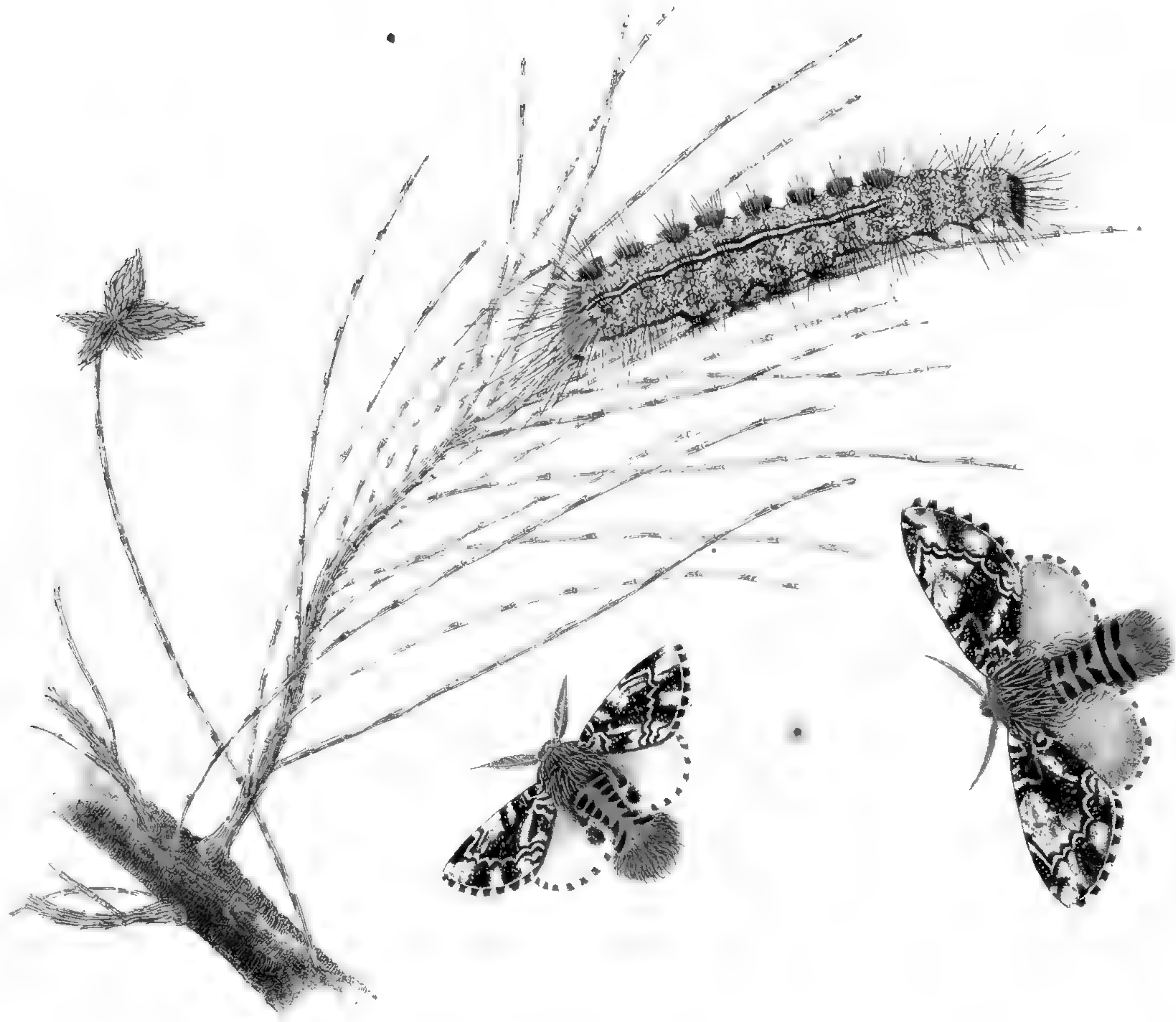
AGLAOSOMA.

Alæ integræ, margine anteriore in maribus subrecto, in fœminis convexiusculo, angulis apicalibus interioribusque rotundatis. Corpus valde robustum, pilosum apice verruculato, alas superante. Antennæ in maribus modice, in fœminis vix bipectinatae. Palpi labiales minuti, valde pilosi, articulo secundo ter longiore basali, terminali minuto. Pedes valde hirsuti, longiusculi, tibiis posticis quatuor calcaribus longiusculis apicalibus armatis. Larva cylindrica, robusta, tuberculata, penicillata, cristis magnis depressis dorsalibus.

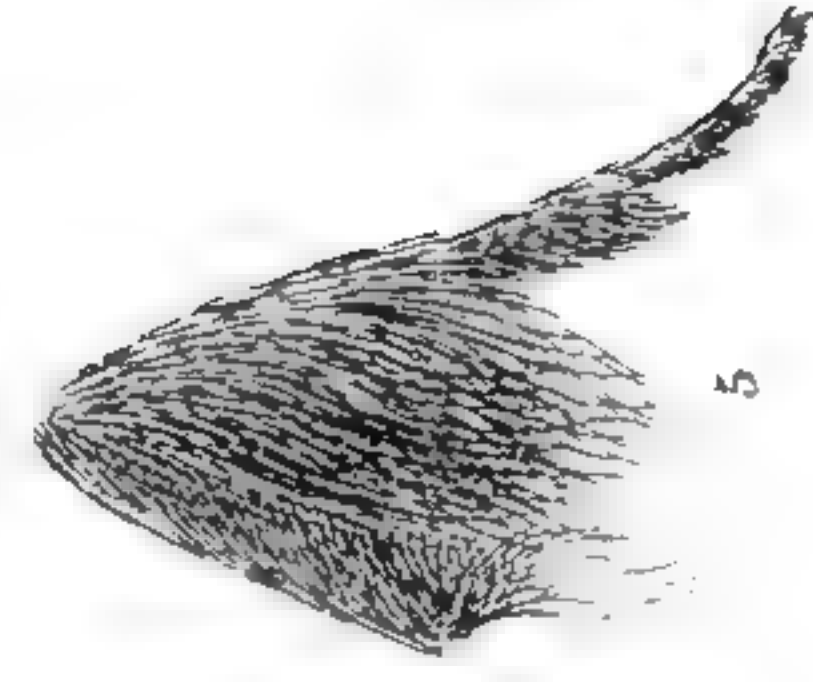
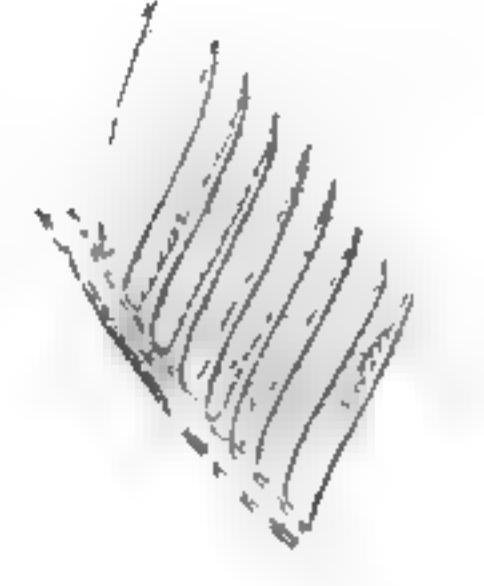
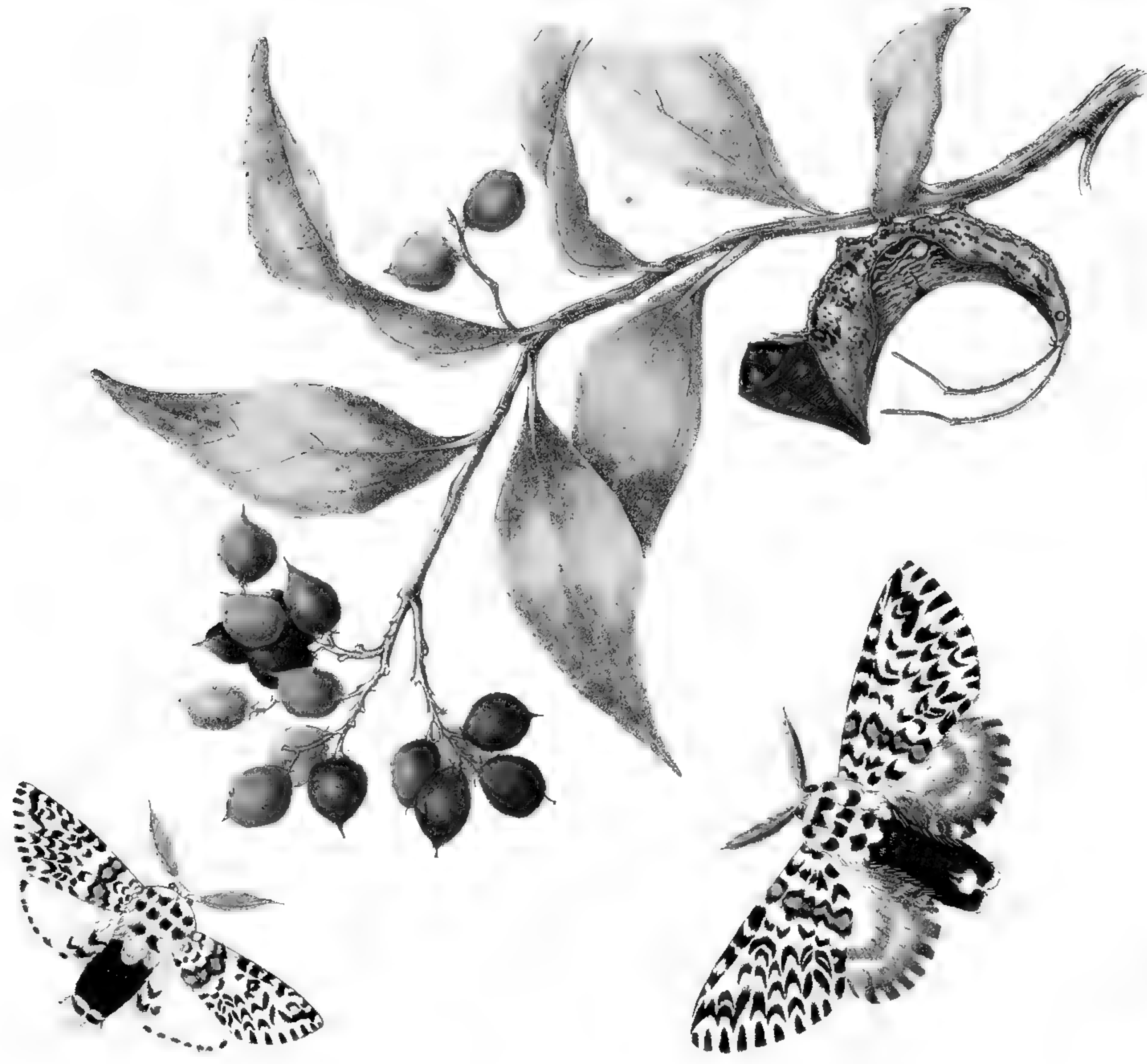
Wings entire, in males rather straight in front, in females slightly arched, rounded at their tips and hinder angles. Body very stout and pilose, tufted at the extremity and extending beyond the wings. Antennæ bipectinated, in the males moderately, in the females slightly. Labial palpi minute, very pilose, 2nd joint three times the length of basal, terminal minute. Legs very hairy, moderately long; hind tibiæ with four longish apical spurs. Larvæ cylindrical, robust, tuberculated, with brushes of long stiff hair, and a dorsal row of large flat tufts.

¹ By Dr Hooker in his “*Icones Plantarum*,” 1837; Dieffenbach, Doubleday, Taylor, &c.

² We can assert that the Charagia Virescens of Doubleday, and the Charagia rubroviridans of Stephens, MSS., Brit. Mus. Cat., pp. 1569, 1570, are ♂ and ♀ of the same species, as we have reared them.



Aglaosoma lauta.



Cerura Australis.

SPECIES 1.—AGLAOSOMA LAUTA.—(PLATE V.)

In July and August, these showy caterpillars may frequently be met with conspicuously placed on the various species of Casuarina, Acacia, Leptospermum, and Styphelia, not being constant to any one of these plants; this fact we have verified by supplying them with one kind during one day, and varying it the next, merely consulting our own convenience in the selection, a proceeding evidently not to their distaste, as they fed voraciously. When young, they congregate on the lower parts of the trunks of those plants upon which they have been bred, dispersing only when in search of food, and again returning for greater shelter and security, but when nearly adult, they separate and establish themselves solitarily upon neighbouring shrubs, selecting those most suitable to their wants. At maturity, they attain to nearly $3\frac{1}{2}$ inches in length, the ground colour being dark brown, thickly spotted over with white, and possessing a lateral line, also white, along the abdominal segments; the lower half of which, together with the whole of the thoracic portion, contains bright cobalt-blue tubercles, each emitting brushes composed of long stiff hairs; the upper part above the line, not tuberculated, but with a dorsal row of velvety-brown flattened tufts, eight in number.

The cocoon, consisting of a slight silken texture, coated abundantly with the brown hairs of the dorsal tufts, is constructed in some concealed situation; in this is enclosed the chrysalis (fig. 1, female) of about $1\frac{1}{4}$ inches in length, of a rich reddish-black colour, and rounded at the extremities, with the wing-cases short.

The female moth is in expansion of wing $2\frac{3}{8}$ inches; the male $2\frac{1}{8}$ inches.

The *Antennæ* ... (fig. 2, male) bipectinated, each pectination ciliated and terminating in a seta curving upwards; female moderately bipectinated.

The *Labial palpi* (fig. 3, female) are minute, densely hairy; 2nd joint 3 times longer than basal, apical minute; male rather larger.

The *Legs*, 2nd pairs with 2 apical, and posterior (fig. 4) with 4 rather long spurs on tibiae, femora and tibiae clothed with long hairs.

In repose the wings are deflexed.

Fore wings of the female brown, mottled with irregular patches of white: several tortuous lines of white towards the base, and a transverse, irregular, undulating band crossing the wing a little beyond the disc, in which are placed two vermilion spots; under wings light brown, with white spotted margins; abdomen orange yellow, broadly banded with black; having a dorsal row of tufts and a terminal brush, both of orange yellow. The thorax is thickly set over with brown and white hairs.

The male presents similar markings, but the white prevails to a much greater extent, more particularly on the under wings, which have additionally two brown patches near the abdominal margin; the red discal spots on the upper wings are nearly obsolete.

The entire under surface of both sexes is light brown, paler in the males.

The illustrations consist of the caterpillar resting on a branch of the Casuarina paludosa, about which are the male and female moths.

C E R U R A .

Cerura, Schrank, Steph., Leach, &c.

Harpyia, Ochs.

Dicranoura, Latreille.

Pania, Dalman.

Furcula, Lamarck.

“Corpus crassum, pilosum. Ocelli nulli. Proboscis brevissima. Palpi brevissimi, porrecti, caput non superantes; articulus 3-us minimus. Antennæ usque ad apices pectinatæ, thorace longiores. Abdomen alas posticas superans. Pedes validi, pilosi; tibiæ posticæ calcaribus duobus minutis apicalibus. Alæ læves, longiusculæ; anticæ arcola appendiculari, apud costam fere rectæ, apice rotundatæ, margine exteriori perobliquæ.” Walker, Cat. Brit. Mus. Lep. Het., p. 982.

Larva crassa, glabra, carnosæ, variegatæ, versus apicem attenuatæ, tentaculis duobus mollibus filiformibus terminatæ.

Folliculus validissimus, firmus, scobe gummiq[ue] tenace compositus.

"Body stout, pilose. Proboscis very short. Palpi very short, not extending so far as the head; 3rd joint very small. Antennæ pectinated to the tips, longer than thorax. Abdomen extending beyond the hind wings. Legs stout, pilose; hind tibiæ with 2 minute apical spurs. Wings rather long. Fore wings almost straight along the costa, rounded at the tips, very oblique along the exterior border; interior angle much rounded; discal areolet intersected by a secondary forked vein; three inferior veins; 2nd about 4 times further from the third than from the first." Walker, Cat. Brit. Mus. Lep. Het., p. 982.

"The Caterpillars are thick, smooth, fleshy, varied in their colours, with the extremity of the body attenuated, and terminated by two long filaments (whence the generic name derived from the Greek) instead of the ordinary anal prolegs, and which enclose two slender very long fleshy threads, which the insect has the power of protruding or exerting at will." Westwood, Brit. Moths, Vol. I., p. 75.

"Cocoon remarkable for its strength and solidity, being composed of particles of wood united by a very adhesive kind of gum." Duncan, Brit. Moths, p. 192.

SPECIES 1.—*CERURA AUSTRALIS*.—(PLATE V.)

This fine species of the Puss Moth, although abundant with us in some seasons, must yet be considered rare, as we do not remember having seen a single specimen, with the exception of those we have ourselves presented, in any of the Sydney collections; but there can be no doubt, when their habits are better understood, that they will be numerous found in many other places beyond a locality so circumscribed as this Island. All the caterpillars of this genus when at rest assume a formidable appearance, holding their large and massive heads erect and recurving their tails, furnished with a long bifurcate horny appendage, as if in readiness to inflict a wound. To this defiant attitude the Larva owes its unenviable reputation in some of the rural districts of England, where it has been described as "a monster with a head like a lion, jaws like a shark, a horn like a unicorn, and two tremendous stings in its tail;" but after all it is very innocent and innocuous, neither possessing the stinging powers of the *Doratiophora*, nor the irritating properties of the *Chelepteryx*, and is withal a very handsome caterpillar, with a robust form and ornamental exterior.

Our species is fully 3 inches in length; the head is brown, and placed under a dark brown horny triangular-shaped shield, the base of which proceeds from the anterior portion of the first segment, rising to a point over the middle of the third; a similarly coloured large saddle-shaped mark along the back and part of the sides, both of these edged with light red, and finely striated with lavender, the latter also with short light coloured longitudinal lines along the sides; the remainder of the caterpillar is a bright emerald green, irregularly spotted with brown. The bifurcate filaments proceeding from the attenuated extremity of the body, which is destitute of caudal feet, are long, minutely spinose and brown, and contain retractile rose-coloured tentacula. When young, there are two horny projecting points, one on each side of the base of the shield, but which disappear in the last moult. At rest, the caterpillar supports itself by the abdominal feet, recurving both its extremities, with the thoracic segments contracted, and forcing the triangular shield into a conspicuous prominence above.

Preparatory to its change to the pupa state, it hollows out a cavity in the bark and adjoining wood, and by agglutinating their comminuted particles forms a strong outward covering of a depressed oval form, and so exactly resembling the bark that the structure might be easily mistaken for a slight woody excrescence. At the head of this cocoon is a circular space of much weaker material left purposely for the easier escape of the imago.

The Chrysalis (fig. 1) is dark brown, bluff towards the head, and rather more than 1 inch in length.

The perfect insects take wing in February and September; in the former case they remain about a month in the cocoon, in the latter, two or three, according to the severity of the winter. The female in expansion of wing is $3\frac{1}{2}$ inches, the male an inch smaller.

The *Antennæ* ... (fig. 2, male) are strongly bipectinated in both sexes.

The *Labial palpi* (fig. 3 and 4) are very small, basal rather longer than 2nd joint, terminal minute.

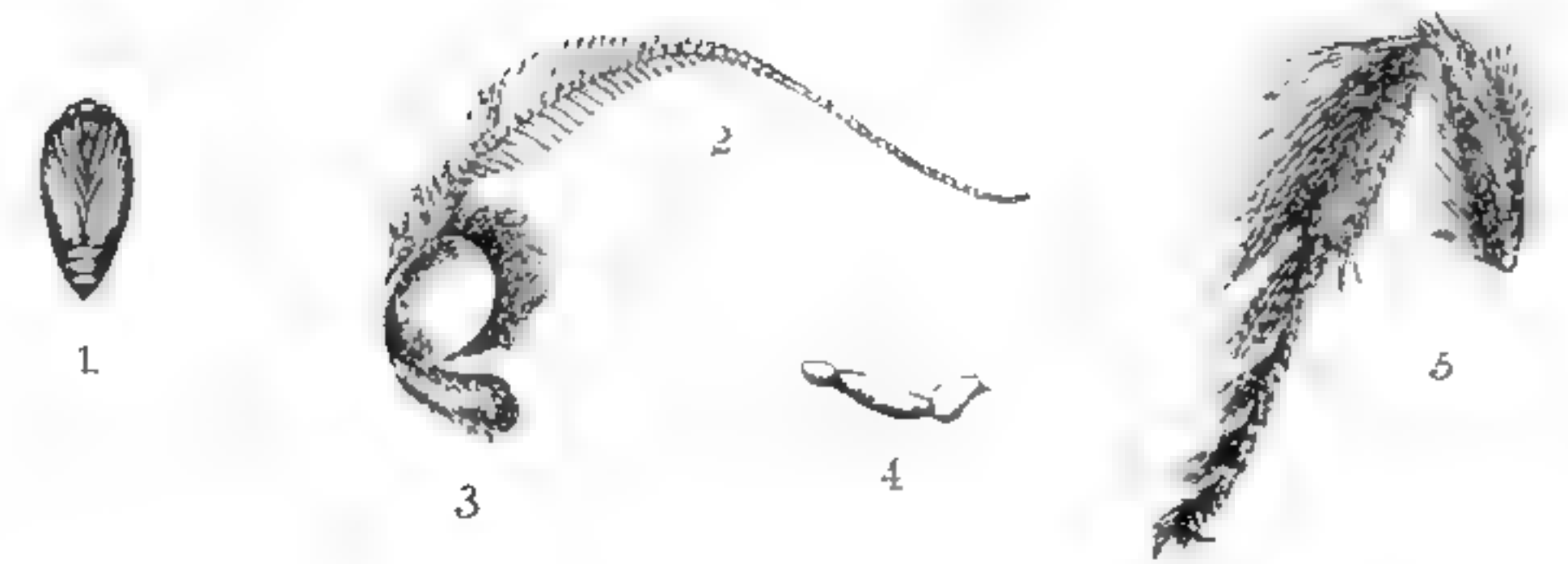
The *Legs*,densely pilose, with 2 very minute apical spurs on the tibiæ of posterior legs, (fig. 5).

Wings deflexed at rest.

The ground colour of the upper surface of the superior wing of the female is white, with a transverse irregular bar near the base, of bright skyblue edged by black; spots and lunules of black are dispersed rather numerous over the other parts and along the exterior margin. The under wing dusky, with two indistinct darker bands, and margined with a row of white spots. The thorax white, containing 10 rich blue spots. The abdomen robust, pilose, and black, with a somewhat heart-shaped white spot near the extremity, which bears two semicircular tufts, also white.

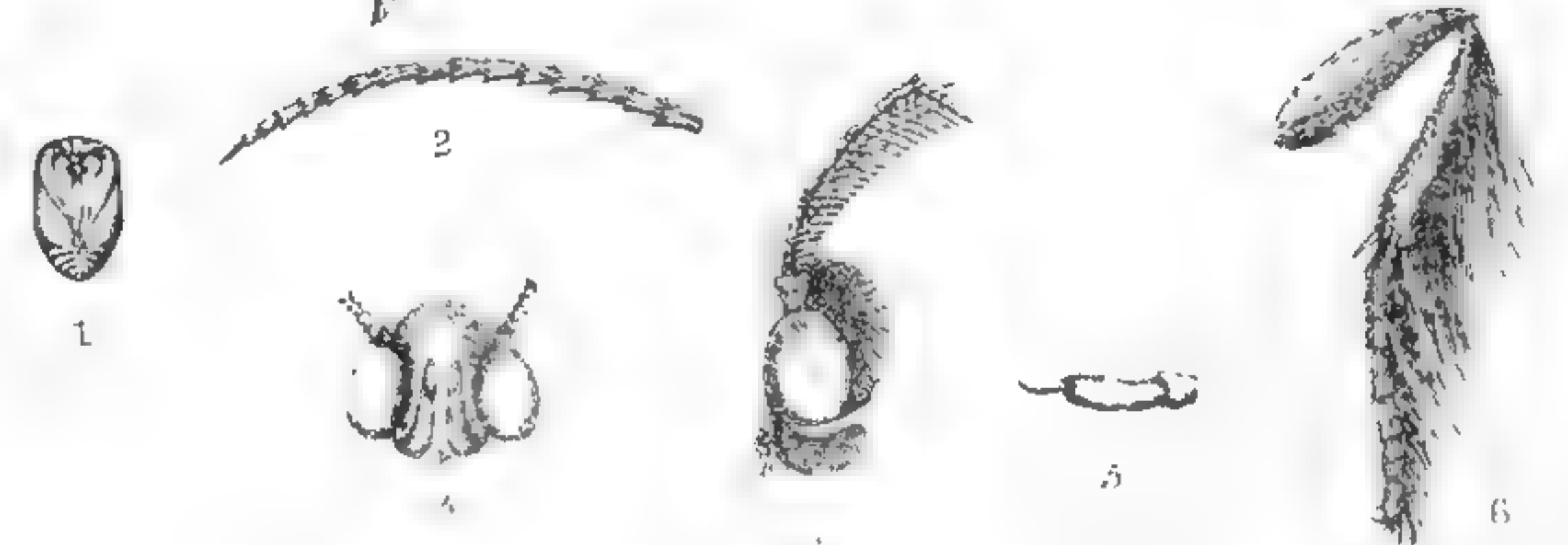
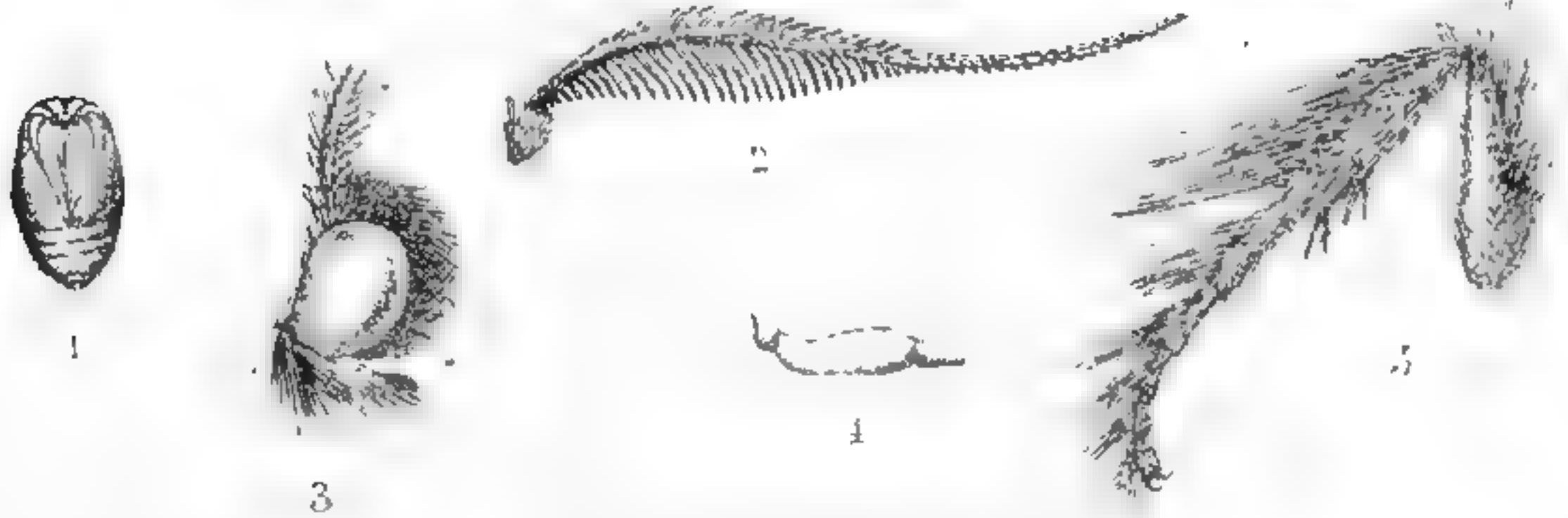
The under side, devoid of the blue bars, exhibits much more black; the spots and lunules on the upper surface of the anterior wing extending into rather broad irregular transverse bands, while the two obscure bands of the inferior wings become black and distinct.

The male is similar in colouring, but fainter, especially in the under wings, which are almost white.



Doratiophora Lewini.

Doratiophora casta.



Apoda infrequens.

Referring to the generic characters of the *Cerura* as detailed by many authors, it will be seen that our Australian species differs principally from the European ones by the fore wings not being sub-diaphanous, by the transverse bar being bright blue and almost macular, and by the Cocoon having at the upper end a circular space composed of much weaker material than the other portions.

A sprig of the *Scolopia Brownii* is drawn in the engraving, an indigenous plant, we may remark, which, if introduced more generally, would prove ornamental to the shrubbery from the profusion of its fragrant flowers and gay parti-coloured berries; upon this, its natural food, the caterpillar is shown in its resting position, with the fleshy threads exerted; the moths ♂ and ♀ are also given.

DORATIOPHORA.

Bombyx, Lewin.

Doratifera, Duncan.

Alæ sat latæ, angulis, apicalibus interioribusque rotundatis; anticæ corrugatæ, costâ in fœminis subrectâ, in maribus subconçavâ. Corpus in fœminis valde, in maribus modice robustum, alas vix superans. Caput parvum. Thorax non fasciculatus. Antennæ, *Mas.*—modice bipectinatæ, dimidio terminali serrato: *Fœm.*—setaceæ. Palpi parvi, dense pilosi, porrecti, deflexique, articulis terminalibus, basalibusque parvis, secundo bis longiori. Pedes sat validi, subpilosi, tibiis tarsorumque articulis externe scopatis, tibiisque posterioribus calcaribus duobus parvis apicalibus armatis. Larva crassa, elongata, in dorsum depressa, truncata, subtusque glutinosa, ramulis spiniformibus plerumque lateralibus, projectionibusque radiatis retractilibus pungere potentibus, supra armatis; capite parvo, retractili, pedibusque obsoletis. Folliculus coriaceus, operculiferus et ramulo-fixtus.

Wings moderately broad, rounded at the tips and hinder angles; costa of the fore wings of the female rather straight, of the male somewhat concave. Surface corrugated. Body very stout in the female, moderately so in the male; projecting slightly beyond the hind wings. Head small. Thorax not tufted. Antennæ, male moderately bipectinated to about half the length, serrated thence to the tip; female setaceous. Palpi small, densely pilose, projecting forwards and downwards; terminal and basal joints small, middle twice as long as either. Legs moderately stout, slightly pilose, with long brushes anteriorly on the tibiæ and each joint of the tarsi; two small apical spurs on tibiæ of 2nd and posterior pairs. Larva thick, elongate, depressed along the back, truncated at the ends, and viscous underneath, with fleshy spine-shaped projections, principally laterally, and armed above with retractile-rayed processes capable of stinging; head small, retractile. Feet obsolete. Cocoons coriaceous, provided with lids, and attached to branches.

SPECIES 1.—DORATIOPHORA LEWINI.—(PLATE VI.)

Mr Duncan has constituted this group into a new genus entirely on account of that peculiar process which the caterpillars bear on the upper portions of their bodies, capable of inflicting wounds of an irritating character; a distinctive peculiarity probably of sufficient weight in itself to authorise their separation from the *Limacodes*; although not backed by other well defined generic characteristics. We possess four *Doratiophoræ* and two *Apodæ*, the former of course with the larvæ bearing the stinging apparatus, the latter innocuous; whose habits, metamorphoses, and anatomical details are so nearly similar, that it would be difficult to part them, without, indeed, having recourse to this one especial distinction. Four varieties of outlines will be seen in plate 6, graduating from the tuberculated and wounding larva, to that of the onisciform and harmless *Apoda*, and however widely these caterpillars may vary in their form, it is nevertheless palpable that in the structure and anatomy of the imago so close a resemblance exists as must necessarily cause difficulty and confusion in their arrangement.

Lewin, in 1805, was the first to draw attention to the metamorphoses of this Australian group of the *Limacodidæ*, and in acknowledgment of this fact, and in testimony to the general correctness of his delineations and descriptions in *Natural History*, we affix his name to the first species of *Doratiophora* figured by us.

We have invariably found the caterpillars of this species during the summer months feeding upon the leaves of the *Eucalyptus*, and we consider them as by no means rare. About $1\frac{1}{4}$ inch in length; they are somewhat elongated, thick, obtuse at the extremities, and flattened on the upper surface; the general colour is bright green, ornamented above on the anterior and posterior portions with lozenge-shaped rose-coloured marks edged interiorly by black, and connected by two rows of rose-coloured tubercles along the back, the middle ones being small. On the thorax are four small openings or slits, with rose-coloured edges, from which

the wounding apparatus is thrown out. Two elongated spine-shaped reddish projections are placed in front, and two similar ones on the penultimate segment; under these in the region of the stigmata are smaller green-coloured projections encircling the caterpillar. When irritated, the caterpillar exerts four star-shaped rose-coloured appendages, which on contact with the skin, will cause pain similar to the sting of a nettle.

The Cocoon is coriaceous, thin, smooth exteriorly, brown-coloured, a regular oval, and affixed to the branch by silken threads: it possesses a neat fitting opening at the lower end, and is delicately lined within.

The Chrysalis (fig. 1) is a little under $\frac{1}{2}$ an inch in length, squat in form, soft and fleshy, of a yellowish tinge, and in the female much rounded at the abdomen.

The female perfect insect is $1\frac{1}{3}$ inch in expansion; the male slightly under $1\frac{1}{4}$ inch.

The *Antennæ*, ...of the male very moderately bipectinated to about the half, the remainder minutely serrated to the tips; of the female (fig. 2) setaceous.

The *Labial palpi* (fig. 3 and 4) anterior joint small, pointed at the tip, and slightly longer than the basal; the middle joint more robust and twice as long; the whole projecting so as to be nearly even with the front of the head.

The *Legs*,2nd and posterior pairs (fig. 4) with 2 small apical spurs on tibiæ; slightly pilose, with long hairs arranged in front of the tibiæ and tarsi.

The wings deflexed in repose.

The upper wings of both sexes are fulvous, darkening in colour towards the costa and base: the whole surface delicately transversely corrugated. An oblique transverse row of black spots near the middle, the three anterior and two posterior distinct; intermediate ones very small and faintly marked, each surrounded by a pale yellowish shade, which also pervades the space near the exterior margin. The under wings are pale yellowish-brown, deepening towards the margin. Head, thorax, and abdomen dark fulvous, the latter in the female bordered towards the extremity with dark brown wool. The underneath throughout is pale fulvous.

The female moth, two caterpillars, a cocoon, and the young foliage of a species of Eucalyptus, are figured.

SPECIES 2.—DORATIOPHORA CASTA.—(PLATE VI.)

The perfect insects of this species, although smaller, agree so closely with the *D. Lewini* just described, that those unacquainted with the larvæ would be apt to associate them under the idea that the present ones were not so large, nor such fine specimens as the preceding. The utter dissimilarity between the caterpillars of the two species may, however, at once be recognised by reference to the drawings. It will thus be seen that this caterpillar is jet black, armed with four longitudinal rows of short, thick, yellowish, spine-shaped protuberances, the two largest placed anteriorly: between these and along the back are small spots and streaks of the same pale colour, assuming in the region of the stigmata a continuous undulating line. The thoracic segments carry the four fasciculated stings, which are of the same colour as the spots and protuberances, so that the whole upper surface of the larva is black and yellowish-white, with the exception of the small reddish anterior annulation. When full grown it attains to 1 inch in length, thick, elongate, obtuse at the extremities, and somewhat depressed along the back.

The larvæ are of frequent occurrence in March, and widely distributed, as we ourselves have procured them both at the Turon, and in our immediate vicinity on the Lower Hunter, the distance between the two places being fully 130 miles. They feed upon the leaves of various Eucalypti, principally confining themselves to the upper surface, which they speedily consume, leaving untouched the inferior epidermis and the nervures, so that from their congregated numbers, the boughs of the tree which they infest appear as if scorched by a hot wind, the leaves becoming shrivelled or rolled up.

Like that of the preceding species, the cocoon is ovate, furnished with a lid, and attached to the twig by threads; but outwardly of a more shining brown, and in length a trifle under $\frac{1}{2}$ an inch.

The Chrysalis (fig. 1, male) yellowish-white, short and fleshy, thick, particularly that of the female.

In expanse of wings the female measures $1\frac{1}{2}$ inches, the male $\frac{1}{6}$ inch less.

The *Antennæ* ... (fig. 2, male) moderately bipectinated to half its length, remainder minutely serrated to the tips; of the female setaceous.

The *Labial palpi* (fig. 3 and 4) small, pilose, projecting as far as the front of the head, terminal joint small, pointed, slightly shorter than the basal; middle fully twice as long.

The *Legs*,slightly hairy, the tibiæ and each joint of the tarsi, with long brushes exteriorly; 2nd and posterior pairs (fig. 5), with 2 small apical spurs on tibiæ.

Wings deflexed at rest.

The superior wings of both sexes above are fulvous, delicately corrugated transversely, and possess an oblique transverse row of small black spots edged with faint yellow: the under wings, abdomen, head, antennæ, and thorax pale pinkish-brown, the latter somewhat darker. Along the costa and exterior margins of the wings a purplish hue exists, giving to this insect a darker tinge, which, combined with the inferiority of size, affords the only means of its recognition from the *D. Lewini*.

In the sketch will be seen two caterpillars, the cocoon, and male and female perfect insects, accompanied by a small piece of the *Eucalyptus Woollsii*, bearing its cup-shaped seed vessel.

A P O D A .

Apoda, Haworth.
Limacodes, Latreille.

Alæ sat latæ, angulis exterioribus posterioribusque rotundatis, anticæ læves vel leviter corrugatæ, costâ in fœminis subrectâ, in maribus subconçavâ. Corpus in fœminis valde, in maribus modice robustum, alas non superans. Caput parvum. Thorax haud fasciculatus. Antennæ, *Mas.*—modice bipectinatæ, fere dimidio apicali serrato. *Fœm.*—setacæ. Palpi parvi, dense pilosi, usque ad verticem porrecti, articulis terminalibus basalibusque parvis, secundo ter longiori. Pedes sat validi, subpilosi, tibiis, tarsorumque articulis externe scopatis, tibiisque posterioribus calcaribus duobus aut quatuor parvis apicalibus armatis. Larva onisciformis, aut lævis aut ramulis parvis lateralibus instructa, pungere impotens, capite parvo retractili. Folliculus coriaceus, ovatus, aut in ramos positus aut sub arbore sepultus.

Wings moderately broad, rounded at the tips and hinder angles; costa of the fore wings of the female rather straight in front, of the male slightly concave; the surface either smooth or very slightly corrugated. Body stout, most so in the female; extending as far as the hind wings. Head small; thorax not tufted; Antennæ of the male moderately bipectinated to a little beyond the half, serrated thence to the tips; female setaceous. Palpi small, densely pilose, projecting as far as the front of the head; terminal and basal joints small, middle nearly three times longer. Legs moderately stout, slightly pilose, with long brushes of hair anteriorly on the tibiæ and each joint of the tarsi, in some the posterior tibiæ with two small apical spurs, in others with four. Larvæ onisciform, either plain or with small lateral fleshy projections: stinging apparatus obsolete; head small, retractile. Cocoons coriaceous, ovate, either placed on branches, or at the foot of the tree in sand.

As we understand the genus *Limacodes*, as at present restricted, to consist of such insects of this extensive family only, the antennæ of which in both sexes are simple or nearly so, we have therefore placed the two following species under the old generic name of *Apoda* of Haworth, for the males of our examples possess antennæ bipectinated to rather more than half of their lengths, besides the posterior tibiæ in some of our species are only provided with two small apical spurs.

SPECIES 1.—APODA XYLOMELLI.—(PLATE VI.)

The caterpillar is onisciform, the sides at their lower edges prolonged into deep serratures, over which are wrinkles disposed obliquely: the upper surface is of a lively green throughout, lighter towards the back, along which runs a straw-coloured band edged with light bluish-green; two small pointed yellowish projections spring from the 2nd segment; the whole body covered with minute raised points, is viscous, and measures $1\frac{1}{4}$ inch in length. It may be commonly found from August to October feeding upon the *Xylomelum pyriforme*, *Telopea speciocissima* or *Banksia serrata*, plants which thrive in the vicinity of Sydney, the Hunter River, and other localities along the coast.

The cocoon composed of silk, is placed lightly in the sand at the foot of the tree the caterpillar has previously inhabited, and encrusted entirely with particles of sand. It is somewhat globular in form and weak in texture.

The chrysalis (fig. 1) is short, stout, fleshy, of a pale yellowish gray and measures $\frac{1}{2}$ an inch in length.

In expansion of wing the male is $1\frac{1}{2}$ inch, the female $\frac{1}{4}$ inch larger.

The *Antennæ* ... (fig. 2, male) bipectinated to more than half the length, the remainder serrated to the tips; of the female setaceous.

The *Labial palpi*, (fig. 3, and 4 male) small, pilose, projecting nearly as far as the front of the head; basal joint small, terminal somewhat larger and pointed, 2nd large, nearly three times the length of the terminal; female similar but larger.

The *Legs*,in both sexes slightly hairy, with brushes of long hair exteriorly on tibiæ and each joint of the tarsi;
2nd pairs with 2, and posterior pairs (fig. 5, male) with 4 small spurs on tibiæ.

At rest the wings are deflexed; the male carrying the head and shoulders erect.

The superior wings of the male above are pale ochreous, with a very large broad dark brown patch from the base to a little beyond the middle, leaving however a fulvous discal spot, and irregularly bifurcate over the hinder angle; beyond this is an undulating transverse brown line, parallel to the exterior margin which is ornamented by a row of dark dots. The under wings are of a pale shining ochreous colour, the exterior margin only with black dots. The head, collar, and abdomen black, the latter tipped with white; the thorax and adjoining segment bright ochreous, and the antennæ brown. The upper surface of the female accords with the description just given, but is much paler with a silvery hue on the upper wings and thorax.

The underneath of both sexes is dull pale brown margined by white.

We may add that the wavy ridges on the superior wings of the *Doratiophoræ* are wanting in this species; again appearing, although slightly, in the following.

The present delineation consists of two caterpillars, the male moth, the cocoon, and the *Xylomelum pyriforme* in flower.

SPECIES 2.—*APODA INFREQUENS*.—(PLATE VI.)

In January we found a single specimen of this caterpillar feeding upon the young leaves of the *Scolopia Brownii*, and many years elapsed before we again met with the species, which we then procured in abundance, existing upon the *Podocarpus spinulosus* and *Elæodendron Australe*. It was during this long interval that we bestowed upon them the inappropriate name of “*infrequens*.”

In shape the larva is onisciform, and in colour a rich velvety green; the whole body covered by minute raised points which under the microscope develop into conical tubercles, each emitting two fine setæ. Three delicate but darker coloured longitudinal lines, the central one dorsal, complete the description of this caterpillar, which is in length $1\frac{1}{4}$ inch.

The cocoon with a neat lid at the lower end, is attached to the tree, of a light fawn colour and generally ovate in form, but this is greatly modified by the situation in which it is constructed, for instance in the crevices of the bark the shape will adapt itself to all the inequalities.

The chrysalis (fig. 1) is short, stout, $\frac{2}{3}$ inch in length, and pale yellow in colour.

The female moth measures in expanse of wings $1\frac{3}{4}$ inch, the male $\frac{1}{2}$ inch less.

The *Antennæ*, ...male moderately bipectinated to rather more than half the length, thence minutely serrated to the tips; female (fig. 2) setaceous.

The *Labial palpi*, (fig. 3, female, 4 and 5 male) small and pilose, projecting forward to nearly the front of the head; terminal joint small, pointed, slightly longer than the basal, middle joint nearly three times the length.

The *Legs*,covered slightly with hair which becomes long and bushy in front of the tibiæ and each joint of the tarsi; 2nd pair (fig. 6) and posterior pairs with 2 small apical spurs on tibiæ.

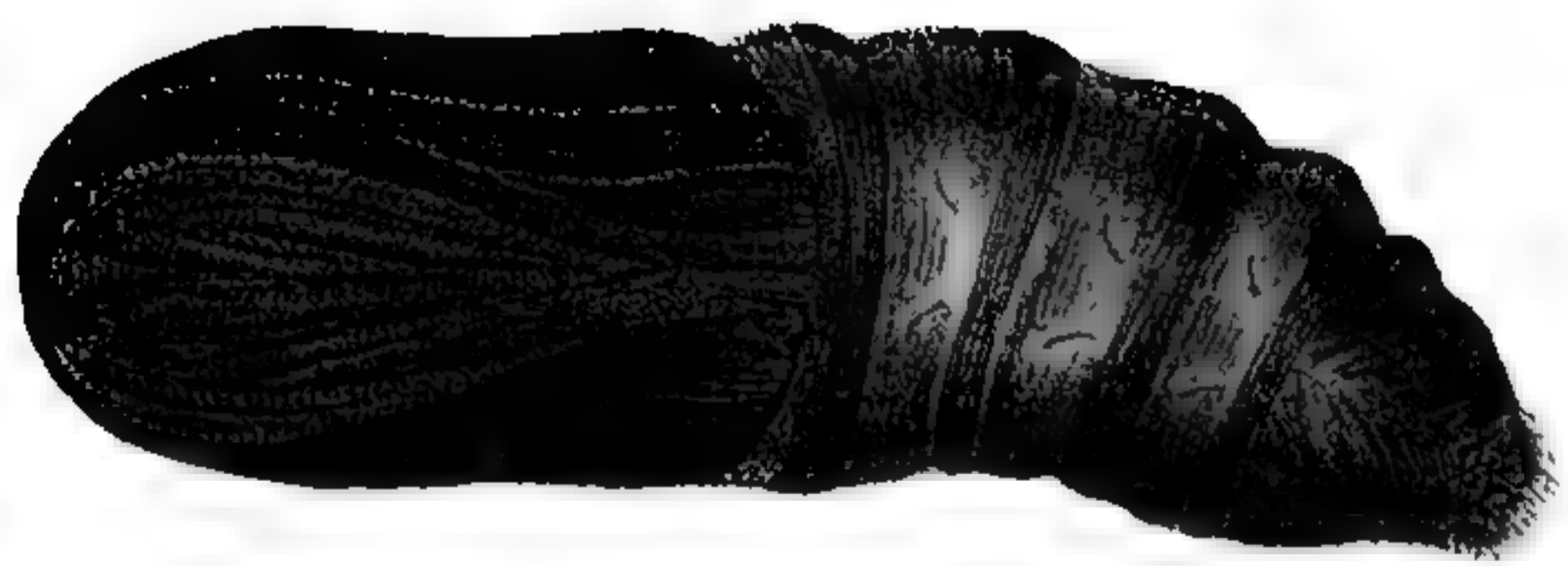
In repose the wings are deflexed.

The upper wings of the male are silvery fawn colour, with a very oblique undulating line of white edged interiorly with dark brown and proceeding from a black discal spot to the inner margin; within this line along the costa to the base is also white; beyond it are delicate wavy transverse lines caused by slight corrugations. The under wings and thorax are fawn colour, the former darkening outwardly, and the latter with whitish tippets. Head, antennæ, and abdomen yellowish, the last banded with brown and terminated by a brownish tuft.

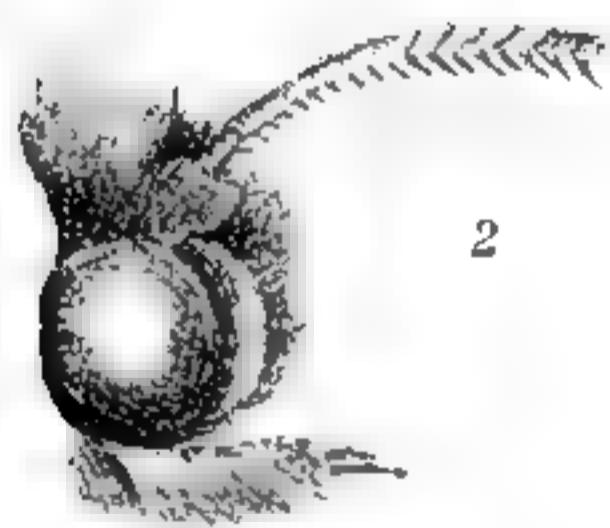
The female silvery fawn colour; upper wings with a straightish pale band, proceeding obliquely from a little beyond the middle of the costa to nearly the base of the inner margin: the exterior margin towards the tips, and the basal portion of the wings whitish, and indistinct raised wavy bands over the whole surface. Head antennæ and thorax fulvous; abdomen pale saturnine-red, faintly banded with brown.

Beneath, both sexes are throughout dull fawn colour.

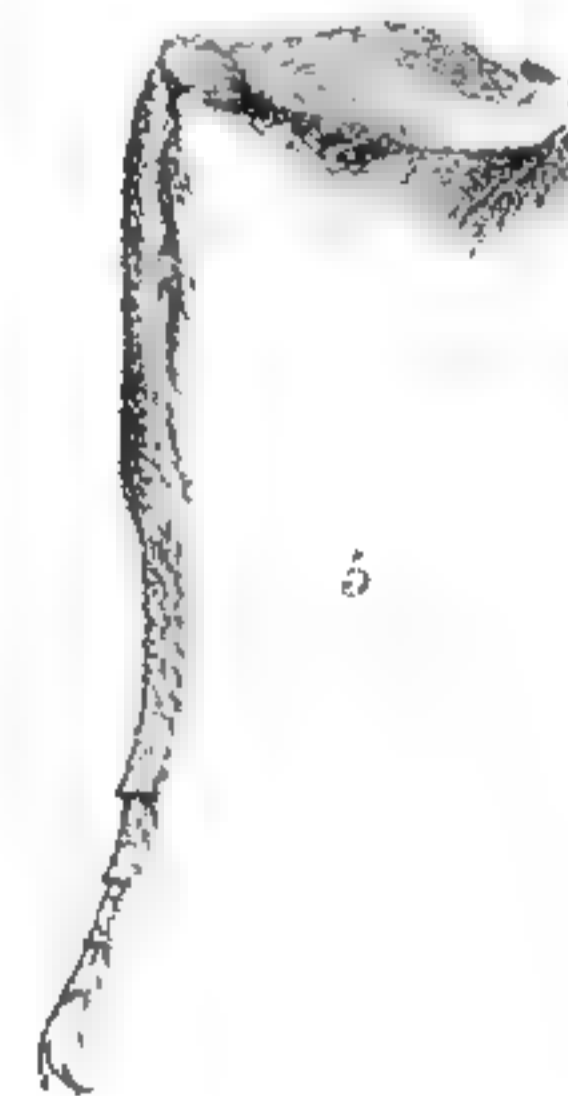
The two moths, male and female, two caterpillars, the cocoon and a small twig of the *Scolopia Brownii* are given as illustrations of this species and its habits.



1



2



3



4

Chelepteryx Collesi

From Nature by Harriet Scott

On Stone by S T Gill.

Allan & Wigley Printers Sydney

CHELEPTERYX.*

Chelepteryx, G. R. Gray, Trans. Ent. Soc. Lond. Vol. 1. p. 122.

Chalepteryx, Brit. Mus. Cat. Lep. Het. p. 913.

Saturnia, Feisthamel.

Festria, Wallengren, Eugenes Resa, p. 366.

Alæ longæ, apud medium sat latæ, anticè subconvexæ, apice subrectangulari acuminato et in posticis angulum anticarum posteriorem superante. *Mas.*: Anticæ trigonæ, margine exteriori undulato obliquo; posticæ apud marginem anteriorem vix undulatæ, subrotundatæ. *Fæm.*: Anticæ sublanceolatæ, margine exteriori obliquo et apud angulum posteriorem rotundatæ: posticæ subrotundatæ et apud marginem anteriorem subdenticulatæ. Corpus pilosum, in maribus modicè, in fæminis valdè robustum. Abdomen alas posticas vix superans. Antennæ longæ, in maribus latè, in fæminis vix bipectinatæ. Palpi porrecti, caput superantes; in maribus sat robusti, in fæminis tenues; articulus terminalis et basalis parvi, subæquales; 2^{dus}. bis longior. Maxillæ obsoletæ. Pedes sat validi; tibiæ intermediæ duobus, et posteriores quatuor calcaribus parvis. Larva robusta, cylindrica, elongata, pilosa, maculis multis verrucosis setas emittentibus.

Wings long, rather broad across the middle, slightly convex in front, tips sub-rectangular, pointed, and in the hind wings produced to some distance beyond the interior angle of fore wings. *Male*—Fore wings trigonate, exterior margin undulating, oblique; hind wings slightly undulating and moderately rounded at the exterior margin. *Female*—fore wings somewhat lanceolate, oblique at the exterior margin, much rounded at the hinder angle; hind wings moderately rounded, somewhat denticulated along the exterior margin. Body pilose, *male*—moderately stout; *female*—stout. Abdomen reaching to even or slightly beyond the hind wings. Antennæ, long, bipectinated; in the male strongly, female slightly. Palpi, porrected forwards beyond the head, in the male moderately stout, female slender; terminal and basal joints small, nearly equal; 2nd joint twice the length of either. Maxillæ obsolete. Legs moderately stout, 2nd pairs with 2, and posterior pairs with 4 small spurs on tibiæ. Larva stout, cylindrical, elongated, pilose, with numerous whorls of verrucose spots emitting setæ.

SPECIES 1.—CHELEPTERYX COLLESI. —(PLATE 7.)

Chelepteryx Collesi, G. R. Gray.

Saturnia Laplacei, Feisthamel.

Festria affubricata, Wallengren, Eugenes Resa.

Of all the Lepidoptera that have come under our notice, the Caterpillars and Cocoons of the *C. Collesi* are pre-eminently the most noxious, being armed at all points with stiff bristles and short fine exceedingly sharp hairs, which by careless handling will puncture and adhere firmly to the skin, thereby causing considerable annoyance and irritation similar in effect to that experienced by contact with the minute bristly spines of the Prickly Pear. (*Opuntia Vulgaris*.)

Apparently powerful and robust as the larvæ are in their natural state, we have always found difficulty in rearing them after they have passed a certain advanced stage of growth; for although well supplied with fresh food and otherwise carefully tended, they still become restless, wander about the box, refuse all nutriment and quickly perish, indicating that we are either not fully acquainted with their wants, or that they will not bear the close confinement to which under the circumstances they must necessarily be subjected. This difficulty of maturing them in captivity however is of no great moment, for their metamorphoses can be easily observed out of doors, from the profusion in which the caterpillars and cocoons are to be met with.

The larvæ affect only one plant, the Eucalyptus, and even of this extensive genus but one or two species seem to please their fastidious palates. On the stems of such trees they may be seen during the day time in summer, congregated in some numbers waiting for the evening, their period for activity and repast. They are exceedingly handsome, and when arrived at full maturity about the largest and most powerful caterpillar we are acquainted with in this Colony, measuring fully 6 inches in length and very robust in form. The general colour is of a rich satiny brown, produced by a thick-set glossy coating of short, fine, depressed hairs. Each segment, with the exception of the first, contains a whorl of 8 yellow verrucose spots, the second and third segments however bearing two additional dorsal spots placed immediately before the others; the upper portion of the 1st segment is occupied by a raised yellow band with a tubercle of the same colour at each end; this band and the whole of the yellow verrucose spots emit tufts of stiff longish brown-coloured bristles, those immediately above the legs and head intermixed with lengthened white hairs. The caudal extremity and two raised bands placed between the legs for the whole length of the caterpillar, are also yellow and thickly set with rigid brown bristles. In consequence of the bands and additional tubercles the anterior and posterior portions are much more setigerous than the intermediate space. When immature the larva is of a light reddish colour and covered with grayish patches; not of that rich dark satiny brown which it afterwards assumes.

The Cocoon is fixed firmly either to the branch or trunk of the tree, and in many instances even on the walls of adjacent buildings or palings or in the fissures of well sheltered rocks; the form being of an elongated oval, much produced at the ends, and composed of a strong silken texture, thickly set with fine hairs, the points projecting outwards, that manufactured by the female is a brownish colour, while that by the male is of inferior size and whitish satiny hue.

These Cocoons are constructed principally towards the end of January, and may readily be met with from their frequency, especially in the neighbourhood of Sydney, although our own experience more particularly relates to the still uncleared land on the eastern slope of Darling Point, where we have taken as many as twenty of them from between the rough bark of the *Monotoca albens*? ranged side by side like so many hammocks. We there also found them in considerable numbers under the overhanging ledges of rocks from the top of which water is continually dripping, nourishing in its course a luxuriant growth of various ferns. We may remark that on examination it will be seen that very many of these cocoons are punctured and the chrysalids within destroyed by some parasitical depredator: the same cause may likewise affect fatally the almost mature larvæ, and constitute one of the means which render their rearing in captivity so difficult.

The Chrysalis (Fig. 1) is $3\frac{1}{4}$ inches in length, of a rich reddish brown, and with the terminal segment setose.

The perfect insects take wing at irregular periods, the majority appearing in June. The female measures in expanse of wings $7\frac{3}{4}$ inches; the male $6\frac{1}{4}$ inches.

The *Antennæ*,long, bipectinated; in the male (Fig. 3) deeply, along its whole length; in the female (Fig. 2) slightly.

The *Labial palpi*, porrected to a little beyond the front of the head; of the female, (Fig. 4) terminal and basal joints small, and nearly equal in length, the 2nd being twice the length of either; 2nd and basal joints thickly covered with hairs and scales, terminal nearly naked and pointed. Of the male similar but larger and more robust, with the terminal joint rounded at the tip.

The *Maxilla*,obsolete.

The *Legs*,tibiæ and tarsi thinly covered with hair, coxæ and femora densely lanuginose, (Fig. 5, anterior leg) 2nd pairs with 2 apical, and posterior pairs with 4 small spurs on tibiæ.

Wings partly deflexed in repose.

In the female the ground colour of the superior wing is of a light tawny brown; through the centre runs a broad scalloped transverse bar of rich brown edged with black, having within it a large whitish discoidal spot, and, on the outer side, a pale indistinct band, which however becomes white and well defined towards the inner margin; beyond this, approaching the apex, are two or three oval semi-transparent spots of dull yellow, from which two irregular undulating bands of light gray branch off, and terminate at the anal angle, the exterior border being broadly edged with brown. The anterior margin towards the apex is grayish, having within it a short wavy distinct sub-costal black band. A strongly defined irregular transverse black band near the base completes the superior wing. The basal moiety of the inferior wing is of a dark neutral tint; and divided by a whitish transverse band from the outer half, which is brown, and which contains two irregular transverse bands, the outer being dull yellowish and scalloped, the inner faint and indistinct. Thorax and abdomen tawny brown; very large and robust.

The inner half of the under surface of the superior wing is brown, bearing in the discoidal cell two whitish spots, the outer one placed on the disc being the largest and lunuled. The exterior moiety, together with the whole of the under wing, brownish gray, relieved by irregular scalloped brown markings; the nervures assuming a yellowish tint.

Thorax and abdomen densely lanuginose.

The male is, in general colour and the various markings, very similar to the other sex, but considerably darker and richer, the principal variations being that the short sub-costal band before described is here continued in regular scallops across the upper wing; the internal edging of the broad transverse bar which contains the discal spot more indented; a distinct saturnine hue pervades the disc and adjoining portions of the wing, and the outer transverse band is brighter and more distinctly scalloped.

Beneath, the similarity is continued with the like exceptions, that of the markings being brighter in colour and more sharply defined.

The male and female moths, the larva at full maturity, and the cocoon of the female are delineated in this plate, on or about a branch of the *Eucalyptus corymbosa* in flower.

The consideration of the foregoing fine insect, the *Chelepteryx Collesi*, has necessarily brought under our notice Mr. H. D. J. Wallengren of Stockholm, the writer on the Lepidoptera collected during the voyage of the Swedish Frigate "Eugenie," as he has described and figured this well known moth as a *new genus* and *new species* by the title of *Festru affabricata*, and we now venture a few general remarks on that portion of his publication which treats of our Colonial insects; and we also append a list of others which we deem erroneously named, in the hope that by so doing we shall be of some service in obviating that perplexity

and confusion which must inevitably ensue from this indiscriminate formation of new genera and new species, with their attendant evils of useless and cumbersome synonyms.

The small collection of lepidoptera which the Swedish naturalists obtained during the short stay of the Frigate in the waters of Port Jackson, has afforded to Mr. Wallengren an opportunity for the construction of a few new genera and twenty-three new species, the majority of which we think must be rejected. Bearing in mind that these insects were found in an English colony and within the precincts of Sydney, a large and populous city, many of whose inhabitants are highly interested in the various branches of Natural History, it does appear somewhat remarkable that Mr. Wallengren should not have consulted the works of English authors before he issued his publication:—a publication which must be taken as a Swedish National production, and one which ought to be looked upon as a correct authority for future writers.

The knowledge which this gentleman possesses of our entomological literature must indeed be very vague and meagre as evinced in the only references, unsatisfactory indeed, he has made to it, and the whole of which we now extract, viz.:—"Species nostra, ut videtur, *L. nasuta*, Lewin, et Boisd. quam maxime "affinis. Opusculum Lewini non vidimus," p. 367. "Species nostra forte sit eadem ac species Donovanii, sed figuram ejus ad manum non habuimus," p. 368. "Species cum *C. strigata*, Lewin, sine dubio affinitatem habet quam maximam, sed figuram hujus speciei, quam dedit auctor, non vidimus," p. 386.¹

Since the days of Lewin and Donovan, however, a host of able writers on exotic entomology have appeared in Great Britain, and had Mr. Wallengren in the performance of the task imposed on him by his government, taken the ordinary precaution of examining their works, which are freely illustrated by coloured plates, he could easily have satisfied himself that most of his new creations had been previously described, nay, many of them figured. In support of our assertion, we cursorily take his list now lying before us, and as the insects we have selected are well known, we can without much difficulty point out in the following species the discrepancies which exist between his nomenclature and that of other authors.

<i>Acrea theodote</i>	<i>Acrea</i> <i>Andromacha</i> , <i>Fabr.</i>
<i>Eudamus Jacchus</i>	<i>Papilio</i> <i>Jacchus</i> , <i>Don</i> ; <i>Hesperia</i> <i>Jacchus</i> , <i>Fabr.</i> ; <i>Steropes</i> <i>Jacchus</i> , <i>Boisd.</i>
<i>Deilephila porcia</i>	<i>Chærocampa</i> <i>Scrofa</i> , <i>Brit. Mus. Cat. Sphingidæ.</i>
<i>Gnathothlibus erotoides</i> (n. gen.)	<i>Sphinx</i> <i>Erotus</i> , <i>Cram. Fabr.</i> ; <i>Chærocampa</i> <i>Erotus</i> , <i>Brit. Mus. Cat. Sphingidæ.</i>
<i>Opodiptera varicolor</i> (n. gen.)	<i>Antheræa</i> <i>simplex</i> , <i>Brit. Mus. Cat. Lep. Het.</i>
<i>Festra affabricata</i> (n. gen.)	<i>Chelepteryx</i> <i>Collesi</i> , <i>G. R. Gray, and Brit. Mus. Cat. Lep. Het.</i>
<i>Gastropacha nasutula</i>	<i>Bombyx</i> <i>nasuta</i> , <i>Lewin</i> ; <i>Lasiocampa</i> <i>nasuta</i> , <i>Boisd</i> ; <i>Opsirhina</i> <i>nasuta</i> , <i>Brit. Mus. Cat. Lep. Het.</i>
<i>Cnethocampa melanospila</i>	<i>Bombyx</i> <i>melanosticta</i> , <i>Don</i> ; <i>Liparis</i> <i>melanosticta</i> , <i>Boisd.</i> ; <i>Teara</i> <i>melanosticta</i> , <i>Brit. Mus. Cat. Lep. Het.</i>
<i>Cryptophasa erathrotenia</i>	<i>Cryptophasa</i> <i>strigata</i> , <i>Lewin.</i>
<i>Cryptophasa melanostigma</i>	<i>Cryptophasa</i> <i>bipunctata</i> , <i>Lewin.</i>

In respect to the above and to the remaining Australian Lepidopterous insects described by this Author, we shall hereafter have to speak more fully as each respectively comes under review in our present publication.

AGARISTA.

Agarista, Leach; Boisd.; &c.

Papilio, Donovan.

Phalaenoides, Lewin.

Alæ sat latæ, apud apicem et angulum posteriorem rotundatæ. Corpus modicè crassum, alas posticas non superans. Caput parvum. Palpi longi, antrosùm porrecti, ascendentes, caput multò superantes; articulus terminalis gracilis, vix pilosus, apud apicem ferè coniformis, nonnullis subelavatus; 2^{dus.} et basalis robustiores, pilosi; 2^{dus.} longior. Antennæ simplices, longæ, graciles, super medium crassiores, et inde ad apicem vix uncinatum minuentes. Pedes sat robusti; femora densè pilosa, tibiæ aliis modicè, aliis vix pilosæ; intermediæ calcaribus duobus, posteriores quatuor longiusculis. Larva elongata, crassa; fasciis transversis, nonnullis vix setosa, vel appendiculis spatulatis; segmento penultimo vix tumido. Folliculus crassus subovatus, scobe lignoso et terroso agglutinatus, nullo subtegumento, humi fere depositus, aut vix subterraneus.

Wings moderately large, rounded at their tips and hinder angles. Body moderately thick, extending to about even with the hind wings. Head small. Palpi long, porrected forwards and upwards to some distance beyond the front of the head; terminal joint thin, almost naked, generally conical at the apex, in some slightly clavate; middle and basal joints stouter and covered with hair, the middle joint being longest. Antennæ simple, long, slender, gradually thickening beyond the middle,

¹ "Eugenies Resa," 1851—1853.

Lepidoptera, species novas descripsit H. D. J. Wallengren: Stockholm, 1861

thence attenuating to a point which is slightly uncinated. Legs tolerably stout; femora densely pilose, tibiæ pilose in some, almost naked in others; second pairs with 2 apical, posterior pairs with 4 longish spurs. Larva elongated, thick, striated or banded transversely; in some slightly setose, in others with spatulate appendages; penultimate segment slightly protuberant. Cocoon composed of particles of earth and comminuted wood, agglutinated together into a thick covering of an irregular oval form, devoid of lining, and generally placed on or slightly below the surface of the ground.

SPECIES 1.—AGARISTA CASUARINÆ.—(PLATE 8.)

Some years have now elapsed since we obtained from one of our workmen engaged in clearing the land, a few larvæ of this species of *Agarista*, which he said he had gathered from the bough of a lofty *Casuarina*; since which time we have never found them here in our numerous excursions, although we have ascertained that they are frequent and well known in the suburbs of the metropolis. From Ashfield the larvæ have been forwarded to us during the month of April, feeding upon the *Loranthus pendulus*, and in the same locality the perfect insects are repeatedly taken much larger and finer than the specimens we figure, which we attribute to the fact that the *Loranthus* and, it may be, other parasitical plants, constitute the proper food of this particular species, as our original larvæ feeding upon the leaves of the *Casuarina*, although sparingly, produced moths of inferior size. The specimens we have seen in the cabinets of the Australian Museum, and in the possession of our friends, fully equal in expanse of wing the female of *Agarista Agricola* figured in the present plate.

The Caterpillar measures $2\frac{1}{2}$ inches in length: the ground colour of a jet black with numerous white bands encircling the body, and a lateral row of white dots immediately above the legs, which with the head and part of the first annulation are of a rich orange yellow. An irregular and slightly tuberculated bar of carmine nearly covers the upper portion of the penultimate segment, and whorls of rather long filamental appendages, slightly flattened at their ends, like battledores, are placed upon each segment in lieu of setæ. When at rest it throws back its head and thoracic segments as shown in the drawing, and if irritated ejects from the mouth a greenish yellow liquid. In March our specimens formed their cocoons of triturated bark, dead leaves, and earthy particles strongly united, in shape an irregular oval.

The Chrysalis (fig. 1) measures $\frac{1}{2}$ of an inch in length, reddish brown colour, truncated posteriorly, and with the spiracles distinctly developed.

The moths reared by us were in expansion of wings $2\frac{1}{2}$ inches, but we consider this as small.

The *Antennæ*(fig. 2) simple, very slightly ciliated beneath, gradually thickening towards the upper end whence they attenuate to a point, terminating in an elongated hook.

The *Labial palpi* (fig. 3; 4, divested of hair,) curve upwards, and project to even with the top of head; covered with hairs except the terminal joint which is almost bare, slightly clavate, $\frac{1}{3}$ less in length than the middle joint, and $\frac{1}{2}$ larger than the basal; the two latter being more robust.

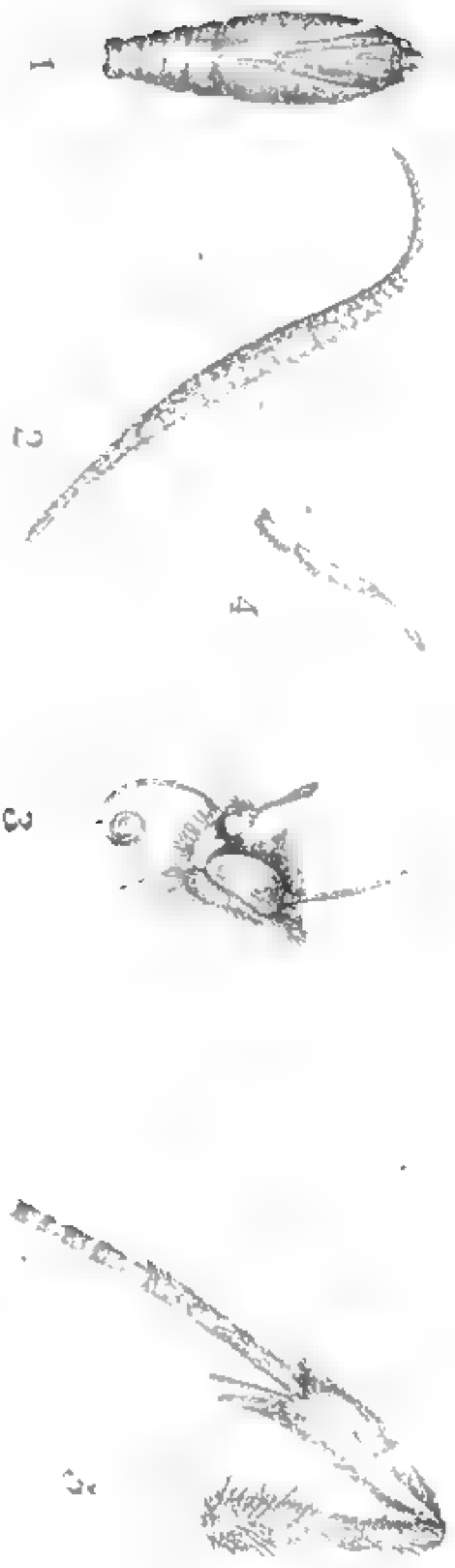
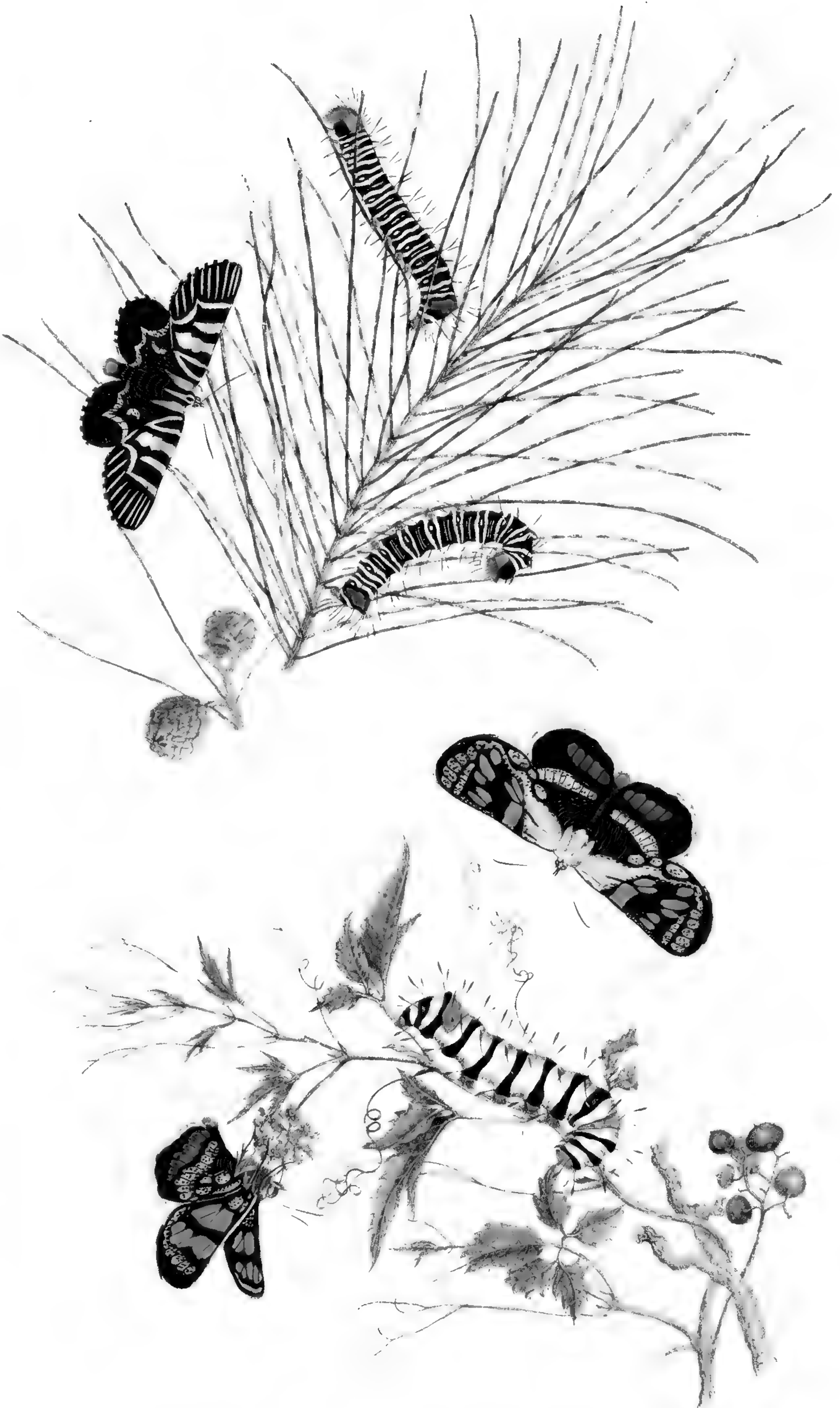
The *Legs*,femora and tibiæ pilose, tarsi nearly naked; 2nd pair (fig. 5) with two, and posterior pairs with four longish spurs on tibiæ.

Wings deflexed in repose, and the moth diurnal.

The upper surface of the perfect insect is throughout of a jet black, with five transverse straw-coloured bands on the superior wing, the two nearest the base thin and converging to a point at the inner margin; the third, across the disc, and the adjoining one broad and distinct, the latter terminating in the middle of the wing; the fifth or outer one thin and scalloped towards the exterior margin: between this band and the exterior margin running along the nervures are whitish streaks. The inferior wing contains across its centre an irregularly scalloped straw-coloured line as if in continuation of that on the superior wing, and over this is a lunuled discal spot of similar colour. The wings are margined with alternate white and black. Head and thorax possess three longitudinal lines of yellowish white, and the abdomen is tipped with orange yellow.

The colouring of the under side is very similar, but whiter in the markings, possessing additionally on the lower wings the whitish streaks in the direction of the nervures. The abdomen, femora, and tibiæ, clothed with orange yellow hairs.

Two caterpillars on a branch of the *Casuarina paludosa* in seed, and the perfect insect, are delineated in our drawing.



Agarista Casuarinae.

Agarista Agricola.

From Nature and on Stone
by Helena Scott.

Allen & Wigley Printers, Sydney

SPECIES 2.—AGARISTA AGRICOLA.—(PLATE 8.)

Papilio Agricola, Donovan, Ins. New Holland.

Agarista picta, Leach.

More than half a century ago Donovan was the first to figure this fine species of *Agarista* in his "Insects of New Holland," wherein he describes it as "possessing no ordinary share of gaiety in its contrasted hues," an observation in strict accordance with the beautiful and varied colouring of the moth which would almost have justified Leach, Godart, and others, in committing a breach of the law of priority by the substitution of the more appropriate name of "picta" for that of *Agricola*.

Although so many writers have noticed this insect in its perfect state, we are not aware that the equally showy caterpillar has ever been figured or described. The one represented in our plate is that of a female, and measures nearly 3 inches in length, (the male less robust, shorter by an inch, but otherwise similar), plump, soft, and of a delicate creamy white, relieved by rich velvety black annular bands in the middle of each segment, with the exception of the fourth, which possesses one of a bright saturnine red; the penultimate segment also carries a saddle shaped marking of the same saturnine hue partly obscuring the black band. The head and feet are of a dull red, and whorls of shining black filamental appendages, few in number and spatulate in form, take their rise from the annular bands.

Two days previous to the construction of its cocoon a material alteration takes place in the appearance of the caterpillar, the creamy white gradually darkening into pale yellow which again deepens into a rich orange, so that the whole body is covered by alternate bands of black and orange.

These larvæ are commonly met with in the warmest summer months, and feed upon the leaves of the *Vitis heterophylla*, a vine very abundant in the low rich brush lands.

Like the preceding species they join together dead leaves, fragments of wood, and earthy particles for their transformation.

The Chrysalis (fig. 1) is reddish brown, truncated at the posterior extremity, in general formation resembles that of the *A. Casuarinæ*, and is nearly 1 inch in length.

The female perfect insect in expansion of wings measures about 3 inches; the male $\frac{1}{4}$ inch smaller.

The *Antennæ*,(fig. 2) are simple, slightly ciliated beneath, gradually thickening towards the tips, when they attenuate and terminate in an elongated hook.

The *Labial palpi*, (fig. 3 and 4) curving upwards and projecting above the eyes in front of the head, are covered with hairs, with the exception of the terminal joint which is almost naked, slender, and equal in length to the basal; the middle joint twice as long as either and more robust.

The *Legs*,femora and tibiæ densely pilose, tarsi nearly naked: 2nd pairs with 2 apical, and posterior (fig. 5) with 4 longish spurs on tibiæ.

Wings deflexed when at rest, and the insect diurnal.

The ground colour of the upper surface of the female is of a deep velvety black, strikingly relieved by a broad band of delicate straw colour, passing across the thorax and extending along under the costa to about a third of the length of each upper wing. Beyond this are two transverse irregular rows of indian yellow patches, and near to the outer margin two macular bands of light blue, the exterior one united to the lower angle of the straw coloured patch before described by a delicate flexuous line, leaving three spots of light blue along the inner margin: several faint costal marks of blue are also visible. The under wings possess a distinct band of pale blue, running transversely through the disc; while nearer to the outer margin a broad bar of deep carmine red commences at the anal angle and terminates at about half the wing. The marginal border of the upper wing is white at the tip and hinder angles, but that of the under wing wholly white. The extremity of the abdomen orange yellow and slightly tufted.

The under side bears a general resemblance to the upper, but is much brighter, and destitute of the straw coloured band so conspicuous above. The densely pilose portions of the legs are bright saturnine red.

The above description is also applicable to the male, with the difference however that the basal straw coloured band is reduced to a narrow bar across the shoulders and to a larger one placed at the lower portions of the thorax and wings, above which are a few flexuous indistinct lines of blue.

This description of the perfect insect of the *A. Agricola* is given as a mean taken from the numerous specimens in our possession, as we find that the various markings change somewhat in size and brightness of colouring in different individuals.

Views of the upper surface of the female, the underneath of the male, and of the ♀ larva, on the *Vitis heterophylla* in flower and fruit, are exhibited in the present plate.

PSYCHIDÆ.

The great divisional character which parts into two the family of the Psychidæ appears to consist wholly in the form which the females assume at their final development: whether they become possessed of wings or remain in an apterous state. This simple arrangement, so ably illustrated by Mr. Walker in the Catalogue of the British Museum, enables us to compare, without difficulty, our Australian examples of the "Fœmina alata," with the only three genera of winged females (containing together but 12 species) mentioned in the Catalogue; and to point out more clearly and easily why we have deemed it advisable to create the following new genera.

The males of two out of the three genera described, viz., the Typhonia and Perophora, have pectinated antennæ, while those of our insects are ciliated, and although the antennæ of the only species of the remaining genus, the Psychoides, are sub-ciliated, still its larva occupies a fixed habitation while those under consideration dwell in portable cases. Keeping in view these essential distinctions, we feel justified in separating our insects from those described in the Catalogue; and with respect to themselves reasons for their division will be introduced in each generic description. We may further remark that the Psychidæ are numerous in this country, and, judging from the many examples which have passed under our notice, the class containing the winged females is fully equal in number to that of the wingless; and that the antennæ of the males of the former are found as yet invariably to be ciliated, while the reverse in both instances appears to be the case in all the genera hitherto described.

In concluding these preliminary observations, we may be permitted to express our gratification in being enabled by the production of the ensuing three new species, to name them in honour of the following scientific and esteemed naturalists, viz., the late Rev. Landsdown Guilding, of St. Vincent's, author of numerous valuable entomological papers; Dr. George Frauentfeld, the present learned Curator of the Imperial Museum at Vienna, whose friendship we acquired in this country during his tour as Naturalist to the Imperial Austrian Expedition; and Dr. C. Felder, of Vienna, one of the authors of the meritorious publication "Lepidopterologische Fragmente" and other works.

The fourth insect in Plate 9, the *Cœinea Scotti*, was named after ourselves, by the eminent entomologist William Sharpe MacLeay, Esq., to whom we are also indebted for many other acts of kindness.

CONŒCA.

Fœm. alata. Mas. et fœm. Alæ elongatæ, angustæ, lanceolatæ, apud apicem vix rotundatæ, margine exteriori perobliquo, angulo posteriore multò rotundato. Abdomen alas anticas superans, in maribus attenuatum et apud apicem acuminatum; in fœminis robustum, rotundatum; segmento ultimo pilis longiusculis. Caput minimum. Antennæ longæ; *mas.* articulis subtus formatis, subserratis, fasciculis ciliatis; *fœm.* filiformes. Palpi minimi; articulus terminalis minutus, acuminatus, subnudus; 2^{dus}. et basalis subæquales, terminali longiores, vix pilosi. Pedes parvi; antici breviusculi, postici longiusculi: tibiæ et tarsi squamis piliformibus sparsim induti; tibiæ intermediæ calcaribus duobus, posteriores quatuor sat longis. Larva crassa, carnosa, segmentis abdominis nudis, thoracis corneis. Involucrum plus minusve coniforme, erectum ferè gestum, sericeum, cortice comminuto vel graneis arenosis dense conspersum.

Females winged. Wings in both sexes elongate, narrow, lanceolate, very slightly rounded at their tips, exterior borders very oblique, and hinder angles much rounded. Abdomen extending beyond the hind wings; in the male attenuated and acuminated at the apex; in the female robust and rounded, with longish hairs on the ultimate segment. Head very small. Antennæ rather long; *male*—articulations produced beneath, somewhat resembling serrations, each being furnished with a ciliated tuft: *female*—filiform. Palpi very small, terminal joint minute and pointed, nearly naked; 2nd and basal joints nearly equal, both being longer than the terminal and slightly pilose. Legs small, graduating in size, the posterior being the largest; tibiæ and tarsi sparingly clothed with hair-like scales; 2nd pair with 2 and posterior with 4 longish spurs on tibiæ. Larva thick, fleshy; abdominal portions naked, thoracic corneous. Case more or less cone-shaped, carried principally upright, open at both ends, composed of silk thickly covered with fine particles of bark or grains of sand.

SPECIES 1.—CONCECA GUILDINGI.—(PLATE 9.)

This species is abundant during the spring and summer months, in the neighbourhood of Sydney, upon Ash Island, and in many other localities; the larva feeding on *Kunzea corifolia*, *Leptospermum lanigerum*, *Juncus effusus* and a variety of other plants.

In form it is somewhat thick (fig. 1, ♀), the body attenuating towards the extremity, the head and thoracic portion corneous, of a dark cream colour spotted with brown, remaining segments dull black; in length from $\frac{1}{2}$ to $\frac{3}{4}$ inch, according to sex.

The case is $1\frac{1}{4}$ inch in length, cone-shaped, thickly encrusted over with triturated portions of bark of a pale brown colour, and carried when the caterpillar is in motion in an upright position, almost at right angles to the plane of the body.

The Chrysalis (fig. 2, ♀) measures $\frac{1}{2}$ inch; wing cases reddish brown, abdomen yellowish brown; that of the ♂ similar, but much smaller and thinner.

The *Antennæ*,.....of the male (fig. 3) above squamose, below joints produced resembling serrations, each bearing ciliated tufts: of the female, filiform.

The *Labial palpi*, — (♂ divested of hair, fig. 5; ♀ fig. 4) very small, projecting; 2nd and basal joints nearly of equal length, terminal minute, pointed: the whole thinly clothed with hair.

The *Legs*,rather weak, graduating in size, posterior pairs being the largest: 2nd pairs (fig. 6, ♀) with 2 spurs at apex of tibia, posterior pairs (fig. 7, ♂) with 4 longish spurs: tibiæ and tarsi thinly clothed with hair-like scales.

The wings deflexed in repose.

The superior wings, head and thorax, of the female, are cinereous minutely barred transversely with black; the under wings and abdomen, brownish gray: the whole sparingly covered with scales.

The male resembles the female in all the markings, but the ground colour of the superior wings and thorax is of a hoary white.

The male and female in flight, and the conical habitation of the larva on *Juncus effusus*, are presented in the illustration.

 ŒCOBIA.

Fœm. alata. Alæ anticæ sat trigonæ, apice vix rotundato, costâ arcuatâ. Abdomen alas posticas multò superans; segmento ultimo pilis longiusculis oviductum exsertum partim celantibus, fimbriato. Antennæ longæ, filiformes. Palpi porrecti, caput vix superantes; articulus basalis et terminalis æquales, terminalis gracilis acuminatus, 2^{dus}. robustior et longior. Pedes robusti, postici multò longiores; tibiæ intermediæ calcaribus duobus, posteriores quatuor sat longis. Larva crassa, carnosa, segmenta abdominis nuda, thoracis cornea. Involucrum cylindricum, pendens, sericeum, ramusculis longitudinaliter et densè compactis obtectum.

Female, winged. Fore wings somewhat trigonate, with their tips slightly rounded and costæ arched. Abdomen extending considerably beyond the hind wings, the ultimate segment fringed with longish hairs which partially conceal the exerted ovipositor. Antennæ long, filiform. Palpi porrected, and reaching a little beyond the front of the head; basal and terminal joints equal in length, the latter slender and acuminated, middle joint more robust and longer than either. Legs stout, the posterior pairs much the largest; 2nd pairs with two, and posterior pairs with four longish spurs on tibiæ. Larva thick, fleshy; abdominal portions naked, thoracic corneous. Case cylindrical, pendent, composed of silk covered closely and evenly with small twigs placed longitudinally.

The *Œcobia* differs from the preceding genus, the *Conceca*, by the trigonate wings, the much larger labial palpi, the more powerful legs, and by the pendent and differently formed case.

SPECIES 1.—*GECOBIA FRAUENFELDI*.—(PLATE 9.)

The habitation of this genus is so similar in construction to those of many species of *Eumeta*, *Thyridopteryx*, *Metura*, and other apterous genera, that we should naturally have supposed that the female perfect insect would also prove to be wingless, but such not being the case a separation, according to the system we follow, becomes inevitable, and this genus must be included in the first division of the *Psychidæ*.

The female caterpillar (fig. 1) drawn in the plate (the only sex in our possession) we found in November, existing on a species of *Eucalyptus* which grows abundantly on the North Shore of Port Jackson. In length it measures under $\frac{3}{8}$ inch, the head and thorax corneous, of a dull cream colour with black longitudinal bands and minute spots; the abdomen dull brown-black, paling underneath.

The habitation, considerably larger than the larva, is composed of silk, covered longitudinally with slender twigs closely and evenly placed side by side of each other, in some instances projecting a little beyond the end.

The Chrysalis (fig. 2) is chestnut brown, abdomen robust, and measures $\frac{1}{2}$ inch.

In expanse of wings the imago attains to nearly $\frac{1}{2}$ inch.

The *Antennæ*,long and filiform.

The *Labial palpi*, (fig. 3) large, distinct, porrected; basal and terminal joints equal in length, the latter thin and pointed; intermediate one longer and more robust; the whole covered rather thickly with hair.

The *Legs*,stout, the posterior pairs much the largest; 2nd with two, and posterior with four longish spurs on tibiæ. Tibiæ and tarsi covered with hair-like scales, (anterior pair, fig. 4; posterior, fig. 5.)

The wings deflexed in repose.

The head, thorax, and superior wings deep purplish black, with many short transverse bands of white: the under wings and abdomen black, the latter sparingly clothed, extending considerably beyond the wings and possessing an exerted ovipositor partially concealed by a fringe of hair.

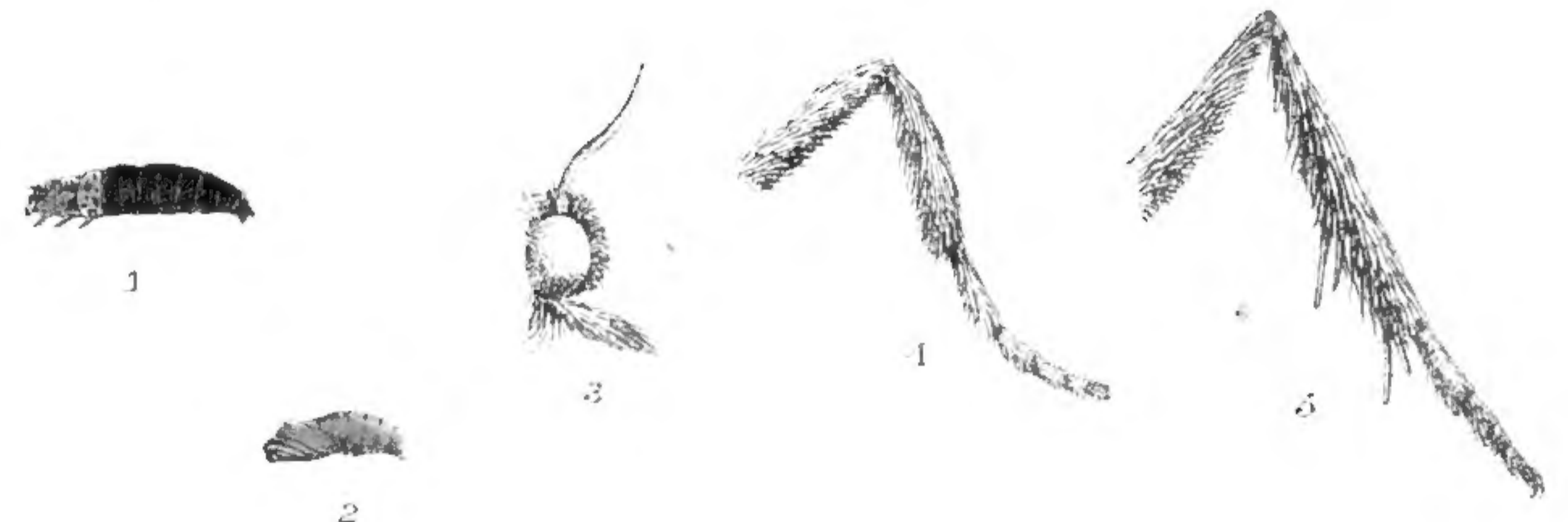
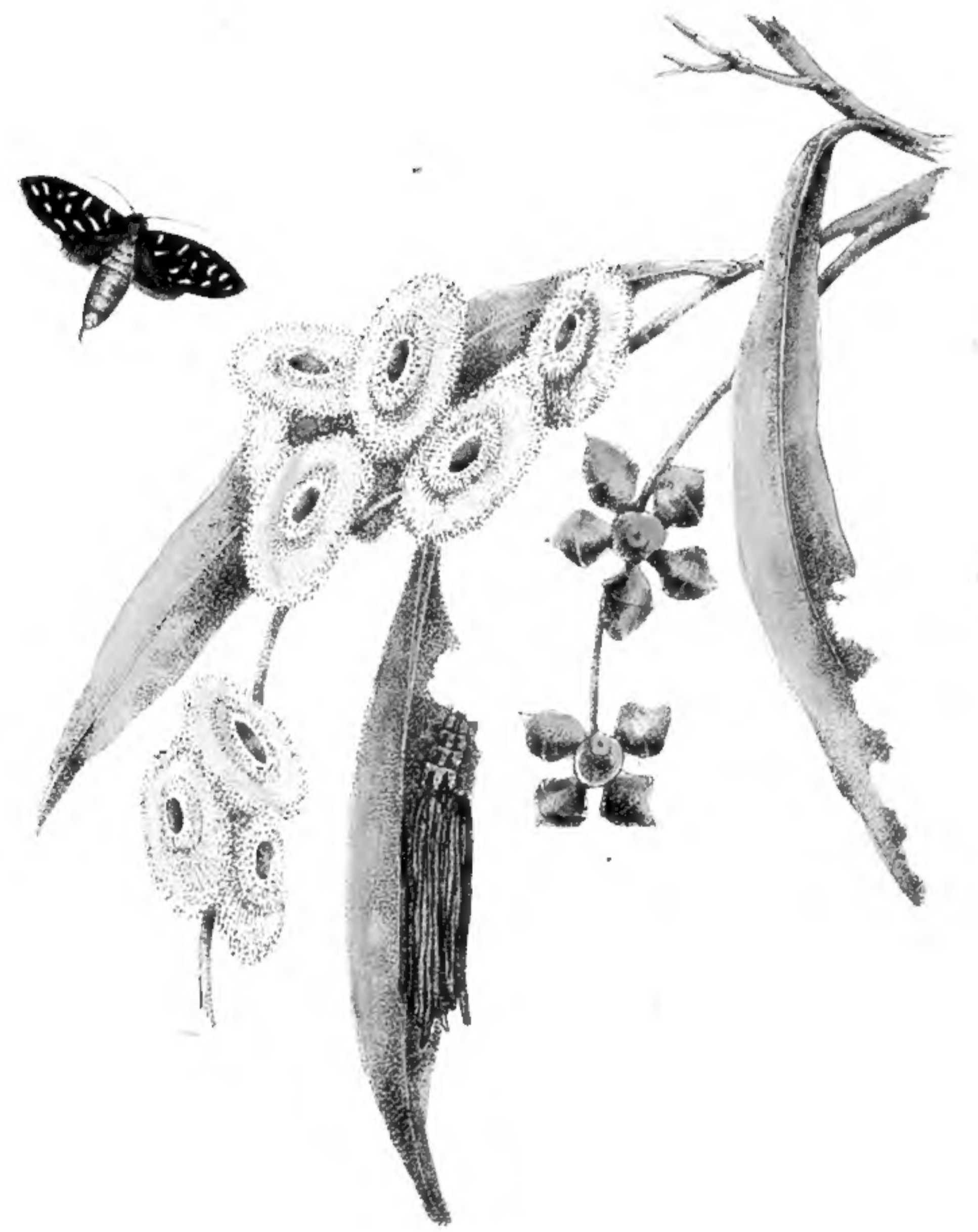
The perfect insect, the larva and case, on the leaf of one of the numerous species of *Eucalyptus*, are the present depictions.

 ŒCINEA.

Œcinea, Macleay, M.SS.

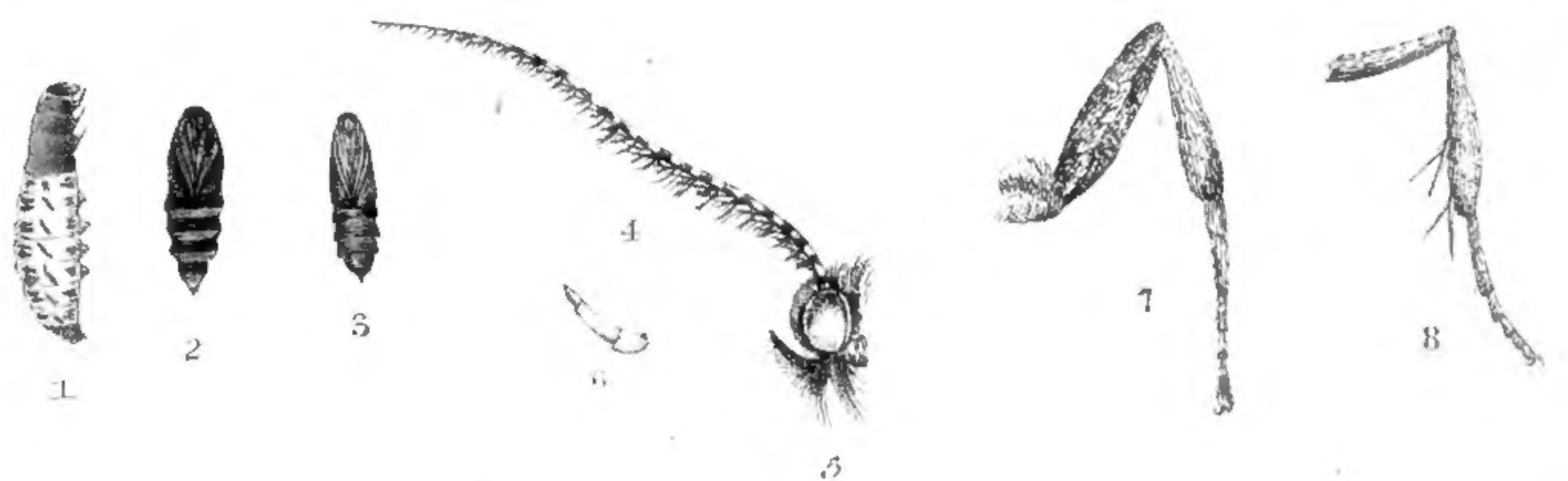
Fæm. plus minusve alata. *Mas.* et *fæm.* alæ anticæ sat trigonæ, apice vix rotundato, costâ arcuatâ. Abdomen in maribus gracile, acuminatum, alas posteriores non superans: in fœminis robustum, alas posteriores multò superans; segmento terminali pilis longiuseculis fimbriato, oviducto longo, exserto. Caput parvum. Antennæ sat longæ; *mas.* articulis subtus formatis subserratis, faciis quatuor ciliatis; *fæm.* subfusiformæ, squamosæ. Palpi minimi, antrorsum porrecti, pilis longiuseculis: *mas.* graciles, acuminati; articulus 2^{lus}. longior; *fæm.* articuli subæquales, basalis subglobosus. Pedes—aliis antici longi, validi, coxis et femoribus longis robustis, aliis posteriores longiores; tibiæ intermediæ calcaribus duobus, posteriores quatuor longis. Larva crassa, carnosa, versicolor, segmentis abdominis mollibus, thoracis corneis. Involucrum sacculiforme, rhomboidale, pendens, particulis corticalibus lignosis vel arenosis extus obtectum et intus serico densè assutum.

Female with wings fully or partially developed. In both sexes fore wings somewhat trigonate, with their tips slightly rounded, and costæ arched. Abdomen, *male*—thin, pointed, extending as far as the hind wings: *female*—robust, lengthened considerably beyond the hind wings, and with the terminal articulation fringed with longish hairs, ovipositor long, exerted. Head small. Antennæ moderately long: *male*—articulations produced beneath somewhat like serrations, each articulation bearing four brushes composed of long ciliæ: *female*—somewhat fusiform, scaly. Palpi, very small, porrected forwards and clothed with longish hairs; *male*—slender, acuminated, with the middle joint longest; *female*—joints nearly equal, the basal being somewhat globular. Legs, in some the anterior pairs large and powerful, owing to the length and robustness of the coxæ and femora: in others, posterior pairs largest, the former with two and latter with four long spurs on tibiæ. Larva thick, fleshy, abdominal portions soft, varying in colour; thoracic corneous. Case, a lozenge-shaped pendulous bag, open at both ends, covered with minute particles of bark, wood, or sand, and thickly lined with silk.



Conoeca Guildingi

Oecobia Frauenfeldi



Oecinea Felderi

Oecinea Scotti

From Nature and on Stone }
by Harriet Scott.

From the *Conceca* this genus differs in the trigonate wings; the deeply ciliated antennæ of the males, and the fusiform ones of the females; by the pendulous case; and by the metallic lustre of the imago.

From *Ecobia*, by the fusiform antennæ of the females; by the very small palpi; by the case not being cylindrical nor bearing twigs; and by the metallic lustre of the perfect insects.

SPECIES 1.—*ECINEA FELDERI*.—(PLATE 9.)

These elegant little insects we collected in September and October, in or immediately about the Botanic Gardens and Government Domain, near Sydney, feeding upon various weeds, preferring chick-weed (*Stellaria media*) and some grasses, and resorting to old and decayed wood either for shelter or for the purpose of procuring material, with which, together with particles of earth, they enlarge and protect their dwellings: these cases are bag-shaped, occasionally with the covering hanging loosely about the entrance, pendent, and lined with soft buff coloured silk. The larva is quick and restless in its movements, and conveys its somewhat cumbrous dwelling from place to place with greater celerity than could at first be imagined. The progression upon any irregular horizontal surface is accompanied by a singular jerking motion, caused by the animal stretching out the thoracic annulations in order to obtain a purchase, and almost simultaneously lifting the case by a muscular motion of the abdomen, it brings it forward with a sudden spring. In length the caterpillar (fig. 1) measures $\frac{3}{8}$ inch, having the head and thorax dark brown and the abdomen black.

The Chrysalis (fig. 2, ♂) is brown, pointed at the extremity, and $\frac{5}{16}$ inch in length: having remained in this state one month, the perfect insects take wing.

The male measures in expanse of wings slightly over $\frac{1}{2}$ inch; the female $\frac{3}{4}$.

The *Antennæ*, ♀ shortish, slightly fusiform, and scaly.

The *Labial palpi*, ♀ minute, projecting forwards and slightly downwards; moderately hairy; joints almost of an equal length, terminal somewhat obtuse.

The *Legs*, Anterior pairs have the coxæ and femora long, and sparingly clothed with scales; 2nd pairs with 2 rather long apical spurs; posterior pairs the largest, moderately hairy, and with 4 large spurs on the tibiae.

The wings deflexed at rest.

The upper surface of the male is of a dark brown, relieved by gold, disposed in two short subcostal patches, and numerous small dots along the exterior and interior margin of each superior wing, and in a large discal patch on the inferior wing. The antennæ and marginal fringes also possess a golden tinge. The female is throughout on the upper side of a dark metallic blue, passing into bright green towards the tips of the superior wings. Distinct largish spots of white are distributed equally over the upper wings, and two small similar spots occupy the abdominal margin of the under ones. The terminal segment of the abdomen tufted with longish yellow hairs, partly concealing an exerted yellow ovipositor.

The flight of the male is rapid, that of the female slow and heavy; and we have reason to believe that the insect is diurnal.

The male, two females, and the caterpillar, are delineated around a small tuft of the *Poa annua*, an imported grass.

SPECIES 2.—*ECINEA SCOTTI*.—(PLATE 9.)

Ecinea Scotti, Macleay, M.SS.

The *Ecinea Scotti* exceeds in size and beauty of colouring the preceding species, and is withal more frequently met with. We have found the larvæ in considerable abundance during the month of September in Sydney and its vicinity, and on Ash Island, where, from their gregarious habits, we were easily enabled to select from beneath the loose bark of a prostrate tree, upwards of 45 specimens, this number being considered amply sufficient for attaining the knowledge of their economy and metamorphoses. When first captured, their cases were entirely covered with dark reddish brown pulverised wood, but being supplied in confinement with decayed wood of various colours, these gradually assumed a motley appearance, the larvæ attaching to their habitations any convenient substance they may meet with: in one instance a few white hairs from the cat having fallen accidentally in the box were immediately appropriated.

The larvæ partake of several kinds of food, but our specimens appeared to prefer chick-weed (*Stellaria media*) and the dead leaves of the Native Fig, (*Ficus Australis*), but no doubt in their natural state they must exist upon various kinds of small lichens or mosses, grass, and the dead leaves of indigenous plants. The head and thoracic segments shining brown; the abdominal, whitish, with two rows on each of short dark brown lines, the dorsal ones transverse, the lateral smaller and oblique: in length $\frac{3}{4}$ inch (fig. 1, ♀); the case being considerably longer. The habits and mode of progression are very similar to those of the first species described, *C. Felderi*.

When about to change to the pupa, they seek concealment, and the case losing the flattened form becomes inflated and cylindrical, caused by the extra lining of silk which the caterpillar has added for its comfort and protection during the dormant state.

The Chrysalis ♂, (fig. 3) somewhat under $\frac{1}{2}$ inch, slight, attenuated, and yellowish red: ♀ (fig. 2) barely over $\frac{1}{2}$ inch, dull brown.

The perfect insects, having remained nearly five weeks in the pupa state, took wing at the latter end of November; the male measuring in expanse of wings nearly $\frac{7}{8}$ inch; the female, only partially developed, about the same.

The *Antennæ*,long; *Male*, (fig. 4) articulations produced beneath, resembling serrations, and each with four brushes of long ciliae. *Female*, slightly fusiform, thickly covered with feathery scales.

The *Labial palpi*, small, porrected, and covered with longish hairs; *Male*, (fig. 5, and 6, divested of hair) rather slender, terminal joint acute at the tip, and about equal in length to the basal, which latter however is more robust; the middle joint the longest. *Female*, joints almost of an equal length, the basal slightly globular.

The *Legs*,Anterior pairs (fig. 7, ♀) long, robust, the coxæ and femora being greatly developed; 2nd pairs smaller, containing 2 longish spurs, and posterior pairs (fig. 8, ♂) with 4 long spurs at apex of tibiae. Tibiæ and tarsi thickly covered with hair-like scales.

The wings deflexed at rest, and the moth diurnal.

The whole of the upper surface of the male is rich chocolate brown, minutely speckled with gold, with the exception of a broad band on the anterior margin of the primary wings which has instead three or four large transverse bars of golden yellow; and of the disc of the secondary wings occupied also by golden yellow.

The colouring of the Female is widely different, being throughout deep metallic blue; the exterior margins of the upper wings deeply bordered with bright yellow, which in some specimens is continued under the costa towards the base. The antennæ are tipped with white, and the abdomen terminates with a fringe of pale coloured hairs. The thorax and abdomen are very large in comparison with those of the other sex, and were the wings perfect their expanse would be considerable; they are, however, so unformed as to preclude the insect from flight, and it proceeds along with a running jerk and an occasional bound, and this transition from place to place is effected with considerable rapidity by the agency of its long and powerfully formed limbs. When at rest the wings slightly droop, the body recurves, and an ovipositor of considerable length is kept continually in motion.

This representation contains the figures of the male and two females in the perfect state, with the larva feeding on the *Poa annua*.

It is manifest that in the two species of *Cecinea* we have illustrated, there exists so great a dissimilarity in certain portions of their conformation as might justify their separation into genera: we allude to the imperfectly formed wings of the female of the *Cecinea Scotti* and its powerful anterior legs, providently supplied to overcome that deficiency of flight; but viewing in both the habits of the larvæ residing in similar dwellings and localities, together with the correlation of the antennæ, the palpi, and the males of the perfect insects, we conceive we do right in still retaining them under the one genus.