THE

HENRY MOORE

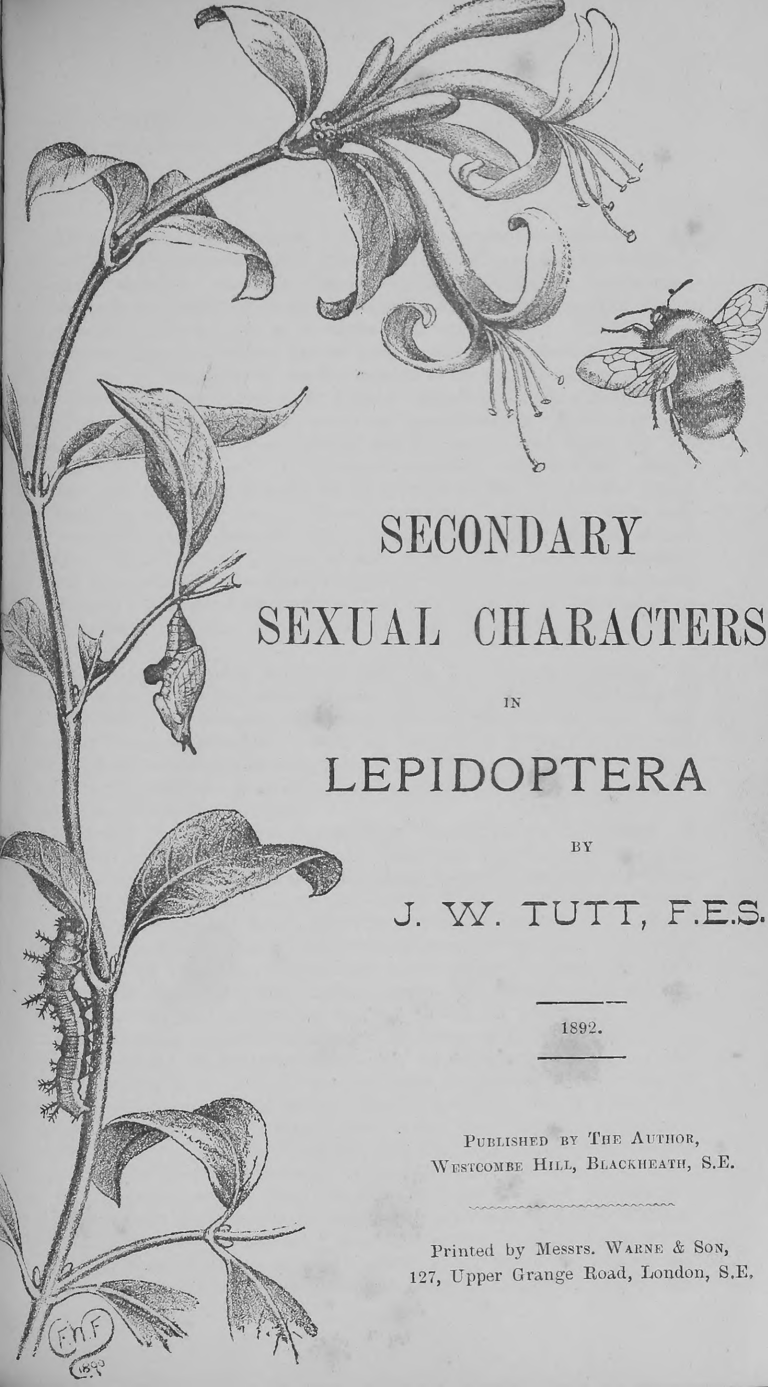
COLLECTTION.

(VC)

Harry Moore
Rotherhithe

60-

175-



SECONDARY SEXUAL CHARACTERS

IN

LEPIDOPTERA

BY

J. W. TUTT, F.E.S.

1892.

Published by The Author,
Westcombe Hill, Blackheath, S.E.

Printed by Messrs. Warne & Son,
127, Upper Grange Road, London, S.E.

It must have been noticed by those lepidopterists who have read the 'British Noctuæ and their Varieties,' that I have repeatedly referred to species as being "sexually dimorphic," in other words, that certain sexes are to be readily distinguished by some characteristic trait which is generally evident even on a superficial examination. Throughout the animal kingdom, there are a large number of species, the sex of which can be determined readily, apart from the sexual organs, by some external structure or conformation which strikes the most casual observer. On the other hand, there are species which have no outward visible signs of their sex, which can be determined alone by the special sexual organs with which most animals are provided. Lepidoptera are not behind-hand in this respect, and there are many external characters by means of one or more of which the sexes may be definitely distinguished without the examination of the sexual organs. These external signs of sex have been termed "secondary sexual characters." To these secondary sexual characters the term "antigeny" is applied by Scudder, and comprises all "those accessory peculiarities of either sex which are not directly connected with generation."

Of these characters in lepidoptera we find a large variety. In fact, in some species or other almost any portion of the body may be so modified as to become such, and thus we find the antennæ, legs, thoracic crests, abdominal crests, the wings as a whole, the nervures, etc., all modified in particular species so as to become "secondary sexual characters," whilst wing markings and colour are also in many instances requisitioned for the purpose.

Darwin in his "Descent of Man" has treated the subject of "secondary sexual characters" very fully, and Geddes and Thompson write:—"Among invertebrates prominent secondary sexual characters are rarely exhibited outside the great division of jointed-footed animals or arthropods. There, however, among crustaceans and spiders, but especially among insects, beautiful illustrations abound. Thus the great claws of crabs are frequently much larger in the males; and male spiders often differ from their fiercely coy mates, in smaller size, darker colours, and sometimes in the power of producing rasping sounds. Among insects, the males are frequently distinguished by brighter colours attractively displayed, by weapons utilised in disposing of their rivals, and by the exclusive possession of the power of noisy love-calling. Thus, as the Greek observed, the *Cicadas* "live happy, having voiceless wives." Not a few male butterflies are pre-eminently more beautiful than the females; and many male beetles fight savagely for the possession of their mates" ('Evolution of sex,' p. 6). Darwin argued that these "secondary sexual characters" originated first of all in slight variations, that these variations were of advantage in what he termed "sexual selection," a phrase adopted to define the advantage due to actual selection, not by nature but by the other sex, so that the individuals possessing advantageous variations were utilised in copulation and gradually outdistanced those without such, in other words "on the advantage which certain individuals have over others of the same sex and species in reproduction," whilst the words in which he sums up the means through which, probably, "sexual selection" has led to the development of "secondary sexual characters" are as follows:—"It has been shown that the largest number of vigorous offspring will be reared from the pairing of the strongest and best-armed males, victorious in contests over other males, with the most vigorous and best-nourished females, which are the first to breed in the spring. If such females select the more attractive, and at the same time vigorous males, they will rear a larger number of offspring than the retarded females, which must pair with the less vigorous and less attractive males. So it will be if the more vigorous animals select the more attractive, and at the same time healthy and vigorous females; and this will especially hold good if the male defends the female, and aids in providing food for the young. The advantage thus gained by the more vigorous pairs in rearing a larger number, has apparently sufficed to render sexual selection efficient."

It may be well now, to run cursorily over the various "secondary sexual characters" presented among our British lepidoptera with a view to drawing further attention to a most interesting subject.

(1). ANTENNÆ.—It strikes one at once that sexual differences in the antennæ are not to be found in our British butterflies except in the most minimised form. Slight differences in length and stoutness are found in certain species of the *Argynnidæ*, *Papilionidæ* and *Pieridæ*, but these are so slight as to be almost unnoticeable. Amongst the *Sphingidæ*, there is a distinct difference, those of the males being more decidedly ciliated than those of the females. In the *Sesiidæ* and *Zygænidæ* there is again but little difference, whilst among the *Bombyces*, made up as it is of so many unequal groups, there is very considerable variation. The *Hèpialidæ*, which do not really belong to this sub-division at all, have simple antennæ without sexual difference; the *Lithosidæ* and *Euchelidæ* present slight differences, the *Chelonidæ* stronger ones, whilst in the *Cochliopodidæ*, *Liparidæ*, *Bombycidæ*, *Endromidæ* and *Saturniidæ* the differences are very great. The differences are fairly well developed in the *Depranulidæ*, *Dicranuridæ*, and *Notodontidæ*. Amongst the NOCTUÆ, PYRALES, CRAMBITES, GEOMETRÆ, TORTRICES, TINEINA, etc., there are considerable differences, the antennæ varying much in closely allied species, and showing how intimate certain phases in the development of the antennæ are with the habits of particular species. The power that certain species have of finding their mates is well-known, and it would appear that all species have this power more or less developed in some form or other. Generally the male, by means of some special sense, finds out the female, but it is beyond doubt that the female frequently asserts an external and direct attractive influence over the male. This is termed "assembling" by lepidopterists. The way in which a virgin female of *Bombyx quercus*, *B. rubi*, *Endromis versicolor* or *Heterogenea limacodes* will, in the day-time, attract considerable numbers of males to them is well known, and it is therefore necessary to examine the habits of some of the species, to get some general idea of its action. We notice that the species just mentioned, constitute a class of insects the males of which fly freely during the day, whilst the females remain hidden. It therefore becomes necessary for the male to have some special means to detect and find out the hidden female before his flight is over so that copulation may take place. If we examine the two sexes of these species we are at once struck with the fact that the antennæ of the male are covered with strongly developed pectinations, and that those of the female are comparatively simple. In TORTRICES which fly during the daylight, and in which the female is comparatively inactive and retired, we find the same character highly developed in the male. Examples that occur to me are *Amphisa prodromana, Ptycholoma lecheana, Clepsis rusticana, Batodes augustiorana, Grapholitha obtusana, Stigmonota perlepidana, Catoptria ulicetana, Tortricodes hyemana*, and many others may be mentioned, whilst of species which fly at dusk and assemble freely *Cabera pusaria, C. exanthemata, Iodis vernaria, Cheimatobia brumata, Aspilates gilvaria, A. citraria* and *A. strigillaria, Amphidasys prodromaria, Stauropus fagi, Spilosoma mendica*, the Noctuid genera *Pachnobia, Tæniocampa*, &c., at once occur to my mind. Here then is a distinct development of a special organ associated with a special habit of the species, to wit, the pectinated antennæ of the male, associated with an ability of the male to seek out and find the female when more or less hidden. When these facts first came to light it was generally assumed that the antennæ enabled the male to find the female by increasing his power of vision, but it is well known that the male frequently retains the power even when the female is completely hidden in a box &c., and I have known the male to fly repeatedly to the spot where a female has been confined. It would appear, therefore, that the male is most probably guided by scent and that the antennæ are specially devised for the reception of an attractive odour given off by the female. It is remarkable that where both species are equally active, and the sexes fly freely together in the daytime, the antennæ are never specially developed, at least not to my knowledge, and that in such cases the "secondary sexual characters," where such exist, are generally connected with the colour, markings, etc., of the wings. For example, both sexes of the butterflies fly freely together and there is no special antennal development, so also do the species in the genus *Zygæna*, and yet in the allied genus *Ino*, where the females remain resting on the grass stems etc, whilst the males buzz or fly about, the modification in the antennæ at once takes place and those of the males become strongly ciliated. In some species, where the ciliations in the male are slight, the antennæ of the female are generally quite filamentous, perfectly simple and unciliated ; but when the pectinations in the male are decidedly well-developed and strongly pectinated, the female also has traces of the ciliations or pectinations. It must be remembered, too, that it is only in those species in which both sexes have simple antennæ that the sexes conform to each other in this respect, and it, therefore, would appear to be a fair deduction that the antennæ of lepidoptera were originally simple and that the pectinated character has been acquired owing to the actual necessity of the development of a sense by means of which the males shall find the females. Mr. Poulton, in his paper 'On the morphology of the Lepidoperous pupæ,' says that the female had them and lost them, but it is more difficult to suppose that the female should have had them and lost them, when there appears to have been no real reason for her to have them and no use that she could make of them, than to suppose that the male has acquired them, and that, in such cases as these in which the female now more or less has them, the male has transmitted some tendency in the direction of their development to the female. We can hardly leave the subject of antennæ without referring to those of the *Adelidæ* consisting of the genera *Nemophora*, *Nematois* and *Adela*. So different are they in the sexes, that early authors separated them by their antennæ alone as different species. Dr. Chapman informs me that *Incurvaria muscalella* is structurally very near *Adela*. The males of the former have pectinated antennæ, those of the latter long ones. It may, therefore, be supposed that the long antennæ of *Adela* are simply the result of a method of increasing the antennal surface, as pectinations do in some other species. It may be a new and artistic method, possibly it is an old and antiquated one.

(2). Scent Glands and Patches.—Having referred to the fact that insects probably use their antennæ as one of the sets of organs by means of which the males search out the females, and that this is probably done through the sense of smell, it becomes clear that there must be some scent given off by the insects by means of which the opposite sex is attracted. The work of Fritz Müller has made us conversant with special organs in which scent is produced (although he himself hardly indicated their use in any sexual relation) and these are divided by Scudder into three classes :—(1). "Extensible glands on the abdomen," as are found in *Anosia*, in the *Euplœinæ* and *Heliconinæ*. (2). "Tufts or pencils of hairs found on various parts of the body including the legs and wings." Fritz Müller found a pencil or tuft of long hairs near the front margin of the hind wings of the male in the *Ithyonida*, and although the same organs are found in the female, they are neither so large nor so well-developed and the vanilla-like odour given off by the male is not so strong or noticeable. In *Prepona*, a tuft of black hairs on the hind wings gives out an odour, whilst, in one of the species *Thaumantes* (belonging to the *Morphinæ*), pencils of hairs called "scent-fans," are situated on the upper surface of the hind wings near the base. Similar tufts, giving out a jasmine-like smell, occur in a species of *Catopsilia*, and Müller also records a faint odour in some of the higher *Hesperidi*, which comes from pencils of hairs found in the hind tibiæ of the male. This brings us close to a case in our own fauna in which an odour is given off from the aborted hind tibiæ of the males of *Hepialus hectus* ('Ent. Rec.' &c., vol. iii., p. 77). (3). "Clusters of scales." These according to Scudder, appear to be confined to the male sex. Niceville states that *Antirrhea* (one of the *Satyrinæ*) gives out an odour from a collection of scales on the hind wings at the anterior base of the upper surface, the area being covered by the fore wings, whilst Scudder gives many other examples. Taken in connection with the power which certain butterflies and moths possess of being attracted by the opposite sex, generally, although by no means universally, the male by the female, these scent glands undoubtedly show, if they do not positively tend to prove, a distinct sexual use which may now be readily understood. The power of "assembling" in British moths especially, is so well recognised that it is almost useless to recall special instances, but I would call to mind that most writers on the subject, notice that only certain atmospheric conditions are suitable for the purpose. I have myself noted that warm evenings with a little wind are most suitable for the "assembling" of moths such as *Iodis vernaria* etc., a condition one might suppose favourable to the diffusion of the scent. Writing of "assembling" with *Amphidasys prodromaria*, Mr. Hope Alderson says:—"I have seldom found the same ♀ of much use on the second night" and "one slightly windy night I attracted a good number of males, and took the same ♀ on the following evening, which was quite mild and warm contrasted with the previous one. I waited by the bag fully two hours without any result" ('Ent. Rec.,' i., p. 18). These statements appear to point conclusively to two facts,—first, that the males are attracted by some scent, or why should not a virgin ♀ be as attractive on the second night as the first; secondly, that the odour is only of brief duration in this species and soon disappears. Two dozen male *Stauropus fagi*, were attracted on one evening by a single female by the Rev. Bernard Smith (' Ent. Rec.,' vol. i., p. 67), whilst almost every record of "assembling" gives some hint as to some odour being the attraction. Thus Mr. J. E. Eastwood records the capture of nine males of *Bombyx rubi* in a few minutes, attracted by a female *in cop.* which proves that "sight could not have led the males there," whilst Mr. Robson records male *Hepialus sylvinus* flying down to the sand, to a spot whence a female had emerged, the scent probably remaining sufficiently to attract the males, and Mr. A. Robinson refers to the fact that species of *Sesia* will not attract the males unless "restless" and "excited." Possibly here, the scent is only diffused by the movement of the wings. This would account for the fact that "restless" females attract readily, whilst lethargic females fail to do so. It is beyond question, at any rate, that these scent receptacles or glands are of direct sexual value, and that certain butterflies and moths do emit odours. Scudder says that they are "in a large measure confined to the male sex, and are emitted through microscopic canals, which course through microscopic glands at their base within the wing membranes." On the contrary, in moths, I believe they are chiefly confined to the female sex, and I will take Scudder's own illustration to prove my point. He says:—"Since these insects emit odours, they must also be able to perceive them. The males of certain species among the *Bombycidæ* will, of an evening, enter in great numbers an open room, within which a female of the same kind has been disclosed from its cocoon, entirely out of sight and often at a great distance from her visitors. It is plain, that in instances of this kind, known to every entomologist and too numerous to mention, the sense of smell must be the sole directing agent" (pp. 1051-1052). Just so, but surely it will be granted that it is the females in these cases that attract the males. It is the females that are hidden. It must be the scent from them that guides the males to their hiding places. In many of these instances, certainly, there is no odour which is perceptible to us, but it appears beyond question that they have a delicate sense of smell by means of which they can detect odours altogether inappreciable as far as we are concerned. But the male does sometimes attract the female. It is the male *Hepialus hectus*, that gives out its pineapple scent whilst gently hovering, and attracts the female, which, when she comes within the scented area, flies against and touches him, the two at once dropping to the ground to pair. Messrs. Barrett and Robson have both recorded observations connected with this. The females of the allied *H. lupulinus* and *sylvinus*, however, stand on a grass stem and appear only to exert their attractive influence on the males (quite an inversion compared with *hectus*, and yet following the general rule), when, with rapidly vibrating wings, they apparently give out an odour which speedily attracts their mates.

The presence of these scent glands and patches being beyond doubt, it now becomes neccssary to classify them. It would appear that they might be readily sub-divided into the following 3 classes:—(1). By the ♀ to attract ♂, rarely (if ever) perceptible by man. It is very possible that this scent which appears to be common to most species, is in direct connection with the primary sexual organs, but not certainly so. In those species as *Hepialus lupulinus* and *H. sylvinus*, in which the female usually rests with quivering wings to attract the male, it is very probable that special organs are actually used to secrete certain odours, and that the movements of the wings help in the diffusion. (2). By the ♂ to attract ♀ as in *Hepialus hectus.* This has already been fully dealt with and is a most remarkable case. (3). By the ♂ to charm ♀ who is discovered by vision, the special scent glands being microscopic and often grouped into special organs in various positions in different groups. This takes place in most butterflies where "sexual selection" probably occurs more frequently than in moths, in fact, it must be a very rare occurrence in the latter. Butterfly courtship (as we suppose it) is pretty well recognised, the ♂ finds the female by sight then flutters around her, pursues her, endeavours to charm her and often fails, having to repeat the process over and over again. It has been suggested to me that it is quite possible that the male odours from the scent structures before mentioned, add a hypnotic influence to the others exerted by the male over the female. It would seem also that almost all butterflies (♂) are scented by "androconia" and that the various patches etc. are special arrangements, or, as it were, local developments of these. (4). By both sexes to repel enemies. This, and No. 3, are the chief cases to which Fritz Müller draws attention. He assumes that the special scent glands found in both sexes are of this character, and it is very possible that his view is correct.

(3) Absence of Wings.—In other families where there is a vast disparity between the sexes, it is usually the female which is the more highly developed, but in lepidoptera, the complete or partial absence of wings is generally (always?) associated with the female sex when such a phenomenon occurs. Apterous and semi-apterous females are therefore well known in this order and we will now look at some instances. The British genera which exhibit this peculiarity most strikingly are as follows:—*Orgyia* in the *Liparidæ*; *Phigalia* and *Nyssia* in the *Amphidasydæ*; *Hybernia* and *Anisopteryx* in the *Hybernidæ*; *Cheimatobia* in the *Larentiidæ*; *Tortricodes* in *Aphelidæ*; *Lemnatophila, Exapate, Diurnæa* and *Epigraphia* in *Epigraphiidæ*; *Talæporia, Psyche, Solenobia* and *Psychoides* in *Psychidæ.* The females of the species in these genera are remarkable not only for the fact that they are apterous or semiapterous, but that their bodies, compared with those of the males. are exceedingly large, and it becomes evident that

the quantity of food etc., which has gone to the production of the wings and external structures in the male has been utilised in the development of an excessive reproductive system in the female, and it is also noticeable that most, if not all, apterous and semiapterous females are capable of producing a large number of ova. In relation to this matter of size Dr. Chapman has pointed out that *Orgyia antiqua* female larvæ have one more moult than the male larvæ.

It is a recognised fact that all animals have some means of escape from their enemies, and that the female requires such special means more than the male. It is also noticeable that many of the apterous and semiapterous species occur in the winter or early spring when the trees are bare and when the males become exceptionally conspicuous. The females also of such as occur in the winter or early spring, move about rapidly from place to place and hide in nooks and crannies into which the male with his wings could not possibly enter. On the other hand, the females of *Orgyia*, *Psyche* etc., emerge in the summer, are scarcely able to crawl at all, have scarcely any means of locomotion, do not hide in crannies etc., but lay their eggs and practically die in the spot where they emerge. Here then are two distinct groups which require separate consideration. They, however, resemble each other in having similar means of planting their young in the world. They produce many ova. Those that emerge in the spring or winter lay their eggs in the crannies of the bark, twigs etc., at a time of the year when they are much exposed and have to leave them largely to fate. The great number of eggs they lay is their only chance in the struggle for existence and they accordingly lay them. But herein the two groups differ. The females of *Nyssia*, *Hybernia*, *Anisopteryx*, *Exapate*, etc., search for these crannies to lay their eggs; but a suitable egg-laying place for the female has to be found by the larva in *Orgyia*, still more being left to chance in *Psyche* where the supply of ova, however, is practically unlimited owing to the parthenogenetic reproduction which takes place in this group.

Let us look now at a few details in certain species which can be taken as characteristic of the rest. *Orgyia antiqua* flies rapidly in the sunshine at a time when insect-eating birds are most abundant, his rapid flight undoubtedly aiding him in protecting himself. The female with her large body cannot possibly be protected in this way. To fly with the rapidity of the male she would require an immense wing area owing to the weight of her body. She, therefore, has to hide, and the hiding place is provided when she is in the larval stage. Her wings are useless and would betray her. In her apterous condition, seated on her pupal web after emergence she looks so exactly like a spider that only practical entomologists recognise her; she lays her eggs in the web and never stirs. To carry the matter a step further, the eggs hatch a few at the time throughout the season, so that it is scarcely possible for a whole batch to fail as they might sometimes do if they all hatched together owing to climatic causes &c. As an example of the "Winter Moths" let us take *Anisopteryx æscularia*. The male of this species is wonderfully protected. With its slender body appressed closely to a twig, and its wings folded carefully round it, it is almost impossible to detect him. The female with its large body would become very conspicuous in a similar position.

It has also to seek for a place to lay its eggs. Wings would keep it on the outside of the thick bushes and hedges it frequents, but the absence of wings and its well-developed legs enable it to crawl rapidly over the twigs of its food-plant in search of a suitable twig on which to lay its eggs, and to hide during the daytime in such corners and crevices as the trees and bushes afford. Males of *Diurnœa fagella* appear to have but little protection beyond that which their colour give them in connection with the resting place they choose. The female again with its large body, would with wings be still more conspicuous. But the female rarely appears to emerge before dark, and then crawls rapidly up the tree-trunks where the males are resting and copulation then takes place. By the morning the females are gone, probably to the upper branches where they hide and lay their eggs, and are rarely seen again, the more conspicuous males remaining still on the trunk below. The habits of *Psyche* are essentially different. Protected by their cases as larvæ, the males on emergence fly rapidly in the sunshine, and fall down into the grass or herbage when disturbed or when the sunshine fails, and in this way receive some measure of protection. The females, on the other hand, are but little different to the larvæ and remain in their cases. The males are provided with strongly pectinated antennæ to enable them to find the females, but their time of flight, and I believe the period of their existence is very limited, and it happens that the females are able, without copulation, to lay large numbers of fertile eggs and to produce parthenogenetically, vast numbers of offspring, although it is assumed, and I believe rightly, that males are never produced from the parthenogenetic ova and larvæ. It may, of course, be urged that in a state of nature under this arrangement, the ♂ must inevitably become extinct in a few generations, and in some species they may probably have almost done so. But there appears no reason to suppose but that parthenogenetically-derived females may be fertilised by a male so as to produce a further supply of males and the production of a very few males per year would necessarily be sufficient to keep that sex from becoming positively extinct. It is remarkable that in most species of *Psyche* and their allies, however, that a large proportion of cases give nothing but females, an occasional male being all that one usually breeds out of a very large number. Here then is a class distinct in itself, and differing from *Orgyia* on the one hand, and *Hybernia*, *Nyssia* and *Diurnœa* on the other; but the analogy between *Psyche* and its allies and *Orgyia* is much stronger than between either of these and the other genera just mentioned. The analogy between *Nyssia*, *Hybernia*, *Diurnœa* etc., is, however, very close indeed. To sum up then. It is the character of *Orgyia* to spread itself about by wandering in search of a place to pupate in. It has also found out that the eggs passed the winter more safely and were better protected by being laid on the cocoon or web, the web keeping them away from wet surfaces &c. The eggs, also, are largely protected by their hard shell, although they are severely attacked by a minute hymenopterous parasite. The necessity that the genera should lay a large number of eggs is, therefore, self-evident. The female had no actual use for wings and they gradually atrophied, possibly because they had not only become useless, but would actually serve to attract enemies rather than otherwise, possibly because nature expended the energy and force necessary to produce them in providing a large supply of ova, nature never expending force in useless directions. *Psyche*, of course, is somewhat analagous, until we reach the point that it lays its eggs *in* the case and can reproduce itself parthenogenetically. In *Hybernia*, *Cheimatobia* &c., the matter is different and probably the female is apterous for greater facility in hiding. When the leaves are off the trees, insectivorous birds have an immense advantage, and they have also to search in the winter much more keenly for a supply of food. The males are protected by their resemblances to dead leaves &c., the females with their large bodies could not thus readily protect themselves (compare the sexes of *A. æscularia* in nature). At the same time they produce very many eggs and the use of almost all energy in this direction may have some effect. These females are also active walkers etc., and can get into crannies and so on, quite the reverse to those of *Orgyia* and *Psyche.* The two classes in fact, appear to have nothing in common in this direction. Before leaving this subject, it would, perhaps, be well to mention the case of *Biston hirtaria*, a species closely allied to the apterous genera *Nyssia* and *Phigalia.* This is a species the female of which has much the habits of the apterous species, crawling over the trunks of trees, rarely flying, and laying its eggs in crannies &c. There is frequently a tendency to partial atrophy in this sex, and its connection with the apterous condition of its allies has been mentioned by more than one writer. Possibly I should not leave the females of *Psyche* without some further reference to their wonderful power of parthenogenetic reproduction, but a full account of parthenogenesis would evidently be out of place here.

Geddes and Thomson say, referring to the essential difference between the male and female *Coccus* :—"This is not a mere curiosity of the entomologist, but in reality a vivid emblem of what is an average truth throughout the world of animals—the preponderating passivity of the females, the predominant activity of the males ;" and again he writes :—"Throughout the class of insects there are numerous illustrations of the excellence of the males over the females, alike in muscular power and sensory acuteness. The diverse series of efforts by which the males of so many different animals, from *Cicadas* to birds, sustain the love-chorus, affords another set of illustrations of pre-eminent masculine activity." The females of *Psyche* reach among insects the extreme development of passivity. As larvæ, pupæ and moths the females never leave the cases which serve as a protection during the larval and pupal stages and as a *nidus* for the ova of the imago.

(4). Size.—In close connection with the consideration of apterous and semiapterous females, is that of size. We have before noticed that some species lay but few eggs, and take great care of them, whilst others lay large numbers and leave them largely to chance. In the first group we find the females differing little in size from the males, and in some genera *Acronycta*, *Orrhodia* &c., there is little even in the relative sizes of the abdomina to tell which specimens are males and which females ; but among those species which lay a large quantity of eggs, we find some whose females fly actively, whilst others are comparatively lethargic. Where the females are lethargic, the larger body necessary to the development of a large number of eggs is not accompanied by a correspondingly larger wing area, but in a small measure, the conditions of the apterous females are followed and the wings are frequently comparatively small. Many such examples readily occur as in *Lithosia pygmæola, Euchelia jacobææ, Nemeophila russula, N. plantaginis, Ino statices, Nudaria senex, Setina irrorella, Cœnobia rufa, Tapinostola fulva, Chortodes bondii, C. arcuosa, Stilbia anomola, Acosmetia caliginosa, Hydrilla palustris, Rusina tenebrosa, Epione parallelaria, Halia brunneata, Scodiona belgiaria, Selidosema ericetaria, Ematurga ato maria, Aspilates strigillaria, A. gilvaria, Mesotype virgata, Cledeobia angustalis, Scopula alpina, Chilo phragmitellus. Crambus salinellus, Eridopsela fractifasciana, Catoptria cæcana, Aphelia osseana, Pleurota bicostella* and very many other species besides. In those mentioned, however, there can be no doubt that the less activity of the females is accompanied by a more or less atrophied condition in the development of the wings, or the wings are not developed proportionately to the extra development of the body. But this condition of things is the exception, and only shows us the connection between habit and actual effect. In lepidoptera, generally, the females are not particularly lethargic but almost as active as the males, and hence the females with their proportionately heavier bodies have a greater wing area, and are altogether larger than the male. To write the names of those lepidoptera in which this is so, would mean writing a large part of the British fauna. I will therefore only give a few examples. Among the butterflies, *Apatura iris* is perhaps the most striking illustration, whilst among the moths *Endromis versicolor, Saturnia carpini, Lasiocampa quercifolia, Bombyx quercus, rubi, castrensis, neustria, Eriogaster lanestris, Odonestis potatoria, Cossus ligniperda, Zeuzera pyrina, Hepialus sylvinus, velleda, Arctia caia, Ocneria dispar, Heterogenea limacodes, Stauropus fagi, Nonagria typhæ, N. lutosa, Neuronia popularis, Angerona prunaria, Metrocampa margaritaria, Cataclysta lemnata, Paraponyx stratiotata, Galleria mellonella, Melissoblaptes bipunctanus, Aphomia sociella, Ptycholoma lecheana, Sciaphila nubilana, Orrhotælia sparganella, Leioptilus microdactyla* etc., are striking examples from the different families, which illustrate this general rule. The females of *Arctia caia, Spilosoma lubricipeda, S. menthastri* and many other species just mentioned, pair where they emerge, or after a very trifling flight. They then lay a batch of eggs where they pair, and so are much lightened for the future flights they take, and this appears to occur very frequently in large and heavy-bodied moths even with a good wing expanse. Geddes and Thomson write:—"Among insects, the more active males are generally smaller, and often very markedly," although it is doubtful whether they understood to what actual extent this was so. It will be thus seen that "size" is frequently a marked secondary sexual character, although the greater or less size may belong to either sex in different families. Geddes and Thomson consider this difference of size due to a more sluggish conservative habit of body in the female, but does this really reach the root and basis of the subject. Is not this a self-evident statement rather than a real probing as to the actual cause? In our insects, is not the larger size of the body of the female due essentially to the large size and weight of the ovisacs and space occupied by the ova compared with the rest of the body, and the greater wing area due to the positive necessity of larger structures to carry the greater weight when the female shall fly for the purpose of oviposition, and still further would "a sluggish conservative habit of body" affect the size of the imagines at all, considering that this (size) is positively determined in the larval stage, long before the perfect insect has a separate existence and therefore "conservative habits" to indulge in ? I fail to see its effect in our lepidoptera, as the larvæ which produce females, as a rule grow somewhat larger than those which produce males, but I have never noted any difference in habit in the larvæ which produce the different sexes, except in one instance, that of *Orgyia antiqua*, and then in that species, the female larva wanders about immense distances to pupate, but its more active habits do not prevent it producing a moth with an immense body compared with that of the male. As to difference in the size of the larvæ which are to produce males and females, Dr. Chapman has recorded that *antiqua* female larva has one more moult than the male larva, and that the male nevertheless is longer in pupa than the female. Probably this occurs in other species.

(5). Shape.—The shape of the wing is occasionally a secondary sexual character and is sometimes very marked, although it must be confessed that shape is generally rather comparative than absolute and to a certain extent dependent on sexual variation in size. The male *Lycæna astrarche* is narrower-winged than the female; in *Hepialus sylvinus* and *H. velleda*, the wings of the female are larger and broader; in *lupulinus* and *hectus*, longer but narrower in comparison than those of the males; whilst in *Neuronia popularis*, *Galleria mellonella* and *Aphomia sociella*, the wings are much broader and more ample in the female; the female of *Nonagria neurica* has a more pointed wing, and so usually has the female of *Viminia albovenosa*. The same character is essentially well-developed in *Chilo phragmitellus*, *mucronellus* and *Cledeobia angustalis*, but whilst the first mentioned generally has the pointed character allied to a greater wing area, the last has the wings much less ample in the females than in the males. The females of *Chortodes arcuosa*, *Stilbia anomola*, *Hydrilla palustris*, *Rusina tenebrosa* and *Scopula alpina* have small square wings compared with the exceptionally full and ample wings of the males. Although striking instances of difference in the shape of the wings in the two sexes are comparatively rare among our British species of lepidoptera, some of the tropical butterflies give examples which are extreme. Among the American lepidoptera Scudder mentions that *Chlorippe* in the female has "the hind wings full and rounded, while those of the male are angulated, the outer margin being nearly straight;" the fore wings of the male of *Strymon titus* have "pointed tips and the hind wings have the inner angle sharply defined, while in the female, both the tip of the fore wings and the inner angle of the hind wings are broadly rounded." I have before mentioned that sexual difference in shape is to a great extent coincident with sexual difference in size. This is especially noticeable among our Bombyces, among the Noctuæ,—*Neuronia popularis*, *Noctua umbrosa*, *Hydrilla palustris*, *Agrotis cinerea*, *Rusina tenebrosa* being examples,—whilst the difference in the shape of the wings of the males of *Galleria mellonella* and *Aphomia sociella* are very remarkable, the broad winged females having lost almost entirely the angulations on the margin which are so conspicuous in the males of these species.

(6). Scale Patches in the Male.—Besides the "scale patches" referred to in certain "hairstreaks" under the head "venation," Scudder also records them in certain species of the genus *Eurymus* (*Colias*) at that "part of the base of the hind wings which is always covered by the fore wings." In the males of *Anosia plexippus* and some of its allies "next the middle of the lower median vein of the hind wings" there is a thickening of the membrane coarsely covered with black scales. In *Laertias philenor*, the inner border of the hind wings of the male is folded back upon itself, concealing what Scudder calls "some pure white floss-like scales and hairs which are apparently exposed at the will of the creature when it is moving forward in its flight." But we have illustrations in our own fauna. Take for example the *Argynnidæ*. In *A. paphia*, if we compare the males with the females, we find the nervures of the fore wings densely clothed with scales, so dense in fact as to give a very decided appearance of thickening to the nervures of the whole of the wing. The same holds good with *A. adippe*, and it is remarkable that in a male specimen which Dr. Chapman brought from the Pyrenees, the character was more marked than is usual in the males of this country. Then there is the tuft of black scales in the centre of the fore wings, extended into the form of a longitudinal streak, so characteristic of some of our "skippers" as in *Pamphila sylvanus*, *linea*, *lineola* and *comma*, whilst Scudder says that "a faint oblique patch of minute and crowded lustreless scales, accompanied by long silky hairs, is often seen crossing the wings of some of the *Satyridæ* or "meadow browns." Indeed we might readily find numerous further examples among our own fauna. The males of *Eucosmia undulata* have a striking patch of scales on the hind wings, whilst thoracic crests and crests on the abdominal segments are frequently better developed in the male than in the female. Certain genera of Noctuæ too, have a remarkable pencil of scales coming out from the abdominal part of the first segment. This was first noted by me in a species of *Mamestra*, but as I made no note at the time, I will quote an observation recently made by Dr. Chapman on *Xylophasia rurea*. He writes:—"In a male *X. rurea* that emerged to-day, I found a remarkable plume of hairs under the abdomen on each side. It took its origin from a small fleshy projection immediately behind the first abdominal spiracle, apparently its posterior lip, passing in a waved line towards the middle line beneath, and then outwards again. The ends of the hairs were enfolded in a slit in the side of the fourth abdominal segment at about the spiracular line. When set free from this slit the extremities spread out somewhat in the fashion of a fan" (*in litt.*). Then there are again the scale tufts which are so strikingly characteristic of the "fan-footed waves," a portion of the genus *Acidalia* in which the hind tibiæ of the males are developed into pencils of hair. Such are found in *Acidalia bisetata*, *remutaria* etc. Similarly developed tufts occur on the front legs of certain Deltoides, as *Herminia cribralis*, *H. barbalis*, *H. tarsipennalis* etc., whilst the anal tufts characteristic of *Scotosia rhamnata*, *vetulata* etc. appear to be so intimately connected with the primary sexual organs that they should hardly find place here.

(7). Folds of the Wing Membrane.—These are not at all of uncommon occurrence in the males of certain species, and are frequently closely connected with scale patches, the peculiar fold in *Laertias* on the inner border of the hind wings of the male which covers a patch of scales, having been already referred to. In our British families, the Tortrices exhibit the character most markedly along the costa of the fore wings. In the males of many species in this group the membrane is folded back on itself and thus increases the wing expanse very strikingly. This character is not even of generic value, the males of most closely allied species being without or with this peculiar development, although Wilkinson founded his division *Plicatæ* on the character. It is remarkable, however, that the males of most of the folded species are remarkably active and the greater wing expanse may thus be of service. Such examples occur in many species of the genera *Tortrix* and *Dichrorhampha, Ptycholoma lecheana* etc. Closely allied to the folds of membrane on the margins of the wing is the presence of an extra winglet or lobe attached to the base of the normal hind wings in the species of the Geometrid genus *Lobophora.* These are of the same membranous structure as the hind wings, and in *L. sexalisata* and *hexapterata* are fringed and very conspicuous. These two species also fly very rapidly in the evening over the tops of tall bushes etc., and as the hind wings are unusually small, the suggestion at once occurs that the extra wing area is needed to aid their flight.

(8). Venation.—We occasionally find the venation giving traces of sexual dimorphism, but venation is in itself so variable a factor that many exact experiments are needed to show which aberrant forms are due to chance, and which are the result of sex. In genera such as *Aphomia* where the cell of the fore wings differs in size, there is a distinct sexual difference in the venation. Scudder says:—" The difference in the direction of the veins of the wings in the sexes is slight, and concerns the point of origin of one or two of the upper branches of the sub-costal vein of the front wings; but occasionally it is very marked, as in many of the " hairstreaks," where the branches of the sub-costal vein near the end of the cell are thrown far out of place to accommodate a patch of peculiar crowded scales. This patch itself, moreover, is a feature of the males alone and occurs in many "hairstreaks," where the position of the vein is not altered " (p. 872).

(9). Legs.—Sexual dimorphism frequently exhibits itself in the structure of the legs. I have previously referred to the development of tufts of scales on the hind legs of certain species in the genus *Acidalia* and to somewhat similar tufts on the fore legs of the species of *Herminia.* The aborted hind legs of the male of *Hepialus hectus*, which is supposed to be a scent gland, has also been previously mentioned. In many species, as *Lobophora*, the spurs on the hind legs of one of the sexes are absent or aborted, whilst the essential difference in the structure of the fore legs of the sexes in the *Erycinidæ, Lycænidæ*, and *Nymphalidæ* is well known. Scudder says:—" Sexual dimorphism shows itself in the legs,—in the proportional length of the different pairs in the two sexes, in the special development of certain joints, in the appendages and in the clothing. It appears remarkably in the appendages of the two higher families of butterflies *Nymphalidæ* and

Lycænidæ, and especially in the latter family, where the terminal appendages of the fore legs are nearly or quite lost in the males, and are as conspicuous as on the other legs in the female. I have not discovered that the differences in the leg-joints follow any general law, although there are few of our butterflies whose sexes do not vary in this particular ; this form of antigeny is also most conspicuous in the *Lycenidæ.* The males of certain Chrysophanidi (*Chrysophanus* etc.), also present another curious feature in the tumid swelling of the basal joint of the middle and hind tarsi. Finally the fore legs of the males of *Nymphalidæ* are frequently furnished with a spreading brush of hairs ; or, in other butterflies, the thighs and shanks of the middle and hind legs are supplied with curious pencils or fringes of stiff hair, which appear to have the same significance as similar adornments in higher animals" (pp. 873-874). There is also the excessive difference in the legs of apterous species of the nature of *Orgyia* and the *Psychidæ* (not *Nyssia, Hybernia* etc.), in which there appears to be no need to walk, and in which nature certainly has expended no waste energy in providing them with legs suitable for the purpose.

(10). Colour.—By far the most striking secondary sexual character found in lepidoptera is that of colour. It is, of course, particularly noticeable in, but by no means confined to, the day-flying species. Many species have the males brilliantly coloured in comparison with the females, but frequently both sexes are equally brilliant or the reverse, but I cannot call to mind a single instance in which the female is more brilliantly tinted than the male, although Scudder mentions a South American genus where this is so. According to Darwin, this excessive beauty on the part of the males in those species in which it occurs is due to "sexual selection," the females having "by a long selection of the more attractive males, added to their beauty or other attractive qualities," whilst he further states, that in instances where "the males have acquired their present structure, not from being better fitted to survive in the struggle for existence, but from having gained an advantage over other males, and from having transmitted this advantage to their male offspring alone, sexual selection must have come into action." Now we are met on the threshhold with the question—Has our study ever exhibited any illustrations that females in any way selected or made a preference in selecting their mates, or that "females select the more attractive males" at all? I doubt it most positively in the case of moths, and to a large extent even in butterflies. But that there is some little action in particular instances seems very probable, and it is in certain butterflies that this takes place more frequently than in others. In *Pieris,* one frequently sees a male flutter around a female, fail to win her affections at once, and repeat the operation, and generally fly away altogether. I have generally assumed that in such cases the female has already been fertilised ; but assuming this is not so, I have, even in the common *P. rapæ,* where this is so noticeable, seen a male pair with a female before her wings have become dry. However, it is impossible to deny that some preference may, in some instances, be shown by the female and that "sexual selection" thus occurs. It must be further borne in mind that it is in butterflies especially that the males are more brilliant than the females, running into other colours and even sometimes taking other patterns. Amongst moths, however, cases of "sexual selection" must be very rare, although the observations of Dr. Chapman and Mr. Robson, go far to suggest that the female of *Hepialus humuli* positively selects a male which is either conspicuously large or white. However, I do not believe that "sexual selection" is so widely or extensively carried on by female lepidoptera as has been generally supposed. Certainly in those lepidoptera which have come under my notice it is not so. I have repeatedly observed that females, as soon as they have emerged from the pupa, and before their wings have become fully developed, have paired with the first male that has offered itself, the sexual attraction having overcome all sexual preference, which could hardly exist in females just emerged and with their wings undeveloped. One finds wherever any species abounds, as in the various *Lycœnæ*, wretched little males in copulation with large well-developed females and *vice versa*, whilst dozens of well-developed specimens are everywhere around. In fact, the ordinary quiescent condition of the female compared with the male at this time, leads one rather to suppose that the female is generally quite a passive agent in the matter, although I am quite ready to grant that when attractive-looking males do pair with well-developed females, heredity will stamp the characters of such a male and female on the offspring. I quite agree too, with Geddes and Thomson, when they write that if "a casual variation, advantageous to its possessor (usually a male) in courtship and reproduction becomes established and perfected by the success it entails," then "'sexual selection' is only a special case of the more general process of 'natural selection,' with this difference, that the female for the most part takes the place of the picking and choosing which is supposed to work out the perfection of the species." Whilst Darwin thinks the beauty of male insects &c., is due to selection on the part of the female, Wallace considers that the sober colours of female insects are due to "natural selection" and have been the means of their preservation, since it ("natural selection") has eliminated those individuals of the latter sex that are most gay by making them conspicuous to their enemies. In other words, as Geddes and Thomson put it:—"Darwin starts from inconspicuous forms, and derives gorgeous males by "sexual selection;" Wallace starts from conspicuous forms, and derives the sober females by "natural selection;" the former trusts to the preservation of beauty, the latter to its extinction." I cannot certainly bring myself to believe in the ability of the female to carry out "sexual selection" to the extent assumed by Darwin. At the same time I believe to the fullest in "natural selection;" and really the study of at least some of our lepidoptera is greatly in support of Wallace's view of it. No group of our butterflies exhibit more marked characters than the *Lycœnidœ*. In those species where both sexes are alike, both are generally brilliantly coloured, as in our common *Polyommatus phlœas*; in those species where the sexes are permanently different (dimorphic), the female is of the duller colour; but in those species in which there is a transition state, the male is the constant, the female the inconstant element, as in *Lycœna corydon*. In this species, the male is always blue (or in southern countries approaching white), whilst the female varies in tint, from a brilliancy almost equal to the male to a dull sooty-black with no trace of blue in it, and this is the most common form. *Lycæna icarus* and *L. adonis* present a range of sexual variation identical in character. According to Darwin's theory, we have in these species, to assume that the males and females were all originally brown or black, that blue has been gradually assumed by the male until such a point has been reached that it is positively permanent and invariable, and that it has then transmitted the colour, in part, to the female. Here we are at once met with this difficulty. Brown or black being the original colour, there must always have been and still be a strong hereditary tendency for this original colour to be present in some way or other, but as a matter of fact it never occurs in the male, and it is difficult to suppose a species, shown to be in a transition state as regards the female, never to show traces of reversion in the male. On the other hand, Wallace's hypothesis that the more brilliant was the original colour receives almost certain confirmation. By his hypothesis, that sex (♂) which remains constant, is the one which is assumed to be of the original colour, and the large percentage of dark females is sufficient to show the power of "natural selection," whilst the large number of females with blue in them is satisfactorily explained by supposing simple hereditary influence and reversion at work. Certainly the more conspicuous blue coloration is a disadvantage to the female, and I altogether incline more to a general acquiescence in Wallace's view than to that of Darwin. There is still another point. The greater number of *Lycænid* species, especially in tropical countries, tends to have the dimorphism less marked, and the males and females are then more or less equally blue. Such is also the case with our own *Lycæna argiolus, L. arion, L. bœtica* &c. There is no opposite result as we go north, for although a few species, as *Lycæna astrarche*, have both sexes of the characteristic female form, yet they are so in every latitude, and it must be borne in mind that the males of *icarus* etc., are as constantly blue in Shetland and Scandinavia, and the females as variable as with us. In *Argynnis, Colias* &c., the same holds good, the male is the permanent, the female the variable form.

It appears to me that colour in relation to the sexes may be classified as follows:—(1) Male smaller and darker (more strongly coloured and scaled) than the female, *e.g., Bombyx quercus.* (2) Male larger and paler than the female, *e.g., Agrotis cinerea.* (3) Male smaller and paler than the female, *e.g., Hepialus humuli.* (4) Male larger and darker than the female, *e.g., Epione vespertaria.* Of these, I take it Nos. 1 and 4 are practically identical, and whether they belong to Nos. 1 and 4 depends on the habits of the female, the more active females going to Class 1, the more lethargic to Class 4. These would I think together comprise a very large percentage of the British fauna. In Class 2 the female is smaller, and unlike the few females that fall in Class 4, generally produce proportionally fewer eggs. They fall, too, largely among the Noctuæ and species that rest on or near the ground and hence much of the prevailing dark tint in the females is probably due to "natural selection;" it must also be considered that the tint of the male though paler is often richer than that of the female, in which case it is of the same genetic value as the colour in Class 4. Class 3 is generally due to some individual pecularity, explicable in tho case of *H. humuli* by "sexual selection," in the case of *Fidonia piniaria* by "natural selection," most of the instances in this class probably coming under one of these two heads; at any rate it appears the male is small and pale in this group by special selection in relation to some special habit. At the same time such species as *B. neustria* falling in Class 3, actually belong to Class 1, the pigmentation of the male, though pale etc., being richer than that of the ♀. As to the richer colours in the males of Class 1 it may occur in this way. Each individual succeeds in elaborating so much colour. The male generally being smaller is able to concentrate it more, the larger female has to spread it, *e.g.*, in one or two species of the *Hybernidæ* that have measureable wings as ♀'s, these are usually much darker than those of the males, and it was very remarkable that when Dr. Chapman and I searched for *Diurnæa fagella* this year we found the females darker than the males. This looks as if the male could dispose of the excess of pigment in his larger wings the female being unable to do so. It must be understood however, that it is not intended here to suggest that each ovum during its life produces so much colour, and that when it is decided that it is to be say a ♀ (of large size) it has then to spread that colour over a larger area, but that such a tendency is inherent; probably when the female first grew a larger wing, the membrane was slightly expanded, without increasing the number of scales and therefore became paler than the male, and *vice versa* in those females with smaller and darker wings. In Class 2 where the scales in the ♀ become more concentrated, one can understand that if "natural selection" found some advantage in this the female would become larger and paler constitutionally. In Class 2 also, as *Euthemonia russula, Agrotis cinerea, Agrotis puta, Rusina tenebrosa, Lithosia pygmæola* etc., although we find the female smaller and darker we have to bear in mind that the paler males, like many butterflies (*Lycæna*) &c., are in reality more richly coloured and have a greater amount of pigmentation, and if we accept Wallace's theory that the darkness of female coloration in these butterflies is due to "natural selection," it becomes much more easy to accept the same theory (and I think it is really the true one), with regard to these moths; and if the males here are really more richly coloured although in reality paler, it quite agrees with the physiological explanation of the origin of the matter which I propose offering. Not that any general rule is likely to meet each individual case but certainly a general explanation appears now to be becoming quite possible. It is quite probable that once the colour has been actually set up as a distinct secondary sexual character as in *Bombyx quercus, B. rubi* etc., and the habits of the sexes differ very much, "natural selection" steps in, and the sexes tend to vary independently, almost as if they were different species, but less readily no doubt, each attempting as it were to carry the other with it. Summarising then, I think that Classes 1, 4 and 3 (in part) have almost the same origin. Class 3 (in part) consists of special cases. Class 2, females darker because smaller, *i.e.*, larger males require more energy for wing membrane. Now it appears to me that the explanation of these "secondary sexual characters" relating to colour, are to a certain extent and at any rate in particular instances, explicable on physiological grounds. Every field naturalist is aware that the larvæ of the sexes are not very different in size and that large larvæ frequently produce males, and small larvæ, females. It is also now fully recognised that colour is probably the result of surplus energy stored up in the larval stage and differentiated in the pupal stage. It appears to be abundantly clear that the energy stored up by the female larva has more outlets, so to speak, than that of the males, and the formation of the ovaries and ova &c., really a large part of the female imago, must absorb a very large percentage of such energy. In some species, already referred to under the head of "apterous and semiapterous females," the demand is so great as to absorb even that part which normally goes to form the wing membranes, scales &c., but apart from these extreme cases, the reproductive system normally makes a large call to which there is nothing corresponding in the male. The surplus energy in the male must therefore be utilised in other directions, of which ornament, as exhibited by colour etc., appears most certainly to be one, and it is remarkable that in a very large percentage of cases, as in *Lycæna icarus, corydon* and *bellargus* only the most robust female specimens are tinged or affected with the blue colouring which we have now grown accustomed to look upon as particularly connected with the male. The female *helice* var. of *Colias edusa* may be looked upon also as a female form in which there is a minimum of surplus energy to form pigment. I would also notice that the only male in which I have observed a tendency to this colour was small and undersized evidently a product of constitutional conditions. With regard to colour as a secondary sexual character Geddes and Thomson write:— "That the male is usually brighter than the female is an acknowledged fact." This certainly is so in lepidoptera. They then say:— "But pigments of many kinds are physiologically regarded as of the nature of waste products." This also appears to be so in lepidoptera, restricting the term "waste products" to that "surplus energy" which is not utilised in the muscular and sensory structure of the organism. "Abundance of such pigments, and richness of variety in related series, point to pre-eminent activity of chemical processes in the animals which possess them. Technically expressed, abundant pigments are expressions of intense metabolism. But predominant activity has been already seen to be characteristic of the male sex; these bright colours, then, are often natural to maleness. In a literal sense animals put on beauty for ashes, and the males more so because they are males, and not primarily for any other reason whatever." These authors appear to me to have traced the actual facts through to their last degree and then failed, and their last statement is altogether un-understandable, and begs the whole question. The cause of "secondary sexual characters" seems to be neglected for there must be a reason underlying the whole which shall explain the origin of these characters better than stating "that the males put on beauty because they are males." Is their own suggestion, indeed, that the cause of these characters is to be found in a physiological explanation quite compatible with such a statement? If the pigments are of the nature of "waste products," is the reason not to be sought here? I do not doubt that the inherent tendency of these characters to develop in the male is present, but the "surplus energy" or "waste products" in the male organisation, compared with those in the female, seem to me the primary cause and to point to the fact that the material utilised for the development of ova &c., in the female, is modified in the male to form pigments and other secondary sexual characters. Perhaps no insect will make this clearer than the purely dimorphic *Epione parallelaria* (*vespertaria*). The female is lethargic, has a large abdomen and produces a large supply of eggs, the wings are small and pale yellow in colour. The male is active, has a slender body, with large ample wings of a rich orange colour with purple borders. The larvæ of the males and females are of about equal size, the male excels in wing membrane and richly developed pigment, the female excels in the size of the abdomen. Is it not evident that the surplus matter in the male is utilised here in a given direction? *Fidonia atomaria* presents in the South of England a parallel case, the female large-bodied, with small wings of a whitish ground colour; the male slender-bodied, with ample wings of a rich ochreous-brown, sometimes almost orange in colour. In localities where their food is sparse, as on some of the Scotch moors, the males have no such active surplusage and closely resemble the females, the dimorphism being but little marked. There is of course a double action here, as the ♂ rests on the top of the heather, the female hiding nearer the ground, the latter being, also, more sluggish and retiring. The colour of the ♂ accords better with the heather foliage, that of the ♀ with the stones and undergrowth, but however much this "natural selection" and "heredity" will account for the intensification of a protective coloration, it will not explain its origin, which is, I believe, purely physiological. *Endromis versicolor*, *Bombyx quercus*, *Angerona prunaria*, *Chilo phragmitellus* are instances amongst very many others, in which the female is larger (owing to heavy body) but has much paler pigment than the male. But a paler pigment does not *always* mean a less highly developed one, although probably it does so in the cases just quoted, in fact, some striking instances of pale colours richly pigmented occur to me, *e.g.*, *Bombyx neustria* (yellow males); *B. castrensis*, in which the male is more richly pigmented and better scaled, and even brighter in general appearance although paler in coloration than the female, but such cases hardly appear to affect the general question, as they belong essentially to the same class as those previously mentioned in Class 1. I look on "bright coloring or rich pigmenting" as "a natural expression of the male constitution" only so far as the fact that a male larva well-fed, compared with a female larva equally well-fed will have a surplus of material which is utilised in the development of certain tendencies, present *ab ovo* in the organism, and which tendencies, well developed, become secondary sexual characters.

The influence of "sexual selection" in producing the brilliancy of male coloring, is admitted as a minor factor by Geddes and Thompson and so also is the "natural selection" of Wallace, and there is no doubt that both are factors, the former indirectly, and more, however, generally as the result of chance than through any selective faculty possessed by the female, although occasionally as in *H. humuli*, selection probably takes place; the latter more directly and actively as the result of every-day conditions tending to the survival of the fittest, by the protection of those females which are sober-coloured and unattractive, which are passed over by their enemies, and which therefore stamp their character more certainly on each successive brood by heredity. But the real basis must be sought for in the peculiar physiological conditions of the sexes, and the necessity in one rather than the other, of utilising all the material for actual nutritive and vegetative processes in the female, leaving a surplus in the males, which, applied to the more actively reproductive organism (if we may so term the males compared with the more passive females), results in the production of distinctly secondary sexual characters. We find, however, as previously mentioned, examples where the smaller male is better scaled and more brilliantly coloured although paler as in *Bombyx neustria*; and in cases where the female is smaller and darker, the male, having expended more energy in the formation of extra wing membrane, has less for pigment, but, at the same time, the pigment of the males in these cases is usually richer than that of the females, *e.g. Agrotis cinerea, Pachnobia leucographa* etc. With regard to colour as a secondary sexual character, Scudder, after quoting a large number of cases in which the sexes differ, says:—"It is not a little remarkable that in all these examples, and, indeed, in very nearly all that have come under my notice, this sexual diversity is displayed only upon the upper surface of the wings and almost invariably upon the fore wings. We might perhaps anticipate the restriction of the characteristics to the fore wings, and upon the upper surface the complication of colorational design is greater in butterflies on these than on the hind wings; yet this same reasoning makes their restriction to the upper surface the more striking, since the under surface of the hind wings of butterflies is usually more variegated than any other part" (p. 531). One hardly likes to suggest that Scudder only made a superficial examination of the undersides but it seems probable. Where sexual colour dimorphism exists on the upper sides, it is so palpable that one cannot fail to note it, but on the undersides, the nice gradations of tint and shades of a hue responding to environment are exhibited in almost every species. In our few British butterflies we have many illustrations, and, where the undersides present no variation in the sexes, we find, as a rule, that the females are as active as the males, and that both are equally well protected by their coloration responding to their surroundings,—*e.g. Thecla rubi, T. w-album* &c. On the other hand *Melanargia galatea, Erebia blandina, Thecla betulæ, Lycæna corydon, L. icarus, L. bellargus* etc., exhibit strong and striking sexual colour dimorphism on the under surfaces, and it would not be difficult to make up a very long list of species thus varying. But such cases as these appear to me to be to a much greater extent the direct result of "natural selection" than does the colour variation of the upper sides. There is one particular phase of colour as a "secondary sexual character" that cannot be passed over. I refer to *Hepialus humuli*. Normally, the female is yellow or orange with red markings, the male pure glossy white, which has gained for it its popular name of "ghost." The males hover in the early evening and are remarkably conspicuous, frequenting open spots where they may be readily seen. This hovering and its connection with its white colour was explained by Dr. T. A. Chapman, who observed that the female flew against the male and then dropped, the male immediately following her down and pairing with her. I cannot help again remarking that here "sexual selection" comes into play, and the case is the more striking considering how rarely moths show it.

There is yet another phrase in the work of Geddes and Thomson which is best discussed as a whole than in parts. It is as follows :—"Brilliancy of colour, exuberance of hair and feathers, activity of scent glands, and even the development of weapons are not and cannot be (except teleologically) explained by "sexual selection," but in origin and continued development are outcrops of a male as opposed to a female constitution. To sum up in a paradox, all secondary sexual characters are at bottom primary and are expressions of the same general habits of body (or to use the medical term *diathesis*), as that which results in the production of male elements in the one case or female elements in the other." I quite agree with these authors that these secondary characters cannot be explained by the direct action of "sexual selection," but is it sufficient to say that they are simply the results of a male as opposed to a female constitution. In lepidoptera at any rate there appears to be some very good ground for supposing that these are transmitted from generation to generation, sometimes more perfectly developed than others, but still certainly transmitted. It is not so evident that secondary sexual characters are at bottom primary, except in the general way that they always accompany the primary sexual characters, a fact that makes them secondary characters, neither is it so clear that because an organism has in it the special requirements to develop a particular sex, which will be accompanied by other characters, that these latter are produced in the same way and on the same basis, although the two happen to be coincident in the same organism, for if we look on these ornaments from Wallace's standpoint as the "natural product and direct outcome of superabundant health and vigour," it is quite possible to assume and imagine a condition sufficiently differentiated to produce primary sexual characters without the superabundant energy necessary to produce the secondary characters. I really am not quite clear that in insects they are expressions of the same general habit of body, although I quite recognise the intimate connection between the two, but at the same time, of one t'ring I feel certain, that they are only the indirect outcome of maleness, inasmuch as only the male normally, in lepidoptera at least, has sufficient surplus energy to develop such secondary characters, the great mass of energy in the female necessary for the perfection of the ovaries and ova reducing the quantity left for such characters to a minimum. In cases where the females are in a transition state, as in some *Lycænæ* (females developing blue scales, &c.), the females, although frequently possessing some of the male colour, are as frequently without it, the result probably being more or less directly dependent on nutrition.

(11). Secondary Characters connected with Oviposition.—These organs are so closely connected with the primary sexual characters that they should properly be omitted, but the interest attaching to them is so great, that this must be my excuse for briefly referring to them. They were recently discovered by Drs. Chapman and Wood, and consist of an apparatus, by means of which the females of certain moths cut out a pocket in a leaf and lay their eggs in the pocket within the substance of the leaf, or, otherwise, puncture a hole in a stem &c., in which to lay the egg. This apparatus was detected simultaneously by these two observant entomologists—Dr. Wood having made his observations on *Micropteryx semipurpurella*, Dr.

Chapman on *M. purpurella.* Observations were afterwards made on *M. unimaculella, Incurvaria muscalella, Adela, Nemophora, Lampronia, Nematois, Pancalia, Tinagma, Glyphipteryx* and certain *Coleophoræ.* With regard to the apparatus with which the females of *semipurpurella* are provided, Dr. Wood states that it "lies within the abdomen, is placed above the viscera and works free in the general body cavity. It consists of two pairs of strong, black, chitinous rods, reaching from the anal extremity, two or more segments upwards. To the proximal end of each rod are attached powerful muscular bands, which pass backwards and are inserted in or near the underside of the last dorsal plate. The distal ends of the lower pair of rods are united to the last ventral plate, and their use is to open the anal orifice, afford an anchorage in the surface of the leaf at the commencement of the operation of cutting the pocket, and later on to advance the point of the ventral plate within the orifice of the pocket and keep it on the stretch. The upper pair of rods are united to the corners of a very beautiful and complicated instrument, which we may call the knife blade. Its extremity has very much the shape of a surgeon's lancet, but instead of the cutting edge, it is armed on each side with a fine saw. Its use, and, up to a certain point its mode of action by the alternate working of the rods, are so self evident that it is unnecessary to dwell upon them. The knife is provided with a sheath, and both are concealed within the abdomen when not in use." Drs. Wood and Chapman then found that the females in *Glyphipteryx* and certain species of *Coleophoræ* were provided with an ovipositor, "very similar in outward appearance to the fore-going, and like them rigid, yet highly elastic, and capable of being freely protruded. In form it was flat, broad, thin and pointed, but in spite of its lancet-like shape, it was incapable of cutting, and had evidently been designed to enable the insect to place its egg within an unopened floret." Since then *Lampronia, Adela* and *Nemophora,* have been added to the list of those with the leaf-cutting apparatus, and probably *Nematois, Pancalia* and *Tinagma.* In *Adela* and *Nemophora,* the end of the knife is conical or trowel-shaped, and is used to scoop out a hole in a stem &c., in which to place the egg. In *Lampronia,* the knife is chisel-like, and the egg is laid in the receptacle of the flower. The way in which the whole complex arrangement connected with oviposition has been worked out in these insects, reflects the greatest credit on the industry and observation of the two gentlemen who have done it.

There are many other minor "secondary sexual characters" that have been purposely left out, and several facts relating to the headings discussed which might have been inserted. In a paper of this kind the difficulty is to keep so wide a subject within bounds, and this is why so many matters, highly interesting in themselves, but not bearing particularly on variation, have been neglected.

AN

ACCENTUATED LIST

OF THE

BRITISH LEPIDOPTERA.

PUBLISHED BY
THE ENTOMOLOGICAL SOCIETIES OF OXFORD AND CAMBRIDGE.

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.
1859.

[*Price Three Pence.*]

RULES FOR PRONUNCIATION.

In the following Catalogue every vowel is to be *pronounced* short, unless marked long, thus—ē.

Table of Vowel Sounds.

"a" is to be pronounced as in the word "hat" . . "ā" as in "hate."
"e" . . . . "met" . . "ē" . . . . "mete."
"i" . . . . "hid" . . "ī" . . . . "hide."
"o" . . . . "hop" . . "ō" . . . . "hope."
"u" . . . . "duck". "ū" . . . . "duke."
"æ" or "œ" as "ē"; "ei" as "ī"; "au" as in "naughty."

Two dots placed over two vowels occurring together (thus, eë) show that the letters are to be pronounced as two syllables. [In the Crambi and Tineæ, where the diminutive termination *-ellus*, or *-ella*, is usually added to the root of the name, and is often immediately preceded by a vowel, the dots have generally been omitted; but in all such cases, the vowels are to be pronounced as two syllables: thus, *Regiella*, pron. *Re-gi-el-la*, not *Re-giel-la*.]

Table of Consonant Sounds.

"c" is to be pronounced hard, as *k*.
"ç" . . . . soft, as *s*.
"ch" . . . . hard, as *k*: except when (in names from the German) preceded by *s*, in which case the *sch* is equivalent to *sh*, and is printed *sçh*; thus Frisçhella, pron. as Frishella.
"g" is to be pronounced hard, as in "gate."
"*g*" . . . . soft, as in "gem."

The position of the accent (′) shows where stress is to be laid, viz. on the syllable *preceding the accent.*

LEPIDOP'TERA.

DIUR'NI.

PĀPILIŌ'NIDÆ, Lea.
PĀPILĪŌ, L.
Machā'on, L.

PĪERIDÆ, Dup.
LEUCOPHAS'IA, Ste.
Sinā'pis, Ste.
PĪ'ERIS, Sch.
Cratæ'*gī*, L.
Bras'siçæ, L.
Rā'pæ, L.
Nā'pī, L.
Daplid'içē, L.
ANTHO'CHARIS, Bdv.
Cardamī'nēs, L.

RHODOÇER'IDÆ, Dup.
GŌNOP'TERYX, Lea.
Rham'nī, L.
CŌ'LIAS, F.
Edū'sa, F.
Hy'alē, L.

VANES'SIDÆ, Dup.
AR*G*YN'NIS, F.
Latō'na, L.
Paph'ia, L.
Aglā'ia, L.
Adip'pē, L.
Euphros'ynē, L.
Selē'nē, W. V.
MELITÆ'A, F.
Athalī'a, Esp.
Çinx'ia, L.
Ar'temis, W. V.
VANES'SA, F.
C-al'bum, L.
Urtī'çæ, L.
Polychlō'ros, L.
Ī'ō, L.
Antiopa, L.
Atalan'ta, L.
Car'duī, L.

NYMPHĀ'LIDÆ, Dup.
LIMENĪ'TIS, F.
Sibyl'la, F.
APATŪ'RA, F.
Ī'ris, L.

SATYRIDÆ, Bdv.
AR'*G*Ē, Esp.
Galatē'a, L.
EREB'IA, Dal.
Blandī'na, F.
Cassiopē, F.
SAT'YRUS, Bdv.
Ē*g*er'ia, L.
Me*g*æ'ra, L.
Sem'elē, L.
Ianī'ra, L.
Tithō'nus, L.
Hyperan'thus, L.
CHORTO'BIUS, Gu.
Dā'vus, F.
Pam'philus, L.

LYÇÆ'NIDÆ, Lea.
THEC'LA, F.
Ru'bī, L.
Quer'cūs, L.
W-al'bum, Kn.
Prū'nī, L.
Bet'ulæ, L.
POLYOM'MATUS, Lat.
Dis'par, Ha.
Phlœ'as, L.
LYÇÆ'NA, F.
Æ'gon, W. V.
A*g*es'tis, W. V.
Alex'is, W. V.
Adō'nis, W. V.
Cor'ydon, Sco.
Ā'çis, W. V.
Ar*g*iolus, L.
Al'sus, W. V.
Arī'on, L.

ERYÇĪ'NIDÆ, Wwd.
NEMEO'BIUS, Ste.
Lūçī'na, L.

HESPERIIDÆ, Lea.
SYRICH'THUS, Bdv.
Alveolus, Hub.
THAN'AOS, Bdv.
Ta'*g*es, L.
HESPER'IA, Cur.
Panis'cus, F.
Sylvā'nus, F.
Com'ma, L.
Lī'nëa, W. V.
Actæ'on, Esp.

NOCTUR'NI.

SPHIN'*G*IDÆ, Lea.
SMĒRIN'THUS, Lat.
Oçellā'tus, L.
Pō'pulī, L.
Til'iæ, L.
ACHERON'TIA, Och.
At'ropos, L.
SPHINX, L.
Convol'vulī, L.
Ligus'trī, L.
Pīnas'trī, L.
DEILĒ'PHILA, Och.
Euphor'biæ, L.
Gal'iī, F.
Līnëā'ta, Och.
CHŒROCAM'PA, Dup.
Elpē'nor, L.
Porçel'lus, L.
Çeler'io, L.
Nē'riī, L.
MACROGLŌS'SA, Sco.
Stellātā'rum, L.
Fūçifor'mis, L.
Bombylifor'mis, Esp.

SĒSIIDÆ, Ste.
SĒ'SIA, F.
Çynipifor'mis, Och.
Tipulifor'mis, L.
Allantifor'mis, New.
Sphēgifor'mis, F.
Myōpifor'mis, Bork.
Formīçifor'mis, Esp.
Culiçifor'mis, L.
Chrȳsidifor'mis, Esp.
Asilifor'mis, Schif.
Ichneumonifor'mis, Sch.
Apifor'mis, L.
Bembīçifor'mis, Hub.

ZENZERIDÆ, Lat.
MACROGAS'TER, Dup.
Arun'dinis, Hub.
ZEN'ZERA, Lat.
Æs'culī, L.
COS'SUS, F.
Ligniper'da, F.

HĒPIAL'IDÆ, Ste.
HĒPIALUS, Ste.
Hu'mulī, L.
Vel'leda, Hub.
Sylvā'nus, L.
Lupulī'nus, L.
Hec'tus, L.

COCHLIOPOD'IDÆ, Sta.
LĪMĀCŌ'DES, Lat.
Asel'lus, Schif.
Testū'do, Go.

PROC'RIDÆ, Dup.
PROC'RIS, Ill.
Globulā'riæ, Hub.
Stat'içēs, L.

ZYGÆ'NIDÆ, Lea.
ZYGÆ'NA, L.
Mi'nos, Sch.
Filipen'dulæ, L.
Loniç'eræ, Esp.
Trifol'ii, Esp.

NŌ'LIDÆ, Sta.
NŌ'LA, Lea.
Cucullātel'la, L.
Cristulā'lis, Hub.
Strig'ula, Hub.
Çentonā'lis, Hub.

LITHOSIIDÆ, Ste.
NŪDĀ'RIA, Ste.
Se'nex, Hub.
Mundā'na, L.
SETĪ'NA, Ste.
Irrōrel'la, L.
CALLIGENĪ'A, Dup.
Miniā'ta, For.
LITHOS'IA, F.
Mesomel'la, L.
Musçer'da, Hub.
Aureola, Hub.
Pygmæ'ola, Dbl.
Hel'vola, Hub.
Complā'nula, Bdv.
Complā'na, L.
Strāmin'eola, Dbl.
Quad'ra, L.
Rubricol'lis, L.
EMYD'IA, Bdv.
Gram'mica, L.
Crī'brum, L.

EUCHĒLIIDÆ, Dbl.
DĒĪOPEI'A, Ste.
Pulchel'la, L.
EUCHĒ'LIA, Bdv.
Jacōbæ'æ, L.
CALLIMOR'PHA, Lat.
Domin'ula, L.

CHELŌNIIDÆ, Ste.
EUTHĒMŌ'NIA, Ste.
Rus'sula, L.
CHELŌ'NIA, Lat.
Plantā'ginis, L.
Cai'a, L.
Vil'lica, L.
ARC'TIA, Sch.
Fūliginō'sa, L.

Mendī'ca, L.
Lubriç'ipēs, L.
Menthas'trī, Schif.
Urtī'çæ, Ste.

LIPARIDÆ, Ste.
LIP'ARIS, Och.
Chrȳsorrhœ'a, L.
Aurif'lua, F.
Sal'içis, L.
Dis'par, L.
Mon'acha, L.
ORGYI'A, Ste.
Pudibun'da, L.
Fasçelī'na, L.
Çœnō'sa, Hub.
Gōnostig'ma, Sco.
Antī'qua, L.
DĒ'MAS, Ste.
Cor'ylī, L.

BOMBȲ'ÇIDÆ, Ste.
TRICHIŪ'RA, Ste.
Cratæ'gi, L.
PŒÇILOCAM'PA, Ste.
Pō'pulī, L.
ERIOGAS'TER, Ger.
Lānes'tris, L.
BOM'BYX, Ste.
Neus'tria, L.
Castren'sis, L.
Ru'bi, L.
Quer'cūs, L.
Callū'næ, Palmer.
Trifol'ii, Schif.
ODONĒS'TIS, Ger.
Potātōr'ia, L.
LASIOCAM'PA, Sch.
Querçifol'ia, L.
Īliçifol'ia, L.

ENDROMIDÆ, Dup.
EN'DROMIS, Och.
Versic'olor, L.

SATURNIIDÆ, Bdv.
SATUR'NIA, Sch.
Carpī'ni, Schif.

GËŌ'METRÆ.

ŪROPTERYG'IDÆ, Gu.
ŪROP'TERYX, Lea.
Sambūcā'ria, L.

ENNOMIDÆ, Gu.
EPĪ'ONĒ, Dup.
Vespertā'ria, L.
Apiçiā'ria, W. V.
Advenā'ria, Bork.
RU'MIA, Dup.
Cratægā'ta, L.
VENĪ'LIA, Dup.
Maculā'ta, L.
ANGERŌ'NA, Dup.
Prūnā'ria, L.
METROCAM'PA, Lat.
Margarītā'ria, L.
ELLOP'IA, Tr.
Fasçiā'ria, L.
EURYM'ENĒ, Dup.
Dolābrā'ria, L.
PERICAL'LIA, Ste.
Syringā'ria, L.

SELĒ'NIA, Hub.
Illūnā'ria, Hub.
Lūnā'ria, F.
Illustrā'ria, Hub.
ODONTOP'ERA, Ste.
Bidentā'ta, L.
CROCAL'LIS, Tr.
Ēlinguā'ria, L.
EN'NOMOS, Tr.
Alniā'ria, L.
Tiliā'ria, Bork.
Fuscantā'ria, Ha.
Ērōsā'ria, W. V.
Angulā'ria, W. V.
HĪ'MERA, Dup.
Pennā'ria, L.

AMPHIDAS'YDÆ, Gu.

PHIGAL'IA, Dup.
Pilōsā'ria, W. V.
NYS'SIA, Dup.
Zōnā'ria, W. V.
Hispidā'ria, W. V.
BIS'TON, Lea.
Hirtā'rius, L.
AMPHI'DASYS, Ste.
Prodromā'ria, W. V.
Betulā'ria, L.

BÖARMIIDÆ, Gu.

HĒMEROPH'ILA, Ste.
Abruptā'ria, Thb.
CLEŌ'RA, Cur.
Viduā'ria, W. V.
Glabrā'ria, Hub.
Līchēnā'ria, W. V.
BÖAR'MIA, Tr.
Repandā'ria, L.
Rhomböidā'ria, W. V.
Abiētā'ria, W. V.
Çinctā'ria, W. V.
Rōborā'ria, W. V.
Consortā'ria, F.
TEPHROS'IA, Bdv.
Consonā'ria, Hub.
Crepusculā'ria, W. V.
Biundulā'ria, V.
Extersā'ria, Hub.
Punctulā'ria, Hub.
GNOPH'OS, Tr.
Obscūrā'ta, W. V.
DASYD'IA, Gu.
Obfuscā'ta, W. V.
PSOD'OS, Tr.
Trepidā'ria, Hub.
MNIOPH'ILA, Bdv.
Çinerā'ria, Bork.

BŌLĒTOBIIDÆ, Gu.

BŌLĒTOB'IA, Bdv.
Fūli*g*inā'ria, L.

***G*ĔŌMET'RIDÆ, Gu.**

PSEUDOTERP'NA, Hb.
Çytisā'ria, W. V.
*G*EŌ'METRA, Lea.
Pāpiliōnā'ria, L.
Smaragdā'ria, F.
NEMOR'IA, Hub.
Viridā'ta, L.
ĪŌ'DĒS, Gu.
Vernā'ria, Ha.
Lactēā'ria, Ha.
PHORODES'MA, Bdv.
Baiulā'ria, W. V.
HĒMITH'ĒA, Ste.
Thȳmiā'ria, L.

EPHYRIDÆ, Gu.

EPH'YRA, Dup.
Pōrā'ria, L.
Punctā'ria, L.
Trilinēā'ria, Bork.
Omīcronā'ria, W. V.
Orbiculā'ria, Hub.
Pendulā'ria, L.

AÇĪDALIIDÆ, Gu.

HYR'IA, Ste.
Aurōrā'ria, Hub.
AS'THENA, Hub.
Lūtēā'ta, W. V.
Candidā'ta, W. V.
Sylvā'ta, W. V.
Blomerā'ria, Cur.
EUPISTĒ'RIA, Bdv.
Hēparā'ta, W. V.
VENU'SIA, Cur.
Cambricā'ria, Cur.
AÇĪDAL'IA, Bdv.
Ōchrēā'ta, Ste.
Rubrīcā'ta, W. V.
Scutulā'ta, W. V.
Bisētā'ta, Huf.
Trī*g*eminā'ta, Ha.
Contigüā'ria, Ha.
Rusticā'ta, W. V.
Ossēā'ta, W. V.
Holosēricā'ta, Dup.
Incānā'ria, Hub.
Çirçellā'ta, Gu.
Ornā'ta, W. V.
Prōmūtā'ta, Gu.
Strāminā'ta, Gu.
Subsēriçēā'ta, Ha.
Immūtā'ta, F.
Remūtā'ta, L.
Commūtā'ta, Gu.
Stri*g*ilā'ta, W. V.
Imitā'ria, Hub.
Ēmūtā'ria, Hub.
Āversā'ta, L.
Inornā'ta, Ha.

Dē*g*enerā'ria, Hub.
Ēmar*g*inā'ta, L.
TĪMAN'DRA, Dup.
Amātā'ria, L.

CABĒ'RIDÆ, Gu.

CABĒ'RA, Tr.
Pusā'ria, L.
Rotundā'ria, Ha.
Exanthēmā'ria, Sco.
CŌRYÇ'IA, Dup.
Temerā'ta, W. V.
Tāminā'ta, W. V.
ALEU'ÇIS, Gu.
Pictā'ria, Cur.

MACARIIDÆ, Gu.

MACAR'IA, Cur.
Albernā'ta, W. V.
Notā'ta, L.
Litūrā'ta, L.
HAL'IA, Dup.
Vauā'ria, L.

FĪDŌNIIDÆ, Gu.

STRĒ'NIA, Dup.
Clāthrā'ta, L.
PANAG'RA, Gu.
Petrā'ria, Esp.
NUMER'IA, Dup.
Pulverā'ria, L.
SCODIŌ'NA, Bdv.
Bel*g*iā'ria, Hub.
SELIDOSĒ'MA, Hub.
Plūmā'ria, W. V.
FĪDŌ'NIA, Tr.
Carbōnā'ria, L.
Atomā'ria, L.
Pīniā'ria, L.
Pīnētā'ria, Hub.
Conspicüā'ta, W. V.
MINŌ'A, Tr.
Euphorbiā'ta, W. V.
SCŌ'RIA, Ste.
Dēalbā'ta, L.
STER'RHA, Hub.
Sacrā'ria, L.
ASPĪ'LATĒS, Tr.
Stri*g*illā'ria, Hub.
Çitrā'ria, Hub.
*G*ilvā'ria, W. V.

ZERĒ'NIDÆ, Gu.

ABRAX'AS, Lea.
Grossulāriā'ta, L.
Ulmā'ta, F.
LIG'DIA, Gu.
Adustā'ta, W. V.
LŌMASPĪ'LIS, Hub.
Mar*g*inā'ta, L.

LIGIIDÆ, Gu.
PACHYCNĒ'MIA, Ste.
Hippocastanā'ria, Hub.

HȲBERNIIDÆ, Gu.
HȲBER'NIA, Lat.
Rūpicaprā'ria, W. V.
Leucophæā'ria, W. V.
Aurantiā'ria, Hub.
Prōgemmā'ria, Hub.
Dēfoliā'ria, L.
ANISOPTERYX, Ste.
Æsculā'ria, W. V.

LARENTIIDÆ, Gu.
CHEIMATOB'IA, Ste.
Brūmā'ta, L.
Borēā'ta, Hub.
OPŌRAB'IA, Ste.
Dīlūtā'ta, W. V.
Fīligrammā'ria, H. S.
LARENTIA, Tr.
Didymā'ta, L.
Multistrigā'ria, Ha.
Çæsiā'ta, W. V.
Rūfiçinctā'ta, Gu.
Salicā'ta, W. V.
Olīvā'ta, W. V.
Pectinitā'ria, Fue.
EMMELĒ'SIA, Ste.
Affinitā'ta, Ste.
Alchemillā'ta, Ha.
Albulā'ta, W. V.
Dēcolōrā'ta, Hub.
Tæniā'ta, Ste.
Ūnifasçiā'ta, Ha.
Erīçetā'ta, Cur.
Blandiā'ta, W. V.
EUPITHĒ'ÇIA, Cur.
Vēnōsā'ta, F.
Consignā'ta, Bork.
Līnāriā'ta, W. V.
Pulchellā'ta, Ste.
Çentaurēā'ta, W. V.
Succȩnturiā'ta, L.
Subumbrā'ta, Hub.
Pernotā'ta, Gu.
Plumbeolā'ta, Ha.
Haworthiā'ta, Dbl.
Vīminā'ta, Dbl.
Pygmæā'ta, Hub.
Helvēticā'ria, Bdv.
Satyrā'ta, Hub.
Egēnā'ria, H. S.
Castīgā'ta, Hub.
Pimpinellā'ta, Bdv.
Pusillā'ta, Hub.
Irrigūā'ta, Hub.
Dēnotā'ta, Bdv.
Innotā'ta, Huf.
Indigā'ta, Hub.
Constrictā'ta, Gu.
Nānā'ta, Hub.
Subnotā'ta, Hub.
Vulgā'ta, Ha.
Expallidā'ta, Gu.
Absinthiā'tā, L.
Minūtā'ta, W. V.
Assimilā'ta, Dbl.
Tenūiā'ta, Hub.
Subçiliā'ta, Gu.
Dōdōnēā'ta, Gu.
Abbreviā'ta, Ste.
Exigūā'ta, Hub.
Sobrīnā'ta, Hub.
Togā'ta, Hub.
Pūmilā'ta, Hub.
Corōnā'ta, Hub.
Rectangulā'ta, L.
Dēbiliā'ta, Hub.
COL'LIX, Gu.
Sparsā'ta, Hub.
LOBOPH'ORA, Cur.
Sexālā'ta, Bork.
Hexapterā'ta, W. V.
Virētā'ta, Hub.
Lobulā'ta, Hub.
Polycommā'ta, W. V.
THĒ'RA, Ste.
Jūniperā'ta, L.
Simulā'ta, Hub.
Variā'ta, W. V.
Firmā'ta, Hub.
HYPSIP'ETĒS, Ste.
Ruberā'ta, Fre.
Impluviā'ta, W. V.
Ēlūtā'ta, W. V.
MELAN'THIA, Dup.
Rūbīginā'ta, W. V.
Oçellā'ta, L.
Albiçillā'ta, L.
MELANIP'PĒ, Dup.
Hastā'ta, L.
Tristā'ta, L.
Proçellā'ta, W. V.
Ūnangulā'ta, Ha.
Rīvā'ta, Hub.
Subtristā'ta, Ha.
Montānā'ta, W. V.
Galiā'ta, W. V.
Fluctūā'ta, L.
ANTICLĒ'A, Ste.
Sinūā'ta, W. V.
Rubidā'ta, W. V.
Badiā'ta, W. V.
Dērīvā'ta, W. V.
Berberā'ta, W. V.
COREMIA, Dup.
Mūnītā'ta, Hub.
Prōpugnā'ta, W. V.
Ferrūgā'ta, L.
Quadrifasçiā'ria, L.
CAMPTOGRAM'MA, St.
Bilinēā'ta, L.
Gemmā'ta, Hub.
PHIBALAP'TERYX, S.
Tersā'ta, W. V.
Lapidā'ta, Hub.
Lignā'ta, Hub.
Polygrammā'ta, Bork.
Vītalbā'ta, W. V.
SCOTOS'IA, Ste.
Dubitā'ta, L.
Vetulā'ta, W. V.
Rhamnā'ta, W. V.
Çertā'ta, Hub.
Ūndulā'ta, L.
ÇIDAR'IA, Tr.
Psittacā'ta, W. V.
Miā'ta, L.
Pīcā'ta, Hub.
Corylā'ta, Thb.
Sagittā'ta, F.
Russā'ta, W. V.
Immānā'ta, Ha.
Suffūmā'ta, W. V.
Silāçēā'ta, W. V.
Prūnā'ta, L.
Testā'ta, L.
Pōpulā'ta, L.
Fulvā'ta, For.
Pyraliā'ta, W. V.
Dōtā'ta, Clk.
PĒLUR'GA, Hub.
Comitā'ta, Hub.

EUBOLIIDÆ, Gu.
EUBOL'IA, Dup.
Çervīnā'ria, W. V.
Mensūrā'ria, W. V.
Palumbā'ria, W. V.
Bipunctā'ria, W. V.
Līnēolā'ta, W. V.
CAR'SIA, Hub.
Imbūtā'ta, Hub.
ANĀĪ'TIS, Dup.
Plagiā'ta, L.
LITHOS'TEGĒ, Hub.
Nivēā'ria, W. V.
CHĒ'SIAS, Tr.
Spartiā'ta, Fue.
Oblīquā'ria, W. V.

SĪŌ'NIDÆ, Gu.
TAN'AGRA, Dup.
Chærophyllā'ta, L.

DREPANU'LIDÆ.

PLATYP'TERYX, Las.
Fal'cula, W. V.
Hā'mula, Schif.
Unguic'ula, Hub.
Sī'cula, Schif.
Laçer'tula, Hub.
ÇIL'IX, Lea.
Spī'nula, Schif.

PSEUDO-BOMBȲ'ÇES.

DICRĀNŪ'RIDÆ, Gu.
DICRĀNŪ'RA, Lat.
Bicus'pis, Bork.
Fur'cula, L.
Bif'ida, Hub.
Vī'nula, L.
STAU'ROPUS, Ger.
Fā'*g*ī, L.
PETAS'IA, Ste.
Cassī'nia, Schif.
Nūbēculō'sa, Esp.

PY*GÆ*'RIDÆ, Gu.
PY*GÆ*'RA, Och.
Būçeph'ala, L.
CLŌSTĒ'RA, Ste.
Cur'tula, L.
Reclū'sa, Schif.

NŌTODON'TIDÆ, Ste.
GLYPHIS'IA, Bdv.
Crenā'ta, Esp.
PTILOPH'ORA, Ste.
Plūmi*g*'era, Schif.
PTILODON'TIS, Ste.
Palpī'na, L.
NŌTODON'TA, Ste.
Camēlī'na, L.
Cucullī'na, Schif.
Carmelī'ta, Esp.
Bic'olor, Hub.
Dictæ'a, L.
Dictæōī'des, Esp.
Dromedā'rius, L.
Tril'ophus, Schif.
Zic'zac, L.
Trep'ida, F.
Chāon'ia, Schif.
Dōdōnæ'a, Schif.
DIL'OBA, Bdv.
Çæruleoçeph'ala, L.

NOC'TUÆ.

NOC'TUO-BOMBȲ'ÇIDÆ, Gu.
THYATĪ'RA, Och.
Dērā'sa, L.
Ba'tis, L.
ÇȲMATO'PHORA, Tr.
Duplā'ris, L.
Fluctūō'sa, Hub.
Dīlū'ta, W. V.
Or, W. V.
Oculā'ris, L.
Flāvicor'nis, L.
Rī'dens, F.

BRYOPHIL'IDÆ, Gu.
BRYO'PHILA, Tr.
Glandi'fera, W. V.
Per'la, W. V.

BOMBȲCŌĪ'DÆ, Gu.
DIPH'THERA, Och.
Orī'on, Esp.
ACRONYC'TA, Och.
Trī'dens, W. V.
Psī, L.
Leporī'na, L.
Aç'eris, L.
Megaçeph'ala, W. V.
Strigō'sa, W. V.
Al'nī, L.
Ligus'tri, W. V.
Ru'miçis, L.
Auri'coma, W. V.
Menyan'thidis, View.
Myrī'çæ, Gu.
SI'MYRA, Och.
Vēnō'sa, Bork.

LEUCA'NIIDÆ, Gu.
SYN'IA, Dup.
Musculō'sa, Hub.
LEUCA'NIA, Och.
Cōnī'*g*era, W. V.
Vitellī'na, Hub.
Tur'ca, L.
Lithar*g*y'ria, Esp.
Obsolē'ta, Hub.
Littorā'lis, Cur.
Pudorī'na, W. V.
Com'ma, L.
Strāmin'ëa, Tr.
Impū'ra, Hub.
Pal'lens, L.
Phragmī'tidis, Hub.
MELIA'NA, Cur.
Flam'mëa, Cur.
SEN'TA, Ste.
Ul'væ, Hub.
NONAG'RIA, Och.
Dēspec'ta, Tr.
Ful'va, Hub.
Extrē'ma, Hub.
Hellman'ni, Fre.
Neu'rica, Hub.
*G*eminipunc'ta, Hat.
Can'næ, Och.
Ty'phæ, Thb.
Lutō'sa, Cur.

APAMĒ'ÏDÆ, Gu.
GORTȲ'NA, Och.
Flāvā'go, W. V.
HYDRŒ'ÇIA, Gu.
Nic'titans, L.
Petasī'tis, Dbl.
Micā'çëa, Esp.
AXY'LIA, Hub.
Pu'tris, L.
XYLOPHAS'IA, Ste.
Rū'rëa, F.
Lithoxy'lëa, W. V.
Sublus'tris, Esp.
Pol'yodōn, L.
Hēpat'ica, L.
Scolopaçī'na, Esp.
DIPTERȲ'*G*IA, Ste.
Pīnas'trī, L.
XYLOM'I*G*ĒS, Gu.
Conspiçillā'ris, L.
APOROPHȲ'LA, Gu.
Austrā'lis, Bdv.
LAPHȲG'MA, Gu.
Exig'üa, Hub.
NEU'RIA, Gu.
Saponā'riæ, Bork.

HĒLIOPH'OBUS, Bdv.
Pōpulā'ris, F.
His'pidus, Hub.
CHARÆ'AS, Ste.
Grā'minis, L.
PACHĒ'TRA, Gu.
Leucophæ'a, W. V.
ÇERĪ'GO, Ste.
Çytherē'a, F.
LUPERĪ'NA, Bdv.
Testā'çëa, W. V.
Dume'rili, Dup.
Çæs'pitis, W. V.
MAMES'TRA, Och.
Abjec'ta, Hub.
An'çeps, Hub.
Albicō'lon, Hub.
Fur'va, W. V.
Bras'siçæ, L.
Persicā'riæ, L.
APAMĒ'A, Gu.
Basilī'nëa, W. V.
Connex'a, Bork.
Gem'ina, Och.
Ūnan'imis, Hub.
Ophiogram'ma, Esp.
Fibrō'sa, Hub.
Ocul'ëa, F.
MIĀ'NA, Ste.
Strig'ilis, L.
Fasçiun'cula, Ha.
Līterō'sa, Ha.
Fūrun'cula, W. V.
Expolī'ta, Dbl.
Arcüō'sa, Ha.
ÇELÆ'NA, Ste.
Haworth'ii, Cur.

CARADRĪ'NIDÆ, Gu.

GRAMMĒ'SIA, Ste.
Trilī'nea, W. V.
HYDRIL'LA, Bdv.
Palus'tris, Hub.
ACOSMĒ'TIA, Ste.
Calīginō'sa, Hub.
CARADRĪ'NA, Och.
Mor'pheus, Huf.
Alsī'nēs, Ste.
Blan'da, W. V.
Cubiculā'ris, W. V.

NOCTUIDÆ, Gu.

RUSĪ'NA, Ste.
Tenebrō'sa, Hub.
AG'ROTIS, Och.
Vallig'era, W. V.
Pu'ta, Hub.
Suffū'sa, W. V.
Fen'nica, Ev.
Sau'çia, Hub.
Seg'etum, W. V.
Lūni'gera, Ste.
Exclāmātiō'nis, L.
Cortiç'ëa, Hub.
Çiner'ëa, Bork.
Rī'pæ, Hub
Cursō'ria, Bork.
Ni'gricans, L.
Trit'içī, L.
Aquilī'na, W. V.
Obelis'ca, W. V.
Agath'ina, Bdv.
Porphyr'ëa, W. V.
Præ'cox, L.
Rāv'ida, W. V.
Pȳroph'ila, W. V.
Luçer'nëa, L.
Ashworth'ii, Dbl.
TRYPHÆ'NA, Och.
Ian'thina, W. V.
Fim'bria, L.
Interjec'ta, Hub.
Sub'sequa, W. V.
Orbō'na, F.
Prō'nuba, L.
NOC'TŪA, Tr.
Glārëō'sa, Esp.
Dēpunc'ta, L.
Au'gur, F.
Plec'ta, L.
C-ni'grum, L.
Ditrapez'ium, Bork.
Trian'gulum, Huf.
Rhomböī'dea, Esp.
Brun'nëa, W. V.
Festī'va, W. V.
Con'flua, Tr.
Dahl'iī, Hub.
Subro'sëa, Ste.
Bel'la, Bork.
Umbrō'sa, Hub.
Bai'a, W. V.
Sobrī'na, Bdv.
Neglec'ta, Hub.
Xantho'grapha, W. V.

ORTHŌSIIDÆ, Gu.

TRĀCHĒ'A, Gu.
Pīniper'da, K.
PACHNO'BIA, Gu.
Alpī'na, Wwd.
TÆNIOCAM'PA, Gu.
Goth'ica, L.
Leuco'grapha, Hub.
Rubrīcō'sa, W. V.
Instab'ilis, W. V.
Opī'ma, Hub.
Pōpulē'ti, F.
Stab'ilis, W. V.
Graç'ilis, W. V.
Miniō'sa, W. V.
Mun'da, W. V.
Crū'da, W. V.
ORTHŌ'SIA, Och.
Suspec'ta, Hub.
Upsī'lon, W. V.
Lō'ta, L.
Maçilen'ta, Hub.
ANCHOÇĒ'LIS, Gu.
Rūfī'na, L.
Pistāçī'na, W. V.
Lūnō'sa, Ha.
Litū'ra, L.
ÇERAS'TIS, Och.
Vaççī'nii, L.
Spādiç'ëa, Hub.
Erythroçeph'ala, W. V.
SCOPELOSŌ'MA, Cur.
Satellit'ia, L.
DASYCAM'PA, Gu.
Rubigin'ëa, W. V.
OPŌ'RĪNA, Bdv.
Croçëā'go, W. V.
XAN'THIA, Och.
Çitrā'go, L.
Çērā'go, W. V.
Silā'go, Hub.
Aurā'go, W. V.
Gilvā'go, W. V.
Oçellā'ris, Bork.
Ferrūgin'ea, W. V.
ÇIRRHŒ'DIA, Gu.
Xērampel'ina, Hub.

COSMIIDÆ, Gu.

TĒ'THEA, Ste.
Subtū'sa, W. V.
Retū'sa, L.
EUPĒ'RIA, Gu.
Fulvā'go, W. V.
DIÇYC'LA, Gu.
Ō'o, L.
COS'MIA, Och.
Trapezī'na, L.
Pyralī'na, W. V.
Diffī'nis, L.
Affī'nis, L.

HADĒN'IDÆ, Gu.

ERĒMO'BIA, Ste.
Ōchroleu'ca, W. V.
DIANTHŒ'ÇIA, Bdv.
Carpo'phaga, Bork.
Capsin'cola, W. V.
Cucu'balī, W. V.
Albimac'ula, Bork.
Consper'sa, W. V.
HECATĒ'RA, Gu.
Dysō'dëa, W. V.
Serē'na, W. V.
POL'IA, Och.
Chī, L.
Flāviçinc'ta, W. V.

DASYPOL'IA, Dup.
Tem'plī, Thb.
EPUN'DA, Dup.
Lutulen'ta, W. V.
Nī'gra, Ste.
Vīminā'lis, F.
Līchēn'ëa, Hub.
VALER'IA, Ger.
Oleā'gina, W. V
MISĒ'LIA, Tr.
Oxyacan'thæ, L.
Bimaculō'sa, L.
AGRIŌ'PIS, Bdv.
Aprīlī'na, L.
PHLOGOPH'ORA, Tr.
Meticulō'sa, L.
Empyrē'a, Hub.
EUPLEX'IA, Ste.
Luçip'ara, L.
APLEC'TA, Gu.
Her'bida, W. V.
Occul'ta, L.
Nebulō'sa, Huf.
Tinc'ta, Bra.
Ad'vena, W. V.
HADĒ'NA, Sch.
Sat'ura, W. V.
Assim'ilis, Dbl.
Adus'ta, Esp.
Prō'tëa, W. V.
Glau'ca, Hub.
Dentī'na, W. V.
Chēnopod'iī, W. V.
Atrip'licis, L.
Suā'sa, W. V.
Peregrī'na, Tr.
Olerā'çëa, L.
Pí'sī, L.
Thalas'sina, Huf.
Contig'üa, W. V.
Genis'tæ, Bork.
HYP'PA, Dup.
Rectilī'nea, Esp.

XYLINIDÆ, Gu.

XYLOCAM'PA, Gu.
Lithorī'za, Bork.
CLOAN'THA, Bdv.
Perspiçillā'ris, L.
Solidā'ginis, Hub.
CALOCAM'PA, Ste.
Vetus'ta, Hub.
Exolē'ta, L.
XYL'INA, Ste.
Rhīzo'litha, W. V.
Sēmibrun'nëa, Ha.
Petrificā'ta, W. V.
CUCUL'LIA, Sch.
Verbas'çi, L.
Scrophulā'riæ, W. V.
Lychnī'tis, Ram.
As'teris, W. V.
Gnapha'liī, Hub.
Absin'thiī, L.
Chamomil'læ, W. V.
Umbrā'tica, L.
CALOPHAS'IA, Ste.
Linā'riæ, W. V.

HĒLIŌ'THIDÆ, Gu.

CHARICLĒ'A, Ste.
Delphī'niī, L.
HĒLIŌ'THIS, Och.
Marginā'ta, F.
Pelti'gera, W. V.
Armi'gera, Hub.
Dipsa'çëa, L.
Scutō'sa, W. V.
ANAR'TA, Och.
Melanō'pa, Thb.
Cordi'gera, Thb.
Myrtil'lī, L.
HĒLIŌ'DĒS, Gu.
Ar'butī, F.

ACONTIIDÆ, Gu.

AGRO'PHILA, Bdv.
Sulphurā'lis, L.
ACON'TIA, Och.
Luctüō'sa, W. V.

ERASTRIIDÆ, Ste.

ERAS'TRIA, Och.
Venus'tula, Hub.
Fus'cula, W. V.
BANK'SIA, Gu.
Argen'tula, Bork.

ANTHOPHILIDÆ, Gu.

HYDRĒ'LIA, Gu.
Un'ca, L.
MĪ'CRA, Gu.
Ostrī'na, Hub.
Par'va, Hub.

PHALÆNŌĪ'DÆ, Gu.

BREPH'OS, Och.
Parthen'ias, L.
Noth'a, Hub.

PLŪSIIDÆ, Gu.

HABROS'TOLA, Och.
Urti'çæ, Hub.
Triplas'ia, L.
PLŪ'SIA, Och.
Orichal'çëa, F.
Chrȳsī'tis, L.
Brac'tëa, W. V.
Festū'çæ, L.
Iō'ta, L.
V-au'rëum, Gu.
Gam'ma, L.
Interrogātiō'nis, L.

GŌNOPTERIDÆ, Gu.

GŌNOP'TERA, Lat.
Lībā'trix, L.

AMPHIPYRIDÆ, Gu.

AMPHI'PYRA, Och.
Pyramid'ëa, L.
Tragopōgō'nis, L.
MAN'IA, Tr.
Ty'pica, L.
Mau'ra, L.

TOXOCAM'PIDÆ, Gu.

TOXOCAM'PA, Gu.
Pas'tinum, Tr.

STILBIIDÆ, Gu.

STIL'BIA, Ste.
Anō'mala, Ha.

CATŌCALIDÆ, Gu.

CATŌ'CALA, Sch.
Frax'inī, L.
Nup'ta, L.
Promis'sa, W. V.
Spon'sa, L.

CATĒPHIIDÆ, Gu.

CATĒ'PHIA, Och.
Alchymis'ta, Hub.

OPHIŪS'IDÆ, Gu.

OPHIŌ'DES, Gu.
Lūnā'ris, W. V.

EUCLĪDIIDÆ, Gu.

EUCLĪ'DIA, Och.
Mī, L.
Glyph'ica, L.

POAPHILIDÆ, Gu.

PHYTO'METRA, Ha.
Æ'nëa, W. V.

DELTÖĪ'DÆ.

HYPĒ'NIDÆ, Gu.

MADŌ'PA, Ste.
Salicā'lis, W. V.
HYPĒ'NA, Sch.
Proboscidā'lis, L.
Rostrā'lis, L.
Crassā'lis, F.
HYPĒNŌ'DES, Gu.
Albistrigā'lis, Ha.
Costæstrigā'lis, Ste.
SÇHRANK'IA, Woc.
Turfosā'lis, Woc.

HERMINIIDÆ, Gu.

RĪ'VULA, Gu.
Sēriçēā'lis, W. V.
HERMIN'IA, Lat.
Dērīvā'lis, Hub.
Barbā'lis, L.
Tarsipennā'lis, Tr.
Grisēā'lis, W. V.
Crībrā'lis, Hub.

AVENTIIDÆ.

AVEN'TIA, Dup.
Flex'ula, F.

PYRAL'IDES.

ODONTIIDÆ, Gu.

ODON'TIA, Dup.
Dentā'lis, Sch.
PYR'ALIS, L.
Fimbriā'lis, W. V.
Farīnā'lis, L.
Glauçinā'lis, L.
AGLŌS'SA, Lat.
Pinguinā'lis, L.
Cuprēā'lis, Hub.
CLĒDĒOB'IA, Ste.
Angustā'lis, W. V.

ENNYCHIIDÆ, Gu.

PYRAUS'TA, Sch.
Pūniçēā'lis, W. V.
Purpurā'lis, L.
Ostrinā'lis, Hub.
RHODAR'IA, Gu.
Sanguinā'lis, L.
HER'BULA, Gu.
Çæspitā'lis, W. V.
ENNYCH'IA, Tr.
Çingulā'lis, L.
Anguinā'lis, Geof.
Octomaculā'lis, L.

ASŌPIIDÆ, Gu.

AGROT'ERA, Sch.
Nemorā'lis, Sco.
ENDO'TRICHA, Zel.
Flammēā'lis, W. V.

STENIIDÆ, Gu.

DIASĒ'MIA, Hub.
Līterā'lis, Sco.
Ramburiā'lis, Dup.
STEN'IA, Gu.
Punctā'lis, W. V.
NAS'ÇIA, Cur.
Çiliā'lis, Hub.

HYDROCAM'PIDÆ, Gu.

CATACLYS'TA, Hub.
Lemnā'lis, L.
PARAP'ONYX, Hub.
Stratiōtā'lis, L.
HYDROCAM'PA, Lat.
Nymphæā'lis, L.
Stagnā'lis, Don.

BO'TYDÆ, Gu.

BŌ'TYS, Lat.
Lupulīnā'lis, Clk.
Pandā'lis, Hub.
Flāvā'lis, W. V.
Hyalinā'lis, Sch.
Verticā'lis, L.
Lançēā'lis, W. V.
Fuscā'lis, W. V.
Terrēā'lis, Tr.
Asinā'lis, Hub.
Urtīcā'lis, L.
EBU'LĒA, Gu.
Sambūcā'lis, W. V.
Croçēā'lis, Tr.
Verbascā'lis, W. V.
PĪŌ'NĒA, Gu.
Forficā'lis, L.
Margarītā'lis, F.
Strāmentā'lis, Hub.
SPĪLŌ'DES, Gu.
Sticticā'lis, L.
Palēā'lis, Geof.
Çinctā'lis, Tr.
SCŌ'PULA, Sch.
Alpīnā'lis, W. V.
Lutēā'lis, Ha.
Olīvā'lis, W. V.
Prūnā'lis, W. V.
Ferrūgā'lis, Hub.
Dēcrepitā'lis, H.S.
MĒÇY'NA, Gu.
Polygōnā'lis, Hub.

PLICĀ'TÆ.

SCŌPĀRIIDÆ, Gu.

SCŌPĀ'RIA, Ha.
Ambigüā'lis, Tr.
Çembrā'lis, Ha.
Pyralā'lis, Hub.
Mūrā'lis, Cur.
Līneolā'lis, Cur.
Mercuriā'lis, Ste.
Phæoleucā'lis, Zel.
Cratægā'lis, Hub.
Rēsīnā'lis, Ste.
Trunçicolā'lis, Sta.
Coarctā'lis, Zel.
Atomā'lis, Dbl.
Graçilā'lis, Dbl.
Parā'lis, Zel.
Pallidulā'lis, Gu.

CRAM'BĪ.

CRAM'BIDÆ, Gu.
PLAT'YTĒS, Gu.
Çērūssel'lus, W. V.
CRAM'BUS, F.
Falsel'lus, W. V.
Prātel'lus, L.
Dūmētēl'lus, Hub.
Eriçel'lus, Hub.
Sylvel'lus, Hub.
Hāmel'lus, Thb.
Pascüel'lus, L.
Ūli*g*inōsel'lus, Zel.
Furcātel'lus, Zet.
Margarītel'lus, Hub.
Pīnētel'lus, Clk.
Lātistriel'lus, Ha.
Perlel'lus, Sco.
Warringtonel'lus, Sta.
Selasel'lus, Hub.
Tristel'lus, W. V.
Pedriolel'lus, Dup.
Contāminel'lus, Hub.
*G*eniculel'lus, Ha.
Culmel'lus, L.
Chrȳsonychel'lus, Sco.
Rōrel'lus, L.
Cassentiniel'lus, Mann.
Hortüel'lus, Hub.
Palūdel'lus, Hub.

CHĪ'LIDÆ, Gu.
CHĪ'LO, Zin.
Çicātriçel'lus, Hub.
Phragmītel'lus, Hub.
SCHŒNOB'IUS, Dup.
Forfiçel'lus, Thb.
Mūcrōnel'lus, Sco.
*G*igantel'lus, W. V.

PHȲ'ÇIDÆ, Gu.
ANERAS'TIA, Zel.
Lōtel'la, Hub.
Farrel'la, Cur.
ĪLĪTHYI'A, Lat.
Carnel'la, L.
MYELOPH'ILA, Tr.
Crībrel'la, Hub.
HOMŒOSŌ'MA, Cur.
Sinüel'la, F.
Nimbel'la, Zel.
Nebulel'la, W. V.
Ēluviel'la, Gu.
EPHES'TIA, Gu.
Ēlūtel'la, Hub.
• Fīçel'la, Dgl.
Sēmirūfel'la, Ha.
Çeratōniel'la, F. v. R.
Pinguēdinel'la, Gu.
Artemisiel'la, Sta.
CRYPTOB'LABES, Zel.
Bistri*g*el'la, Ha.
NYCTĒ'GRETĒS, Zel.
Achātinel'la, Hub.
PLODIA, Gu.
Interpunctel'la, Hub.
NEPHOP'TERYX, Zel.
Angustel'la, Hub.
*G*YMNAN'ÇYLA, Zel.
Cānel'la, W. V.
PHȲ'ÇIS, F.
Betulel'la, Goe.
Carbōnāriel'la, F. v. R.
Dīlūtel'la, Hub.
Ornātel'la, W. V.
Abiētel'la, W. V.
Rōborel'la, W. V.
PEMPEL'IA, Hub.
Palumbel'la, W. V.
RHODOPHÆ'A, Gu.
Formōsel'la, Ha.
Consoçiel'la, Hub.
Advenel'la, Zin.
Marmorel'la, Ha.
Suāvel'la, Zin.
Tumidel'la, Zin.
Rubrotībiël'la, Mann.
ONCOÇ'ERA, Ste.
Ahēnel'la, W. V.
MEL'IA, Cur.
Soçiel'la, L.
Anel'la, W. V.
GALLER'IA, F.
Çērel'la, L.
MELIPHŌ'RA, Gu.
Alvëāriel'la, F.

TORTRĪ'ÇES.

ÇYM'BIDÆ, Gu.
HAL'IAS, Tr.
Prasinā'na, L.
Quercā'na, W. V.
Chlōrā'na, L.

TORTRĪ'ÇIDÆ, Gu.
SARŌ'THRIPUS, Cur.
Revayā'na, W. V.
TOR'TRIX, L.
Pȳrastrā'na, Hub.
Piçëā'na, L.
Cratægā'na, Hub.
Xylostëā'na, L.
Sorbiā'na, Hub.
Rosā'na, L.
Dūmētā'na, Tr.
Transitā'na, Gu.
Çinnamōmëā'na, Tr.
Hēparā'na, W. V.
Ribëā'na, Hub.
Corylā'na, F.
Ūnifasçiā'na, Dup.
Sēmialbā'na, Gu.
Costā'na, W. V.
Viburnā'na, W. V.
Icterā'na, Fre.
Viridā'na, L.
Ministrā'na, L.
Adjunctā'na, Tr.
Branderiā'na, L.
DICHĒ'LIA, Gu.
Grotiā'na, F.
AMPH'ISA, Cur.
Gerningā'na, W. V.
Walkerā'na, Cur.
ŒNEC'TRA, Gu.
Pilleriā'na, W. V.
LEPTOGRAM'MA, Cur.
Līterā'na, L.
Treveriā'na, W. V.
Scabrā'na, Ste.
Boscā'na, F.
PERONĒ'A, Cur.
Favillāçëā'na, Hub.
Rūfā'na, W. V.
Mixtā'na, Hub.
Sçhalleriā'na, L.
Calēdoniā'na, Bent.
Permutā'na, Dup.
Variegā'na, W. V.
Cristā'na, W. V.
Hastiā'na, L.
Maccā'na, Tr.
Umbrā'na, Hub.
Ferrūgā'na, W. V.
Tristā'na, Hub.
Aspersā'na, Hub.
Shepherdā'na, Ste.
TER'AS, Tr.
Caudā'na, F.
Contāminā'na, Hub.

DICTYOP'TERYX, Ste.
Ūlīginōsā'na, Bent.
Lœflingiā'na, L.
Holmiā'na, L.
Bergmanniā'na, L.
Forskalēā'na, L.
ARGYROTOX'A, Ste.
Conwayā'na, F.
PTYCHŌLŌ'MA, Ste.
Lechēā'na, L.

PENTHINIDÆ, Gu.

DIT'ULA, Ste.
Hartmannia'na, L.
Sēmifasçiā'na, Ha.
PEN'THINA, Tr.
Pīcā'na, Fro.
Betuletā'na, Ha.
Capræā'na, Hub.
Prælongā'na, Gu.
Prūniā'na, Hub.
Ōchroleucā'na, Hub.
Çynosbā'na, L.
Ōchromelā'na, Gu.
Sauçiā'na, Hub.
Grevillā'na, Cur.
Gentianā'na, Hub.
Sellā'na, Hub.
Marginā'na, Ha.
Carbōnā'na, Ha.
ANTITHES'IA, Ste.
Salicā'na, L.

SPĪLONŌ'TIDÆ, Gu.

SPĪLONŌ'TA, Gu.
Oçellā'na, W. V.
Pauperā'na, Fro.
Açeriā'na, F. v. R.
Dēalbā'na, Fro.
Neglectā'na, Dup.
Suffūsā'na, Kuhl.
Rosæcolā'na, Dbl.
Rōborā'na, W. V.
PAR'DIA, Gu.
Tripunctā'na, W. V.

SĒRICOR'IDÆ, Gu.

AS'PIS, Tr.
Uddmanniā'na, L.
SIDĒ'RIA, Gu.
Achātā'na, W. V.
SĒRIC'ORIS, Tr.
Lātifasçiā'na, Ha.
Euphorbiā'na, Dup.
Bifasçiā'na, Ha.
Littorā'na, Cur.
Absçīsā'na, Gu.
Çæspitā'na, Hub.
Conchā'na, Hub.
Herbā'na, Gu.
Lacūnā'na, W. V.
Urtīcā'na, Hub.
Dalēā'na, Cur.
Micā'na, Hub.
MIXOD'IA, Gu.
Sçhulziā'na, F.
Palustrā'na, Lie.
Ratzeburgiā'na, Sax.
ROXĀ'NA, Ste.
Arcüā'na, L.
EUCHRŌ'MIA, Ste.
Flammēā'na, Hub.
Purpurā'na, Ha.
Arbutā'na, Hub.
ORTHOTÆ'NIA, Ste.
Antīquā'na, Hub.
Striā'na, W. V.
Erīçetā'na, Bent.

SÇIAPHILIDÆ, Gu.

ERIOPSĒ'LA, Gu.
Fractifasçiā'na, Ha.
Quadrā'na, Hub.
PHTHEOCH'ROA, Ste.
Rūgōsā'na, Hub.
CNEPHAS'IA, Cur.
Çinctā'na, W. V.
Lepidā'na, Cur.
Musculā'na, Hub.
SÇIAPH'ILA, Tr.
Nūbilā'na, Hub.
Cretāçēā'na, Cur.
Subjectā'na, Gu.
Virgaurēā'na, Tr.
Alternā'na, W. V.
Sinüā'na, Ste.
Hybridā'na, Hub.
Octomaculā'na, Ha.
Penziā'na, Ste.
Colquhounā'na, Sta.
SPHALEROP'TERA, Gu.
Ictericā'na, Ha.
CAP'UA, Ste.
Ōchrāçēā'na, Ste.
CLEP'SIS, Gu.
Rusticā'na, Tr.

GRAPHOLITH'IDÆ, Gu.

BAC'TRA, Ste.
Lançēolā'na, Hub.
Furfurā'na, Ha.
PHOXOP'TERYX, Tr.
Sīculā'na, Hub.
Unguicā'na, L.
Uncā'na, Hub.
Biarcüā'na, Ste.
Subarcüā'na, Dgl.
Comptā'na, Fro.
Myrtillā'na, Tr.
Lundā'na, F.
Derāsā'na, Hub.
Dīminutā'na, Ha.
Mitterpacheriā'na, W. V.
Upupā'na, Tr.
Rāmā'na, L.
GRAPHOL'ITHA, Tr.
Paykulliā'na, F.
Nīsā'na, L.
Nigromaculā'na, Ha.
Campoliliā'na, W. V.
Minūtā'na, Hub.
Trimaculā'na, Don.
Penkleriā'na, W. V.
Obtūsā'na, Ha.
Nævā'na, Hub.
Geminā'na, Ste.
PHLŒŌ'DES, Gu.
Tetraquetrā'na, Ha.
Immundā'na, F. v. R.
Demarniā'na, F. v. R.
Crenā'na, Hub.
HYPERMĒ'ÇIA, Gu.
Augustā'na, Hub.
BATŌ'DĒS, Gu.
Angustiorā'na, Ha.
PÆDIS'CA, Tr.
Bilūnā'na, Ha.
Oppressā'na, Tr.
Corticā'na, W. V.
Profundā'na, W. V.
Ophthalmicā'na, Hub.
Occultā'na, Dgl.
Solandriā'na, L.
Sēmifuscā'na, Dbl.
Sordidā'na, Hub.
EPHIPPIPH'ORA, Dup.
Bimaculā'na, Don.
Çirsiā'na, Zel.
Scutulā'na, W. V.
Brünnichiā'na, W. V.
Turbidā'na, Tr.
Fœnēā'na, L.
Nigricostā'na, Ha.
Signātā'na, Dgl.
Trigeminā'na, Ste.
Tetragōnā'na, Ste.
Costipunctā'na, Ha.
Ephippā'na, Hub.
Obscūrā'na, Ste.
OLIN'DIA, Gu.
Ulmā'na, Hub.
SĒMAS'IA, Gu.
Spīniā'na, F. v. R.
Ianthinā'na, Dup.
Rūfillā'na, Zel.
Wœberiā'na, W. V.
COCÇYX, Tr.
Cosmophorā'na, Tr.

Strobilā'na, L.
Splendidulā'na, Gu.
Argyrā'na, Hub.
Tædā'na, L.
Pygmææā'na, Hub.
Herçyniā'na, Bech.
Ustomaculā'na, Cur.
Nānā'na, Tr.
Vaççiniā'na, Tis.
HEUSIMĒ'NĒ, Ste.
Fimbriā'na, Ha.
PAMPLŪ'SIA, Gu.
Monticolā'na, Mann.
RĒTIN'IA, Gu.
Būoliā'na, W. V.
Pīnicolā'na, Dbl.
Turionā'na, L.
Pīnivorā'na, Zel.
Rēsinā'na, L.
Dūplā'na, Hub.
Sylvestrā'na, Cur.
CARPOCAP'SA, Tr.
Splendidā'na, Hub.
Grossā'na, Ha.
Pōmōnā'na, L.
OPĀ'DIA, Gu.
Fūnebrā'na, Tr.
ENDOP'ISA, Gu.
Nebrītā'na, Tr.
Pīsā'na, Gu.
STIGMONŌ'TA, Gu.
Lūnulā'na, W. V.
Cōniferā'na, Ratz.
Leplastrierā'na, Cur.
Perlepidā'na, Ha.
Internā'na, Gu.
Composā'na, F.
Weirā'na, Dgl.
Redimītā'na, Gu.
Trauniā'na, W. V.
Rēgiā'na, Zel.
Puncticostā'na, Ste.
Germarā'na, Hub.
DICRORAM'PHA, Gu.
Polītā'na, W. V.
Alpīnā'na, Dup.
Sequā'na, Hub.
Petiverā'na, L.
Ūlicā'na, Gu.
Sāturnā'na, Gu.
Plumbāgā'na, Tr.
Acūminātā'na, Zel.
Senectā'na, Gu.
Simpliçiā'na, Ha.
Tanaçētā'na, Sta.
Consortā'na, Ste.
PYRŌ'DĒS, Gu.
Rheediā'na, L.
CATOP'TRIA, Gu.
Albersā'na, Hub.
Ūliçētā'na, Ha.
Jūliā'na, Bent.
Hȳpericā'na, Hub.
Wimmerā'na, Tr.
Scopoliā'na, Ha.
Hohenwarthiā'na, W.V.
Çæçimaculā'na, Hub.
Parvulā'na, Wilkinson.
Modestā'na, H. S.
Hawkerā'na, Stev.
Mīcrogrammā'na, Gu.
Expallidā'na, Ha.
Çitrā'na, Hub.
Pūpillā'na, L.
TRȲCHĒ'RIS, Gu.
Mediā'na, W. V.

PYRALÖĪ'DIDÆ, Gu.

SYMÆ'THIS, Lea.
Vibrā'na, Hub.
CHOREŪ'TĒS, Tr.
Sçintillulā'na, Hub.
XYLOP'ODA, Lat.
Fabriçiā'na, L.
Pariā'na, L.

CONCHYLIDÆ, Gu.

LŌBĒ'SIA, Gu.
Reliquā'na, Hub.
Servillā'na, Dup.
EUPŒÇILIA, Ste.
Nā'na, Ha.
Dubitā'na, Hub.
Atricapitā'na, Ste.
Maculosā'na, Ha.
Sodāliā'na, Ha.
Hybridellā'na, Hub.
Ambigüā'na, Hub.
Angustā'na, Hub.
Affīnitā'na, Dgl.
Ūdā'na, Gu.
Notulā'na, Zel.
Rūpicolā'na, Cur.
Flāviçiliā'na, Dbl.
Roseā'na, Ha.
Subroseā'na, Ha.
Rūfiçiliā'na, Ha.
Anthemidā'na, Cur.
XANTHOSĒ'TIA, Ste.
Zoëgā'na, L.
Hāmā'na, L.
CHRŌ'SIS, Gu.
Tesserā'na, W. V.
Rutilā'na, Hub.
Audouinā'na, Dup.
ARGYROLEP'IA, Ste.
Baumanniā'na, W. V.
Dubrisā'na, Cur.
Schreberiā'na, Fro.
Badiā'na, Hub.
Cnīcā'na, Dbl.
Æneā'na, Hub.
Mussehliā'na, Tr.
Maritimā'na, Gu.
CON'CHYLIS, Tr.
Dipoltā'na, Hub.
Françillonā'na, F.
Dīlūçidā'na, Ste.
Smeathmaniā'na, F.
Strāmineā'na, Ha.
Gigantā'na, Gu.
Inopiā'na, Ha.
APHĒL'IA, Cur.
Prātā'na, Hub.
TORTRICŌ'DES, Gu.
Hyemā'na, Hub.

TIN'EÆ.

EPIGRAPHIIDÆ, Gu.

LEMNATOPH'ILA, Tr.
Phrȳganel'la, Hub.
EXAP'ATĒ, Hub.
Gelātel'la, L.
DASYS'TOMA, Cur.
Saliçel'la, Hub.
DIUR'NEA, Ha.
Fāgel'la, W. V.
EPIGRAPH'IA, Ste.
Avellānel'la, Hub.
Steinkellneriel'la, W. V.

PSȲ'CHIDÆ, Bru.

TALÆPŌ'RIA, Zel.
Pūbicornel'la, Ha.
Pseudobombȳçel'la, Hb.
PSȲ'CHĒ, Sch.
Villōsel'la, Och.
Opāçel'la, H. S.
Calvel'la, Och.
Pullel'la, Esp.
Radiel'la, Cur.
Rētiçel'la, New.
Rōboricolel'la, Bru.
SŌLĒNOBĪA, Zel.
Triquetrel'la, F. v. R.
Inconspicüel'la, Sta.
PSȲCHŌĪ'DES, Bru.
Verhuellel'la, Hey.

TINEIDÆ, Sta.

DIPLODŌ'MA, Zel.
Marginipunctel'la, Ste.
XYSMATODŌ'MA, Zel
Melanel'la, Ha.

OCHSENHEIMER'IA, Hub.
Birdel'la, Cur.
Bisontel'la, Lie.
Vacculel'la, F. v. R.
EUPLOC'AMUS, Lat.
Bolē'tī, F.
TIN'ËA, L.
Īmel'la, Hub.
Ferrūginel'la, Hub.
Rustiçel'la, Hub.
Monachel'la, Hub.
Fulvimītrel'la, Sod.
Tapētiel'la, L.
Arçel'la, F.
Picārel'la, Clk.
Arcüātel'la, Sta.
Cortiçel'la, Cur.
Parasītel'la, Hub.
Grānel'la, L.
Clöāçel'la, Ha.
Rūricolel'la, Sta.
Conchylidel'la, Sta.
Albipunctel'la, Ha.
Caprimulgel'la, Hey.
Misel'la, Zel.
Fusçipunctel'la, Ha.
Pellionel'la, L.
Merdel'la, Zel.
Pallesçentel'la, Sta.
Flāvesçentel'la, Ha.
Lappel'la, Hub.
Biselliel'la, Hum.
Simpliçel'la, H. S.
Nigripunctel'la, Ha.
Sēmifulvel'la, Ha.
Bistrigel'la, Ha.
Subammanel'la, Sta.
Argentimaculel'la, Sta.
Ōchrāçeël'la, Teng.
LAMPRON'IA, Zel.
Quadripunctel'la, F.
Luzel'la, Hub.
Prælātel'la, W. V.
Rubiel'la, Bj.
INCURVĀ'RIA, Ha.
Muscalel'la, F.
Pectin'ëa, Ha.
Tenuicor'nis, Sta.
Oehlmanniel'la, Hub.
Capitel'la, L.
MĪCROP'TERYX, Zel.
Calthel'la, L.
Ārunçel'la, Sco.
Seppel'la, F.
Mansuētel'la, Zel.
Allionel'la, F.
Thunbergel'la, F.
Purpurel'la, Ha.
Salōpiel'la, Sta.
Sēmipurpurel'la, Ste.
Ūnimaculel'la, Zet.
Sparmannel'la, Bosc.
Subpurpurel'la, Ha.
NĒMOPH'ORA, Hub.
Swammerdammel'la, L.
Schwarziel'la, Zel.
Car'terī, Sta.
Pilel'la, W. V.
Metaxel'la, Hub.
ADĒ'LA, Lat.
Fībulel'la, W. V.
Rūfimītrel'la, Sco.
Sulzeriel'la, W. V.
DeGeerel'la, L.
Viridel'la, Sco.
Cuprel'la, F.
NĒMAT'OÏS, Zel.
Scabiōsel'lus, Sco.
Cupriaçel'lus, Hub.
Fasçiel'lus, F.
Minimel'lus, Mann.

HYPONOMEU'TIDÆ, Sta.

SWAMMERDAM'MIA, Sta.
Apiçel'la, Don.
Çæsiel'la, Hub.
Griseocapitel'la, Sta.
Prū'ni, Sta.
Lūtā'rëa, Ha.
Pyrel'la, V.
SÇŸTHRŌ'PIA, Sta.
Cratægel'la, L.
HYPONOMEU'TA, Lat.
Vīgintipunctā'tus, Retz.
Plumbel'lus, W. V.
Irrōrel'lus, Hub.
Padel'lus, L.
Euōnymel'lus, Sco.
Pa'di, Zel.
ANĒSYCH'IA, Ste.
Pusiel'la, Ro.
Bipunctel'la, F.
Fūnerel'la, F.
Deçemguttel'la, Hub.
CHAL'YBĒ, Dup.
Pyraus'ta, Pal.
PRĀ'YS, Sta.
Curtisel'lus, Don.

PLŪTEL'LIDÆ, Sta.

EIDOPHAS'IA, Ste.
Messingiel'la, F. v. R.
PLŪTEL'LA, Sch.
Crūçiferā'rum, Zel.
Porrectel'la, L.
Annulātel'la, Cur.
Dālel'la, Sta.
ÇĒROS'TOMA, Lat.
Sequel'la, Clk.
Vittel'la, L.
Radiātel'la, Don.
Costel'la, F.
Sylvel'la, L.
Alpel'la, W. V.
Lūçel'la, F.
Horridel'la, Tr.
Scabrel'la, L.
Asperel'la, L.
Nemorel'la, L.
Xȳlostel'la, L.
THĒRIS'TIS, Sta.
Caudel'la, L.

GĒLECHIIDÆ, Sta.

ORTHOTEL'IA, Ste.
Sparganel'la, Wen.
HENICOS'TOMA, Ste.
Lobel'la, W. V.
PHIBALOÇ'ERA, Ste.
Quercā'na, F.
EXÆRET'IA, Sta.
Allisel'la, Sta.
DĒPRESSĀ'RIA, Ha.
Costō'sa, Ha.
Litūrel'la, W. V.
Pallōrel'la, Zel.
Umbellā'na, Ste.
Bipunctō'sa, Cur.
Assimilel'la, Tr.
Nānātel'la, Sta.
Atomel'la, W. V.
Arēnel'la, W. V.
Propinquel'la, Tr.
Subpropinquel'la, Sta.
Alstrœmeriā'na, Clk.
Çiniflōnel'la, Lie.
Purpu'rëa, Ha.
Caprëolel'la, Zel.
Hyperiçel'la, Hub.
Conterminel'la, Zel.
Angeliçel'la, Hub.
Cardüel'la, Hub.
Oçellā'na, F.
Yeatesiā'na, F.
Applā'na, F.
Çiliel'la, Sta.
Grānulōsel'la, Sta.
Rotundel'la, Dgl.
Dēpressel'la, Hub.
Pimpinel'læ, Zel.
Albipunctel'la, Hub.
Ēmeritel'la, Hey.
Pulcherrimel'la, Sta.
Douglasel'la, Sta.
Weirel'la, Sta.
Chærophyl'lī, Zel.
Ultimel'la, Sta.
Nervō'sa, Ha.
Badiel'la, Hub.
Pastināçel'la, Dup.
Hēraclëā'na, DeG.
Libanōtidel'la, Schl.

PSŌRICOP'TERA, Sta.
Gibbōsel'la, Zel.
GĒLECH'IA, Zel.
Çinerel'la, L.
Rūfes'çens, Ha.
Inornātel'la, Dgl.
Gerronel'la, Zel.
Vilel'la, Zel.
Basā'lis, Dgl.
Malvel'la, Hub.
Pōpulel'la, L.
Ni'gra, Ha.
Temerel'la, Lie.
Lentiginōsel'la, Tis.
Vēlōçel'la, Tis.
Fūmātel'la, Dgl.
Eriçetel'la, Hub.
Mūlinel'la, Tis.
Dīvīsel'la, Dgl.
Palustrel'la, Dgl.
Sororculel'la, Hub.
Cunēātel'la, Zel.
Pēliel'la, Tis.
Alaçel'la, Zel.
Longicor'nis, Cur.
Diffī'nis, Ha.
Terrel'la, W. V.
Dēsertel'la, Edl.
Polītel'la, Dgl.
Acūminātel'la, Sir.
Artemisiel'la, Tis.
Senectel'la, F. v. R.
Mundel'la, Dgl.
Sim'ilis, Dgl.
Affī'nis, Ha.
Boreēl'la, Dgl.
Galbanel'la, F. v. R.
Basaltinel'la, Zel.
Domes'tica, Ha.
Rhombel'la, Hub.
Proximel'la, Hub.
Notātel'la, Hub.
Humerā'lis, Zel.
Vulgel'la, Hub.
Lūculel'la, Hub.
Scriptel'la, Hub.
Fugitīvel'la, Zel.
Æ'thiops, Wwd.
Solūtel'la, F. v. R.
Distinctel'la, Zel.
Çelerel'la, Dgl.
Costel'la, Ste.
Macu'lēa, Ha.
Tricolōrel'la, Ha.
Leucomelanel'la, Zel.
Frāternel'la, Dgl.
Viscāriel'la, Lo.
Maculiferel'la, Mann.
Junctel'la, Dgl.
Viçīnel'la, Dgl.
Hüb'neri, Ha.
Marmor'ēa, Ha.

Instabilel'la, Dgl.
Atripliçel'la, F. v. R.
Obsolētel'la, F. v. R.
Oçellātel'la, Sta.
Littorel'la, Dgl.
Se'quax, Ha.
Aleēl'la, F.
Leucatel'la, L.
Al'biçeps, Zel.
Nānel'la, Hub.
Mouffetel'la, W. V.
Dōdeçel'la, L.
Triparel'la, Zel.
Tenebrel'la, Hub.
Tenebrōsel'la, F. v. R.
Ligulel'la, Zel.
Vortiçel'la, Zel.
Tæniolel'la, Tr.
Sircomel'la, Sta.
Immaculātel'la, Dgl.
Nigritel'la, Zel.
Corōnillel'la, Tis.
Anthyllidel'la, Hub.
Atrel'la, Ha.
Albipalpel'la, H. S.
Bifractel'la, Mann.
Suffūsel'la, Dgl.
Lūçidel'la, Ste.
Lutulentel'la, Zel.
Çerēālel'la, Ol.
Nigricostel'la, F. v. R.
Gemmel'la, L.
Næviferel'la, Zel.
Hermannel'la, F.
Pictel'la, Zel.
Brizel'la, Tis.
Eriçinel'la, Dup.
Subdecurtel'la, Sta.
Paupel'la, Zel.
Inōpel'la, Zel.
Suboçel'lēa, Ste.
PARAS'IA, Dup.
Lappel'la, L.
Metzneriel'la, Dgl.
Carlīnel'la, Dgl.
Neuropterel'la, F. v. R.
CLEODŌ'RA, Ste.
Çytisel'la, Cur.
Striātel'la, W. V.
CHĒLĀ'RIA, Ha.
Hübnerel'la, Don.
ANAR'SIA, Zel.
Spartiel'la, Sch.
Genis'tæ, Sta.
HYPSIL'OPHUS, Ste.
Fasçiel'lus, Hub.
Marginel'lus, F.
Juniperel'lus, L.
HAP'LOTA, Ste.
Palpel'la, Ha.
NŌ'THRIS, Sta.
Verbasçel'la, W. V.

Durdhamel'la, Sta.
SŌPHRŌ'NIA, Sta.
Parenthesel'la, L.
Humerel'la, Hub.
PLEU'ROTA, Sta.
Bicostel'la, L.
HARPEL'LA, Sch.
Geoffroyel'la, L.
Bractēel'la, L.
HYPERCAL'LIA, Ste.
Christiernīnāna, L.
DASY'ÇERA, Sta.
Sulphurel'la, F.
Olivierel'la, F.
ŒCOPH'ORA, Sta.
Minūtel'la, L.
Flāvimaculel'la, Sta.
Tripunc'ta, Ha.
Similel'la, Hub.
Augustel'la, Hub.
Woodiel'la, Cur.
Gran'dis, Desv.
Formōsel'la, W. V.
Lūnā'ris, Ha.
Lambdel'la, Don.
Subaquil'ēa, Edl.
Panzerel'la, Ste.
Tinctel'la, Tr.
Ūnitel'la, Hub.
Flāvifrontel'la, Hub.
Fusçes'çens, Ha.
Pseudosprētel'la, Sta.
ŒCOGEN'IA, Gu.
Quadripunc'ta, Ha.
EN'DROSIS, Sta.
Fenestrel'la, Sco.
BŪ'TALIS, Tr.
Grandipen'nis, Ha.
Fusco-æ'nēa, Ha.
Senes'çens, Sta.
Fuscocu'prea, Ha.
Çicādel'la, Zel.
Variel'la, Ste.
Chēnopodiel'la, Hub.
Torquātel'la, Lie.
Incongrüel'la, Sta.
PANCAL'IA, Sta.
Latreillel'la, Cur.
Lewenhoēkel'la, L.

GLYPHIPTERYGIDÆ, Sta.

ACROLEP'IA, Cur.
Perlepidel'la, Sta.
Grānitel'la, Tr.
Pygmæā'na, Ha.
Betulētel'la, Cur.
RÖSLERSTAM'MIA, Sta.
Erxlebenel'la, F.
Prōnubel'la, W. V.

GLYPHIP'TERYX, Sta.
Fuscoviridel'la, Ha.
Thrasōnel'la, Sco.
Cladicl'la, Sta.
Haworthā'na, Ste.
Equitel'la, Sco.
Schœnicolel'la, Boyd.
Oculātel'la, Zel.
Fisçheriel'la, Zel.
ÆCH'MIA, Sta.
Dentel'la, Zel.
PERIT'TIA, Sta.
Obscūrepunctel'la, Sta.
TINAG'MA, Dup.
Sēriçiel'lum, Ha.
Stanneël'lum, F. v. R.
Resplendel'lum, Dgl.
DOUGLAS'IA, Sta.
Ocnērostomel'la, Sta.

AR*G*YRESTHIIDÆ, Sta.

AR*G*YRES'THIA, Sta.
Ephippel'la, F.
Nitidel'la, F.
Purpurasçentel'la, Sta.
Sēmitestāçel'la, Cur.
Spīniel'la, Zel.
Albis'tria, Ha.
Conju*g*el'la, Zel.
Sēmifus'ca, Ha.
Mendī'ca, Ha.
Glauçinel'la, Zel.
Rētinel'la, Zel.
Abdōminā'lis, Zel.
Dīlectel'la, Zel.
Andereggiel'la, Dup.
Curvel'la, L.
Sorbiel'la, Tr.
Pygmæel'la, Hub.
Gœdartel'la, L.
Līterel'la, Ha.
Brochel'la, Hub.
Arçeu'thina, Zel.
Præcoçel'la, Zel.
Aurulentel'la, Zel.
Deçimel'la, Sta.
ÇĒDES'TIS, Sta.
Farīnatel'la, Dup.
Gysselinel'la, Dup.
OCNĒROS'TOMA, Zel.
Pīniariel'la, Zel.
ZELLER'IA, Sta.
Hēpariel'la, Mann.
Insignipennel'la, Sta.
Fasçiapennel'la, Lo.

GRAÇILĀRIIDÆ, Sta.

GRAÇILĀ'RIA, Zel.
Swederel'la, Scha.
Stigmatel'la, F.
Strāmineël'la, Sta.
Hēmidactylel'la, Hub.
Falcōnipennel'la, Hub.
Sēmifas'çia, Ha.
Pōpulētō'rum, Zel.
Ēlon*g*el'la, L.
Trin*g*ipennel'la, Zel.
Syrin*g*el'la, F.
Omissel'la, Dgl.
Phāsiānipennel'la, Hub.
Auroguttel'la, Ste.
Onō'nidis, Zel.
Imperiālel'la, Mann.
CORIS'ÇIUM, Zel.
Brongniartel'lum, F.
Cucūlipennellum, Hub.
Sulphurel'lum, Ha.
OR'NIX, Zel.
Avellānel'la, Sta.
Devoniel'la, Sta.
Angliçel'la, Sta.
Bet'ulæ, Sta.
Scutulātel'la, Sta.
Torquillel'la, Zel.
Scōtiçel'la, Sta.
Loganel'la, Sta.
Gut'tëa, Ha.

COLEOPHORIDÆ, Sta.

GŌNIODŌ'MA, Zel.
Auroguttel'la, F. v. R.
COLEOPH'ORA, Zel.
Fabriçiel'la, V.
Dēaurātel'la, Lie.
Alçyonipennel'la, Kol.
Frisçhel'la, L.
Pāripennel'la, F. v. R.
Wockeël'la, Zel.
Ō'chrëa, Ha.
Binotapennel'la, F. v. R.
Lixel'la, Zel.
Vībiçel'la, Hub.
Conspicüel'la, Mann.
Pyrrhulipennel'la, Tis.
Albicos'ta, Ha.
Vulnerā'riæ, Zel.
Anatipennel'la, Hub.
Palliātel'la, Zin.
Ībipennel'la, Hey.
Currūçipennel'la, F. v. R.
Niveïcostel'la, F. v. R.
Discordel'la, Zel.
*G*enis'tæ, Sta.
Saturātel'la, Sta.
Onosmel'la, Bra.
Inflā'tæ, Sta.
Therinel'la, Zel.
Trōglodytel'la, Zel.
Līneol'ëa, Ha.
Mūrīnipennel'la, F. v. R.
Squāmōsel'la, Sta.
Çæspititiel'la, Zel.
Annulātel'la, Nyl.
Salinel'la, Sta.
Apiçel'la, Sta.
Ar*g*en'tula, Zel.
Virgau'reæ, Sta.
Hēmerobiel'la, Sco.
Junçicolel'la, Sta.
Lariçel'la, Hub.
Albitarsel'la, Zel.
Nigriçel'la, Ste.
Fusçēdinel'la, Zel.
Orbitel'la, Zel.
Grȳphipennel'la, Bou.
Sicçifol'ia, Sta.
Vīminētel'la, Hey.
Vītisel'la, Greg.
Olivāçëel'la, Sta.
Sōlitāriel'la, Zel.
Lūtipennel'la, Zel.
Badiipennel'la, F. v. R.
Līmōsipennel'la, F. v. R.
Chalcogrammel'la, Zel.

ELACHIS'TIDÆ, Sta.

BEDEL'LIA, Sta.
Somnulentel'la, Zel.
STATHMOP'ODA, Zel.
Pedel'la, L.
COSMOP'TERYX, Sta.
Druriel'la, F.
Lienigiel'la, Zel.
BATRACHED'RA, Sta.
Præangus'ta, Ha.
Pīnicolel'la, Zel.
ŒNOPH'ILA, Ste.
V-flā'va, Ha.
CHAULIODUS, Tr.
Insecūrel'lus, Sta.
Illigerel'lus, Hub.
Chærophyllel'lus, Goe.
LAVER'NA, Sta.
Conturbātel'la, Hub.
Propinquel'la, Sta.
Lactëel'la, Ste.
Misçel'la, W. V.
Ste'phensī, Sta.
Epilobiel'la, Sch.
Ōchrāçëel'la, Cur.
Phragmītel'la, Bent.
Decōrel'la, Ste.
Subbistri*g*el'la, Ha.
Ā'tra, Ha.
Rhamniel'la, Zel.
Rasçhkiel'la, Tis.
CHRYSOCLYS'TA, Sta.
Linnëel'la, Clk.
Bimaculel'la, Ha.
Sçhrankel'la, Hub.
Flāvicap'ut, Ha.
HĒLIODĪ'NĒS, Sta.
Rœsel'la, L.

ANȲ'BIA, Sta.
Langiel'la, Hub.
ASYCH'NA, Sta.
Modestel'la, Dup.
Fuscoçiliel'la, Sta.
Ærātel'la, Zel.
Terminel'la, Da.
Profu*g*el'la, Zel.
CHRȲSO'CORYS, Cur.
Festaliel'la, Hub.
ANTISPĪ'LA, H. S.
Pfeifferel'la, Hub.
Treitsçhkiel'la, F. v. R.
STEPHEN'SIA, Sta.
Brünnichel'la, L.
ELACHIS'TA, Sta.
Gleichenel'la, F.
Magnifiçel'la, Teng.
Apiçipunctel'la, Sta.
Albifrontel'la, Hub.
Holdenel'la, Edl.
Ātricomel'la, Sta.
Flāvicomel'la, Sta.
Lūticomel'la, Zel.
Po'æ, Dgl.
Kilmunel'la, Sta.
Çinereopunctel'la, Ha.
Trapeziel'la, Sta.
Nigrel'la, Hub.
Gregsō'ni, Sta.
Stabilel'la, Sta.
Subnigrel'la, Dgl.
Perplexel'la, Sta.
Hu'milis, Zel.
Consortel'la, Lo.
Bedellel'la, Sir.
Obscūrel'la, Sta.
Zōnāriel'la, Teng.
Gangabel'la, F. v. R.
Tæniatel'la, Sta.
Çin*g*illel'la, F. v. R.
Oblīquel'la, Edl.
Megerlel'la, Sta.
Adsçītel'la, Sta.
Çērūssel'la, Hub.
Rhynchosporel'la, Sta.
Cā'ricis, Sta.
Eleochariel'la, Sta.
Biatomel'la, Sta.
Serricor'nis, Lo.
Triatom'ëa, Ha.
Triseriatel'la, Sta.
Suboçel'lëa, Ste.
Pollināriel'la, Zel.
Rūfoçiner'ëa, Ha.
Ōchrëel'la, Sta.
Çygnipennella, Hub.
TISÇHER'IA, Zel.
Complānel'la, Hub.
Mar*g*in'ëa, Ha.
Angusticollel'la, Hey.

LITHOCOLLĒ'TIDÆ, Sta.

LITHOCOLLĒ'TIS, Zel.
Rō'boris, Zel.
Hortel'la, F.
Amyotel'la, Dup.
Lantānel'la, Sch.
Triguttel'la, Sta.
Quinqueguttel'la, Sta.
Nigresçentel'la, Lo.
Irradiel'la, Scott.
Bremiel'la, Zel.
Lautel'la, Zel.
Vacçiniel'la, Scott.
Cavel'la, Zel.
Pōmifoliel'la, Zel.
Cor'ylī, Nic.
Spīnicolel'la, Kol.
Fā*g*inel'la, Mann.
Torminel'la, Frey.
Saliçicolel'la, Sir.
Vīminētō'rum, Sta.
Carpīnicolel'la, Sta.
Ulmifoliel'la, Hub.
Spinolel'la, Dup.
Querçifoliel'la, F. v. R.
Messāniel'la, Zel.
Corylifoliel'la, Ha.
Calēdoniel'la, Sta.
Vīminiel'la, Sir.
Scōpāriel'la, Tis.
Uliçicolel'la, Vau.
Alnifoliel'la, Hub.
Heegeriel'la, Zel.
Cramerel'la, F.
Tenel'la, Zel.
Sylvel'la, Ha.
Emberīzæpennel'la, Bo.
Frölichiel'la, Zel.
Dunningiel'la, Sta.
Niçel'liī, Zel.
Stettinen'sis, Nic.
Kleemannel'la, F.
Sçhreberel'la, F.
Tristri*g*el'la, Ha.
Trifasçiel'la, Ha.
Scabiōsel'la, Dgl.
Comparel'la, F. v. R.

LYONETIIDÆ, Sta.

LYONE'TIA, Hub.
Clerckel'la, L.
Padifoliel'la, Sta.
PHYLLOCNIS'TIS, Zel.
Suffūsel'la, Zel.
Salig'na, Zel.
ÇĒMIOS'TOMA, Zel.
Spartifoliel'la, Hub.
Laburnel'la, Hey.
Sçītel'la, Zel.
Wailesel'la, Sta.
Lōtel'la, Sta.
ŌPOS'TEGA, Zel.
Salāçiel'la, Tr.
Auritel'la, Hub.
Crepusculel'la, F. v. R.
BUCCULĀ'TRIX, Zel.
Aurimaculel'la, Sta.
Çidarel'la, Tis.
Ulmel'la, Mann.
Vetustel'la, Mann.
Cratæ'*g*ī, Zel.
Demaryel'la, Dup.
Marit'ima, Sta.
Boyerel'la, Dup.
Frangulel'la, Goe.
Hippocastanel'la, Dup.
Cristātel'la, F. v. R.

NEPTICULIDÆ, Sta.

NEPTIC'ULA, Zel.
Ātricapitel'la, Ha.
Pōmel'la, Vau.
Rūficapitel'la, Ha.
Anōmalel'la, Goe.
Pygmæel'la, Ha.
Oxyacanthel'la, Sta.
Visçerel'la, Dgl.
Cathartiçel'la, Sta.
Septembrel'la, Sta.
Cryptel'la, Frey.
Wea'verī, Dgl.
Intimel'la, Zel.
Headleyā'na, Sta.
Subbimaculel'la, Ha.
Ar*g*yropez'a, Zel.
Apiçel'la, Sta.
Trimaculel'la, Ha.
Quinquel'la, Bed.
Sēricopez'a, Zel.
Floslactel'la, Ha.
Sal'içis, Sta.
Myrtillel'la, Edl.
Microthēriel'la, Wing.
Potē'riī, Sta.
Betulic'ola, Sta.
Ignōbilel'la, Sta.
Ar*g*entipedel'la, Zel.
Açētō'sæ, Sta.
Pla*g*icolel'la, Sta.
Prūnētō'rum, Sta.
Tītyrel'la, Dgl.
Mālel'la, Sta.
Angulifasçiel'la, Sta.
Ātricol'lis, Sta.
Arcūā'ta, Frey.
Grātiōsel'la, Sta.
Mar*g*inicolel'la, Sta.
Alnētel'la, Sta.
Glūtinō'sæ, Sta.
Continüel'la, Sta.

Aurel'la, F.
Lūtëel'la, Sta.
Rēgiel'la, Frey.

TRIFUR'CULA, Zel.
Ātrifrontel'la, Sta.
Squāmātel'la, Sta.

Immundel'la, Zel.
Pulverōsel'la, Sta.

PTEROPHORĪ'NA.

ADAC'TYLA, Zel.
Bennet'ii, Cur.
PTEROPH'ORUS, Geof.
Rhododac'tylus, W. V.
Ōchrodac'tylus, Hub.
Similidac'tylus, Da.
Trigōnodac'tylus, Ha.
Zettersted'tii, Zel.
Acanthodac'tylus, Hub.
Punctidac'tylus, Ha.
Parvidac'tylus, Ha.

Hierā'çii, Zel.
Pilōsel'læ, Zel.
Phæodac'tylus, Hub.
Bipunctidac'tylus, Ste.
Plagiodac'tylus, F. v. R.
Loew'ii, Zel.
Fus'cus, Retz.
Lithodac'tylus, Tr.
Pterodac'tylus, L.
Lienigiā'nus, Zel.

Tephradac'tylus, Hub.
Ostëodac'tylus, Zel.
Mīcrodac'tylus, Hub.
Brachydac'tylus, Kol.
Galactodac'tylus, Hub.
Spīlodac'tylus, Cur.
Baliodac'tylus, F. v. R.
Tetradac'tylus, L.
Pentadac'tylus, L.
Palū'dum, Zel.

ALŪÇITĪ'NA.

ALŪ'ÇITA, L.
Polydac'tyla, Hub.

N.B. In p. 2, ORGYI'A is to be pronounced as if *Or-gwī'-a*.
In p. 9, ĪLĪTHYI'A is to be pronounced as if *I-li-thwī'-a*.

POSTSCRIPT.

Since the publication of the larger Work from which these names are reprinted, the 'Entomologist's Annual' has announced the discovery of some new species: their names we have printed in this List, which therefore contains some not to be found in our other Volume.

THE END.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.