THE

BUTTERFLIES AND MOTHS

OF TENERIFFE.

THE BUTTERFLIES AND MOTHS OF TENERIFFE.

BY

A. E. HOLT WHITE.

EDITED BY

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πειρατα γαιης
Τῇ περ ῥηίστη βιοτὴ πέλει ἀνθρώποισιν·
Οὐ νιφετὸς, οὔτ' ἂρ χειμὼν πολὺς οὔτε ποτ' ὄμβρος,
Ἀλλ' αἰεὶ Ζεφύροιο λιγὺ πνείοντας ἀήτας
Ὠκεανὸς ἀνίησιν ἀναψύκειν ἀνθρώπους·

HOMER, Od. iv.

Omnia bene describere, quæ in hoc mundo a Deo facta, aut naturæ creatæ viribus elaborata fuerunt, opus est non unius hominis, nec unius ævi. Hinc Faunæ et Floræ utilissimæ ; hinc monographi præstantissimi.

SCOPOLI, Ann. Hist. Nat.

TO

ELIZABETH MARY ODLING

IN MEMORY OF

MANY HAPPY DAYS SPENT WITH HER AND HER FATHER

THE LATE ALFRED SMEE, F.R.S.

THIS BOOK

Is dedicated by

HER AFFECTIONATE FRIEND

THE AUTHOR.

LONDON:
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PREFACE.

When the author left England, in the autumn of 1892, for a winter's sunshine in Teneriffe, it was by no means her intention to write on the Lepidoptera of that Island. Soon after her arrival, however, she was struck by two things; the want of any sort of interesting out-door occupation (other than somewhat desultory riding expeditions) experienced by her companions in exile, and the absence of any account of the Lepidoptera of the Canary Islands, which would enable collectors to name their specimens. It is her hope that the present publication may be, at least to some extent, the means of remedying these deficiences.

To a detailed description of the Lepidoptera of Teneriffe, so far as they are at present known, an introductory

chapter has been added, for the benefit of novices in the study and collection of butterflies and moths.

Those, for whom fresh air and a certain amount of exercise are essential, can hardly find any more health-giving or light interesting occupation than the practical study of Entomology.

This study lends an interest to excursions which might otherwise be tedious, and leads the collector into all sorts of beautiful and picturesque unexplored nooks and corners of the Island, which to the ordinary traveller are quite unknown. Many visitors hardly ever extend their wanderings farther than the Carretera (the one high road in Teneriffe), and have no idea of the many beauties to be seen, or of the interest that may be found in studying the Botany, as well as the Entomology, of this most charming of the "Summer isles of Eden lying in dark-purple spheres of sea."

All the species and varieties of Teneriffe butterflies, with the exception perhaps of three, are found between the months of November and May; so that anyone staying there for the winter and spring months may

procure a tolerably perfect collection; more especially as the different species found in Teneriffe are but twenty-nine, so far as is at present known, all of which are now described. The author has been fortunate enough to add four of these to the number previously known to exist in the Island.

The most complete collection of moths which came under notice is in the possession of Dr. Zorolo, of Villa Orotava, and this numbers about seventy species and varieties. Forty-one moths are described out of some fifty which were collected and studied by the author; and a list of twenty-one others, chiefly small and of little interest to the amateur collector, is appended.

Almost all the facts and particulars relating to the life history of the Lepidoptera are the result of the personal experience of the author, who is also responsible for the drawings from which the illustrations have been reproduced.

It is believed that the Lepidoptera of the other six Islands are largely similar to those of Teneriffe. (See Appendix A.)

The author desires to offer her best thanks to Señor Don Ramon Gomez, of Puerto Orotava, for his kindness and courtesy in placing his large collection of Lepidoptera at her disposal for study and illustration.

The Rev. O. A. Benthall has kindly given information upon specimens which he has netted and observed; and the author is also indebted to Dr. Zorolo, of Villa Orotava, who has lent one or two rare specimens for illustration. Kind assistance in naming some specimens has been given by A. G. Butler, Ph.D., F.L.S., F.Z.S., and Mr. W. F. Kirby, F.L.S., F.E.S., of the British Museum; and Mr. Bethune Baker, F.E.S., has been good enough to name some of the smaller moths.

A. E. H. W.

November 1893.

INTRODUCTORY CHAPTER.

MANY persons who know little or nothing about butterflies may be tempted to make a collection of them when they find themselves in a semi-tropical land, which yields in great profusion such beautiful creatures, whose brilliant colouring when grouped together has so pleasing an effect. To such, a slight sketch of the life of a butterfly may not be unacceptable.

Butterflies and moths belong to the order Lepidoptera or Scale-winged insects. The different stages of growth of these insects are called the—

Ovum.	*Larva.*	*Pupa.*	*Imago.*
Egg.	Caterpillar.	Chrysalis.	Butterfly.

The body consists of three parts: the head, the thorax, and the abdomen. There are two pairs of wings, the upper and the lower; or, as they are generally called,

the fore and the hind wings. These are covered with a downy substance, like feathered scales, which are most beautiful when seen under a microscope, and vary much in form. It is in these that the colouring-matter resides, which gives the beautiful colour to different species. Lepidoptera have six legs; in some, however, the fore-legs are so short and inconspicuous that the insect almost appears to have only four legs. The proboscis or trunk is a long flexible double tube through which the animal sucks the juices of the flowers; it is curled up under the thorax like a watch-spring, and expands at will. It varies much in length both in moths and butterflies. The antennæ are the horns or feelers of the insect, and are believed to contain the organs of smell. They vary much in size and thickness, and are most important as regards the classification of the different species of Lepidoptera. They are generally of considerable length in a butterfly, increasing in thickness at the end till a sort of long knob is formed.

Moths are distinguished from butterflies by a few simple characteristics, which can be seen at a glance.

First, with some few exceptions, of which the Humming

Bird Hawk moth is one, moths are always found on the wing at dusk, or at night, whereas butterflies take their flight by day. Secondly, the moth either folds its wings close to its side or else spreads them out flat. The butterfly, when at rest, as a rule keeps its wings straight up, face to face, or else keeps up a fluttering motion, continually putting them in this position. Thirdly, the body of a butterfly is small at the waist, while that of the moth is larger, and of a more uniform size. The antennæ are the most distinctive feature, those of the moth being fine and long, and having no knob at the end. In some species they are short and finely feathered the whole length, terminating in a sharp point; this feature is generally distinctive of the male sex; the Rufescens moth being an example. The Skipper family have antennæ like the butterfly, but the body of a moth.

The butterfly or moth lays its egg (not more than a pin's head in size) on that particular plant or tree on which the caterpillar, that it will shortly become, feeds. These look of much the same form to the naked eye, but when magnified they are seen to be of many different shapes, some being conical, others round, angular and

many sided, &c., &c. The colours also of the eggs are various, but most frequently they are yellow, green, or greenish white. A microscopic examination of these will prove both interesting and instructive.

The caterpillars, as soon as they emerge from the eggs, the time of which varies with different species, at once commence to eat, and continue to do so voraciously till they turn to the pupa state. This being the case, they must be constantly supplied with fresh food when kept in captivity, once certainly, if not twice a day. There are, however, one or two varieties which cease to eat, and lie in a semi-dormant state for some time before taking the form of a chrysalis; the caterpillar of the Exoleta moth is an example of this. The greatest cleanliness, together with good ventilation, freshness of food, and regularity in feeding, are essential to keep all caterpillars in health.

If we watch the creature feeding, we shall observe that it takes the leaf edgeways between its two fore-feet, ceaselessly moving its head up and down, and taking a large piece of leaf at each mouthful. Some moth-caterpillars are night-feeders, and so hide themselves under

the thickest leaves on which they feed, or else bury themselves in the earth till night comes again.

Cannibal caterpillars are to be found on the potato-plants; they are of rather a reddish brown colour, from an inch and a half to two inches in length. The author was not very fortunate in rearing them to the moth-stage; it is said that they should be fed on the young larvæ, and possibly the specimens had caterpillars to feed on that were too old. There is room for interesting experiments in Teneriffe on one, if not more, species.

Many of the caterpillars are most beautifully coloured and marked. Those of the Hawk-moth are usually the most brilliant, but, at the same time, they are most delicate, and require the greatest attention as regards freshness of food, ventilation, and cleanliness.

Some larvæ shed their skins twice only, others moult seven times; but the majority effect this change four or five times. This is rather a laborious process for them, and sometimes proves fatal. During the process they cease feeding, but commence again with renewed vigour after the change has taken place. The colourings and

markings of the new coat often vary from those of the one cast off, and an experienced entomologist can tell the age of the caterpillar by the colour and texture of the skin in many varieties. When the creature has passed through the larva and arrived at the pupa state, it has at first a soft and tender skin, through which parts of the future butterfly can be clearly seen; this soon hardens, however, and forms a case impervious to rain or other atmospheric influences.

Before taking the pupa form some caterpillars creep into holes and crevices of walls and old buildings, others bury themselves in the earth; some envelop themselves in a tissue of silk which they spin as a silkworm does, and this case is called a cocoon. Other species draw a leaf round their bodies, fastening it together with silk-like threads, and so making a complete shelter for itself. The Aurifera caterpillar is an example of this type, being commonly found in Teneriffe on the potato plant, from the leaf of which it constructs its house. Still further varieties suspend themselves to a bough or leaf head downwards. There are other varieties which suspend themselves from the centre of their bodies

by silk-like threads, and use much ingenuity in so doing.

Many caterpillars are smooth, others rough and hairy. The hairy specimens vary much, the hair of some being soft, long, and silky, others having short stubby spikes rather than hairs sparsely dispersed over the body. The hairy species (the Rufescens moth caterpillar being one) use their hairy coats as a slight cocoon, and the hairy coat also, it is said, serves as a protection from birds; at the same time the hairs cause great irritation to the human skin if the caterpillars are handled too freely. The acrid taste of some also protects them from feathered enemies. When the insect has remained in the pupa state for a sufficient length of time, which varies according to species from a couple of weeks to a few months, the process of throwing off its skin is quickly performed. Weather has much influence on the period during which the pupa lies dormant. The Teneriffe winter of 1892-93 was particularly warm, and all specimens emerged to the butterfly stage somewhat earlier than usual.

A few days before the butterfly or moth appears, the

pupa becomes less lively, and at last splits its skin down the middle of the back, and the insect squeezes first its head and front legs through the aperture. This aperture soon enlarges, the pupa skin being very dry and giving little resistance, and the creature emerges, its legs clinging to some substance so that the wings are in a suspended position. These are quite small at first and wet, but they expand very quickly, acquire their full size, and become firm and stiff as the animal flutters and crawls about. The insect then emits a quantity of reddish fluid, and in a short time it is able to fly away. The duration of the life of Lepidoptera varies much, most species living a few days or a few weeks, but some hibernate. The flight of Lepidoptera is a very distinctive feature of the different species, the larger, such as the Plexippus, Chrysippus and Pandora, seem to sail through the air, sometimes rising to a great height. The Cardui and Huntera have a much quicker and more jerky flight, and are troublesome to net. A great many of the large moths may be said to rush along, the Convolvuli being a very difficult one to capture, and often escaping when it seems quite within the net. Taking

the flight of the majority of moths and butterflies, they seem to be more active and stronger on the wing in Teneriffe than those of the same species in England.

The food of Lepidoptera consists of honey which they take from the flowers, or else a moisture which exudes from trees or plants. Their food is always of a liquid form, and is sucked up through the proboscis or long tongue. The Convolvuli moth hovers at dusk over flowers, inserting its very long tube into the extremity of trumpet-shaped blossoms.

When forming a collection of the Lepidoptera of Teneriffe, it seems a pity that so many insects should be unnecessarily caught and destroyed, and the author would earnestly beg all lovers and collectors of the beautiful creatures to bear this in mind, as some of the rarer varieties may otherwise stand a good chance of being exterminated.

The "muchachos" (Spanish boys) are all too eager to supply any collector with specimens for a few "quartos," and bring many poor mutilated insects in the hope of finding a purchaser. A refusal to buy the much be-fingered and dilapidated creatures does not deter them

from further pursuit, as they only endeavour to catch a greater quantity in the hope of at last getting a good specimen which will find a buyer. If collectors would only net them themselves, and not encourage the indiscriminate way in which the boys pursue them, it would greatly tend to preserve the different species.

HINTS AND SUGGESTIONS ON NETS, BREEDING-CAGES, ETC.

As some difficulty is experienced in Teneriffe by persons who arrive there without already being provided with materials for collecting Lepidoptera, the description of a few useful expedients resorted to may be of service. A moderate knowledge of the Spanish language is a very useful help towards obtaining any small necessaries, but the Spanish shop-keepers are most obliging, and understand quickly by the help of a very few words what is wanted.

A butterfly-net is one of the first requisites, so some wire must be bought at the tin-smiths, of whom there are several in Orotava. With a little instruction he will make it into a ring about one foot in diameter, with a socket of tin soldered on to it. Into this socket an ordinary walking-stick can be fixed for a handle. The stick is useful to walk with over the rough ground

when not required for the net, and the net can be easily carried with other necessaries one has to take on an expedition.

Mosquito-netting answers the purpose of green gauze for the net. Gauze is the best, however, and can be purchased in England, but not in Orotava. The mosquito-netting gets soft and pliable by use, but it is best to scald it in hot water before making it into a net, so as to insure a soft substance in which to catch the fragile creatures without injuring their wings or plumage. The net should be made round at the bottom, and be about a yard in length. Purchase a yard of mosquito-netting; it is sold two yards in width, and the quantity which is not used for the net serves to cover the breeding-cages, which are about to be described.

Another essential is a breeding-cage for caterpillars, and, as several are required if many butterflies and moths are to be reared, the following plan is a good one to adopt. Procure a small wooden box, about 6 or 8 inches long, or even larger, and about 3 inches deep; empty chocolate boxes are serviceable for the purpose. In each corner fix upright, with a couple of tacks, a

piece of cane about 8 or 10 inches in length. Over this stretch a piece of mosquito-netting, tacking it to the edge of the box all round, except at one side, where it should be left loose, so as to be fastened down at will with two or three stout pins. The loose side can then be raised to give the caterpillars fresh food, and to remove dirt or refuse. Breeding-cages that one can purchase at any naturalists' outfitters are made very handily of wood, zinc, and glass, and of course are very durable, but those described above last well for a season, and have the merit of being of no expense.

To procure good moths and butterflies with bright and uninjured plumage, it is best to rear them from the caterpillar stage of development, but as all varieties are not easily found, the net is usually the collector's first resource. Raising caterpillars from the egg is a very interesting process, but it is rather tedious, and requires more knowledge and experience to meet with success than finding the insects in the next stage of development, and keeping them till they reach the perfect state.

When starting for a day's ramble butterfly-hunting,

one of the great charms seems to be the delightful uncertainty about the sport which may fall to one's lot, so it is as well to provide for all contingencies, taking the net, poison-box, or bottle, a tin for caterpillars (which should be perforated at the top), a nest of glass-topped pill-boxes for specimens of any butterfly or moth one may wish to take home alive, and envelopes for butterflies when killed in the net. The latter may be made of note-paper, by cutting a long square of paper and folding it in a triangular shape, and then turning up the edges of two sides, so as to make a little bag.

Butterflies travel well placed flat in these envelopes, and should be set directly home is reached. A small cork collecting-box is also useful, together with some insect-pins, in case one gets many specimens, some of which can be pinned into the box preparatory to setting them on the return home.

Insect life is so prolific in Teneriffe, and one sees so many strange and curious animals, that anyone really interested in Entomology is certain to find specimens to bring home, such as the "Praying Mantis," found frequently on half dead thistles in "barrancos" and on

shrubs, the many varieties of large grasshopper, and the gorgeous coloured dragon-flies flitting about and killing butterflies in a rather wholesale manner.

All these insects are of such interest, that it is as well to be provided with various appliances for carrying them on the homeward journey.

As sunshine and brightness prevail in Teneriffe during the winter months, it is not necessary to choose a "likely" day, as in England, in order to have a good day's sport, indeed there seem to be more butterflies on the wing on the days that are not too brilliant. On the very sunshiny days the butterflies are about in the greatest quantities in the early morning, retiring at noon to more shady or sheltered spots. A nice quiet sheltered little dell, covered with rough herbage and cactus by the sides of the barrancos, is a very favourite spot. The barrancos are dry river-beds, sometimes of great extent, with large boulders and rocks thrown about in wild confusion; generally speaking they are intersected by a path, up which one can ride or walk, leading up the mountains to different villages and hamlets.

Occasionally, during the winter months, a great quantity of water runs down the barrancos, but the supply only lasts a short time, soon drying up, and leaving a few small stagnant pools here and there, and these in turn soon disappear.

Walking over much ground is hard work, as the country is steep, and rough with stones and rocks. I advocate strongly the use of mules, as being the most pleasant mode of locomotion. They are so sure-footed and easy in their quick walk, that one feels far less tired after a long day's excursion on mule-back up the mountains and barrancos, than by any other mode of locomotion. The muleteer carries all necessaries, together with luncheon, and one is able to stop and alight where fancy dictates or butterflies abound. Mules can be hired at Villa Orotava, the charge being one dollar, or five pesetas, for a short day; beyond this a small gratuity to the muleteer makes him pleased and happy.

There are many completely uncultivated spots up the mountains, intersected by little bye-paths along which the mules can walk; these are perfect "Eldorados" for

moths and butterflies, and one must be busy with net and poison-box, not forgetting the tin case in which to place larvæ for the breeding-cage, and especially remembering to carry home some of the plant upon which they feed.

Some of these places are so rough and thick with bramble growth, and vegetation of like nature, that walking is really hard work. The lava-rocks are sharp, and the numerous grasses with hooks, such as the "Amour Sec," together with the thorns of the prickly pear, make a formidable barrier for the pedestrian. There are, however, no poisonous snakes to dread, no biting animals of any sort larger than flies, so that the inconvenience of the thorns and pricks is all that need be feared.

On returning home from the expedition, all the various wants and requirements of the specimens must be attended to. The caterpillars have to be put into breeding-cages, which should have been already prepared for them. Different kinds which feed on the same plant may be put together. Care must, however, be taken not to put any cannibal species, such as the

Armigera, among the others; also moth and butterfly larvæ should be kept separate.

For moth larvæ it is essential to have some fine earth (previously baked to destroy the ants, which are very troublesome) spread on the bottom of the box, from 1 to 2 inches thick. The caterpillars bury themselves in this when they have finished feeding, making for themselves a slight mould of earth, welded together with silk-like threads. Different species, however, vary in their mode of procedure, some making very slight, and others more pronounced cocoons; while yet others make quite an oval shell, choosing only the finest grains of earth with which to construct their houses.

It is said that some sort of dried leaf answers the purpose of earth, and is less likely to injure the moth's plumage, but the former mode has been found to be perfectly successful. Place the plant on which the animal is to feed in a moist pot of earth, or in a bottle of water, so as to keep it fresh. If the latter mode is adopted, care must be taken that the animal does not drop into the water; so it is best to choose a wide-mouthed bottle, putting a bung with a hole in it as a

stopper, and inserting the plant through the hole into the water. The earth should be kept slightly moist, and many people give caterpillars a gentle spray of water occasionally to take the place of dew, which they would have in their natural state. It is a good plan to let them have a little of the early morning sun upon them, as it serves to keep them in health, but they cannot bear the sun of mid-day.

For butterfly larvæ the same procedure is required, except that only a thin sprinkling of earth is wanted at the bottom of the box for the purposes of cleanliness.

When the larva of the butterfly is about to develop to its pupa state, it readily crawls up the box and netting, suspending itself from the top head-downwards, and the netting serves as a good foot-hold for the butterfly when it appears. If possible the chrysalides should remain as they place themselves until the next stage of development is reached; because, unless they are able to expand their wings while in this position, deformity is likely to ensue.

The majority of butterfly chrysalides are naked, and of an angular form, some being remarkable for the brilliancy with which they are spotted with gold and silver.

The Vanessa family is an example of this, the Vulcania and Huntera being especially brilliant.

Caterpillars of the "Skipper" family make a web-like covering of silk for the reception of the chrysalides, but there has been hitherto only one species of this family found in Teneriffe.

Many caterpillars of various kinds kept during the winter months were very subject to the raids of the Ichneumon fly. This fly lays its egg on the larva, and it is not easily perceived on the animal unless looked for through a magnifying-glass.

The caterpillar lives on, and seemingly thrives, but after it has turned to its pupa state the fly develops, and a fine Ichneumon fly appears in the breeding-cage instead of the expected butterfly. There are large and small varieties of this fly, the former laying only one or two eggs on the caterpillar, the latter a great many, and they emerge from the chrysalis in corresponding numbers.* The only remedy seems to be to inspect all larvæ through a magnifying-glass, and to reject any

* This occurrence is mentioned by Gilbert White in his "Natural History of Selborne," v. "Observations on Insects and Vermes," p. 519. Ed. 1813.

infected specimens. Pieris Cheiranthi is particularly liable to this fly. The red fungus found on the Tithymali moth caterpillar is another disease, but is not very common.

Caterpillars should be handled as little as possible while removing them to their fresh food. As a rule, they crawl on to the fresh supply at once, but in the case of very small specimens a camel-hair brush should be used to lift them from one place to another. Many of them emit a fluid when touched. The Tithymali spits out a quantity of green fluid when disturbed.

Butterflies generally seem to be found in the greatest numbers in the barrancos early in the year. When, however, the fields get green and vegetation increases, they desert the barrancos and take more to the fields and country, with the exception of the Argynnis Lathonia, a variety which more particularly frequents barrancos.

The time of appearance of all species takes place from two to four weeks later the higher they are up the mountains. The south part of the island is not so fertile a place for Lepidoptera as the north; perhaps

this is owing to the more sparse vegetation on that side.

Many species are found inland, while some are peculiar to the coast. The heights and localites in which all the different kinds are found have been indicated as far as possible in the description of the various species.

KILLING AND SETTING BUTTERFLIES AND MOTHS, RELAXING SPECIMENS, ETC.

BUTTERFLIES, when netted, can be easily killed by a prolonged sharp pinch under the thorax before being taken from the net, and do not need to be put into a poison-box. The pinch should be given between the finger and thumb, the wings of the insect being kept in an upright position.

Moths must be put into a poison-bottle or box, and left there from twelve to twenty-four hours. Some varieties die much quicker than others. Various kinds of poison are used for the boxes and bottles, but cyanide of potassium seems most generally approved of by entomologists. To catch moths, many people use the sugaring process. A mixture, made of beer, rum, and coarse sugar or treacle, boiled till it becomes thick like

treacle is placed at night on the trunks of trees or on flowers, and a lamp is placed near the sugared plants. True votaries of "sweetness and light," the moths alight on the sticky mixture, and, becoming stupefied with the beer and rum, as a rule fall to the ground, where they can easily be caught or netted.

Setting-boards are made of strips of wood about one foot or eighteen inches in length, varying in width according to the size of the specimen one wishes to pin out on it. These boards are covered with sheet cork, having a groove down the middle to receive the body of the insect. Some boards have a flat, others a slightly curved surface, and these are covered with white paper. English entomologists generally use curved boards, but foreign collectors prefer the flat setting-boards. These latter seem somewhat preferable.

The good appearance and value of a collection greatly depend on the setting, and for this reason much care and patience is required. The butterfly should be taken between the thumb and finger of the left hand, and an insect-pin inserted in the middle of the thorax, bringing the point slightly sloping backwards and out at the legs.

Then having selected a board suitable in size to the specimen, it should be pinned exactly in the middle of the groove, the body being kept quite straight. Two narrow strips of paper, not more than $\frac{1}{8}$th of an inch in width, are now required to fasten down the two wings on each side of the groove. Let each strip be pinned in front of the two fore-wings, holding the end of a strip in the left hand; then very gently place the wings, first the fore and then the hind-wing, in position, bringing them forward with a long pin (the point being placed on the wings as near the body as possible) in the right hand. At the same time the strip of paper which is being held in the left hand is gently lowered and fastened with a pin immediately below the hind-wing. Great care must be taken not to injure the plumage by touching it. A second strip of paper is now necessary on each side to pin down the outer edges of the wings; but the first two strips are the most important ones, as they keep the wings in position, and the latter may be very easily added. The antennæ should be straightened and placed under the first two strips of paper, or placed in position by two pins. The paper is fastened along

the boards, fixing as many specimens as its length will permit.

Many persons use triangular pieces of card as braces for the butterfly, fixing one or more on each wing, but the strips of paper seem somewhat easier to arrange, and damage the plumage even less than the card, though when either method is adopted the specimen ought not to be damaged in the least. In making a perfect collection of butterflies three specimens should be set up of every variety; the male, the female, and one set with the underside uppermost. It is not usual to set moths the reverse way.

Butterflies must be left on the board to stiffen for ten days or a fortnight; after that they can be removed to the store-box. Moths with large bodies take longer in drying, and must be left for three or four weeks. By touching the end of the body of a specimen gently with a pin it can easily be seen whether it is firm and stiff enough to be removed to the case. If butterflies and moths are not set soon after death they become stiff, and would be useless; but there are several modes of relaxing them, and it may be useful to give a description

of the process which is generally adopted. Procure a marmalade-pot or earthenware jar, into which put three inches of sand; pour on the sand enough water to wet it thoroughly, without allowing the water to appear on the surface. It is as well to put a small quantity of carbolic acid with it. The insects to be relaxed should be pinned on to a thick piece of cork, the cork resting on the top of the sand. Close the mouth of the jar with a piece of glass, or something which will make it air-tight. A few hours is often enough to relax specimens, but if left longer they must be carefully watched, as they very soon become mouldy. To keep the insects free from mites, napthaline must be freely used in the store-boxes and cases. Camphor is used by some persons, but napthaline is a far more efficacious preventive of the ravages of parasites.

In packing specimens already set for England, store-boxes will hold a great number if the specimens are judiciously placed one over the other in a sloping manner, great care being taken that they do not touch each other, as the slightest rubbing spoils the plumage.

Don Ramon Gomez, chemist, of Puerto Orotava,

Teneriffe, has all necessaries for the collector, such as setting-boards, store-boxes, pins, etc., etc., and is most obliging in packing specimens for England and giving any advice.

Many interesting objects for the naturalist and antiquarian may be seen in his large collection, his Guanche remains being especially deserving of notice.

Part I.

BUTTERFLIES.

PIERIS CHEIRANTHI.

PLATE I.—FIG. 2.

THIS is a large creamy-white butterfly peculiar to the Canary Islands. It is found in some numbers on and near the coast of Teneriffe from April to September; the time of its appearance, however, varies somewhat in different years. The larva is smooth, and has a ground-colour of grey, finely dotted over with black spots. There is a yellow stripe on the back and along each side. It feeds on the nasturtium gregariously, and the pupa attaches itself, head downwards, to a wall near the plant.

The female butterfly, the underside of which is illustrated, has a long uneven blotch of black on the surface of the fore-wings; the male has none. The upper sur-

face of both sexes is cream-white, with a black apical patch on the fore-wings. The undersides have the long black blotch as seen on the surface of the female, and the ground-colour of both is yellow, finely sprinkled with black dots. The measurement across the wings varies from two and a half to three and a half inches.

It is best to procure the larvæ to obtain good specimens, but the Ichneumon fly is such an enemy to this species that great disappointment will probably be experienced in the rearing if the caterpillars are not well examined before being placed in the breeding-cages.

PIERIS WOLLASTONI.

PLATE I.—FIG. 1.

This butterfly is allied to the Cheiranthi, but is a distinct variety, only recently met with in this island. Mr. Butler, of the British Museum, has named and fully described this insect, which has hitherto only been found in Madeira, but is now for the first time enumerated in the list of Teneriffe Lepidoptera. It is somewhat smaller than the Cheiranthi, measuring not more

than two and a half inches in expanse. The reverses of the female (which is illustrated) and of the male are of a grey tinge, in place of the rather bright yellow shade of the Cheiranthi, sprinkled over with fine black dots. The apical patch is also grey, and both sexes have long black spots on the fore-wings. The upper surface is cream-white; the female has two distinctly marked long black spots on the fore-wings; the male having none. The black apical markings are similar in both sexes, and a small black spot is seen on the inner margin of the hind-wing of both male and female.

There are no observations to record on the caterpillar and pupa, as the specimens of the fly (one of which is illustrated) were netted; but very possibly larvæ may be found gregariously with the Cheiranthi in like manner to the Callirrhoe and Atalanta, or the Plexippus and Chrysippus.

The specimens taken were netted about 500 feet above the sea.

PIERIS RAPÆ.

The common English variety, Small Cabbage White. The fore-wings are creamy white, with an irregular

blackish mark at the tip. The male generally has a black spot in the middle of the wing, the female having two; and both sexes have two black spots on the underside, which is of a yellowish colour, thickly dotted with small black atoms. All the markings vary greatly, however. The larva is dull green, with a yellowish stripe on its back and yellow dots on the side. It generally feeds on the cabbage, but is found also on the nasturtium. It is very common, and may be found everywhere from February to October. The Ichneumon fly is a great enemy to this insect.

PIERIS DAPLIDICE.

This butterfly resembles the rare English specimen Bath White. It is very common in some years,* and found in most localities from February to October. It seems mostly to frequent rough poorly-cultivated fields. The wings are white, the fore-wings having a large black spot in the middle, and being bordered with black encircling distinct white spots. The markings of the

* During the winter of 1892-1893 it was met with in great numbers.

under-side show through on the hind-wings, and these have black markings on the edges in the female. The underside has a ground colour of sage-green, freely spotted with white. The markings show considerable variety, some being marked much more heavily than others. It measures across the wings from two to two and a half inches. The caterpillar, which is greyish green, has yellow stripes on the back, and feeds generally on cabbage. The butterflies are much pursued and destroyed by dragon-flies.

EUCHLOË CHARLONIA (Donzil).

PLATE I.—FIG. 4.

This butterfly was seen near Orotava, 500 feet above the sea-level, during the first week in May by the author, who, however, was not fortunate enough to secure a specimen. Several specimens of this species, which is rare in the Canary Islands, have been netted in the island of Fuerteventura, and two of them have been presented by Mr. E. H. Hodges, of Rugby, to the British Museum, from which the illustration has been drawn.

It measures in expanse about an inch and a half. The general colour is yellow, varying in intensity of shade in different specimens, with black apical markings on the fore wings and a long black patch on the centre of the upper margin. A full account of this interesting insect is to be found in Ann. Soc. Ent. Fr., 1842, p. 197, f. 1, but hitherto it has not been recognized in Teneriffe as a species belonging to the island. It is found in North and West Africa.

APORIA CRATÆGI.

This specimen is the rare English Black-veined White butterfly. It has undoubtedly been netted in Teneriffe, though it has not been personally observed by the author. In flight its similarity to other white specimens is so great that it may often be passed unnoticed. It is said to be local and uncertain in appearance, being seen chiefly during the summer months about the fields and gardens. The wings are entirely of a white cream colour, and are alike on both sides, the veins being black, and the fore-wings having some dusky spots on them. The caterpillar is black, thickly

sprinkled with whitish hairs, and with a reddish yellow stripe running along each side. It feeds on various fruit trees, and is believed to be very destructive.

RHODOCERA CLEOBULE.

PLATE I.—FIG. 3.

This finely-coloured and beautiful butterfly resembles the English Brimstone, but is quite a distinct variety, being of squarer form and having no decided point at the angle of the hind-wings. It is peculiar to the Islands. The male is a most brilliant sulphur yellow, the fore-wings being of a deeper shade than the hind ones. The hind-wings have a deep orange spot about the centre. The female differs from the male in being of a much paler shade of yellow, with quite a tinge of green all over it; it also has a small orange spot on the fore-wings in addition to that on the hind-wings. Both wings have red markings round them on the outer edge, which form an almost interrupted fine line of colour. The under-side resembles the upper, but is paler. The antennæ are short and thick, with a reddish tinge, which becomes deeper at the knob.

It is found from January to June in most localities on and at a little distance from the coast; gardens and fields seem somewhat favoured, but it is by no means common anywhere. There seem to be several broods between the months mentioned above, but the larva and pupa have not been observed.

COLIAS EDUSA.

PLATE I.—FIG. 5 (female).

This specimen is the English Clouded Yellow. The wings measure from two to two and a half inches across, the female being somewhat larger than the male. Both sexes have the same broad black margin on the fore and hind-wings, but the male differs from the female in having no irregular yellow spots marked on these black borders, which are seen in the female. The hind-wings of the female are of a somewhat darker shade of yellow, tinged with green, than those of the male, and both sexes have a bright orange spot about the middle of the wing. Beneath, both sexes are alike, the fore-wings being of a lighter orange with several

irregular black spots and a margin of greenish yellow. The hind-wings are of a uniform green colour with a red ringed spot about the centre of each, accompanied by a silver-like dot in the middle. It is found in quantities in most localities, from the coast to the pine forests, from February to November. The caterpillar is green, with a stripe of yellow and white, having several orange dots on it. It is a miscellaneous feeder, preferring, however, leguminous plants.

COLIAS v. HELICE.

PLATE I.—FIG. 6.

A pale yellowish-white variety of the former specimen. It is very rare, and is found in May and during the summer months, though very seldom met with in England.* It is slightly smaller than the Colias Edusa, and has been found so small as to measure only an inch across the wings. Don Ramon Gomez has one in his collection of this size. The markings vary considerably, and the bright orange spot in the centre of the hind-wing,

* In the summer of 1892 many were taken.

as seen in the illustration, is replaced occasionally by a pure white one. The male has hitherto not been found.

LYCÆNA BÆTICA.

A commonly found blue butterfly, measuring from one to one and a half inches across the wings. It is rarely met with in England. The insect has a slender tail at the lower angle of each hind-wing, surmounted by two black dots. The margins of both wings have a slight black or dark brown band. The under-sides of both wings are of a grey-brown colour streaked and slightly spotted all over with faint white lines. On the lower angle of each hind-wing the two black spots on the upper side are replaced by two black ones dusted with silver, and surrounded by a bright orange ring which is broader at the top than at the bottom.

The antennæ are brown, slightly sprinkled with white. It is found on the rough fields (especially where the Lupine grows), barrancos, and hedge-rows, between March and August. Specimens netted early in the year are not so large as those found during May, and in the summer months.

LYCÆNA WEBBIANA.

PLATE I.—FIGS. 7 AND 8.

This is a smaller blue butterfly than that just described, measuring about one inch across the wings. It is peculiar to the Islands, and is known by some lovers of Entomology as the "Peak Blue." It is not, however, found on the Peak alone, but is netted in barrancos and gardens at a much lower altitude; it frequents the pine forests in large numbers, and has been also found on the south coast of the Island of Teneriffe, at Guimar (see Appendix B), so it may be fairly considered to be widely dispersed over the Island. It is undoubtedly found in the greatest numbers in the elevated zone of the pine forests, where, however, owing to the extremely slippery nature of the ground, it is difficult to net. The male is of a beautiful metallic blue colour; the female of a much browner blue. The upperside of the male, and the underside of the female, are shown in the illustrations.

The fore-wings of the underside in both sexes are alike, being of an orange tawny colour, with a white

uneven spot on the top margin of each wing, and five or six somewhat indistinct brown spots at the outer edge, interspersed with white.

The hind-wings are of an ashy brown, with a longitudinal, irregular silver white line down each, both wings being minutely dotted with white. Five or six brown spots, dusted with silver, are seen at the margin of the hind-wings. It usually appears in March, though it has been seen at an earlier date. The larva and pupa have not hitherto been found.

LYCÆNA LYSIMON.

This is the smallest specimen of blue butterfly found in Teneriffe, being not quite one inch in expanse. The female is rather a browner blue than the male. The colouring on the upperside is of a most beautiful uniform blue, all the wings having a margin of brown; and a slight white fringe at the edges. The underside of all the wings is grey, rather freely dotted over with darker spots, encircled by greyish white. It is very commonly found on all grassy fields and lanes, and

quantities flutter quickly along the grass-grown streets of Orotava from April to August.

It is not an inhabitant of England, but is found in the south of France, Spain, greater part of Africa, Western Asia, and the East Indies. The caterpillar and chrysalis have not been observed.

LYCÆNA ASTRARCHE v. ÆSTIVA.

PLATE II.—FIG. 6.

A small dark copper, the expanse of wings being about one inch, or rather more. It is not found in England. On the upperside on all the wings there is a marginal band of bright copper, the fore-wings have a black spot about the centre of each. A fringe of white edges all the four wings. The under widely differs from the upper side in colouring and markings. The ground colour is light grey, freely dotted over with black spots encircled by white. All four wings have the same bright marginal copper band as seen on the upper side. The antennæ are black or dark brown, finely dotted with

white. It is somewhat rarely found in fields and barrancos on high ground, but may be met with in larger quantities in the pine forests. The time of its appearance is from April to September. When comparing the Teneriffe specimen of this butterfly with those of other countries at South Kensington, it was noticed that the marginal copper band was broader on the Teneriffe specimen, and it may be possible that it should be reckoned as a new variety.

POLYOMMATUS or CHRYSOPHANUS PHLÆAS.

A copper butterfly, and a common English specimen, measuring from one to one and a half inches across the wings. The fore-wings are of a bright copper red, with large square black spots distinctly marked, and an outer band of brown. The hind-wings are dark brown, having a marginal copper band on the outer edge, which in some specimens is surmounted by a few blue spots. The underside of the fore-wings is pale copper, the hind-wings being grey, with minute black or dark brown spots, and traces of a marginal

band of copper. It is commonly found from February to September in most places in Teneriffe, up to the altitude of the pine forests. The larva feeds on a variety of Rumex (dock or sorrel). Some specimens have been found much darker in colour than those described above, the difference being so great as to suggest the possibility of a distinct variety.

THECLA RUBI.

This small butterfly is called in England the Green Hair Streak. It is said to have been netted in the Island during the summer months, and its appearance is believed to be well authenticated. The larva is green, with a yellow line on the back, bordered with darker, and followed by a line of pale triangular spots, and a yellow line on the sides: it lives on brambles, &c. The fly expands about one inch; it is of a uniform brown colour above, and a uniform green below, with a row of white dots on the underside of the hind-wings.

DANAIS PLEXIPPUS, formerly ARCHIPPUS.

PLATE II.—FIG. 1.

The largest butterfly found in the Islands, measuring from four to four and a half inches across the wings.

The larva is very bright in colour, having transverse bands of blackish violet, gold, and white alternately. It has four black horns or fleshy spikes along its back, and when full grown measures about two inches in length, and it is rather stout and smooth. The pupa, green when first turned, and suspending itself by the tail only, has a bright gold band half-way round its base, and a series of gold spots encircling its head. Shortly before emerging to a butterfly, it turns to a dark brown. The caterpillar never suspends itself to the plant on which it feeds, but goes to some of the higher grasses near it, or it prefers still better a mallow plant, from the leaves of which as many as sixteen beautiful bright green and gold chrysalides have been seen hanging, forming quite a picture under the illumination of the glorious sun of Teneriffe. It lives and feeds

gregariously on the "Arbol de Seda,"* a plant bearing a very bright red and gold flower. Many specimens were reared from quite small caterpillars in the breeding-cages. They were easy to keep, but especial care must be taken in providing them with fresh food, and great attention ought to be paid to ventilation, or some disappointment may be experienced in the number that die during the pupa state for no apparent reason. A little of the morning sun is beneficial to them, as they are found, when in a natural state, in the most sunny localities.

A brood seems to emerge about every three months in most years from February to September. The butterfly frequents flower-gardens and fields near the coast, not often being found more than seven or eight hundred feet above the sea. It is of a rich orange tawny colour, rather heavily veined with black or dark brown. All four wings have a broad black border, with two lines of whitish yellow dots along the margin. There is a large apical patch of blackish brown on each fore-wing, with seven large yellow and white spots on the tip. There is not a great difference between the

* Asclepias cuvassavica.

upper and the under side, except that on the latter the white marginal spots are larger, and there is more white on the black-feathered body.

The insect looks splendidly bright and flashing as it soars along with a steady flight from tree to tree on the "Carretera," and it must be quickly netted, or it soon rises out of reach. These butterflies are distasteful to birds, as also are the three following varieties belonging to the same family. For this reason the family of Danais is "mimicked" by butterflies of other species, the butterfly next described (Danais Chrysippus) being, for instance, copied closely by several African and Indian species of butterflies and even some moths.

The Danais Plexippus is a very common butterfly in North America, and has within the last few years become widely dispersed, some specimens having been found in England in 1877 and subsequently.

DANAIS CHRYSIPPUS.

PLATE II.—FIG. 2.

This butterfly is widely dispersed over Europe, Asia, and Africa, but it is not found in England. It is of

the same colour as the last described specimen, but is not so large, measuring in expanse from two and a half to three and a half inches. The tips of the fore-wings are broadly marked with black, shading off to brown, crossed with a band of white spots. Four of these spots are of a quadrilateral form, and much larger than the rest. The outer margins of all four wings are bordered with black, freely dotted with white. There are three black spots on the centre of the hind-wings of the female; the male has four, the fourth, which is largest, being placed under the principal vein. The under is similar in markings and colouring to the upper side, but the white spots are more pronounced, and the tawny yellow somewhat paler; the apex of each fore-wing is moreover tipped with yellow, instead of being black like the upperside. The larva is very similar to that of the Plexippus. It is somewhat smaller, however, has six fleshy horns instead of four, and the transverse gold and black stripes are interspersed with white spots instead of stripes. It feeds gregariously with the above variety on the "Arbol de Seda," and appears at the same time, in the same locality, and in equal numbers.

When it changes to the pupa state it resembles closely the bright green chrysalis of its companion, only it is not quite so large.

DANAIS ALCIPPOIDES.

PLATE II.—FIG. 3.

This butterfly, a variety of the Chrysippus, is rare in Teneriffe. It is found commonly in Africa and Western Asia, and is a transition variety between the Chrysippus and Alcippus. It has whitish hind-wings, rather silvery looking, with orange markings within the black border. The hind-wings have less white upon them than those of the Alcippus. It is similar in all respects and habits, mode of feeding, etc., to the Chrysippus, and is found gregariously with it. When kept collectively, about one in fifty of the chrysalides proves to be of this variety. The caterpillars of the three varieties of Danais described are about four weeks before turning to chrysalides, and remain in that state from two to three weeks before emerging to the imago.

DANAIS DORIPPUS v. KLUGII.

This is the fourth variety of the genus Danais, and is authentically claimed as one of the Teneriffe butterflies, though by no means commonly found. It varies from the Chrysippus in having no brown apical patch on the fore-wings, and it also has no band of white spots across them. It measures from two and a half to three and a half inches across the wings. It is not an inhabitant of England, but is commonly found in North Africa and Western Asia.

ARGYNNIS MAIA (Cram), or PANDORA.

PLATE III.—FIGS. 1 AND 2.

This butterfly is one of the most beautiful Fritillarys, and is also one of the largest of Teneriffe butterflies, measuring in expanse from three and a half to four inches.

It mostly frequents woods and meadows, not often being met with below an altitude of fifteen hundred feet above the sea. It is found in South Europe, and is

also met with in Africa. The time of its appearance commences in May, and continues during the summer months. The larva is purplish-brown with black markings ; it feeds on heartsease. The upper and under side differ greatly, as may be seen in the illustrations. The prevailing colour of the upper surface is a beautiful bronze green, tinged with yellow on the fore-wings. The bronze green colour is freely marked all over by velvety black oblong spots, dashes, and lines, the margin of each wing having a continuous scalloped line of black. The body and hind-wings are very feathered and downy. The underside of the fore-wings is a brilliant pink-red and black colour, with an apical patch of green, having yellow markings. The hind-wings are green with a long irregular stripe of silver down the centre of each, the stripe being fringed on the outer edge by five silver dots. There is a marginal silver band with a fine yellow line running along the outer edge of the hind-wings. The body is green on the upper, and buff-yellow on the under-side, the legs being of the latter colour. There is not much difference between the male and female.

ARGYNNIS LATHONIA.

PLATE III.—FIGS. 3 AND 4.

This exquisite butterfly, which is about two inches in expanse, is known in England, where it is accounted a great rarity, by the common name Queen of Spain Fritillary, and it is not very commonly found in Teneriffe. The caterpillar is a greyish brown with a white dorsal line, spotted with black, and having two brownish lines on the sides. The spines are reddish and the legs yellow. It feeds on the heartsease, violet, etc. The upper surface is a tawny orange colour with many distinct rounded black spots. On the under-side the hind-wings are brownish yellow with very large oval silver spots interspersed with smaller ones. The fore-wings have black spots of various sizes, and five or six apical silver spots. The butterfly is found mostly on high ground in barrancos; but also in fields and gardens from the months of March to September, though in some years it appears earlier. It flits quickly along the paths in the barrancos, settling at short distances, very often

just out of reach of the net, and this liveliness often necessitates a long walk after a specimen. The antennæ are furnished with a round thick nob at the end. There is no very marked difference in the male and female.

PYRAMEIS ATALANTA.

PLATE III.—FIG. 7.

This richly-coloured butterfly, known in England as the Red Admiral, is very rare in the Canary Islands. The ground-colour of the upper surface of the fore-wings is a velvety black, shading off to brown at the base. A bright red oblique band crosses the wings, and four large oblong white spots, with four or five smaller ones, are grouped on the apex. These again are bordered by several faint blue spots, quite at the tip. The hind-wings are blackish brown, with a broad red margin, in which are four black dots, and some blue spots are marked on the lower angle of the wings. On the underside the fore-wings are black, with several steely blue lines, the red band across the centre being clearly defined. The apex of the wings is brownish

yellow, marked with white. The hind-wings are most beautifully variegated with steely blue, black, and buff. The antennæ are long and slender, abruptly forming a knot at the end, which is tipped with white. The larva is dusky green in colour, with a yellow line running down its back and sides; it is sparingly coloured with short stubby hairs, and is found gregariously on the nettle-leaf. Gold spots are freely sprinkled over the brown chrysalis. The caterpillar stage lasts five or six weeks, the butterfly appearing in another three or four. The larva suspends itself by the tail, often wrapping itself in a nettle-leaf, on which it feeds. If the pupa is gathered from the nettles for breeding, it should be fastened in the cage in the same position, head downwards. Disappointment is often experienced in the number of butterflies that emerge from the chrysalis state, so many being attacked by ants, &c.

The caterpillars are found gregariously with the Callirhoe, which is the commonest species of Pyrameis found in the Islands. Among many reared, three only proved to be Atalanta butterflies. It is found in Teneriffe from January to June.

PYRAMEIS CALLIRHOE, or VULCANIA.

PLATE III.—FIG. 6.

This is the most common butterfly of the Pyrameis genus found in the Islands. It is similar in colouring to the last described, but it has a much broader red oblique indented stripe on the fore-wings. The white apical markings are not so many or large, and it has no blue spots on the tips of the fore-wings.

The habits and locality of the caterpillar and chrysalis are so like those of the Atalanta, that description is not needed.

In rearing many specimens, two butterflies proved to have bright yellow on the hind-wings in place of the red band. Whether they are a distinct variety or not, cannot at present be positively stated.*

PYRAMEIS CARDUI.

PLATE II.—FIG. 5.

This insect, which is the English Painted Lady,

* See Appendix C.

might at first sight be taken for a faded Atalanta. The caterpillar lives generally solitary on hollyhock, nettle, or mallow, curling itself up in a leaf. It is of a grey-brown colour, thickly sprinkled with hairs, a yellow line fringed by reddish dots runs along each side. It is found in most localities up to a considerable elevation, from February till well on into the summer. The butterfly is of a tawny red colour, shading off to brown at the base of the fore-wings, with dark markings and oblong black spots. The apex of the wings is marked and edged in white, similar to the Atalanta. The hind-wings are of the same tawny red colour, having a line of five round black spots running along each lower margin. The fore-wings are marked on the under-side as above, the colour, however, being redder. The hind-wings are pale buff, olive brown, and white, having four or five blue-black eyes near the lower margin, the two centre eyes being smaller than the others, which are circled by black and white. Its flight is very swift, and its erratic and rapid gyrations from side to side make it a difficult specimen to net.

PYRAMEIS v. HUNTERA.

PLATE II.—FIG. 4.

This is a scarce variety in Teneriffe of the butterfly just described. It is commonly found in America, and some few insects have been taken in England. It is similar in colouring to the Cardui, but somewhat brighter. The flight of the insect is steadier, and this, together with the brightness in colour, distinguishes it from others of the same family when seen flying in company. It is found in barrancos and gardens, and has been netted in a locality about 600 feet above the sea near Orotava, together with the last two butterflies described. All three specimens were seen flitting in company, the Callirhoe and Cardui predominating in number, with a few specimens of the Huntera dispersed among them. The upper surface is brick-red, marked with black, the fore-wings having a dark apical patch, with several white spots. The hind-wings have five blue spots, encircled by black, near the lower margin. Beneath, the fore-

wings are of a most beautiful red colour, interspersed with black, grey-brown, and white, and having two eyes on the apex. The hind-wings are of a lovely grey-brown tinge, liberally veined with white, having a whitish uneven band down the centre. This band has two large eyes, with blue centres outside it. On the edge of the wings three grey-blue lines are seen, making the *tout ensemble* a most exquisite reverse, and the greatest contrast to the upper surface. It is usually found from April to August. Though faded and small specimens were found earlier, the beauty of the insect is not seen till April. The caterpillar is brown, sparingly covered with hairs, and has bright red spots down its sides. It is rather larger than the Cardui larva.

PARARGE XIPHIOIDES.

PLATE III.—FIG. 5.

This is not an English butterfly, though it is somewhat similar to the Speckled Wood Argus (Parage Ægeria). It is very commonly found in the Islands in most localities up to three or four thousand feet above the sea.

It measures in expanse from two and a half to three inches. Those found early in the year are of a smaller and duller colour than those netted later on. It is of a rich brown colour, the fore-wings being freely marked with orange-yellow spots. The hind-wings are plentifully feathered at the base, and have a long dash of yellow down them, with three dark eyes near the margin, which is scalloped with faint white. The under-side of the fore-wings is lighter in colour than the surface, though similar in markings. The hind-wings are of a uniform olive-brown shade, with a long uneven silvery stripe half-way down the centre. There is no very decided knob on the end of the antennæ, which only thicken slightly towards the end.

EPINEPHELE HISPULLA, or FORTUNATA (Alph.).

This brown butterfly resembles the English Large Meadow Brown (E. Janira), but is of a richer colour and larger size, measuring in expanse about two and a half to three inches. The female, which differs largely from the male in colour and markings, is of an ashy-brown colour, the fore-wings being orange-tawny,

leaving only an uneven marginal band of grey-brown. There is an apical eye of black, with a small white centre. The hind-wings are ashy-grey, with a marginal orange-tawny band. The body and base of the lower wings are freely feathered. The under-side is similar in colouring, only lighter; the apical eyes are more strongly marked; the hind-wings are of an orange-brown tint, the orange band being slightly defined on this side. The male has no orange-tawny markings on the surface, only a slight shade of yellow being seen on the fore-wings, shimmering through the uniform brown colour of the insect. There is a small black eye, with a white central dot on the apex of each fore-wing. On the under-side the fore-wings of the male are orange-tawny, the black eye being larger and more pronounced than on the surface. The hind-wings of the male are of a uniform olive-brown colour. It is found in barrancos, meadows and rough places, from the coast up to a moderately high altitude, from April to September; the male appears first in the greatest numbers, and towards June the female is also found in great quantities. The caterpillar has not been observed.

HIPPARCHIA STATILINUS.

PLATE II.—FIG. 7.

This is a brown butterfly common in many parts of Southern and Central Europe, though not found in England. It is a rare insect in Teneriffe, and is only met with high up in the mountains, chiefly at Vilaflor, and on the south part of the island, about July and August. It measures in expanse from two to three inches, and is of a uniform brown colour, having a few white markings, which vary much in different specimens, on the fore-wings. Two large brown spots are seen at the outer margin of each fore-wing, interspersed with small white spots. The hind-wings are brown, shading to lighter colour at the base. The under-side is prettily mottled, and streaked with grey-brown, the two dark spots seen on the margin being well defined. The larva and chrysalis have not been observed.

HESPERIA ACTÆON.

PLATE II.—FIG. 8.

This is a small Skipper, the only member of this family

found in Teneriffe. It resembles the English Lulworth Skipper, and frequents damp places near the water-courses, though somewhat partial and scarce. In a limited spot near Orotava it has been found in quantities; and at Tacoronti, where butterflies abound, some have been taken. The whole surface is of an orange-bronze colour with slight brown markings. The antennæ are short and club-like; the head is large, and the body thickish. It is found from April till June, but solitary specimens are sometimes met with earlier in the year.

LIST OF BUTTERFLIES FOUND IN TENERIFFE.

	NAME OF BUTTERFLY.	REMARKS ON LOCALITIES, ETC.
*1	Pieris Cheiranthi	Only in Canary Islands.
*2	,, Wollastoni	Canary Islands and Madeira.
3	,, Rapae	England (Common White).
4	,, Daplidice	England; rare (Bath White).
*5	Euchloë Charlonia	Not in England; N. and W. Africa.
6	Aporia Cratægi	England; rare (Black-veined White).
*7	Rhodocera Cleobule . . .	Not in England; peculiar to the Islands.
*8	Colias Edusa	England (Clouded Yellow).
*9	,, v. Helice	England; rare.
10	Lycæna Bætica	England; very rare (Tailed Blue).
*11	,, Webbiana . . .	Only in Canary Islands.
12	,, Lysimon	Not in England.
*13	,, Astrarche v. Æstiva	Not in England.
14	Polyommatus or Chrysophanus Phlæas	England (Common Copper).
15	Thecla Rubi	England (Green Hair Streak).
*16	Danais Plexippus (formerly Archippus)	England; very rare.
*17	,, Chrysippus . . .	Not in England.
*18	,, Alcippoides. . . .	Not in England.
19	,, Dorippus	Not in England.

*20	Argynnis Maia (Cram), or Pandora	In Canary Islands, N. Africa, and S. Europe.
*21	Argynnis Lathonia. . . .	England; rare (Queen of Spain Fritillary).
*22	Pyrameis (formerly Vanessa) Atalanta	England (Red Admiral).
*23	Pyrameis Callirhoe or Vulcania	Not in England.
*24	Pyrameis Cardui	England (Painted Lady).
*25	,, v. Huntera . . .	England; very rare; common in America.
*26	Pararge Xiphiodes. . . .	Not in England.
27	Epinephele Hispulla or Fortunata (Alph.)	Not in England.
*28	Hipparchia Statilinus. . .	Not in England.
*29	Hesperia Actæon	England; local (Lulworth Skipper).

* Marked thus are illustrated.

Part II.

MOTHS.

ACHERONTIA ATROPOS.

PLATE IV.—FIG. 1.

THIS is the largest moth found in the Canary Islands, known as the Death's Head, very rarely met with in England.

It measures from five to six inches in expanse. The ground-colour of the fore-wings is brown, varied with zig-zag lines of whitish yellow and light brown. There is a white dot in the centre of each, and they are dusted all over with minute white dots. The hind-wings are orange, with two black marginal bands on the lower edge. The head is dark brown or black, marked with a pale-brown skull. The body is orange, with a longitudinal band of bluish grey down the centre,

increasing in width towards the base. Six bands of black, broadest near the head, cross the body. The antennæ are rather short and thick, tipped with white. The caterpillar measures about four inches in length, and is of a most gorgeous green and yellow colour, alternate transverse bands of these colours running along the sides. It has eight small eyes in a line below the transverse bands, and a horn on its tail. It feeds on the potato, the pupa making a cell for itself underground, and appearing in the largest numbers between May and July; but as a fresh crop of potatoes is planted every three months in the Canaries, the caterpillars are found in small numbers all the year round.

When bred in captivity the pupa is delicate, quite five out of ten dying in their cases.

SPHINX CONVOLVULI or BATATÆ.

This moth is found in England, and all over Europe. It is a large moth, measuring about five inches across the wings. All four wings are of a variegated grey-

brown colour, the body having a longitudinal grey stripe, increasing in width at the base, and five stripes of pink and black across it alternately. The antennæ are somewhat longer and more slender than those of the Death's Head moth. They are feathered, and grey in colour, terminating in a sharp point. The insect is provided with a very long proboscis, which one sees it inserting into the centre of the flowers at dusk. During the winter months it is met with commonly in some years. The caterpillar, which measures four inches in length, feeds on the sweet potato in the fields, and on the petunia and phlox in gardens. It is of a brown-grey colour, shading to green on the back, having black longitudinal stripes along the back, and transverse black and white stripes surmounted by white spots at the sides. It is a night-feeder, hiding itself under the leaves or in the ground at day-time, and constructing the pupa-case underground. It is delicate and difficult to rear in captivity, like the Atropos.

DEILEPHILA TITHYMALI.

PLATE IV.—FIG. 4.

This beautiful moth is peculiar to the Canary Islands, although allied species are found over the greater part of Europe.* It expands from three to three and a half inches. The fore-wings are silvery grey in colour, having dark olive-grey markings, and a long stripe of this colour, increasing in width towards the body, from the apex to the base. The hind-wings are a rich pink, having a marginal band of dark brown, and a fine white line on the outer edge. The antennæ, which are white, are thick and feathered. The head and body, thickly feathered with white, are of an olive brown colour. Two bands of black cross the top of the abdomen, which tapers off to a point, with bands of alternate white and olive brown slightly marked with black. The caterpillar is easily found on the Euphorbia, where it feeds gregariously. It is a beautiful dark pink, the horn being of this colour. The dark pink is interspersed with dusky green and greyish black spots, and

* See Appendix D.

the caterpillar, when at full size, attains a length of about four inches. It is found from January till the end of May, but in the greatest numbers in April, whilst the Euphorbia is in its prime. The road-side between Rambla and Icod is a particularly favoured spot. About one or two inches of dried earth prepared as already mentioned are required for the larva to make its slight case in, though when in a natural state it buries itself much deeper, and the pupa is difficult to find. Some were fed and reared on a species of milk-wort. They thrived, but eventually turned into small moths of a paler colour than usual. The pupa varies much in the time of turning to the moth stage, according to the weather,—from six weeks, the usual time, to three months. Some caterpillars obtained in January did not become moths till the end of March; others taken at full growth on March 15th effected their last change to the moth during the last week in April and first week in May. The pupa when it first turns is of a beautiful shaded green colour with yellowish markings, but it changes to a uniform brown in a few days. The caterpillar is sometimes affected by

a disease which consists of a small red fungus growing on the body, generally towards the tail. One small brood was entirely lost from this disease, which seemed to be contagious. As a rule, however, the larvæ are easy to keep, and the chrysalides hatch well and strongly. When numbers are kept, an old wine-case should be substituted for the smaller breeding-cages already mentioned, the mosquito-netting being used in the same way. A little sun is beneficial to them every day in the morning. When kept too long in the sun, however, they cease to feed, although when in a natural state sunny localities are most favoured. They are not night-feeders only.

CHŒROCAMPA CELERIO.

PLATE IV.—FIG. 2.

(*Sharp Winged Hawk-Moth.*)

This beautiful moth is somewhat allied to the last described, the colour being similar, but the body is longer and more tapering. It is found in England, and in most countries where the vine grows, on which it feeds. The fore-wings are greyish brown with a silvery grey stripe

from the apex to the base; the outer lower margin is bordered by a similar stripe. The hind-wings are of a rosy pink colour, veined with, and having a marginal band of brown. The body is feathered, and has a series of five short silver streaks down each side. The antennæ are greyish white, not so long as those of the Tithymali. From three to four inches is the length of the beautiful bright green caterpillar. This has two dark and two light spots on its head, and a horn on its tail. A faint yellow longitudinal line runs along each side. It is rather liable to the attacks of the ichneumon fly, and so it is as well to search for the eggs before putting it aside for rearing. This year (1893) some were found in April, this being unusually early, as it does not appear generally till June, from which date until August it is very commonly met with in the vineyards. The pupa lies in a dormant state for four weeks, and then turns to the moth freely and strongly.

MACROGLOSSA STELLATARUM.

(*Humming Bird Hawk-Moth.*)

This moth is common in England and most parts of

Europe. Its fore-wings are brown, with faint longitudinal lines of a darker shade; the hind-wings are orange tawny, fringed with light brown. It measures in expanse about two inches. The head and body are brown, the abdomen spotted with black and white, rather liberally feathered. The antennæ are brown, being thinnest at the base, and gradually thickening to the extremity. It is seen in the daytime, as well as evening hovering, with an ever-restless motion of the wing, over flowers. The caterpillar is green, with a longitudinal white stripe, and a faint yellow one under the spiracles. The time of its appearance is from March to September, but it is seen about in greatest numbers in June.

RHYPARIOIDES RUFESCENS.

PLATE IV.—FIG. 5.

This pretty moth is peculiar to the Islands, measuring rather more than two inches across the wings. It is red in colour, the hind-wings being brighter than the fore-wings. These latter are marked with longitudinal dark stripes in the female, dark spots being substituted for

the stripes in the male. The head is dark red, shading off to lighter red on the richly-feathered body. The antennæ are red, being thicker and more feathered in the male than the female. The caterpillars are brown, thickly covered with long silky hairs, and are found mostly in barrancos, feeding on the dock and sorrel singly. They are also found in gardens, feeding somewhat indiscriminately on cabbage or hollyhock. When kept in captivity they can be reared on cabbage, and after attaining their full size of about one and a half inches, they make a slight hairy cocoon under a thin covering of earth. The caterpillar stage lasts about twenty days. They are found in January and hibernate in the pupa state till well on in the summer, sometimes as late as October or November, though some taken in January were brought to England and turned to moths on the 24th of June following. After being kept for a time the chrysalides become a very dark brown, almost black, so that there is a temptation to throw them away as dead, since they show so little life; but on opening the hard, stick-like skin, the creature is found to be quite fresh.

DASYCHIRA FORTUNATA.

PLATE IV.—Fig. 11.

In colour a dull grey moth. The fore-wings are ash-coloured, variegated with whitish on the upper side. The reniform spot is rust-coloured in the male and whitish in the female. The transverse lines are black and dentated, the submarginal line maculated. The hind-wings are grey, with a slight lunule in the middle; the underside uniform grey. The body is less stout than the D. Fascelina (Linn.). The abdomen is long in the male and longer in the female. The antennæ are pectinated in the male, simple in the female. The legs are thickly clothed with hair, the feet yellowish beneath. Although the caterpillar has not been described, it presumably has much the same characteristics as its allies, and is probably greyish, with tufts of hair on its back; it feeds on the Pinus Canariensis.

This moth is allied to the English and European species Dasychira Fascelina (Dark Tussock), but is probably peculiar to the Islands. It has been described as being found in the Islands of Palma and Hiero by

Rogenhofer in the "Verhandlungen des Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien," vol. 41 (for 1891), p. 566. The specimen illustrated was drawn from one of two presented to the South Kensington Museum by the Rev. O. E. Benthall, who found the chrysalides on trunks of the Canary pine near Guimar, Teneriffe, about 2,000 feet above the sea, and as far as the author can ascertain it has not before been recorded as occurring in Teneriffe.

DEIOPEIA PULCHELLA.

PLATE IV.—FIG. 9.

This beautiful little moth, expanding about one and a half inches, is a very rare insect in Teneriffe at the present time, though two or three years ago it was found in great abundance near, and along, the coast during the spring months.* It has yellowish white fore-wings freely spotted with black, alternated with

* A single specimen was taken by the Rev. O. E. Benthall at Guimar in 1893.

oblong red spots, not so numerous. The hind-wings are pearl-white, having a small blackish brown spot towards the top, and a marginal indented border of the same colour. The thorax and head are speckled with black and yellow. The body is light pearl-grey. The larva is dark grey with a broad white stripe on the back and reddish streaks on the sides. This species is abundant throughout Africa, the South of Asia and Europe, but a very scarce insect in England. Don Ramon Gomez kindly supplied the specimen illustrated.

PSEUDOPHIA TIRHACA (Cram); wrongly called TYRRHÆA.

PLATE IV.—FIG. 3.

This is not an English species, but is met with in Europe and North Africa. It is not very commonly found in Teneriffe. The fore-wings are green, with a central reddish-brown spot, the outer margin having an indented band of the same colour. The body and hind-wings, richly feathered, are a beautiful straw yellow, the latter having a dark brown graduated band near the lower

margin. It expands about two inches and a half. The larva is grey, with a pale grey stripe on the sides, and black spots on the lower surface between the pro-legs.

CALOCAMPA EXOLETA.

(*Sword-Grass Moth.*)

This moth is an English species. It measures in expanse between two and three inches, and is of a soft violet grey tinge, the fore-wings having a variety of brown markings. The caterpillar feeds on the Euphorbia, and has been found gregariously with the Tithymali on that plant. It is met with, however, on peas and potatoes, and can be reared on the leaves of any of these plants. The larva is bright green, with two lines of black and white spots down each side of the back. These are bordered by a yellow stripe (sometimes, however, absent), and it has a broken red line on each side. The caterpillar attains a length of about three inches. Some were kept in the same breeding cage with the Tithymali, but their habits were entirely different. When the Exoleta caterpillar ceased to feed, it did not immediately attain the pupa state, but was restless and

lively, remaining as a caterpillar from six to eight weeks, gradually shrinking and losing its colour, until it turned to the pupa. It made a fragile shell of fine earth, oval in form, and buried itself a short distance under the surface. Full-sized caterpillars, taken on the 20th of March, ceased feeding and turned to the pupa state from the 1st to the 20th of May, emerging to the moth on the 15th of June. In some specimens the process of turning to the pupa took place on the journey to England in a box, the caterpillars being covered lightly with cotton-wool.

TRIPHÆNA PRONUBA.

(*Common Yellow Underwing.*)

This is a common moth in England and Europe, but is rather a scarce species in Teneriffe. It expands a little more than two inches. The fore-wings are dark brown, having a few irregular markings of a lighter shade. The hind-wings are bright yellow, with a dark brown marginal band on the lower edge. The body is a somewhat lighter brown, and the antennæ are long and fine.

The caterpillar is brown, and it feeds on a variety of low-growing plants in the barrancos, and may also be found on the potato. It commences to appear in the early spring.

PLUSIA AURIFERA.

PLATE IV.—FIG. 6.

This moth is closely allied to the Chrysitis, which is found in England, differing, however, in the shape of the gold markings.* The fore-wings have a bright golden marginal band of varying width across them, from the apex to the base. It is found in rough places, and can be easily netted when hovering over clover-flowers or similar low-growing herbage at dusk. The hind-wings are grey-brown, shading off to a lighter tint towards the body. The antennæ are long and fine. The caterpillar feeds on the tobacco-plant, and is found in barrancos, but it is most usually met with on potato-plants; it envelops itself in a leaf, drawing it together

* Alpheraky describes the Indian variety Chrysitina as a Teneriffe moth.

with silk-like threads, and so forming a case in which it turns to the chrysalis. It is found very nearly all the year round, but is met with in greatest numbers during the spring months.

PLUSIA TRIPARTITA (Hufn.) URTICÆ (Hübn).

Known in England as the Spectacle Moth. It is met with in the day-time as well as at dusk, like many others of the genus Plusia. Its fore-wings are dark grey, varied with greenish-white in the basal and marginal areas; the sub-terminal line is marked below the costa with black arrow-heads in front, and is bordered with deep black behind. It is common in the greater part of Europe and Northern Asia. The larva, which is greenish brown, has two white lines on the back, and slender white and green lines along each side above the feet. It feeds on nettle.

PLUSIA CIRCUMFLEXA.

Similar somewhat to the English Gamma, or silver Y moth, but a distinct variety, and found largely in Europe.

The fore-wings are dark ashy-grey, with bronze markings, and have a pale golden mark in the middle resembling the letter *r*. The hind-wings are brown, of a lighter shade towards the base. It measures in expanse about two inches ; the antennæ are long and fine. The larva, which is green with a yellowish stripe at the sides, feeds on the potato and other low-growing plants, and is found during the early spring months, and well on into the summer.

PLUSIA ERIOSOMA.

This is the fourth species described here of the large genus Plusia. It is a much brighter golden-brown colour than the last described specimen, measuring about one and a half inches across the wings. The fore-wings are golden-brown, having two distinct gold spots about the centre. The hind are of the same tint as the fore-wings, darker at the margin, and shading off lighter towards the base. It is found in India, but is not a European species.

HELIOTHIS ARMIGERA.

This is a very rare moth in England, but is found over the greater part of the world. It expands about one and a half inches.

The fore-wings are a brownish yellow, with darker indistinct markings. The hind-wings are lighter yellow in colour, with a dark semi-lunar spot in the middle, and have a dark marginal border. The antennæ are long and fine. The caterpillar was found on the potato-plant and proved to be one of the cannibal species. It fed occasionally on the food provided, but seemed generally to prefer its companions in captivity, feeding at night, and so had to be separated from them. The larva is reddish brown in colour, with a yellowish stripe on the sides, and it is very commonly found in Teneriffe during the early spring months.

HELIOTHIS DIPSACEA.

This is a small moth, about one to one and a half inches in expanse, and found throughout the greater part of

Europe, Northern and Western Asia, and North Africa. It frequents high ground in the spring and summer, living in rough places and in clover-fields. The fore-wings are of light olive-brown shade, with dark markings across them. The hind-wings are dark olive-brown, fringed with yellow, and having two large yellow uneven spots about the centre, with a similar one on the brown margin. The body is stout, the antennæ long and fine. The larva is green or rust-colour, with white lines on the back and sides.

PRODENIA LITTORALIS.

A moth, expanding about one inch and a half, found in Africa, but not in England. It has brown-grey fore-wings, with opalescent markings. The hind-wings are of a shining opalescent white. The larva is brown, feeds on the potato-plant, and appears during the early spring. The moths are seen a month or six weeks later; those bred in captivity appear simultaneously with those out of doors.

PERIDROMA SAUCIA.

Rather a fine moth, inhabiting Europe, though not found in England. It expands about two inches or more. The fore-wings are dark brown, sometimes suffused with a reddish tinge at the upper margin. The hind-wings are of a greyish pearl-white colour, veined with brown, with a brown shade fringing the margins. The larva is greyish-brown, and feeds on the potato-plant, where it is found during the late winter and early spring. The average time for turning from the larva to the moth stage is from six to eight weeks.

TARACHE LUCIDA.

PLATE IV.—FIG. 8.

This is a small moth, not very commonly found in Teneriffe. It is met with by day along the coast, and up to an altitude of 2000 feet or more in rough rocky places, in April and up to June or July. The prevailing colour is a blue-grey. The fore-wings have a large

square patch of white on the upper margin, and a smaller dot of the same colour towards the middle. The hind-wings are fringed with white, and have two or three patches of the same colour along their margins. In the male, the white on both wings is increased towards the base. It is not an English species, but is found in Europe and along the Mediterranean. The larva is a green or brownish grey, with three dark double lines on the thoracic segments ; tufted, and with a white line on the back on segments 5 to 7, and with a dark stripe on the back, and a whitish line on the sides of the remaining segments.

STERRHA SACRARIA.

A pretty little moth, about one inch in expanse, commonly found in the Canary Islands. It is widely dispersed over Europe and Asia, and is a rare inhabitant of England. The fore-wings are sulphur-yellow, tinged with bright red at the apex, and having a red line running from the tip to the middle of the inner margin. The hind-wings are pale yellowish white. It frequents

rough places among short herbage, and is found on and near the coast in the early spring and during the summer. The larva is green, with a paler line on the back, and a yellowish line on the sides. Spiracles red. It feeds on low-growing plants.

OMMOTOSTOLA SACCHARI.

A pale buff moth, measuring in expanse about two inches. The specimen described was netted at Guimar, Teneriffe, in May. It is somewhat common. The fore-wings and body are buff, the latter being rather richly feathered. The hind-wings are cream-white; the antennæ are rather thick, of a medium length. It is not an inhabitant of Europe. The larva has not been observed.

HYPENA OBSITALIS.

Not an English moth, but an inhabitant of South Europe, North Africa, and Asia. It measures in expanse about one inch. The fore-wings are brown, varied with

pale yellow and black markings. The hind-wings are grey, shading lighter at the base. It makes its appearance in the spring, and is very commonly found in dwelling-houses or surrounding out-houses in the evening. The larva is green, with a white stripe on the sides.

HYPENA LIVIDALIS.

A smaller moth than the last specimen described. The fore-wings are olive-brown, violet-grey towards the margins. The two colours are separated by an oblique whitish line from the apex to the middle of the inner margin. The hind-wings are grey, shading off lighter to the base, and are veined with brown. It is not an English species, but is very commonly found in Teneriffe, on rough ground, among cactus, &c., in the early spring, at no great distance from the coast. It inhabits South Europe, North Africa, and Western Asia.

OMPHACODES DIVINCTA.

PLATE IV.—FIG. 7.

A pretty little sea-green moth (geometra) found in South Africa, but very rarely met with in Teneriffe. It

was netted in a rough place among cactus-plants in April at dusk, about 500 feet above the sea level. It measures about one inch in expanse; the fore-wings and upper part of the body are of a beautiful bright sea-green colour when first netted, but the insect quickly fades. The hind-wings are paler green, and all four wings are fringed with white. The antennæ are short and slightly feathered.

This moth had not figured in any collection of Teneriffe moths as far as the author could ascertain. No observations have been made on the larvæ and pupæ.

ASPILATES COLLINARIA. (Holt-White.)

PLATE IV.—FIG. 10 (Female).

This moth is allied to the Aspilates Gilvaria, but is probably an insect peculiar to the Canaries. It measures in expanse about one inch. It is of a pale buff-colour, the female being of a much intenser shade than the male. The hind-wings in both sexes are much lighter in colour than the fore-wings. The fore-wings

of the female have a slate-blue narrow band of colour, extending from near the apex to the base of the upper margin, forming a semicircle. Within the semicircle, and near the upper margin, is a small slate-blue dot. The hind-wings have also a band of varying width and of the same colour extending across them, and a slate-blue dot is seen near the top of the upper margin above the slate band. The male has similar markings, but they are much paler, and not nearly so well defined. The antennæ of the male are feathered, of medium length; those of the female are longer and finer. At first sight this moth might be deemed a variety of Sterrha Sacraria. The female was taken at Guimar about 1000 feet above the sea. Several male specimens were taken near Orotava, at a somewhat higher altitude. This moth, being unknown at South Kensington, has been named as above by the author.

BRYOPHILA var. RAVULA (Hübn).

A small moth, about one inch in expanse, with a slender body. The fore-wings are dark brown, with

the base, tip, and inner margin whitish. The centre of the wings is suffused with red, and two transverse lines of darker colour cross them. The larva is blue with a black line on the back and a zigzag yellowish-red stripe on the sides, bordered below with black. It feeds on lichens growing on walls. It is not a British species, but is met with in Southern Europe.

BRYOPHILA ALGÆ (Fabr.).

This is a small moth, with the same characteristics as to size and form as the last described. The fore-wings are green, varied with brown and blackish in the position of the claviform stigma. It has dark transverse lines, and the hind-wings are brownish grey. The larva is bluish-grey, with a grey stripe on the back. It feeds on lichen, and inhabits Central and Southern Europe, and Western Asia, but is a great rarity in England.

AGROTIS SPINIFERA (Hübn).

This is a moth somewhat larger than the last-described, with rather a stout body. It is fawn-colour, the ab-

domen pale-brown, and the margin of the fore-wings has several black spots. The hind-wings are whitish. It inhabits South-Western Europe, but is not met with in England.

SESAMIA NONAGRIOIDES (Lef.).

The body of this moth is stout, the fore-wings are nearly rectangular at the tips, without any distinct pattern. The antennæ and tongue are short. The fore-wings are greyish-yellow with a black discal spot, and an outer row of black dots. The hind-wings are white. It inhabits Spain, North Africa, and Madeira, but is not a British species. The larva lives on the stalks of maize, corn, and sugar-cane.

ACIDALIA CONSOLIDATA.

One of the large genus of Acidalia, a small and delicate moth. The wings are yellowish-white, finely dusted with black. The fore-wings have five and the hind-wings four brownish yellow transverse bands. It expands about one inch. It is not a British species.

ZONOSOMA PUPILLARIA (Hübn).

A small moth, with the tips of the fore-wings pointed. The wings are greyish yellow, finely and indistinctly speckled with purplish brown, with a small brown central spot centred with white, a row of black dots beyond the middle, and often a dull red, zigzag central shade also. This is a very variable species, inhabiting S. Europe, W. Asia, and N. Africa, but is not an inhabitant of England. The larva is very variable in colour, being dull green, brown, or reddish. It feeds on the cistus, arbutus, myrtle, etc.

TEPHRONIA SEPIARIA (Hufn).

A small moth, with narrow fore-wings, expanding about one inch. The fore-wings are ashy-grey, finely dusted with a darker shade. The hind-wings are paler, with two dark marginal bands. It is met with in Central and Southern Europe, but is very rare in Britain. The larva is brownish grey, with a paler line and two rows of pale spots on the back.

EUPITHECIA PUMILATA (Hübn).

The fore-wings are pointed, reddish grey in colour, and bordered by a brownish-red band. The larva is pale yellowish-green, with dark green or reddish-violet lines on the back, and a paler line on its sides. It feeds on the flowers of a great variety of plants, such as clematis, broom, convolvulus. It is widely distributed in Central and Southern Europe and W. Asia, but is not an inhabitant of Britain.

LIST OF MOTHS FOUND IN TENERIFFE.

	NAME OF MOTH.	REMARKS ON LOCALITIES, ETC.
	Sphinges.	
*1	Acherontia Atropos . . .	England (Death's Head).
2	Sphinx Convolvuli . . .	England (Convolvulus Hawk-moth).
*3	Deilephila Tithymali . . .	Peculiar to the Islands.
*4	Chœrocampa Celerio . . .	England (Sharp-winged Hawk-moth).
5	Macroglossa Stellatarum . .	England (Humming-bird Hawk-moth).
	Bombyces.	
*6	Deiopeia Pulchella . . .	European. England; rare.
*7	Rhyparioides Rufescens . .	Peculiar to the Islands.
*8	Dasychira Fortunata . . .	Peculiar to the Islands.
	Noctuæ.	
9	Bryophila Ravula	Not in England.
10	„ Algæ	England; rare.
11	Sesamia Nonagrioides . . .	Spain, N. Africa, Madeira.
12	Triphæna Pronuba	England (Common Yellow Underwing).
13	Agrotis Spinifera	Not in England; S.W. Europe.
14	Peridroma Saucia	Not in England; European.
15	Ommatostola Sacchari . .	Not European.
16	Prodenia Littoralis . . .	Not in England; S. Asia and Madagascar.
17	Calocampa Exoleta . . .	England (Sword-grass moth).
18	Heliothis Armigera . . .	England; rare (cannibal).
19	„ Dipsacea . . .	England.

	NAME OF MOTH.	LOCALITIES.
20	Heliaca Tenebrata	England (Small Yellow Under-wing).
21	Plusia Circumflexa	Not in England ; S. Europe.
22	,, Eriosoma	Not in England ; India.
*23	,, Aurifera	Peculiar to the Islands.
24	,, Tripartita	England (Spectacle Moth.)
*25	Tarache Lucida	England, rare ; S. Europe.
*26	Pseudophia Tirhaca . . .	Not in England ; S. Europe, N. Africa.
27	Hypena Lividalis	Not in England ; S. Europe, N. Africa.
28	,, Obsitalis	,, ,, ,,
	Geometridæ.	
*29	Aspilates Collinaria . . .	Probably peculiar to the Islands.
30	Sterrha Sacraria	England; S. Europe, Africa, and S. Asia.
*31	Omphacodes Divincta . .	Not in England; South Africa.
32	Acidalia Consolidata . . .	Not in England ; Europe.
33	Zonosoma Pupillaria . . .	S. Europe, W. Asia, and N. Africa.
34	Tephronia Sepiaria. . . .	England (rare) ; European.
35	Eupithecia Pumilata var. Tempestivata	European.
	Micro-Lepidoptera.	
36	Botys Verbascalis	England.
37	,, Polygonalis	,,
38	,, Asinalis	,,
39	Asopia Farinalis (dark form)	,,
40	Centra Stregaria (Woll.) or Coremia Cidaria (Staud)	Probably peculiar to the Islands.
41	Calymnia Ferruginea (Woll.)	,, ,, ,, ,,

* Marked thus are illustrated.

In addition to the specimens above described, a list of twenty-one more names of Teneriffe moths is appended, which have been written upon by S. Alpheraky in the memoirs of N. M. Romanoff, vol. v., 1889. Several of the insects in this list were collected by the author, but as they were mostly very small brown or grey moths, and of but little interest to the ordinary collector, a description of them has been omitted. The difficulty of identification without illustration also precludes their insertion in a work of the present character.

ALPHERAKY.

1 Plusia Chrisitina
2 Cosmophila Erosa
3 Acidalia Guancharia
4 Scoparia Sudetica
5 Hellula Undalis
6 Aporodes Floralis
7 Botys Aurata
8 ,, Meridionalis
9 ,, Ferrugalis
10 ,, Dorcalis
11 Duponchelia Fovealis
12 Crambus Tersellus
13 Cryptoblabes Gnidiella
14 Ephatia Ficulella
15 Ucetia Transversella
16 Ephestia Callidella
17 ,, Elutella
18 Plodia Interpunctella
19 Setomorpha Bogotatella
20 Litha Solanella
21 Pterophorus Monodactylus

APPENDIX A.

Mr. Scott Wilson, writing to the author of his visit to the Isle of Palma, states that the Queen of Spain Fritillary (Argynnis Lathonia) is very common in the meadows near the town of El Paso, 2000 feet above the sea level in May. In the same month he noticed the clouded yellow (Colias Edusa) in large numbers in the clearings amongst the pine-woods. A few specimens of the large Fritillary (Argynnis Maia) were secured by him at El Paso early in May, where the Vulcania was also found; of these latter specimens only two out of one hundred proved to be of the British form Atalanta. The Bath-white (Pieris Daplidice) was common near Argual.

The Danais Chrysippus appeared rather uncommon, only a few specimens being taken near the barranco Del Carmen, not far from the town of Santa Cruz, and a few near Tijarafe.

Specimens of the small blue (Lycaena Webbiana) were taken near Argual.

In the middle of May the large white (Pieris Cheiranthi) was commonly found on the large laurel-trees at La Galga.

The author believes that the same species of Lepidoptera are generally distributed over all the seven islands, but that in Fuerteventura and Lanzarote, both of which are dry, sandy, and somewhat barren islands, they are not found in such numbers or variety. It is probable that different species of small African moths, some of which are enumerated on pages 93-4, may be found in Lanzarote, which is the nearest island to the coast of Africa, and which more closely resembles it in climate and vegetation, in greater numbers than in Teneriffe. The Euphorbia, which grows so plentifully in most of the islands, is uncommon in Lanzarote ; hence the D. Tithymali, abundant in Teneriffe, would be scarce in this island. The lack of water in Fuerteventura, and consequent sparse vegetation, is doubtless the cause of the scarcity of Lepidoptera in that island, though the interesting

occurrence of the insect "Euchlöe Charlonia," a North and West African butterfly (which has only once been recorded as having been observed in Teneriffe), is accounted for by the proximity of the island in question to the African mainland. This species probably occurs in Lanzarote, for the same reason; it will doubtless become dispersed over the remaining islands in time.

APPENDIX B.

Under date July, 1893, the Rev. O. E. Benthall writes :—

"As to the 'blue' (Webbiana), I found it in abundance at Guimar about half a mile from the coast, where the barrancos shallow down before running into the sea.

"Most of the specimens were rather wasted, so I suppose the best time for them would be a fortnight earlier than when we went there (April)."

APPENDIX C.

Several of the Teneriffe moths, although similar to English and European species, assume rather a darker insular form. The Triphæna Pronuba, Calocampa Exoleta and Asopia Farinalis are examples of this. The Sterrha Sacraria is also met with marked with a much brighter red than in ordinary specimens, and showing great diversity in shade of colour, from red to almost yellow. Anyone wishing to acquire more knowledge on this subject should refer to "Observations on some remarkable Varieties of Sterrha Sacraria, with general notes on Variation in Lepidoptera, by R. M. McLachlan, F.L.S." Transactions of the Entomological Society of London, Ser. 3, vol. ii, pp. 453-468, pl. 23.

Those who are interested in the subject, and have sufficient time and patience, would probably be well

repaid for their trouble by the result of experiments in selecting and breeding together insects of the same species which exhibit any slight deviation in their markings and colour. Thus in rearing a number of the Pyrameis Callirhoe several specimens have been observed to emerge from the chrysalis state with bright yellow instead of red markings on the margins of the hind-wings. The white markings on the upper wings also varied somewhat. The Pyrameis family would possibly lend itself freely to the production of new varieties. The Danais Chrysippus is another species of butterfly which presents itself for experiment. By selecting the lighter hind-wing variety, Alcippoides, for breeding, perhaps the Alcippus, which hitherto has not been found in Teneriffe, might be produced. Among the smaller butterflies, the Chrysophanus Phlœas, and the Astrarche var. Aestiva have both shown deviation in colour and markings, but these are much smaller, and consequently more difficult to rear. Moreover, they would not lend such an interest to the subject as the larger specimens.

In the moths, the Deilephila Tithymali caterpillars,

if fed on a species of milk-wort, evince a slight variety in colouring and size of moths as compared with those fed on Euphorbia. They must, however, be fed on the plant from the earliest stage, as they only thrive on the food to which they have been accustomed from the first. Some of the earliest specimens are occasionally found on the milk-wort, the eggs having been deposited thereon. Those found in January are more likely to thrive on this food than those met with later on, as the Euphorbia, on which they generally feed, is not in its prime till the early spring.

Great care, patience, and time are required for these most interesting experiments, but the natural advantages of the climate of Teneriffe would greatly facilitate any efforts made, as the variation in temperature is so slight, and consequently the breeding process can be carried on nearly all the year round. Experiments of this nature, which might pleasantly be made by those with whom time might otherwise pass slowly in Teneriffe, would probably prove of distinct value to students of Biology.

APPENDIX D.

The "Deilephila Daucus," allied to "Lineata," a North American species, is said to occur in Teneriffe, but the author has not seen a specimen. If such a species is really found in the island, it is more probably D. Livornica, which is common in South Europe and throughout Africa, and is found in Madeira. Either of the above species may be distinguished from D. Tithymali by the white lines on the wings, but D. Livornica has only four longitudinal white stripes on the thorax, whereas D. Daucus has six. D. Livornica is a rarity in England, but is found throughout all the warmer parts of the Old World.

ALPHABETICAL INDEX OF GENERA AND SPECIES.

[*The specific names, including varieties, are printed in italics.*]

DESCRIPTION OF PLATES.

PLATE I.

FIG.

1. Pieris Wollastoni.
2. „ Cheiranthi (under side).
3. Rhodocera Cleobule.
4. Euchloë Charlonia.
5. Colias Edusa (female).
6. „ var. Helice.
7. Lycæna Webbiana (upper side).
8. „ „ (under side).

PLATE II.

FIG.

1. Danais Plexippus.
2. „ Chrysippus.
3. „ Alcippoides.
4. Pyrameis Huntera.
5. „ Cardui.
6. Lycæna Astrarche var. Aestiva.
7. Hipparchia Statilinus.
8. Hesperia Actæon.

PLATE III.

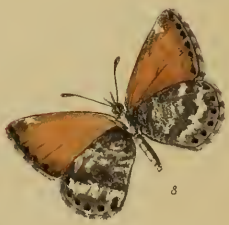
FIG.

1. Argynnis Maia or Pandora (upper side).
2. „ „ (under side).
3. Argynnis Lathonia (upper side).
4. „ „ (under side).
5. Pararge Xiphioides.
6. Pyrameis Vulcania or Callirhoe.
7. „ Atalanta.

PLATE IV.

FIG.

1. Acherontia Atropos.
2. Chœrocampa Celerio.
3. Pseudophia Tirhaca.
4. Deilephila Tithymali.
5. Rhyparioides Rufescens.
6. Plusia Aurifera.
7. Omphacodes Divincta.
8. Tarache Lucida.
9. Deiopeia Pulchella.
10. Aspilates Collinaria.
11. Dasychira Fortunata.



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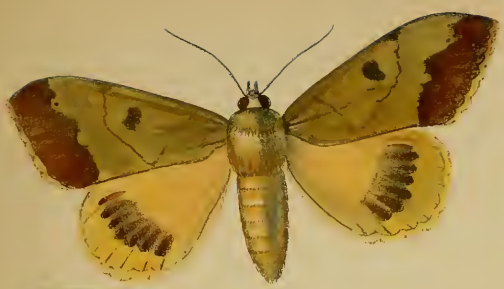
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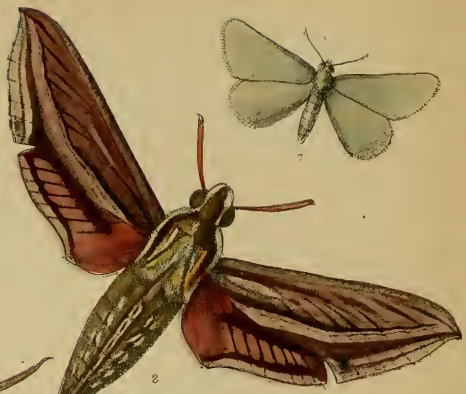
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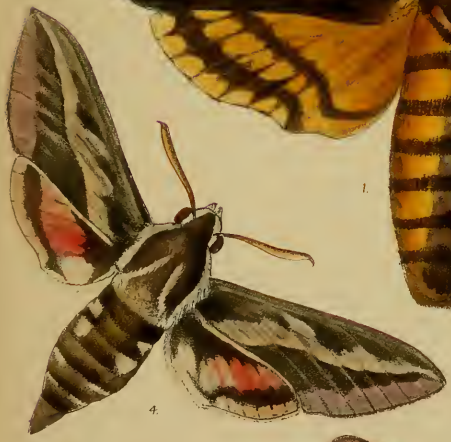
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