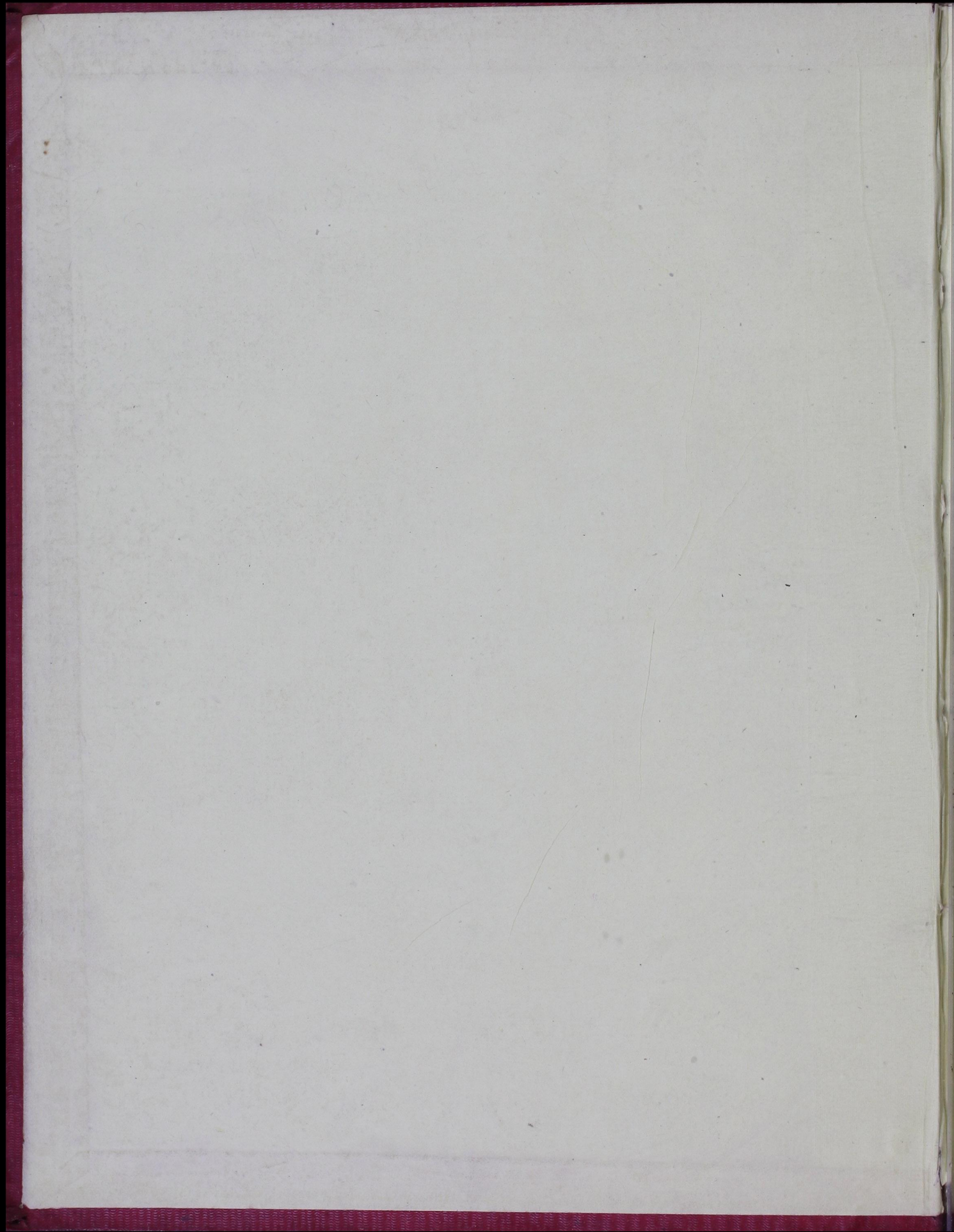


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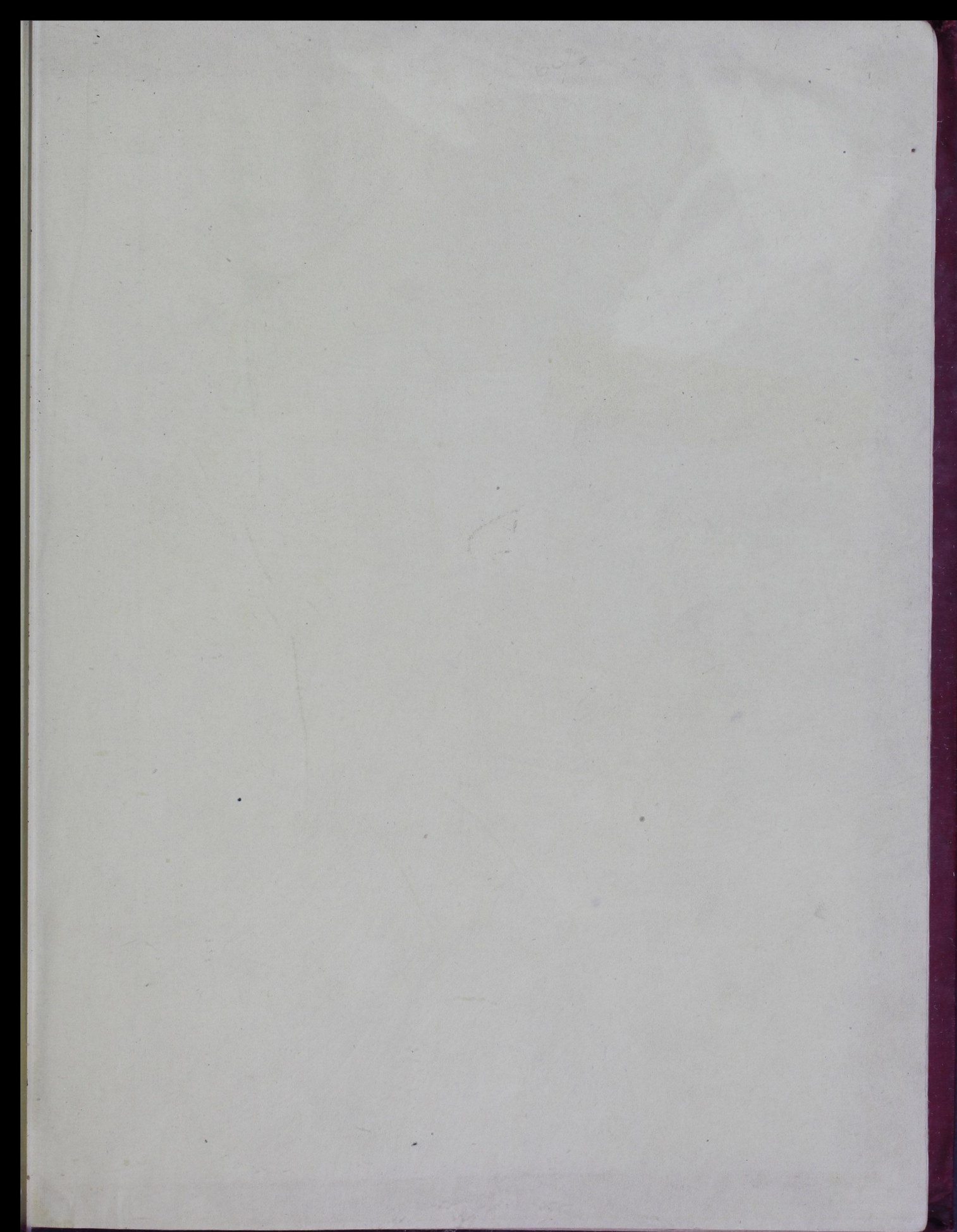


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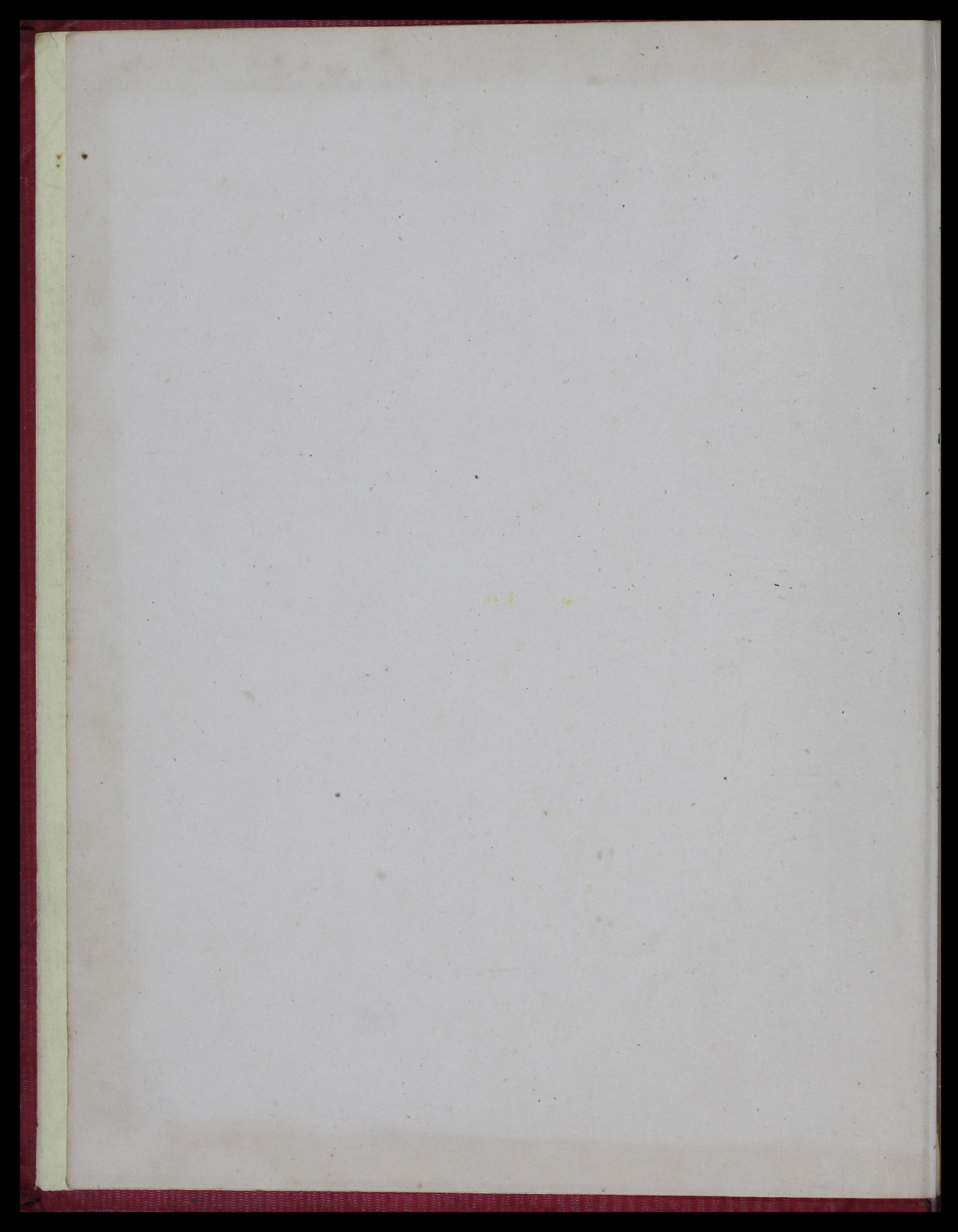




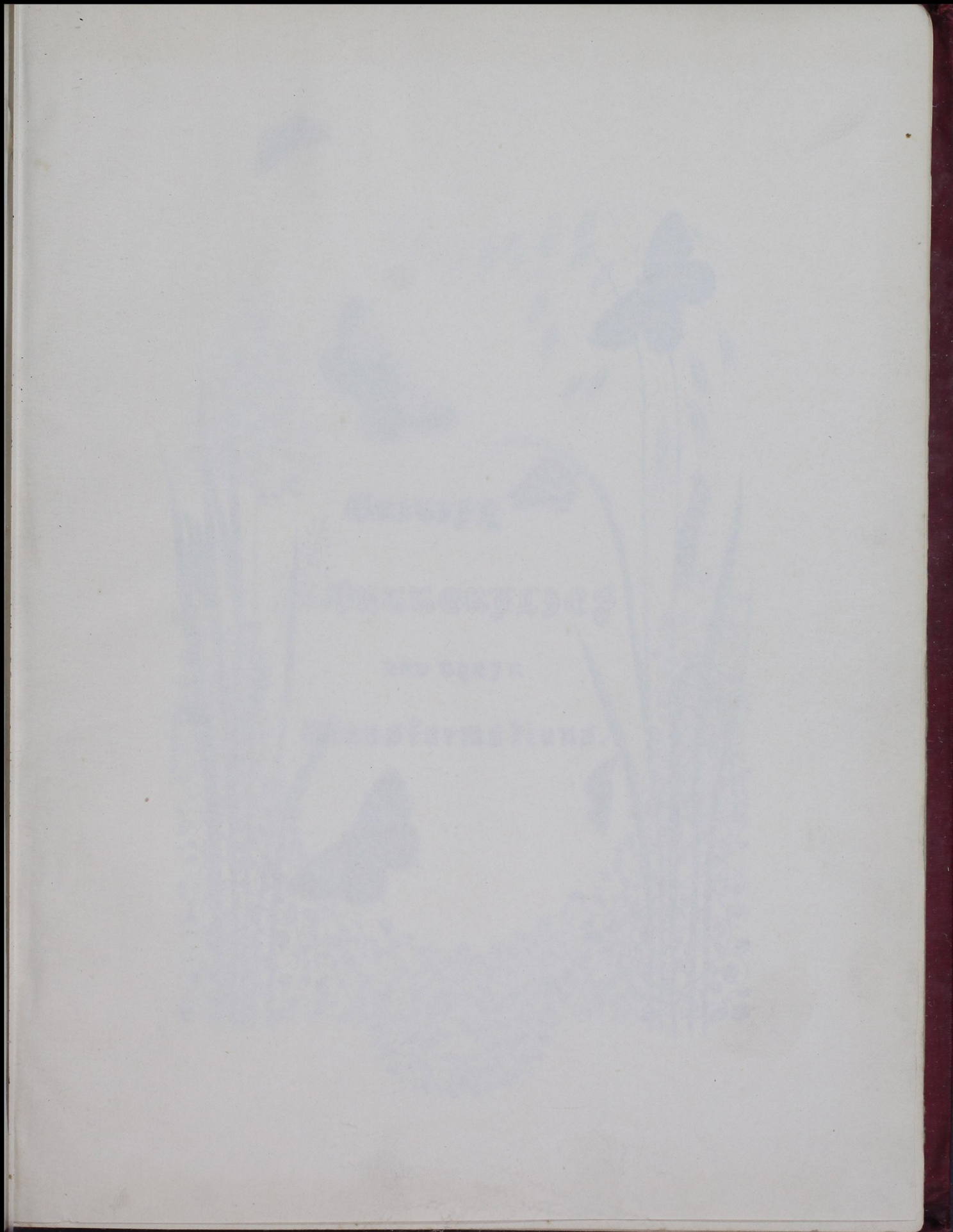




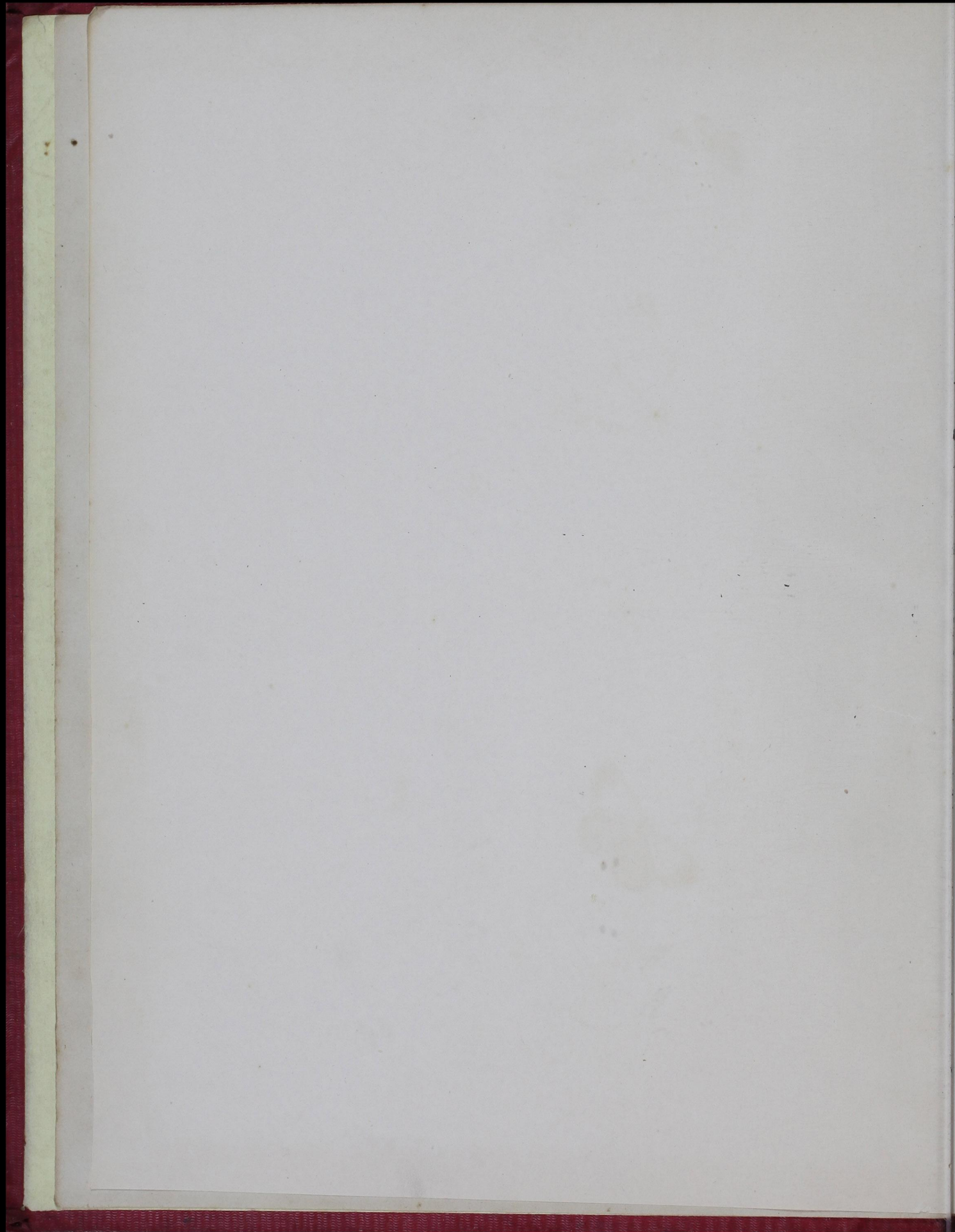




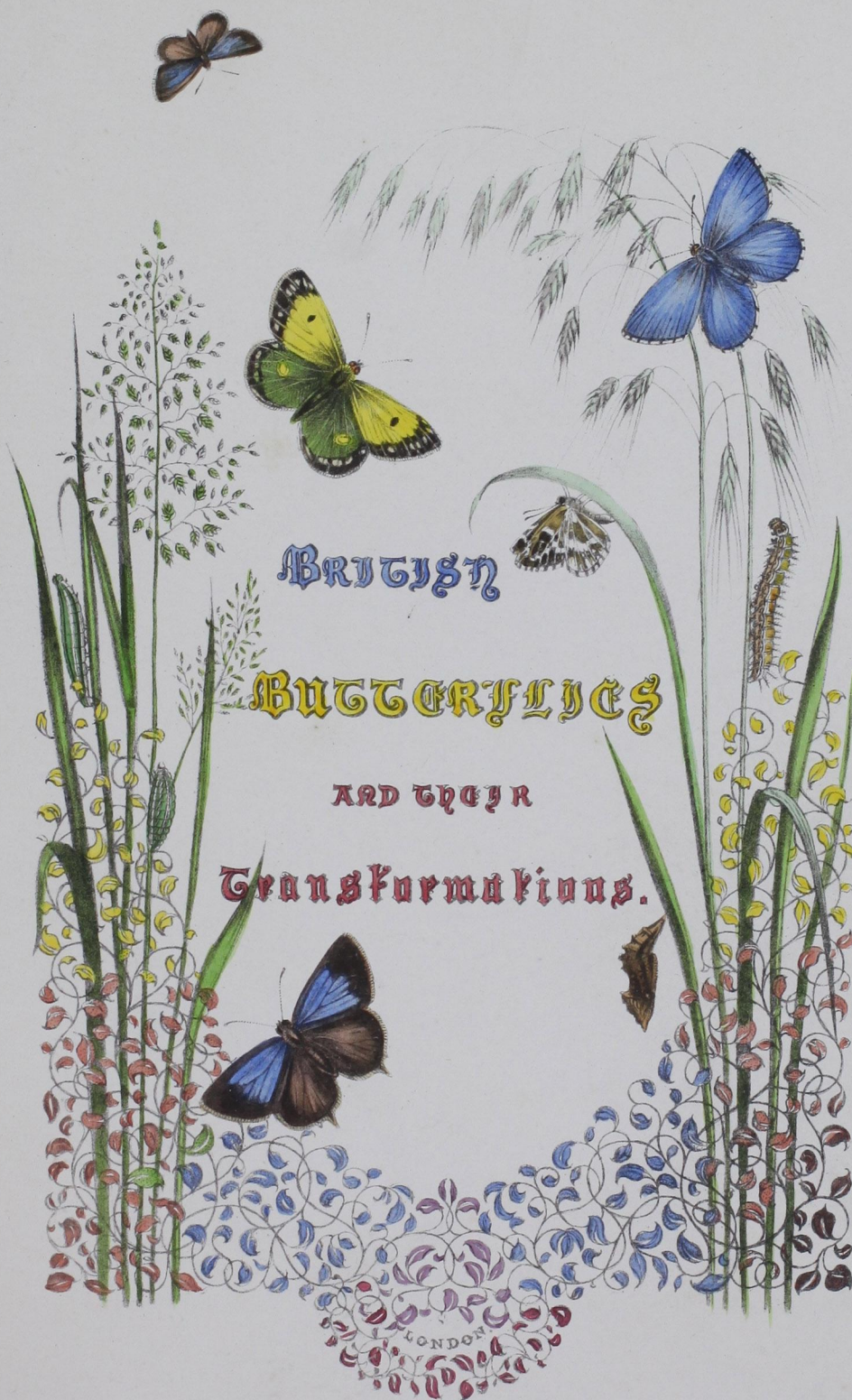




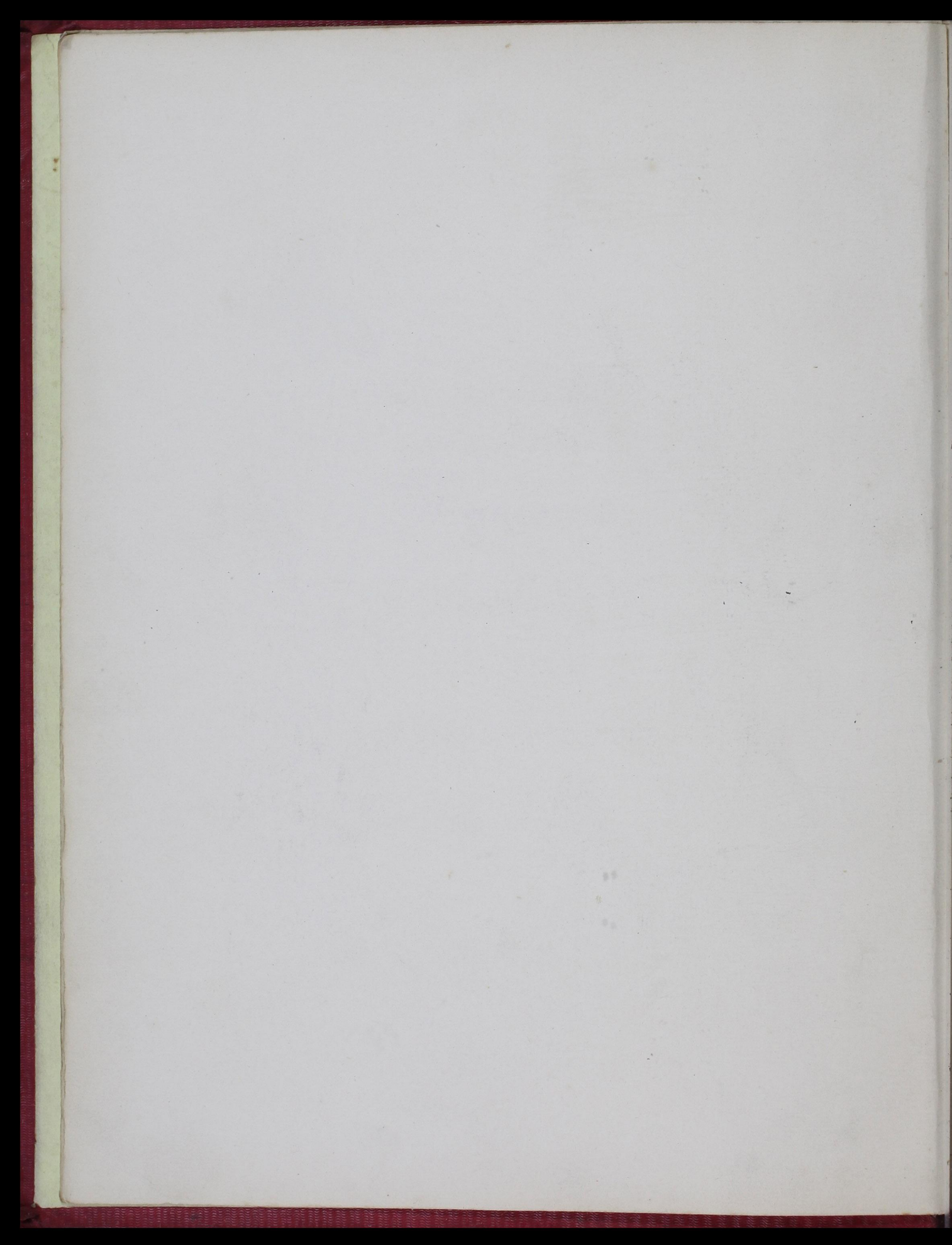














# BRITISH BUTTERFLIES

AND THEIR

## TRANSFORMATIONS.

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ARRANGED AND ILLUSTRATED IN A SERIES OF PLATES BY

H. N. HUMPHREYS, ESQ.

WITH CHARACTERS AND DESCRIPTIONS BY

J. O. WESTWOOD, ESQ., F.L.S.

SEC. OF THE ENTOMOLOGICAL SOCIETY.

NEW EDITION, REVISED AND CORRECTED BY THE AUTHOR.

LONDON:

THOMAS SANDERSON, 77, FLEET STREET.

MDCCCLVII.



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## TRANSFORMATION

AND THE LIFE HISTORY OF THE BUTTERFLY

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"	4. The Chrysalis.
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"	17. <i>Calluna vulgaris</i> (common Heath).
"	18. <i>Plantago lanceolata</i> (Ribwort).

## PLATE IX.

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"	4. The Caterpillar.
"	5. The Chrysalis.
"	6. <i>Argynnis Aglaia</i> , male (the dark green Fritillary B.).
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"	8. Showing the under side.
"	9. The Caterpillar.
"	10. The Chrysalis.
PLANTS.	11. <i>Rubus Idæus</i> (the Raspberry).
"	12. <i>Viola odorata</i> (the Sweet Violet).

## PLATE XII.

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INSECTS.	1. <i>Argynnis Charlotta</i> (a variety of <i>A. Aglaia</i> ).
"	2. Showing the under side.
"	3. <i>Argynnis Paphia</i> (a beautiful female variety).
"	4. <i>Argynnis Aphrodite</i> .
"	5. Showing the under side.
PLANT.	6. <i>Viola lutea</i> (the wild Yellow Heartsease).

## PLATE XIII.

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" 8. The Chrysalis.	
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" 12. The Chrysalis.	
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" 16. Urtica dioica (the common Stinging Nettle).	

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" 3. The Caterpillar.
" 4. The Chrysalis.
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" 6. The Caterpillar.
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" 3. The Caterpillar.
" 4. The Chrysalis.
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" 7. Cynthia Cardui.
" 8. Showing the under side.
" 9. The Caterpillar.
" 10. The Chrysalis.
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" 3. Cnicus lanceolatus (the Spear-plum Thistle).

## PLATE XVI. 5

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" 2. The female.
" 3. Showing the under side.
" 4. The Caterpillar.
" 5. The Chrysalis.
" 6. Limenitis Sibilla (the White Admiral).
" 7. Showing the under side.
" 8. The Caterpillar.
" 9. The Chrysalis.
PLANTS. 10. Quercus sessiliflora (the Sessile-fruited Oak).
" 11. Lonicera Periclymenum (the common Honey-suckle).

## PLATE XVII. 64

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" 2. Showing the under side.
" 3. The Caterpillar.

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" 6. Showing the under side.	
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" 8. Showing the under side.	
" 9. The Caterpillar.	
" 10. The Chrysalis.	

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" 2. The female.
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" 4. The Caterpillar.
" 5. The Chrysalis.
" 6. Hipparchia Semele, male.
" 7. The female.
" 8. Showing the under side.
" 9. The Caterpillar.
" 10. The Chrysalis.
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## PLATE XIX. 68

INSECTS. 1. Hipparchia Briseis, female.
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" 5. Showing the under side.
" 6. The Caterpillar.
" 7. The Chrysalis.
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INSECTS. 1. Hipparchia Janira, male (the Meadow-brown Butterfly).
" 2. The female.
" 3. Showing the under side.
" 4. The Caterpillar.
" 5. The Chrysalis.
" 6. Hipparchia Hyperanthus (the Ringlet B.)
" 7. Showing the under side.
" 8. The Caterpillar.
" 9. The Chrysalis.
PLANT. 10. Poa annua (annual Meadow-grass).

## PLATE XXI. 72

INSECTS. 6. Cœnonympha Davus, the small Ringlet Butterfly.
" 7. Showing the under side.
" 3. Cœnonympha Polydama (the specimen formerly figured by Mr. Stephens), showing the under side, with the cream-coloured band or fascia continuous, and not interrupted as in Fig. 2.
" 1. Cœnonympha Typhon, the Marsh Ringlet B. (the specimen formerly figured by Mr. Stephens as Iphis).
" 2. Showing the under side.
" 4. The Caterpillar of C. Iphis of Godart.
" 5. The Chrysalis.



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	FIG.	PAGE
INSECTS.	8. Another specimen of <i>C. Typhon</i> , approaching in colour on the under side to <i>C. Pamphilus</i> .	
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"	14. <i>Melica nutans</i> (mountain Melic-grass).	

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"	4. The Caterpillar.	
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"	8. The under side of the Scotch variety, male.	
"	9. The under side of the English variety, female.	
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"	4. The Chrysalis.	
"	5. <i>Thecla Quercus</i> (the purple hair-streak B.), female.	
"	6. The male.	
"	7. A common variety of the male, more dusky in tint.	
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## PREFACE.

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DURING a recent tour through Italy, I first conceived a predilection for the study of entomology. Early in the Italian spring, in the months of March and April, after a winter's residence in Rome, my favourite rambles were over the desert yet beautiful Campagna; and in these walks my attention was actively aroused by the profusion and variety of insect life, particularly of glittering butterflies, that in those early months already flitted over the flowery waste. As I stepped among tufts of the Alpine anemone, the crimson cyclamen, or purple squill, crowds of painted insects arose at every tread, as though a passing gust of wind had suddenly scattered a cloud of the many-coloured petals of the crushed flowers to the breeze. Later in the season the numbers still increased, and their brilliancy and novelty soon determined me to attempt the formation of a collection, reserving the classification and study till my return home; when I discovered that many beautiful species of Lepidoptera which I had deemed novelties were well known as indigenous to our own island, where, however, their comparatively unfrequent appearance had not forced them into notice, whilst in Italy their profusion had compelled attention. Such was the case with *Papilio Machaon* (the swallow-tail butterfly), as common on the Roman Campagna as the cabbage-white in our gardens. *Mancipium Daplidice* (the Bath white) and *Pieris Cratægi* (the black-veined white) were still more numerous; whilst the whole Campagna about mid-day received quite a golden hue from the rich orange colours of *Gonepteryx Cleopatra* and *Colias Edusa*, both of which were in such profusion that I actually took above twenty specimens of the latter species at once, upon a gigantic thistle, on the road to Tivoli.

Upon my return to England, I found the arrangement and description of my collection not so easy a matter as I had anticipated, for want of some popular yet comprehensive and complete work upon the subject; and I was only eventually enabled to make myself acquainted with even the British species in their different stages, by reference to expensive foreign works. Feeling thus the want of some popular work in which the transformations of British Lepidoptera were accurately described and developed, with accurate portraits of each insect in its three great stages\*—the caterpillar, the chrysalis, and the butterfly or moth, I planned the present work, with the view of supplying the deficiency I had so much felt myself; not confining myself to Lepidoptera, but extending the plan to all British insects, many of whose trans-

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\* Several works exist, which are nearly complete, with reference to the imago or complete insect, but none representing all the British species in the three stages of larva, pupa, and imago; the figures in Stephens, Curtis, or Donovan being only selections.



formations are perhaps even more wonderful than those of butterflies; and with the able assistance of Mr. Westwood, who has kindly undertaken to describe the characters, etc., etc., I hope to make the present a more complete work than any that has hitherto appeared in this country upon the subject, whilst its price will make it attainable by the great mass of the public.

In this place it is usual to put forth some argument in favour of the study of such subject as the book treats of, but it seems scarcely necessary to urge anything in favour of the delightful study of entomology. The great beauty of many tribes of insects, their wonderful and minute organization, their extraordinary metamorphoses, and the links they add to the chain of created beings, appear to form an all-sufficient attraction.

All must acknowledge the desolateness and vacancy of the mind which, placed among the treasures of a splendid library, is unable to taste the rich fruits of reason that are piled around—unable to read; yet, without being acknowledged or felt by the great mass of society, just such is the situation of one who has never awakened to the wonders of natural history, when he finds himself in the woods or fields. He cannot read in the beautiful book of Nature, when in the summer it opens its brightest leaves, illuminated with its most gorgeous pictures, before him.

The study of natural history is the learning of the characters with which the wonderful story of nature is written; and I cannot conceive a more pleasing and natural introduction to its general study than entomology, of which I think the division *Lepidoptera*, the first portion of which will occupy the present volume, the most easy and attractive section. The individual beauty of the insects in every stage, the ease with which they are preserved, and the comparative facility with which a tolerably complete collection of British species may be formed, particularly of butterflies, of which we number scarcely more than eighty distinct species, render it a task of easy attainment; and carrying forth the student among trees and fields and flowers at the most delightful period of the year, its pursuit becomes very captivating; a most attractive first step towards the acquirement of a general knowledge of natural history.

Many other temptations might be adduced to encourage the study of the natural history of butterflies, but I will only allude to one. Botanists are sent, at vast expense, to every region of the earth to collect the most beautiful flowers of every clime for the decoration of our gardens; and the efforts of scientific gardeners are exerted to naturalize them to our climate; but though the plants of temperate regions have been found, in many instances, to bear the open air in our country, the gorgeous vegetation of the tropics can only be seen in England in the stove or the conservatory. Yet, though we cannot transplant the flowers of the tropics to our bleaker soil, it appears by no means impossible that we may naturalize some of their splendid insects. Their system of hybernation in the pupa case, in which state insects have been found to resist almost any degree of cold without injury, would shield them from the effects of our long winters. Their development would not take place till the warmth of summer became sufficient; when we might see tropical butterflies flit from flower to flower—a splendid novelty to our gardens, exhibiting colours more gorgeous than anything in the vegetable empire; and our lawns would be spangled with colours still more beautiful than those of the brightest flowers, and endowed, moreover, with the extra charm of motion. If we cannot add the humming-birds of the Brazils to our garden luxuries, it seems



probable that we might import many of the brilliant butterflies—in some instances, even still more wonderful specimens of tropical colouring.

These remarks may tempt some, who have favourable opportunities, to make the experiment; which, with proper precaution in selecting such species as would find appropriate food in this country (which would be easy, as several tropical plants are in most extensive cultivation here, of which it will suffice to name the potato and many species of *tropæolum*), and also by selecting such as appear at the coolest seasons, might surely prove successful.\* A few, somewhat similar, experiments have already been tried with complete success in transplanting English species from a part of the country where they were abundant, to one where they were comparatively unknown; and some few attempts have been made to naturalize continental species, but not upon a scale or with the precaution necessary for a fair trial. I feel quite convinced that we might easily, for instance, render the beautiful *P. Podalirius*, an extremely scarce if not absent species, as common as *P. Machaon*.

In conclusion, and more particularly addressed to those whose delicate sympathies shrink from making entomology a study on account of the *cruelty* of killing the necessary specimens, I may repeat a few of the arguments so often urged by eminent naturalists, but still little known, except to the very small number who have made entomology a pursuit. Those who have not carefully examined the subject have got a few texts from poets or moralists, which serve them on all occasions as argument on the side of the alleged cruelty. But they should recollect that poets are not always good naturalists. Milton, for instance, speaks of the leaves of the banyan as “broad as an amazonian targe,” an assertion quite at variance with fact. On the other hand, men of science make sometimes but poor critics of art, like a celebrated French philosopher of the period of Louis XIV., who speaks of Michael Angelo and Raphael as “those *Mignards* of their age.” Great men of all vocations may thus occasionally make mistakes in speaking of subjects which they have not carefully studied; and even Shakspeare shows that he was no entomological anatomist, when he asserts that the insect we unheedingly tread upon

“In corporal sufferance feels a pang as great  
As when a giant dies.”†

Minute dissections, and the closest anatomical examinations, have proved that though insects are possessed

\* It should be tried both with eggs and pupæ.

† I quote this passage in its original and long-accepted meaning, although several writers upon the subject have endeavoured to twist it to a different sense (Bennett, *Zoological Journal*, No. 18, p. 19; Mr. Bird, *Entomological Mag.*), and make it appear that Shakspeare not only made no mistake, but, on the contrary, understood the physiology of insects as well, at a time when entomology was unknown as a science, as the men who during the last century have devoted their entire lives to the study of the subject by means of the most minute dissections and the most careful analyses.

The passage occurs in “Measure for Measure,” when Isabella encourages the condemned Claudio to suffer death rather than dishonour.

“Darest thou die?  
The sense of death is most in apprehension;  
And the poor beetle, that we tread upon,  
In corporal sufferance feels a pang as great  
As when a giant dies.”

Mr Bird asserts that Shakspeare's intention was to show “that death was most in apprehension, and that even a beetle, *which feels so little*, feels as much as a giant.” If Shakspeare, who is never mystical or indistinct, and had not the means of knowing that beetles felt little, had meant this, his passage would have been to the effect, that

“The dying giant,  
In corporal sufferance, feels no greater pang  
Than the poor beetle that we tread upon.”

The true meaning is very evident: Shakspeare wishes to convey that a man of courage ought to be able to look calmly upon death as the common lot of every living thing—a pang to be borne at every moment, by creatures unprovided with the moral strength of man; that at every incautious step we may



of nerves, they have no well-defined organ representing our brain, the organ of concentrated feeling, where all the nervous conductors meet. They have, instead, a chain of ganglia or bundles of nervous substance, from each of which nerves branch out to the contiguous parts, so that the sensations are not all carried to one grand central focus of acute sensibility as with us, but form, as it were, separate systems, any of which might be destroyed without communicating its sensation to the rest.

Mr. Haworth, the well-known English entomologist, being in a garden with a friend who firmly believed in the acute susceptibility of insects, struck down a large dragon-fly, and in so doing accidentally severed its long abdomen from the rest of its body. The mutilated insect, after this misfortune, felt so little inconvenience or loss of appetite, that it greedily devoured two small flies. Mr. H. then contrived to form a false abdomen, to create such a balance to the rest of the body as would enable it to fly; after which it devoured another insect, and on being set at liberty, flew away with the greatest glee, as if it had received no injury. It is well known that large moths found asleep in the day-time, may be pinned to the trunks of trees without their suffering a sufficient degree of pain to awake them; and only at the approach of twilight do they seek to free themselves from what they must doubtless consider an inconvenient situation.\* Many other equally striking facts might be adduced to prove that *cruelty* is not an objection to be made to the practical study of entomology. Besides, cruelty is an unnecessary infliction of suffering, as when a person is fond of torturing creatures from mere wantonness without any useful end in view, or has recourse to circuitous modes of killing, where direct ones would answer equally well.† The sportsman may perhaps be said to be cruel, for his primary object is amusement; and, unlike the entomologist, he is not adding to the general stock of knowledge. But all dispute may be ended by a very simple expedient; for by dipping the entomological pin in prussic acid previous to piercing the insect, the effect is instantaneous.

In the ensuing plates, the caterpillar, chrysalis, and imago of every British species of butterfly will be given as far as they are known; and amateur collectors are invited to preserve, and make careful drawings of every caterpillar they may find which is not figured in this work, carefully supplying them with proper food till the change to the pupa state. By such a course, pursued simultaneously by many individuals in different parts of the country, the gaps in the natural history of British Lepidoptera may be rapidly filled up, to which desirable object I trust the present work may conduce.

H. N. H.

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cause that pang of death to be borne by some poor insect which feels as keenly as ourselves, though deprived of the means of expressing pain or the mental strength to overcome it; and that therefore man, the most perfect of created beings, ought not with his superior advantage to shrink from the pang which the poor beetle bears, when honour bids him face it. This is very philosophically reasoned by Isabella, and is a strong argument to induce her brother to meet death rather than disgrace; the simile of the beetle being only rendered inappropriate by modern discoveries in entomology, which have proved that a crushed beetle cannot feel "a pang as great as when a giant dies;" but, on the contrary, that all insects are, from the nature of their structure, incapable of acute sensations of pain. H. N. H.

\* Vide Knowledge for the People (Zoology), and Encyclop. Brit., art. Animal Kingdom.

† Vide Kirby and Spence, Introduction to Entomology.



# BRITISH BUTTERFLIES

AND

## THEIR TRANSFORMATIONS.

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### ORDER LEPIDOPTERA.

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THE beautiful tribes of Butterflies and Moths constitute one of the primary divisions or orders of winged insects, and are easily distinguished by several characters not found in any other annulose animals.

The wings, four in number, are of a membranous texture, covered on both sides with innumerable minute scales, resting upon each other like the tiles of a roof, and easily removed. It is to these scales that the insects are indebted for their splendid colours, the membrane of the wing itself being colourless.

The head is free—that is, not received in a frontal cavity of the thorax—and is furnished on each side with a large compound eye, and above with a pair of elongated antennæ, variable in form, not only in the different species, but also often in the sexes of the same species, and which in the butterflies are almost always terminated by a knob-like club. The mouth occupies the lower part of the face, and appears at first sight to consist only of a long tongue, which the insect folds and unfolds in a spiral manner at will, and of a pair of scaly or hairy appendages, serving as a defence to the spiral apparatus when coiled up; but a more minute examination shows that the mouth is much more complicated in its structure, and that it exhibits all the parts (although generally in quite a rudimental state) of the mouth of the biting insects. In fact, by denuding the front of the head of its scales, two minute triangular pieces are observed at a small distance apart above the origin of the spiral instrument, and which are the rudimental mandibles, here apparently useless, as is also the small conical upper lip placed between these two rudimental jaws, below which on each side is an oval plate soldered to the head, from the upper part of which arises one of the lateral halves of the spiral instrument, which in effect is composed of the two lower jaws extraordinarily elongated, and applied together so as to form a sucking tube; at the base of each portion of this tube is a minute tubercle, which in some species is developed into an elongated pair of feelers, or maxillary palpi; the labial palpi being the large feelers between which the spiral maxillæ are placed when at rest, and arising from the sides of the lower lip, which, like the basal part of the maxillæ, is soldered to the head.

The transformations of these insects, which have attracted the attention of the most incurious observer from the earliest period, also serve to distinguish them from all other insects. The females deposit a considerable number of eggs, from which are hatched small worm-like jointed animals, furnished with a scaly head armed with a mouth and powerful jaws; six short scaly legs, attached in pairs to the three segments succeeding the head, and a variable number of short, thick, fleshy legs attached in pairs to the posterior segments of the



body. The appearance of these larvæ is extremely variable, some being smooth, others warty, some hairy, etc. Their food consists almost entirely of vegetable matter. Whilst in this state they cast their skins several times, and when full-grown this operation is again repeated; but instead of the insect reappearing as a caterpillar, it now more nearly resembles an Egyptian mummy; on minutely examining which, however, we can trace the rudiments of most of the limbs of the perfect insect, but closely applied to the body and covered by a general slender pellicle; the future wings occupying the sides of the anterior part of the body, between which are to be observed the leg-cases and the antenna-cases. The form of these chrysalides, aureliæ, or pupæ (as the insects are termed in this state), varies greatly; those of butterflies may almost always, however, be distinguished by having several angular prominences in various parts of the body, whilst those of moths are conical and not angularly tubercled. This peculiarity seems dependent on the circumstance that the caterpillars of the latter tribes enclose themselves in cocoons or cases entirely of silk, or of silk mixed with various extraneous materials, in which angular prominences on the body would be inconvenient to the enclosed insect; the caterpillars of butterflies, on the contrary, rarely form cocoons, but are transformed to pupæ in the open air. After remaining a certain period in this state, the time for the bursting forth of the perfect insect arrives, and after slitting the pupa skin in several directions, it disengages itself from its exuvie, gradually extends its wings, and assumes all the beautiful characteristics of its perfect state.

"Behold, ye pilgrims of this earth, behold!  
 See all, but man, with unearn'd pleasure gay;  
 See her bright robes the butterfly unfold,  
 Broke from her wintry tomb in prime of May!  
 What youthful bride can equal her array?  
 Who can with her for easy pleasure vie?  
 From mead to mead with gentle wing to stray,  
 From flower to flower on balmy gales to fly,  
 Is all she hath to do beneath the radiant sky."

THOMSON'S *Castle of Indolence*.

The Lepidopterous insects were divided by Linnæus, the great classifier of the animal and vegetable kingdoms, into three primary genera, *Papilio*, *Sphinx*, and *Phalæna*, each subdivided into minor groups, and corresponding with the butterflies, hawk-moths, and moths of English collectors. As, however, the number of species became more and more extended, and a more minute investigation of the characters of the species was made, it became necessary to introduce a much more extended mode of distribution, whereby the order was divided into three principal sections, *Diurna*, *Crepuscularia*, and *Nocturna* (corresponding with the three Linnæan genera). These have been again subdivided into families, and the latter into numerous genera and subgenera. The *Crepuscularia* and *Nocturna*, or the hawk-moths and moths, are, however, much more closely allied together than either of them are to the *Diurna*; so that M. Boisduval, the most recent author upon the order, has proposed to adopt only two principal sections, *Rhopalocera*, or those with clubbed antennæ (butterflies), and *Heterocera*, or those with antennæ of variable shape, but never clubbed (hawk-moths and moths). This arrangement appearing to me the most natural of any yet published, I have adopted it in my "Introduction to the Modern Classification of Insects," as well as in the present volume, intended to contain the butterflies, whilst the hawk-moths and moths, or the sections *Crepuscularia* and *Nocturna*, together forming the division *Heterocera*, will form a subsequent work.



## DIVISION I.

## LEPIDOPTERA RHOPALOCERA (DIURNA, LATREILLE).

The Diurnal Lepidoptera, or butterflies, corresponding with the Linnæan genus *Papilio*, are distinguished not only by having the antennæ long and slender, and terminated in a larger or smaller club, which in the terminal family is hooked at the tip, but also by the want of a bristle at the base of the anterior margin of the hind wings beneath, which, passing through a loop on the under side of the fore wings of the moths, retains them in their proper place during flight. The wings also, when at rest, are mostly carried erect over the back, their upper surfaces being brought into contact. The flight of these insects is diurnal. Their caterpillars are constantly furnished with sixteen feet (six thoracic, eight ventral, and two anal). Their chrysalides are almost always naked, attached by the tail, and often by a girth round the middle of the body; they are often angular in their form, and are scarcely ever enclosed in a cocoon.

The Diurnal Lepidoptera are divisible into the six following families:—1. *Papilionidæ* (including two sub-families, *Papilionides* and *Pierides*). 2. *Heliconiidæ* (including the *Danaides*). 3. *Nymphalidæ* (including the *Hipparchiides*, or the *Satyrides* of Boisduval, or *Thysanuromorpha* of Horsfield, and some other minor tribes separated by Boisduval). 4. *Erycinidæ*. 5. *Lycænidæ*. 6. *Hesperiidæ*.\* The last family differs from all the others in the habit of the caterpillars rolling up leaves, within which they undergo their transformations.

## FAMILY I.

## PAPILIONIDÆ, LEACH.

This family consists of some of the most gigantic species of butterflies, distinguished by having all the six feet in the perfect state fitted for walking, the anterior pair not being more or less rudimental; the hind tibiæ have only a single pair of spurs at the tip; the tarsal ungues are distinct and exposed; the antennæ are never hooked at the tip, the club being distinct, but variable in form; the palpi are variable, but the third joint is never suddenly slenderer than the rest, and naked; the central cell of the hind wings is always closed behind by a nerve. The caterpillars are elongated, nearly cylindrical, and naked; the chrysalides are attached not only by the ordinary anal hooks, but also by a girth round the middle of the body. In one genus (*Parnassius*) they are, however, enclosed in a rough cocoon.

This family is divisible into two sub-families, *Papilionides* and *Pierides*. The first sub-family, *PAPILIONIDES*, has the anal edge of the hind wings concave, or cut out to receive the abdomen; the anterior tibiæ have a spur in the middle; and the tarsal ungues are simple. The caterpillars are furnished with two fleshy retractile tentacles, forming a fork upon the back of the segment succeeding the head.

\* In the fine work upon the Genera of Diurnal Lepidoptera, commenced by the late Mr. E. Doubleday and completed by myself, several additional families have been introduced amongst the butterflies. As the additional families are, however, of small extent, and consist exclusively of exotic species, I have not thought it necessary to allude to them further in the present edition of this work. J. O. W. (1854.)



## GENUS I.

## PAPILIO, LINNÆUS.

The antennæ are elongate, with a moderate-sized club, gradually formed and somewhat curved; the palpi are very short, so as to be scarcely seen,—they appear only two-jointed, the third joint being almost obsolete; the spiral tongue is long; the eyes are large and naked; the abdomen rather short, and ovate-conical; the wings are elongate, and more or less toothed at the edges, the posterior pair being often produced into a long tail, and having the anal margin cut out to allow the motion of the abdomen; the strong central nerve of the fore wings emits four branches behind; and the middle cell of the hind wings is closed and emits six nerves. The fore legs are alike in both sexes, the two fore legs being fitted, as well as the four hind ones, for walking; the anterior tibiæ have a single strong spur at the middle, the four hind tibiæ have two long spurs at the tip of each. The larvæ are naked, and furnished on the neck with a fleshy furcate tentacle, which they are able to retract or exert at will. The chrysalides are attached by the tail, and girt round the middle with a silken thread, with the head pointing upwards, and forked, or bimucronate.

This genus is extremely numerous, Boisduval having described as many as two hundred and twenty-four species, exclusive of several which he has detached under other generic names. They are mostly of large size, and are found in the tropics, only three or four species being natives of Europe.

## DESCRIPTION OF PLATE I.

- INSECTS.—Fig. 1. *Papilio Machaon* (the swallow-tail Butterfly). 2. The Caterpillar. 3. The Chrysalis.  
 „ Fig. 4. *Papilio Podalirius* (the scarce swallow-tail B). 5. The Caterpillar. 6. The Chrysalis.  
 „ Fig. 7. *Gonepteryx Rhamni* (the brimstone B), the male. 8. The female. 9. The Caterpillar. 10. The Chrysalis.

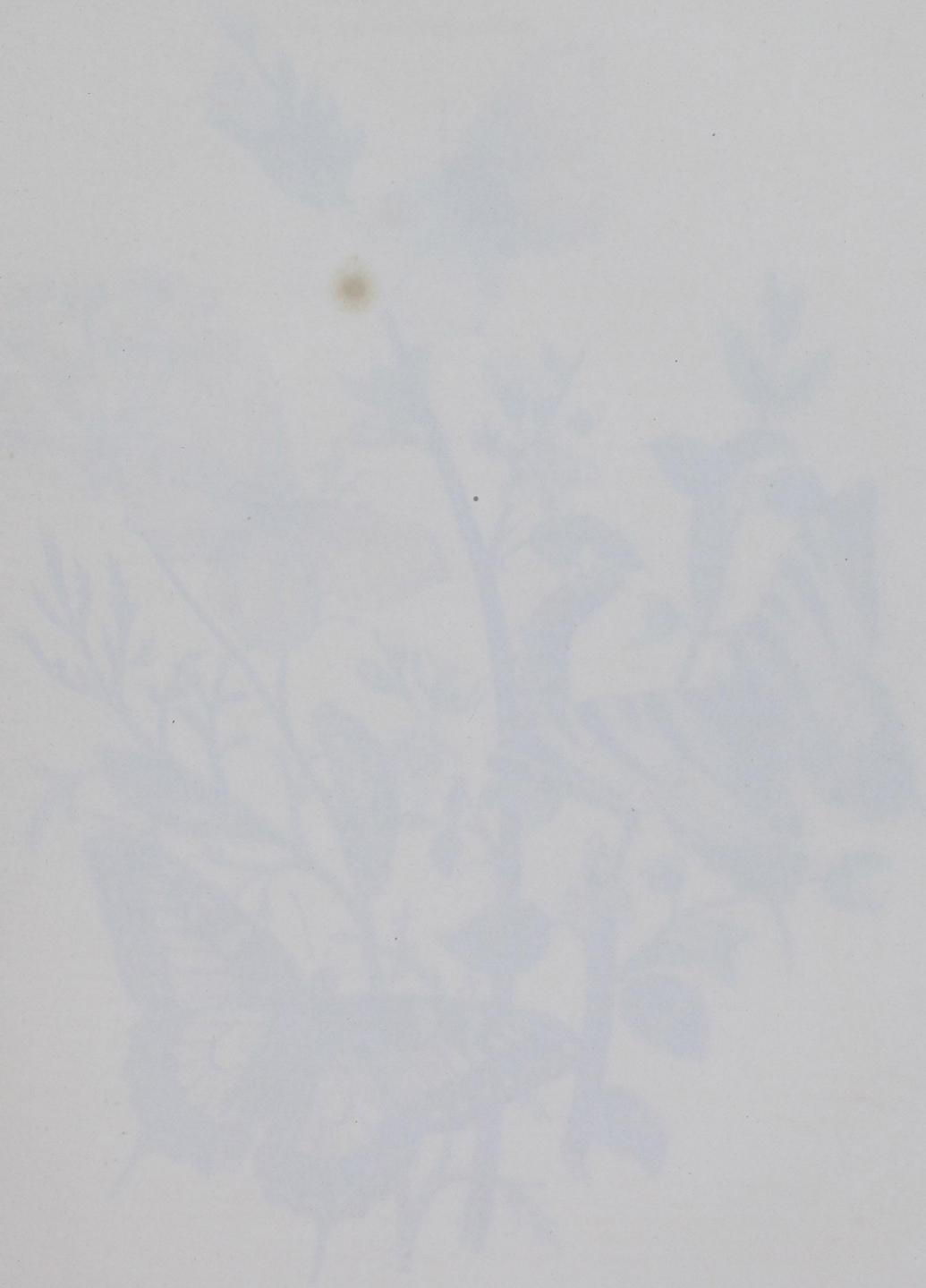
PLANTS.—Fig. 11. *Daucus carota* (wild Carrot). 12. *Prunus spinosa* (Sloe). 13. *Rhamnus catharticus* (Buckthorn).

I have here introduced *Papilio Podalirius*, though still considered doubtful by some entomologists, as a British species. My figure is drawn from an Italian specimen of my own, taken near Tivoli, which differs from the individual figured by Mr. Curtis, in having the black stripes less strongly marked.\* *Papilio Machaon* and *Gonepteryx Rhamni* are from English specimens in my own collection, and I should have liked to have added *G. Cleopatra* from a beautiful Italian specimen, as in most countries in Europe it is equally common with *G. Rhamni*; but no instance of its being seen in England has, I believe, yet occurred.† It might, however, I should think, be easily imported; but Boisduval asserts that *G. Cleopatra* and *G. Rhamni* have both been reared from the same eggs, and that the caterpillars offer no perceptible difference even in the markings; thus inferring that the more rich colouring of *G. Cleopatra* is attributable to the effect of climate upon the more robust individuals. It is singular, however, if this be the case, that similar varieties do not occur in favourable climates in other parts of the world where *G. Rhamni* is common; in Nepal, for instance, or parts of North America, where the modifications effected in *G. Rhamni* by climate or food are but slight. H. N. H.

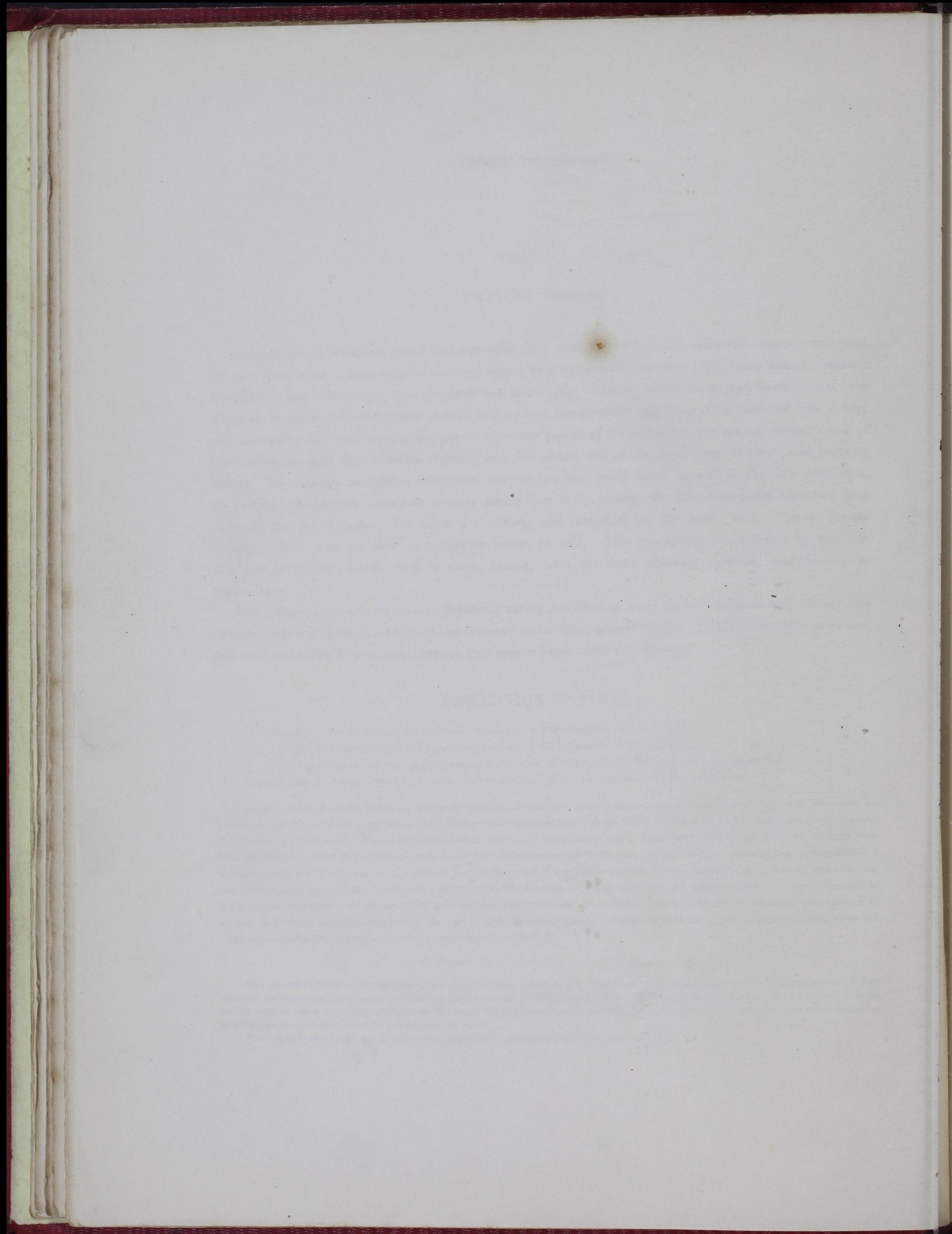
\* The unusual darkness of the markings of Mr. Read's English specimen of *P. Podalirius* tends to confirm the really indigenous character of that specimen, which seems to be completely supported by the fact that the individuals taken farther south than the one figured in Plate I., namely, in Spain and the north of Africa, have the ground-colour of the wings "toujours sensiblement plus blanc," which has induced M. Godart to regard them as forming a distinct species under the name of *P. Feisthamelii*. J. O. W.

† The variety figured by Mr. Curtis cannot be considered even an approach to *G. Cleopatra*. H. N. H.





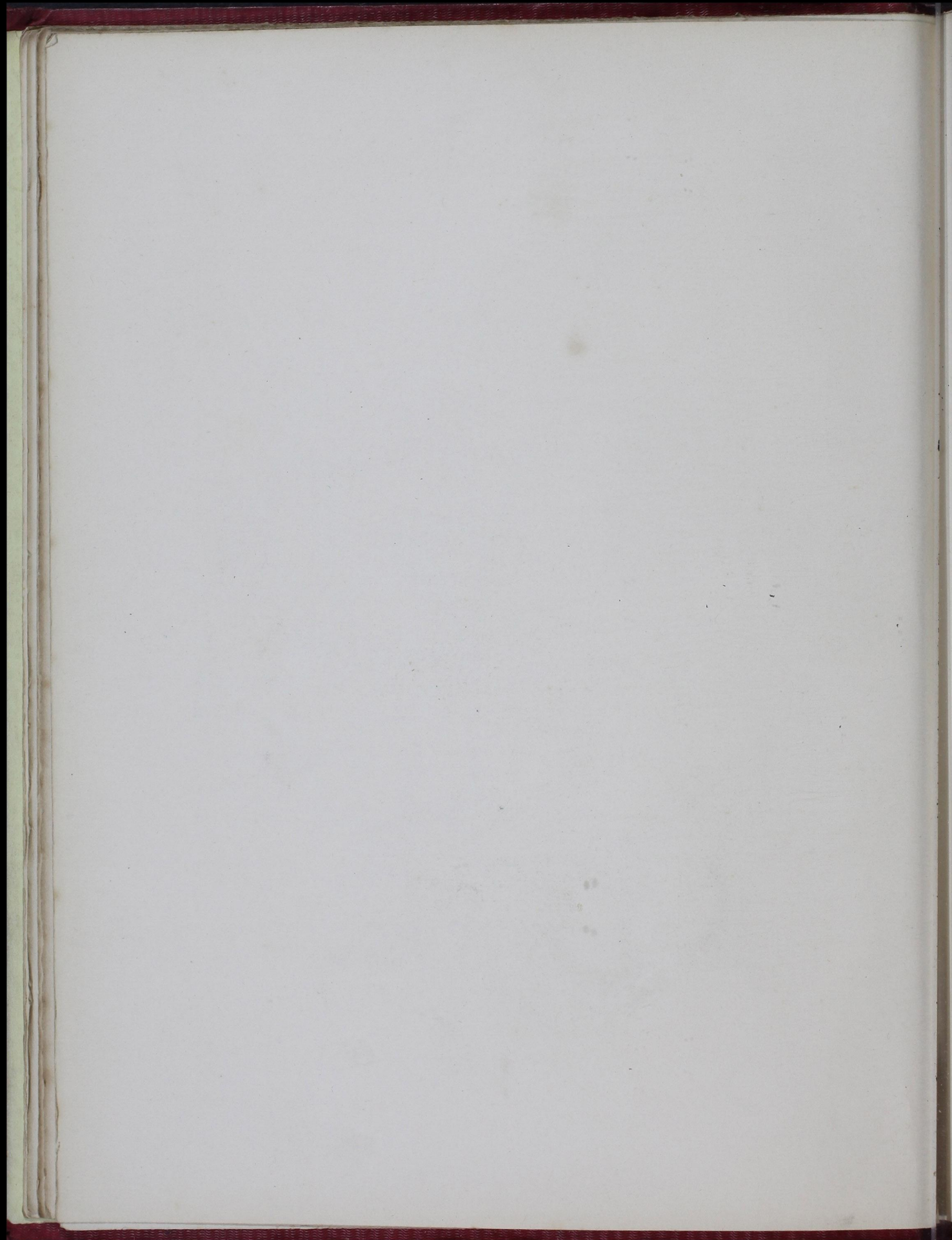














## SPECIES 1.—PAPILIO MACHAON. THE SWALLOW-TAIL BUTTERFLY.

Plate i. figs. 1—3.

SYNONYMES.—*Papilio* (*Equites Achivi*) *Machaon*, Linn. Syst. Nat. ii. 750.  
 Donovan Brit. Ins. 6, pl. 211. Lewin Brit. Butt. pl. 34. Harris Aurelian,  
 pl. 36. Westwood Ent. Text Book, tab. 4, fig. inf.; ditto Introd. ii. p. 332,  
 fig. 95. 1—10. Duncan Brit. Butt. pl. 4, fig. 1.

*Papilio Reginae*, De Geer. Gen. 6. 30. 5.*Jasonides Machaon*, Hubner.*Amaryssus Machaon*, Dalman. Pap. Suec. 85. 1.

This beautiful butterfly varies from three inches to three inches and nearly three-quarters in the expanse of the wings, which are of a yellow colour with black markings, the fore wings having a large patch of black at the base; the anterior margin is black, with three large black subcostal marks; the nerves are also broadly black, as is also the apical margin, in which are eight yellow lunules, above which is a thick sprinkling of minute yellow scales; the posterior wings are more strongly denticulate at the edges, and produced behind into a pair of rather long tails; they are yellow, with the inner margin and a very broad apical border black, the latter with six yellow lunules, above which is a thick sprinkling of blue scales. The anal angle is ornamented with a brick-red eye, margined with yellow beneath and with blue above, the latter having also a black crescent above it.

The under side of the wings is much paler than the upper, the black markings being less extended; the apical yellow lunules of the upper side are replaced by a narrow continuous bar, above which the yellow irroration is much stronger; the broad black apical bar of the hind wings is much paler, the black being confined to the curved margins of the bar, and in the middle of the hind wings are three triangular brick-red spots; a spot of the same colour also exists in the squarish yellow submarginal spot nearest the fore edge of the hind wings.

This species is very widely dispersed, being found all over Europe, Siberia, Syria, Egypt, the coast of Barbary, Nepal, Cashmere, and the Himalayan Mountains, from which last locality I possess a specimen, captured by Professor Royle, which scarcely exhibits the slightest differences when compared with English specimens. In our own country it chiefly occurs in the fenny districts of Cambridgeshire and Huntingdonshire, but it has also been captured in Hampshire, Middlesex, Sussex, Essex, and Kent. The caterpillar is of a fine green colour, with velvety black rings, spotted alternately with fulvous-red. It is found in June and September, there being two broods in the year, according to Boisduval; but this is doubted by Stephens, the perfect insect being taken from the beginning of May to the end of August in England. It feeds upon various umbelliferous plants, especially on the marsh-milk parsley (*Selinum palustre*), fennel (*Anethum feniculum*), and wild carrot (*Daucus carota*), preferring the flowers. The fork-like tentacle on the neck is of a red colour, and emits a strongly-scented liquor when alarmed, by which it is said to drive off the Ichneumon flies. The mode in which the transformation of this butterfly is effected has been carefully investigated by Reaumur. When full-grown, the caterpillar discharges from the spinning apparatus in the middle of the under part of the mouth a small quantity of silk, forming it into a little mass, which it lays hold of with its hind pair of feet; it then attaches another thread on one side of the twig at some distance in advance of the small mound, and gradually forms it into a loop, attaching the other end of the thread to the opposite side of the twig, and holding it open by means of its fore legs; it then spins a sufficient number of similar threads, until the loop has acquired sufficient strength for its destined use. When it is completed, the insect, still holding it open by means of its fore legs, somewhat in the same way as a skein of silk is held on the hands whilst being wound off, slips its head between these legs, and thus



passes the loop over its back, and by the repeated action of the anterior segments, it gradually brings it to that part of the body best calculated to balance it when it shall have assumed the chrysalis state. It sometimes, however, happens that, notwithstanding all its care, the threads of the loop slip off its legs. This is indeed a woful calamity to the poor larva, which has the greatest difficulty, and is sometimes unable, to re-collect the threads of the loop upon its legs, trying every contortion of limb to effect this purpose, but sometimes in vain. Should it, however, succeed, the body is stretched forward in a right line, and remains in this position until the skin is cast, being slit down the back by the contortions and annular contractions of the insect, the girth being too loose to form a material hindrance to its being slipped beneath backwards to the tail, where it is ultimately thrown entirely off.

SPECIES 2.—PAPILIO PODALIRIUS. THE SCARCE SWALLOW-TAIL BUTTERFLY.

Plate i. figs. 4—6.

SYNONYMES.—*Papilio* (*Equites Achivi*) *Podalirius*, Linn. Syst. Nat. ii. *Podalirius Europæus*, Swainson.  
 751. Donovan Brit. Ins. 4, pl. 109. Lewin Brit. Butt. pl. 35. Curtis *Ipheclides Podalirius*, Hubner.  
 Brit. Entomol. pl. 578. Westwood Ent. Text Book, pl. 4, fig. 1. Duncan  
 Brit. Butt. pl. 4, fig. 2.

This fine butterfly is about the same size as, or rather larger than, *P. Machaon*, varying from three inches to four inches and a half in expanse. The hind wings are also longer; the ground-colour of the wings is much lighter, being straw or cream yellow. The fore wings have two broad black bars crossing them near the base, and extending half-way across the hind wings; the second of these is succeeded by a black bar extending from the costa to the middle nerve of the wing, and this by a stripe entirely crossing the wing, but gradually narrowed behind; this is accompanied by another shorter narrower bar, extending from the fore margin nearly half across the wing; the apex of the wing has a broad black edge narrowed towards the posterior angle, and divided by a narrow yellow stripe. The extremity of the hind wings is black, with a black anal patch, having a blue lunule in its middle, and bordered above with red, forming an eye. The posterior margin has four or five lunules of blue specks, and the edges are indented with yellow crescents; the tip of the tails is also yellow.

The under side is paler than the upper, the black markings being less extended; and the fascia on the middle of the hind wings is formed of two narrow black lines, the outer one being edged within with orange.

Like *P. Machaon*, this species inhabits the whole of the southern and temperate parts of Europe (being found plentifully near Berlin, at Moscow, and even at Hamburgh), the north of Africa, and Asia Minor. Its claim, however, to be ranked as a British species has occasioned much controversy. The great Ray says that he had found it "*ni male memini* in Anglia;" and Berkenhout, in his "Outlines of British Natural History," that it is "rare in woods." Dr. Abbott stated to Mr. Haworth that he took a specimen near Clapham Park Wood, in Bedfordshire. The Rev. F. W. Hope, F.R.S., has informed me that he took a specimen near Netley; and W. H. R. Read, Esq., has also informed me that whilst at Eton, about the year 1826 (the last year of his being at that school), he took a specimen on the wing between Slough and Datchet, previously to the month of July, when the vacation commences. This specimen, which is a very dark-coloured one, has been figured by Mr. Curtis, who gives a different date to the capture from that mentioned to me by Mr. Read himself. In my copy of Haworth's "*Lepidoptera Britannica*," which belonged to Donovan, I find the following pencil note, in the handwriting of the latter, opposite *P. Podalirius*:—"One in Mr. Swainson's cabinet, which he told me was taken by his brother-in-law, Captain Bray; I think he said in the Isle of Wight."



The caterpillar is short and thick, especially towards the head, becoming more taper towards the tail; it is green, but varying to yellowish red, with a slender yellowish dorsal stripe, and a lateral one above the legs; on each side are also oblique yellowish lines dotted with red; the head is small, and the neck is furnished with a forked tentacle. It feeds on the apple, peach, almond, plum, sloe, and especially on the sloe-thorn, and not on the species of *Brassica*, as stated by Fabricius and Stephens.

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## GENUS II.

PARNASSIUS, LATR. DORITIS, FABR., STEPHENS.

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The antennæ are short, terminated by a straight and nearly oval club; the palpi are longer than the head, above which they are slightly elevated; they are composed of three distinct joints of nearly equal size. The body is robust and hairy; the wings parchment-like and sparingly clothed with scales, and of a somewhat oval form, with the edges entire; the hind pair has the anal edge entirely excised, so as to allow the free action of the abdomen.

The caterpillars are thick, cylindrical, covered with little setose tubercles, the segment succeeding the head being furnished with a fleshy fork-like appendage similar to that of the genus *Papilio*. The chrysalis is cylindric-conical, covered with a bluish powder, enveloped between the leaves in a slight silken web, and supported by several transverse threads.

This is an exceedingly interesting genus, beautifully connecting the *Papilionides* with the *Pierides*. In the general appearance of the butterfly, the three-jointed palpi and short antennæ, it approaches the latter; but in the characters of the larva, and especially in the curious retractile fork of the neck, and the excised hind wings of the perfect insect, it resembles the genus *Papilio*. The chrysalis, with the exception of the head, resembles those of the moths of the genus *Catocala*, especially in the blue powder with which it is covered, whilst the mode in which it is enclosed in a kind of cocoon formed of leaves loosely fastened together, gives it some relation with the *Hesperiidæ*. The females are further remarkable for possessing a small corneous pouch at the extremity of the abdomen, which is found in no other *Lepidopterous* insect.

The genus *Parnassius* was first proposed by Latreille, in his "*Histoire Naturelle*," with *P. Apollo* for its type, the name of *Doritis* not having been published until several years subsequently, with the same type. I have accordingly followed M. Boisduval in restoring the former name to this genus, although he appears to me to have erred in giving the name of *Doritis* to other insects with which Fabricius was totally unacquainted. It would certainly have been preferable to have proposed a new generic name for these last butterflies.

The species of *Parnassius* are few in number, and chiefly found in the Alpine regions of the Old World.\* The larvæ feed solitary upon the species of *sedum* and *saxifrage* growing in such situations.

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\* A new species has just (December, 1845) been received from the Rocky Mountains of North America. [J. O. W. Note to 2nd edition.]



SPECIES 1.—*PARNASSIUS APOLLO*. THE CRIMSON-RINGED BUTTERFLY.

Plate vii.

SYNONYMES.—*Papilio Apollo*, Linn. Syst. Nat. ii. 754. Donovan Brit. Ins. vol. xiii., pl. 433. Haworth Ent. Trans. i. p. 332.

*Doritis Apollo*, Fabricius, Stephens, Duncan Brit. Butt. pl. 11, fig. 1.  
*Parnassius Apollo*, Boisduval Hist. Nat. Lep. i. 395.

The expansion of the wings of this fine butterfly varies from three to three and a half inches. The wings are white, the base and fore margin of the anterior being dotted with black, the apex of the fore wings being transparent, and preceded by a transverse sinuous row of blackish dots; the disc of the fore wings is also marked with five black spots; the posterior wings have two large eye-like spots on the disc, of a red colour, surrounded with black, the centre being white; there are also two other smaller black spots often united together at the anal angle of the hind wings. The under side of the fore wings differs in having the innermost black spot, and sometimes also the apical one, often marked with red in the middle, whilst the hind wings differ in having four red spots at the base edged with black; the two spots also at the anal angle of these wings is also red, edged with black, with a white middle.

The caterpillar is of a velvety black colour, pubescent, with orange-coloured dots, and small blue tubercles; the neck is furnished with a yellow forked appendage, capable of being entirely withdrawn into the segment. It feeds on saxifrage and Crassulaceæ.

The butterfly is common in most of the Alpine regions of Europe; but it appears to be very questionable how far it is truly a British species, the original specimen, supposed to have been captured in one of the Hebrides, having been received in a box of insects from Norway. Mr. Duncan, however, states that he had been assured that it had been noticed on the wing in some part of the west coast of Scotland in the summer of 1834.

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The second sub-family of the Papilionidæ, *PIERIDES*, has the anal edge of the hind wings formed into a gutter to receive the abdomen; the anterior tibiæ do not possess a spur in the middle; and the tarsal unguis are one- or two-dentate.

The caterpillars are not furnished with a nuchal fork. They are slightly pubescent, and rather slender at each end of the body.

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GENUS III.

*RHODOCERA*, BOISDUVAL. *GONEPTERYX*, LEACH.

The antennæ are rather short and robust, terminated by a club gradually formed, commencing nearly at the middle of the antennæ, the apex not compressed and slightly truncate; the scales on the front of the head form an erect tuft; the palpi are as long as the head, distinctly three-jointed, the third joint small; the wings are ample, the anterior angulated at the tip, and the posterior nearly in the middle of the hind margin; the fore legs are alike in both sexes, the tibiæ not armed with a spur in the middle, and the tarsal unguis bifid, with slender pulvilli. The larvæ are elongated, slightly pubescent, attenuated at each end. The chrysalis is gibbose, much bent, terminated like a spindle at each extremity, always attached by the tail and by a transverse girth across the middle.



M. Boisduval rejects Dr. Leach's name for this genus, *Gonepteryx* (misquoted by the former under the name *Gonopteryx*), because it is too much like *Gonoptera*, proposed *long afterwards* by Latreille for another genus of *Lepidoptera*; and because names ending in *pteryx* have but little euphony, and ought only to be used in *Ichthyology*, where they are more prevalent. All these reasons appear to me insufficient; I have, therefore, retained Dr. Leach's name, which in the early editions of this work I had slightly altered, in order to make it more in accordance with its Greek derivatives, *γωνια* an angle, and *πτερον* a wing. As this alteration has not been adopted by subsequent writers, and as I have found by experience that it is preferable to retain even a nonsense word to a perpetual alteration of names, I have thought it better to recur to the Leachean name.

## SPECIES 1.—GONEPTERYX RHAMNI. THE BRIMSTONE BUTTERFLY.

Plate i. figs. 7—10.

SYNONYMES.—*Papilio* (Dan. Cand.) *Rhamni*, Linn. Syst. Nat. ii. p. 765.  
 Donovan Brit. Ins. 5, pl. 145. Lewin Brit. Butt. pl. 31. Albin Brit. Ins.  
 pl. 3, fig. 3 e. h.  
*Gonepteryx Rhamni*, Leach, Stephens, Curtis, Duncan Brit. Butt. p.  
 5, fig. 1.

*Goniopteryx Rhamni*, Westw. Introd. Gen. Syn. p. 87.  
*Rhodocera Rhamni*, Boisduval Hist. Nat. Lep. 1, p. 602.  
*Anteos Rhamni*, Hubner.  
*Ganoris Rhamni*, Dalman.

This butterfly varies in expanse from two inches to three inches and a half. The male has the upper side entirely sulphur-yellow, and the female greenish white, with an orange spot at the extremity of the discoidal cell of each wing, and some very minute ferruginous points at the place of union of the nerves with the margins of the wings. The under side of the wings is paler than the upper, especially in the males; and the orange discoidal spot is replaced by a ferruginous dot, whitish in the centre, between which and the marginal ferruginous points is a row of fuscous spots.

Mr. Curtis has figured a variety of this insect captured near Peckham, with the upper wings variegated with orange, slightly as in *G. Cleopatra*; thus proving the correctness of the statement made to me by M. Boisduval, that he had reared *G. Rhamni* and *Cleopatra* from eggs deposited by the female of the former, the larvæ producing the latter offering no variation from those from which the latter were reared. (See also his Hist. Nat. Lepid. i. p. 602.)

To no species of butterfly can we apply with greater effect, but with a little alteration, Mrs. Barbauld's beautiful image of the origin of the snowdrop:—

As if "Flora's breath, by some transforming power,  
 Had changed" a flower into a butterfly.

Sporting about in some flowery nook in the very first sunny days of February and March, this butterfly looks more like the petals of the primrose over which it hovers, floating on the breeze, than a living creature. These early specimens have survived the winter, and produce eggs from which a fresh brood of butterflies is produced in May, and another in the autumn, some of which last again survive the winter.

The caterpillar is green, finely shagreened with black scale-like dots on the back, with a whitish or pale green line on each side, the upper edge of which is shaded off into the general colour. It feeds on the buckthorn (*Rhamnus catharticus*), and the berry-bearing alder (*Rhamnus frangulus*), as well as on *Rhamnus alaternus*. The chrysalis is green, with several reddish dots; it is very gibbous in the middle, and attenuated



like the end of a boat in front; it is attached by the tail on a perpendicular branch, and fastened with a loose silken thread round the middle of the body; the pupa state lasts about a fortnight. This butterfly occurs commonly in various parts of England, as far north as York, Windermere, and Newcastle; but Mr. Duncan states that it has not yet been found in Scotland.

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GENUS IV.

COLIAS, FABRICIUS.

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The species of this genus, like the preceding, are distinguished by the brilliant yellow or orange colour of their wings; but they are more or less bordered at the tips with black, and are never angulated. The fore wings exhibit also on both sides a discoidal black spot, and the posterior a central spot, which is orange above and generally silvery beneath. The antennæ are short, nearly straight, gradually clavate to the tip, which is truncate; the palpi are shorter than in *Gonepteryx*; the head has no frontal tuft; the fore wings are subtriangular, and the posterior are rounded; the fore legs are alike in both sexes; the tarsal unguis bifid, and the pulvilli very minute. (A highly magnified figure of the unguis and their appendages is given in the Crochard edition of the *Règne Animal, Insectes*, pl. 132, fig. 3, c.) The caterpillar is naked, elongate, cylindric, very finely setose and tubercled; the chrysalis rather short, subangulated, gibbous, slightly beaked in front, attached by the tail and by a girth behind the thorax.

From the great similarity of some of the numerous species of this genus and their apparent variation, much confusion has occurred in the investigation of the British species; Mr. Stephens describing four (exclusive of *P. Palæno*, Linn., a reputed British species, and *P. Helice*, Haw., a presumed variety of *C. Edusa*), whilst Mr. Curtis only admits two. The Rev. W. Bree has published a memoir on the British species in the "*Magazine of Natural History*," No. 26.

The generic name *Colias* appears to have been inappropriately derived by Fabricius from *Kolízis*, a word used by the Greeks for some kind of fish.

DESCRIPTION OF PLATE II.

- INSECTS.—Fig. 1. *Colias Edusa* (the clouded-yellow Butterfly), the male. 2. The female. 3. The Caterpillar. 4. The Chrysalis.  
 „ Fig. 5. *Colias Hyale* (the pale-clouded yellow B), the male. 6. The female. 7. The Caterpillar.  
 „ Fig. 8. The pale female variety of *C. Edusa*, considered by some authors as a distinct species under the name of *C. Helice*.  
 PLANTS.—Fig. 9. *Sylvestris Marianum* (Milk-thistle). 10. *Festuca gigantea* (Giant fescue grass).

In this plate I have given both male and female of two of our most brightly-coloured native butterflies, and have been careful, by placing *C. Edusa* and *C. Hyale* on the same plate, to show the marked and striking difference of the two species, the former being of a rich orange colour, whilst the latter is of a pale sulphur; notwithstanding which, by bad colouring and other defects, they have been completely confused in many other works. They are all from fine specimens, particularly the female *Edusa*, from the collection of Mr. Westwood. The *C. Helice*, or pale female variety of *C. Edusa*, is from an Italian specimen in my own collection, but it differs in no respect from the pale English varieties. H. N. H.







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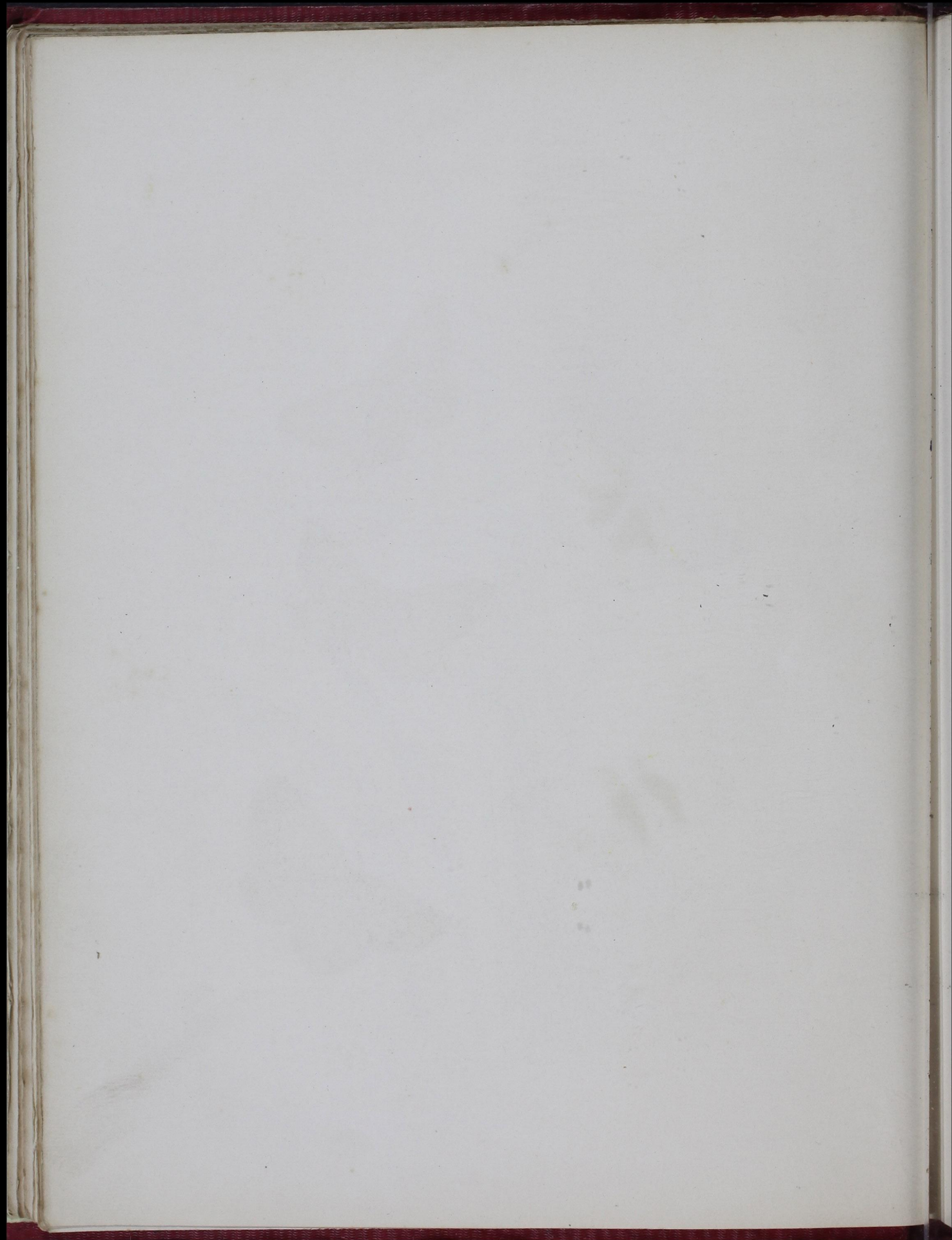
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SPECIES 1.—*COLIAS EDUSA*. THE CLOUDED-YELLOW BUTTERFLY.

Plate ii. figs. 1, 2, 3, 4, and 8.

SYNONYMS.—*Papilio Edusa*, Fabricius Ent. Syst. v. iii., part 1, p. 206.  
 Donovan Brit. Ins. 7, pl. 238, fig. 2 (female). Harris Aurelian, pl. 29, fig.  
 n ♂, fig. m ♀.

*Colias Edusa*, Stephens, Curtis, Duncan Brit. Butt. pl. 5, fig. 2.

*Papilio Hyale*, Esper. Donovan Brit. Ins. 2, pl. 43, fig. sup. ♂.  
*Papilio Electra*, Lewin, pl. 32 (and Linn. Syst. Nat. ii. 764, teste  
 Newman Ent. Mag. 1, 85).

The expansion of the wings of this species varies from nearly two inches to two inches and a half. The upper surface of the disc of the wings in both sexes is a rich orange colour, the males having a round discoidal black spot on the fore wings, and a broad black apical margin irregularly toothed within, extending through both wings, with several narrow orange lines running through the black border, indicating the place of the nerves; the disc of the hind wings is somewhat darker, with a large discoidal bright-coloured orange patch. The upper side of the female differs in having the broad apical border marked with several irregular yellow spots, and more indistinctly indicated in the hind wings, which are darker and yellower than in the males.

Beneath, both sexes are nearly alike, the disc of the fore wings being lighter orange, with a black discoidal spot, the margins greenish, with a row of blackish spots at some distance from the apical margin; the hind wings are greenish, with a round silver discoidal spot surrounded with red, and accompanied by a smaller silvery dot; between this and the apical margin is a row of brownish red dots. Most modern Entomologists are agreed in regarding the *PAPILIO HELICE* of Hubner and Haworth, figured by Stephens (Illustr. Haust. pl. 2\*, and our fig. 8), as a variety of the female of *Colias Edusa*, from which it differs in having the ground-colour of the disc of the wings, as well as the spots in the black apical margin, yellowish white. No corresponding variety of the male has yet been observed. The insect figured in the next plate, under the questionable name of *Colias Chrysotheme*, has also been regarded by Mr. Curtis as a variety of *C. Edusa*.

The caterpillar of *C. Edusa*, which feeds upon *Medicago lupulina*, various species of *Trifolium*, and other leguminous plants, is green, with a lateral stripe varied with white and yellow, and with an orange dot on each segment. The chrysalis is green, with a lateral yellow line and several ferruginous dots.

Boisduval gives Europe, Egypt, the coast of Barbary, Nepaul, Cashmere, Siberia, and North America as the localities of this species. Mr. Burchell is stated by Mr. Duncan to have found it in South Africa; but this I apprehend must have been the species described by Boisduval, from the Cape of Good Hope and Caffraria, under the name of *C. Electra* of Linnæus, by whom also the Cape of Good Hope was given as its locality. Hence, from the similarity of the two species, it is that I have hesitated to consider our English species as the true *C. Electra*, as stated by Mr. Newman. Indeed, upon examining the Linnæan Cabinet, I find that the *Colias* preserved therein, attached to the label of "Electo" (subsequently altered to *Electra* in the printed work of Linnæus), is the male of a species closely allied to our *Edusa*, in which the dark border of the fore wings is not divided by the orange veins, and the silver spot on the under side of the hind wings is very small, with a very minute brown dot attached to it. Moreover, specimens of our *Edusa* are attached to a label, also in the handwriting of Linnæus, marked "Pteridis;" and on referring to the works of Linnæus, we find no such species, but *P. Palæno* described with the "habitat in Pteride Aquilina." It is to be feared that some confusion has been introduced into the arrangement of these insects.\*

\* I also found *Chrysophanus Chryseis* attached to the Linnæan label of *Hippothoe*.

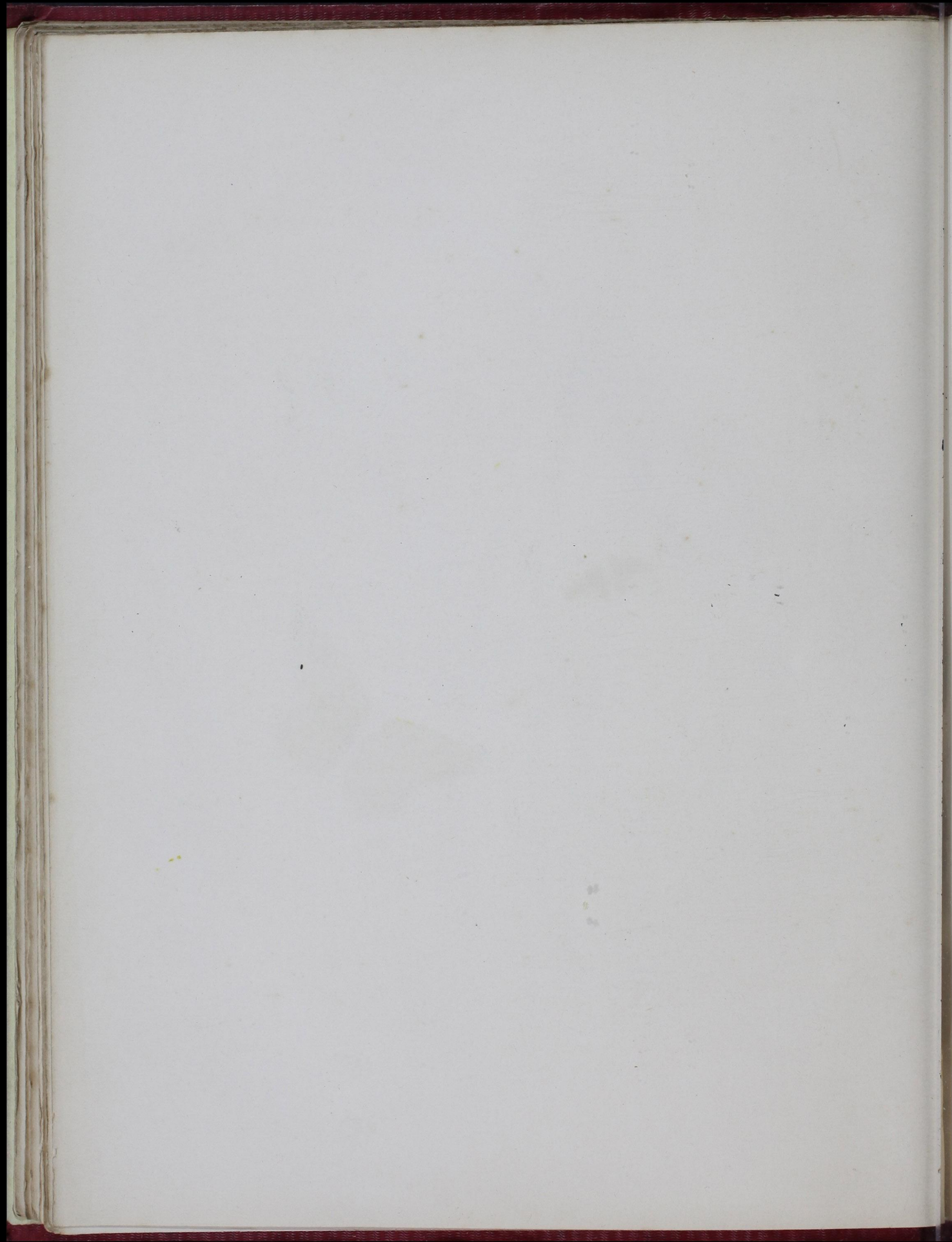














SPECIES 3.—*COLIAS EUROPOME?* THE CLOUDED SULPHUR BUTTERFLY.

Plate iii. fig. 4—6.

SYNONYMES.—*Papilio Europome*, Villers Ent. 2, 17, 19, and 4, 408, 19? *Papilio Palæno*, Linn. Syst. Nat. ii. 2, 764? Hübn. Pap. pl. 86, fig. 434,  
 Esper Schmett. 1, pl. 42, Suppl. 18, fig. 1, 2, and pl. 100, cont. 55, fig. 5? 435? Boissduval Hist. Nat. Lep. 1, p. 645?  
 Haworth Lep. Brit. p. 13. Stephens Illust. Haust. pl. 1\*. *Eurymus Eurypome*, Swainson Zool. Illust. n. ser. pl. 70.

In the opinion of the best modern Entomologists, *Papilio Europome* and *Palæno* are identical; the latter especially inhabits Sweden, as well as the Alps and Pyrenees. Martyn, in his *Aurelian's Vade-Mecum*, introduced *P. Palæno* as a British species; and Mr. Haworth, in his *Lepidoptera Britannica*, *P. Europome*, on the authority of the cabinets of Francillon and Swainson. In the *Butterfly-collector's Vade-Mecum*, it is said to occur in meadows and roadsides near Ipswich; and in the *Entomological Magazine*, it is stated to have been noticed in the meadows near the confluence of the Avon and Severn, flying with great swiftness in August. Its claim, however, to be regarded as indigenous is still denied by several of our principal Entomologists; and Mr. Curtis asserts that Mr. Stephens's specimens from the collection of Francillon, mentioned above, and figured by him in his *Illustrations*, pl. I. \*, are identical with the North American *C. Philodice*. Mr. Swainson also, as quoted above, has described and figured the individuals in his father's collection, which had been mended with the heads of *Gonepteryx Rhamni*, and which he states that he could not distinguish from *C. Philodice*.

As, however, there is a great resemblance between *C. Philodice* and *C. Europome* (or *Palæno*), and as the latter is a native of Sweden, and therefore not unlikely to occur in England, we have thought it useful to introduce it, in order to allow of comparative examination. The following is a translation of M. Boissduval's description of the Swedish species *C. Palæno*, or *Europome*, which it will be serviceable to compare with that of Mr. Stephens, drawn from the asserted American specimens:—

"Rather smaller than *C. Hyale*. Upper side of the wings of a slightly greenish yellow, with a rather broad black border, slightly sinuated on the inside, narrowed in the hind wings, and often not extending beyond the middle of the limb; the anterior having at the extremity of the discoidal cell a small blackish circle, oblong, more or less marked, rarely wanting, or replaced by a blackish dot; the posterior wings with a small whitish discoidal spot. The under side of the fore wings differs from the upper in having the margin replaced by greenish yellow or reddish colour, and in the small discoidal circle being more decided. The under side of the hind wings is entirely of a reddish yellow, or greenish, with a silvery white discoidal spot, slightly circled with ferruginous. The fringe of the four wings and the costa of the anterior beneath is bright rose coloured. The body is of a blackish yellow or greenish, with the prothorax rosy, the antennæ rosy, with the club darker coloured and yellow at the tip. The female differs from the male in having the ground-colour of the wings nearly white or yellowish white on the upper side." The larva is described by Zetterstedt as pubescent, green, with yellow lines and black dots. The pupa is unknown.

SPECIES 4.—*COLIAS CHRYSOTHEME?* THE SMALL CLOUDED YELLOW BUTTERFLY.

Plate 3, fig. 1—3.

SYNONYMES.—*Papilio Chrysotheme*, Esper, 1, pl. 65, fig. 3, 4?  
*Colias Chrysotheme*, Stephens, Illust. Haust. pl. 2, fig. 1, 2.  
*Colias Edusa*, var. Curtis, Duncan.

The insects regarded as this species by Stephens have been considered by several subsequent writers as small



varieties of *C. Edusa*\*. The figures indeed given of *C. Chrysotheme*, especially those of Boisduval (Icon. Hist. des Lépidopt. pl. 9, fig. 3, 4), differ materially from those of Stephens; and as *C. Chrysotheme* is described as a native of Hungary, Syria, and Southern Russia, it is most probable that that species is not a native of England. Boisduval has indeed noticed a character which will satisfactorily decide the specific identity of the English specimens with *C. Chrysotheme* or *C. Edusa*, the genus being divisible into two groups, *C. Edusa* belonging to the first, in which the males are provided with a glandular space or sac at the anterior edge of the hind wings near the base, whilst in the second group, to which *C. Chrysotheme* belongs, they are destitute of this sac.

The following is a translation of Boisduval's description of the true *C. Chrysotheme*, which I have here introduced, in order that it may be compared with Mr. Stephens's description of the supposed English species:—

"Figure of *C. Edusa*, but about one-fourth smaller. Upper side of the wings of a paler yellow, with the margin browner, divided in the fore wings by fine yellow nerves; the fore wings having moreover the costa broadly yellow. The discoidal spot is narrower, transverse, slightly marked, and edged with a little red. The under side of the fore wings nearly as in *C. Edusa* and the allied species, except that the discoidal spot of the fore wings has the centre rather pupilled with silver. The female is much paler than the female of *C. Edusa*, and the yellow orange colour only occupies the disc of the fore wings, and the yellow spots which divide the dark margin are larger, more marked, and of a much paler yellow colour."

Mr. Stephens gives Norfolk or Epping Forest as the locality of one of his British specimens.

#### SPECIES 5.—*COLIAS MYRMIDONE*.

Plate xlii. fig. 1—3.

SYNONYMS.—*Papilio Myrmidone*, Hübner, Pap. fig. 432, 433. Ernst, *Colias Myrmidone*, Godart, Boisduval, Icones, pl. 9, fig. 1, 2, Ochsenheimer, 1, pl. 78, Suppl. 24, fig. 111, a. b. bis. (Le safrané, Esper.)

This species is closely allied to *C. Edusa* (p. 15, pl. 2, fig. 1, 2, 3, 4, and 8), but it is about one-fifth smaller; the wings are rather more rounded, of a much brighter orange colour, the posterior, especially, having a decided purplish tinge; the dark border is nearly as in *Edusa*, but is *never divided at the extremity* of the fore wings by the slender yellow lines which are seen in *Edusa*; on the contrary, it is generally finely powdered with greenish (or, as in Mr. Stephens's specimen, with yellow) atoms. The under surface of all the wings exhibits nearly the same character as the *Edusa*. The female is rather larger than the male, of a rather duller hue, but decidedly more orange in its tint than the female of *Edusa*; the dark margin marked with brighter yellow spots, the costal spot pupilled with yellowish—a character which is sometimes also found in the male as well as in some varieties of *Edusa*.

This species, according to Boisduval, inhabits Syria, Hungary, and South Russia, where it flies with *Edusa* and *Chrysotheme*, but keeping as distinct from them as *Brassicæ*, *Rapi*, and *Napi* do. It has been supposed to be also found in France, but erroneously.

This species is introduced on the authority of a specimen in the collection of J. F. Stephens, Esq., captured by himself in 1819, between Dover and Brighton, and which he has ever since placed in his cabinet with a ticket "*Edusa*? var?" It is very doubtful, however, whether it be the real *C. Myrmidone*.

\* It is to be observed that M. Boisduval describes no other variety of *C. Edusa* than the *C. Helice*. The small English specimens might be regarded as *C. Myrmidone*, except that they have yellow lines in the black apex of the fore wings.



## GENUS V.

## PIERIS\*, SCHRANK. PONTIA, STEPHENS, ETC.

In its present restricted state this genus consists of species which, from their common occurrence in our gardens throughout the summer, have attracted our earliest attention; their almost uniform white colour, and the places where they mostly frequent, having led to their receiving the ordinary name of Garden Whites. From the preceding genus they are distinguished by the more acute tip of the fore wings, and by their longer and slenderer antennæ, which are terminated by a broad compressed and obtuse club. The palpi are short, three-jointed, nearly cylindrical, with the terminal joint as long as or rather longer than the second. The legs are long, slender, and alike in both sexes, the anterior pair being perfect.

The tarsi are terminated by two equal-sized hooklets much curved, each having a small tooth on its under side; between these hooklets is a long fleshy pulvillus, and each is laterally defended by a long conical hirsute appendage. The details of this curious structure are represented in the Crochard edition of the Règne Animal, now in course of publication. Curtis describes the claws as unidentate or bifid; but I have found their structure uniform in all the species I have examined, agreeing also in this respect with the black-veined white and orange-tipped butterflies.

The wings are opaque, and thickly clothed with scales, thus disagreeing with the black-veined white and Apollo. The upper wings are at once distinguished from those of all the other Pierides by having only one very short vein emitted close to the apex of the wing from the third branch of the postcostal nerve; this peculiarity, not hitherto noticed by Lepidopterists, will further distinguish this genus from the black-veined white, in which the same typical arrangement exists, but the short nerve above mentioned is considerably longer and more distinct.

From *Gonepteryx Rhamni*, in which the arrangement of the veins is nearly as in *P. Cratægi*, they are at once separated by the form and colour of the wings. From the orange-tipped butterfly they are distinguished by the shape and variegated colours of the wings, and especially by the apical veins of the fore wings, which are more numerous in that insect than in *Pieris*; the palpi also differ as well as the transformations. The Bath white, which is united with the orange-tipped butterfly in the genus *Mancipium*, by Stephens and Curtis, is certainly referable to this genus, with which it is united by Boisduval and Ochsenheimer.

The caterpillars are cylindric and fleshy, with numerous minute points, or larger tubercles, which emit pale hairs, and are arranged in regular transverse series. The chrysalis is angulated with a short process in front of the head, and with a projecting lateral appendage behind (not in front of, as described by Stephens) each of the wing-cases. They are generally to be found attached to walls by a little tuft of silk at the tail and by a girth round the middle of the body. They do not constantly place themselves in one position with the head upright, but undergo this state in various positions.

The genus is very extensive, the species being distributed over most parts of the globe, but especially in the intertropical parts of the Old World, the western hemisphere being comparatively poor in species. In the great number of the species there exists a considerable number of natural divisions, as pointed out by Boisduval and

\* Derived from *Πιερίς*, plural *Πιερίδες*, the Muses, a poetical license similar to that used in giving the name Parnassius to the genus having *P. Apollo* for its type.



Lacordaire. The caterpillars of such species as have been observed in the preparatory states, feed on the Cruciferae, especially the species of Brassica, as well as on the Resedaceae, Tropaeolums, and Capparideae. They sometimes abound to a very great extent, especially when their natural enemies have failed; at such times our cabbages, cauliflowers, etc., become a prey to them, but their taste is so accommodating that they freely devour imported plants belonging to allied natural families. The prevailing colour is white, of a more or less clear hue, with a black edge at the extremity of the fore wings. The females in our indigenous species are mostly marked with black spots in the posterior part of the disc of the fore wings. Some of the exotic species are much more varied in their colours.

The number of British species of this genus has been the subject of much recent inquiry, it having, until within the last fifteen years, been considered that there were but three—*P. Brassicae*, *Rapi*, and *Napae*, exclusive of *P. Daphidice* and *Cardamines*. In 1827, however, Mr. Stephens increased the number to seven in his Illustrations, separating *P. Chariclea* from *P. Brassicae*, *P. Metra* from *P. Rapae*, and *P. Napae* and *Sabellicae* from *P. Napi*. It is proper, however, to state that all these supposed new species had been indicated by previous authors, as will be noticed from the synonymes given below. The propriety of their separation has, however, been questioned by several writers, amongst whom the Rev. W. T. Bree has published some observations in opposition to the views of Mr. Stephens in Loudon's Magazine of Natural History, vol. iii., contending that as the three old-established species are exceedingly variable, the supposed new species ought only to be regarded as varieties of them. It is with the view of stating the grounds upon which these species rest, and of directing attention to the elucidation of the question that we have given figures of all the species, in some instances from the collection of Mr. Stephens himself.

No generic names have been so completely unsettled as the synonymous ones of *Pontia* and *Pieris*, a defect which has resulted from the want of some settled principle regulating the adoption of names of genera when an old-established genus has been cut up into several others. In the works of Stephens, Curtis, and others, *Pieris* is the generic name used for the black-veined white, and *Pontia* for the garden white butterflies. Boisduval, adopting the French mode of nomenclature, has employed the name *Pieris* for the genus of the garden whites, with which he has also associated the black-veined white and the Bath white butterflies, whilst he has given the name of *Pontia* to a few exotic species. Ochsenheimer, on the other hand, in accordance with the system of German nomenclature, has given all the whites, including the black-veined, the Bath white, the orange tip, and the small wood white, under the name of *Pontia*. Such confusion as this is disgraceful, and ought to be no longer tolerated, although numberless other instances (in which the very commonest insects are known by three different generic names in England, France, and Germany) might be adduced to prove the necessity for some decisive step to remedy the evil. In one respect, naturalists (with the exception of a few vain persons who hesitate not to displace old specific names to make way for others of their own) are agreed in adopting the name first proposed for any genus or species, and to reject all subsequent ones proposed for the same group or species as synonyms. In the present instance, therefore, by the adoption of this principle alone we shall be able to remedy the defect pointed out. The name *Pieris* was first proposed by Schrank for all those butterflies which Linnæus had united together under the sectional name of *Danai Candidi*\*, including the brimstone and clouded yellow butterflies with the whites, as well as the *Parnassii*. About the same time Fabricius prepared

\* Dalman, in 1815, united all the *Danai Candidi* into one genus, named *Ganoris*.



the manuscript of his *Systema Lepidopterorum*, in which he gave the name of *Pontia* to the black-veined white and garden whites, and that of *Colias* to the brimstone and clouded yellows. But this work has never been published, and a very short generic abstract alone was given by Illiger some years afterwards, in his *Entomological Magazine*. Of these two last-mentioned names *Colias* is adopted by all entomologists for the clouded yellow butterflies, and were we therefore to adopt the other Fabrician name *Pontia*, we should do injustice to Schrank, because *Colias* and *Pontia* are together synonymous with *Pieris*, which would thus be thrown out of use, but which on the contrary ought to be used for the great bulk of the white butterflies; other generic names being given to such aberrant species (but few in number) as may be required to be separated from the rest.

In any case, the mode in which these names have been used has been erroneous, for if we consider the black-veined-white as the type of *Pieris*, it is also the strict type of *Pontia*, and therefore is synonymous therewith; or if on the other hand we regard the garden whites as the types of *Pieris*, as we contend ought to be done, the black-veined white ought either to receive a new generic name or be generically termed *Pontia*.

In this view of the subject, and still further in order to remedy the confusion above alluded to, we consider it necessary entirely to reject the name *Pontia* except as a synonyme; to employ *Pieris* for the garden whites, as the natural types of the great body of the genus; and to give other generic names to such of the species of whites as have been separated therefrom.

#### DESCRIPTION OF PLATE IV.

INSECTS.—Fig. 1. *Pieris Brassicæ* (the large garden white Butterfly), male. 2. The Female. 3. The male, showing the under side.

4. The Caterpillar. 5. The Chrysalis.

Fig. 6. *Pieris Chariclea* (the early large garden white B.), male. 7. The female, showing the under side. 8. The Caterpillar.

9. The Chrysalis.

PLANTS.—Fig. 10. *Brassica oleracea* (Sea Cabbage). 11. *Tropæolum majus*. 12. *Tropæolum peregrinum*.

I have in this plate given three separate portraits of our commonest butterfly, *Pieris Brassicæ*, in order to enable young collectors to ascertain at once the different markings and characters that distinguish this species from the other common white butterflies of the garden, which he would be apt to consider not worthy of attention, unless pointed out as distinct and well-defined species.

On the same plate I have placed the insect most nearly resembling *Pieris Brassicæ*, viz., *Pieris Chariclea*, which, however, nearly resembling the former species, possesses distinctive marks sufficient in the opinion of most entomologists to make it a separate species. In addition to the difference of size, it will be seen that the black mark at the tips of the anterior wings is not indented with pointed arches as in *P. Brassicæ*, and on the under side the secondary wings are not thinly sprinkled with black specks as in *P. Brassicæ*, but thickly powdered with them, giving them a much more dusky appearance.

No difference has as yet been satisfactorily ascertained in the respective caterpillars, which would determine the point whether *P. Chariclea* is to be considered a distinct species or a mere variety. But in Albin's old and curious work, *P. Chariclea* is figured as the common cabbage, and as its caterpillar and chrysalis are likewise figured, I have given accurate copies of them in the present plate. If it could be ascertained that the caterpillar is the one from which the butterfly was raised, it would assist in determining the question, as it presents some points of difference with that of *P. Brassicæ*, as will be seen on comparison; and that it is the identical caterpillar which produced the butterfly figured with it is highly probable, as it appears from Albin's description of his plates that it was his custom to make a drawing of a caterpillar immediately after taking it, another after it assumed the chrysalis form, and another on its perfect development; and this is the way in which his plates were produced, for he seems to have been so poor an entomologist, that even in the case of the common cabbage white butterfly, he would not have known what larva belonged to it by any other means. Another reason for considering Albin's butterflies as produced from the caterpillars drawn, is the circumstance that they made their appearance in the middle of April, thus agreeing with the time of appearance of *P. Chariclea*.

The plants in this plate are *Brassica oleracea*, the little plant from which all our garden cabbages, cauliflowers, brocoli, etc., etc., have been obtained by the arts of horticulture; *Tropæolum majus*, erroneously known as the common *Nasturtium*\*; and *Tropæolum peregrinum*.

I intend to confine myself to indigenous plants; but, in the present instance, the voracious appetites of the caterpillars represented, which greedily devour almost all succulent plants, have tempted me to introduce the *Tropæolum majus* to enliven the plate, and I was then induced to add the *T. peregrinum*, as much less known, and as a hardy annual well worthy of general cultivation in our gardens. H. N. H.

\* When the *Tropæolum* was first introduced from Chili, it was called Indian-cress, from the circumstance of its being eaten in salads by the natives, and the name of *Nasturtium*, that of our common *water-cress*, was inadvertently given to it.



## SPECIES 1.—PIERIS BRASSICÆ. THE LARGE GARDEN WHITE BUTTERFLY.

Plate iv. fig. 1—5.

SYNONYMES.—*Papilio* (*Danaï Candi*) *Brassicæ*, Linn. Syst. Nat. ii. 759. Donovan Brit. Ins. vol. 13, pl. 446. Lewin Brit. Butt. pl. 25. Haworth.

*Pontia Brassicæ*, Fabricius, Ochseneimer, Leach, Stephens, Curtis, Jermy, Duncan Brit. Butt. pl. 7, fig. 1, 2.

*Pieris Brassicæ*, Schrank, Latreille, Boisduval, Zetterstedt.

*Ganoris Brassicæ*, Dalman.

*Catophaga Brassicæ*, Hübner.

This is one of the commonest species of butterflies, occurring in all parts of the country. It varies in the expanse of its wings from two and a half to two and three-quarter inches. The upper side of the wing is white, the fore wings having a broad black patch occupying the apex of the upper side, being larger in the females than in the males, with its inner edge more or less distinctly notched; there is also a small black patch on the fore edge of the hind wings on the upper side. The under side of the fore wings is marked in both sexes with two black discoidal spots beyond the middle of the wings (which also appear on the upper side of these wings in the female), and the under side of the hind wings is dull yellow, covered with very minute black irroration. The black apex of the fore wings is represented on the under side by a yellowish mark. Sometimes, but rarely, the males have a black spot on the disc of the anterior wings above.

The caterpillar of this species has been described as greenish yellow, with three yellow lines, but the entire ground-colour of the caterpillar is uniformly greenish yellow, the segments being almost covered with black tubercles, varying in size, and emitting white hairs (three of the larger ones on each side of each segment forming a triangle); but these tubercles are so placed as to leave a clear line on each side above the legs and one down the back; the head, fore legs, and anal segment, are also black. The chrysalis is pale greenish, spotted with black, with three yellow lines.

"The larvæ of this insect," observes Mr. Haworth, "multiply so much in dry seasons as to make great havoc amongst our cabbages, etc. Small birds destroy incredible numbers of them as food, and should be encouraged. I once observed a titmouse (*Parus major*) take five or six large ones to its nest in a very few minutes. In enclosed gardens, sea-gulls with their wings cut are of infinite service. I had one eight years, which was at last killed by accident, that lived entirely all the while upon the insects, slugs, and worms, which he found in the garden. Poultry of any sort will soon clear a piece of ground, but unless they are of the web-footed kind they do much damage by scratching the earth."—(Lepid. Britann.) Great numbers of these caterpillars are also destroyed by a very minute species of ichneumon-fly (*Microgaster glomeratus*), which deposits a considerable number of its eggs in the body of the living caterpillar, which are soon hatched, and produce minute footless grubs, that continue feeding upon the fat internal parts of the caterpillar, which, notwithstanding their presence, feeds on as though unconscious of any injury. When, however, the time for its assuming the pupa state arrives, it creeps up the adjacent walls, but instead of changing to a chrysalis the little parasite grubs burst through its skin, which shrivels up into a small compass, arrange themselves close together by the side of the exuviae of the caterpillar they have destroyed, and each spins for itself a little oval cocoon of yellow silk, which ignorant persons mistake for the eggs of the caterpillar and destroy, thus foolishly killing their benefactors. In a short time the little parasites appear in their new form of active four-winged ichneumon flies.

The transformations of this species have been carefully investigated by Swammerdam and Reaumur, whose researches, in conjunction with the anatomical details of the same species published by Herold, have left







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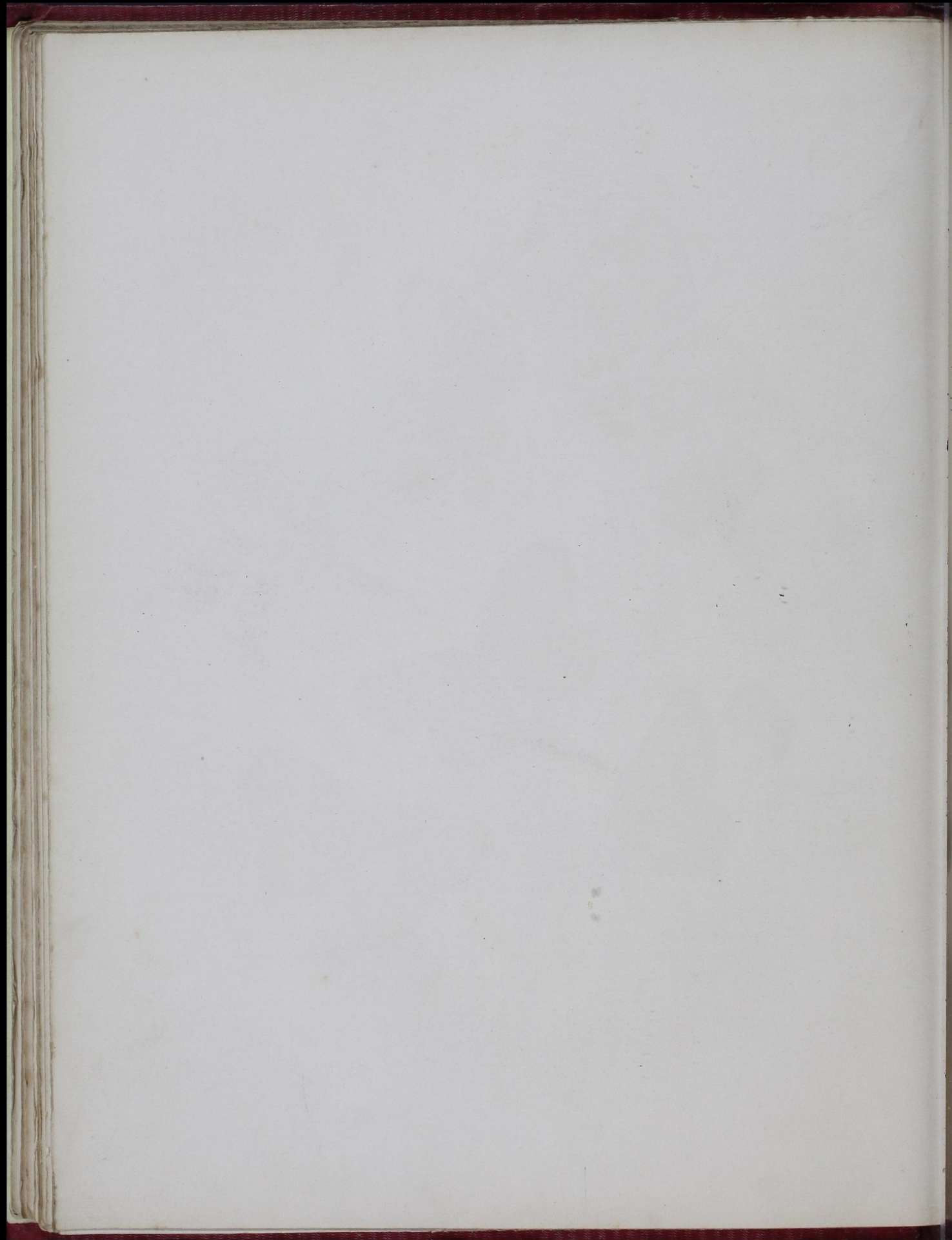
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nothing to be desired on the subject. The first of these authors chose this species to illustrate his "History of an Animal in an Animal, or the Butterfly hidden in the Caterpillar; which is a third particular example, serving as an additional illustration to the second method of the third order or class of natural transformations." The observations of this most indefatigable and celebrated author had for their object the proof of the natural production of insects from eggs laid by parents of the same species, and of the natural transformation of insects; and it is impossible to conceive more conclusive proofs, than are contained in his writings and figures, against the old theories of spontaneous generation and absolute metamorphosis.

The eggs of this butterfly, observed by Swammerdam, are oval, with fifteen small longitudinal ridges converging to the centre of the smaller extremity of the eggs; the ribs themselves, and the membrane of the egg between them, being also divided crosswise by regular grooves or channels. These eggs are deposited in clusters on the leaves of cabbages, etc., the larger end being applied to the surface of the leaf. After several changes of the skin, the caterpillar prepares to undergo its change to the chrysalis state, and spins a little hillock of silk, which it seizes firmly with the hooks of its anal feet. It has still, however, to construct a silken girth across the middle of its body, which it effects in a manner the most simple and least liable to accidents of the three modes adopted for this purpose by the different kinds of caterpillars which fasten themselves by girths. The swallow-tail butterfly presents us with one of these modes, in which, owing to the comparatively slight flexibility of the body, the caterpillar is forced to hold the skein of silk open by means of its fore legs. The species of hair-streaked butterflies (*Thecla*) offer another mode, as will be detailed in our observations on that genus; but the caterpillars of this genus have a very flexible body, so that they are able to throw back the head until it extends to the back of the fifth segment of the body, its fore legs being elevated in the air, it then applies the spinneret of its lower lip to the surface on which it is stationed, close to one of the first pair of fleshy pro-legs, and has only to carry its head over the body to the opposite side to fix the other end of the thread. It then causes its head to return by the same route, emitting a second silken thread in like manner, one end of which it fastens at the spot at which the first was terminated, and the other end where the first was commenced. By repeating this manœuvre a certain number of times, the skein of silk becomes sufficiently strong to bear the insect, and Reaumur states that it is composed of about fifty threads, as he had observed a caterpillar spin thirty-eight, and about a dozen had been already spun when he commenced the observation. The number of these threads being completed, it only remains for the caterpillar to disengage its head from beneath the skein; a thing which might appear difficult, but which is easily effected by the caterpillar; to effect this it brings the head close to the surface on one side, where the threads are all fastened together; where, in fact, there is less liability to separate them from each other, which would be the case were the head to be withdrawn whilst it lies upon the middle of the back of the caterpillar, when the threads are of course loosest. It is then carefully withdrawn. The skein might be supposed to be too loose for the chrysalis, being spun over the body when that is doubled; but the future movements both of the caterpillar and chrysalis require that the skin should not be too tight, but should allow a little play in all directions; moreover the body, of course with the head turned back, as in the operation of spinning the skein, was stretched out, so that its natural diameter was considerably reduced. Having thus completed its skein, it reposes quietly at full length, or rather its body contracts in length and becomes thicker, and at length the skin of the fore part of the back bursts and the head of the chrysalis appears; by continued writhing of the body the slit is enlarged and the skin pushed backwards beneath the skein of silk and thrown off at the tail, in the manner described under *P. Rapæ*.



The first of the two plates is a photograph of the interior of the building, showing the main hall and the staircase. The second plate is a photograph of the exterior of the building, showing the entrance and the surrounding area.

PLATE 2 - THE INTERIOR OF THE BUILDING

The interior of the building is shown in this plate. The main hall is large and open, with a high ceiling and a large staircase. The walls are made of brick and the floor is made of wood.

The staircase is made of wood and has a large handrail. The walls are made of brick and the floor is made of wood. The ceiling is high and has a large chandelier.

The main hall is large and open, with a high ceiling and a large staircase. The walls are made of brick and the floor is made of wood. The ceiling is high and has a large chandelier.

The walls are made of brick and the floor is made of wood. The ceiling is high and has a large chandelier. The main hall is large and open, with a high ceiling and a large staircase.

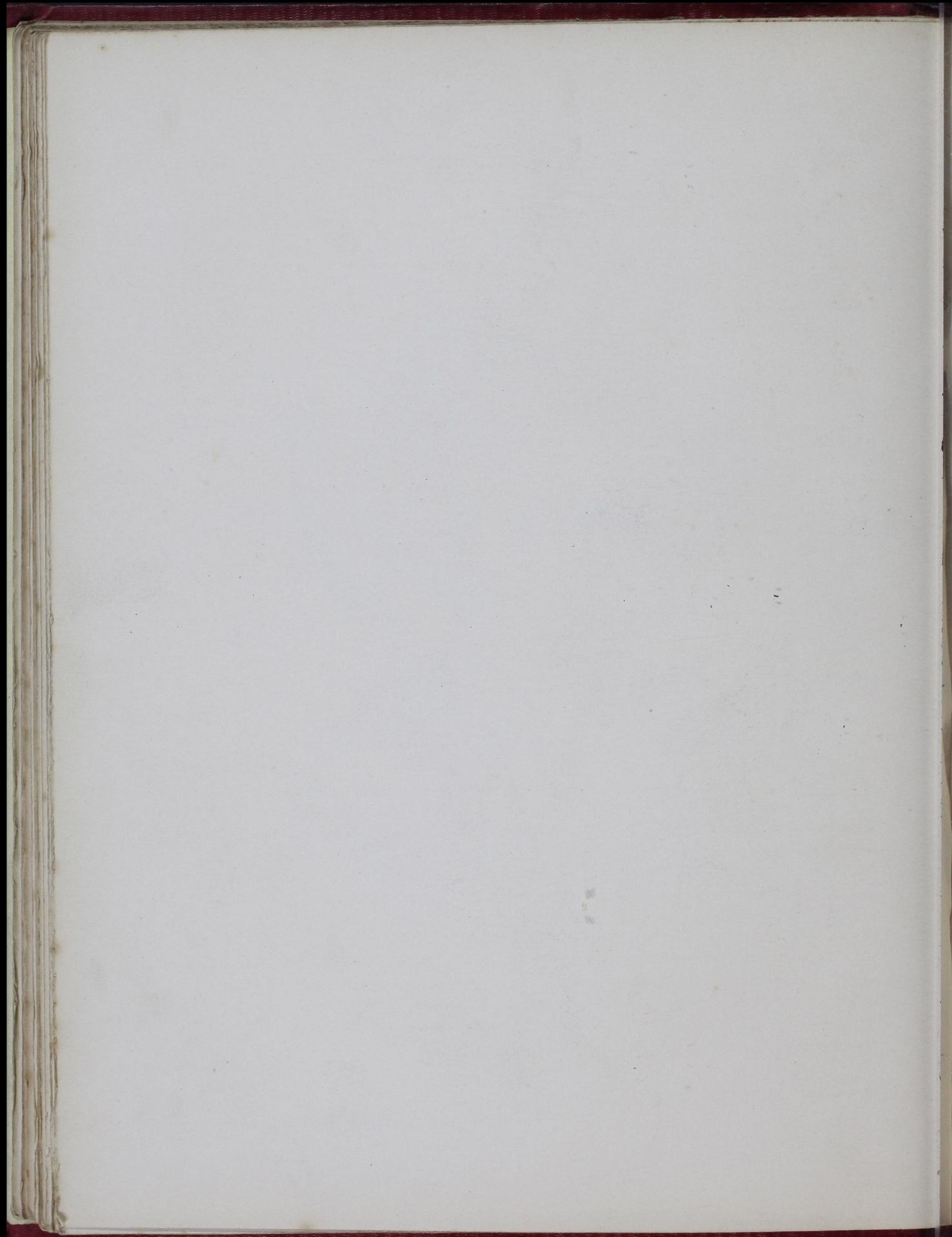
DESCRIPTION OF PLATE 1

Plate 1 shows the exterior of the building. The entrance is on the left side of the plate. The building is made of brick and has a large chimney. The surrounding area is paved and there are some trees in the background.











## SPECIES 3.—PIERIS RAPÆ. THE SMALL GARDEN WHITE BUTTERFLY.

Plate v. fig. 1—4.

SYNONYMES.—*Papilio* (Dan. Cand.) *Rapæ*, Linn. Syst. Nat. ii. 759.

Haworth. Lewin Brit. Pap. pl. 26. Wilkes, pl. 97.

*Pontia Rapæ*, Ochseneheimer, Stephens, Curtis, Duncan Brit. Butt. pl. 7, fig. 3.*Pieris Rapæ*, Latreille, Boisduval, Zetterstedt.*Ganoris Rapæ*, Dalman,*Catophaga Rapæ*, Hübner.

By persons ignorant of the nature of the growth and transformations of insects, this butterfly is considered as the young of *P. Brassicæ*, with which indeed it exhibits considerable resemblance, although it is usually considerably smaller, varying, however, from one and two-thirds to nearly two and a half inches in expanse. It is of a creamy white on the upper side, the tip of the fore wings having a very slight fuscous, dusky or black irregularly defined mark, not extending along the entire margin of the wing. On the under side this mark is replaced by a pale yellow mark, and the hind wings on the under side are also yellow, thickly spotted towards the base with black atoms. The males have moreover a black spot, and the females two round spots on the upper side of the fore wings, and both sexes have two black spots on their under side. The females have often also an elongated patch on the inner margin of the fore wings above, and there is a slight black mark on the costa of the hind wings. All the markings vary greatly, and some females have the upper side dirty pale buff.

If the perfect insects of this and the first species, *P. Brassicæ*, thus agree so closely together, their preparatory states are totally unlike, affording reason to believe that the specific distinctions of the other presumed species might also be better determined by their preparatory states. The eggs of this species are placed singly, and not in clusters, upon various species of *Brassica*, *Reseda*, etc.; the caterpillars are pale green, with a slender yellow dorsal line, and an interrupted yellow line above the feet on each side, in which the spiracles are placed; the head, feet, and tail are also entirely green; the body is transversely wrinkled, and the segments are but slightly indicated. Under a lens the whole body is seen to have a vast number of very minute black tubercles arranged in transverse rows. It feeds on the interior leaves of the hearts of cabbages, etc.; it is therefore much more obnoxious than *P. Brassicæ*. It is from this circumstance well known in France under the name of the *ver du cœur*.

The mode in which the transformation of this insect from the caterpillar to the chrysalis state is effected has been carefully described by Reaumur. Having attached itself by the hind feet to the little bundle of silk at the tail, and suspended itself by a silken skein across the middle of the body, in the manner described in our observations on *P. Brassicæ*, it remains for about thirty hours unchanged, or rather the change is going on beneath the skin of the caterpillar, which gradually becomes of a dusky colour, owing to the separation of the body of the chrysalis within; the throwing off of the skin is effected very rapidly, "*c'est l'affaire d'un instant*," says Reaumur. After a variety of contortions the skin of the back slits near the head, and forms a passage sufficiently large for the passage of the whole body of the chrysalis. When the head of the chrysalis is disengaged, it rests upon the old skin of the caterpillar, but it remains now to draw the hind part of the chrysalis out of the slit, or what is the same thing, to push back the caterpillar skin until it becomes a crumpled mass near the spot where the two hind legs are fixed; this is effected by the alternate lengthening and shortening of the chrysalis. The skein of silk across the body is now seen to offer but little obstacle to the pushing back of the exuvia by the contraction of the rings of the chrysalis. When the exuvia has been pushed back so as to cover only about one-third of the length of the chrysalis, the insect ceases this operation, it being more



convenient for it to withdraw the extremity of the chrysalis out of the aperture (being upheld by the transverse girth), and then push it back outside the exuvia till it reaches the little bundle of silk, into which it fixes the little hooks at the extremity of the tail. It then rids itself of the exuvia by a semicircular movement of the extremity of the abdomen, which is at the time curved, whereby it pushes the exuvia out of its old position and breaks the threads of silk to which it was attached, when it falls down. The chrysalis then remains quiet, being fixed exactly in the same situation and manner as the caterpillar. The chrysalis is yellowish, greenish grey, or brownish, often with three sulphur yellow lines.

According to Mr. Stephens, the first brood appears at the end of April, and the second about the beginning of July; but there is evidently no regularity in the broods, as may be seen from the following result of the observations of Jacob L'Admiral of the dates in which specimens of this species spun their skeins, became pupæ, and appeared as butterflies, with the number of days in which they remained as pupæ.

SPON.	WIERD EEN POPPE.	EN KAPEL. IN DAAGEN.
De eerste, 18 July, 1720.	20 July.	5 Augustus, — 16
De 2de, 6 July, [Juni?] 1723.	8 Juny.	19 Juny, — 11
De 3de, 13 September.	16 September.	1 April, — 197
De 4de, 2 September, 1739.	4 September.	23 September, — 19
De 5de, 2 September.	5 September.	28 May, — 265

Like *P. Brassicæ*, this species inhabits the whole of Europe, from Lapland to the south, and is found in Egypt, Barbary, Asia Minor, Siberia, and Cashmere. The *P. Ergane*, Hübn. (*P. Narcea* of Dahl and Treitschke), and the *P. Nelo* of Borkhausen, are probably varieties of this species.

#### SPECIES 4.—*PIERIS METRA*. HOWARD'S WHITE BUTTERFLY.

Plate v. fig. 5, 6.

SYNONYMS.—*Pontia Metra*, Stephens Illust. Brit. Ins. Haustell, vol. i. pp. 19, 146. Duncan Brit. Butt. pl. 8, fig. 2.  
Male.—*Papilio alba media immaculata*, Petiver Pap. pl. 1, fig. 13, 14.

Female.—*Papilio alba media trimaculata*, Petiv. pl. 1, fig. 11, 12.  
*Pieris Rapæ*, var. H. Doubleday. Dawson in Zoologist, pp. 681, 729.

This supposed species bears the same relation to *P. Rapæ* as *P. Chariclea* does to *P. Brassicæ*, differing from it in its smaller size, varying from twenty to twenty-five lines in expanse, and being also early in appearance, the first brood being found early in April, or even at the middle of March. In the appendix to his work, Mr. Stephens questions whether this or *P. Chariclea* be double-brooded, as out of several hundred specimens taken in July and August, not one belonged either to *P. Metra* or *Chariclea*, but to *P. Rapæ* and *Brassicæ*. *P. Metra* is very variable in its markings, but is generally distinguished from *P. Rapæ* by the comparative slenderness and truncation of the fore wings, which are consequently very acute at the apex, which is slightly clouded with dusky; and by the black base of the wings. "The male has a single obsolete dusky spot, and the female two, that at the anal angle being geminated; this sex has also the basal half of the wing much clouded with dusky: the posterior wings in both sexes are white, with the base black, and a dusky costal spot. Beneath, the sexes are similar; the anterior wings are white, with the tip yellow; the base and two obsolete spots dusky; the posterior wings are bright yellow, with a pale orange streak on the costa, strongly irrorated throughout with dusky, the anterior half of the discoidal cell being least speckled; the antennæ, legs, and body resemble those of *P. Rapæ*; the ciliæ are entirely clear, white." (Stephens.) Mr. Stephens describes two varieties of the male, in which the markings are less distinct, or even almost entirely obliterated. He also in



his appendix mentions several circumstances in support of the specific distinction of these early "small whites;" and states that the present had long been known amongst collectors under the name of "Mr. Howard's white." If indeed it be proved that these "early whites" exhibit constant distinctions of form, size, colour, and markings, it seems impossible to suppose that their detention in the chrysalis through the winter months should have the effect of producing such striking peculiarities. The caterpillar has not, unfortunately, been yet observed, "but the chrysalis does not materially differ from that of *P. Rapæ*." (Stephens.) Several of our best Lepidopterists regard it, however, merely as a variety of *P. Rapæ* (as does also Mr. Stephens himself in the British Museum Catalogue of British Lepidoptera).

### SPECIES 5.—PIERIS NAPI. THE GREEN-VEINED WHITE BUTTERFLY.

Plate v. fig. 7—10.

SYNONYMES.—*Popilio* (Dan. Cand.) *Napi*, Linn. Syst. Nat. ii. 760.  
 Lewin Brit. Pap. pl. 27. Donovan Brit. Ins. vol. viii. pl. 280, fig. 1. Albin  
 Ins. pl. 52, fig. d—g. Wilkes Ins. pl. 98.  
*Pontia Napi*, Fabricius, Ochsenheimer, Stephens, Curtis, Duncan Brit.  
 Butt. pl. 9, fig. 1.

*Pieris Napi*, Schrank, Latreille, Boisduval, Zetterstedt.  
*Ganoris Napi*, Dalman.  
*Cataphaga Napi*, Hübner.

This species is at once distinguished by the green colour of the parts of the wings adjoining the veins on the under side; whence the English name of the species. It varies in the expansion of its wings from one and one-third to two inches. The wings are white above, except at the base, which is generally black; the tip is also dusky; the apex of the branches of several of the subcostal nerves marked with small triangular spots. The males have generally a black spot between the middle and apex of the wing. The females have the apical dark mark larger, and have also two large black spots towards the posterior margin; the hinder one being connected with a black dash on the inner margin. On the under side, the fore wings of the males have the tip yellow, the nervures dusky, and two black spots corresponding with those of the females. In both sexes the hind wings are pale yellow beneath, with the veins broadly margined on each side with dusky greenish, and the hind wings have a small dusky mark on the costal edge above. The fore wings in the females are more rounded than in the males.

This is a very common and very variable insect, being found, especially at the middle of May and beginning of July, in gardens and pastures, the larva feeding on the Navew and other species of *Brassica*, *Reseda*, *Raphanus*, and other plants. It is pubescent, of an obscure green colour on the back, but brighter on the sides, with the spiracles red, placed upon a small yellow spot on each segment. The chrysalis is greyish, or yellowish-green, with black spots.

Amongst the varieties of this insect should most probably be arranged the *PAPILIO NAPÆÆ* of Esper, distinguished by being of a larger size than the ordinary specimens of *P. Napi*, varying from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches in expanse; "the male has the upper surface of the wings milk-white, with the tip, a spot, and two or three triangular dashes on the hind margin of the anterior, black; beneath, the latter have slightly dilated greenish nervures, with two cinereous spots placed transversely, and a yellowish tip; the posterior wings are pale yellowish, with a deeper costal streak; the basal nervures above, dilated and greenish. The female has the tip of the anterior wings and three spots, one of which is subtriangular, and placed on the thinner edge of the wings, black or dusky, and the posterior wings are clearer yellow. The nervures on the under surface of the posterior wings are more or less dilated in different specimens." Such is the description given by Mr. Stephens; who



however, adds, "I think with Godart that it may only be a very large variety of *P. Napi*, but as it appears to have characters sufficient to constitute a distinct species, the determination of this point must be left for future investigation." The caterpillar and chrysalis have not been observed, nor have any circumstances connected with the time or place of its appearance been given, so that we have even less ground for considering it as distinct than exists in respect to *P. Chariclea* and *Metra*.

### SPECIES 6.—*PIERIS SABELLICÆ*. THE DUSKY-VEINED WHITE BUTTERFLY.

Plate v. fig. 11, 12.

SYNONYMS.—*Papilio Sabellicæ*, Petiver Papil. pl. 1, fig. 17, 18, ♂;

fig. 15, 16, ♀.

*Pontia Sabellicæ*, Steph. Illust. Haust. 1, p. 22, pl. 3\*, fig. 3, 4. Duncan

Brit. Butt. pl. 8, fig. 3.

*P. Bryonia*, Godart Enc. Méth. 9, p. 162, No. 146.

*P. Napi*, var., Haworth, Boisduval, Zetterstedt, E. Doubleday.

This supposed species differs from *P. Napi* (to which it is otherwise closely allied in general markings and appearance), not only in having the veins on each side strongly margined with brown, but in the form of the fore wings, which Mr. Stephens describes as being nearly of the form of those of *P. Cardamines*; but this is not quite correct, the apex of these wings being as acute as in *P. Napi*, but the lower portion of the outer margin of the wing is greatly dilated. In my specimen of the female, the difference in the form of the wings when compared with a male of *P. Napi* (in which the expansion, measured from tip to tip, is precisely similar) is most striking; for on measuring the expanse from the base to the apex of the middle branch of the median wing-vein of this specimen of *P. Sabellicæ*, each wing is found to be more than  $1\frac{1}{3}$  line longer than the same portion of the wing in *P. Napi*; thus making a difference of nearly a quarter of an inch across this part of the wing, although the measure between the tips is alike. It is true that the females of *P. Napi* are described as having the "anterior wings more rounded than the male," but Mr. Stephens also describes and figures a male with the characters of *P. Sabellicæ*. Such a character, if found permanently in conjunction with the dark margins of the veins of the wings both on the upper and under surface, we should certainly deem of specific value, although Boisduval gives it as a variety of *P. Napi*, describing only the female; whilst Zetterstedt describes both sexes of this as variety B. of *P. Napi*, but adds that the females were most abundant. He, however, states that he had repeatedly captured the true males of *P. Napi* united with the females of his variety B. (or *P. Sabellicæ*). He had also reared a female of his var. B. from a yellowish-green chrysalis, very similar to the ordinary chrysalis of *P. Napi*, on the 20th of June. So that the preponderance of evidence is against the specific rank of *P. Sabellicæ*. (It is reduced to a variety by Mr. Stephens in the Museum Catalogue.)

#### DESCRIPTION OF PLATE VI.

INSECTS.—Fig. 1. *Euchloe Cardamines* (the orange-tip Butterfly), male. 2. The female. 3. The female, showing the under side. 4. The Caterpillar. 5. The Chrysalis.

„ Fig. 6. *Pieris Daplidice* (the Bath white B.), male. 7. The female. 8. The male, showing the under side. 9. The Caterpillar. 10. The Chrysalis.

„ Fig. 11. *Leptosia Candida* (the wood-white B.) 12. The Caterpillar. 13. The Chrysalis.

PLANTS.—Fig. 14. *Reseda lutea* (base Rocket, or wild Mignonette). 15. *Cardamine pratensis* (common meadow Ladies' Smock). 16. *Lathyrus pratensis* (meadow Vetchling).

As the male and female of two of the species represented in the above plate present marked differences, I have in both instances given portraits of both sexes, as well as an under side view, which will enable the young collector to distinguish at once the female of *E. Cardamines* from the male of *P. Daplidice*, which from their similarity in some respects he might have otherwise mistaken. The figures of *P. Daplidice* are from Italian specimens in my own collection, which differ in no respect from the indigenous specimens which I have seen. The *E. Cardamines* and *L. Candida* are from British specimens, and I shall in future endeavour to have all the plates drawn from British specimens only. H. N. H.







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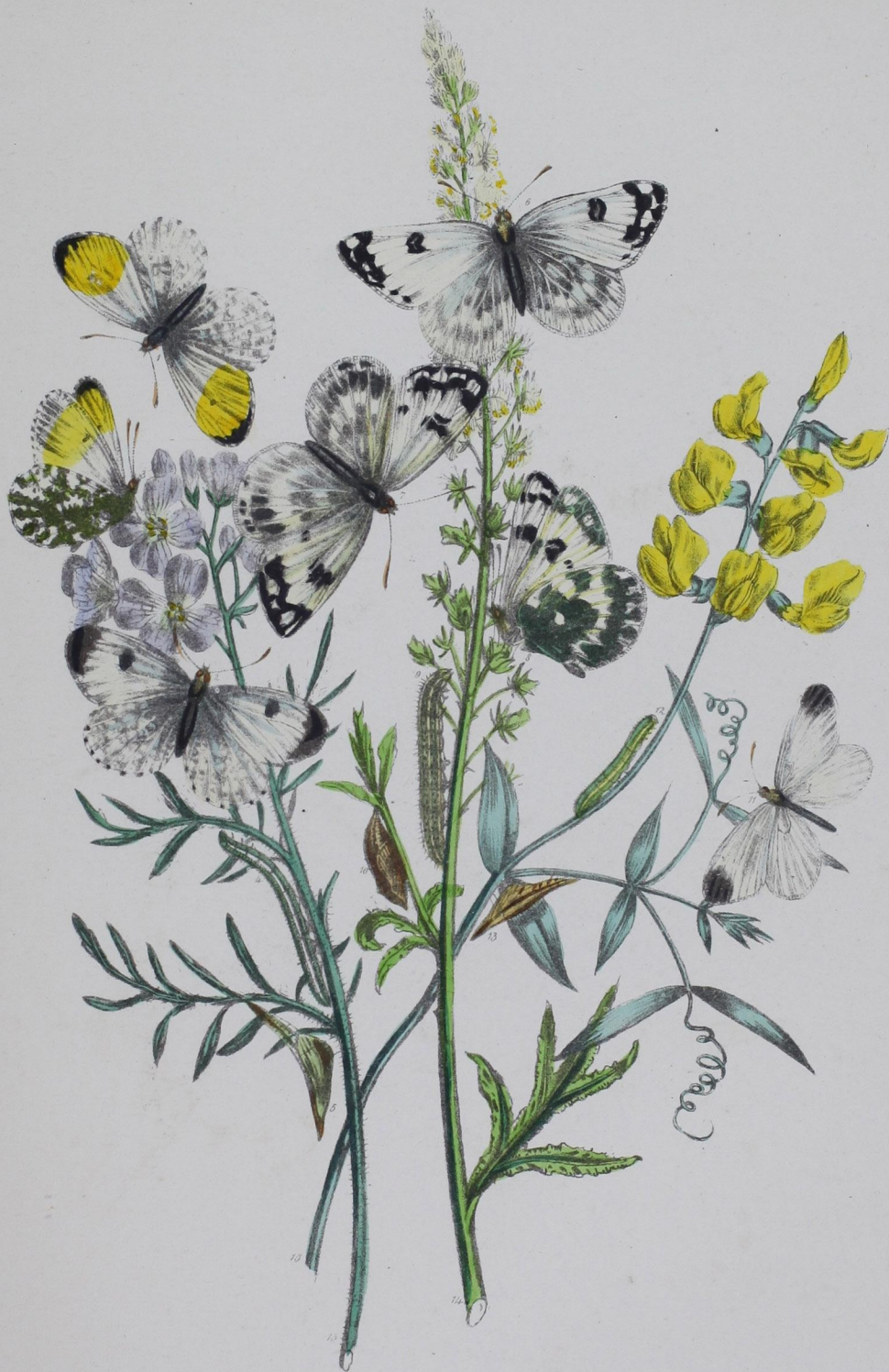
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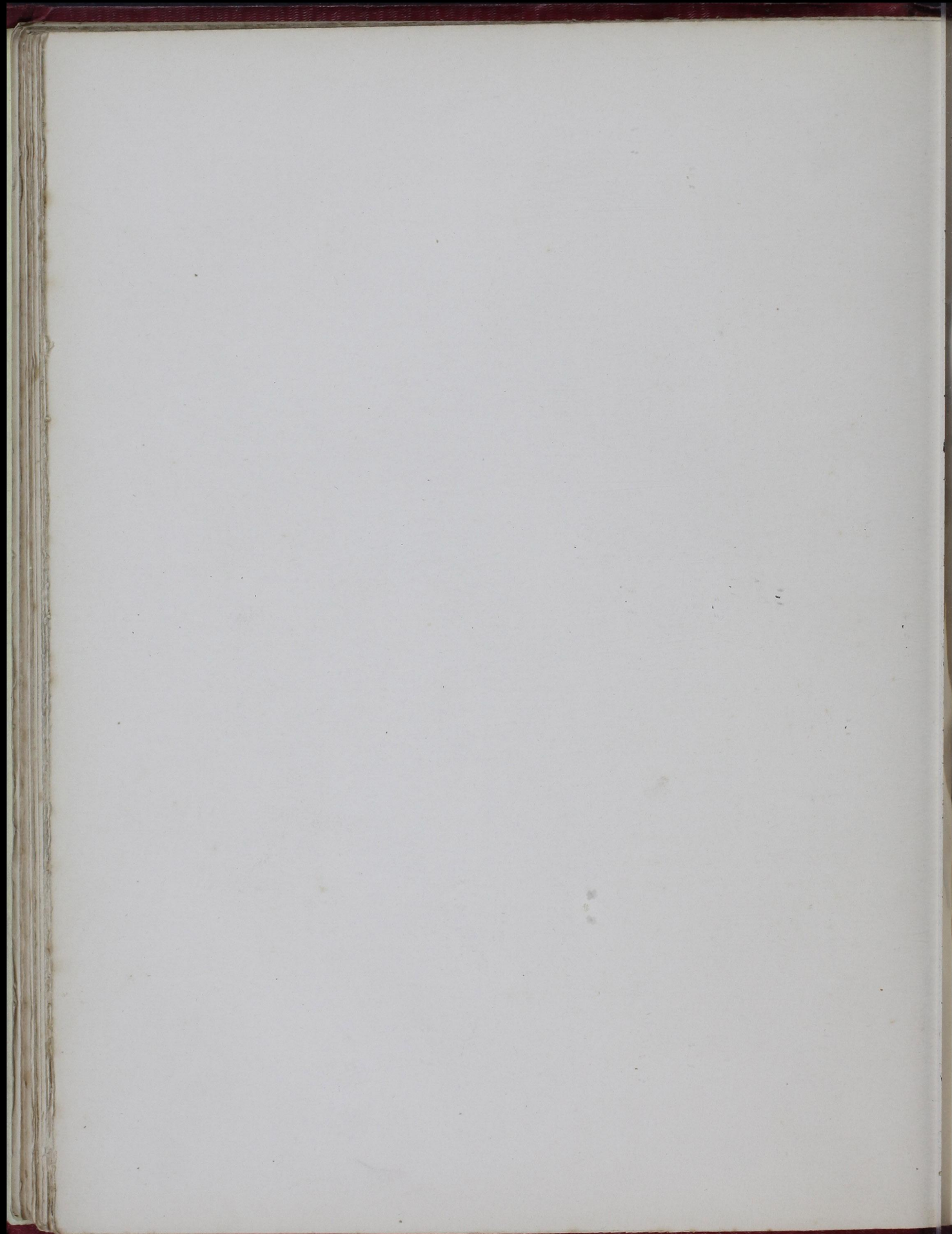
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## SPECIES 7.—PIERIS DAPLIDICE. THE BATH WHITE BUTTERFLY.

Plate vi. fig. 6—10.

SYNONYMES.—*Papilio* (Dan. Cand.) *Daplidice*, Linn. Syst. Nat. ii. 760.  
 Lewin Brit. Papil. pl. 28. Donov. Nat. Hist. Brit. Ins. 6, pl. 200.  
*Pontia Daplidice*, Fabricius, Oehsenheimer, Steph. Ill., Curtis Brit.  
 Entomol. pl. 48.  
*Mancipium Daplidice*, Stephens Nom., Duncan Brit. Butt. pl. 9, fig. 2.

*Pieris Daplidice*, Schrank, Latreille, Boisduval, Zetterstedt.  
*Synchlœ Daplidice*, Hübner (Verz. bek. Schmet).  
*The Slight Greenish Half-mourner*, Petiver Pap. pl. 2, fig. 8, male.  
*Vernoun's Greenish Half-mourner*, Petiver Pap. pl. 2, fig. 9,  
 female.

This very rare butterfly varies in the expanse of its wings from an inch and two-thirds to nearly two inches. The wings are of a white colour, those of the males being rather more cream coloured. The upper side of the fore wings is blackish at the base, and is marked with a rather large discoidal black spot at the extremity of the discoidal cell, in which the transverse veins appear of a white colour. The apex of these wings is irregularly black, the dark colour being broadest towards the front margin, extending only to the middle branch of the mediastinal vein, and being irrorated with white, having also four irregular white spots in the black patch, which is darker in the females than in the males; the females have moreover a small black patch near the inner margin of the fore wings; the upper side of the hind wings is white, but exhibits traces of the marking on the under side, in consequence of their slight transparency; indeed, in the female, these traces are more or less distinctly marked with black scales, especially along the edge. On the under side the markings are alike in both sexes, the male having the spot on the inner edge of the fore wings, which is wanting on the upper side in this sex. The marks of the fore wings on the under side are of a greenish colour. The under side of the hind wings is yellowish green or greenish (in some females), with three large white spots, forming a triangle towards the outer base of the wing, succeeded by an irregular white bar beyond the middle of the wing, traversed by yellowish veins and with five white clavate spots on the outer margin. The male moreover differs from the female in the form of the fore wings, which are more acute at the apex than in any other species of this genus,\* and with the external margin slightly concave, instead of being convex, as in the female. This remarkable sexual difference, hitherto I believe unnoticed in this species, occurs as we have seen, but in a less striking degree, in *P. Napi* and *Sabellicæ*. The caterpillar, which feeds upon various wild Resedaceæ and Cruciferae, such as wildwoad, base rocket, and cabbage, is, according to Boisduval, of an ashy blue colour, covered with small black granules, with four white longitudinal stripes, marked at each incision with a lemon-coloured spot. The belly and legs are whitish, with a yellow spot above each of them. The chrysalis is greyish, dotted with black, with several reddish stripes. Our figures of the larva and pupa (carefully copied from Hübner) differ in their colours from the individuals described and figured by Boisduval in his *Collection Iconographique des Chenilles d'Europe*.

On the Continent, two broods of this insect appear in the course of the year.† It is found in dry and sandy situations, and is very common, especially in the more southern part of the continent of Europe, as well as in Barbary, Asia Minor, and Cashmere. In this country it is very rare. According to Ray, it was formerly taken by Vernon near Cambridge; and Petiver records it as having been taken near Hampstead.

\* Notwithstanding this circumstance, the species is placed by Stephens at the head of his section division of *Pontia*, characterised by having "the anterior wings distinctly rounded at the tip," in contradistinction from the typical species, *P. Brassicæ*, etc., in which they are described as "obtusely angled."

† In April and May, and afterwards in August, according to Godart; but Boisduval gives April and May, and June and July, as the time of its appearance. Mr. Stephens captured his specimen, however, in the middle of August.



Lewin informs us that it was named the Bath White, from a piece of needlework executed at Bath by a young lady, from a specimen of this insect, said to have been taken near that city. Mr. Haworth, in his *Lepidoptera Britannica* (pref. p. xxvi.), states that it had been taken in the preceding *June* (not May, as mentioned by Stephens) in White Wood, near Gamlingay, Cambridgeshire. Mr. Stephens captured it on the 14th August, 1818, in the meadow behind Dover Castle, where other specimens have since been captured (*Entomol. Mag.* iii. 409). According to Mr. Dale, a specimen was also taken about the same time near Bristol.

Our recent English entomologists have been singularly unfortunate in respect to the generic relations of this insect. Mr. Curtis first proposed forming it and *P. Cardamines*, L., into a section of the genus *Pontia*, having the wings variegated beneath, and the terminal point of the palpi shorter than the second. Subsequently, Mr. Stephens, although noticing Mr. Kirby's observations on the peculiarity of the metamorphosis of *P. Cardamines*, adopted this section under the name *Mancipium*—Hübner. In none of his characters of the section, however, except the trivial one of the variegated under surface of the wings, is there any agreement between *P. Daplidice* and *Cardamines*. The labial palpi in a female of *Daplidice* which I have dissected, have the second and third joints of equal length, although Savigny and Curtis figure the third as scarcely more than half the length of the second; the anterior wings of the female *Daplidice* are not rounder than those of *P. Napi*, whilst we have seen that they are much more acute in the males. At the same time, the character of the transformations of the two species is totally distinct (see Plate VI., those of *P. Daplidice* agreeing with the rest of the genus). Moreover, the antennæ in *Daplidice* are terminated by a suddenly formed flat club, which is even broader than in *P. Napi*, whilst in *P. Cardamines* the club is long, and gradually formed; and, lastly, the veins of the fore wings\* are arranged as in *Pieris Napi*, differing from those of *P. Cardamines*.

## GENUS VI.

### EUCHLOE,† HÜBNER. ANTHOCARIS, BOISDUVAL.

This genus is closely allied to *Pieris* in many respects, but differs in others, which are considered as of primary importance; the palpi are especially distinct, the second joint being very long, and the third very minute, not being more than one-fourth of the length of the preceding.‡ The antennæ are short, and terminated by a gradually formed oval compressed club; the fore wings are much more dilated and rounded at the tips, and in order to support this increased expanse, the third branch of the postcostal vein emits from its upper side two distinct veins.§ The under wings form a slight channel for the abdomen. The wings are somewhat transparent, so as to show the markings of the under side when viewed from above. They are generally ornamented with a bright orange spot at the tip in one or both sexes, and on one or both of their surfaces.

\* In the specimens of *P. Daplidice*, the wings of which I have examined and denuded of scales, the third branch of the postcostal nerve is destitute of the short branch emitted close to the apex of the fore wing in the other species of *Pieris*; but the position of this little branch varies in the different species of *Pieris*, and it is sometimes even wanting, as I have more recently discovered; indeed, I possess specimens, one fore wing of which possesses this short branch, and the other wants it. Typically speaking, however, it is the character of *Pieris*.

† Derived from the Greek *εὐ* very, and *χλωη* the green herb, in allusion to the spotted green wings.

‡ Boisduval describes the last joint of the palpi as "à peine aussi long que le précédent."—(*Hist. Nat. Léop.* 1, 556.) But my description is taken from a carefully dissected specimen of *E. Cardamines*.

§ Boisduval figures *Anthocharis Antevippe* (*Hist. Nat. Léop.* pl. 18, fig. 3) with only one vein from this third branch, as in *Pieris*.



The caterpillars are much more slender than those of *Pieris*; pubescent and attenuated at each end of the body. The chrysalis is naked, strongly boat-shaped, and more or less curved, pointed at each end, and destitute of lateral points. Boisduval states that the segments of the Chrysalis are immovable.

### SPECIES 1.—EUCHLOE CARDAMINES. THE ORANGE-TIPPED BUTTERFLY.

Plate vi. fig. 1—5.

SYNONYMES.—*Papilio* (*Dan. Cand.*) *Cardamines*, Linn. Syst. Nat. ii. pl. 761. Lewin Papil. pl. 30. Harris Aurelian, pl. 22, fig. g. h. Wilkes Brit. M. & B. pl. 99. Donovan Brit. Hist. pl. 169.

*Mancipium Cardamines*, Stephens, Duncan Brit. Butt. pl. 10, fig. 1, 2.

*Anthocaris Cardamines*, Boisduval, Godart.

*Pieris Cardamines*, Schrank, Latreille, Zetterstedt.

*Ganoris Cardamines*, Dalman.

*Euchloe Cardamines*, Hübner, Verz. bek. Schm. 1816.

This beautiful insect varies in the expanse of its wings from  $1\frac{1}{2}$  to 2 inches. The ground-colour of the wings is white; on the upper side the base is black; there is a black semicircular mark at the extremity of the discoidal cell, and the apex is black, with pale spots along the margin. In the males, the space between the discoidal spot and the dark apex is suffused on both surfaces with bright orange, which is entirely wanting in the females; the upper surface of the hind wings is white, but exhibits the traces of the markings which ornament the under side; the cilia is marked with seven black dots. The fore wings on the under side are yellowish at the base, and the dark apical spot is pale grey varied with green; the under wings on this side in both sexes are marbled with white and green, the veins being edged with yellow.

Mr. Stephens describes several varieties—one having a black spot on the upper surface of the hind wings, and another with the black lunule of the fore wings almost obliterated. Mr. Haworth also describes a variety of the male having the orange spot almost obliterated above; and Boisduval mentions a variety of the female having an orange spot on the under side of the fore wings.

The larva is green, slightly pubescent, very finely dotted with black, with a white lateral stripe. It feeds upon Cardamine impatiens (whence its specific name), *Turritis glabra*, *Brassica campestris*, etc. The chrysalis is at first green, but in a few days it assumes a yellowish grey colour with brighter coloured stripes.

This is a very abundant species, sporting about sunny lanes and pastures, and open places in woods, in the early spring. Mr. Stephens states that of six pupæ of this species, two came to perfection at the end of May, one in the beginning and one at the end of June, and the other towards the middle of July; thus accounting for the apparently long continuance of the insect in the perfect state.

## GENUS VII.

### LEPTOSIA\*, HÜBNER. LEUCOPHASIA, STEPHENS.

This genus is at once distinguished from its allies by the very peculiar form of the wings, which are narrow, elongated, and slender, the anterior being rounded at the tip, and the posterior slightly grooved. The head is of moderate size, with the eyes large and prominent; the palpi short, the base joint being very large and broad, the second small and square, and the third very small and rather oval; the antennæ are terminated by a rather abruptly formed obconical compressed club; the thorax is very small, and the abdomen very long and slender.

\* Evidently derived from the Greek λεπτος, slender, in allusion to the delicate form of the wings.



Like its allies, the wings of the female are more rounded at the tip than those of the male. The discoidal cell in both the fore and hind wings is very short, scarcely extending beyond one-fourth of the length of the wing from the base; this cell is closed by a transverse vein. The arrangement of the veins of the fore wings is peculiar, differing from every other English butterfly. The postcostal vein, instead of emitting several distinct branches in front, emits but one, which branches off at the apex of the discoidal cell; but this branch emits four veins in front, so that in effect an equal support is given to the membrane of the wing, as though these veins had separately branched off from the main postcostal vein.\* The unguis are distinct and bifid.

The caterpillar is slender, attenuated at each end, very slightly pubescent. The chrysalis is angulated, spindle-shaped, nearly resembling that of *E. Cardamines*, but not bent in the middle, and with the segments moveable.

The habits of the species materially differ from those of *Pieris*, the perfect butterfly frequenting woods, as its English name indicates, and its larva feeding on leguminous herbs.

#### SPECIES 1.—LEPTOSIA CANDIDA, WESTWOOD.

Plate vi. fig. 11—13.

SYNONYMES.—*Papilio* (Dan. Cand.) *Sinapis*, Linn. Syst. Nat. ii. 760.  
Lewin Papil. pl. 29. Donovan Brit. Ins. vol. viii. pl. 280, fig. 2. Harris  
Aurel. pl. 29, fig. t. u.  
*Pontia Sinapis*, Fabr., Ochs., Leach.  
*Pieris Sinapis*, Schrank, Latreille, Godart.

*Leucophasia Sinapis*, Stephens, Boisduval. Duncan Brit. Butt. pl. 10, fig. 3.  
*Ganoris Sinapis*, Dalman, Zetterstedt.  
*Leptosia Lathyri*, Hübner, Verz. bek. Schmett, p. 95.  
*Leucophasia Loti*, Rennie Conspect. p. 4.  
*Papilio Candidus*, Retzius (Gen. et. Sp. Ins. De Geer). p. 30.

This delicate little butterfly varies in the expanse of its wings from  $1\frac{1}{3}$  to  $1\frac{5}{8}$  inch. The wings are of a pure white colour on the upper side, with a roundish dark blackish spot occupying the tip of the fore wings, and which in the females is of a paler greyish colour. In some specimens, however, this apical patch is entirely wanting.† The under side of the fore wings has the fore margin greyish coloured, interrupted by a more or less distinct whitish crescent-like mark, placed at the extremity of the discoidal cell, the base and tip of these wings being of a very pale yellowish green; the under side of the hind wings is slightly stained with greenish yellow, with the veins and two irregular and often interrupted transverse bars of a greyish ash colour.

The caterpillar is described by Boisduval as green, with the dorsal vessel rather darker, and a lateral yellow stripe situated above the feet. The chrysalis is at first of a greenish yellow, but subsequently of a whitish grey, with red dots on the sides and upon the wing-cases (Collect. Inconogr. des Chenilles d'Europe).

The caterpillar feeds upon *Vicia cracca*, and on the species of *Lotus*, *Lathyrus*, and *Orobis*, growing in woods. Linnaeus, however, says of it, "Habitat in Brassica et affinibus;" and Fabricius, "Habitat in Brassica, Sinapi, Rapa," and hence the name of *P. Sinapis* was given to it. As, however, such is now ascertained not to be the case, the insect confining its attacks to a very different natural order of plants, I have thought it more proper to refer to the name proposed by Retzius, the commentator of De Geer, rather than to give it a new specific name, or adopt that proposed by Hübner, which has subsequently been misapplied to another species.

Its flight is slow and undulating; it is by no means a common insect, frequenting the glades in woods of the southern counties of England, and appears to be double brooded, being found in the winged state in the middle of May and beginning of August.

\* The same arrangement of the veins is found in *Euterpe Charops*, figured by Boisduval (Hist. Nat. Léop. pl. 18, fig. 2).

† These individuals were considered by Borkhausen as a distinct species, which he named *P. Erysimi*.



## DESCRIPTION OF PLATE VII.

INSECTS.—Fig. 1. *Parnassius Apollo* (the *Apollo* or crimson-ringed Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.  
See pages 11 and 12 for the description of this insect.

„ Fig. 5. *Aporia Cratægi* (the black-veined white B.) 6. The female. 7. The Caterpillar. 8. The Chrysalis.

PLANTS.—Fig. 9. *Cratægus oxyacantha* (Hawthorn). 10. *Sedum Telephium*.

Though not in the order of the latest arrangements, I have given *Aporia Cratægi* and *Parnassius Apollo* together, as from many features of resemblance, the semitransparency of a portion of the wings, etc. etc., they group better than they would have done in their respective places. The remarkably perfect specimen from which *Parnassius Apollo* is drawn, I took upon the Mount Cenis a few summers ago in the month of July, where it is found in such abundance that I captured between thirty and forty specimens in less than half an hour. *Aporia Cratægi*, male and female, are from specimens taken near Tivoli. The under side of *Aporia Cratægi* is generally described as closely resembling the upper surface, but in my female specimen, in addition to the brown veinings which usually distinguish it from the male, the anterior wings are of a deeper cream colour, and the posterior ones inclining to pale yellow. The larva and pupa are both from Hübner. Of the plants I have only to remark that the red variety of the hawthorn is given instead of the more common white, as affording a better contrast to the colours of the insects. Both the caterpillars are from Hübner. H. N. H.

## GENUS VIII.

APORIA,\* HÜBNER. PIERIS, STEPHENS, E. DOUBLEDAY.

This genus is closely allied to the garden white butterflies, but is distinguished from them not only by its habits subsequently detailed, but also by various peculiarities in its structure. The palpi are rather short, with the basal joint longest and most robust, the second and third of nearly equal length, the third being, however, much slenderer than the second; the antennæ are terminated by a gradually formed slightly compressed club; the wings are almost diaphanous, surrounded by a distinct nerve, the cilia being very short, and the discoidal cell in all the wings being closed, the fore wings are somewhat triangular, but with the apex and posterior angle rounded off; the apical nervure, which is the third anterior branch of the postcostal, is forked more strongly than in the garden whites; the legs and unguis are formed as in the same insects. The larva is elongated, slightly fusiform, hirsute; and the chrysalis is angulated, but not boat-shaped, with an obtuse beak in front of the tail, conical, attached in the same manner as all the other Pierides.

The palpi have been relied upon as the chief character of the genus, but from the variations which are found even in the British species of garden whites, it appears to me an unsatisfactory one. The antennæ and subdiaphanous wings are of more importance.

I must refer to my observations under *Pieris* for the reasons which have induced me to reject the name of *Pieris* used for this insect by Stephens and others, and to employ one proposed long ago for it by Hübner. It is on this account that I have also rejected Donzel's name, *Leuconea*.†

\* Probably derived from the Greek *ἀπορία*, destitutus sum, from the nakedness of the wings.

† M. Donzel was induced to form this insect into a genus intermediate between *Pieris* and *Parnassius*, chiefly from the peculiarity which he observed, that the female carries the male when flying together coupled. He further states that it differs from *Pieris* in having ten distinct terminal nerves, whilst there are only nine in *Pieris*; he, however, overlooks the small apical branch which also exists in *Pieris*, although it is sometimes necessary to denude the wing of its scales before it can be seen in that genus.



SPECIES 1.—*APORIA CRATÆGI*, HÜBNER. THE BLACK-VEINED WHITE BUTTERFLY.

Plate vii. fig. 5—8.

SYNONYMS.—*Papilio* (Dan. Cand.) *Cratægi*, Linn. Syst. Nat. ii. 758.  
 Lewin Papil. pl. 24. Donovan Brit. Ins. vol. xiii. pl. 454. Albin Brit. Ins.  
 pl. 2, fig. 2, a—d. Wilkes M. & B., pl. 95. Harris Aurelian, pl. 9, fig.  
 g—k.

*Pieris Cratægi*, Schrank, Latreille, Boisduval, Zetterstedt, Stephens, Curtis  
 B. E. pl. 360. Duncan Brit. Butt. pl. 11, fig. 2.  
*Pontia Cratægi*, Fabr., Ochs., Leach.  
*Leuconea Cratægi*, Donzel, Ann. Soc. Ent. de France, 1837, p. 80.  
*Aporia Cratægi*, Hübner, Verz. bek. Schmett.

This remarkable insect varies in the expanse of its wings from  $2\frac{1}{3}$  to  $2\frac{1}{2}$  inches. The wings are entirely of a white cream colour, and are alike on both sides, the veins being black and more or less dilated, their extremities on the fore wings being accompanied by triangular dusky spots. In the female the veins of the fore wings are generally of a brownish hue.

The caterpillar is at first black, but is afterwards thickly clothed with whitish hairs, with the sides and belly of a leaden grey colour, marked with two longitudinal red or yellow stripes. The chrysalis is of a greenish white, with two lateral yellow lines and a great number of black dots.

This is a very destructive insect on the Continent, its larva feeding in society under a silken web not only on the white thorn (*Cratægus oxyacantha*), but also on the *Prunus spinosa*, the cherry, pear, and other fruit trees. M. Kollar has given a long and interesting account of its proceedings in his work on obnoxious insects, to which I must refer the reader, and of which a translation by Miss Loudon, illustrated with woodcuts, has recently been published, with additional notes by myself. De Geer has also given an account of its transformations. It is fortunate, however, that this insect is of uncommon occurrence in this country, so that hitherto we have not experienced any of the injuries which it is capable of inflicting, and which led Linnaeus to call it the pest of gardens. Pallas also relates in his travels that he saw this butterfly flying in such vast abundance in the environs of Winofka, that he at first took them for flakes of snow. It appears in this country somewhat periodically, being found plentifully in the New Forest, Hampshire, and at Combe Wood in Surrey, although I have never seen it in the latter place during many years' collecting. It has also been taken at Chelsea, Muswell Hill, Herne Bay, Glanville's Wooton (Dorset), Enborne (Berkshire), and other parts of the south of England. In France there appear two broods, one in the spring, the other in autumn. Their periodical appearance may probably be owing to the failure in the preceding year of their natural enemies, but the cultivator ought to take advantage of their appearance in the winged state in order to prevent their increase, as the destruction of one female butterfly would prevent the deposition of a certain number of eggs, and the mischief attendant thereupon.

## FAMILY II.

## NYMPHALIDÆ, SWAINSON.

This, which is the third family of the butterflies, is in effect the second British family, there being no indigenous species of the second family Heliconiidae. The butterflies of which it is composed are for the most part very beautifully coloured, and of very robust structure; so that their flight is powerful and quick. They may be said to be of the middle size; few equalling the giant size of some of the Papilionidae. Their chief







CHAPTER I

THE HISTORY OF THE UNITED STATES

SECTION I

The first part of the history of the United States is the history of the discovery and settlement of the continent. The second part is the history of the formation of the Union. The third part is the history of the development of the country.

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SECTION II

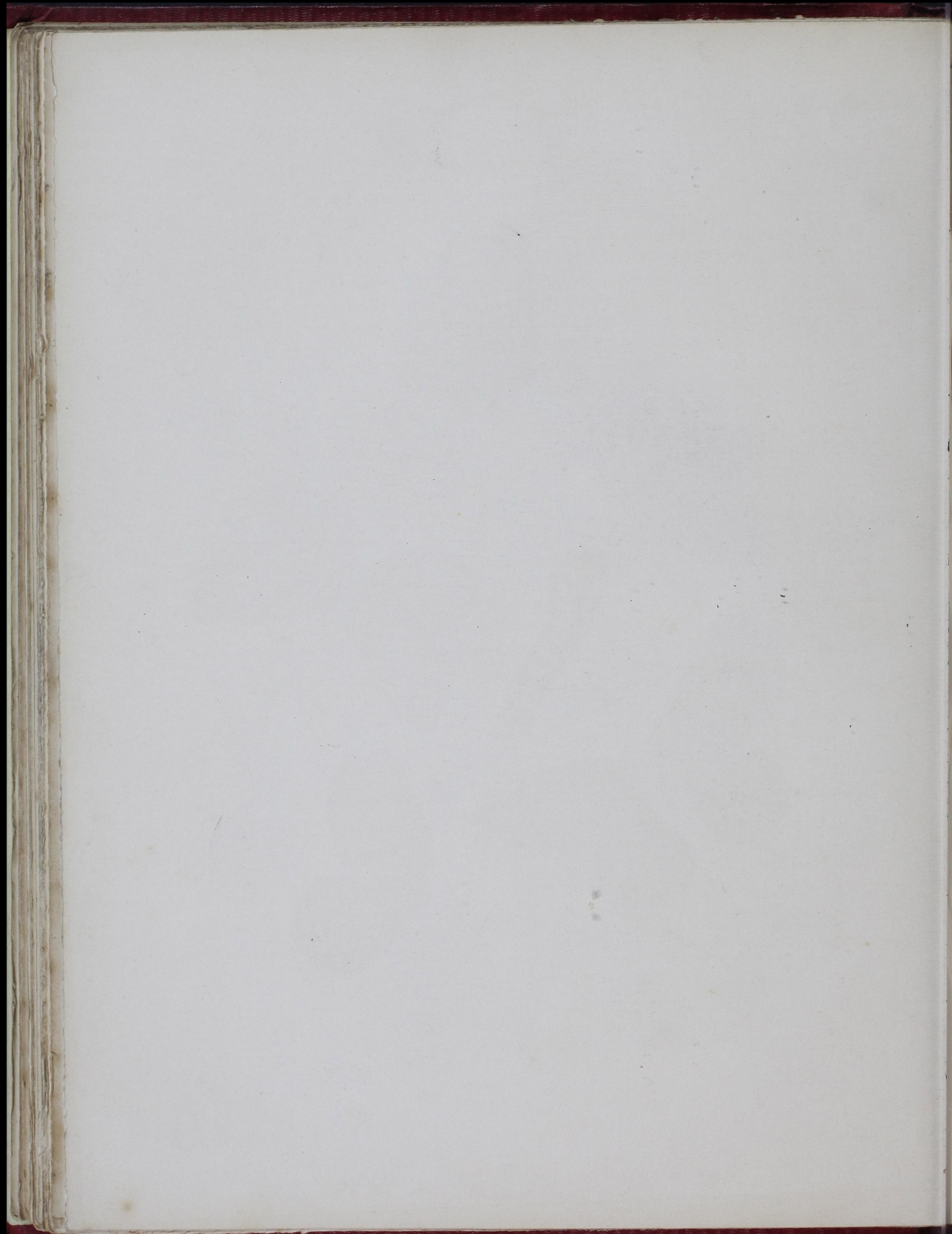
THE HISTORY OF THE UNITED STATES

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characteristics, however, consist in the very short fore feet in both sexes, which are quite unfitted for walking, and in the chrysalides being simply suspended by the tail. The antennæ have the extremities generally furnished with a more or less distinct club, which is never hooked; the hind legs have only a single pair of spurs at the extremity of the tibiæ, and the posterior wings have a groove to receive the abdomen. There is comparatively slight variation in the arrangement of the veins of the wings throughout the British genera of this family, if we except the more or less complete closing of the discoidal cell of the hind wings.\* The caterpillars are variable in their structure, but in general they are clothed with numerous strong spines; others have the body smooth with the head or tail forked. The chrysalides are naked, and often armed with small conical protuberances. They are also often ornamented with golden or silvery spots. It will be observed that, by the arrangement of the butterflies here adopted, the Papilionidæ are far removed from the Lycænidæ, which agree together in the girthed condition of the chrysalis, and in the fore feet being fitted like the others for walking. M. Boisduval has endeavoured to obviate this objection by introducing the Lycænidæ between the Papilionidæ and Heliconiidæ, whilst Dr. Horsfield has commenced the arrangement of the butterflies with the Lycænidæ, followed by the Papilionidæ. As, however, I consider the Papilionidæ as the types of the Diurnal Lepidoptera, and consequently as most worthy to be placed at the head of the section, and as there certainly exists a natural transition from the Papilionidæ to the Heliconiidæ and Nymphalidæ (see my Introduction to Mod. Classif. of Insects, vol. ii. p. 342—353), I have adopted the arrangement of Stephens and other English authors. Some of the genera of this family recede from the others in having the club of the antennæ slender and very gradually formed, the larvæ smooth, with an anal fork and the pupa smooth. These have been separated by Dr. Horsfield as one of the five primary groups of butterflies; but the genera thus characterised, *Apatura*, *Hipparchia*, etc., possess so few characters in common, and are in other respects so closely allied to the typical Nymphalidæ, that it is not material, in a work of such confined limits as the present, to separate them therefrom.

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## GENUS IX.

### MELITÆA,† FABRICIUS.

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This genus is distinguished from the majority of the family by the very large and flattened club of the antennæ and the naked eyes. The palpi are long, ascending, and wider apart at the tip than at the base. The second joint is by far the largest, the third joint being small but variable in shape. The head is of moderate size; the fore wings rather long and triangular, but with the outer margin always rounded; the hind wings are rounded, and generally destitute of silvery markings. The fore legs are spurious in both sexes;‡ the four hind legs are terminated by tarsi, described as having double nails, or with simple claws furnished with an unguiform

\* Since the earlier editions of this work were published, Mr. E. Doubleday has submitted the wings of this family to a rigid examination (Linn. Trans., vol. xix. p. 477). His plate, however, only exhibits several trivial variations in the position of the small branches of the postcostal vein, and the insertion of the transverse vein which closes the discoidal cell of the fore wings.

† A fanciful name, probably derived from μέλι, honey, from the ground-colour of the wings; or perhaps from Μελίταια, the name of an ancient town in Thessaly.

‡ Mr. Curtis describes them as similar in the sexes, imperfect, hairy, and four or five-jointed; his pl. 386, fig. 8, represents the fore legs as very hairy, and 8 b the tarsus as composed of three joints. The anterior tarsi, however, offer a most tangible character for the determination of the sexes. Their structure, now for the first time described, is as follows:—In the males they are not only very much more hairy than in the females, as pointed out by Zetterstedt, but entirely destitute of articulations, whilst in the females they are much less hairy, and distinctly composed of five joints, even without denuding them of scales, each of the joints having two short spines at the extremity of the inside. Mr. Curtis's description is therefore that of the female, and his fig. 8 that of the male fore leg, but his fig. 8 b must, I apprehend, be erroneous.



appendage; the unguis are, however, simple, acute, and strongly curved, each with an external pubescent curved and bifid appendage on the outside, and there is a large fleshy pulvillus between the unguis. The characters laid down by Entomologists for the separation of this genus from the next, appear to me by no means satisfactory; indeed, the French and Germans seem to rely chiefly on the presence or absence of silvery spots on the under side of the wings; they accordingly unite *Euphrosyne* and *Selene* with *Argynnis*, of which, indeed, they are made the types both by Hübner and Ochsenheimer, which is thus made to contain very distinct groups. The fact, however, appears to me to be that the *Fritillaries*, as these spotted butterflies are called, instead of forming two genera, constitute a number of sub-genera of equal rank. With this view I propose the following arrangement, upon external characters alone, of the British *Fritillaries*.

1. Fore wings with the anterior margin straight or slightly concave; exterior margin rounded. *Artemis*.
2. Fore wings with the anterior and exterior margins rounded; not silvery beneath. *Athalia*, *Cinxia*.
3. Anterior and exterior margins of the fore wings rounded; hind wings silvered beneath. *Euphrosyne*, *Selene*.
4. Fore wings broad with simple veins, the fore margin rounded, and the outer margin concave. *Lathonia*.
5. Fore wings broad with dilated discoidal veins in the males, and with the outer margin generally concave. *Paphia*, etc.

This distribution appears to me to be confirmed by the structure of the palpi; thus, *Artemis* and *Cinxia* materially differ from each other in this respect, although Mr. Stephens places them in the same subsection. As, however, our English species constitute two, at first sight, tolerably distinct groups, founded on a general uniformity and smallness of size, and rounded outer margin of the fore wings in *Melitæa*, and a larger size, generally accompanied by a concave outer margin to the fore wings in *Argynnis*, I shall adopt the arrangement of our English authors. In respect also to the arrangement of their wing veins, the British species form two groups; first, the *Melitæa*, in which the postcostal vein only emits one branch before joining the transverse vein, and a second at the junction of the transverse and postcostal veins, this second branch emitting three branchlets extending to the costa; and, second, the *Argynnes* (including, however, *Lathonia*), in which the postcostal vein of the fore wings emits two branches before joining the transverse vein, and a third branch at the junction of the transverse and postcostal veins, this third branch emitting two branchlets.

#### DESCRIPTION OF PLATE VIII.

- INSECTS.—Fig. 1. *Melitæa Cinxia* (the Gleanville Fritillary Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.  
 „ Fig. 5. *Melitæa Artemis* (the greasy Fritillary B.) 6. Showing the under side. 7. The Caterpillar. 8. The Chrysalis.  
 „ Fig. 9. *Melitæa Athalia* (the pearl-bordered likeness B.) 10. Showing the under side. 11. The Caterpillar. 12. The Chrysalis.  
 „ Fig. 13. *Melitæa Pyronia* (a variety of *M. Athalia*). 14. Showing the under side.  
 PLANTS.—Fig. 15. *Veronica Chamædrys* (Speedwell). 16. *Scabiosa succisa* (Devil's-bit Scabious). 17. *Calluna vulgaris* (Common Heath).  
 „ Fig. 18. *Plantago lanceolata* (Ribwort).

The plan of this work is to give as far as possible an entire genus upon each plate, so as to present the points of difference of each species in juxtaposition, without having to refer backwards and forwards, during which operation the eye can scarcely carry minute differences with sufficient accuracy for the purposes of comparison. The advantage of this arrangement is particularly shown in the present plate, containing a large portion of the genus *Melitæa*. The three species, *Cinxia*, *Athalia*, and *Artemis*, which occurring in successive pages would appear to the inexperienced eye precisely similar, are now placed side by side, and made clearly to display their differences of marking. *Cinxia*, with its range of black spots upon the border of the posterior wings; *Artemis*, with a somewhat similar range of spots, but varied by a central band of markings of a lighter colour upon both anterior and posterior wings; and *Athalia*, deprived entirely of the range of spots, thus at once appear, even without reference to the under sides, so distinct as to enable the most unpractised eye to distinguish them at a glance. The differences of the caterpillars are still more slight; but it will be perceived that that of *Cinxia* has the head and legs brown, in that of *Artemis* the legs only are brown, and it has the additional distinction of a row of white markings along the side, while in that of *Athalia* the legs and head are black and the spines only are brown. The caterpillars of *Cinxia* and *Athalia* are from Godart, that of *Artemis* from Hübner. H. N. H.





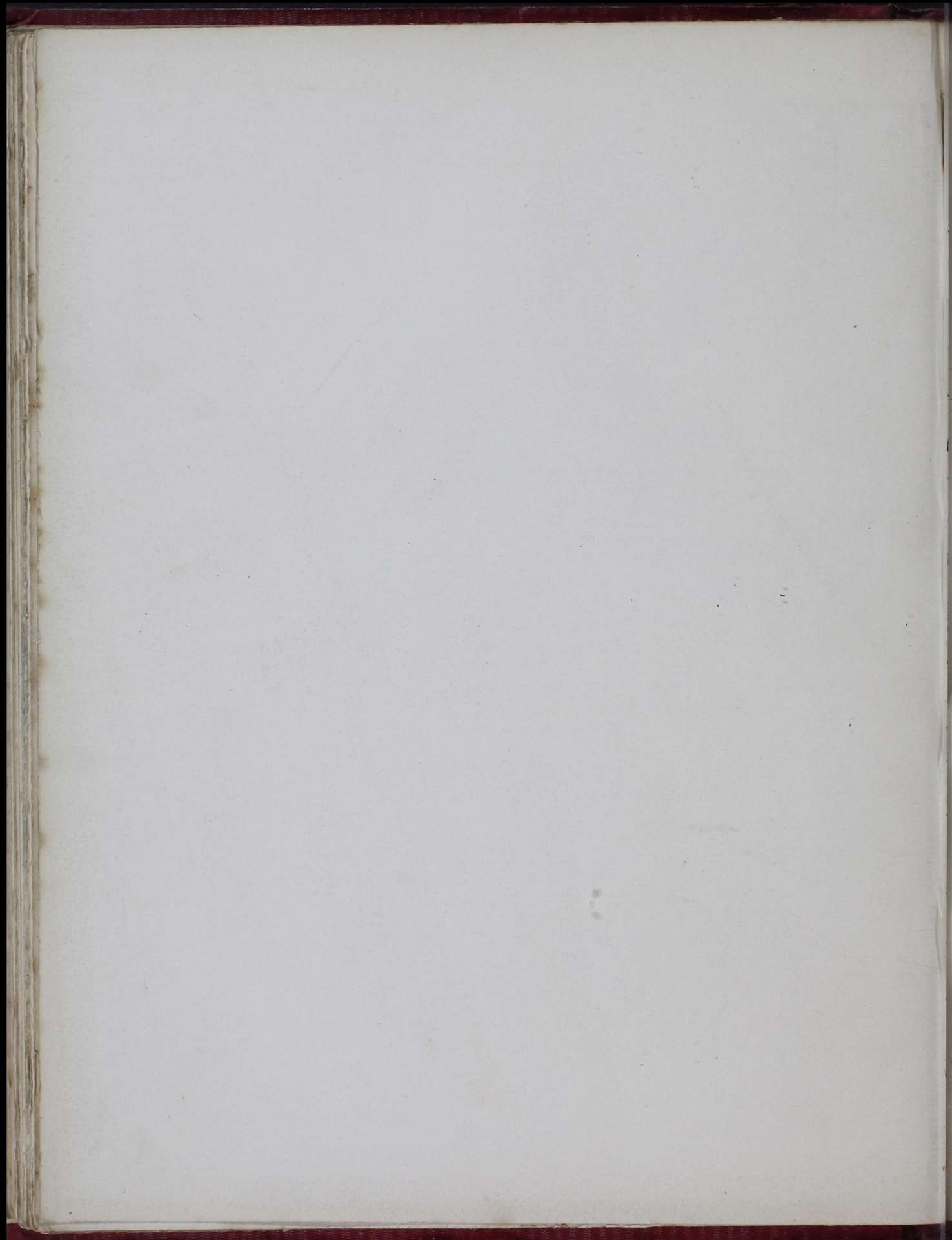














## SPECIES 1.—MELITÆA ARTEMIS. THE GREASY FRITILLARY.

Plate viii. fig. 5—8.

SYNONYMS.—*Papilio Artemis*, Fabricius, Lewin Brit. Papil. pl. 15.

Harris Aurel. pl. 28, fig. e—i.

*Melitæa Artemis*, Fabricius, Ochsenheimer, Hübner, Stephens, Duncan

Brit. Butt. pl. 13, fig. 2.

*Papilio Maturna*, Esper.*Papilio Lye*, Borkhausen.*Papilio Matutina*, Thunberg.*Papilio Lucina*, Wilkes Eng. Ins. pl. 114.

This very distinct species varies in the expanse of its wings from  $1\frac{1}{2}$  to nearly 2 inches. The wings on the upper side are of a darkish orange colour, varied especially from the base to beyond the middle of the wing with black and straw-coloured markings, which are succeeded on both wings by a broad orange bar, ornamented in the fore wings of fine specimens with a row of small straw-coloured dots, and on the hind wings with a similar row of black dots; this bar is followed by a row of black lunules, between which and the black margin of the wing is a row of orange or straw-coloured spots. The fore wings beneath are of a paler and more obscure orange colour, with the black and straw-coloured marks almost obliterated, except at the tip, which is pale. The hind wings beneath have three yellowish bands margined with thin black lines: the first near the base, irregular and oblique; the second broader and curved, in the middle of the wing; and the third composed of marginal lunules, between which and the preceding bar is a row of black dots, each surrounded with a pale circle. The specimens vary considerably in the intensity and size of the markings. One of these varieties is figured by Mr. Duncan in his British Butterflies, plate 14, fig. 2, but mistaken for *Melitæa Cinxia*. Two others are figured by Mr. Dale in Loudon's Mag. of Nat. Hist. No. 34. The fore wings have the anterior margin straight or rather slightly concave, the palpi are comparatively short, with the terminal joint nearly half as long as the preceding, and attenuated to the tip.

The caterpillar is very spiny; black above and yellowish beneath, with a row of small white dots down the back and sides, the legs are red-brown, the head and spines of the body black. It feeds on the Devil's-bit Scabious, and both the species of Plantain. When full grown it draws several blades of grass together, and fastens them at the top with threads, suspending itself, according to Moses Harris, in the centre beneath. The chrysalis is pale with dark spots. The caterpillars are hatched in the autumn, the young brood passing the winter under a common web. They are full fed in April. The chrysalis state continues about a fortnight, and the butterfly is found in the months of May, June, and July, in swampy places, and is thence called the Marsh Fritillary by Bingley. The following localities have been given for it. Near Brighton; Enborne, Berkshire; Beachamwell, Norfolk; Clapham Park, Bedfordshire; Glanville's Wootton and Dartmoor; Amble-side; Monk's Wood and Holmefen, Huntingdonshire; Eriswell, Mildenhall, and near Beccles, Suffolk; near Haverfordwest, near Durham, and near Belford, Northumberland. In profusion near Aldwinkle, Northamptonshire. Near "Coleshill, Woodstock, and Coventry." (Rev. W. T. Bree.)

*PAPILIO MATURNA* of Linnæus, a species closely allied to *Artemis*, but differing especially in the dark markings of the under side of the fore wings, and the want of the row of black dots near the margin of the hind ones, has been recorded by Stewart and others as a native species, but on insufficient authority, having been mistaken for *P. Maturna*, Fabricius, or *M. Athalia*.



SPECIES 2.—*MELITÆA CINXIA*. THE GLANVILLE FRITILLARY.

Plate viii. fig. 1—4.

SYNONYMS.—*Papilio Cinxia*, Linn. Lewin Pap. pl. 14. Donovan, pl. 242, fig. 1. Wilkes Brit. Ins. pl. 111. Harris Aurelian pl. 16, fig. a—f.  
*Melitæa Cinxia*, Ochsenheimer, Boisduval, Stephens, Curtis.  
*Schænia Cinxia*, Hübner, Verz. bek. Schm.

*Papilio Delia*, Hübner, Papil.  
*Papilio Pilosella*, Esper.  
*Papilio Trivia*, Schrank.  
*Papilio Abbacus*, Retzius.

This butterfly varies from  $1\frac{3}{4}$  to nearly 2 inches in the expanse of the wings. The upper surface of the wings is uniformly fulvous, with numerous black markings; the base and costal edge of the fore wings is black, with fulvous dots; the discoidal cell has a broad central and apical black bar, with a fulvous middle; beyond this, there are four waved bands of black, the last being marginal; the same markings exist in the hind wings, besides which there is a row of round black dots on a fulvous ground near the margin of the wing. The fore wings, beneath, are fulvous, with the black spots nearly obliterated; the apex being very pale yellow with black dots; and the hind wings have three broad and very irregular pale yellow bars edged with thin black lines, and marked with black dots, between the basal and middle one of which is an irregular fulvous bar, and between the middle and apical ones is a row of fulvous eyes, with a black dot for a pupil. The fore wings have the costal margin evidently rounded; the palpi are long, with the last joint more than half the length of the second joint, and very acute at the tip. The caterpillar is intensely black, very slightly spotted with white; the head and pro-legs fulvous. The chrysalis is brownish, with rows of fulvous tubercles on the back. The butterfly is rare. It appears in June and July (Harris says the middle of May). The caterpillars are hatched in the autumn, living in societies under a kind of tent formed by drawing together the tips of the leaves on which they feed, and covering them with a web. It is found in meadows near woods, especially in the south of England. Near Ryde and the Sand-rock Hotel, Isle of Wight; Dover, Birchwood, Dartford, Kent. It has also occurred in Yorkshire and Lincolnshire. "Once taken by Mr. Walhouse, near Leamington." (Rev. W. T. Bree.)

SPECIES 3.—*MELITÆA ATHALIA*. THE PEARL-BORDERED LIKENESS FRITILLARY.

Plate viii. fig. 9—12.

SYNONYMS.—*Papilio Athalia*, Esper.  
*Melitæa Athalia*, Ochsenheimer, Stephens, Duncan Brit. Butt. pl. 12, fig. 2.  
*Cinclidia Athalia*, Hübner, Verz. bek. Schmet.

*Papilio Dictynna*, Lewin, pl. 14, fig. 5, 6. Haworth, Jermyn, but not of Fabricius.  
*Papilio Maturna*, Fabricius, Wilkes, pl. 112. (The Heath Fritillary.)  
Harris Aurel. pl. 38, fig. f. g.  
*The White May Fritillary*, Petiver.  
*Melitæa Pyronia*, var., Hübner, Stephens (*Papilio Eos*, Haworth).

This species is nearly an inch and three quarters in expanse. The upper surface of the wings is black, the fore wings having two fulvous bars across, and one at the extremity of the discoidal cell, and with a narrow bar behind the middle of the preceding; there are also three curved rows of fulvous spots between the middle and external margin of the wing, the third of which has the markings much smaller than the two preceding bars; these markings also run across the hind wings, the base of which is black, with a very few small spots. Beneath, the fore wings are fulvous, with slight black marks indicating the situation of the principal markings on the upper side; the spots along the outer margin and at the apex are straw coloured. The hind wings beneath are fulvous at the base, which colour extends nearly to the middle of the wings; nearly at the base is an irregular bar of four straw coloured spots, succeeded by a single spot of the same colour, all having a slender edge of black; a broad curved bar of straw colour runs nearly across the middle of the wing, margined with black lines,



and having a slender black line running irregularly through it towards the base; this bar is succeeded by a row of fulvous lunules; the margin of the wing consisting also of straw-coloured lunules edged with black, and having a thin scalloped line of black running through it close to the margin.

Several varieties of this species are described by Mr. Stephens, varying in the size of the fulvous markings, whereby they either become confluent from their larger size, or are almost obliterated by the black becoming more prominent.

The caterpillar is black and spiny, with two white dotted lines on each segment, and white tubercles on the sides. It feeds on the narrow and broad-leaved plantain, and according to Wilkes on the common heath. The butterfly appears from the beginning of May to July, frequenting heaths, marshes, etc. It is rare near London, but abundant in some parts of Devonshire, Dartmoor, and near Bedford; Coombe Wood, Harley Wood, Essex; Aspley Wood, Bedfordshire; Caen Wood, Middlesex, and Faversham.

MELITÆA PYRONIA, Hübner, Stephens, or the PAPILIO EOS, Haworth, is considered by Ochsenheimer, Curtis, and Stephens to be a variety of this species. That it is not a distinct species I infer from the irregularity and want of tessellation in the markings, the typical individuals of all the Fritillaries being more or less distinctly tessellated. Our figures, plate 8, fig. 13, 14, are copied from representations of this beautiful insect given by Mr. Stephens (Illust. Haust. pl. 4\*, fig. 1, 2). The specimen figured was taken by Mr. Howard at Peckham in June, 1803, and is rather more than an inch and a half in expanse, with the fore wings above deep fulvous; the veins, blotches in the middle; a waved streak and marginal band black; hind wings above black, with a waved bar of six fulvous spots beyond the middle; beneath, the fore wings are fulvous, but paler at the tips, with two black spots at the base, and a broad black bar in the middle divided by fulvous veins, and with a row of black lunules near the margin; hind wings fulvous at base, with about eight confluent black patches; the middle of the wing occupied by a broad whitish band, intersected by blackish veins, followed by a row of fulvous lunules with black edgings; the outer margin straw coloured, with a row of ochraceous lunules in the middle.

PAPILIO TESSELLATA, *serotina subtus straminea*, or the Straw May Fritillary of Petiver (Papil. pl. 3, fig. 11, 12, and our plate 9, fig. 13, 14), is also now considered by Stephens and Curtis as a variety of *P. Athalia*. In Petiver's time it was "pretty common in Caen Wood," where *Athalia* also occurred. It is paler above than that species, and the fore wings are more fulvous beneath; the hind wings beneath are entirely straw coloured, with black veins; at the base are three large yellow spots edged with black; a broad curved fascia of straw-yellow runs across the middle of the wings, edged with black, and with an irregular black line running through the middle of it; this is succeeded by a row of black lunules, and the margin is straw-yellow with a black vandyked line running along it.

#### DESCRIPTION OF PLATE IX.

INSECTS.—Fig. 1. *Melitæa Selene* (small pearl-bordered Fritillary Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.

" Fig. 5. *Melitæa Dia* (the small purple Fritillary B.) 6. Showing the under side. 7. The Caterpillar.

" Fig. 8. *Melitæa Euphrosyne* (the pearl-bordered Fritillary B.) 9. Showing the under side. 10. The Caterpillar.

" Fig. 11. A dark variety of *M. Euphrosyne*.

" Fig. 12. A variety of *M. Euphrosyne*, with pale under side. (The *Thalia* of Haworth.)

" Fig. 13. *Melitæa Tessellata*. 14. Showing the under side.

PLANTS.—Fig. 15. *Viola Tricolor* (Heartsease). 16. *Viola Canina* (Dog's violet).

Two of the insects figured in this plate, *M. Selene* and *M. Euphrosyne*, are so much alike on the upper side, that it is difficult in a drawing to render them very distinct. The two individuals from which the drawings were made were indeed somewhat different in colour, but that is not a constant difference,



and can therefore be no guide. The markings, however, on the posterior wings are somewhat different, those of *Selene* being of a rather more regular character, and the dot near the base round and distinct, whilst in *Euphrosyne* it is almost always shaded off indistinctly into the dark colour at the base of the wing. I have noticed also, and endeavoured to have it expressed in the plate, that the rings of white upon the antennæ are broader in *Selene*, giving them a lighter and more checkered appearance. But though there is some difficulty in distinguishing the insect on the upper side, it will be seen that the under sides are very dissimilar. Both specimens are from the collection of Mr. Westwood. The caterpillars are from Hübner. The dark variety of *Euphrosyne*, which on the other side is the same as in ordinary specimens, is from the collection of Mr. Westwood, and the pale variety is the one figured by Mr. Stephens. *Melitæa Dia*, the *Petite Violette* of the French, so called from the beautiful purple blush that suffuses the posterior wings on the under side, is from the specimen in the collection of Mr. Stephens, and the caterpillar likewise from Hübner.

*Melitæa Tessellata* is from the old and somewhat coarse etching of Petiver, and perhaps does not convey a very accurate idea of the insect, but I have been induced to give it, in order that this and the preceding plate might contain all the small Fritillaries reputed British. H. N. H.

#### SPECIES 4.—MELITÆA SELENE. THE APRIL OR SMALL PEARL-BORDERED FRITILLARY.

Plate ix. fig. 1—4.

SYNONYMS.—*Papilio Selene*, Fabricius, Haworth.

*Melitæa Selene*, Stephens. Curtis Brit. Ent. pl. 386. Duncan Brit. Butt. pl. 13, fig. 3. (*M. Silene*.)

*Argynnis Selene*, Ochsenheimer, Boisduval, Hübner, Verz.

*Papilio Euphrasia*, Lewin Pap. pl. 13.

*Papilio Euphrosyne*, var., Esper. Harris Aurelian, pl. 31, fig. i—k.

*Papilio Thalia*, var., Hübner, Haworth.

This species varies in its expanse from  $1\frac{3}{4}$  to nearly 2 inches. It is fulvous on the upper side, spotted with black; four irregular bars run across the discoidal cell, succeeded first by a single spot extending from the costa, and then an interrupted row of four spots, then a row of seven small round black dots, and a row of black lunules reaching to the margin, which is edged with black; the hind wings are similarly marked beyond the middle, but the base is black, with numerous fulvous angular-shaped marks, amongst which a spot on the centre of the discoidal cell, with a round black dot in the middle, is most conspicuous. The fore wings on the under side are nearly marked as above, except that the spots are smaller, and the apex is varied with ferruginous and straw coloured; the hind wings beneath are most beautifully tessellated with white, straw colour, buff, dark ferruginous, and silver, the several markings being edged with black lines, and the veins being black. The red mark in the middle of the discoidal cell, with a black dot in the centre, is here conspicuous, succeeded by an oblong silvery patch, between which and the outer angle are three smaller silvery patches, there being also a marginal row of six wedge-shaped silvery marks on the outer margin. The hind wings, as shown in our figures 2 and 9, are much narrower than in *M. Euphrosyne*; so that the space between the longitudinal veins is narrower, and the markings consequently not so broad.

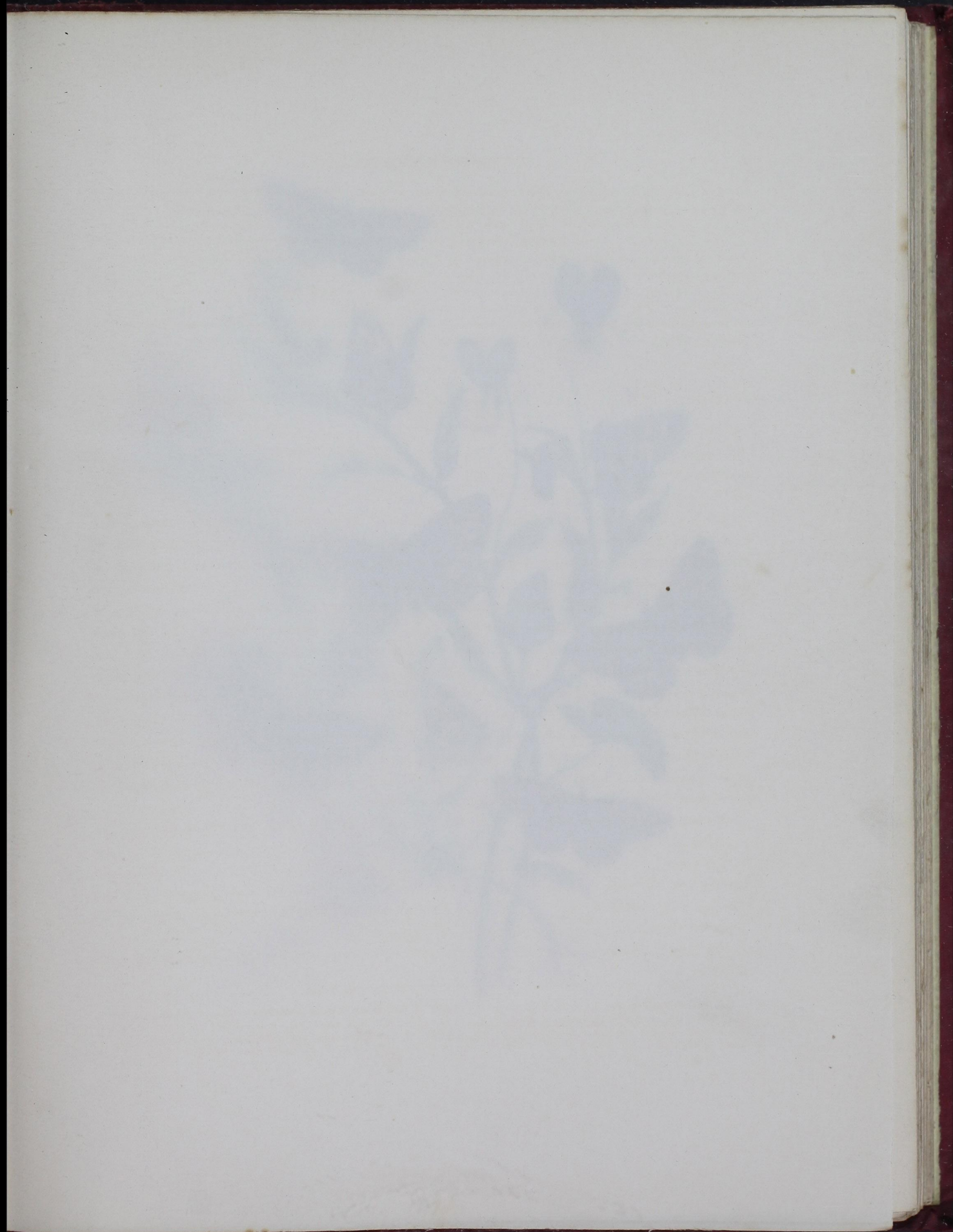
The caterpillar is black, with a pale lateral stripe; the spines are half yellow, and two on the neck are larger than the rest, and project forwards. The chrysalis is dirty greyish coloured.

This species is common in various places in the south of England; Dartmoor, Lyndhurst, Newcastle, and Durham have also been mentioned as its localities. It frequents heaths and waste grounds. Although occasionally captured in May and July, the beginning of June appears to be the period for the exclusion of the first brood, the second being produced in August and September.\*

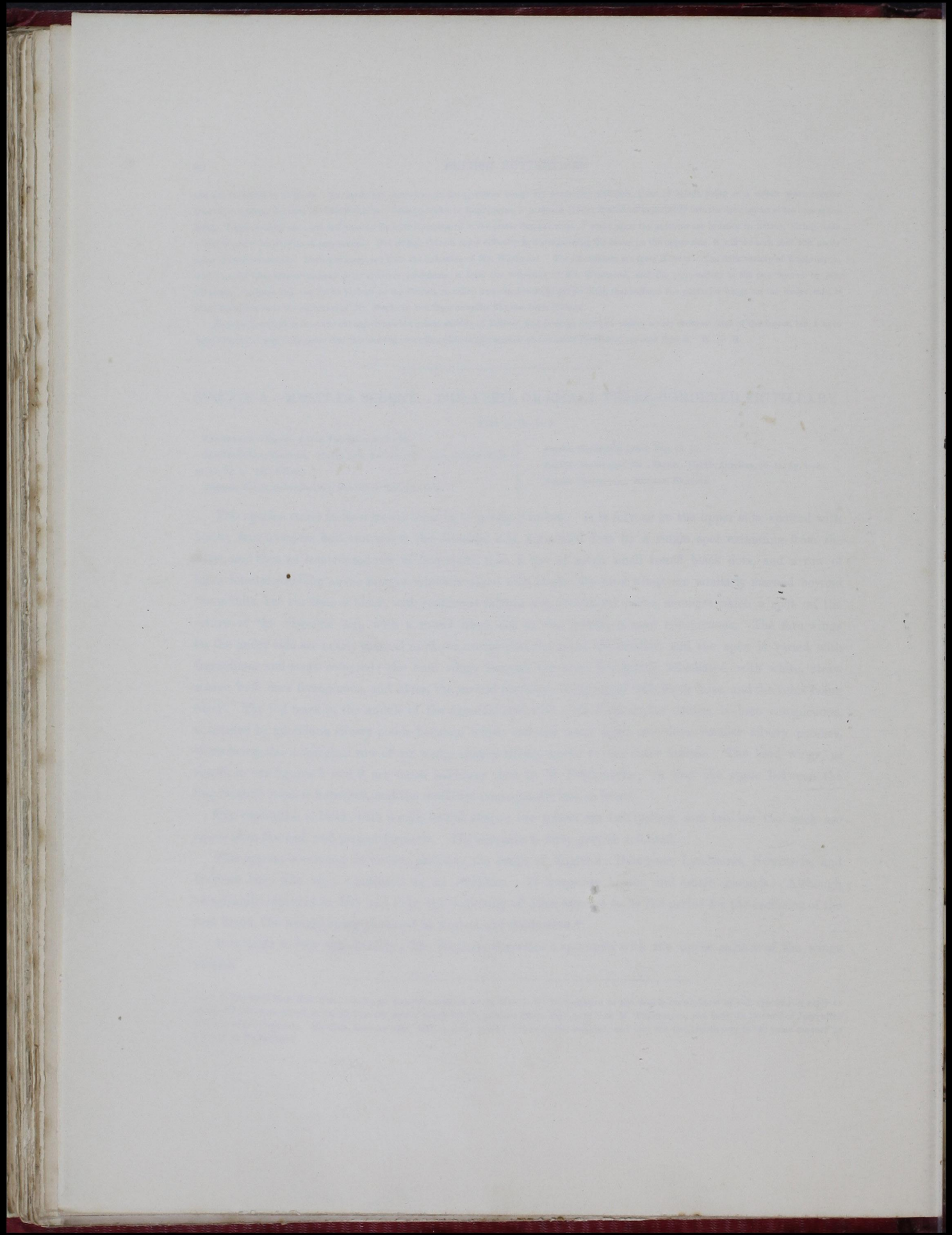
It is liable to vary considerably; Mr. Stephens describes a specimen with the upper surface of the wings whitish.

\* In London's Mag. Nat. Hist., No. 21, are some observations by the Rev. T. W. Bree relative to the double-broodedness of this species; in reply to which, Mr. Newman stated, in No. 22, that this species appears in the summer fifteen days later than *M. Euphrosyne*, and lasts till the end of July, after which it never reappears. Mr. Dale, however (Ent. Mag. 1, 357), speaks of it as double-brooded, and that the two broods vary in the same manner as those of *M. Euphrosyne*.





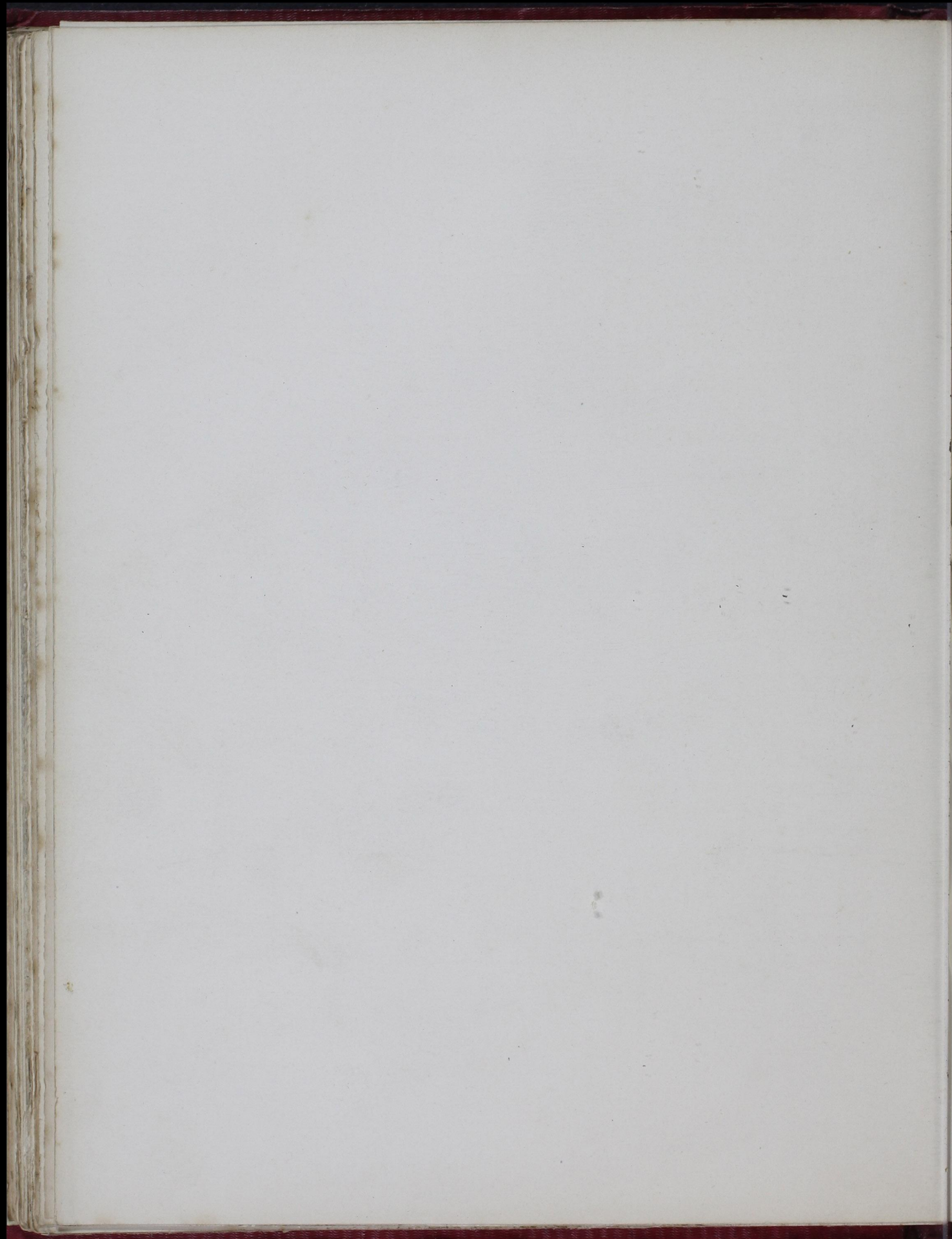














*PAPILIO THALIA* of Hübner and of Haworth is also considered by Mr. Stephens as an accidental variety of this species, although it has been questioned whether the *Thalia* of Haworth may not be a variety of *Euphrosyne*. The latter variety is copied, in our plate 9, fig. 12, from Mr. Stephens's figure, drawn from Mr. Haworth's specimen, and is thus described by Mr. Stephens:—"Wings above, pale fulvous, irregularly spotted with black; anterior, beneath, pale, varied with yellowish and ferruginous towards the tips, with some obsolete black and dusky spots on the disc; posterior wings variegated with ferruginous, yellowish, and greenish, with the pupil of the ocellus very large; the discoidal silvery spot produced to the hinder margin, and the usual marginal spots lengthened inwardly; the usual fasciæ are obliterated, but the silvery spot at the base is somewhat apparent."

#### SPECIES 5.—*MELITÆA EUPHROSYNÆ*. THE PEARL-BORDERED FRITILLARY.

Plate ix. fig. 8—10.

SYNONYMES.—*Papilio Euphrosynæ*, Linnaeus. Lewin Pap. pl. 13, Donovan, pl. 312.

*Melitæa Euphrosynæ*, Leach, Stephens, Curtis, Duncan Brit. Butt. pl. 15, fig. 2.

*Argynnis Euphrosynæ*, Ochsenheimer, Boisduval, Hübner (Verz.) Harris Aurelian, pl. 40, fig. c, f.

This species is closely allied to the last, but is rather larger, varying from  $1\frac{3}{4}$  to nearly 2 inches, and having the hind wings far less strikingly variegated on the under side. The upper side of all the wings so closely resembles those of *M. Selene*, that no further description is required of them; the under side of the fore wings is also similar to that of the same species, but the black markings are not so distinct, and the apex of the wing has the buff much deeper and the ferruginous marks much paler. The hind wings, beneath, have all the markings much less distinct than the *Selene*, there being moreover only one small patch towards the base, a large spot at the apex of the discoidal cell, and seven marginal wedge-shaped marks of silver. The centre of the discoidal cell is rusty red, with a yellowish spot in the centre, having a black dot in the middle; between the central and marginal silvery spots is a row of round rusty red dots.

Mr. Stephens mentions several varieties of this species; in one of which the silvery marginal spots are wanting; another, with "the basal half of all the wings, above, black, spotted with fulvous, with large black spots on the anterior wings beneath," seems in some degree to resemble the specimen figured in our plate 9, fig. 11, from my collection, in which all the black markings on the upper side of the fore wings are suffused, except the row of submarginal round spots; the markings on the hind wings are somewhat more distinct. The under side scarcely differs from typical individuals. The Rev. Mr. Bird possesses another variety nearly white.

This species is the most abundant of all the Fritillaries, especially in woods in the southern parts of the kingdom; it is also found plentifully in various parts of Scotland. The larva is black and spiny, with two rows of orange dots on the back.

It feeds on various kinds of violet, and there are two broods in the year, the butterfly first appearing in May, and again at the beginning of autumn.\*

\* The Rev. W. T. Bree published some observations relative to the double-broodedness of this species, in London's Mag. of Nat. Hist. No. 21, in reply to which, Mr. Newman, in the next number of the same work, stated that at Birch Wood, Kent, this butterfly appears at the end of May by thousands, and lasts till the end of June, but that it never reappears afterwards. Mr. Dale, however (Ent. Mag. 1, 357), speaks of it as double-brooded, and states that the spring brood varies very much in its markings, and that the September brood varies in colour, being much yellower.



## SPECIES 6.—MELITÆA DIA.

Plate ix. fig. 5—7.

SYNONYMES.—*Papilio Dia*, Linnæus, Stewart, Turton.*Melitæa Dia*, Stephens, Jermyn. Loudon's Mag. Nat. Hist. vol. v. 751, fig. 124.*Argynnis Dia*, Ochsenheimer, Hübner (Verz.)

This species, which is also closely allied to *M. Selene*, is about an inch and three-quarters in expanse. The upper surface of both pairs of wings has the black spots and markings larger and stronger, the base of the posterior being nearly black; so that the whole assumes a darker appearance than in *M. Selene*. But the principal difference consists in the under side of the posterior wings, which are of a brownish purple, interspersed with darker markings of the same colour, and numerous irregular semi-metallic spots; of which there are six or seven of small size at the base, intermixed with minute yellowish dots; a band composed of silvery and yellowish spots; then a purplish white streak, in which is a series of circular spots slightly pupillated; and, finally, in the margin is a series of silvery lunules.

The caterpillar is black, with the spines white and reddish; the back greyish, with a longitudinal line. It feeds on the *Viola odorata*, and there are two broods in the year.

Stated to have been found by Mr. Weaver several times in Sutton Park, near Birmingham, and also near Alderley, in Cheshire, by Mr. Stanley; but doubts being entertained as to the correctness of these statements, the species is placed amongst the doubtful natives by Mr. Stephens, in the British Museum Catalogue.

## GENUS X.

## ARGYNNIS,\* FABRICIUS.

Referring to the observations under the genus *Melitæa*, relative to the characters of that and the present genus, we may define this to be distinguished chiefly by the larger size of the insects, the silvery spots which ornament the under side of the wings, which are broad and of ample size, the ordinarily concave posterior margin of the fore wings, the tessellated appearance of their upper surface, and the dilatation of the branches of the median and the anal vein of the fore wings in the males of most of the species. The antennæ are terminated by a suddenly-formed broad compressed, or rather spoon-shaped, club; the head is broad, the eyes are large and naked, the fore legs rudimental.† The unguis of the four posterior tarsi are formed as in *Melitæa*, and their structure has been carefully illustrated in the Crochard edition of the *Règne Animal*, Insectes, plate 135. I have purposely omitted all mention of the form of the palpi in the above characters, as this character does not appear to me of any value in separating the Fritillary butterflies into two genera, the true types of *Melitæa*, or those without silvery spots, having the terminal joint as large and acute as it is in the typical *Argynnes*, whilst Mr. Stephens has observed that *Lathonia* and *Euphrosyne* agree together in their palpi. *Lathonia* moreover differs from the other *Argynnes* in several other important respects, so that it must evidently be regarded as an intermediate form: I therefore place it at the head of the genus, in order that it may be brought into connection with the silvery spotted *Melitæa*.

\* A fanciful name, being one of the denominations of Venus (Vollm. *Vollst. Wörterb. der Mythol.* Stuttg. 1836).

† The fore legs are described by Curtis as "alike in both sexes." They differ, however, in the sexes, in the same manner as the fore legs of *Melitæa*, described in a preceding page. I have represented their structure in *P. Paphia*, in my *Introd. to Mod. Classific.* vol. ii. p. 353, fig. 98, 4, 5, 6, 7.





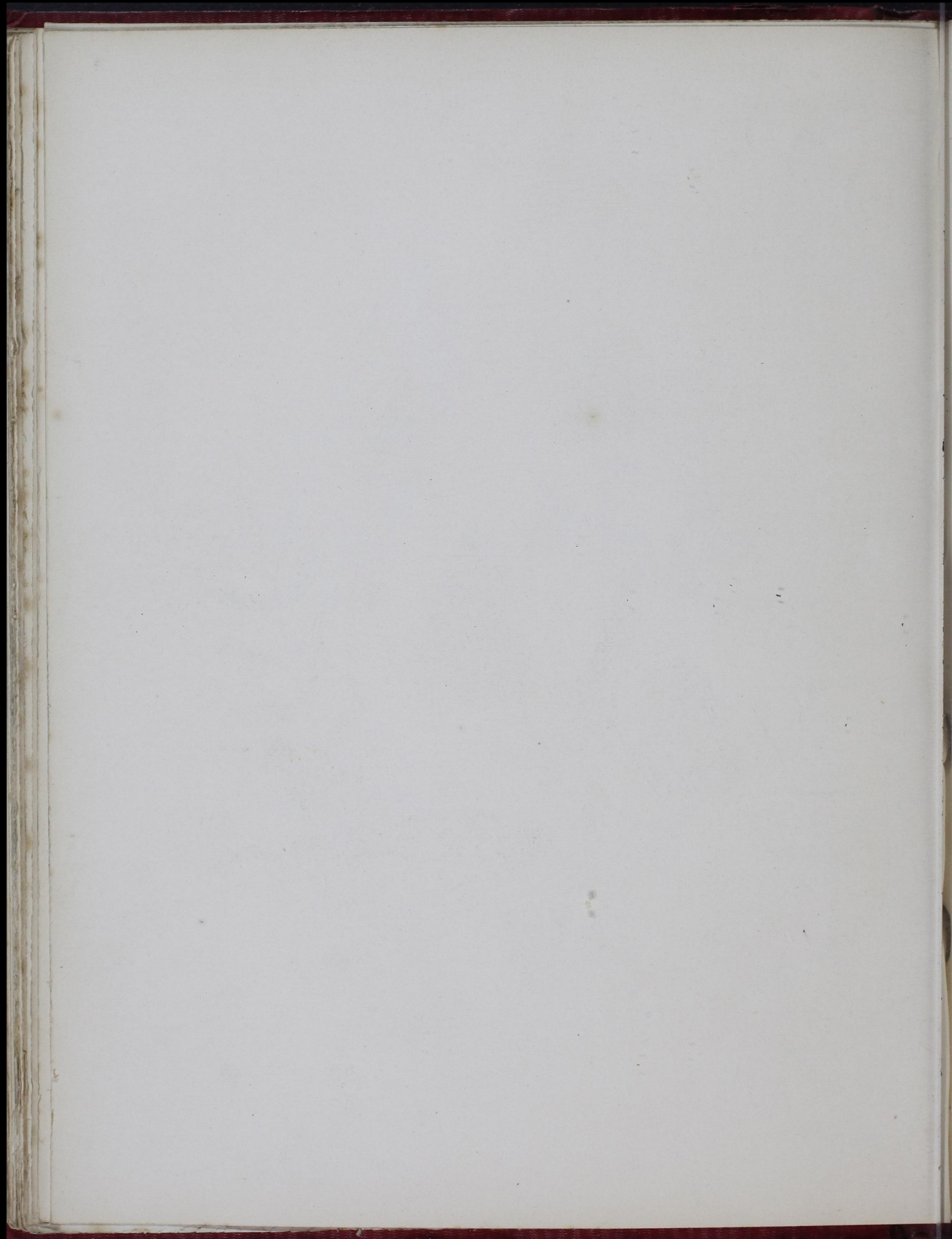














## DESCRIPTION OF PLATE XI.

INSECTS.—Fig. 1. *Argynnis Adippe*, female (the high-brown Fritillary Butterfly). 2. Showing the under side. 3. The Caterpillar.

„ Fig. 4. *Argynnis Lathonia* (the Queen of Spain Fritillary B.). 5. Showing the under side. 6. The Caterpillar. 7. The Chrysalis.

PLANTS.—Fig. 8. *Onobrychis sativus* (the Common Sainfoin). 9. *Anchusa officinalis* (the Alkanet).

I have not thought it worth while to give both male and female of *A. Adippe*, as they are very similar, the male being merely a little smaller, of a somewhat richer colour, and having two of the nervures of the anterior wings slightly thickened. At first sight, the insect appears very like *A. Aglaia*, but, upon examination, it will be found that the markings are much more open; and on the under side the difference is rendered more distinct by the brown ocellated spots of the posterior wings, in which it more nearly resembles *A. Lathonia*. *A. Lathonia* is, however, very distinct from every other species of this genus, both by the fine regular spotting of the wings on the upper side, and also by the profusion of metallic marks on the under side of the posterior wings, which in some brilliant varieties taken on the Continent, form one united plate of silver. *A. Lathonia* is from a specimen in my own possession; *A. Adippe* from the collection of Mr. Westwood; and the caterpillars are from Godart. H. N. H.

## SPECIES 1.—ARGYNNIS LATHONIA. THE QUEEN OF SPAIN FRITILLARY.

Plate xi. fig. 4—7.

SYNONYMS.—*Papilio Lathonia*, Linnæus, Lewin pl. 12. Donovan Brit. Ins. vol. iii. pl. 73.

*Argynnis Lathonia*, Fabricius, Ochseneheimer, Leach, Stephens, Curtis, Duncan Brit. Butt. pl. 16, fig. 2.

*Issoria Lathonia*, Hübner (Verz.)

*Papilio Principissa*, Linnæus, Olim.

*Papilio Latonia*, Denn. and Schiff. *Argynnis Latonia*, Zetterstedt.

*Papilio Lathona*, Hübner (Schm. Eur.)

This exquisite insect is generally about two inches in expanse. The upper surface of the wings is fulvous orange, with numerous very distinct and mostly rounded black spots; those of the apex of the fore wings uniting with the dark margin, and enclosing several small paler buff patches. The anal and median veins are not dilated in the males. Beneath, the fore wings are marked nearly as above, except that the apex of the wing has a broad ferruginous patch, at the base of which is a silvery spot, succeeded by two small eyes, between which and the margin are several oval silver patches; the hind wings on this side are pale buff, varied with reddish brown, ornamented with numerous silvery patches, varying greatly in size and form, of which there are about fourteen between the base of the wings, and a row of seven dark brown ocelli with silvery pupils, between each of which and the margin of the wing is a large silvery patch.

The caterpillar, according to Godart, is greyish brown, with a white dorsal line spotted with black, and with two brownish yellow lines on the sides; the spines and legs pale yellow; it feeds on heartsease, sainfoin, and borage. The pupa is varied with brownish and greenish, and ornamented with metallic spots. The perfect insect appears in August and September; but, according to Godart, the later specimens survive the winter, and again appear in spring. Mr. Dale says there are two broods (Ent. Mag. i. 356). By Petiver it is recorded as occurring again in May; but Mr. Stephens's specimens captured in the middle of August were much faded, so that he is led to believe that the species is double-brooded. This butterfly, although still accounted a great rarity, occurs in numerous situations wide apart. The following are some of its localities:—Gamlingay, Cambridgeshire; Stoke-by-Nayland, near Wisbeach; Halvergate, Norfolk; Battersea Fields, Dover, Colchester; Birch Wood, Kent; Hertford.

## SPECIES 2.—ARGYNNIS ADIPPE. THE HIGH-BROWN FRITILLARY.

Plate xi. 1—3.

SYNONYMS.—*Papilio Adippe*, Linnæus, Esper, Lewin Pap. pl. 30. Donovan Brit. Ins. pl. 448. Harris Aurelian, pl. 23, fig. a—d.

*Argynnis Adippe*, Fabricius, Ochseneheimer, Stephens, Duncan Brit.

Butt. pl. 16, fig. 1.

*Acidalia Adippe*, Hübner (Verz.)

This species varies in the expanse of the wings from  $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches. The upper surface is uniformly of a



rich fulvous orange, except at the base, which is greenish, with numerous black markings, many of which assume a crescent shape, especially the row running near the outer margin of the wing, and which are united to two slender marginal black lines. The fore wings in the males have the two inner branches of the median veins strongly dilated in the middle, the anal vein being scarcely dilated. The under side of the fore wings almost resembles the upper, except that the spots towards the apex of the wing assume a rich brown colour, some being marked with silver spots. The hind wings are on this side varied with buff, ferruginous, and brown; at the base are about seven silvery patches, disposed somewhat in a circle, beyond which is an irregularly curved row of about nine or ten silvery patches, varying in size, succeeded by a row of rusty red spots, some of which have the centre silvery; there is also a row of seven submarginal silvery wedge-shaped spots. In both sexes the outer edge of the fore wings is slightly concave.

Several varieties of this species have been observed, in which the spottings of the wings become more or less confluent.

The caterpillar is at first red, but subsequently olive green, with a white line down the back, and white spots on the sides. It feeds on the heartsease and sweet violet. The chrysalis is reddish, with silvery spots. This state lasts about a fortnight: the butterfly appears at the end of June or beginning of July. The butterfly frequents heaths and the borders of woods, and is far from uncommon in most of the southern counties of England.

Godart, Ochsenheimer, and Curtis consider it doubtful whether this insect be the *P. Adippe* of Linnæus, considering that the *A. Niobe* of Hübner, etc., is the true *Adippe*. Professor Zetterstedt has, however, shown the correctness of the ordinary opinion respecting the names of this species. The true *Niobe*, which Stewart gives as British, and of which Mr. Dale possesses a specimen, which he obtained from the professedly indigenous collection of Dr. Abbot, is indeed very similar to our common *Adippe*, but it is rather smaller, with the base of the wings above more dusky, and the posterior beneath much more strongly variegated with yellow (or rarely silver) spots; but a more important character is the very slight incrassation of the veins of the fore wings of the males.

#### DESCRIPTION OF PLATE X.

INSECTS.—Fig. 1. *Argynnis Paphia*, male (the silver-washed Fritillary Butterfly). 2. The Female. 3. Showing the under side. 4. The Caterpillar. 5. The Chrysalis.

„ Fig. 6. *Argynnis Aglaia*, male (the dark green Fritillary B.) 7. The Female. 8. Showing the under side. 9. The Caterpillar. 10. The Chrysalis.

PLANTS.—Fig. 11. *Rubus Idæus* (the Raspberry). 12. *Viola odorata* (the Sweet Violet).

This plate contains only two species, but as they are two of the most remarkable and distinct of the larger Fritillaries, I have thought it advantageous to give three figures of each, particularly as the males and females present such differences of marking and colour as might lead the young collector to consider them as different species. The male of *A. Paphia*, it will be seen, is of a much brighter colour than the female, and the nervures of the anterior wings are thickened into broad black stripes, not found in the female.

The male of *A. Aglaia*, on the contrary, is not so fine an insect as the female, which is not only larger but more strongly marked; and the rounded spots enclosed by the black crescents of the border of the posterior wings are of a lighter and brighter tone than the ground-colour. In the males these spots are the same as the ground-colour, which is generally somewhat richer than the female. The male and female of both species are from specimens in the collection of Mr. Westwood, and the caterpillars are from Hübner. H. N. H.





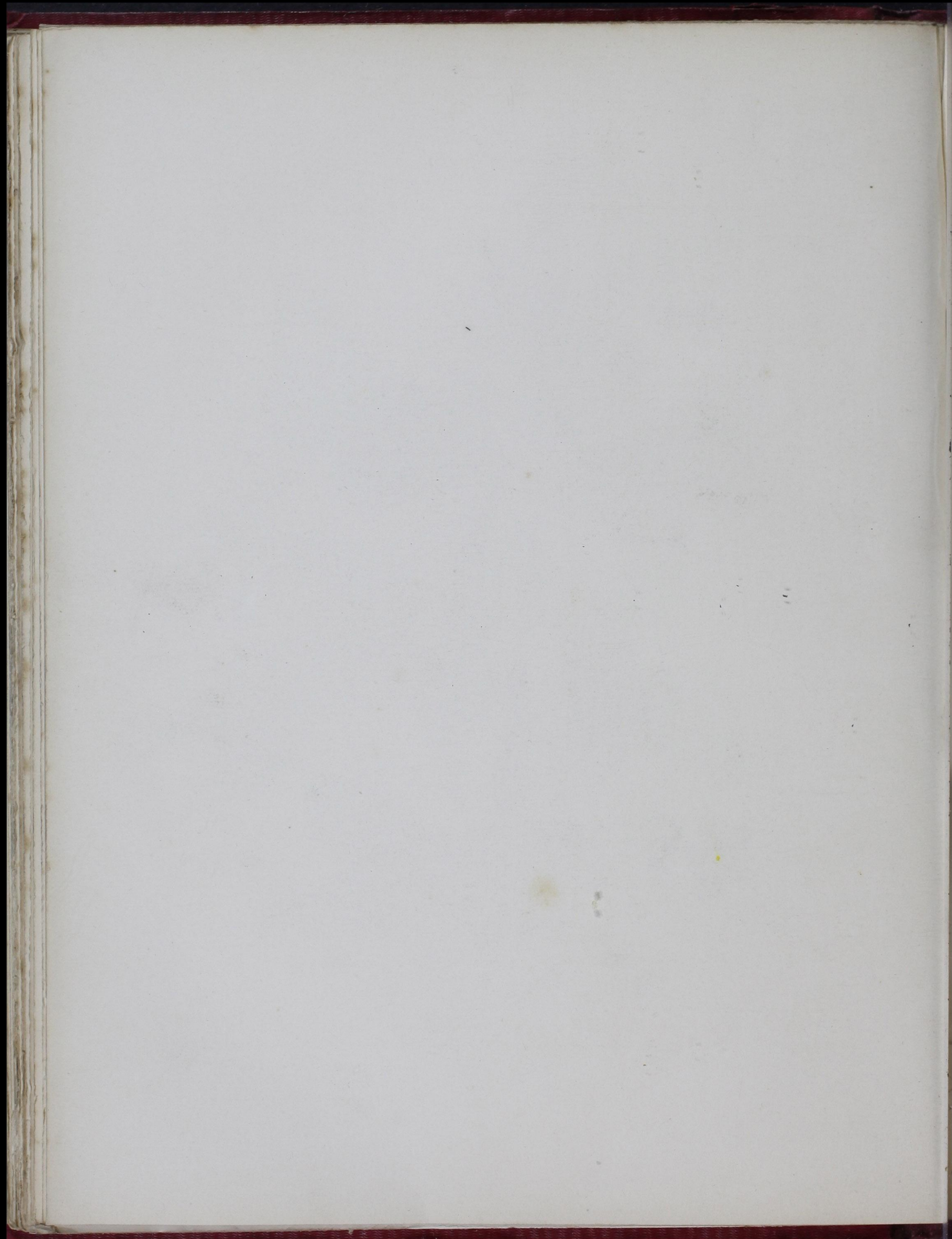














## SPECIES 3.—ARGYNNIS AGLAJA. THE DARK GREEN FRITILLARY.

Plate x. fig. 6—10.

SYNONYMS.—*Papilio Aglaja*, Linnæus. Lewin Pap. pl. 11. Donovan,  
pl. 302. Wilkes, pl. 115. Harris Aurelian, pl. 26, fig. o, p.  
*Argynnis Aglaja*, Ochsenheimer, Stephens, Jermyn, Duncan Brit. Butt.  
pl. 15, fig. 1.

*Acidalia Aglaja*, Hübner (Verz.)  
*Papilio Emilia*, Acerbi.  
*Papilio Charlotta*, var., Haworth.

This species is closely allied to the preceding, which it very much resembles, especially on the upper side of the males, differing, however, in several characters which do not appear to have been previously attended to. The two inner branches of the median vein are much more slightly dilated in the males, the anal vein being on the contrary more strongly dilated; the outer margin of the fore wings in the males is almost straight, or scarcely perceptibly concave, whilst that of the females is distinctly rounded, and the hind wings are destitute beneath of the rich-coloured row of eyes between the two outer rows of silvery spots (?); it is, occasionally, also rather wider in expanse of the wings than *A. Adippe*. The general colour is also paler, with the marginal band darker coloured. The females are much paler than the males, with the submarginal row of spots above still paler. Beneath, the hind wings are varied with green and yellow, with about seven silvery spots at the base, an irregular row of seven silver spots beyond the middle of the wing, and a row of seven submarginal transverse spots of silver, bordered above with greenish crescents.

*PAPILIO CHARLOTTA* of Haworth (Lep. Brit. p. 32; Sowerby Brit. Misc. pl. 11; Bree in Loudon's Mag. of Nat. Hist. vol. v. p. 750; Arg. Caroletta, Jermyn), represented in our pl. 12, fig. 1, 2, is regarded by Stephens and Curtis as a variety of this species, differing from it in having two of the costal spots on both sides of the fore wings united, and only nineteen instead of twenty-one silvery spots on the under side of the hind wings, several of the ordinary spots at the base being confluent.

Several specimens of another still more striking variety (at first given by Stephens as a variety of *Adippe*) have also been captured, in which the upper surface of the fore wings is almost entirely of a dark brownish black, except a black linear fulvous mark, and beyond it a much smaller mark of the same colour; with a row of faint tawny spots running parallel with the hinder margin. The hinder wings have the markings considerably more distinct. Beneath, the ground-colour of the fore wings is dark ferruginous, and that of the hind wings pea green, with twenty-one silvery spots. This variety has been figured by Curtis (Brit. Ent. pl. 290), and by the Rev. W. T. Bree (Loudon's Mag. Nat. Hist. vol. v. p. 749), and has been taken near Ipswich and Birmingham. Mr. Curtis mentions a variety intermediate between this and the preceding, and in the Magazine of Natural History (No. 26) a pale buff-coloured variety is mentioned with the spots and markings very faint.

The caterpillar is blackish, with a whitish line down the back and another at the side, above which is a row of eight small red spots. It feeds on the dog's violet. The perfect insect appears in July and August. It is a common species, and is found throughout the whole kingdom, frequenting heaths, meadows, woods, and downs.

## DESCRIPTION OF PLATE XII.

INSECTS.—Fig. 1. *Argynnis Charlotta* (a variety of *A. Aglaja*). 2. Showing the under side.

„ Fig. 3. *Argynnis Paphia* (a beautiful female variety).

„ Fig. 4. *Argynnis Aphrodite*. 5. Showing the under side.

PLANTS.—Fig. 6. *Viola lutea* (the wild yellow Heartsease).

As the Fritillaries are remarkable for accidental variations of colours and markings, I have devoted this plate to two of the most striking varieties known in England. *A. Charlotta*, which some consider a distinct species, appears something between *A. Aglaja* and *A. Adippe*; it, however, most strongly resembles



Aglaja, particularly on the under side. It differs from both in having one of the numeral figures on the costa of the anterior wings (which in the former species are said to resemble 1536) obliterated by its confluence with the next; and on the under side, the six basal silver spots of the posterior wings of Aglaja are in *A. Charlotta* united into three larger ones. These characteristic differences are constant in different individuals, which seems to entitle *A. Charlotta* to rank at all events as a sub-species. Specimens taken recently by Mr. Weaver at Sutton Park, and near York, agree perfectly in these characters. The variety of *A. Paphia* is from the specimen in the British Museum taken by Mr. Dale forty years ago, which is I believe unique.

*A. Aphrodite* having been captured in England, I have thought it well to give a figure of it also in this place, though I do not consider it a British insect. Its having been captured at Upton Wood is no proof of its indigenous character; a splendid Brazilian insect was recently caught in the conservatories of Messrs. Loddiges of Hackney, imported no doubt in its preparatory state in a parcel of plants; and I know a fine collection of exotic beetles all caught alive in the London Docks. H. N. H.

#### SPECIES 4.—ARGYNNIS APHRODITE.

Plate xii. fig. 4—5.

SYNONYMS.—*Papilio* (*Nymph.*) *Aphrodite*, Fabr. Ent. Syst. 3, p. 144.

*Argynnis Aphrodite*, Bree in Mag. Nat. Hist. 2nd Ser. vol. iv. p. 131. Suppl. Illust. pl. 10.

An account of the capture of a specimen of this North American insect having recently appeared, we have added a figure of it, without, however, wishing thereby that it should be inferred that the species in question is a native of our island. The specimen described by Mr. Bree is represented in the plate above referred to as being nearly  $3\frac{1}{4}$  inches in expanse. It is described by him as being of a rich fulvous colour, chequered and spotted with black on the upper surface. The black spots and markings on the second pair of wings are neither so large nor so strongly developed as in the corresponding wings of *A. Paphia*, *Aglaja*, and *Adippe*, to which latter species it more nearly approaches on the under surface; having the second pair of wings adorned with numerous silver spots on a buff-coloured ground, which is dark towards the base of the wings and becomes lighter towards the outer extremities, with a marginal row of semicircular silver spots. From Mr. Bree's account, there appears to be no reason to doubt that the insect in question was taken by James Walhouse, Esq., of Leamington, in Upton Wood, a few miles from that town, in the summer of 1833, and was presented to Mr. Bree's son, in whose possession it now is, by Moreton J. Walhouse, Esq., the brother of the captor. Mr. Bree considers that this specimen could neither have been imported from America nor have flown across the Atlantic. It appears to me, however, not improbable that it might have been imported either in the egg or chrysalis state from America attached to American plants. In a subsequent page of the same volume, Mr. Bladon mentions his having seen a *Fritillary* near Pontypool, which he conjectures must have been this species.

There are several very closely allied American species, including the present—if, indeed, they are not merely varieties of each other. I mention this because the specimens of *Aphrodite* in the British Museum are larger than the figure above referred to.

#### SPECIES 5.—ARGYNNIS PAPHIA. THE SILVER-WASHED FRITILLARY.

Plate x. fig. 1—5.

SYNONYMS.—*Papilio Paphia*, Linnaeus. Lewin Pap. 9. Donovan, 7, pl. 247. Wilkes, pl. 110. Harris Aurelian, pl. 34, fig. k—n.

*Argynnis Paphia*, Fabricius (type species), Ochsen., Stephens, Curtis, Duncan Brit. Butt. pl. 14, fig. 1.

*Argyronome Paphia*, Hübner (Verz. d. bek. Schmett.)

This is the largest of our strictly British *Fritillaries*, varying from  $2\frac{3}{4}$  to 3 inches in the expanse of the wings, which are of a fulvous colour in the male on the upper side, but paler and tinged with greenish in the female, with numerous black spots and bars, there being three distinct rows of spots along the outer margin, the







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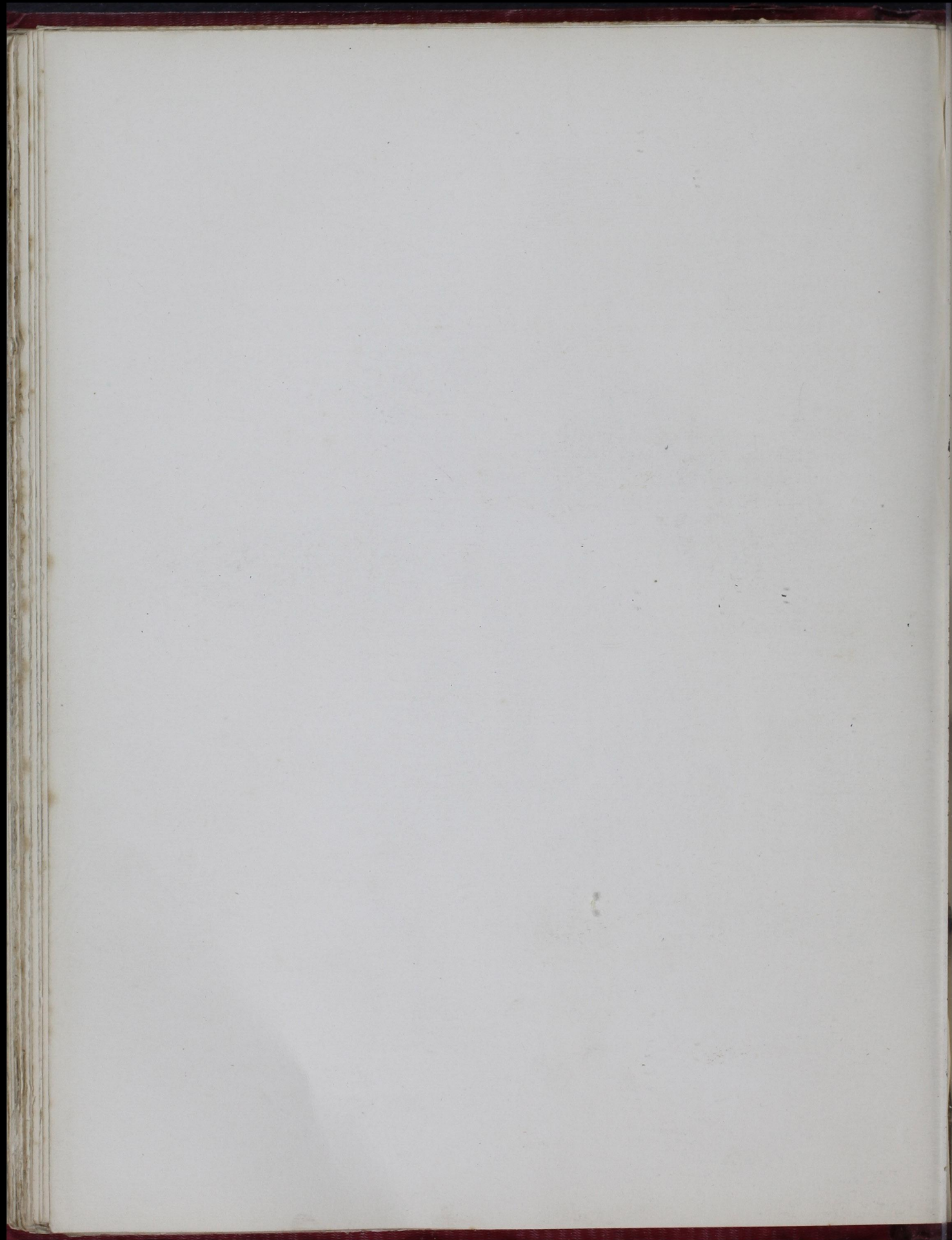
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most external of which are diamond-shaped; besides which, the males have the anal vein and the three branches of the median vein strongly dilated and black in the middle. The under side of the fore wings is paler, with black marks; but those adjoining the outer margin are almost obliterated, and replaced near the tip with greenish scales. The hind wings are greenish, with two short silvery bars near the base, a narrower one running obliquely across the middle of the wing, and another marginal one; between the two last is a row of green circles, and another of green lunules forming the inner margin of the marginal band.

A fine variety of this species, which has been regarded as a distinct species, and figured by Ernst, is in the British Museum, from which our plate 12, fig. 3, was taken. It was captured many years ago by Mr. Dale, and is a female, and has the upper surface of the wings very dark, with some whitish spots at the tips of the fore wings. Similar individuals have not unfrequently been met with on the Continent, where they are known under the ordinary name, "*le Valaisien*." Their specific identity with *A. Paphia* has been demonstrated in a remarkable manner—Hübner having figured (pl. 190, fig. 935, 936) a specimen, apparently female, the right wings of which are coloured as in the variety, and the left as in the type of the species. A still more remarkable specimen has been figured by M. Wesmael, in the fourth volume of the Bulletin of the Academy of Brussels, in which the right wings were those of the male type, except that the marginal row of spots were as large as in the female; the left fore wing exhibited a complete *mélange* of the male and female, as well as of the variety and typical individuals, the ground-colour being fulvous as in the male, but the markings, especially at the tip, dark as in the female, with the white spots of the variety, the upper side of the hind wings entirely coloured as in the dark variety.

Another gynandromorphous individual is mentioned by Ochsenheimer, the right wings of which are those of the male, and the left those of the female. In Loudon's Magazine of Natural History, the capture of an English specimen is noticed, according with Ochsenheimer's description. Another is given by Hübner, fig. 935, 936.

The caterpillar is light brown, with a row of yellow spots on the back. The spines are long, the two next the head being longer than the rest. It feeds on the dog's violet, raspberry, and nettle. The chrysalis is grey, with the tubercles gilt.

This is an abundant species, especially in the south of England, occurring also in Scotland. It flies in July.

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## GENUS XI.

### VANESSA,\* FABRICIUS.

This genus may be considered as comprising the most beautiful and highly ornamented of our British butterflies, distinguished generically from the preceding Nymphalidæ by having the eyes pubescent and the wings angulated, by which latter character, as well as by the more sudden formation of the club, they are separated from the terminal genera of the family. The head is narrower than the thorax, with the eyes large, lateral, and densely clothed with very fine hairs; the labial palpi are of moderate length, contiguous and parallel to each other, being obliquely elevated in front of the head, and three-jointed, the middle joint being much the longest, and the third short, and when denuded of its scales and hair, somewhat pointed at the tip. The antennæ are

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\* More properly *Phanessa*, being derived from *Φάνης*, one of the Greek names of love. Hedrich Mythol. Lex. 1724. Vollm. Vollst. Worteb. 1316.



rather long, slender, and terminated by an abruptly-formed, short, somewhat cylindrical club, never flattened nor spoon-shaped. The body is very robust, and well formed for sustaining the powerful flight of these insects. The wings are of large size, with the outer margin not only scalloped, but the anterior have the third and sometimes the last scallop but one, strongly angulated (the tip being, as it were, falcated), and the posterior have the middle of the outer margin also equally angulated. The discoidal cell in both pairs of wings is closed by an oblique vein. The fore legs are very short and rudimentary, so as to be quite unfitted for walking; they are composed of the ordinary parts, except that the tarsal portion is formed into a flat inarticulate plate, which, as well as the tibia, is very densely clothed with hairs. The hind feet are long and strong, the tarsi of the ordinary size, five-jointed, and terminated by two curved unguis, on the outside of which is a pair of similarly formed membranous appendages bifid at the base, the under division being very short; between the unguis is a short pulvillus or cushion.\*

The caterpillars are long, cylindric, and clothed with numerous bristly spines, arranged in whorls round the body, each segment (except that immediately following the head) having a whorl of these spines. The head is generally entire, but in some of the species it is bituberculated. The pupa is considerably angulated, with the head bituberculated; and it is adorned with silvery and golden hues. It is suspended by the tail.

The genus is of considerable extent, but none of the exotic species exceed those of our own country in beauty; indeed, it is impossible to find more exquisite contrasts of colour or delicacy in pencilling than is exhibited by some of our British species. The caterpillars are gregarious in some of the species, but those of the rest live solitary; the different species of *Urtica* afford nourishment to the caterpillars of several of them. In their perfect state, several of the species are long-lived, and are often to be seen in the autumn, especially delighting to frequent the dahlia, Michaelmas daisy, and other composite flowers. Ivy also, when in flower, is a particular favourite with them; and some are very fond of ripe fruit; *V. Atalanta* being even said to be sometimes very destructive to it, especially cherries, by extracting the juice, probably taking advantage of previous injuries occasioned by birds, wasps, and flies. This unusual propensity is occasioned by a very beautiful apparatus forming part of the spiral tongue (or maxillæ), which has recently been described by Mr. G. Newport in his valuable article "Insect," in the *Cyclopædia of Anatomy and Physiology*. This consists of a great number of minute papillæ along the anterior and lateral margins of the spiral tongue, in the form of little, elongated, barrel-shaped bodies, terminated by three smaller papillæ arranged around their anterior extremity, with a fourth one a little larger than the others, placed in their centre. These papillæ are arranged in two rows along the lateral and anterior surface of each maxillæ near its extremity for about one-sixth of its whole length, there being seventy-four in each maxilla or half of the spiral tongue. Judging from their structure, and from the circumstance that they are always plunged deeply into any fluid when the insect is taking food, Mr. Newport suggests that they are probably organs of taste. They are largely developed in this genus, but in *Pontia* and *Sphinx Ligustri* they are scarcely perceptible. There are also some curious appendages arranged along the inner anterior margin of each maxilla in the shape of minute hooks, which when the proboscis is extended serve to unite the two halves together. In this genus they are described by Mr. Newport as falcated, and furnished with an additional tooth a

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\* De Geer (*Mémoires*, tom. i. p. 652, and tab. 20, fig. 12) describes and figures the hind tarsi of *V. C. Album* as furnished with four unguis of equal size and form; and in the Crochard edition of the *Règne Animal*, *Insectes*, pl. 135, fig. 3 e, the lateral appendage of the unguis of *V. Io*, *Antiope*, *Urtica*, etc., is represented as forming only a simple and undivided piece; but in *P. Atalanta* these lateral appendages are distinctly bifid, the inner division being about half the length of the exterior.



little beyond the apex; they are so exceedingly minute, and arranged so closely together, that their true form is with difficulty distinguished. They lock across each other like the teeth in the jaws of some fishes, and Mr. Newport considers that the points of the hooks in one-half of the proboscis are inserted when the organ is extended into little depressions between the teeth of the opposite side, so that they form the anterior surface of the canal. That they really form the anterior surface of the canal or tube, seems evident from the distinctness with which coloured substances are observed to pass along the tube when the insect is taking food. It occasionally happens that some of these insects survive the winter, passing that period of the year in a state of lethargy. It has been generally supposed that these are females, which had been produced late in the preceding autumn, and which, although impregnated at that time, had not deposited their eggs, but waited until the renewal of the season brought forth a fresh supply of food for their offspring. M. Boisduval, however, opposes this, stating that these individuals had entered their lethargic state at a much earlier period (having observed *V. Polychloros* and *Urticæ* in this state in August), and that their impregnation does not take place until the following spring. Mr. Brown also opposes the ordinary opinion in Loudon's Magazine of Natural History, No. 39, founding his observations on the Lepidoptera of Switzerland. The Rev. W. T. Bree, however, whose practical knowledge of the subject renders his opinion of so much weight, opposes the statements of Mr. Brown, and supports the generally-received opinion in a subsequent number (42) of the same Magazine.

The true Fabrician type of this genus is *Pap. Io*; but Ochsenheimer introduced *P. Levana* and *P. Cardui* (which Fabricius placed in the genus *Cynthia*) into the genus, forming the latter and *P. Atalanta* into a first section, thus making *P. Cardui* stand as the type of the genus. Hübner, also, in his *Verzeichniss*, gave *P. Cardui* as the true *Vanessa*; *P. Atalanta*, under the subgeneric name *Pyrameis*; *C-album*, under that of *Polygonia* (since changed by Mr. Kirby to *Grapta*); *P. Polychloros*, *Urticæ*, and *Antiopa* under that of *Eugonia*; *P. Io*, under that of *Inachis*; and *P. Levana* under that of *Araschnia*. Until, however, a careful revision of all the exotic species belonging to the ill-constructed Fabrician genera *Cynthia* and *Vanessa* be made, it is impossible to decide on the propriety of the establishment or the extent of these groups.

The British species form three evidently natural divisions, which appear to me to be equivalent in value to those which I have proposed amongst the Fritillaries.

1. Fore wings with the anal margin very strongly emarginate; posterior wings with a short tail. Caterpillars gregarious, with two tubercles on the head. *C-album*.

2. Fore wings with the anal margin nearly straight; posterior with a strong angular prominence in the middle of the hind margin. Caterpillars gregarious, without the two tubercles on the head. *Urticæ*, *Polychloros*, *Antiopa*, *Io*.

3. Hind wings rounded and scalloped. Caterpillars solitary, without the two tubercles on the head. *Atalanta*.

#### DESCRIPTION OF PLATE XIII.

INSECTS.—Fig. 1. *Vanessa C-album* (the Comma Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.

„ Fig. 5. *Vanessa Polychloros* (the great Tortoise-shell B.) 6. Showing the under side. 7. The Caterpillar. 8. The Chrysalis.

„ Fig. 9. *Vanessa Urticæ* (the small Tortoise-shell B.) 10. Showing the under side. 11. The Caterpillar. 12. The Chrysalis.

13. A variety of *Vanessa Urticæ*.

PLANTS.—Fig. 14. *Ribes rubrum* (the Red Currant). 15. *Ulmus campestris* (the Elm). 16. *Urtica dioica* (the common Stinging Nettle).

When I first turned my attention to natural history and began to collect insects, I imagined *V. Polychloros* to be nothing more than large faded specimens of *V. Urticæ*, and they are certainly very similar at a first glance, but placed side by side, as they will be found in the present plate, the student will have no difficulty in finding sufficient marks of distinction. Whilst in the preparatory larva state, the species present but little similarity, which is in fact still less



than appears on the plate; for the larva of *V. Urticeæ*, represented with light yellowish markings, becomes nearly all black previous to its change. I have also given the singular variety of *V. Urticeæ* taken near Coventry, and intend, in a supplementary plate at the end of the volume, to give some other varieties of different species which have been communicated to me, and also some new species, ascertained to be British since the commencement of this work, particularly *Colias Myrmidone*, of which Mr. Stephens possesses a specimen taken near Dover. H. N. H.

### SPECIES 1.—VANESSA C-ALBUM. THE COMMA BUTTERFLY.

Plate xiii. fig. 1—4.

SYNONYMS.—*Papilio C-Album*, Linnæus, Lewin Brit. Papil. pl. 5. pl. 17. fig. 1. Westwood Mod. Class. v. ii. p. 353, fig. 98, 1.  
 Donovan Br. Ins. 6, pl. 199. Albin Ins. pl. 54. Harris Aurelian, pl. 1, fig. *Polygonia C-Album*, Hübner (Verz. bek. Schmett.)  
 a—d. *Comma C-Album*, Rennie Conspect.  
*Vanessa C-Album*, Ochsenheimer, Curtis, Stephens, Duncan Brit. Butt. *Vanessa* (*s-g. Grapta*), Kirby, Fauna Am. Bor. p. 292.

This is the smallest species of the genus, measuring only from  $1\frac{3}{4}$  to rather more than 2 inches in the expanse of its wings. Its form is also quite unlike that of any of the other species, having both the exterior and anal margins of the fore wings strongly emarginate as well as the former scalloped. In its general colour and markings, however, it bears so strong a resemblance to *V. Polychloros*, that it might at first be easily regarded as a distorted and stunted variety of that species. The wings above are of a tawny orange colour, with the broad outer margins dark coloured. There is a black bar running across the middle, and a broader one at the extremity of the discoidal cell, and between the latter of these and the tip of the wings is another abbreviated and more indistinct dark bar. On the posterior part of the disc of the fore wings are also three round black spots and a dusky patch near the anal angle. The hind wings are dark at the base, with three black discoidal spots and a row of deep crescents in the broad dusky border. On the under side all the wings are of a greyish ashen colour, with very numerous more or less distinct transverse and irregular dark dashes, and a darker brown irregular bar running across the wings, between which and the outer margin are two irregular rows of dull greenish marks, with a small black dot in the middle (these markings vary, however, greatly in intensity in different individuals); in addition to which the disc of the hind wings is ornamented with a white mark like a C.

This species is subject to an extraordinary variation in the form of its wings. In some specimens the incision in the outer margin of the fore wings (extending from the first branch of the median vein to the main branch of the postcostal vein) is so deep that it forms nearly a semicircle, whilst in others it is scarcely more than a sextant; the other indentations being equally varied. Mr. Haworth alludes to this, observing, "*Femina paullo pallidior et subinde minus laciniata*" (Lep. Brit. p. 26). The larva is not gregarious, of a brownish red colour, the back being reddish in front, with the hinder part white; it is remarkable for having the sides of the head produced above into two conical tubercles, which, as well as the spines on the segments of the body, are bristly. It feeds on various trees and plants, especially hops, nettles, elm, willow, honeysuckle, etc. The chrysalis is flesh coloured or brownish, narrowed in the middle, and spotted with gold. Harris says it remains in this state about fourteen days. There are two broods in the year, the first appearing in June, and the second in August or September. The latter brood are said to be of a paler colour than the summer ones.

This is by no means an uncommon species, being generally distributed. Near London, Hertford, York, Fifeshire, etc., are recorded localities; and the Rev. W. T. Bree informs us that in some years it is not uncommon in many parts of Warwickshire. De Geer (who as well as Réaumur, *Mémoires*, tom. i. pl. 27, has given a very exact account of this species in its different states, *Mémoires*, tom. i. p. 298, pl. 20, fig. 1—12) observes that it evidently passes the winter in the perfect state, as specimens are occasionally observed in the first days of spring.







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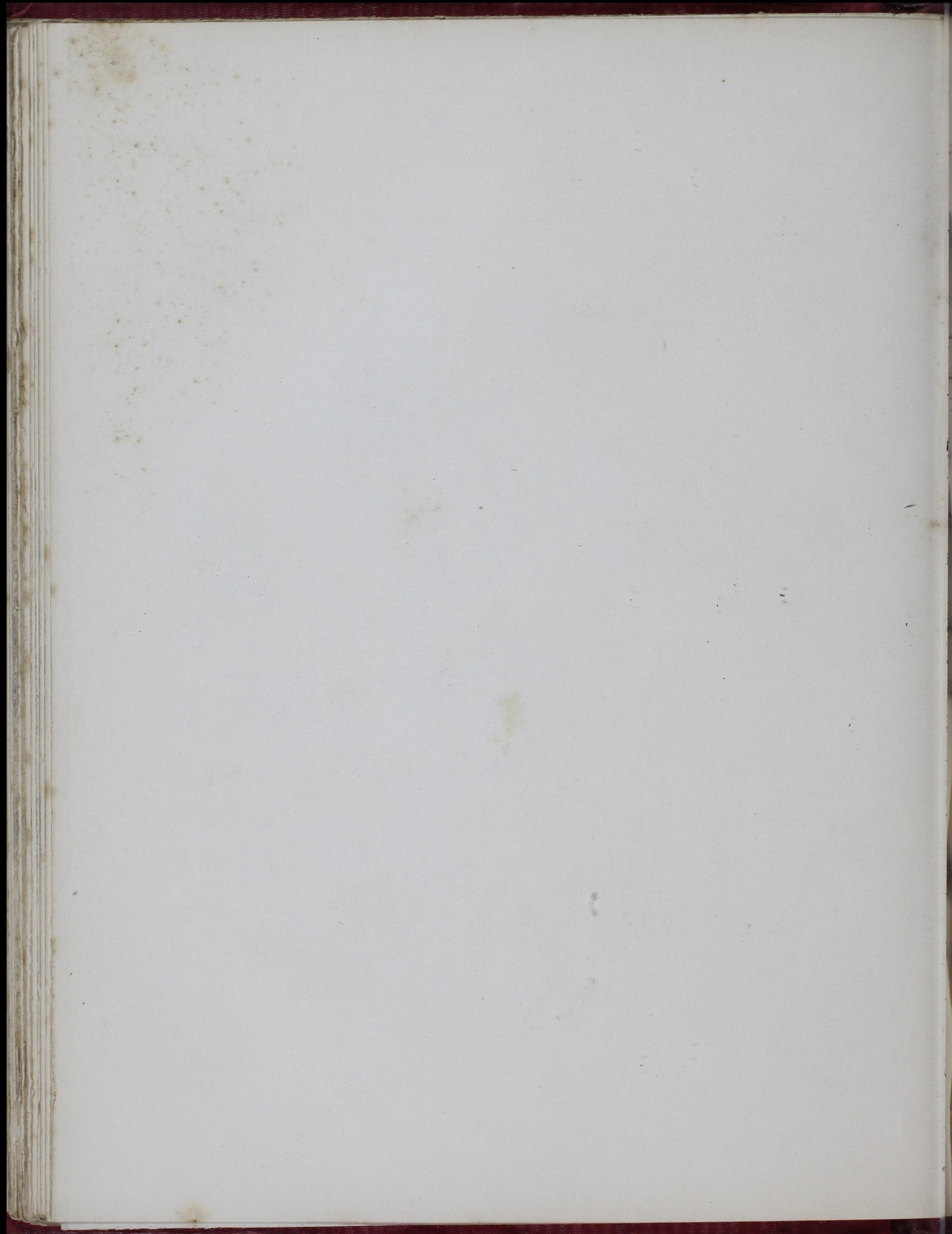
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## SPECIES 2.—VANESSA POLYCHLOROS. THE GREAT TORTOISE-SHELL BUTTERFLY.

Plate xiii. fig. 5—8.

SYNONYMES.—*Papilio Polychloros*, Linnæus, Haworth, Lewin Papil. pl. 2. Donovan Brit. Ins. vol. viii. pl. 278. Albin Ins. pl. 55. Wilkes, pl. 108. *Vanessa Polychloros*, Ochsenheimer, Curtis, Stephens, Duncan Brit. Butt. pl. 17, fig. 2. *Eugonia Polychloros*, Hübner (Verz. bek. Schmett.)

This species is larger than either the preceding or following, with both of which it agrees in the general character of its markings, the wings measuring from  $2\frac{1}{8}$  to 3 inches in expanse. On the upper side all the wings are of a dull orange colour, darker at the base. The anterior have four black subquadrate spots on the posterior part of the disc, and three larger abbreviated fasciæ on the costal edge. The outer margin is dark, with an irregular pale line. The hind wings have a large black costal spot, and the outer margin is obscure, with dull blue crescents, and two slender pale lines, parallel to the margin. The under sides of all the wings are clouded with numerous fine black transverse streaks and lines, the basal half being darkest; or rather, there is a very broad ash-coloured fascia beyond the middle of both wings. Beyond this, and parallel with the outer margin, is a row of dull bluish lunules; the hind wings have a small white dot in the middle. There are several varieties, arising from the greater or less extent of the black markings.

The caterpillar feeds on the elm, and is gregarious, at least previous to the first moulting of the skin, the young brood living beneath a common silken web. It is blackish or brownish, with a lateral yellow line, and the spines subramose and yellow. The chrysalis is flesh coloured, with golden spots, and is attached to the bark of the trees on which the larvæ feed.

The perfect insect appears in the middle of July;\* but some individuals survive until the following spring, when they appear in a faded state. It is occasionally very abundant, breeding in the environs of the metropolis where elms abound. I have taken it at Chelsea, and it used to be found in Copenhagen Fields, and numerous other localities in the south of England have been given. Mr. Duncan also says that it had been found as far north as Dunkeld, and in many intervening places. It is, however, very uncertain in its appearance. Réaumur has given ample illustrations of the transformations of this species, in his Mémoires, tom. i. pl. 23.

## SPECIES 3.—VANESSA URTICÆ. THE SMALL TORTOISE-SHELL BUTTERFLY.

Plate xiii. fig. 9—13.

SYNONYMES.—*Papilio Urticæ*, Linnæus, Lewin Pap. pl. 3. Donovan Brit. Ins. vol. ii. pl. 55. Albin Ins. pl. 4, f. 6. Wilkes Ins. pl. 107. Harris pl. 19, fig. 1. *Vanessa Urticæ*, Fabricius, Ochsenheimer, Stephens, Duncan Brit. Butt. *Eugonia Urticæ*, Hübner (Verz. bek. Schmett.)

This very beautiful but most abundant species varies in the expanse of its wings from  $1\frac{1}{2}$  to  $2\frac{1}{8}$  inches. The wings above are of a rich orange colour; the anterior dark at the base, with three short broad costal bars, between which the ground-colour of the wings is paler; behind these are three unequal-sized round spots. The exterior margin of all the wings is black, with a row of blue lunules, and two pale slender parallel submarginal lines. The basal half of the hind wings is also black. Beneath, the orange colour is replaced by pale stone colour, and the two smaller posterior discoidal spots are wanting. The margins of all the wings on this side are freckled with brown, having a row of black lunules. Various varieties have been described and figured, in

\* On the Continent, it is stated to appear in the spring and at the close of the summer; but I apprehend that the early spring specimens are the remnant of the preceding years, and not a distinct brood.



which the black spots are either more or less obliterated, or are enlarged, so as to become confluent. A fine individual of the latter kind is figured by the Rev. W. T. Bree, in the New Series of the Magazine of Nat. Hist. Suppl. pl. 15; and our fig. 13, in which the second and third costal black bars are united, whilst the two round discoidal spots are wanting; the hind wings are uniformly obscure.

The caterpillars of this species are found on the common nettle in the beginning of June and the middle of August; they are gregarious in the early period of their lives, and are dusky coloured, varied with green and brown, with paler lines down the back and sides, and with the head black, the body beset with strong branched black spines. The chrysalis is brownish, with golden spots on the neck, and sometimes entirely golden. This golden appearance, which suggested to the early naturalists the names of *Chrysalis* from the Greek, and *Aurelia* from the Latin, names for gold, and which is so conspicuous in the pupæ of this and the other species of this genus, is owing simply to the shining white membrane immediately below the outer skin, which being of a transparent yellow, gives a golden tinge to the former. Its appearance, however, was seized upon by the alchemists as a natural argument in favour of the transmutation of metals; nor was it until the researches of Réaumur in France, and of Ray and Lister in England, that its real nature was discovered, the last-named author having imitated it by putting a small piece of black gall in a strong decoction of nettles; this produces a scum, which, when left on cap-paper, will exquisitely gild it, without the application of the real metal. Réaumur also mentions that, for producing this appearance, it is essential that the inner membrane of the chrysalis should be moist; whence may be explained the disappearance of the gilding so soon as the fluids within the body have been absorbed by the formation of the limbs of the butterfly (British Cyclop., art. *Aurelia*).

The perfect insect is very abundant, and appears in the beginning of July and September, often surviving the winter, and coming abroad the first warm days, having been noticed in the Isle of Wight even so early as the 8th of January. It is distributed all over the kingdom, extending to the northern extremity of Scotland, in which country it is known under the name of the Devil's or Witch's Butterfly! In the south of Europe it continues on the wing through the winter; and according to Mr. Brown (Mag. Nat. Hist., No. 9), it would appear that none of the specimens of this species hibernate in Switzerland, and reappear in the spring.

Mr. Stephens possesses a most remarkable specimen of this species, having five wings, the fifth of small size, being implanted on the disc of one of the hind wings, which it resembles in its markings. It was captured by Mr. Doubleday near Epping.

This species afforded the great anatomist Swammerdam materials for a most elaborate memoir on the structure of the larva, and the mode of its transformation to the pupa state. His figures occupy two folio plates (34 and 35) in his great work on insects.

#### DESCRIPTION OF PLATE XIV.

INSECTS.—Fig. 1. *Vanessa Io* (the Peacock Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.

„ Fig. 5. *Vanessa Antiopa* (the Camberwell Beauty). 6. The Caterpillar.

PLANTS.—Fig. 8. *Salix Russelliana* (the Bedford Willow). 9, 10. *Urtica dioica* (the Stinging Nettle).

The little *Cynthia Hampstediensis*, of Petiver, appears out of its place in this plate; but the next (where it would not have appeared much less so) was too crowded to admit it, and I did not like to omit it altogether here, particularly as Mr. Stephens has inserted it in his work after C. Cardui. It, however, has so much the air of a species or variety of *Hipparchia*, that it would have looked much more at home in one of the plates illustrative of that genus. I have shown the dingy under side of *V. Io*, as affording a singular contrast to the gay colouring of the upper surface, but that of *V. Antiopa* I considered scarcely worthy of a figure; it is very similar to that of *V. Io*, with the exception that its pale and dark borders are both there repeated, which renders it less singular. H. N. H.







CHAPTER I

The first of the great principles of the science of the mind, as it is called, is that the mind is a power, and not a substance. This is the first of the great principles of the science of the mind, as it is called, and it is the first of the great principles of the science of the mind, as it is called.

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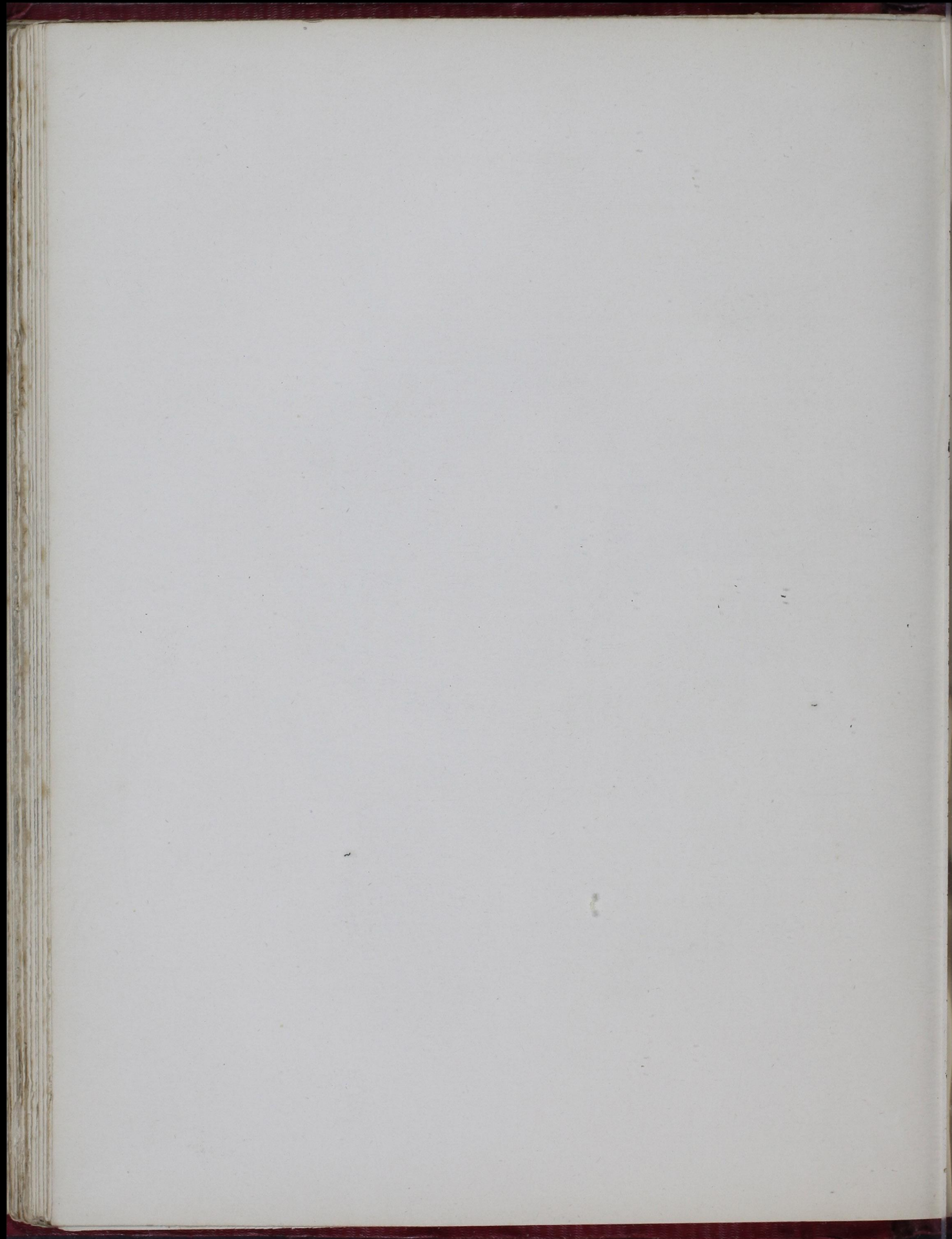
CHAPTER II

The first of the great principles of the science of the mind is that the mind is a power, and not a substance. This is the first of the great principles of the science of the mind, as it is called, and it is the first of the great principles of the science of the mind, as it is called. The second of the great principles of the science of the mind is that the mind is a power, and not a substance. This is the second of the great principles of the science of the mind, as it is called, and it is the second of the great principles of the science of the mind, as it is called.











## SPECIES 4.—VANESSA ANTIOPA. THE WHITE BORDER, OR CAMBERWELL BEAUTY.

Plate xiv. fig. 5—6.

SYNONYMES.—*Papilio Antiopa*, Linnæus, Haworth, Lewin Papil. pl. 1. *Vanessa Antiopa*, Ochseneheimer, Stephens. Duncan Brit. Butt. pl. 18, Donovan Brit. Ins. vol. iii. pl. 89. Harris Aurel. pl. 12, fig. a—c. Wilkes, fig. 2. Curtis Brit. Ent. vol. ii. pl. 96 (V. Antiope).  
*Eugonia Antiopa*, Hübner (Verz. bek. Schmett.)

This fine species varies in the expanse of its wings from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  inches. The wings are on the upper side of a rich claret black, with the apical margin and two costal spots near the extremity of the fore wings, of a white or whitish colour, slightly speckled with black; the white margin is preceded by a series of blue spots, on a black bar. Beneath, the wings are dark brown, with a very great number of slender transverse black lines. The white margin and costal spots are as on the upper side; but the black subapical bar, with its blue spots, is almost obliterated. The hind wings are marked in the centre with a minute white spot. The pale margin of the wings varies to deepish yellow. The caterpillar, which is gregarious, is of a black colour, with squarish dorsal spots, and the abdominal pro-legs of a red colour.\* It feeds on the willow and birch, always selecting the highest branches, according to Harris, and is found at the beginning of July. The chrysalis is blackish, spotted with fulvous, and is dentated. The perfect insect appears at the beginning of August, but sometimes survives the winter, and deposits its eggs in the following spring. It appears to be distributed nearly over the whole of the kingdom, having been found as far north as Ayrshire. It must now, however, be considered as one of our rare butterflies, although about seventy years ago it appeared in such immense numbers throughout the kingdom that the Aurelians of that day thence gave it the name of the Grand Surprise. Since that period, however, it has become rare, appearing, however, periodically, after a lapse of eight, ten, or more years. "To suppose they come from the Continent is an idle conjecture, because the English specimens are easily distinguished from all others by the superior whiteness of their borders. Perhaps their eggs in this climate, like the seeds of some vegetables, may occasionally lie dormant for several seasons, and not hatch until some extraordinary but undiscovered coincidences awake them into active life" (Haworth Lep. Britann. p. 28). It received its English name of the Camberwell Beauty from having been observed at that village, to which it was attracted by the willows, which grew there in profusion.

## SPECIES 5.—VANESSA IO. THE PEACOCK BUTTERFLY.

Plate xiv. fig. 1—4.

SYNONYMES.—*Papilio Io*, Linnæus, Haworth, Lewin Papil. pl. 4. *Vanessa Io*, Fabricius, Ochseneheimer, Stephens, Duncan Brit. Butt. pl. 18, fig. 1.  
*Inachis Io*, Hübner (Verz. bek. Schmett.)

This very beautiful insect, which measures from  $2\frac{1}{2}$  to 3 inches in the expansion of its wings, may be considered as one of the commonest of our butterflies. The fore wings on the upper side are of a dark but rich red colour. The costa is varied with black and yellowish buff patches, the base of the costa being marked with black and yellowish transverse streaks. Near the apex of the wings is a very large eye, in which red, black, yellowish buff, and leaden blue are agreeably blended. The outer margin of the wing is dark brown; and there are five blue spots, three of which appear in the eye and two below it. The hind wings are of a darker red,

\* De Geer has illustrated the transformation of this species, in his Mémoires, tom. i. pl. 21, and has figured several varieties in the spines of the larvæ these spines do not exist on the segment succeeding the head.



the base and apex being brown; near the outer angle is a very large eye, with a black centre, in which are several blue markings. This is surrounded by a whitish circle, which is deeply margined with black towards the base of the wing. All the wings beneath are dark brown, with black transverse streaks; the anterior having five small pale marks, representing the blue dots of the upper side, and the posterior having a broad central darker bar, margined with black, within which is a small central white spot.

The caterpillar, which is gregarious, spinose, black, spotted with white, and with the hind legs red, feeds on the common stinging-nettle, and is found at the beginning of July. The chrysalis is greenish, dotted with gold, and dentated. The imago appears in the middle of July, and often survives until the following spring, when the female deposits its eggs. Although very abundant in England, it appears not to extend further north than the Frith of Forth; and in the south of Scotland it is but sparingly seen.

This butterfly and its preparatory states have formed the subject of one of the most interesting of the "Mémoires" of Réaumur, by whom it was selected as an example to illustrate the manner in which the butterflies which are merely suspended by the tail in the chrysalis state effect their transformations. If the proceedings of the swallow-tail or cabbage butterflies on assuming the pupa state (see *ante*, pp. 9 and 23) have excited our admiration, the mode in which these caterpillars change to *suspended* chrysalides is far more extraordinary. Like the former, each constructs a small button of silk, to which it firmly attaches itself by the hooks of the hind feet. When this is effected, the head is permitted to hang downwards. Whilst thus suspended, it succeeds, after at least twenty-four hours' contortion, in forming a slit down its back, through which the head of the chrysalis is protruded, and the caterpillar skin gradually pushed upwards to the tail. A delicate operation has still to be performed: the caterpillar was suspended by the hooks of its own hind legs to the silken button; but not only has the still partially enclosed chrysalis to disengage itself entirely from the skin of the caterpillar, and *attach itself* to the silken button, but also to get rid of the old and no longer necessary caterpillar skin. To effect these objects, the chrysalis carefully withdraws its tail from the skin, seizing hold of the outside of the latter by pressing two of the rings of its body together, and enclosing between them part of the old skin. By repeating this proceeding, it at length pushes its tail upwards, till it reaches the silken button, to which it fastens itself by means of the hooks with which the tail of the chrysalis is furnished. We now see the chrysalis suspended head downwards, by the side of the old caterpillar skin, which it ultimately gets rid of by a succession of gyrations, which burst the silken threads holding the caterpillar skin, and which, no longer supported, falls to the ground.

#### DESCRIPTION OF PLATE XV.

INSECTS.—Fig. 1. *Vanessa Atalanta* (the Red Admiral Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.

„ Fig. 5. *Cynthia Huntera*. 6. Showing the under side.

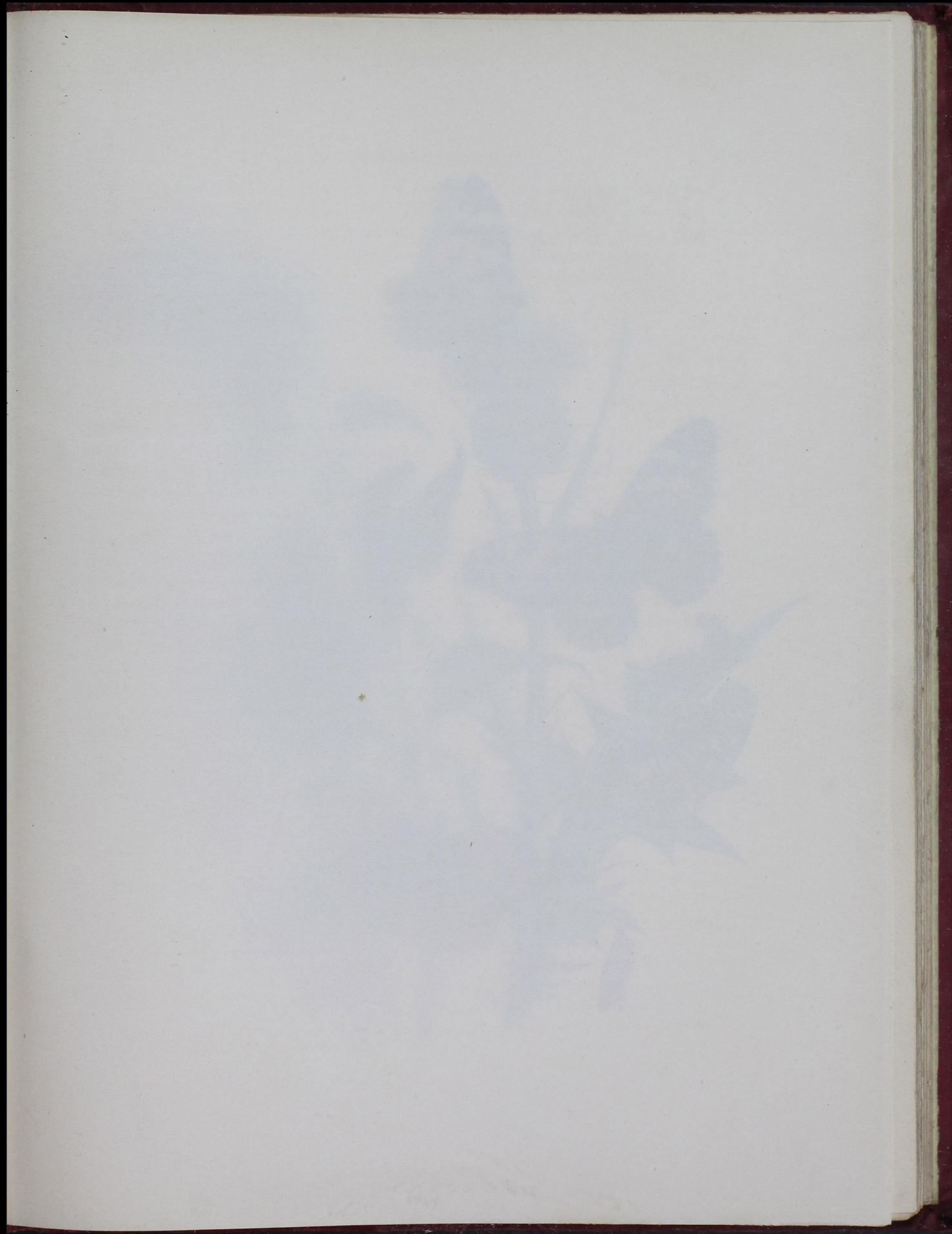
„ Fig. 7. *Cynthia Cardui*. 8. Showing the under side. 9. The Caterpillar. 10. The Chrysalis.

PLANTS.—Fig. 1, 2. *Urtica dioica* (the Stinging Nettle). 3. *Cnicus lanceolatus* (the Spear-plum Thistle).

*Cynthia Huntera* has no greater claim to be considered a British species than *Argynnis Aphrodite*. But, as in that case, I avail myself of the fact of its having been taken in England to introduce so beautiful an insect in this work. The under side presents an extremely elegant variation of the colouring of *C. Cardui*. I am compelled unavoidably to give here a third portrait of the unornamental nettle, as it is the only food of the insects which it accompanies.

H. N. H.





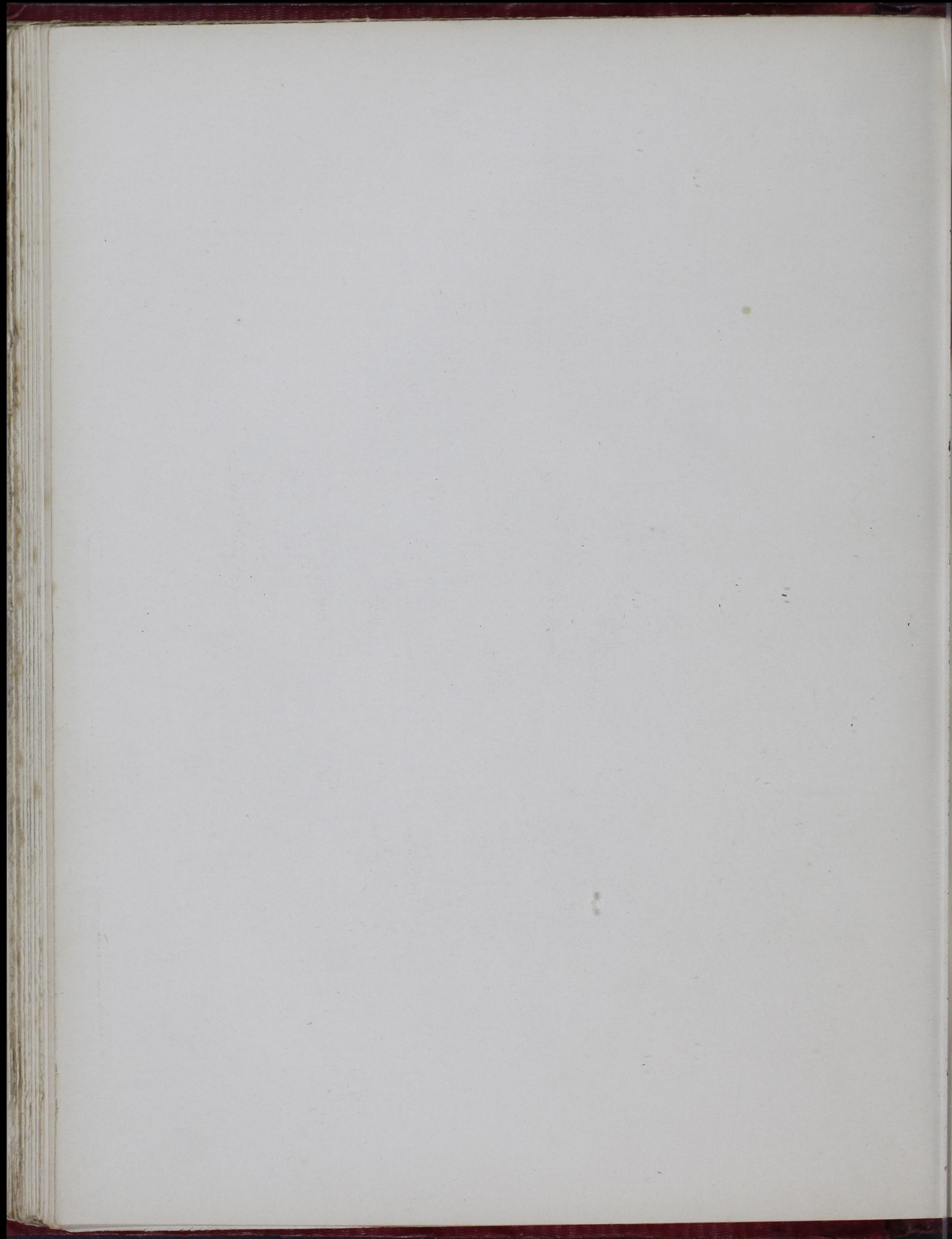














## SPECIES 6.—VANESSA ATALANTA. THE RED ADMIRAL, OR ALDERMAN BUTTERFLY.

Plate xv. fig. 1-4.

SYNONYMES.—*Papilio Atalanta*, Linnaeus, Haworth, Lewin Papil. pl. 7. *Vanessa Atalanta*, Fabricius, Stephens, Curtis. Duncan Brit. Butt. pl. Donovan, vol. viii. pl. 260. Albin, pl. 3. Wilkes, pl. 105. Harris Aurelian, 20, fig. 1. *Pyrameis Atalanta*, Hübner (Verz. bek. Schmett.) *Amiralis Atalanta*, Rennie.

This remarkably rich-coloured butterfly is one of the commonest of our native species. It varies in the expanse of its wings from  $2\frac{1}{2}$  to 3 inches. The ground-colour of the upper surface of the fore wings is intense velvety blue black, brownish at the base; having an irregular oblique central bar of bright red, slightly curved on the side nearest the tip of the wing, and formed as it were of large squarish confluent patches; it does not quite extend to the anal angle of these wings. Between the fascia and the apex of the fore wings is a large costal white spot, beyond which is a curved row of five white spots, of which the first and fourth are the largest. Still nearer the margin of the wing is an obscure bluish wave. The hind wings are blackish brown above, with a broadish red margin, in which are four black dots, and there are two obscure confluent blue spots at the anal angle. On the under side the fore wings are black, the base with several narrow red and bluish transverse stripes; the red oblique bar is here present but more broken, between which and the large costal white spot is a horseshoe blue mark. The apex is ashy brown, with two small brown eyes with white centres and two white spots. The hind wings on this side are brown and most beautifully mottled with black and grey, with a large triangular pale spot in the middle of the costal margin, and two transverse and wedge-shaped discoidal black marks. Near the margin of the wing is a row of four obscure eye-like patches. In some specimens the red bar of the fore wings bears a small white dot near its hinder extremity; these, according to Mr. Haworth, are the females.

This species differs from all the foregoing, not only in the form of the wings, of which the anterior are less strongly angulated, and the posterior rounded, but also in several other characters, especially the form of the palpi and the habits of the caterpillars. Hence Mr. Kirby suggests, in the *Fauna Boreali Americana* (p. 294), that it "seems rather to belong to the genus, or perhaps sub-genus, *Cynthia*; at any rate, it forms a connecting link between it and *Vanessa*."

The caterpillar is of a dusky green colour, with a yellowish dorsal line and also a pale line on each side above the feet. The chrysalis is brownish or blackish, beneath grey with golden spots.

The caterpillar feeds on the common nettle, especially preferring the seeds, and is found in July; the imago is abundant wherever this plant is common—it appears at the beginning of August, and survives the winter, the female depositing her eggs in the following spring.

According to Sepp, the caterpillar shortly after it is hatched selects a nettle-leaf, which it draws together with threads into a roundish hollow form, leaving for the most part an opening into the interior both before and behind, thus serving both for shelter and food until almost devoured, when it selects a fresh leaf and proceeds with it in the same manner, one caterpillar only being found on a single leaf, thus indicating a peculiar liking for a solitary life; a circumstance confirmed by the eggs being laid singly and apart, whereas caterpillars hatched from eggs deposited in clusters are gregarious. The caterpillar state lasts about five weeks.

The species appears to be very widely distributed. I have received specimens from North America, which, although slightly differing from our native individuals, I cannot regard as specifically distinct. Such is also the opinion of Mr. Kirby, who has described his American specimens under this name.

It also occurs throughout Europe and along the African shores of the Mediterranean. It delights in the flowers of the ivy and dahlia, and is a remarkably bold insect, whereof some remarkable instances are mentioned in Loudon's *Magazine of Natural History* (No. 25).



## GENUS XII.

## CYNTHIA, FABRICIUS.

This genus, or perhaps rather sub-genus, differs chiefly from *Vanessa* in the form of the wings, the anterior pair being very slightly angulated at the tip, whilst the hind ones are rounded and scalloped, and in certain trivial distinctions, as in the club of the antennæ, which is very short and compressed, and in the palpi, which are long, deflexed, pointed and beak-like; the second joint, with the posterior half, pilose. The caterpillar and chrysalis resemble those of *Vanessa*. By Curtis, it is united with the last-named genus. As, however, *C. Cardui* is not one of the types of the genus as established by Fabricius, it is perhaps best to retain it, considering the exotic species *Papilio Arsinoë* and *Cenone* as the types of the two sections into which it is divided, and regarding *Cardui* as an aberrant species leading to *Vanessa*.

## SPECIES 1.—CYNTHIA CARDUI. THE PAINTED LADY.

Plate xv. fig. 7—10.

SYNONYMS.—*Papilio Cardui*, Linnæus, Fabricius, Haworth, Lewin  
Pap. t. 6, f. 1—4. 'Donovan Ins. v. 9, tab. 292. Shaw Nat. Miscell. 9, tab.  
430. Panzer Faun. Ins. Germ. 22, 19. Wilkes Papil. t. 107, f. 1. Albin  
Ins. t. 56. Harris Aurelian, t. 11, fig. e—f.  
*Libythea Cardui*, Lamarck.

*Vanessa Cardui*, Godart, Latreille, Meigen, Hübner (Verz. bek.  
Schmett.)

*Cynthia Cardui*, Fabricius, Kirby (F. B. A.), Stephens, Duncan Brit.  
Butt. t. 19, f. 2.

This elegant insect in its markings might at first sight be mistaken for a mottled and faded *Atalanta*; so closely allied are the two species together, although perfectly distinct both in habits and markings; being in fact widely separated in the Linnæan system, one belonging to the *Nymphales Phalerati*, and the other (*C. Cardui*) to the *N. gemmati*, in consequence of the wings being marked with eye-like spots. It varies in the expanse of its wings from  $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches. The fore wings on the upper side are at the base brown; the disc tawny orange,\* with three somewhat square black spots; the apex blackish, with five white spots, the largest of which is on the costa, and the four others form a curved line, between which and the margin is a slender whitish line. The hind wings above have the base and costal margin brown; the disc fulvous, with numerous black marks arranged, as it were, in four transverse rows, the second forming a row of round darker-coloured spots, the fourth being marginal, the margin itself whitish. Beneath, the fore wings are nearly marked as above, but the fulvous colour is more diffused; the dark spots are smaller, and the apex of the wing is dark stone colour, instead of black. The hind wings below are beautifully mottled with pale olive brown, yellowish buff, and white, the veins being white; near the hind margin is a row of slender blackish blue marks, above which are four beautiful eyes, the two middle ones being smaller than the outer ones, which are circled with black. The markings vary in size in different individuals, Mr. Stephens having described several varieties. The caterpillar is spined, of a brown colour, with interrupted lateral yellow lines; it is solitary, and feeds on the *Carduus lanceolatus*, and other species of the same genus, as well as on the nettle, mallow, artichoke, etc. It is found in the middle of July. Like that of *V. Atalanta*, it draws up the leaves upon which it is feeding with its threads, and like it, is solitary in its habits. The chrysalis is brown, with ash-coloured lines and golden spots.

\* The tawny orange marks on the right fore wing bear a tolerably good resemblance to a map of England and Ireland.



This is one of those species of butterflies remarkable for the irregularity in its appearance; in some years occurring plentifully even in the neighbourhood of London, after which it will disappear for several years. Indeed, instances are on record in which, owing to the vast numbers, migration has become necessary; and in the *Annales des Sciences Naturelles* for 1828, an account is given of an extraordinary swarm which was observed in the preceding May in one of the cantons of Switzerland, the number of which was so prodigious that they occupied several hours in passing over the place where they were observed. The precise causes for this phenomenon were not investigated, and the time of the year is remarkable. Like *V. Atalanta*, the species is very widely dispersed, being an inhabitant of North America, New South Wales, Java, both extremities of Africa, Brazil, etc.

There are numerous notices relative to this butterfly contained in Loudon's *Magazine of Natural History*, Nos. 4, 13, 18, 26, 31, and 39, to which I must refer the reader.

## SPECIES 2.—CYNTHIA HUNTERA. HUNTER'S CYNTHIA.

Plate xv. fig. 5, 6.

SYNONYMES.—*Papilio Huntera*, Fabricius, Herbst, Abbot and Smith,  
Ins. Georgia, vol. i. t. 9.

*Papilio Cardui Virginiensis*, Drury Ins. i. p. 15, fig. 1.

*Papilio Iole*, Cramer.

*Cynthia Huntera*, Kirby, Fauna Bor. Amer. p. 296 (1837). Westwood  
in Drury Ins. 2nd edit. (1837).

*Vanessa Huntera*, Dale in Loudon's Mag. Nat. Hist. vol. iii. p. 332.  
Stephens.

This American species, although closely allied to the preceding, cannot be considered as its Transatlantic representative, as Drury imagined, by calling it *Cardui Virginiensis*. It measures about  $2\frac{3}{4}$  inches in the expanse of the wings, which are of a less brilliant tawny orange colour than those of *P. Cardui*; brown at the base, the orange disc much broken in the fore wings by blackish irregular bars, the apex blackish, with a long white costal spot, and four dots near the apex, white, between which and the margin is a pale broken rivulet. Beyond the middle of the hind wings is a slender interrupted brown bar, succeeded by four indistinct eyelets, a black submarginal bar, and two very slender marginal dark lines. But the great beauty of the insect consists in the under side of the wings, the anterior being elegantly varied with white, orange, brown, and black, with two eyes near the apex. The disc of the hind wings is white, with the veins and many lines and bars of brown; these form a double scallop beyond the middle of the wing, succeeded by a white bar of the same form, the terminal part of the wing being brown and ornamented by two very large eyes, margined with black; between these and the margin is a slender bar, and two dark thin marginal lines.

The caterpillar of this butterfly is described by Drury as green, with black rings round the body, and as feeding, about New York, on the wild balsam; appearing about the end of July or beginning of August. According to Abbot, however, the caterpillar is brown, with the incisions and lateral line yellow; it has also two dorsal lines formed alternately of white and red points. It feeds upon the *Gnaphalium obtusifolium*. The chrysalis state is assumed at the end of April or beginning of May. The butterfly appears in about ten days. Like *C. Cardui*, its caterpillar folds and spins the leaves of the plants on which it feeds, together; and the perfect insect appears about once in five or six years in very great abundance; at other times they are scarce.

An instance of the capture of this butterfly by the late Captain Blomer in Pembrokeshire has been recorded by Mr. Dale, in the work above mentioned.



## CYNTHIA HAMPSTEDIENSIS. ALBIN'S HAMPSTEAD-EYE.

Plate xiv. fig. 7.

SYNONYMES.—*Papilio ocellatus Hampstediensis ex aureo fuscus*, Petiver  
Pap. pl. 5, f. 2. Haworth, p. 54.

*Hipparchia Hampstediensis*, Jermyn.

*Cynthia Hampstediensis*, Stephens Ill. pl. 5, f. 3, 4. Brit. Butt. 20.

This butterfly is represented by Petiver, the only authority for the species, as about 2 inches in expanse, or of the size of *Hipparchia Aegeria*; the fore wings are brown, with three transverse subcostal spots; two elongate ones near the hinder margin, and the margin itself yellow; at the apical and anal angle is a large ocellus. The hind wings are brown, with a yellow margin, and with two large ocelli near the hind margin. Beneath, the fore wings are yellowish, with brown cloudings, and with a row of brown submarginal lunules. The posterior are dull yellow, with darker cloudings of brown at the base, with a small ocellus near the anal angle, and a row of four brown spots, between which and the margin is a nearly obsolete row of brown lunules.

The only instance of the capture of this otherwise unknown insect was recorded more than a century ago by the faithful Petiver, from whose representation our figure is taken; its capture is noticed by him in these words: "Albin's Hampstead-Eye, where it was caught by this curious person, and is the only one I have yet seen." Like *Aphrodite* and *Huntera*, I have no doubt that it is an exotic species which had been accidentally brought to this country. I have followed Mr. Stephens in giving this as a species of *Cynthia* rather than as an *Hipparchia*, as it is evidently allied to *Cynthia Orythia*.\*

CYNTHIA LEVANA (*Papilio* L., Linn.; *Vanessa* L., Ochsenh.), a continental species, being  $1\frac{1}{2}$  inch in the expanse of its wings (which are fulvous coloured, varied with black and yellow above, the anterior having also several white spots, and beneath reticulated with whitish yellow, fulvous, brown and yellowish), is indicated as British by Turton (*Syst. Nat.* p. 42); but no specimen captured in this country is known to be in existence.

## GENUS XIII.

## APATURA,† FABRICIUS.

## DESCRIPTION OF PLATE XVI.

INSECTS.—Fig. 1. *Apatura Iris* (the Purple Emperor), male. 2. The female. 3. Showing the under side. 4. The Caterpillar. 5. The Chrysalis.

„ Fig. 6. *Limenitis Sibilla* (the White Admiral). 7. Showing the under side. 8. The Caterpillar. 9. The Chrysalis.

PLANTS.—Fig. 10. *Quercus Sessiliflora* (the Sessile-fruited Oak).

„ Fig. 11. *Lonicera Periclymenum* (the Common Honeysuckle).

The Purple Emperor is the most favourite butterfly of English collectors, partly from its comparative rarity and the difficulty of capture even when discovered, and partly in consequence of its being the only British butterfly of large size that exhibits a blue tint. The beautiful purple gloss exists, however, only in the male, and only in certain lights. I have endeavoured to have the beautiful effect it produces imitated in fig. 1, of Plate 16; but art cannot do justice to the fitful flashes of rich colour which every change of light produces upon this insect; leaving it at one moment all sober brown, the colour of the female, and the next tinging it with a flush of the richest metallic purple. As in flying downward the purple is nearly constant over a large portion of the wings, I have chosen that position as the one most capable of conveying, in a drawing, some idea of the beauty of the insect. The female, generally somewhat

\* This supposed relationship is partially confirmed by a very remarkable painting, described by Mr. Edward Doubleday (*Gen. Diurn. Lep.* p. 211), as "containing figures of innumerable species of our British Lepidoptera, executed about a century since, in which are four very accurate figures, representing both surfaces of *Iunonia* [*Cynthia*] *Vellida*, the species which we had considered most to resemble Petiver's figure. The minute accuracy of the figures, worthy of Sepp or Curtis, leaves no doubt of the identity of the insect. How an insect, now only known as an Australian species, could then exist in a collection of purely British insects, and how Petiver, Albin, and others came to believe that it had been captured at Hampstead, I cannot explain. The only other exotic insect in the painting referred to is *Deiopeia cribraria*, and is precisely that variety which is found in the easternmost islands of the Indian Ocean.

† More properly *Apaturia*, a name of Venus, from ἀπάτη. Vollm. Vollst. Wörterb. p. 271.





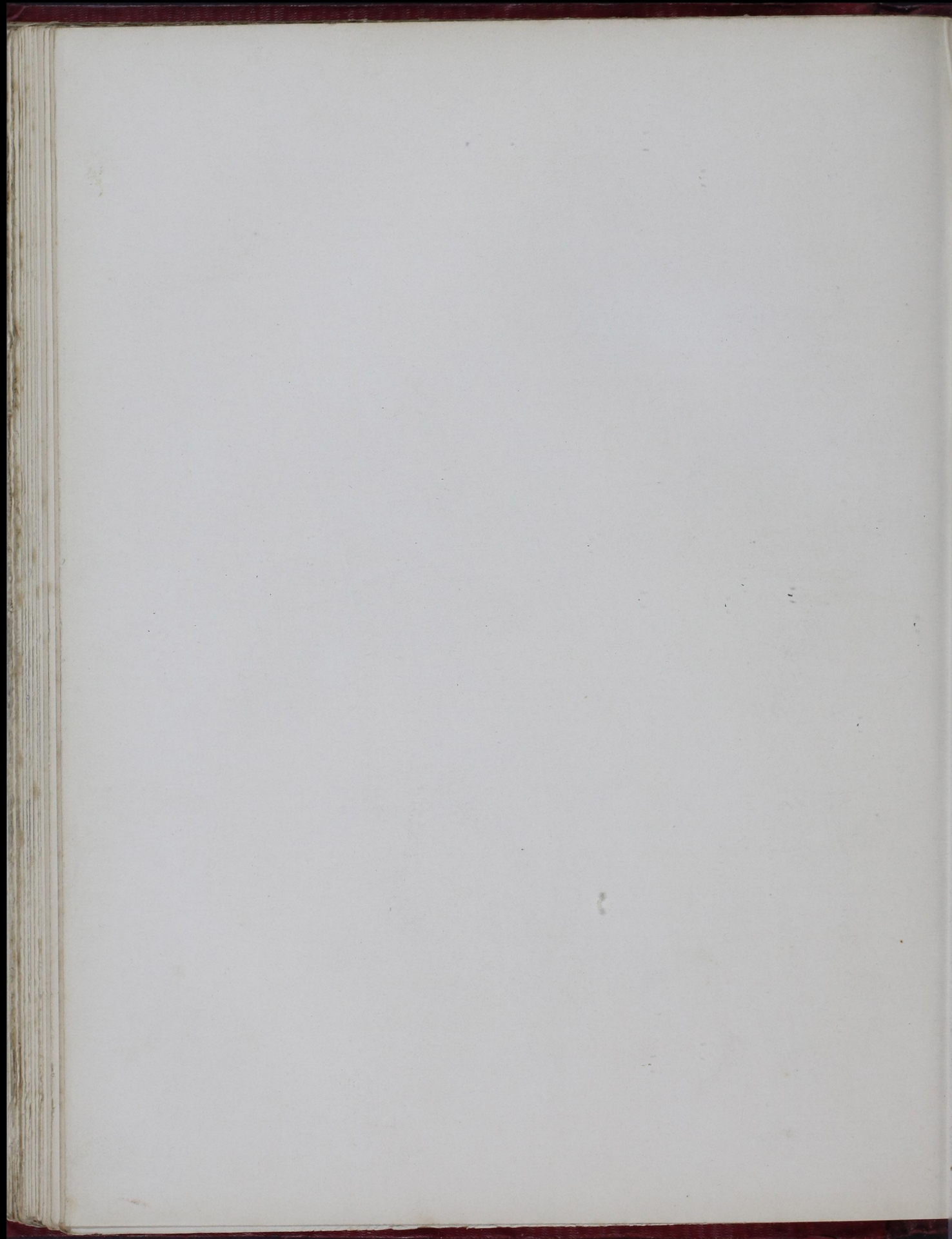














larger in size, and of a paler brown, is represented beneath. Only this solitary species of the genus *Apatura* is found in England; but on the Continent I have met with several others, particularly the beautiful "*Mars Changeant*" of the south of France, which, though of a brighter brown, greatly resembles the present species, both in the purple gloss and in the markings of the under side. *Limenitis Sibilla* has been placed in this plate to show the affinity which exists between these two genera, on comparing the under sides. The butterflies are from fine specimens in the British Museum. The caterpillars and chrysaïdes are from Hübner and Godart. H. N. H.

The insects composing this splendid genus are at once distinguished from all the preceding genera of this family by having the antennæ very gradually thickened towards the tips into a club, whilst it is separated from *Hipparchia* by their being straight and not curved, and by the robust structure of the insects. It agrees with the *Fritillaries* in having naked eyes, by which character it is at once separated from *Limenitis*. The palpi are close together and compressed, so as to form an elongated beak pointed at the tip. The body is robust, the wings powerful, the anterior having the posterior margin entire, and the hind wings scalloped. The discoidal cell of the wings is not closed; the fore legs are rudimental, with the tarsi articulated; thus differing from *Vanessa*. The four hind legs are terminated by two strong unguis, defended at the side by bifid membranous appendages.

The larva somewhat resembles a slug, having the body thickest in the middle, fleshy, destitute of spines, except a pair on the crown of the head and the bifid tail. The chrysalis is compressed, with the head-case bifid. This variation in the form of the larva has induced Dr. Horsfield to unite this genus with *Hipparchia* and some others into a distinct primary division of the Diurnal Lepidoptera named *Thysanuromorpha*, from a supposed resemblance to the fork-tailed *Thysanuræ*, or spring-tailed insects! The only British species is the following.

#### SPECIES 1.—*APATURA IRIS*. THE PURPLE EMPEROR.

Plate xvi. fig. 1—5.

SYNONYMES.—*Papilio Iris*, Linnaeus, Haworth, Donovan, pl. 37.  
 Lewin Papil. pl. 16. Wilkes, pl. 120. Harris Aurelian, pl. 3, fig. sup.

*Apatura Iris*, Ochsenheimer, Leach, Stephens. Curtis, pl. 333. Duncan  
 Brit. Butt. pl. 21.  
*Doxocopa Iris*, Hübner (Verz. bek. Schmett.)

This fine insect varies in the expanse of its wings from  $2\frac{1}{2}$  to  $3\frac{1}{4}$  inches. The wings of the male are above of a blackish hue, with a splendid purple blush, varying according to the position from which they are seen, and marked in the middle and towards the hinder margin with white spots, the inner ones forming the curved upper extremity of a bar which runs across the hind wings nearly to the anal angle; this angle itself being orange, with two black spots, above which is an ocellus. The under side of the fore wings is varied with grey, orange, fulvous, and black, there being an interrupted, curved, white fascia across the wings, behind which is a black eye with a lilac centre surrounded by a broad orange circle, in which are two white spots. The hind wings on this side are grey, with a broad white bar attenuated towards the anal angle, on each side broadly ferruginous; the anal angle ferruginous, above which is a black eyelet with a lilac pupil and orange iris.

The wings of the female are brown, destitute of the purple lustre, but marked as in the male.

The caterpillar is green, with pale yellow lateral oblique stripes. It feeds on the broad-leaved willow, and is found at the end of May. The chrysalis is of a pale green colour. The perfect insect is found in the middle of July in woods, in various parts of the south of England. Epping Forest, Great and Little Stour Woods, Wrabness, and Ramsay, Essex; Badly, Dodnash, and Raydon Woods, in Suffolk; Clapham Park Woods, Beds; Brinsop Copse, Heref.; Enborne Copse, Berks; near Warminster, Wilts; Christchurch, Hants;



Monkswood, Camb.; near Hertford, and Coombe and Darenth Woods,—have been given as its localities; to which we may add, that it is “occasionally though rarely seen in Warwickshire, near Doncaster, and in the Isle of Wight” (Rev. W. T. Bree, MSS.)

Owing to the habit which the Purple Emperor exhibits of fixing his throne on the summit of a lofty oak, from the utmost sprigs of which, on sunny days, he performs his aerial excursions, defending his territory against a rival emperor with the greatest energy, it is necessary to use a bag net fixed at the end of a slender rod twenty or thirty feet long. He is exceedingly bold, and will almost suffer himself to be pushed off his seat. The females are much rarer, and do not take such lofty flights as the males.

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#### GENUS XIV.

#### LIMENITIS,\* FABRICIUS.

This genus is closely allied to *Apatura*, but differs in its general weaker formation, and in the hinder margin of the fore wings being rounded, and not concave as in the Purple Emperor; the hind wings are more rounded, and the eyes are pubescent. By these characters, and by the gradual formation of the straight club of the antennæ, it is distinguished from all the other genera of this family; the palpi are not contiguous, as long as the head, not pointed at the tip, and clothed with scales and hair; the hind wings have the discoidal cell open; the fore legs are short in both sexes; the tarsi of the males formed of a single joint clothed with long hairs and terminated by a small single unguis; those of the females not like those of the males, as stated by Curtis, but articulated; the four hind legs are formed as in *Apatura*. The larvæ are long, cylindric, with several pairs of obtuse hirsute spines on the back, and lateral fascicles of hairs. The chrysalis has the head also beaked, and is very gibbose beneath. It is suspended by the tail. The close relation of this genus and *Apatura* in the perfect state is sufficient to prove that they are not referable to separate primary groups of the Diurnal Lepidoptera, on account of the differences in their caterpillar state.

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#### SPECIES 1.—LIMENITIS SIBILLA. THE WHITE ADMIRAL.

Plate xvi. fig. 6—9.

SYNONYMES.—Male, *Papilio Sibilla*, Linnaeus, Fabricius, Stewart, Doubleday. Stephens Cat. Lep. Brit. Mus.

Female, *Papilio Camilla*, Linnaeus, Haworth. Lewin Papil. pl. 8. Donovan Ins. 8, pl. 244. Harris Aurelian, pl. 30, fig. m, n.

*Limenitis Camilla*, Leach. Curtis Brit. Ent. pl. 124. Duncan Brit. Butt. pl. 20, fig. 2. Hubner (Verz. bek. Schmett.) Stephens Illustr.

The wings of this species measure from 2 to 2½ inches in expanse. The upper surface is dull black, with a curved interrupted row of white spots extending from near the middle of the costa of the fore wings to the anal angle of the hind ones; in addition to which the anterior have several additional small spots near the apex, and the posterior have an obscure reddish spot at the anal angle, within which are two black dots. Beneath, the ground-colour of the wings is yellowish brick-red, with the white spots of the upper side conspicuous; in addition to which all the wings, especially at the base, are marked with black streaks and dots, and the hind wings, between the white band and the margin, have two rows of black dots and two rows of crescents on the

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\* One of the names of Venus. Vollm. Vollst. Wort. 1143.



margin. The fore wings also exhibit near the anal angle several additional white spots; and the anal edge of the hind wings is pale bluish.

A remarkable variety, in which the white spots on the wings are nearly effaced, the white band being also entirely or nearly obliterated, as well as the dark mark on the under side, is figured by the Rev. W. T. Bree, in Loudon's Magazine of Natural History, vol. v. p. 667. The specimen was taken near Colchester, by Dr. MacLean. Mr. Ingall also possesses a similar specimen from the same neighbourhood.

The caterpillar is green, with the head, legs, and dorsal tubercles reddish. It feeds on the honeysuckle. A careful figure of it, from an original drawing in the collection of M. Boisduval, is given in the Crochard edition of the Règne Animal, Ins. pl. 137, fig. 4. The chrysalis has the head beaked and bifid, and a very large and prominent dorsal appendage. It is brownish or green, with golden spots.

The butterfly appears in July, and is a rare species, although formerly more abundant; it appears widely distributed over the southern parts of the kingdom. Near Peterborough; near Ipswich; Hartley Wood, Essex; near Rye; Coombe Wood; near Finchley; Birchwood, Kent; Enborne Copse, Berks; New Forest; "abundantly in woods near Winchester; also a specimen in the Isle of Wight" (Rev. W. T. Bree, MSS.)

"The graceful elegance displayed by this charming species when sailing on the wing is greater perhaps than can be found in any other we have in Britain. There was an old aurelian of London so highly delighted at the inimitable flight of Camilla, that long after he was unable to pursue her he used to go to the woods and sit down on a stile, for the sole purpose of feasting his eyes with her fascinating evolutions" (Haworth, Lep. Brit. p. 30).

The remaining British species belonging to the family Nymphalidæ constitute a group of very great extent; the number of the European species being considerably greater than one-third of the whole of the Diurnal Lepidoptera of Europe. They form the genus *Hipparchia* of Fabricius (together with part of his genus *Melanitis*, or the subsequently named genus *Satyrus* of Latreille, or *Erebia* of Dalman). By Boisduval they are formed into a distinct tribe, *Satyrides* (*Satyridæ*, Swainson), and by Hübner into a stirps named *Driades*; whilst by Dr. Horsfield they are considered as the types of one of the five primary divisions of the Diurnal Lepidoptera, most of the other Nymphalidæ belonging to one of his other primary divisions.

These butterflies are of the middle size, with the wings ornamented beneath with eye-like spots, and entire or scalloped, but never angulated, nor with the outer margin of the fore wings concave. They have the discoidal cell of the hind wings closed, whilst the base of one or more of the longitudinal veins of the fore wings is dilated and vesiculose. The arrangement of these veins offers no difference between this genus and the other Nymphalidæ. The two fore legs are minute and rudimental in both sexes; the antennæ are terminated by a curved club, which is generally slender and spindle-shaped, but in a few species very distinct; the eyes are either naked or hairy; the palpi are not close together, the under side being clothed with long hairs. But the most characteristic mark of distinction consists in the form of the caterpillars, which are attenuated at the posterior extremity, and pisciform, with the tail terminated by a small fork; the body is destitute of spines, and is generally pubescent, with the head more or less rounded, and sometimes heart-shaped. The chrysalis is but very slightly angulated, and almost destitute of prominent tubercles.

The species feed exclusively upon the different species of grasses, and are consequently widely dispersed almost over the whole globe.



The relations of these insects with the other tribes of Diurnal Lepidoptera are very interesting. In the form of the caterpillars, as well as of the imago, as suggested by Mr. Curtis, they approach *Pieris* (Pontia); but the supposed resemblance with the *Melitæ* appears to me to be very slight. Boisduval has more correctly indicated the relation of their larvæ with those of *Morpho* and *Brassolis*, as well as with *Apatura*, and of the imago with *Biblis*.

The distribution of these insects has hitherto received but little attention. By Mr. Curtis (who has in these insects alone departed from his usual plan of giving only one illustration of each genus) they are formed into a single genus, divided into two groups, from the hairy or naked eyes. Mr. Stephens, by a more careful examination of the structure of the different species, has divided the genus into five sections, in the following manner:—

- A.—Eyes pubescent; wings, especially the posterior, more or less denticulated; palpi moderately hairy; frequent woods, lanes, and highways. *Ægeria*, *Megæra*.
- B.—Eyes naked; the wings, especially the posterior, more or less dentated; palpi moderately hairy; frequent heaths, commons, and meadows; subdivided, from the form of the club of the antennæ, and of the wings. *Semele*, *Galathea*, *Tithonus*, *Janira*, *Hyperanthus*.
- C.—Eyes naked; anterior wings entire, rounded, posterior dentated; palpi hairy, terminal joint short, obtuse; frequent mountainous districts or swampy heaths. *Ligea*, *Blandina*.
- D.—Eyes naked; wings elongate, pilose, entire; palpi very hairy; frequent mountainous districts. *Cassiope*.
- E.—Eyes naked; wings entire; palpi slender, moderately hairy; terminal joint very long, acute; frequent boggy heaths and marshy places in mountain districts. *Polydama*, *Davus*, *Hero*, *Ascanius*, *Pamphilus*.

M. Boisduval, in his beautiful *Icones des Lépidoptères*, has divided these insects into four genera:—*Arge* (the group typified by *Galathea*); *Erebia*, corresponding with the mountain groups (Stephens's sections C and D); *Chionobas*, an Arctic group; and *Satyrus*, formed of the remainder, and divided into nine races.

M. Duponchel, in a memoir published in the *Annals of the French Entomological Society* for 1833, has regarded these insects as constituting but a single genus, and as divisible into nine groups, characterised by the variations in the dilatation at the base of the veins of the wings (a character entirely neglected by our English authors), and the form of the antennæ. The following are his groups, with the names of the English species belonging to each.

1. GRAMINICOLES, *Galathea*. 2. ERICICOLES, *Phædra*. 3. RUPICOLES, *Briseis* and *Semele*. 4. HERBICOLES, *Janira* and *Tithonus*. 5. VICICOLES, *Megæra* and *Ægeria*. 6. RAMICOLES, *Hyperanthus*. 7. DUMICOLES, *Hero*, *Ascanius*, *Iphis*, *Davus*, and *Pamphilus*. 8. ARCTICOLES (no British species). And 9. ALPICOLES, *Cassiope*, *Blandina*, and *Ligea*.

The great extent of the group, and the variation in the characters noticed above, to which others of still greater importance (but which have been neglected by preceding authors) must be added, induce me, after much consideration, to break up the old genus *Hipparchia*, instead of treating it as I have done the *Fritillaries* and *Vanessæ*, and to adopt a plan of distribution intermediate between those of Boisduval and Duponchel. The genera *Arge* (Graminicoles, Dup.), *Chionobas* (Arcticoles, Dup.), and *Erebia* of Boisduval (Alpicoles, Dup.), appear to me to be natural groups, although there is a marked difference in the form of the wings of *Blandina* and *Cassiope*, belonging to the last-mentioned group; but the genus *Satyrus* of Boisduval is a complete magazine, comprising species with naked and hairy eyes; smooth and pubescent larvæ; one, two, or three of the veins dilated at the base, etc. From this mass I therefore propose to detach the Vicicoles of Duponchel, having, in



addition to his characters, the eyes hairy, and his Dumicoles, additionally distinguished by the glabrous larvæ and very long terminal joint of the palpi. I thus leave together all the species which have the anal vein of the fore wings not swollen, the mediastinal and median alone being more or less dilated. This group will therefore correspond with Mr. Stephens's section B, after the removal of *Galathea*.

These groups are further confirmed by the variations in the structure of the fore feet in the different sexes; a character which has been neglected by all previous authors, except Mr. Curtis, who, without noticing the variations or even the sexual distinctions in this part, merely describes the fore tarsi of the genus as four-jointed; whilst Zetterstedt states that the males have the fore legs pilose, and the females almost naked, without mentioning the difference in the number of their joints or in their formation.

#### DESCRIPTION OF PLATE XVII.

INSECTS.—Fig. 1. *Arge Galathea* (the Marbled White Butterfly). 2. Showing the under side. 3. The Caterpillar. 4. The Chrysalis.

„ Fig. 5. A dark variety of *H. Galathea*. 6. Showing the under side.

„ Fig. 7. *Lasiommata Aegeria* (the Speckled Wood Butterfly). 8. Showing the under side. 9. The Caterpillar. 10. The Chrysalis.

Fig. 1, *Arge Galathea*, from an English specimen in Mr. Westwood's cabinet, is exactly identical with several which I took in Italy, in the neighbourhood of Civita Vecchia; and yet the varieties found on the Continent (by many considered distinct species) are almost numberless. The present it would seem, however, is the type of the species, as it is by far most abundant and constant. In England the species does not seem so prone to variation, but several varieties have nevertheless occurred; one of the most remarkable of which is the dark one, No. 5 and 6 of this Plate, first figured and described by the Rev. W. T. Bree, in the Magazine of Natural History. The dark markings of this handsome species are generally described as *black*, but they are in fact a deep rich *brown*. This want of exact accuracy in entomological descriptions exists also in other species: for instance, the dark portion of the apex of the anterior wings of *Cynthia Cardui*, generally described as black, is also a full rich brown; and this is not the case in pale specimens only, but on the contrary is still more evident in the most strongly marked individuals. This may be at once very plainly illustrated by comparing the markings in question with those of a really pure black, in *V. Urticæ* or *P. Machaon*, or many others. The absence of accurate discrimination in describing dark colours is perhaps not of much consequence, and yet, as it might so easily be corrected, it appears desirable that attention should be called to it. I will mention one instance where, in consequence of this defect, the description might almost apply to some other insect. In the Naturalist's Library, Entomology, vol. iii., *Vanessa Atalanta* is described as having "the upper side of a deep black, with a deep silky gloss," etc., etc. The rest of the description is accurate; but that portion which makes the entire ground deep black is quite the contrary. The fact is that the ground of the posterior wings is a fine rich silky brown, and the anterior wings are of the same colour from the base as far as the red band, beyond which the ground-colour is intense violet approaching to black, but not black.

*L. Aegeria* is from a very brightly marked specimen in the collection of Mr. Westwood, very much brighter than the individuals which I have been in the habit of taking on the Continent; the light markings of which, instead of being of a light, clear straw colour, are generally of a dusky orange. The caterpillars and chrysalides are from Godart. H. N. H.

#### GENUS XV.

##### ARGE,\* SCHRANK.

This genus is distinguished by having the eyes naked; the antennæ elongated, with a long and slender spindle-shaped club gradually commenced; the palpi are composed of attenuated joints, the last of which is distinctly pointed and naked at the tip, the under side of the preceding joints clothed with long hairs; the hind wings are dentated; the mediastinal vein alone of the fore wings is vesiculous at the base, both above and beneath. The fore legs, in both sexes, are so extremely minute as not to be visible amongst the hairs upon the

\* Probably derived from *Ἀργῆς*, *albus*, from the prevailing white colour, or else from *Ἀργός*, *otiosus*, from the weak flight of the insect.



breast; those of the female are still more minute than those of the male, but shorter and thicker in proportion to their size; they are alike clothed with scales, and the tarsal portion is not articulated.

The larvæ have the body slightly thickened in the middle, cylindric, attenuated to the tail, which is forked. The chrysalis is destitute of tubercles.

The perfect insects are found in grassy places in woods.

This genus is exclusively composed of the species (numerous on the Continent, but of which only one has been found in England) which have the ground-colour of the wings white, marked with black spots; hence they are called by the French *Leucomélaniens*, White Satyrs and Semi-deuils (half-mourners). They constitute the group *Graminicoles* of Duponchel. M. Lefebvre has published a valuable memoir on this group, in the first volume of the *Annals of the Entomological Society of France*.

#### SPECIES 1.—ARGE GALATHEA. THE MARBLE WHITE HALF-MOURNER, OR MARMORESS.

Plate xvii. fig. 1—6.

SYNONYMES.—*Papilio Galathea*, Linnaeus, Haworth. Lewin Papil. pl. 28. Donovan Brit. Ins. vol. viii. pl. 258. Wilkes, pl. 100. Harris Aurelian, pl. 11, fig. g—k.

*Hipparchia Galathea*, Leach, Stephens, Curtis. Duncan Brit. Butt. pl. 23, fig. 1.

*Arge Galathea*, Boisduval, Hübner.

*Satyrus Galathea*, Latreille, Duponchel.

This singularly marked butterfly, which from the contrasts of its colours was called the "half-mourner" by our early aurelians, varies in the expanse of its wings from 2 to 2½ inches. Its colours, which are yellowish white and almost black, are distributed in nearly equal proportions over the wings. The ground-colour on the upper side is almost black, with one large whitish oval spot near the base of the costa, succeeded by four long whitish patches, the two middle ones being nearest the apex of the wings, and smaller than the others; between these and the apex are two smaller white spots, and there is a row of white submarginal spots. The hind wings have a large oval whitish spot near the base, succeeded by a very broad bar of the same colour, and with a row of submarginal white crescents varying in size.

The markings on the under surface of the wings are nearly similar, except that the blackish markings are much paler, especially in the hind wings, where they are irrorated with buff. Moreover, the fore wings have a small black eye, with a white centre near the tip; and the posterior wings have five eyes placed just above the white submarginal crescents (the third crescent from the outer angle of the wings not having an eye), and the eye nearest the anal angle being doubled.

The female differs in being of a larger size and in having the under surface of the wings of a yellower hue than in the males. Some specimens in the British Museum are so strongly characterised in this respect, that I at first thought it probable they constituted a distinct species. Varieties of this species are described both accidental and apparently permanent. Of the former, one of the most singular is represented in our plate 17, fig. 5, 6, from a specimen taken near Dover, and kindly communicated to us by the Rev. W. T. Bree, who has published a notice of it in *Loudon's Magazine of Natural History*, vol. v. p. 335. A similar variety is also figured by Ernst, *Pap. d'Europe*, 1, pl. 30, fig. 60. The black marks in this variety are very greatly suffused over the largest portions of the wings. An apparently permanent variety, with pale yellowish brown markings in lieu of the black ones, is described by Stephens. The *Arge Procida* of Herbst is esteemed by Boisduval also





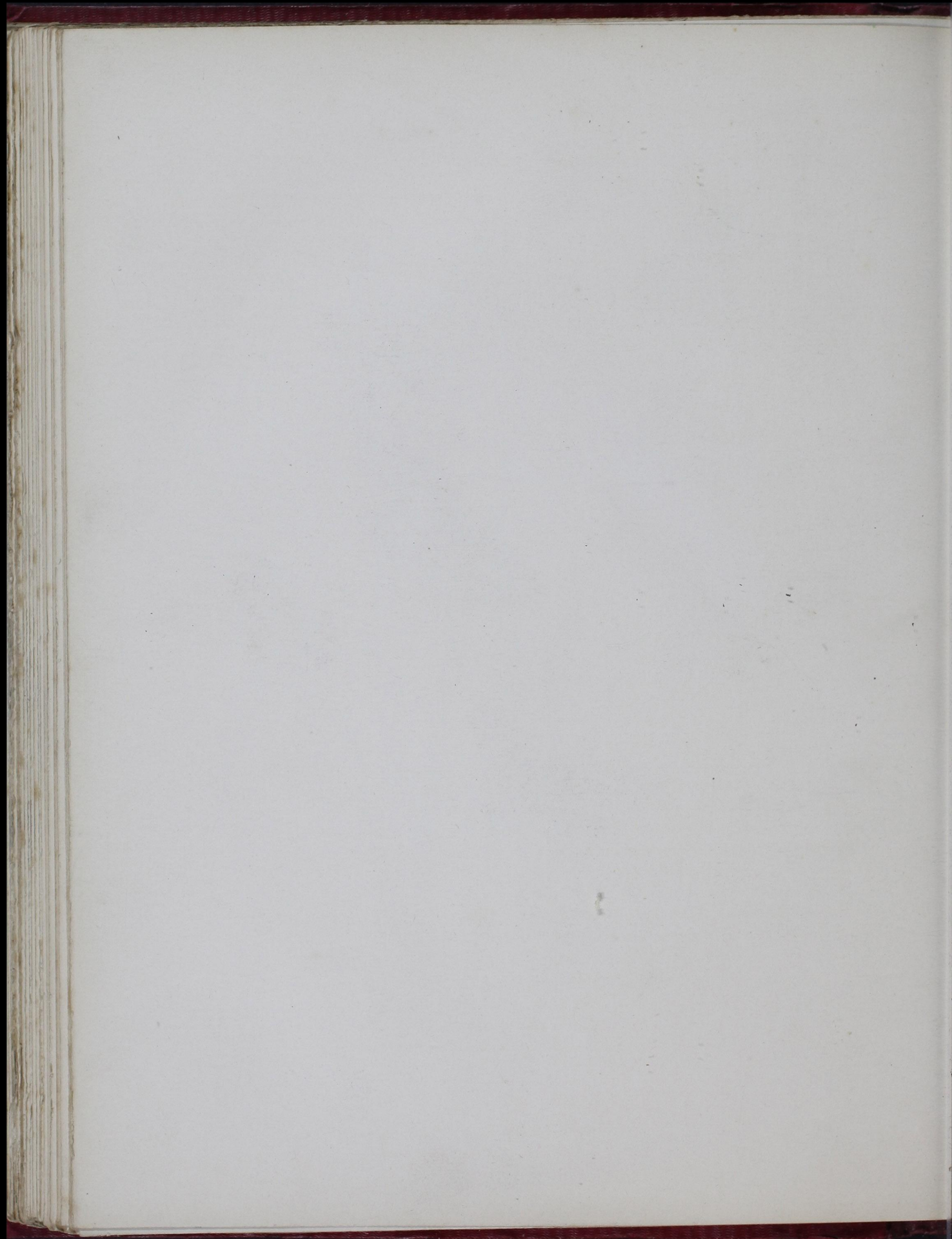














as a local variety, owing to climate: the black markings in this are much more extended, especially on the upper surface of the wings. In like manner, Boisduval regards the *Arge leucomelas* of Esper as another local variety, in which the hind wings on the under side have the black markings replaced by so very pale a shade of buff as to cause the wings to appear almost white, the eyelets being always absent.

The caterpillar is yellowish green, with a darker line down the back and on each side. It feeds on the cat's-tail grass.

The perfect insect appears in June and July. It especially frequents damp open places in woods, and although local, it seems to be distributed over the greater part of England; it has not, however, been found in Scotland.

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GENUS XVI.

LASIOMMATA,\* WESTWOOD.

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This genus is at once distinguished from all the other *Hipparchiides* by having the eyes thickly clothed with hairs, in addition to which the palpi are very slender, moderately clothed to the tip beneath with long hairs, the terminal joint being very short; the wings, especially the posterior pair, are denticulated, and considerably varied, the fore wings with one, and the hind ones with five or six eyes; the antennæ are straight, distinctly annulated with black and white, and with the club pyriform; the mediastinal and median veins are more or less swollen at the base, the anal one being simple. The fore legs, although considerably smaller than the intermediate ones, are yet very conspicuous; they are of equal length in both sexes, but those of the males are comparatively slender and more densely clothed with long slender hairs; the tarsal portion in the male is simple, but in the female it is broader and articulated with several short strong spines at the tips of the joints on the under side; the larva of *L. Megæra* is elongated, villose, with two short points at the tail, and the pupa is short, thick, with small angular points, and two points at the head; it is suspended by the tail. The chrysalis of *L. Mæra*, according to M. Marloy, is suspended by the tail in the open air; it is naked and angular with two points on the head, and with broad brown bands on the wing-covers. This genus corresponds with the first section of *Hipparchia*, of Curtis and Stephens, and with Duponchel's fifth group, *Vicicoles*, the species being stated to occur in the neighbourhood of habitations. Stephens more correctly states that they frequent woods, lanes, and highways. They form Hübner's two groups, *Pararge* and *Dira*.

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SPECIES 1.—LASIOMMATA *ÆGERIA*. THE SPECKLED WOOD, OR WOOD ARGUS BUTTERFLY.

Plate xvii. fig. 7—10.

SYNONYMES.—*Papilio Ægeria*, Linnaeus, Haworth. Lewin Papil. pl. 19.  
Donovan Brit. Ins. 14, pl. 498. Wilkes Engl. Butt. pl. 103. Harris  
Aurelian, pl. 41, fig. f-i. Sepp. 1, tab. 6.

*Hipparchia Ægeria*, Fabricius, Ochsenheimer, Leach, Stephens, Curtis.  
Duncan Brit. Butt. pl. 23, fig. 4.  
*Satyrus Ægeria*, Latreille, Boisduval, Duponchel.  
*Pararge Ægeria*, Hübner (Verz. bek. Schmett.)

This butterfly varies in the expanse of its wings from  $1\frac{1}{2}$  to 2 inches. The ground-colour of the wings on the upper side is brown. The fore wings are marked with a number (ten or eleven in the strongest marked

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\* Derived from the Greek *λαδαιος*, *hirtus*, and *ὄμμα*, *oculus*, from the hairiness of the eyes.



individuals) of pale buff patches of variable size, placed irregularly; the one nearest the apex of the wing being ornamented with a black eye, having a white dot in the centre; the hind wings are more sparingly marked with pale patches, but in the centre towards the margin they have three larger eyes placed in a bar of pale buff. On the under side, the brown colour in the fore wings is more clouded, the apex being much paler, with the eye near the tip, whilst the hind wings are more varied with lighter and darker undulations, the outer angle being paler, and a row of six white dots, varying in size near the hinder margin (which has sometimes a purplish tinge), the larger ones replacing the others of the upper side. There is great variation in the size and number of the pale spots, as well as of the clouding of the under surface of the wings, and the females are generally ornamented with larger and more numerous spots than the males.

The caterpillar of this species is green, with white longitudinal lines, and a spined tail. It feeds upon grasses, preferring the common couch-grass, and is found in March, May, and June, the perfect insect appearing in April, June, and August, there being several broods in the course of the year. It delights in lanes and glades of woods, and is a common species, occurring from Dover to the north of Scotland.

#### DESCRIPTION OF PLATE XVIII.

INSECTS.—Fig. 1. *Lasiommata Megæra*, male. 2. The female. 3. Showing the under side. 4. The Caterpillar. 5. The Chrysalis.

„ Fig. 6. *Hipparchia Semele*, male. 7. The female. 8. Showing the under side. 9. The Caterpillar. 10. The Chrysalis.

PLANT.—Fig. 11. *Bromis sterilis* (Barren Brome-grass).

The insects figured on this plate are all from English specimens in Mr. Westwood's or my own collection, and the caterpillars are from Godart.

*Hipparchia Briseis*, a common species on the Continent, having been on one occasion discovered in England, I shall take the opportunity of giving a figure of it in this work, and intended that it should have appeared in juxtaposition with *H. Semele* on the present plate. But the space does not admit of it, and it will therefore be given in the next. H. N. H.

#### SPECIES 2.—LASIOMMATA MEGÆRA. THE WALL BUTTERFLY.

Plate xviii. fig. 1–5.

SYNONYMS.—*Papilio Megera*, Linnaeus. Lewin Papil. pl. 21. Donovan  
Brit. Ins. 8, pl. 279. Sepp. v. 2, pl. 2, 3. Wilkes, 53, pl. 102.  
*Papilio Megera*, Haworth.

*Hipparchia Megera*, Ochsenheimer, Leach, Stephens, Curtis.

*Satyrus Megera*, Latreille, Boisduval, Duponchel.

*Dira Megera*, Hübner (Verz. bek. Schmett.)

*Papilio Mara*, Berkenhout. Harris Aurelian, pl. 27, fig. a–g.

This pretty butterfly varies in the expanse of its wings from  $1\frac{1}{2}$  to nearly 2 inches. The ground-colour of the upper surface of the wings is of a fulvous yellow, with several transverse irregularly undulating brown bars, the base of the hind wings being also brown, as well as the margin of all the wings. Near the tip of the fore wings is a large black eye with a white pupil; and the hind wings have a row of from three to five black eyes, varying in size, the middle ones also having a white pupil. The male differs in having a broad oblique brown bar extending across the middle of the hind part of the fore wings. On the under side, the fore wings are nearly marked as above, except that the brown bars are more slender, and the broad oblique bar of the male is wanting. The ocellus is surrounded by a brown ring, and accompanied by another minute ocellus. The under wings are beautifully freckled with ashy and brown, with many waved darker marks, forming a broadish curved bar across the middle of the wings, beyond which is a row of six beautiful eyes, that at the anal angle being double, succeeded by a row of darker waves.

The caterpillar is slender, pubescent, and of a light green colour, with darker lines on the back and sides. It





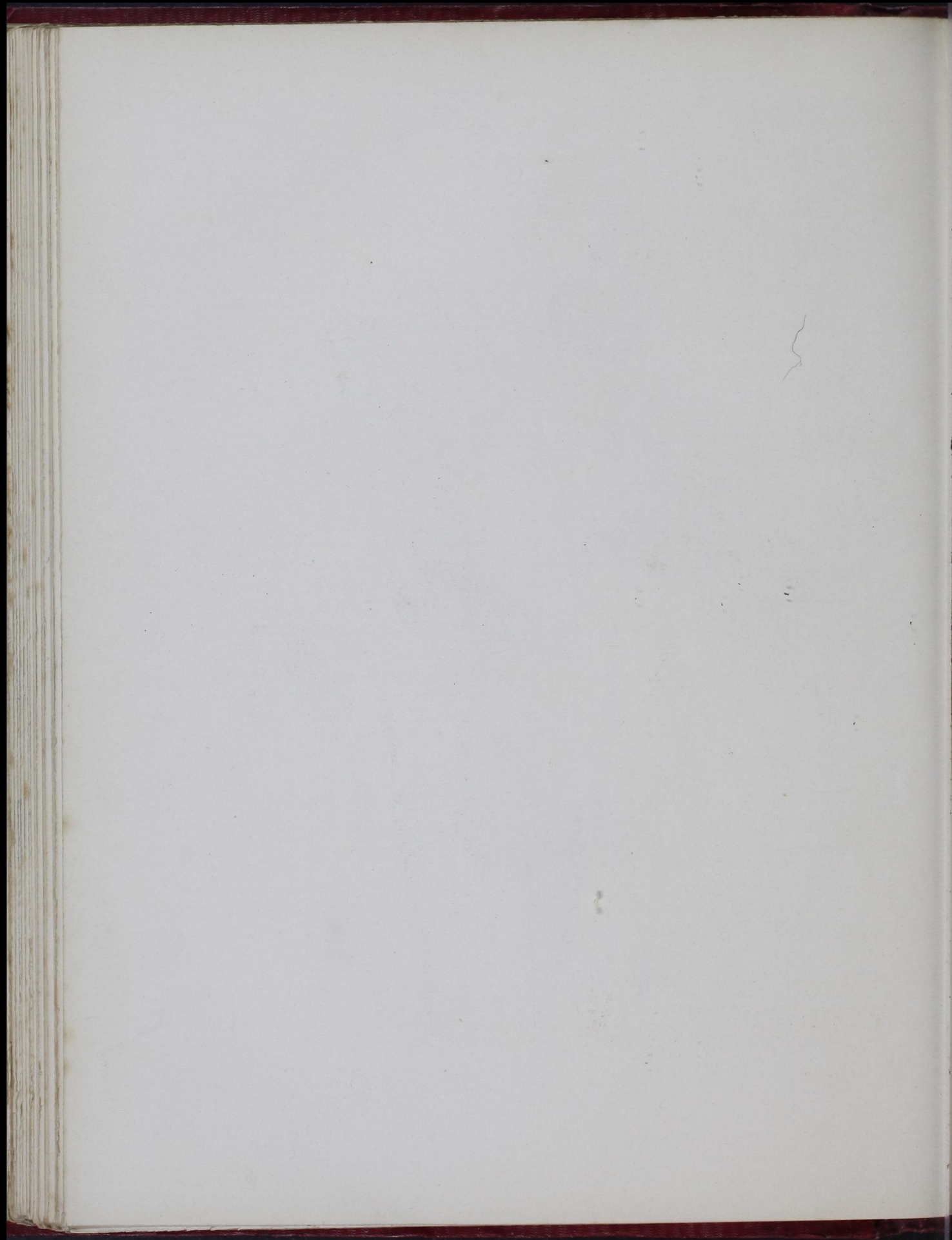














is found at the beginning of May and August, and feeds on grasses. The imago appears in July and August, and is a common and widely-dispersed species, frequenting lanes and roadsides, delighting to settle on walls (whence its ordinary English name), flying off when approached, and settling at a short distance, again to be disturbed at the approach of the passer-by.

PAPILIO MÆRA (Linnæus), a species closely allied to the preceding, and placed in the same subgenus *Dira* by Hübner, has been introduced into the English list of butterflies, in consequence of Linnæus having erroneously referred Wilkes's figure of *Megæra* to *Mæra*, which evidently induced Berkenhout to give *Megæra* under the name of *Mæra*. Although similar to *Megæra* in its markings, it is at once distinguished by the more distinct club of the antennæ, a character pointed out by Zetterstedt.

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## GENUS XVII.

### HIPPARCHIA,\* FABRICIUS.

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This genus is distinguished from the preceding (with which it agrees, in having the mediastinal and median veins above more or less dilated at the base), in the naked eyes. The wings are generally considerably variegated, and more or less denticulated, especially the hinder pair, and the palpi moderately hairy. The antennæ vary in the construction of the club, which in some species is long, slender, and fusiform, and in others abrupt and broad. The fore legs are of comparatively moderate length, and distinctly visible in both sexes, those of the males being much more densely clothed with hair, and those of the females rather larger. The tarsal portion is simple in the males, but articulated in the females, without, however, the short spines at the tips of the joints beneath observed in the *Lasiommata*.† This genus comprises the greater part of Stephens's section B of *Hipparchia*, and with Duponchel's *Ericicoles* (*Phædra*, etc.), *Rupicoles* (*Briseis*, *Semele*, etc.), *Herbicoles* (*Janira* and *Tithonus*, etc.), and *Ramicoles* (*Hyperanthus*, etc.)

The larvæ are conical, with the head round, and the tail bifurcate; they are marked with several longitudinal black stripes. M. Marloy, who has published a short notice on the larvæ of these insects, in the *Annals of the Entomological Society of France* for 1838, mentions that the chief cause why these larvæ are so seldom met with is, that they conceal themselves and remain inactive during the day, but come forth to feed by night, when they may be found in great numbers with the help of a lamp. The caterpillars of *Briseis* and *Semele* form large cocoons under ground, composed of grains of earth fastened together with a little silk; their chrysalides are short, ovoid, glabrous, contracted, with the head obtuse and the tail pointed. *Janira* differs from the preceding, in having the chrysalides naked, angular, with the head bifid, and suspended head downwards. The larva of *Tithonus*, according to Boisduval, has the hairs of the body bifid.

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\* Unmeaningly derived, by Fabricius, from the Greek ἵππαρχία, *præfectura equitum*.

† The tarsi above described are those of *Semele*. Those of *Janira* are shorter (although conspicuous) and very slightly pilose, with the tarsal portion in the males short and slightly compressed, but longer in the females, and articulated. In other respects they are nearly alike in size and appearance. In *Tithonus* they are very minute in both sexes, but rather larger in the females, and very slightly hairy in the tarsal part, more elongated than in the male, and thick at the tip. The same minuteness of size occurs also in *Hyperanthus*, thus confirming the subdivisions established on other characters.



## SPECIES 1.—HIPPARCHIA SEMELE. THE GRAYLING.

Plate xviii. fig. 6—10.

SYNONYMES.—*Papilio Semele*, Linnaeus. Lewin Papil. pl. 17. Donovan  
 Brit. Ins. pl. 259. Haworth. Harris Aurelian, pl. 44, fig. d, e.  
*Hipparchia Semele*, Ochsenheimer, Leach, Stephens. Duncan Brit. Butt.  
 pl. 22, fig. 1, 2.

*Satyrus Semele*, Latreille, Boissduval, Duponchel.*Eumenis Semele*, Hübner.

This is the largest of our common British *Hipparchiæ*, measuring from  $2\frac{1}{3}$  to more than  $2\frac{1}{2}$  inches in expanse. The fore wings on the upper side are of a dull brown colour, with a broad interrupted bar of various size near the extremity, in which are two black eyes; the hind wings are brown at the base, with a brighter coloured bar near the margin, having a single black eye with a white centre, near the anal angle; on the under side, the fore wings are darker at the base, with the extremity yellowish or pale buff, terminated by a narrow dusky margin. The two ocelli are here distinct, the anterior one being largest; the under wings on this side are marked with very numerous, short, slender, transverse, white, brown, and black streaks; the basal half is darkest, and is terminated by a very irregular broad paler bar; near the anal angle is a nearly obsolete eyelet.

The markings vary greatly in size as well as in the intensity of their colours; and the females have the marks and eyes larger, but paler.

The caterpillar is green or grey, with the belly and legs brownish; it is rather more than an inch long; its body is thick, hard, and conical, with five blackish longitudinal lines, the dorsal one being the darkest. It forms a cocoon in the earth, according to M. Marloy. The butterfly, which appears in July, is rarer than the preceding, owing to its preferring certain localities, such as heaths (Newmarket, Gamlingay, and Salisbury Plain, for example); and rocky places, such as Arthur's Seat, near Edinburgh; and stony places, near Durham and Castle Eden Dene. Mr. Wailes also observed it frequently on the sea-coast, near South Shields, where the magnesian limestone occurs, although not found on the opposite side of the Tyne, where there is no limestone.

*PAPILIO PHÆDRA* of Linnaeus appears to have been introduced by Turton as a British species, without sufficient authority. It has all the wings on the upper side of a deep uniform brown, the fore ones with two large ocelli, and the hinder ones with a single minute one near the anal angle. It measures  $2\frac{1}{2}$  inches in the expanse of its wings.

*PAPILIO ALCYONE* of Esper has also been erroneously given as a native of Scotland by Stewart, who mistook *Blandina* for it. It has the wings brown with a whitish bar, the anterior having two ocelli on each side, and the posterior beneath marbled, with a white angular bar and a single ocellus.

## DESCRIPTION OF PLATE XIX.

INSECTS.—Fig. 1. *Hipparchia Briseis*, female. 2. Showing the under side.

„ Fig. 3. *Hipparchia Tithonus* (the large Heath Butterfly), male. 4. The female. 5. Showing the under side. 6. The Caterpillar.  
 7. The Chrysalis.

PLANT.—Fig. 8. *Poa pratensis* (Common Meadow Grass).

The *Hipparchia Briseis* figured on this plate seems to have a fair claim to be considered British, as it was raised from the caterpillar found in the neighbourhood of London; of which I much regret not being able to give a drawing. It will be seen, on comparison with the figure in the previous plate, that the insect is closely allied to the common *H. Semele*. H. N. H.







GENERAL DESCRIPTION

SPECIES 1. *HYDROPHILA REMANE* THE GRAYLING

Length 1.5 m.

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The body is elongated, with a slightly flattened head. The head is large, with a broad snout. The eyes are large and prominent. The mouth is wide and deep. The gills are large and prominent.

The body is covered with scales. The scales are large and prominent. The scales are covered with a thin layer of mucus. The scales are covered with a thin layer of mucus. The scales are covered with a thin layer of mucus. The scales are covered with a thin layer of mucus.

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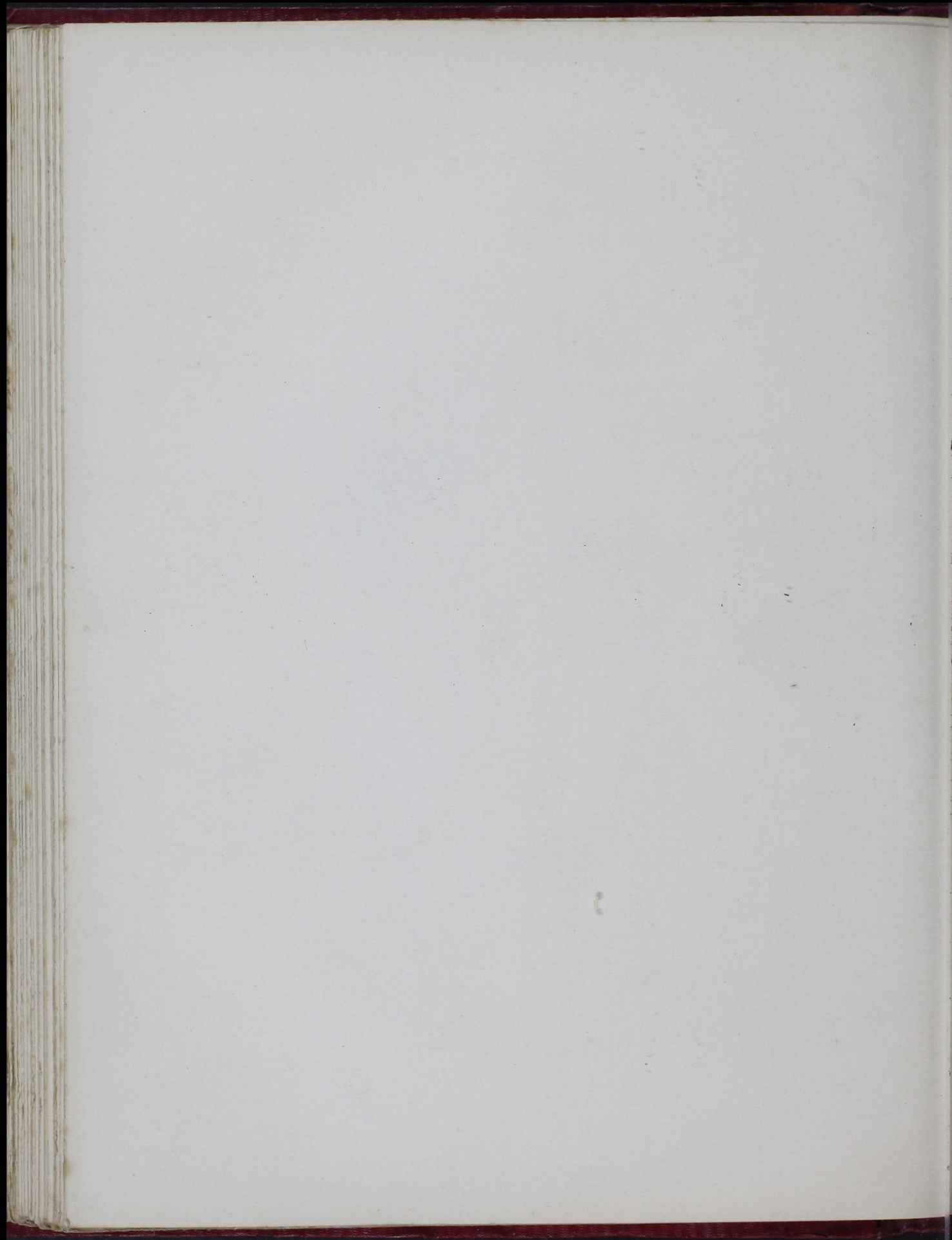
DESCRIPTION OF THE SPECIES

The body is elongated, with a slightly flattened head. The head is large, with a broad snout. The eyes are large and prominent. The mouth is wide and deep. The gills are large and prominent. The body is covered with scales. The scales are large and prominent. The scales are covered with a thin layer of mucus. The scales are covered with a thin layer of mucus.











## SPECIES 2.—HIPPARCHIA BRISEIS.

Plate xix. fig. 1, 2.

SYNONYMES.—*Papilio Briseis*, Linnæus, Fabricius. Ernst Pap. 1, pl. 21, fig. 36, a—d. Naturforscher, 10, tab. 2, fig. 3, 4.*Hipparchia Briseis*, Ochsenheimer.

This fine species measures about  $2\frac{1}{2}$  inches in the expansion of the wings, which are denticulated, and of a brown colour, having a greenish gloss. The anterior have an interrupted row of pale buff spots near the outer margin, which are extended across the hind wings; moreover the fore wings are marked with two black ocelli, with a white centre. The under surface of the fore wings is more varied with brown and buff than the upper, especially towards the base, and is marked on the costa with two blackish spots, and the tip is freckled. The hind wings also on this side are freckled with short transverse streaks. A very irregular paler bar runs across the middle of the wing, succeeded by a darker waved one, in which are several rudimental ocelli.

The caterpillar is smooth, thick, and greyish coloured, conical, with five longitudinal dark lines, the dorsal one being the darkest; the head is round and red. It forms a cocoon under ground, according to M. Marloy.

We have introduced this common continental species for the first time as an English insect, a specimen having been reared by A. Lane, Esq., from the larva which was found feeding on grass near Newington. The perfect insect was exhibited at the meeting of the Entomological Society, on the 7th of October, 1839, the larva having been captured on the 11th of August preceding.

## SPECIES 3.—HIPPARCHIA TITHONUS. THE GATE-KEEPER, OR LARGE HEATH BUTTERFLY.

Plate xix. fig. 3—7.

SYNONYMES.—*Papilio Tithonus*, Linn. (Mantissa). Lewin Pap. pl. 22. Harris Aurelian, pl. 44, fig. f, g.*Hipparchia Tithonus*, Ochsenh., Steph., Curtis. Duncan Brit. Butt. pl. 23, fig. 2, 3.*Pyronia Tithonus*, Hübner (Verz. bek. Schmett.)*Papilio Tithonus*, Villars (not his *Pilosellæ*).*Papilio Herse*, Hübner, Pap.*Papilio Phædra*, Esper.*Papilio Pilosella*, Fabricius, Haworth. Donovan Brit. Ins. v. 12, pl. 405.

This common butterfly varies from  $1\frac{1}{2}$  to nearly 2 inches in the expanse of its wings, the ground-colour of which on the upper side is of an ochre yellow, with a broadish brown margin. The base of all the wings is also brown; near the apex of the fore wings is a large black eye, in which are two small white dots; near the anal angle of the hind wings is also a nearly obsolete eye, more strongly marked in the female. The male is distinguished by its smaller size, more obscure colouring, and by having a broad brown oblique patch in the middle of the posterior disc of the fore wings. The fore wings on the under side are coloured as on the upper, except that the brown patch is wanting in the males; the hind wings, on the contrary, are of a golden brown at the base and margin, with an irregular waved greyish buff band running across the middle, having a brown patch near the outer angle, in which are two small eyes, and another patch and ocellus towards the anal angle, sometimes accompanied by one or two small white ocelli. The size of these ocelli, as well as their number, varies in different specimens.

The caterpillar is greenish, pubescent, with a reddish line on each side, and a brownish head. It feeds on the annual meadow-grass, and also (according to Haworth) on the *Hieracium Pilosella*. It is found in this state in the beginning of June, and the butterfly appears in the middle of July. It is a very abundant species, frequenting pasture lands and lanes throughout the kingdom.



## DESCRIPTION OF PLATE XX.

INSECTS.—Fig. 1. *Hipparchia Janira*, male (the Meadow Brown Butterfly). 2. The female. 3. Showing the under side. 4. The Caterpillar. 5. The Chrysalis.

„ Fig. 6. *Hipparchia Hyperanthus* (the Ringlet Butterfly). 7. Showing the under side. 8. The Caterpillar. 9. The Chrysalis.

PLANT.—Fig. 10. *Poa annua* (Annual Meadow Grass).

*H. Hyperanthus* has been grouped with *H. Janira* upon this plate to display the singular resemblance of the male insect of the two species on the upper side, while they are so strikingly different beneath. H. N. H.

## SPECIES 4.—HIPPARCHIA JANIRA. THE MEADOW BROWN BUTTERFLY.

Plate xx. fig. 1—5.

SYNONYMS.—*Papilio Janira*, Linnæus (male), Turton, Stewart.

*Hipparchia Janira*, Ochseneimer, Stephens, Leach, Curtis, Duncan  
Brit. Butt. pl. 24, fig. 1, 2.

*Papilio Jurtina*, Linnæus (female). Lewin Pap. pl. 18. Donovan, 1, pl. 320.

Haworth. Harris Aurelian, pl. 32, fig. a—c.

*Papilio Hyperanthus*, Wilkes, 53, pl. 101. Albin, pl. 53, fig. a—e.

*Epinephile Hyperanthus*, Hübner (Verz. bek. Schmett.)

This most abundant species varies in the expanse of its wings from  $1\frac{1}{2}$  to 2 inches. As its English name imports, the prevailing colour of the wings on the upper side is obscure brown or almost black, especially in the males. Both sexes have a small black eye, with a white centre, placed on a small fulvous patch near the tip of the fore wings; and the female has a large fulvous patch beneath the ocellus, which is sometimes also slightly visible in the males; on the under side the wings are brighter coloured, the fore ones being dark orange yellow, lighter beyond the middle, and with the margin pale brown. The ocellus near the apex is also here present; the basal half and the margin of the hind wings are tawny brown, separated by a broad irregular paler bar, in which are from one to three minute dark dots. The markings of this species, however, greatly vary in size, as well as occasionally in colour; and the ocellus of the fore wings is sometimes without and sometimes with two white dots; occasionally also it is accompanied by one or two black spots beneath, as in fig. 2. A very remarkable variety is represented in our supplemental plate (xlii. fig. 6).

The caterpillar is pubescent, green, with white longitudinal lines, and the tail is forked. It feeds on several species of grass, especially *Poa pratensis*. The chrysalis is naked and angular, suspended by the tail, with two sharp points at the head.

The butterfly, which is to be found in every meadow and grassy lane, is one of the commonest of our English species, and occurs all over the kingdom. Mr. Knapp, the author of the pleasing *Journal of a Naturalist*, notices that it appears but little affected by the diversity of seasons, being equally copious in damp and cheerless summers as in the driest and most arid ones. In 1826, however, which was exceedingly parched, the number of these butterflies was so great as to attract the attention of different persons.

Linnæus mistook the sexes of this butterfly for different species; but their specific identity has long been unquestionably established. In such cases the name given to the male specimens is retained instead of that of the female.

## SPECIES 5.—HIPPARCHIA HYPERANTHUS. THE RINGLET BUTTERFLY.

Plate xx. fig. 6—9.

SYNONYMS.—*Papilio Hyperanthus*, Linnæus. Lewin Pap. pl. 20. Donovan  
Brit. Ins. 8, pl. 271. Haworth. Harris Aurelian, pl. 35, fig. d—h (not of  
Wilkes).

*Hipparchia Hyperanthus*, Ochseneimer, Leach, Stephens, Curtis,  
Duncan.

*Papilio Polymeda*, Scop. Hübner, Pap.

*Satyrus Hyperanthus*, Boisduval.

*Enodia Hyperanthus*, Hübner (Verz. bek. Schmett.)

This plain-coloured butterfly varies in the expanse of its wings from  $1\frac{1}{2}$  to nearly 2 inches. The upper surface of all the wings is dark brown, without any shade or mark except one or two small and more or less