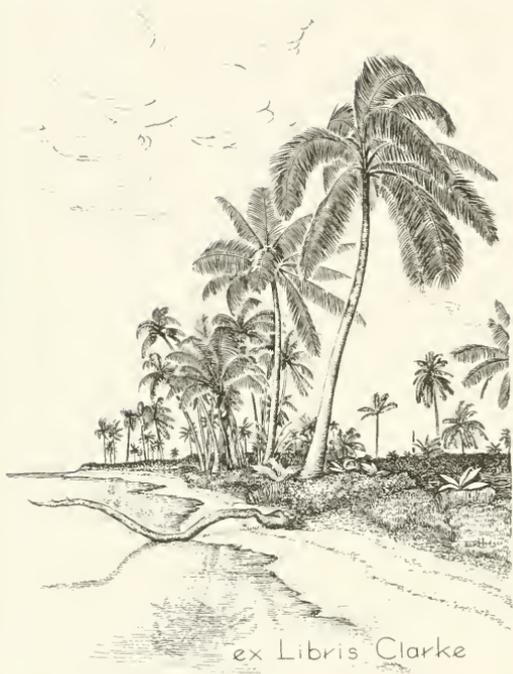


The
Genitalia
of the
Noctuidæ

By F. N. PIERCE, F. E. S.



ex Libris Clarke

To Prof. J. W. Gates Clarke
with compliments of
Henry Bird
and his entomological friend
who appreciates your good
work,

Geo. Zinica

THE GENITALIA OF THE
BRITISH NOCTUIDÆ

*“ He who never makes a mistake,
never makes anything.”*

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The Genitalia
of
The Group Noctuidæ
of the Lepidoptera
of the
British Islands.

AN ACCOUNT OF THE MORPHOLOGY
OF THE MALE CLASPING ORGANS.

BY
F. N. PIERCE, F.E.S.

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ILLUSTRATED BY F. N. PIERCE & H. BUTLER

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Plates by T. Chell, 22 Cable Street, Liverpool.



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PREFACE.

In these present days, when so much is known about the habits and life history of our *Noctuid* moths, there is little scope for a student to throw any new light on these subjects; hence we often find the more studious entomologists directing their attention, rather to the dry investigation of nomenclature, than to the deeper examination of the structure of the insects which they study. There are however still many students who ask for work rather than books and mere cabinet specimens. So work must be forthcoming or interest will flag. When I conceived the idea of working upon the male genital organs of the *Noctuid* group, I fondly hoped the investigations would settle finally most of the points in dispute amongst systematists. In this, as in other of our incipient thoughts we must be prepared for disappointments. There have been plenty of these, but so interesting was the work that when they occurred they only urged me on to a deeper insight into the marvellous anatomy of these organs. And even now, were it not for the earnest solicitations of my friends, and the duty I owe to entomologists of all ranks (who have so generously helped me with specimens, even to the extent of taking them out of the much prized series of their cabinets) to publish what I have already done, I fear the temptation to continue my already extensive preparations and examination of other groups, would be too strong to be withstood.

It is therefore not without misgivings that I am induced to record the results of 20 years spent in happy investigations, made in odd hours stolen from so busy a life that often weeks would elapse, before I could spare the time to continue my favourite pursuits, this coupled with the fact that I have suffered nearly every year with a distressing eye trouble, must be sufficient excuse for not falling in with my friends wishes earlier.

A mere accident drew my attention to these organs, and about the same time a question arose as to the identity of certain specimens of *Miana* taken in Ireland, which appeared to puzzle the savants of that time.

I made preparations of the several species of the genus, and had the satisfaction of being able to prove there are distinct and unalterable forms of genitalia to each species; so that any doubtful specimen could be at once determined by an examination of these parts. I then discovered that other investigators had already worked certain groups from a similar standpoint. I found that P. H. Gosse had published an illustrated monograph of the *Papilionidae* in the transactions of the Linnæan Society for 1883. This work which is beautifully illustrated, contains an account of the genital organs as seen in dried specimens, by the removal of one valve, (harpe), and certain parts were named. Unfortunately in several instances the drawings are quite incorrect, and the majority entirely misleading, owing to the most important structures being hidden by dessication. He also gives a short Bibliography of his subject. Dr. Buchanan White had previously, in 1876, published in the transactions of the same society, a paper on the genitalia of the European *Rhopalocera*. His figures which are very poor, show only the outline of the parts as seen by removing the scales. This is most unsatisfactory and gives no idea of the important internal structure. Scudder's work published about

1888, and in previous writings, treats of the parts in a similar way.

In 1889, Professor John B. Smith of New Jersey, U.S.A., in conjunction with Professor Riley and H. G. Dyar, commenced a series of monographs on the *Noctuidæ* of North America, in which he laid great stress on the value of the genitalia. These monographs are illustrated by rough outline drawings of one harpe and clasper only, of the various species. These figures were a step in the right direction, but were not carried out sufficiently, and appear to me, very much like illustrating a butterfly book with drawings of fore wings alone. It is evident that for scientific purposes the whole apparatus must be dealt with.

In the Transactions of the London Entomological Society for 1889, pp. 209, Dr. T. A. Chapman follows Professor Smith in an exhaustive article on the *Erebias*, and has also from time to time published notes on various species. None of these works seem to me to utilise to the fullest extent the information which may be gathered from the examination of the genitalia. The complete organs must be studied, for the reason that in different groups, certain particular parts form the chief distinguishing feature; often the harpes are so similar that reference must be made to the uncus; at other times it is the juxta that differs; generally the penis is a safe organ for differentiation.

Recognising the importance of this, I resolved to figure the whole apparatus, but never having been taught drawing and having no natural gift I at first secured the services of Mr. Henry Butler, a rising young artist, and endeavoured to help him to draw what I saw. His figures are signed with his initials. I drew the remaining figures myself, and have also gone over his, making them uniform with my own.

The drawings are all done to one scale. At one time I hoped photography would have aided their

delineation, but after photographing some two hundred preparations, I found that they were not suitable for my purpose. Firstly, owing to the great transparency, including both upper and under surfaces, which instead of elucidating the structure, simply bewildered and confused the picture. Secondly, on account of the great difficulty in getting the preparations exactly balanced. In drawing it was possible to exclude extraneous parts and rectify misplacements and so produce a figure, that would be much simpler and more correct for comparison.

I now regret that I did not include the penis in the figures, as it is often of the utmost importance in critical cases; but at first I did not estimate this organ at its true value, and the confusion produced by its central position, coupled with the extreme difficulty in getting anything like uniformity, owing to the softness of the structure and the difficulty of extroverting the eversible parts, has made me feel that a short description is even better than a drawing, which as often as not, might be misleading.

I have adopted the scheme of placing the name of the species beside each drawing. This deviation from the ordinary numbering of the figures (which necessitates having to turn to another page for an explanation) will I am sure be appreciated as an important saving of time.

For supply of specimens, both local and rare. I wish to express my warmest thanks to our British Lepidopterists all over the country, without whose help I could never have got the work to its present complete state, and I wish here to place on record my grateful thanks to my old and valued friend Samuel James Capper, the veteran and life long president of the Lancashire and Cheshire Entomological Society, and not less to E. R. Bankes, G. T. Porritt, W. G. Sheldon, Louis B. Prout, Dr. T. A. Chapman, J. W. Tutt,

E. C. Stott, R. South, A. Bacot, William Mansbridge, Charles H. Walker, Dr. William Bell, The Rev. C. R. N. Burrows, H. M. Edelsten, A. Robinson, Herbert Massey, J. A. Simes, W. Mounfield, Dr. Cotton.

Whilst to others who have rendered me noble assistance, my thanks come too late. For years that queen of entomologists Mrs. Emma Sarah Hutchinson, put aside for me spoiled specimens of rarities she was breeding, thus helping to spare my feelings in having to sacrifice cabinet specimens. The late John E. Robson that kindest of entomologists, who placed his entire cabinet at my disposal. The late Charles G. Barrett, J. A. Clark, Dr. Philip Mason, the Rev. Joseph Green, and my companions in field work George A. Harker and Rathbone Hughes. Alas! They are no more.

I also particularly wish to acknowledge my debt of gratitude to my friend the Rev. C. R. N. Burrows, whose love of accuracy has so greatly helped me in the production of the letter press. His unwearying care in correcting the proof sheets, and his many suggestions for elucidating difficult passages, have proved him to be a valuable friend, especially to one who for so many years worked entirely alone.

F. N. PIERCE.

THE ELMS,
DINGLE,
LIVERPOOL.

4th January, 1909.

INTRODUCTION.

Before entering upon the descriptive part of the work, it will be necessary to make some preliminary observations, in order that those who have not worked at this branch of entomology may be able to follow the points touched upon.

The organs constitute the last abdominal segments of the insect, and are generally withdrawn into the preceding segment, and hidden by an abundance of scales and hairs, either on the last segment of the body or on the organs themselves. Reference to various writers shows that the segmentation of the body is still unsettled. This is mainly owing to the author's speaking of a certain segment, without describing its position ; I have therefore thought it wise to definitely state the plan I have followed. The body consists of a head, three thoracic segments, eight abdominal segments, which may have 6, 7 or 8 true spiracles, and the genitalia. I treat these as a whole, notwithstanding the opinion of some authorities that a division can be discovered. Without throwing doubt upon their investigations, I consider it unnecessary to discuss the matter, being unable to locate a definite segmentation, and finding the matter unimportant from the point of view from which I am describing the organs in this work.

MANIPULATION.

In order to obtain a comprehensive view, the organs must be extruded, and made transparent, this is very simple. Having removed the body near the thorax, it is soaked in a 10 per cent. solution of Caustic potash, for about 24 hours to 2 or 3 days, according to the size and nature of the body. Or it may be boiled in a test tube, for a short time in the same solution, which is a quicker method. When it is quite soft, it is taken out and placed in a shallow dish of water. The body is then gently tapped with a small bent spatula or a brush, when the parts will fly out. If a little pressure be now put on the junction of the harpes, they will separate, exposing the interior with all the parts beautifully displayed. The Alkali must then be carefully washed out of the preparation, which should next be slid on to a glass slip, arranged with needles, and covered with a small piece of glass, (I generally use a 3 x 1 inch slip cut into 3, i.e., one inch square), which gives about the right amount of pressure. A small quantity of Absolute Alcohol should now be allowed to flow in to remove the water; after dehydrating for about half an hour, Oil of cloves must be run in from one side, and allowed to soak in until the parts are clear and free from air bubbles. The object is then ready for mounting. This can be easily done by placing a couple of drops of Canada balsam in benzole, slightly spread on a clean slip to fit the cover glass. The preparation should now be gently lowered into the Balsam, *right way up*; the cover glass placed over, and the slide put aside to dry.

I find it better not to hurry the drying, and patience pays well at this stage.

Should the mount be very thick, a cavity slip should be used. I do not recommend the use of clips, though in very tough species, they are useful if carefully applied to the edges of the cover glass.

I lay great stress on having the mounts right way up, and uniform. In the examination of a number of slides this will be found a great time saver, and productive of an easy conscience, no matter how many slides are to be examined.

The labels also should be so uniformly placed, that the name can be read without difficulty, whilst the slide is on the stage of the microscope. The importance of this will be felt when comparing a number of slides.

STAINING.

Besides improving the look of the mount, staining is useful in bringing up details in transparent parts, that might otherwise be difficult to see. If Carbol fuscine, or Carbol Methyl Blue be added to the Alcohol used for dehydration, the tissues and chitine will be stained red or green.

When this is done the preparation must not be left too long in oil of cloves, and it will be necessary to immerse it for a few minutes in spirits of turpentine, before placing it in the Balsam.

DRY MANIPULATION.

When an examination is necessary without destroying the specimen, it may often be accomplished by inserting into the genital cavity a drop of wood naphtha, by means of a camels hair brush; in a few moments the harpes will be sufficiently relaxed, to allow the insertion of the points of fine tweezers, the spring of which will force the harpes apart, and allow a close examination with a Coddington lens.

The harpes may afterwards be gently pinched together without damage to the specimen.

This method will be found especially useful in the *Hydræcias*, *Nonagria neurica* and *arundineta*, and any species where a rough and ready examination is

needed. The females should be held by the pin head between the thumb and first finger, with the body resting on the second finger. It should then be brushed with a short stiff brush on the ventral surface, which will expose the lodix and genital plate, which can then be easily examined with a lens.

NOMENCLATURE AND DESCRIPTIONS.

It has been found necessary to construct, as far as possible, a typical set of organs giving to each a distinctive name. This so far has never been done. Various writers having used various terms for the parts. These I have endeavoured to make use of, adding thereto names for those parts that I believe to be undescribed. It must be understood that in the descriptions following, the specimens are examined from beneath, with the uncus at the top.

MALE.

The ninth abdominal segment consists of **The Tegumen**, the base of which rests on the plane of the ventral surface of the abdomen, the upper part curving anally, until it lies longitudinally in the plane of the dorsal surface. It is a flattened sac of thin chitine, enclosed in a stronger ring, the dorsal point of which is called **The Uncus**, and the basal portion **The Vinculum**. This ring is sometimes articulated, in the middle laterally, enabling the uncus half to be thrown backward towards the head.

The Uncus, present in all the *Noctuidæ*, is of hardened chitine and occupies in this group the central upper part of the tegumen. It varies considerably in shape, and may be a single hook, bifurcate or trifurcate or even bifid or trifid. When divided to the base, the side portions will sometimes travel to wide distances apart, upon the edge of the tegumen. However widely

the side pieces are separated, they are still to be treated as forming the uncus. The central hook of the uncus may be

Simple,
Sickleform,
Cygnated,
Tongue shaped,
Diamond form,
Spatulate,
Mandibulate.

It is doubtful what is the exact use of the uncus; generally it is presumed to grasp the female dorsally. It has also been suggested that it is thrown back and acts as a guide, sometimes fitting between the lobes of the ovipositor of the female.

On either side of the tegumen laterally, in the vicinity of the articulation is a lobed process, densely clothed with hairs which I call **The Peniculus**; and which appears to act as a brush to the penis. The basal portion of the ring of the tegumen, which I have called **The Vinculum**, varies considerably in form, being generally pointed ventrally; the point being sometimes enormously extended (e.g. *Apatura iris*). Below the articulation of the tegumen, are hinged, on either side the two large wing like processes which form **The Harpes**. For convenience I have divided these into three portions, upper, lower and central, although the divisions are sometimes difficult to define. The upper part, which I have called **The Cucullus** is sometimes divided, i.e., plainly differentiated from the central portion by a fold or groove. The Cucullus may be

Peaked,
Bifurcate,
Trigonate,
Battledore shaped.

The upper edge is called **The Margin**, to which is often attached a uniform row of incurved spines, which I call **The Corona**, there are also attached to the edge of the harpe long spines which I term **Marginal Spines**. The outer margin of the cucullus, where the division usually occurs is called **The Anal Angle** and is sometimes armed with a large **Anal Spine**. Where the division is not evident, this position is sometimes occupied by a projecting column or thumb, which I call **The Pollex**. The upper inner angle is sometimes produced to a point, and occasionally below this, proceeding from the skin, on the inner side of the cucullus, is another small papilla called **The Digitus**.

The lower portion of the harpe I term **The Sacculus**. This invests the base of the harpe, and is free along the costal edge. It is attached to the outer margin of the harpe, but is sometimes extended into a free arm, almost to the extremity of the harpe. From within the base of the costa of the sacculus, arises a small organ which I have termed **The Clavus**, which may be rounded, produced, peaked or brush form.

The central area of the harpe is occupied by a complicated series of organs, which practically vary in every species and afford a great help in differentiation. For convenience sake they may be divided into **The Clasper and Ampulla**. The Clasper which arises toward the outer side and is generally a free arm, produced from a peculiarly curved base, by which it may frequently be recognised. Sometimes it is foot shaped, as in the *Noctua*, in which case the terms, toe, heel, &c., indicate the parts spoken of; or it may be a simple swelling, entirely attached to the skin, when it is spoken of as, not free. On the inner side of the central area is **The Ampulla**, a process arising direct from the skin. It is a very variable organ and difficult to locate. It is often a small papilla, sometimes only a wart, at other

times a long shaft extending beyond the cucullus, or it may be only a flap on the skin. Below the ampulla, on the costal side, is often a small finely spined prominence called **The Editum**.

At the base of the uncus, on the inner surface of the tegumen, is an opening through which passes, a thin transparent tube which is **The Anus**. Attached to the anus on the upper surface, is a process only present in some of the *Noctuidæ* which is **The Scaphium** (of Gosse). This is well worth further study. There is often another process somewhat similar, attached beneath the Anus, which I propose to call **The Subscaphium**. These organs are sometimes united, forming a tube, through which the anus passes.

My friend, The Rev. C. R. N. Burrows and I, have examined these organs most carefully and have come to the conclusion, that they are only an armature of the Anus.

Beneath the anal aperture, and attached to the same articulation as the harpes, is a band like sheath, through which the penis is protruded, this I have previously called **The Juxta**. Although sometimes only a transparent tube, it is often decorated with a shield-like plate in front, which may extend right round the band until it becomes a really complicated organ (vide *Tæniocampa gothica*).

The **Penis** itself is a tube of varying length and width, bulbed at the base. The outside covering is called **The Ædœagus**, and consists of a stout tube, with an opening in the side near the base (which receives the seminal duct), and contains the eversible, balloon-like, membrane **The Vesica**. This is attached to the irregular edge of the orifice of the ædœagus. This vesica is of the most delicate texture and can only be examined when extruded, it is usually furnished with

one or more strong spines, which for descriptive purposes I have termed **Cornuti**. This armature of the vesica may be represented by a bulbed cornutus, a short bulbed cornutus, a spicule, a band of teeth, or a comb of teeth.

The orifice of the *Ædœagus* may be hooked, scobinated, dentated or crested.

FEMALE.

It may be thought with such elaborate organs for clasping, that corresponding features would be found to exist on the exterior of the female abdomen. This is not entirely so, indeed so far as known to me at present, with a few notable exceptions, the external organs are :

The Lodix (coverlet). The central plate upon the anal edge of the lower surface of the 7th abdominal segment, and which covers the genital plate.

The Genital Plate, a strongly chitinous plate varying in different species, leading to the genital tube.

The Ovipositor, a segmented tube of varying length bearing a lateral pair of lobes, which is usually withdrawn within the body cavity.

In cases where there is a specialised complicated structure in this sex, there is little doubt the mechanism is specially adapted for oviposition, and not for copulation. (Vide *Nonagria cannæ* and *Calymnia pyralina*).

Recent investigations tend to show that some variation exists in the internal female organs, especially among the *Geometræ*; Copulation takes place by the insertion of the penis into the genital tube.

I have found it necessary to make use of certain adjectives in the descriptions, which will convey a definite meaning to various ornamentations of the chitine.

- Spinöse ; clothed with spines.
- Hairy ; clothed with hairs.
- Scobinated ; with rasp like teeth.
- Squamous ; scaled.
- Dentated ; teeth larger than scobinations.
- Crested ; edged with large teeth.
- Serrated ; edged with small teeth.

CLASSIFICATION.

It may be taken as an axiom that no single stage or organ can be used exclusively for the purpose of classification of the Lepidoptera. Any attempt at this must fail entirely. But it cannot be denied that the genitalia are most important features in many cases.

Certain genera can often be distinguished by the general uniformity of the organs, some genera assuming so distinct a pattern, and the individuals included, running so close, that only minute differences separate them into species. Others are superficially so very different, that they can only with difficulty be connected into genera.

Occasionally in a long run of species there will be a sudden divergence, and were it not for the accepted relationship, combined with the study of the larvæ, ova, &c. ; it would be impossible to imagine them to belong to the same genus.

It will therefore be seen, that great care must be taken that a divergent species is not separated from a natural genus. In this work classification is largely based on the genital organs. It is not however put forward as the only true system, but that the student may use it in his studies from this particular standpoint.

VALUE.

It will be necessary to give some idea of the value of the genital characters. In his great work "The

Noctuidæ of Temperate North America," Professor John B. Smith says:—

"The study of the primary sexual characters is one of the most valuable guides in the recognition of species. The structures are within my experience absolutely invariable within specific limits; and species otherwise closely allied are sometimes well separated by these characters. They have proved invaluable in settling questions of identity of American and European forms so closely allied as to be considered races, and in several instances they have proved the identity or distinctness of species when superficial characters left it in doubt. It has removed individual judgment as a factor in many cases, and allows a final appeal in cases of difference."

These remarks are obvious from our investigations in recent years of the genus *Miana*; the genus *Oporabia*; the specific distinction of *Coremia ferrugata* and *C. unidentaria*; of *Retinea buoliana* and *R. pinicolana*, and of new species added to our British list, or even to Science, *Zygæna achillæa*; *Hydræcia crinanensis*; *H. lucens* and *H. paludis*; *Cidaria concinnata*; *Nonagria edlesteni*; *N. neurica* and *N. arundineta*. The recognition of all of which is mainly due to examination of the genitalia.

When I first took up the work, one of the great difficulties was to convince entomologists that species did not differ inter se, or alter with drying. This is generally accepted now, and it would be useless entering into the arguments brought forward to lessen the value of my observations, all of which were found to be groundless. At the same time it must not be taken for granted that there is no variation in the organs. To a certain extent there must always be some. Dr. T. A. Chapman in a plate in the "Entomologist," vol. XL. (1907) May, shows several slight variations in *Acronycta tridens*, some of which may be errors in interpretation. Generally, however, the organs are remarkably constant.

ASYMMETRY.

But in certain species the organs of the genitalia are never symmetrical, and where this asymmetry occurs it is as far as I know also constant. I have found this want of symmetry in the harpes and their armature, in the juxta, and in the vinculum. Dr. T. A. Chapman records it also in the penis, (Trans London Entomological Society, Part IV., 1902), but for my own part I fail to see how a single organ, especially when it is cylindrical and curved, can be spoken of as asymmetrical.

It is a noticeable fact that this want of symmetry appears to affect particular genera, and even groups.

MATERIAL USED.

Where I had no reason to doubt a species, I have made the drawing from a single specimen, but in the majority of cases two or more specimens have been examined for verification; and in the case of the *Hydræcia nictitans* group close on 100 examples were prepared, before satisfactory evidence could be produced of the existence of several species, amongst insects which had previously been popularly considered one; confirming Mr. Tutt's suggestions of 20 years ago.

Care must be taken that the correct bodies are on the specimens before they are prepared. It is a common failing with collectors, rather than have a specimen in their cabinet without a body, to glue on the body of any species that first comes to hand. I need hardly say that, to the genitalia worker, this is productive of much unhappiness. It is also well to examine the frenulum for the sex, before detaching the insect's body.

AS MICROSCOPICAL OBJECTS.

The examination of these parts is most interesting and often at times exciting. The marvellous variety

and the extraordinary beauty of the minutest parts, far surpassing many of the more popular microscopical studies, especially when a little stain is used.

PENCILS OF HAIR.

Before proceeding to the descriptions of the various species I should like to call attention to the hair pencils possessed by many of the male *Noctuidæ*, which appear to be almost unknown.

These beautiful tufts are often in close proximity to the genital organs, but generally upon one of the earliest abdominal segments. The usual construction put upon them is that they are scent distributors.

In the face of the wonderful power possessed by so many Lepidoptera of assembling, one would expect to find these scent organs in the female, and used to attract a partner, as is customary in nature, instead of which we find the sombre, and often portly dame credited with chasing after the elegant, dandy, love sick swain, attracted by the scent he distributes!

That the male does in some species possess scent organs I cannot doubt, as it was unquestionably proved by my old friend John E. Robson, who imprisoned males of the genus *Hepialus* in a chip box, and found on opening, that it was impregnated with a distinct odour, strongly resembling pine apple. My own experience with *H. humuli* was, that the odour in this case resembled violet powder, and a friend who was with me, at the time I made the observation, suggested heliotrope.

But then the colouring of the sexes, and the observations made in pairing, prove that in this species at any rate, the female is attracted to the male, not only by the scent, but also by its brilliant white wings, whilst it pendulates in the summer twilight, forming a conspicuous object to perhaps, the none too sensitive vision of its future spouse.

In the case of *H. hectus*, another species in which the male attracts the female, the scent distributors are understood to be on the hind leg, the tibia of which has no terminal joints, but is round like a bladder. This species does not possess hair pencils.

These pencils are situated at either side of the ventral surface of one of the earliest segments of the insects body. There is a large base, from which the pencils spring; the hairs are generally about half as long as the body, the basal portion being agglutinated together, they then spread out into an expanded tuft. As a rule they are invisible to the eye, being cunningly concealed in two long lobed pockets. In fresh specimens these hairs can easily be withdrawn by the aid of a pin. Whether the moth has power to replace them I am unable to say. But as we rarely capture a specimen with them extended we can only conclude—

1. That they can be replaced, or
2. That they are seldom used, or
3. That they fulfil their functions in their natural position within the pockets.

They are of no generic value. In the undoubted genus *Hydræcia*, *nictitans* does not possess them and the others do, and also *Nonagria arundineta* does not possess them and *neurica*; *edelsteni* does.

Where, in the course of my dissections I have come across them I have recorded the fact of their presence or absence. Where this is not stated the species still require examination.

NOMENCLATURE.

I have adopted the specific names generally used by British Lepidopterists, and have also added the name used by Richard South in his "Entomologist List"; merely for identification purposes, leaving the question of priority and synonymy for abler hands than mine.

Classification of the Noctuidæ based on the Structure of the male Genitalia.

The **Cymatophoridæ** are a very distinct group of the Heterocera. They are at once distinguished from the *Noctuidæ* by the fact that the uncus is trifurcate. The present grouping is fairly correct.

Thyatira derasa.

Harpes simple without armature; the sacculus forming a projecting hook on the outer margin; uncus trifurcate; vesica with a mass of teeth.

Batis. From John Gardner. Pencils present. Harpes shorter than preceding species; sacculus projecting from the outer margin; uncus trifurcate.

The **Cymatophoras** are by no means as easy to determine. First I should place as being a near approach to *Thyatira*; *diluta*, having simple harpes, with the sacculus produced; *fluctuosa* has also the sacculus strongly marked; *ocularis* and *or*, having a distinct form of uncus, seem almost to require a separate genus; *duplaris* again has such a distinct form of uncus, and harpe, that it must also be separated from the *Cymatophoras*, and could be easily included in the same genus as *coryli*, to which on account of the similarity of the uncus it is evidently closely allied.

Cymatophora diluta. From R. Hughes.

Harpes simple; sacculus ending in hook set with scobinated teeth; uncus trifurcate; ædœagus dentated, and divided at the tip; vesica simple; juxta composed of two antler like processes scobinated.

Fluctuosa. From John E. Robson. Pencils absent. Harpes peaked; sacculus terminating in small teeth with a scobinated process nearer the base; uncus trifurcate.

Or. From S. J. Capper.

Harpes rounded, simple; sacculus slightly produced with papilla nearer the base; uncus trifurcate, the downward and upward curve of the lateral prongs seeming to suggest a pincer like arrangement; vesica with small cornutus; ædœagus with wide mouth.

Ocularis; octogesima. From Eustace Banks. Pencils absent.

Harpes rounded, simple; sacculus with papilla; uncus trifurcate strongly mandibulate; vesica with small scobinations; ædœagus with wide mouth. The juxta of this, as in the preceding species, *or*, appears to be connected with the harpes.

Cross pairing here should not be difficult, and was accomplished by W. H. B. Fletcher, vide "Entomologist." vol. xxvi (1893), p.p. 329.

Duplaris.

Harpe rounded with thick curved costal edge; cucullus is divided, below the division is a row of strong teeth; the sacculus terminates in a bunch of long strong teeth; uncus is trifurcate, having a dentated subscaphium; vesica simple.

Demas coryli.

Harpe rounded; clasper indicated by papilla; uncus trifurcate, the lateral pieces wide apart; vesica with two masses of teeth; juxta curled, squamous behind, the upper part set with a dentated process of long teeth at either side.

Asphalia flavicornis. From Dr. J. Cotton.

Harpes peaked; sacculus is produced into a sucker-like process; the uncus almost defies description, arising from a blunt central base, are two stout columns, each of which terminate in three short arms, the inner pair being finely

scobinated, the outer pair terminating in a sharply emarginate hook, the hinder pair are broad and rounded. The Columns are united to the tegumen by a buttress, which opens out into an ovate lobe; the vesica has a strong spicule.

Ridens. From C. H. Walker.

The Harpe is peaked; the clasper is more developed and becomes a straight column; in the centre of the sacculus is a large flap, similar to that found on several of the *Cymatophora*; the uncus is bifurcate, and appears to work laterally; there is also an indication of a scaphium; the *Ædœagus* terminates in two strong hooks of uneven length, curved inwards; the vesica has a small scobinated process.

The **Noctuidæ** now start with a long run, in which the uncus consists of a single hook, with the exception of two species, *Xanthia silago* and *Miselia oxyacanthæ*, in which it is bifurcate.

The **Bryophilidæ** are strongly generic.

Bryophila glandifera; muralis. From C. H. Walker.

The harpes are rounded, widening at the apex; the clasper consists of an elbowed hook; the uncus is tongue shaped; the vesica has a strong cornutus.

Impar. Pencils absent.

The harpes are rounded, wider at the apex; clasper an elbowed hook; uncus tongue shaped; vesica has a large and small cornutus.

Perla. From George Harker. Pencils absent.

Harpe rounded not wider at the apex; clasper a column; uncus tongue shaped; vesica with scobinated process.

Moma orion.

Harpe rounded emarginate at the anal angle, producing a pollex; clasper broad at the base tapers to a point; uncus simple with curved point; vesica with small bunch of cornuti, and rosette of short teeth.

The **Acronyctas** have been so fully written upon by Professor J. B. Smith, and Dr. T. A. Chapman, that it would be presumptuous on my part to appear to suggest any criticisms on the work of these specialists in the group. I shall content myself with merely treating them from a genitalia standpoint.

As a whole the group are closely generic, with the exception of *megacephala* and *ligustri*. *Ligustri* evidently belongs to a separate genus, *megacephala* is entirely different, and I should be inclined to make a separate genus for it, were it not for the fact that Dr. Chapman considers in other respects it belongs here. We are therefore bound to conclude that it is a strong example of one of those curious sports that will be met with throughout the order Lepidoptera.

Taking *rumicis* as the type *venosa*, *leporina* and *aceris* all run closely into it; note should here be made of the curious little peduncle described by Prof. Smith, on the apex of the harpe, in the American species *albovenosa*, which does not occur in our British species *venosa*.

The next group including *myricæ*, *strigosa*, *auricoma*, *menyanthidis*, *alni* and *psi*, have the clasper bifurcate in various forms; that of *tridens* as its name suggests being in the form of a trident.

Acronycta rumicis.

Harpe rounded; clasper a long arm; uncus tongue shaped; vesica with large scobinated processes and band of teeth.

Venosa. From Dr. Chapman. Pencils absent. Harpes rounded; clasper a long arm; uncus simple; vesica has a scobinated process. In *albovenosa* the vesica has, besides a scobinated process, six long bulbed cornuti.

Leporina. From Dr. Chapman.

Harpes rounded; clasper a long arm; uncus deep and curved, ending in a hook; vesica with bunch of cornuti.

Aceris. From S. J. Capper.

Harpe broad; clasper with long hook; uncus is very large and cygnated, with long neck; vesica with long band of strong cornuti.

Myricæ. From J. W. Tutt.

Harpe rounded; clasper reaches nearly to the apex of the harpe and is bifurcate; uncus short and blunt; vesica has a short band of strong cornuti.

Strigosa. From Dr. Chapman.

Harpe rounded; clasper bifurcate, the outer hook prolonged and ending in a sharp point; uncus is slender and simple; vesica has a thick bunch of long cornuti.

Auricoma. From John E. Robson.

Harpe rounded; clasper bifurcate, the inner hook long; uncus cygnated; vesica with several short cornuti.

Menyanthidis. From S. J. Capper.

Harpe rounded; clasper bifurcate, the arms being of equal length, the inner one terminating in a pointed hook; uncus is tongue shaped; vesica has a bunch of strong bulbed cornuti.

Alni. From Dr. Chapman.

Harpe rounded; clasper bifurcate with an indication of further division of the outer arm; the inner arm is very long and curved; below the base is a well marked editum; uncus is simple; vesica has a number of small bulbed cornuti.

Tridens. From Dr. Chapman.

Harpe rounded; clasper trifurcate; uncus long and simple; vesica has a large bunch of short stout cornuti hardly bulbed; the juxta is broad and strongly scobinated.

Psi.

Pencils absent.

Harpe rounded; clasper bifurcate the outer arm being rudimentary and rounded; uncus simple; vesica with a large bunch of strong stout teeth; juxta large, the scobination being only on the upper portion.

Megacephala.

Harpe deeply emarginate on the outer edge of the cucullus, forming a strong curved hook; clasper a single curved arm; uncus simple; the vesica has a large bunch of long and short cornuti.

Ligustri.

Harpe rounded, quite simple, with a fold arising from the sacculus; there are no claspers; uncus cygnated, with a long scaphium; vesica has a mass of small cornuti.

The Genus **Leucania** is a most unnatural sequence to the *Acronyctas*. After throwing out *brevilinea*, which evidently belongs more to the *Hydræcias*, the *Leucanias* separate naturally into two distinct divisions; those with the rounded battledore harpes, and strong corona; and those in which the harpes are not battledore, and only have marginal spines. Of the first division we may take *turca* as a type, we have in order *pallens*, *favicolor*, *lithargyria*, *littoralis*, *vitellina*, *pudorina*, *albipuncta*, and *L-album*. *Conigera*, *impura*, and *straminea* are separated from the foregoing by the pointed apex of the harpe, whilst *extranea* takes the most exaggerated form, the pointed apex forming a strong spine, whilst the lower portion of the harpe bulges out enormously.

The second group is composed of *putrescens*, *comma*, and *obsoleta*, keeping *flammea*, which appears to closely follow this second group, in its separate genus *Meliana*.

Turca. From S. J. Capper.

Harpe battledore, several rows of spines on the cucullus; clasper long; ampulla sickle shaped; uncus tongue shaped; the vesica has long band of short teeth.

Pallens.

Harpe battledore, with spinose cucullus; clasper with elbowed arm; ampulla curved; uncus cygnated; vesica with long band of short teeth ending in a mass of larger ones.

Favicolor. From Gervase Mathew, (his original type specimen).

Harpe battledore; cucullus strongly spinose; clasper with elbowed arm; ampulla curved; uncus cygnated; vesica with long band of short teeth ending in mass of larger ones.

I can see no difference in the form of the genitalia of this and *pallens*, except that *favicolor* is larger.

Lithargyria. Pencils present and central tufts of black hair.

Harpe battledore; cucullus with heavy spines; the clasper protrudes and is curved; ampulla curved; clavus rounded; uncus tapered; vesica with single cornutus.

Littoralis. Pencils present and central tufts of black hair.

Harpe battledore; cucullus spinose; clasper protrudes, the arm being bulged; ampulla curved; uncus tapered; vesica without cornutus.

Vitellina. From E. R. Bankes. Pencils sparse.

Harpes battledore; cucullus spinose; clasper with blunt head; ampulla curved and pointed; clavus a small round knob; uncus tapered; vesica with long band of short teeth and single cornutus.

Pudorina; impudens.

Harpe battledore; cucullus with fine spines; clasper a short arm; ampulla curved; uncus cygnated; vesica with long band of teeth and single cornutus.

Albipuncta. From E. R. Bankes. Pencils present and in addition has a large bunch of black hair. Harpes battledore; cucullus spinose; clasper short with rounded head; ampulla curved; clavus produced to a bent column, the upper and inner surfaces of which are finely scobinated; uncus tapered.

L-Album. From L. B. Prout Pencils present, besides bunch of black hair.

Harpe battledore; cucullus almost covered with rows of strong spines; the clasper short; ampulla curved; uncus tapered.

Conigera.

Harpe battledore; cucullus with obtuse apex, almost pointed, spinose; clasper long; ampulla curved; clavus small and outcurved to a point; uncus cygnated and elbowed; vesica with long band of shortish teeth.

Impura. From S. J. Capper.

Harpe battledore, apex of cucullus produced to a small sharp point, spinose; clasper curved; ampulla curved; clavus sharply incurved to a point; uncus tapered; vesica with long band of very short teeth and bunch of larger teeth.

Straminea.

Pencils sparse.

Harpe battledore; cucullus sharply pointed at the apex, spinose; near the centre of the cucullus is a curious fold; clasper curved, widest at the top and truncated; ampulla curved; clavus peaked and strong; uncus tapered; vesica has long band of short teeth.

Extranea.

Pencils present.

Harpe battledore; apex of cucullus ending in a long point, thickly spinose; the lower part of the harpe below the waist is produced into a long lobe; clasper very small, as is also the ampulla; uncus tongue-shaped; vesica with broad band of large teeth, dwindling down to quite small ones.

Putrescens.

Harpe divided at the base of the cucullus; corona absent, nor is there any spinose clothing, but the edge of the cucullus has long straight marginal spines; clasper long, bulbed at the tip; ampulla curved; clavus bulbed; uncus cygnated; vesica has a long band of shortish teeth and one long cornutus.

Comma.

Harpe has the cucullus long and narrower than the preceding species; clasper is very long; ampulla stout, narrowing quickly to a point; clavus slightly bulbed; uncus cygnated; vesica with a long wide band of longish teeth, and one long cornutus.

Obsoleta. From Eustace Bankes. Pencils present.

Harpe with cucullus longer than preceding species; clasper shortish and pointed; ampulla curved; clavus hardly produced and scobinated; vesica with band of longish teeth and one very long strong cornutus.

For the purpose of comparison, the following two lists of the *Leucanidae* are given from Staudinger and Barrett, with the distinguishing mark "x" for the first division with the rounded cucullus, those marked "o" have the pointed cucullus, and those marked "†" for the three species that are quite separate, but which are at present intruded between closely connected species. Staudinger still continues to include *brevilinea* and *phragmitidis* which obviously do not belong here.

Staudinger.

Conigera o
 Vitellina x
 Turca x
 Lithargyria x
 L-Album x
 Loreli ?
 Albipuncta x
 Obsoleta †
 Putrescens †
 Brevilinea
 Littoralis x
 Pudorina x
 Comma †
 Straminea o
 Impura o
 Pallens x
 Favicolor x
 Phragmitidis

Barrett.

Pudorina x
 Impura o
 Pallens x
 Favicolor x
 Straminea o
 Obsoleta †
 Putrescens †
 Comma †
 L-Album x
 Littoralis x
 Loreyi ?
 Extranea o
 Vitellina x
 Conigera o
 Albipuncta x
 Lithargyria x
 Turca x

Meliana flammea. Appears to be an off-shoot of the second group of *Leucanias*.

Harpe with cucullus divided, without corona, but with marginal spines; clasper a trident, in which the inner prong is a club, the middle one a spear, and the outer one a scythe; clavus angulated; uncus tapered; vesica with band of short teeth and two long cornuti.

Synia musculosa, should certainly not precede the *Leucanias* with which it has nothing in common. Barrett places it among the *Tapinostolas*; this might easily be if the *Tapinostolas* were made to include several of the *Nonagrias* and also (*Miana*) *arcuosa* and *expolita* which undoubtedly belong to this group; and possibly the remainder of the *Mianas*. From a genitalia point of view, I suggest the following alteration, as being nearer to true relationship, at the same time admitting that the grouping is distinctly difficult, mostly leading directly or indirectly to the *Hydræcias*,

Nonagria musculosa.

Harpe peaked, with corona; from the base of the cucullus arises a spatulate flap, which is connected with a rudimentary clasper; clavus rounded and scobinated; uncus bluntly pointed; ædœagus strongly toothed at the orifice; vesica with short bulbed cornutus.

Fulva.

Harpe rounded, with marginal spines, no corona; clasper extends from the cucullus, and is strong and pointed; uncus tongue shaped; vesica with bunch of small teeth; the juxta is produced into two flaps turned over, and scobinated.

Geminipuncta.

Harpe simple, hairy, with indication of cucullus being divided, without corona or marginal spines: clasper and ampulla atrophied; clavus lobed; uncus cygnated; peniculus curiously peaked; vesica with spicule.

Neurica; edelsteni. Tutt. Pencils present.

Harpe trigonate, with a corona of 20 spines; clasper attached to the skin, except at the head, where it turns to a short peaked arm; ampulla a papilla; clavus rounded; uncus tongue shaped; ædœagus with a short tooth; vesica with scobinated process where it joins the ædœagus at the orifice.

Arundineta; neurica. Pencils absent.

Harpe hardly trigonate, with corona of 10 spines; clasper a longer arm than preceding; clavus rounded; uncus tongue shaped; ædœagus strongly crested at the orifice; vesica with small cornutus.

Despecta; rufa. From J. Gardner. Pencils absent.

Harpe with cucullus narrow and rounded, with marginal spines, spinose, without corona; clasper strong, arises from below the sacculus, curved, terminating in a flattened sucker, with a sharp point; uncus tongue shaped; ædœagus dentated at the orifice; vesica without teeth.

Cannæ. From W. G. Sheldon.

Harpe divided, with corona; cucullus hairy; ampulla clubbed; uncus very curious, tapering from the base, it again broadens out into a flat diamond shaped surface, the points being rounded, the lateral edges are then incurved, forming a deep hollow; ædœagus dentated; vesica without teeth.

Sparganii. From Eustace Bankes. Pencils absent.

Harpe almost trigonate, with corona; cucullus divided and hairy; ampulla a simple arm; clavus produced, peaked and clothed with papillæ, each emitting a fine hair; uncus shaped like an arm bone (humerus); ædœagus dentated at the orifice; vesica without teeth; juxta has two hairy editi.

Typhæ; arundinis. From S. J. Capper.

Harpe divided, with corona; cucullus spinose; clasper bifurcate at the tip; uncus strong, round and pointed; ædœagus strongly toothed at the orifice.

Tapinostola phragmitidis.

Harpe trigonate, with corona, divided; clasper not free; ampulla a small clubbed arm; at the base of the cucullus on the costal side is a rounded flap clothed with hair; clavus rounded; uncus flat and parallel, hardly pointed; ædœagus with a dentated plate at the orifice; vesica with a short bunch of teeth; juxta produced at either side into a pair of antlers.

Hellmanni. From Eustace Bankes. Pencils absent.

Harpe with corona, divided; cucullus hairy; ampulla a stumpy arm; clavus peaked; uncus widens considerably to the tip, which is very broad, ending in two lobes; the peniculus is curious, the tegumen extending upwards into two cones, the inner surfaces of which are clothed with long hair; ædœagus has two sharp teeth at the orifice; vesica with short band of teeth.

Concolor; extrema. from Eustace Bankes.

Pencils absent.

Harpe with corona; cucullus divided, spinose; clavus produced, stout and clothed with hair; uncus not tapered; ædœagus studded with short teeth at the orifice; vesica with short band of teeth.

Bondii.

Harpe with corona; cucullus divided and spinose; clavus long, tapered and clothed with hair; uncus parallel; ædœagus scobinated at the orifice; vesica with band of spines and short bulbed cornutus.

Arcuosa.

Harpe without corona; cucullus divided, with the anal angle pointed, clothed with fine spines; clasper not produced; ampulla a papilla; clavus long peaked and clothed with hair; uncus tapered; peniculus angulated; vesica with bunch of teeth.

Captiuncula; expolita. From J. E. Robson.

Harpe rounded, without corona; cucullus not divided, spinose; clasper not produced; ampulla bulbed; clavus peaked and clothed with hair; uncus tapered; peniculus angulated; vesica with bunch of teeth. This little species is wonderfully close to *arcuosa*.

Furuncula; bicoloria. Pencils present.

Harpe peaked, with corona; cucullus divided, anal angle pointed, but not produced; clasper not produced;

ampulla very small; clavus simple, indented at top; uncus very broad and tapered, rounded at the tip; vesica with two bunches of matted teeth and a row of stronger teeth.

Literosa.

Harpe with part corona; cucullus thickly spined at the anal angle; clasper not produced; ampulla bulbed; uncus tapered; vesica with bunch of matted teeth.

Elymi. From J. E. Robson.

Harpe divided, with corona, cucullus densely clothed with hair; clasper and ampulla each a short rounded arm; uncus tapered, not pointed; vesica with patch of long teeth and strong cornutus.

Miana strigilis. I examined a great number of this, and the other species of the *Mianas*, of every variety; for the material of which, I am indebted to W. H. Harwood, C. S. Gregson, J. E. Robson, S. J. Capper, C. E. Stott, &c.

Harpe angulated, with corona; cucullus divided, the anal angle produced and lobed, the lobe being thickly clothed with spines; below the cucullus on the outer edge is a straight arm; clasper not produced; ampulla rounded; clavus peaked, bulbed at the base, and clothed with short hair; uncus narrow waist, diamond pointed; vesica with curved bulbed cornutus; juxta without side spines.

Fasciuncula.

Harpe angulated, with corona; cucullus divided, the anal angle produced and lobed, the lobe being thinly clothed with spines; below the cucullus on the outer edge is a straight arm; clasper not produced; ampulla stout and rounded; clavus peaked and clothed with short hair; uncus broad without waist and pointed; vesica with bulbed cornutus; juxta has two arms surmounted with a bunch of spines at either side.

Hydræcia lutosa. Barrett and South remove this from the *Nonagrias*; its formation brings it between *musculosa* and *nictitans*. I include it in the *Hydræcias*. Harpe obliquely rounded; cucullus divided, densely clothed with long spines, and corona; immediately below the cucullus arises a strong hook nearly divided from the clasper, which is not produced; the ampulla is club shaped and spined; the tegumen is extended into two lobes, which form the base of the uncus, which is tapered; the ædœagus is very long, terminating in a star shaped plate; vesica has a small limpet-like cornutus.

(Gortyna) flavago; ochracea.

Harpe rounded, with cucullus divided, spinose, with corona; the clasper extends from the cucullus, and is strong and pointed; ampulla clubbed; clavus scobinated; uncus tapered; ædœagus dentated; vesica with bulbed cornutus and bunch of teeth.

Nictitans. From H. Massey. Without pencils.

Harpe trigonate, rounded, with corona extending half way along the margin; a large patch of spines at the anal angle; clasper bifurcate with short arms; ampulla a papilla; clavus produced to a tapered hairy arm; uncus slender, slightly tapered; vesica with bunch of six or eight longish teeth.

Paludis. From the Rev. C. R. N. Burrows.
Pencils present.

Harpe trigonate, angulated; corona extending three-quarter way along the margin; the cucullus has a large patch of spines at the anal angle, which is obtusely pointed; clasper bifurcate, inner arm short, sometimes very short, outer arm long, and generally straight; ampulla a papilla; clavus produced to a long hairy arm, pointed at the tip; uncus widest in the centre; vesica with bunch of short strongish teeth.

Lucens. From Joseph Collins. Pencils present.

Harpe trigonate, angulated; corona extending beyond three-quarters of the way along the margin: cucullus

with a small patch of spines at the anal angle which is acutely pointed; clasper bifurcate, inner arm long, often curved, outer arm long, often curved; ampulla a papilla shorter than preceding; uncus widest in the centre; vesica with a bunch of fine long teeth.

Crinanensis. From A. Bacot and J. A. Simes.

Pencils present.

Harpe trigonate, rounded; with corona only on the upper fourth of the margin; cucullus almost filled with spines; below the cucullus on the inner side, longitudinally, is a semi-circular flap with a serrated edge; clasper not produced, is attached to the skin of the harpe; clavus produced and tapered, hairy part way up, the tip being naked; attached to the base, and produced is a pointed plate with dentated edge; uncus widest at the centre, but wider above than below; vesica with bunch of shortish strong teeth.

Atlantica. (American species). From Dr. James Fletcher, included here, in case it may be found among the series of so-called *nictitans*, from the imaginal markings of which it is almost impossible to be distinguished.

Pencils present.

Harpe hardly trigonate, with corona extending three-quarters of the way down the margin; cucullus spined along the base; clasper hardly bifurcate, the inner arm almost absent, having the appearance of being broken off; clavus produced and tapered, hairy on the inner surface, to the base of this is attached a sharply pointed flap, the edge of which is deeply indented; uncus parallel, widest in the centre; vesica with band of shortish teeth.

Micacea.

Harpe with small trigonate cucullus, divided, with corona; anal angle rounded; clasper extends to the base of the cucullus in a long pointed arm; ampulla curved; uncus simple tapered to a point; vesica with short strong bulbed cornutus.

Petasitis. From S. J. Capper.

Harpe with small trigonate cucullus, divided, with corona; anal angle pointed; clasper extends to the cucullus, tapered; ampulla a short arm; uncus broad, tongue shaped, not pointed; ædœagus dentated at the orifice; vesica with strong short bulbed cornutus.

Brevilinea.

Pencils present.

Harpe with corona only on the upper 4th; cucullus divided, rounded at the anal angle; the clasper a tapered arm; uncus slender, not pointed; vesica with two short cornuti.

Axylia putris.

Harpe with round cucullus, corona with 3 rows of very long spines; clasper curved; ampulla short and rounded; clavus raised and spinose; uncus simple.

We now come to a number of genera of single species wherein the genitalia do not suggest modifications of the existing arrangement; I have therefore adhered to this, omitting *sapponariæ*, which appears to have been included only on account of its reticulated wing markings; really it belongs to the trigonate group of *Xylophasias Mamestras*, &c.

Dipterygia pinastri.

Pencils present.

Harpe rounded; cucullus spinose with long spines, at the anal angle, is a bifurcate jointed tooth; clasper a straight arm; sacculus thickly clothed with long hair; uncus broad and bluntly tipped; vesica clothed with a number of strong cornuti.

Cloantha perspicillaris; polyodon. From

L. B. Prout.

Pencils absent.

Harpe with corona; cucullus divided, and hairy; clasper very wide, with blunt tip; ampulla bifurcate, with extending finger; uncus broad and tapered; vesica with two long, strong cornuti.

Aporophyla australis. From A. Bacot.
Pencils absent.

Harpe with corona; cucullus angular, spinose; clasper spatulate, and pointed; ampulla small, simple; clavus scobinated; uncus cygnated; ædœagus thickly scobinated; vesica with band of teeth.

Laphygma exigua. From Eustace Banks and A. Bacot, the latter supplying a number of specimens from Australia; Pencils are absent, but it has in place large beautiful tufts of broadly tipped scales at the extremity of the body.

Harpe rounded without corona; cucullus spined on the margin; clasper a long curved hook; uncus slender; vesica with strong cornutus with long base.

Neuria reticulata; saponariæ. See p.p. 40

Neuronia popularis. From S. J. Capper.
Pencils absent.

Harpe angulated, without corona; cucullus hairy, from the base outwards is produced a form of pollex; clasper flattened and lobed; uncus spatulate, very broad, and rounded at the tip; ædœagus with short teeth at the orifice; vesica with band of short teeth.

Heliophobus hispida. From S. J. Capper.

Harpe narrow, rounded, without corona; clasper an arm, with curled tip; uncus cygnated; vesica with six or seven cornuti, united at the base, and small bulbed cornutus.

Pachetra leucophœa. From G. T. Porritt.

Harpe with corona; cucullus spinose, with jointed tooth at the anal angle, below which the harpe is bulged out; ampulla long and curved; uncus short, spatulate; ædœagus furnished with a row of square teeth or cogs; vesica with long band of teeth.

Cerigo cytherea; matura.

Harpe angulated with corona; cucullus hairy, with marginal spines; clasper with open snake-like mouth; uncus broad, cygnated; vesica with a number of cornuti.

There is nothing in common in the three species of *Luperina*.

Luperina testacea.

Harpe angulated without corona; anal angle of cucullus produced, and peaked, spinose; clasper not raised; ampulla bulbed; clavus angulated and scobinated; uncus cygnated; ædœagus scobinated; vesica with number of small cornuti.

Dumerili.

Pencils absent.

Harpe with corona; cucullus spinose, pointed at the anal angle; clasper a short peaked arm; ampulla a papilla; uncus flattened at the tip, with a back ridge; ædœagus scobinated at the orifice.

Cespitis.

Harpe without corona; cucullus spinose; clasper flattened, and curved at the apex, forming an absurd likeness of a sculptured bust; uncus broad, and tapered; vesica with strong cornutus.

Connexa may easily be included here, with *basilinea*, *unanymis*, and *gemina* it forms a connecting link from the *Hydræcias* to the *Mamestras*, which are not separable from the *Apameas*, and should all be included with the *Xylophasias*. Following *gemina*, we get *anceps*, *albicolon*, *furva*, *brassica*, and *persicaria* with its abnormal scaphium. *Neuria saphonarica* should be here included, to be followed by *abjecta*, *rurea*, *hepatica*, and finishing with the masterpieces *polyodon* and *sublustris*, whose minute points of difference have made it doubtful if *lithoxylea* is not merely a coloration form of *polyodon*. This same trigonate form is carried out in *exulis*, following which we get the distinct modification *oculea*, which is not unlike *Xylophasia scolopacina*, and should hardly be included in the group.

Apamea connexa.

Harpe angular, with corona; cucullus spinose; anal angle with projecting point; clasper absent; ampulla a simple arm; uncus slender; vesica with single strong cornutus.

Basilinea.

Pencils absent.

Harpe trigonate, with corona; cucullus spinose at the anal angle and hairy; clasper stout, bent outwards; ampulla very long and slender; clavus short, irregular, pointed; uncus with the tip tongue shaped; ædœagus strongly toothed.

Unanimis.

Pencils present.

Harpe trigonate, with corona; cucullus spinose and hairy; clasper stout, bent outwards and upwards; ampulla short, rounded at the tip; clavus not produced, scobinated; uncus tip tongue shaped; ædœagus toothed; vesica with bulbed cornutus.

Gemina.

Harpe trigonate, with corona; cucullus spinose and hairy; clasper long, thin and curved; ampulla long and elbowed; clavus produced and rounded; uncus parallel and pointed; ædœagus terminating with a cock's-comb; vesica with shortish bulbed cornutus.

Mamestra anceps; sordida.

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Harpe trigonate, with corona; cucullus spinose and hairy; clasper bifurcate, or deeply emarginate, with other projecting points; ampulla long and slender; clavus bluntly pointed, strongly scobinated; uncus parallel, slightly widening at the tip; ædœagus terminating with three or four strong teeth; vesica with shortish cornutus, heavily bulbed.

Albicolon.

Harpe trigonate, with corona; cucullus with outer margin rounded, spinose; clasper bifurcate, joined to the bend of the harpe below the cucullus, and produces a strong outer arm; the inner arm bluntly pointed and roughly scobinated; clavus produced and rounded; uncus long and tapered; vesica has a band of matted teeth, and joins the ædœagus with a row of short teeth.

Furva.

Harpe trigonate, indented at the crown, with corona; cucullus hairy; clasper strong pointed; ampulla slender; clavus produced, plain and rounded; uncus diamond shaped tip.

Brassicæ.

Pencils present.

Harpe trigonate, rounded, with corona; cucullus hooded and spinose; clasper a flap attached to the skin; uncus tongue shaped.

Persicariæ.

Pencils present.

Harpe trigonate, pointed at the apex; cucullus spinose; clasper a flap attached to the harpe; arising from the inside of the inner edge of harpe is a strong column with a rounded head; the clavus is produced, rounded and scobinated; the sacculus extends high up the harpe, and ends in a rounded squamous head; uncus long and tongue shaped, beneath which is a large diamond shaped scaphium; vesica with bulbed cornutus.

Sapponariæ; reticulata.

Harpe trigonate, with corona; cucullus spinose, with sharp curved hook at the bend of the harpe, below the cucullus; clasper a flap attached to the skin of the harpe; clavus not produced, scobinated; sacculus produced into a pointed head, squamous, and scobinated; uncus tongue shaped; vesica with long band of teeth.

Objecta. From Gervase Mathew.

Harpe trigonate, deeply indented on the margin, with corona; cucullus thickly spined along the base, and hairy; clasper long and curved; ampulla long and slender; clavus produced and rounded, quite plain; uncus slender; vesica with bulbed cornutus.

Xylophasia rurea.

Harpe trigonate, with corona; cucullus with a double row of spines at the base, remainder hairy; clasper shortish; ampulla long and slender; clavus rounded and plain; uncus diamond shaped; vesica with two shortish bulbed cornuti.

Hepatica.

Pencils present.

Harpe trigonate, with corona ; cucullus heavily spined along the base ; clasper a strong arm ; ampulla short and bulbed ; uncus spatulate, very broad at the base ; ædœagus heavily toothed at the orifice.

Sublustris. From Mrs. Hutchinson.

Harpe trigonate, with corona ; cucullus spinose on base, deepest in the centre, and hairy ; clasper long and curved ; ampulla long, very slender, ending in a single fine bristle ; clavus rounded and simple ; uncus long and narrow, tongue shaped ; vesica with two very short bulbed cornuti.

Lithoxylea. From Mrs. Hutchinson.

Harpe trigonate, with corona ; cucullus with a row of spines on the base, deepest at the anal angle ; clasper broad and suddenly narrowed toward the tip ; ampulla long and slender, terminating with several bristles ; clavus broad and round, plain ; uncus long and narrow tongue shaped ; vesica with two minute cornuti.

Polyodon ; monoglypha. Pencils present.

Harpe trigonate, with corona ; cucullus with a row of spines along the base, deepest at the anal angle ; clasper broad, narrowing towards the tip ; ampulla long and slender, terminating with four bristles ; clavus rounded and plain ; uncus long and narrow, tongue shaped ; vesica with two bulbed cornuti.

These three species are wonderfully alike. The most important character lying in the vesica, the smallest pair of cornuti belonging to *lithoxylea* ; those of *sublustris* being only just larger, whereas in *polyodon* they are a fair size. This I consider is sufficient to do away with the old theory, that the first and last are colour varieties of the same species. The ampulla also affords some small difference, *sublustris* with one bristle, *polyodon* with four, and *lithoxylea* with more probably five or six. *Polyodon* also has larger built genitalia.

Crymodes exulis. From Dr. Mason, and Eustace
Bankes. Pencils absent.

Harpe trigonate, with corona; cucullus spinose, enclosing before the bend a rounded knob densely clothed with hair; clasper short and pointed; ampulla slender, slightly thicker towards the base; clavus round and scobinated; uncus parallel and pointed; vesica with two short bulbed cornuti.

Scolopacina. Pencils absent.

Harpe trigonate, and rounded; corona present on the upper half only; clasper springing from the base of cucullus is broad and curved, the end being lobed; ampulla short and slender; clavus protruding and rounded plain; apex of sacculus produced to a scobinated flap; uncus very narrow and tapered; ædœagus with dentation at the orifice.

Oculea ; didyma.

Harpe battledore, or very roundly trigonate, with corona; cucullus spinose; clasper atrophied; ampulla a short arm; clavus rounded and scobinated; uncus diamond pointed; vesica with cornutus; ædœagus with cock's comb serrations on the orifice.

Ophiogramma. Pencils present.

Harpe with half corona; cucullus rounded, with a sharp tooth at the anal angle; on the inner margin of the cucullus is a round concave plate, producing a pencil of strong hairs; clasper a short pointed arm; uncus pointed; vesica with a bunch of teeth.

Fibrosa ; leucostigma.

Harpe peaked, with long marginal spines; cucullus divided, the anal angle forming an arm; clasper not produced; ampulla bulbed; the uncus which is slender and curved, is set on two lobes produced from the tegumen, to the junction of which is united a circular squamous plate; the base of the peniculus has a tuft of curved hairs; vesica has a strong curved cornutus with

a long base, and a minute bulbed cornutus. This species is a singular form, and it is doubtful if it should be included in any existing genus.

Charæas graminis.

Harpe with half corona; cucullus hardly divided, the anal angle forming a curved tip, with a single tooth; clasper, broad at the base is tapered; clavus rounded and scobinated; uncus broad and tapered; vesica with small bunch of fine teeth.

Celœna haworthii.

Harpe rounded, without corona; clasper terminates with a sharp spine at the anal angle of the cucullus; ampulla bulbed; clavus not produced; uncus tapered at the tip; vesica with cornutus with two small projections at the base.

Grammesia trilinea; trigrammica.

Harpe without corona; cucullus ends with a curved point at the apex; from the base of the cucullus, there is a deep cavity from which springs the clasper, a plain arm; the ampulla is a short stump clothed with long spines; the clavus is rounded, with small scobinations; the sacculus is extended, and peaked; uncus tongue shaped and spatulate; vesica has six short bands of thickly matted spines; the juxta terminates in a scobinated blunt tip.

In the group *Caradrina*, *morpheus* and *cubicularis* are very distinct from the other four species, which are strongly generic.

Caradrina alsines.

Harpe peaked, with corona; cucullus hairy and divided; clasper a fold attached to the skin of the harpe; ampulla slender, slightly thicker towards the apex, which is rounded; uncus sickle form; vesica with a tremendously long band of teeth, and mass of short bulbed cornuti.

Blanda; taraxaci.

Similar to preceding, but ampulla not rounded at the apex, and slightly tapered. The upper part of the sacculus ends in a triangle, the base of which is squamous.

Superstes. From L. B. Prout.

Similar to preceding species, but has the upper part of the sacculus ending in a triangle, the whole of which is squamous.

Ambigua. From L. B. Prout.

Harpe peaked, with corona; cucullus divided, hairy; ampulla broadest at the base, curved; sacculus ending in a scobinated bulb; uncus sickle form; vesica with shortish band of matted teeth, and a number of long cornuti, generally about 14 or 15.

Morpheus. From Geo. Harker.

Harpe deeply emarginate on the inner edge at the apex, without corona; cucullus divided, and overlaps the outer margin; clasper peaked; uncus flat and parallel; vesica with band of fine teeth.

Cubicularis; quadripunctata.

From Geo. Harker.

Pencils absent.

Harpe without corona; cucullus not divided, square at the apex, the upper angle being produced to a long blunt point; clasper curved, ending in a bulb; the sacculus has three raised folds on the inner surface; uncus slender; vesica with band of short fine teeth and rosette of small teeth; vinculum long and slender.

Rusina tenebrosa.

Harpe rounded, without corona, the costal edge of the harpe projects beyond the apex, and is bifurcate; cucullus undivided; clasper elbowed, and extending from the cucullus which it overlaps, is produced to a long curved arm; clavus angulated and scobinated; uncus slender and tapered; vesica filled with strings of matted teeth.

Acosmetia caliginosa.

Harpe roundly peaked, without corona, the costal edge curved; at the base of the cucullus is a raised flap; clasper curved and bulbed at the end; sacculus consists of two round balloons; uncus spatulate, broad; vesica simple.

Hydrilla palustris. From Eustace Bankes.
Pencils absent.

Harpe rounded, without corona; clasper tapered; editum raised, with long spines; vesica with long slender cornutus; juxta with a lateral pair of spined processes.

It may here be convenient to take the following species, the peculiar formation of the harpes, and general appearance of which seem to form a separate group, the *Cosmiidæ*, which appears to lead naturally to the *Triphænidæ*, which again, forms a connecting link to the *Agrotidæ*.

Stilbia anomala. From F. de Kane.

Harpe peaked, without corona; clasper peaked; sacculus very narrow; clavus long and club shaped; uncus not pointed; vesica with bands of long teeth.

Tethea subtusa. Pencils present.

Harpe peaked, with corona; clasper curved; ampulla very weak; uncus flattened; peniculus protruded above; vesica with a bunch of teeth.

Retusa.

Harpe trigonate, peaked, with corona; cucullus divided; clasper elbowed and strong; ampulla absent; uncus slender; vesica with short bulbed cornuti.

Euperia fulvago; paleacea. Pencils present.

Harpe peaked, with double corona; cucullus long; clasper curved; the structure of the tegumen is exceptional, the peniculus is produced into a high shoulder; the uncus slender and tapered, is set on a rounded process, at either side of which, are two bent lobes; the vesica has two cornuti.

Dicyela oo.

Harpe peaked, with corona; cucullus divided; clasper with curved point; uncus short and parallel; vesica with scobinated process.

Calymnia pyralina. From L. B. Prout, and
Dr. W. E. Riding. Pencils absent.

Harpe peaked, without corona; clasper club shaped, scobinated and terminating in a curved point; uncus is a short strong hook wide at the base; ædœagus dentated at the orifice; vesica with a small curved cornutus.

Diffinis. Pencils absent.

Harpe peaked, without corona; cucullus narrow and rounded; clasper concave, terminating in a point at the apex; clavus not produced, scobinated; uncus sickle form; ædœagus serrated at the orifice.

Affinis. Pencils absent.

Harpe peaked, without corona; cucullus narrow and rounded; clasper a stout column with a concave head; uncus tapered, with an enlarged tip not pointed; ædœagus serrated at the orifice; vesica with a single large cornutus.

Trapezina.

Harpe roundly peaked, without corona; clasper a stout arm dentated at the base; clavus extends far up the sacculus, and is strongly scobinated; uncus sickle form; vesica simple.

Triphæna fimbria. From A. Harrison,

Harpe peaked, pointed at the anal angle, slightly bulging on the costa, without corona; clasper large, curved and pointed; tegumen greatly extended, terminating in a short uncus, set between two squamous lobes; peniculus absent; ædœagus serrated at the orifice.

Interjecta. From J. E. Robson. Pencils absent.

Harpe peaked, pointed at the apex, bulged at the costa; clasper curved, tip curled; uncus cygnated; vesica with a quadruple bulbed cornutus, and a second single one.

Janthina.

Harpe with cucullus sickle form pointed, below the cucullus, projecting over the costa, is a sharp curved arm; the ampulla arises close to the costa, and is wavy, thickest in the middle; uncus cygnated; ædœagus scobinated at the orifice; vesica with a short bulbed cornutus.

Pronuba.

Harpe with cucullus, curved and pointed, at the base on the costa is a small projection or fold, beyond this the costa is strongly bulged; the clasper forms a hood, into which the upper part of the sacculus extends; the ampulla is very long, with spines branching throughout the length; uncus long and slender; the vesica has a circular serrated process, sparsely clothed with short teeth. The base of the vinculum is joined vertically with a strong, round plate of chitine.

Subsequa; orbona. From R. Tait, junr. and
J. E. R. Allen. Pencils absent.

Harpe tapered to a point, elbowed; clasper a curved club, uncus tongue shaped, from the upper side of which arises a small peak; ædœagus sparsely dentated at the orifice.

Orbona; comes.

Harpe tapered to a point; clasper a curved arm, concave at the extremity; uncus curled at the tip; vesica with a mass of small, matted, irregular shaped teeth.

The sequence from the *Triphænidæ* to the *Noctuæ* and *Agrotidæ* is very evident. If we make *augur* the connecting link with *ravida*, picking up *neglecta*, we easily take up *lunigera*, *suffusa*, *cinerea*, *valligera*, *ripæ*, *puta*, *exclamationis*, *segetum*, *corticea*, *flammatra*, *ulvæ* (which belongs here), and *plecta*, we may then pick up the connecting link *præcox*, leading to *depuncta* and *glareosa*, after which the anal angle produces a thumb = pollex. We next get *ashworthii*, *umbrosa*, *triangulum*, *xanthographa*, *c-nigrum*, *ditrapezium*, *rhomboidea*, with an extreme form in *baja* and *alpina*, and possibly also *lucernea*. There is then a branch off to the

Tæniocampas, continuing the run, *agathina* leads the way to *aquilina*, *tritici*, *obelisca*, *nigricans*, *cursoria*, and again to *saucia*, *dahlia*, *rubi*, and *brunnea*, when we get to the height of elaboration, descending to *festiva*, *conflua*, *leucographa*, *sobrina*, *pyrophila*, and *porphyrea*.

Agrotis augur.

Harpe tapered to a point, without corona; clasper hooked above, on the outer margin there is a blunt point, showing the junction of the sacculus with the edge of the harpe; uncus is tongue shaped; vesica has a short bulbed cornutus, and a scobinated process; the juxta is bi-lobed.

Ravida; obscura. From John Gardner.

Harpe tapered to a curved point; clasper elbowed; uncus short and pointed; ædœagus has a jointed cap which is crested; vesica with round process, scobinated, and toothed; juxta a thin plate.

Neglecta; castanea. From S. J. Capper.

Harpe peaked, without corona; cucullus with a tooth at the anal angle; clasper rounded at the elbow; uncus blunt at the tip; ædœagus serrated and scobinated at the orifice; vesica with a small cornutus; juxta with a thick ring at the base.

In the following species only the salient features will be noted. The harpe is peaked, with corona; the clasper is bulbed at the base conically, and curved upwards to a point.

Suffusa.

Harpe long; clavus very small and spined; uncus parallel and pointed; vesica with long band of small teeth; juxta a thin plate.

Lunigera. From J. W. Tutt.

Harpe long; clavus produced and spined; uncus cygnated; vesica with small teeth; juxta a thin plate.

Cinerea. From J. W. Tutt.

Harpe short; clavus small and spined; uncus parallel, curved at the tip, which is not pointed; vesica with small curved scobinated process; juxta wide, pointed at the base.

Valligera; vestigialis.

Harpe short; clavus small and spined; uncus cygnated; vesica with curved scobinated process; the juxta has a deep point at the base, forming less than a right angle.

Segetum.

Below the cucullus is an indication of a small flap; clasper hardly a cone, tip blunt; clavus small; uncus long and bent; vesica with curved crested process; juxta pointed at the base.

Ripæ.

Clasper only just present; ampulla flattened on the inner side; uncus short; vesica with round scobinated process; juxta pointed.

Putæ.

Clavus short; clasper flattened on the outer side; uncus cygnated; vesica with rounded scobinated process; juxta pointed.

Exclamationis.

Clavus not long; clasper pointed; uncus cygnated; vesica with irregular scobinated process.

Corticea.

Below the cucullus there is an indication of a small flap; clasper pointed; clavus not produced; uncus long and bent; vesica with curved crested process; juxta sharply pointed at the base.

Flammatra.

Without pencils.

Harpe indented before the cucullus; below the cucullus, the small flap indicated in *segetum* and *corticea* becomes more developed, and is shown in a peaked hook; clasper very narrow above the lobe; clavus not produced; uncus cygnated; vesica with short cornutus; juxta pointed.

Senta ulvæ; maritima. From John Gardner.

Pencils absent.

Similar general form; clasper pointed; clavus rounded, not produced; uncus slender; vesica with small teeth.

Plecta.

Clasper very slender; clavus produced and spined, bulbed at the base; uncus pointed; vesica with large cornutus; juxta pointed.

There is a division here, the form of the harpe alters and loses its corona, and the clasper develops an elbowed base.

Præcox.

Harpe peaked, without corona; clasper pointed; clavus not produced; uncus widens twice, the tip being densely clothed with stiff hairs; vesica with round process of small cornuti; juxta emarginate at the base.

The clasper now taking another form, is attached to the harpe on the outer margin, where it is sometimes rounded, and sometimes produced direct from the skin, it proceeds towards the inner margin, when it takes a sharp turn towards the apex, forming an elbow; in the descriptions, attachment = where it joins the harpe, foot = the bent part of the clasper corresponding in shape with a human foot: The terms heel foot and toe being used to describe the parts.

Depuncta. From J. Gardner.

Harpe rounded, without corona; clasper attachment rounded; heel pointed, foot long, flattened, and curved inwards; uncus curved; ædœagus scobinated at the orifice; vesica with small bunch of teeth; juxta slightly pointed.

The following species have the juxta strong and well marked.

Glareosa. From Rath Hughes.

Harpe peaked, without corona; clasper attachment not rounded; heel pointed, foot long and flattened on the inner side; uncus cygnated; vesica with stumpy cornutus; juxta cleft in the centre forming two scobinated lobes.

The following species with pollex:

Ashworthii. From C. S. Gregson, W. Gardner, and W. Mansbridge. Without pencils.

Harpe rounded, without corona; pollex rounded; clasper attachment not rounded, heel angulated, foot short and not flattened, with several protruding papillæ, (each emitting a single hair) on the instep; uncus cygnated; ædœagus terminating with a curved tooth at the orifice; juxta lobed and plain.

Candelarum. From J. Arkle. I cannot distinguish any difference between this and *ashworthii*.

Umbrosa.

Harpe peaked, without corona; pollex rounded; clasper not rounded at the attachment, heel pointed, foot flattened inside, tip curled, instep with several papillæ, each emitting a single hair; uncus short tapered and pointed; juxta produced to a high peak deeply cleft; ædœagus crested at the orifice.

Triangulum. From S. J. Capper.

Harpe rounded, without corona; pollex rounded; clasper not rounded at the attachment; heel gently curved, foot short and stout, almost round; uncus pointed; vesica with curved spicule; juxta peaked, not cleft, and plain.

Xanthographa. From Mrs. Hutchinson.

Harpe peaked, without corona; pollex rounded; clasper not rounded at the attachment, heel pointed, foot curved and pointed; uncus pointed; ædœagus with dentate plate and scobinated process; juxta a column on which the dentated plate of the ædœagus fits.

C-nigrum. From S. J. Capper.

Harpe peaked; pollex rounded; clasper not rounded at the attachment, heel angulated, foot short; uncus slender; ædœagus serrated at the orifice; vesica with small spicule; juxta a scobinated lobe sharply indented in the centre.

Ditrapezium. From A. Harrison. Pencils absent.

Harpe peaked, without corona; pollex rounded; clasper simply attached, foot almost lobed; uncus suddenly narrows from the centre to the tip; ædœagus with a small tooth at the orifice; juxta a high peak, plain.

Rhomboidea; stigmatica.

Harpe peaked; pollex rounded; clasper simply attached, heel rounded, toe pointed; uncus simple; ædœagus scobinated at the orifice; vesica with a single spicule; juxta with short narrow peak.

Baja. From Thos. Tunstall.

Harpe peaked, pollex high in the cucullus, rounded; below this, arising from the inside of the harpe, is a second arm; clasper with the foot lobed; uncus slender; vesica with hooked process; juxta peaked.

Agathina. From Eustace Bankes. Pencils absent.

Harpe slightly emarginate on the margin, without corona; pollex produced from the base of the cucullus, which is divided; clasper rounded at the heel, toe pointed; uncus round at the tip, broad above; ædœagus serrated at the orifice; vesica with scobinated process and small cornutus; juxta thin.

Pachnobia alpina; hyperborea. From Eustace Bankes. Pencils absent.

Harpe, without corona, emarginate on the margin; the pollex forming the outer tip; clasper angulated at the heel, rounded at the toe; uncus cygnated, flattened at the tip; ædœagus with a long row of serrations at the orifice; juxta thin.

Lucernea.

Harpe with a long narrow cucullus, without corona, the costal margin terminates, at the base of the cucullus, in a double lobed flattened plate; the clasper is a straight arm; the uncus is simple; the ædœagus broad, scobinated, and dentated at the orifice.

Subrosea.

Harpe without corona, spinose, emarginate on the margin; the large pollex forming the outer tip; clasper rounded at the heel, toe extended and pointed, flattened inwards; uncus flat at the tip; ædœagus with long row of serrations at the orifice; vesica with spicule; juxta strong, roundly peaked.

Porphyreia; strigula. From S. J. Capper.

This species lacks nearly every characteristic of the group.

Harpe without corona, bifurcate, pointed at each extremity of the margin; the only indication of the clasper is a fold; the sacculus extends far into the cucullus, and is rounded and scobinated; the uncus is barely broader in the centre, with a curved tip; ædœagus scobinated at the orifice; juxta thin. It is quite possible the *Taniocampids* branch off here.

The following group of five species is strongly generic, and is an example of a failure of the genitalia for specific classification, the points of difference being very minute. In Professor Smith's work on the *Agrotidæ*, he calls this group *Carneades*, and records some 120 species, mostly with the harpes so similar that he in some cases makes one figure do for 13 species. It is not, therefore, surprising in dealing with a group of this kind that little, if any, difference can be detected in *tritici* and *aquilina*, and if they are to be proved to be distinct species resource must be had to other characters. Reasoning by analogy that seeing two such distinct species as *obelisca* and *tritici* are almost undistinguishable from the genitalia, it is feasible to believe that the same resemblance may occur in *tritici* and *aquilina*. The following is an attempt to collate the points of difference.

Obelisca. From E. R. Banks. Pencils absent.

Harpe acutely pointed at the apex, anal angle obtuse, with corona; clasper long, curved, curled at the tip and clothed with short fine spines, almost to the base; clavus absent; sacculus produced to a long arm, projecting beyond the anal angle of the harpe; uncus tapered; ædœagus with indefinite structure; vesica with two short fine cornuti; juxta upright, deeply cleft to a point in the centre, the two peaked heads being squamose.

Nigricans.

Harpe similar to preceding; clasper slightly broader, set with a number of coarse spines; clavus produced,

club shaped, and clothed with spines; arm of sacculus extends only just beyond the anal angle; uncus tapered; vesica with a small cornutus, thicker than preceding; juxta deeply cleft, the base of the opening being round.

Cursoria.

Harpe similar, asymmetrical; clasper slender, wider at the tip, which is blunt, and set with a very few coarse spines; clavus longer than *nigricans* not clubbed; the arm of the sacculus on the right harpe produced beyond the anal angle, that on the left harpe not reaching the anal angle; uncus tapered; I can find no cornutus on the vesica; juxta not deeply cleft, the base of opening being rounded.

Tritici.

Harpe similar; clasper broader than *cursoria*, the upper half clothed with short fine spines; uncus very long; vesica with two minute cornuti; juxta not deeply cleft.

Aquilina. From J. E. Robson and Rev. C. N. R. Burrows. Similar to *tritici*.

There is here a further departure.

Saucia.

Harpe trigonate, with corona of strong spines; clasper with the heel pointed, foot long; ampulla arises below the sacculus and is a peaked concave hook; clavus slightly produced, rounded and scobinated; uncus cygnated; ædœagus with a plate at the orifice having a long serrated tooth, and other smaller serrations; juxta strong, is a dome shaped pinnacle.

Dahlii. From J. Whittle.

Harpe very broad with part corona, heavily spined especially at the anal angle; clasper hardly elbowed, heel rounded; ampulla long and slender; uncus long and parallel; vesica contains a strong cornutus, a crested semi-circular crown, and other dentated processes; juxta fairly strong and peaked.

Rubi. From Mrs. Smith.

Harpe wide, with corona, cucullus divided, and small, spinose; clasper elbowed at the base, which is wide; ampulla large, and antler shaped; uncus terminating in a round head; vesica with crested process, and short bunches of teeth; juxta shouldered, flattened above, and scobinated on either side.

Brunnea. From G. A. Harker. Pencils absent.

Harpe trigonate, broad, with corona; cucullus small, a strong jointed tooth at the anal angle; clasper elbowed at the base, slender above; ampulla long and curved at the tip; clavus rounded and spined; uncus tongue shaped; vesica with strong cornutus with a heavy base; juxta produced into two arms.

Festiva.

Harpe peaked, with corona; clasper curved; ampulla a slender arm, bulbed at the base; beneath the ampulla is a third arm, arising from the skin and emitting a few bristles from the head; uncus parallel, with rounded tip; ædœagus dentated at the orifice; vesica with a band of teeth; juxta sharply peaked.

Conflua.

I can detect no difference between this and *festiva*.

Leucographa.

Harpe peaked, without corona; clasper bulged in the centre and pointed; ampulla arises below the cucullus and is peaked; uncus simple; ædœagus dentated at the orifice; vesica with 10 or 12 very long spines, reaching nearly the whole length of the ædœagus.

Sobrina. From Jno. E. Robson.

Harpe peaked, without corona, clasper rounded at the tip; ampulla a fold; clavus round and scobinated; uncus lobed at either side, supported along the back with a ridge of chitine; ædœagus serrated at the orifice; vesica with a curved spicule; juxta cleft and heavily scobinated.

Pyrophila ; simulans. From Eustace Banks.

Pencils absent.

Harpe peaked, without corona ; clasper roundly elbowed at the base, the tip truncated ; in place of the ampulla there are several spined papillæ ; clavus absent, unless it is represented by a strong curved trifurcate arm which is attached to the sacculus ; uncus tapered ; vesica has scattered over it a number of strong cornuti.

Trachea piniperda. From S. J. Capper.

Harpe peaked, without corona ; clasper short and hardly produced ; ampulla a long curved arm ; uncus has a round tip with a dorsal support ; ædœagus scobinated at the orifice ; vesica with bulbed cornutus ; juxta with a projecting and receding lip.

Rubricosa.

Pencils absent.

Harpe peaked and narrow. without corona ; clasper curved and truncated ; uncus flattened ; vesica with strong bulbed cornutus ; juxta has two lateral bunches of spines spread out like the wings of a bird.

The Tæniocampas form one of the most elaborate and interesting groups, inasmuch as they present a variety of forms that is quite unequalled in any other genus of the *Noctuidæ*, and yet to a large extent it is evident they are closely allied. The juxta is well developed in all the species, but takes a most exaggerated form in *gothica*.

Tæniocampa populeti.

Harpe without corona ; cucullus antler form ; the clasper is cornucopia shaped, from the mouth of which proceeds the ampulla, a long curved arm ; uncus expanded at the tip, which is squared ; vesica with muscular interior ; juxta cleft.

Munda.

Harpe without corona, cucullus antler form ; clasper irregularly rounded ; ampulla curled at the tip and flattened ; the sacculus is produced on the inner edge, into a long curved arm ; uncus tongue shaped ; vesica with bunches of cornuti ; juxta long and cleft.

Instabilis; incerta.

Harpe without corona, anal angle of cucullus pointed; clasper an irregularly curved arm; ampulla long with a pointed tip; sacculus with rounded clavus; uncus spatulate, broadest before the tip, which is pointed; ædœagus with a long cornutus on the outside of the orifice.

Stabilis.

Harpe without corona, emarginate at the anal angle, which is peaked; clasper rounded; ampulla lobed to a point and heavily scobinated; uncus roundly tongue shaped, emarginate laterally; vesica with a curled band of small fine teeth; juxta cleft, forming two strong peaks.

Cruda; pulverulenta.

Harpe without corona; clasper rounded; ampulla long, broader towards the base, tip spined; uncus tapered and sharply pointed; vesica with muscular interior; juxta peaked in the centre.

Miniosa.

Harpe without corona, anal angle produced and pointed; clasper with wide mouth; ampulla shortish, pointed; uncus slender and parallel; vesica with bunch of teeth and short bulbed cornutus; juxta indented.

Opima.

Harpe with corona; cucullus divided, pointed at the anal angle; below the cucullus is a protruding pollex, terminating in small spines; clasper rounded with a small papilla; ampulla long and blunt at the tip; uncus rounded at the tip; vesica with strong cornutus; juxta deeply cleft.

Gracilis.

Harpe with corona, cucullus with pollex at the anal angle; clasper rounded, with a short papilla or nipple; ampulla long and curved; uncus cygnated; ædœagus toothed and crested at the orifice; vesica with bulbed cornutus and bunch of teeth; juxta cleft, forming two squamose peaks.

Gothica.

Harpe without corona, emarginate on the margin, forming a blunt point; from the upper part of the cucullus arises a

short digitus ; clasper with large round mouth ; ampulla long, curved and tapered ; uncus broad at the tip ; ædæagus dentated at the orifice ; vesica with scobinated process and short cornutus ; the juxta is very elaborate, from a squamose collar there arise laterally, two long elbowed arms, deeply scobinated.

The Orthosias are a curiously separated group. The elaborate and highly developed uncus of *macilenta*, being worthy of attention, the long curved clasper of *lota*, making a good connecting link to the *Anchocelias*.

Orthosia suspecta.

Harpe peaked, with corona, cucullus divided and spinose ; clasper curved ; ampulla below the cucullus, small ; clavus rounded, studded with small spines ; uncus slender ; vesica with short cornutus ; juxta weak.

Upsilon.

Pencils present.

Harpe peaked, almost trigonate, with corona ; cucullus spinose and divided ; clasper strong, opening into a round flattened plate with serrated edges ; ampulla elbowed, and strong ; uncus tongue shaped, emarginate laterally ; vesica with strong cornutus ; juxta doubly peaked, strong.

Macilenta. From S. J. Capper.

Harpe without corona, cucullus not divided, outer tip longest ; clasper with curled tip ; ampulla extends to centre of cucullus, the head being a rounded plate ; clavus produced and lobed. It is almost imposible to describe the complicated uncus, nor does the figure give any idea of the extraordinary structure ; vesica with a long and short cornutus, and a bunch of teeth ; juxta weak.

Lota.

With pencils.

Harpe pointed, without corona ; cucullus not divided ; clasper long and very curved, typical of this group ; ampulla extends to the centre of the cucullus, where it produces a sharp hook ; clavus rounded ; uncus sickle form ; vesica with bunches of strong teeth , juxta weak.

Anhocelis lunosa. From C. H. Walker.

Harpe peaked and pointed, without corona; cucullus not divided; clasper spined at the tip; ampulla produced from the base of the cucullus in a flap; clavus rounded; uncus broad, rounded at the tip; vesica with longish cornutus and bunch of teeth; juxta doubly peaked.

Rufina.

Harpe peaked, with corona; cucullus not divided; clasper long and slender; ampulla flattened, with curled tip; uncus strong, produced from a curious termination of the tegumen; with a scaphium; vesica with long cornutus; juxta not cleft.

Litura.

Harpe with part corona; clasper short and curved; ampulla extends to the anal angle in a series of folds of the skin; clavus produced and peaked, spinose; from the head of the tegumen arises a square flap, from the centre of which springs a short slender uncus; vesica with band of teeth and long cornutus.

Pistacina.

Pencils present.

Harpe without corona; cucullus lobed, the anal angle uniting with the ampulla forms a strong pointed arm; clasper long and bent into a pot-hook; uncus curved and pointed; ædcæagus serrated at the orifice; juxta indented at the top.

The Cerastias are generically a continuation of the preceding, and should include *rubiginea*. *Vaccinii* and *spadicea*, often a stumbling block for the beginner, are equally difficult to separate by the genitalia.

Cerastis vaccinii.

Harpe long, slender and pointed, without corona; clasper long, slender and twisted; uncus flattened at the tip; vesica has a long cornutus at the base, a bunch of cornuti in the centre, and a bulbed cornutus above; juxta peaked, indented at the tip.

Spadicea.

Harpe long, slender and pointed, without corona; clasper long, slender and twisted; uncus flattened at the tip; vesica has a long cornutus at the base, a bunch of long cornuti in the centre, and a bulbed cornutus above; juxta peaked, indented at the top.

Erythrocephala.

From Eustace Banks.

Pencils present.

Harpe long, slender and pointed; clasper long and slender; ampulla forms folds or ridges into the cucullus; uncus simple; peniculus on a peduncle; vesica with large cornutus, and bunches of long strong teeth; juxta square at the top.

Dasycompa rubiginea.

Harpe pointed, without corona; cucullus divided; clasper a straight arm; uncus parallel square tipped; peniculus produced; vesica with huge cornutus, a band of teeth, and a tiny cornutus; juxta strong.

Scopelosoma satellitia.

Harpe with corona; cucullus divided; clasper irregularly twisted; ampulla antler shaped; editum strong, clothed with long hairs; sacculus produced into a long arm on the outer edge; clavus rounded; uncus tapered; vesica with short bulbed cornuti, and bands of teeth.

Oporina croceago.

Harpe pointed inwardly, with corona, anal angle pointed; cucullus not divided; clasper long and curved; uncus simple, flattened at the tip; ædœagus with very large scobinations at the orifice; juxta peaked, emarginate in the centre.

The Xanthias present the difficulty of a genus containing forms which from colour, and shape, are obviously connected, and yet differ in their genital construction. The two species *aurago* and *citrago*, are closely allied; *silago* might easily be included here, were it not for the rare form of the uncus, which in this species is bifurcate. Since leaving the early groups of the *Noctuidæ* the uncus has been a single hook, but in *silago* for some

unaccountable reason it suddenly becomes bifurcate, (the only other species among the *Noctuidæ*, partaking of this character is *oxyacanthæ*), a close family likeness unites *gilvago*, *cerago*, and *xerampelina*, whilst *ferruginea* differs in every particular and is evidently correctly placed in a separate genus *Mellinia*.

Xanthia aurago. Pencils present.

Harpe peaked, with corona; cucullus divided; clasper curved; ampulla narrow and pointed; clavus rounded; uncus tapered, broad at the tip; vesica with bulbed cornutus, and spicule.

Citrago.

Harpe peaked, with corona; cucullus divided; clasper ovate; ampulla a long arm; uncus tongue shaped; vesica with bulbed cornutus, and band of teeth.

Silago; flavago. From S. J. Capper.

Pencils present.

Harpe peaked with a weak corona; clasper toothed at the tip; uncus bifurcate, forming two pointed arms; peniculus on a peduncle; vesica with thick cornutus.

Gilvago.

Harpe with corona; cucullus divided; clasper long and pointed; ampulla much larger, lying in the same direction; uncus rounded at the tip; vesica with bands of teeth and two small bulbed cornuti.

Cerago; fulvago. From S. J. Capper.

Harpe with corona; cucullus divided; clasper shorter and thicker than preceding; ampulla also short and thick; uncus parallel; vesica with bands of teeth and two cornuti.

Cirrhœdia xerampelina. Without pencils.

This species is so closely connected with the two preceding that it should be included with them, but as they are so different from the *Xanthias*, I suggest they should come into the genus *Cirrhœdia*.

Harpe similar to preceding; clasper elbowed, scobinated, and bifurcate at the tip; ampulla pointed; uncus parallel; vesica with two small bulbed cornuti.

Mellinia ferruginea ; circellaris.

Harpe peaked, without corona; clasper elbowed at the base, the upper part is again elbowed, terminating in a round head, flattened at the side and scobinated; ampulla hardly more than a papilla; uncus sickle form; vesica with cornutus and bunch of teeth.

Eremobia ochroleuca.

Harpe trigonate, with corona; cucullus divided; clasper is a wide flat plate; uncus diamond pointed; vesica with band of teeth and scobinated process.

Dianthæcias.—This interesting group should be remodelled. There are a number of species that show a strong generic tendency. Prof. Smith places them among the *Mamestras*. The species occurring in this country do not show this relationship, but rather agree with some of the *Hadenide*. The small white spot at the anal angle of the hind wing being a distinct character endorsed by the genitalia. Taking the form of *cucubali* as a type, we have *serena*, *genistæ*, *glauca*, *cucubali*, *carpophaga*, *capsophila*, *capsincola* and *barrettii*, with the cucullus bent over, forming a battledore harpe. The costal edge is curled inwards; where it joins the harpe it generally produces a curled rounded flap, this is really the ampulla; in *glauca* it becomes an arm, in *genistæ* it is strong; but in the second group of the *Dianthæcias* it is very large and connects this section comprising *conspersa*, *albimacula*, *compta* and *cæsia* with the first group, between which it would otherwise be difficult to see the relationship. *Dysodea* is evidently in this group.

Serena.

Harpe battledore, with corona; clasper broad and flattened; clavus peaked; uncus tongue shaped; vesica with small bulbed cornutus; covering the vinculum is a rounded plate slightly cleft in the centre and fringed with scales.

Genistæ.

Harpe short, battledore, spinose, with no distinct corona; clasper turns and is produced downwards toward the sacculus; uncus broad and pointed; vesica with short bulbed cornutus.

Oleracea.

Harpe short, battledore, spinose with no distinct corona; clasper a curved arm; ampulla bifurcate, of the two arms one is stronger than the other, the weaker one is set with short fine bristles; below the fork and on the surface of the ampulla is an editum clothed with long hairs; clavus peaked and spinose; uncus long and slender, curved upwards at the tip, having the base on a central lobe of the tegumen; vesica with two short cornuti and bunch of fairly long teeth.

Glauca.

Harpe short, battledore, spinose, with no distinct corona; clasper turns but is attached to the skin of the harpe; ampulla is an arm projecting from the base of the cucullus; uncus slender, and tapered; vesica with band of teeth.

Cucubali. From D. Onslow.

Harpe full battledore, spinose, without corona; clasper a fold; ampulla a papilla from the base of the cucullus; clavus strongly scobinated, not produced; uncus simple; ædæagus with serrations at the orifice, extending along the vesica.

Carpophaga.

Harpe small, battledore, spinose, without corona; clasper a small projection; clavus peaked; uncus simple; vesica with small heavily bulbed cornutus and band of teeth.

Capsophila.

I can detect no difference between this and the preceding, unless it be that the band of teeth in the vesica are a little larger and stronger.

Irregularis.

Pencils absent.

Harpe small, battledore, without corona, spinose, especially at the anal angle, which is toothed; clasper a small projection; ampulla a raised process with spines; sacculus produced into a short arm; uncus cygnated; vesica with bulbed cornutus and band of teeth.

Capsincola.

Harpe battledore, spinose, without corona; clasper attached to skin of the harpe; sacculus terminating in a quadrilateral plate; uncus simple; vesica with two small bulbed cornuti, and band of teeth; juxta strongly scobinated and deeply cleft.

Barrettii. From F. de Kane. Pencils absent.

Harpe roughly battledore, spinose; clasper reduced to a fold; ampulla a broad flap; sacculus divided at the apex, where it forms a lobe; uncus broad and tapered; vesica with a spicule and bunch of teeth; juxta scobinated.

Chenopodii; trifolii. From C. H. Walker.
Pencils absent.

In this species the eyes are not hairy, the *Dianthacias* have hairy eyes. (Barrett).

Harpe full battledore, spinose; clasper attached to the skin of the harpe; sacculus asymmetrical, on the right harpe extending in a long dentated arm nearly to the base of the cucullus; on the left harpe this arm is slender, without a crest; clavus on the right side produced and rounded, with a point on the inner side; on the left side there are two scarcely raised lobes; uncus broad, tongue shaped; ædœagus with peaked projection dentated at the orifice; vesica with small bulbed cornutus; juxta peaked.

Conspersa; nana.

Harpe rounded, with corona, the cucullus being thrown to the outer edge; clasper indefinite, attached to the skin; ampulla broad and extending above the cucullus; below the cucullus is a strong pencil of hair attached to the harpe; the sacculus peaked; clavus sharply peaked and clothed with hair; uncus simple; vesica with bulbed cornutus and band of teeth; juxta elbowed forming two long spiculated arms.

Albimacula. From Eustace Banks.

Pencils absent.

Harpe rounded, with corona, the cucullus being thrown to the outer edge; clasper broad, not free; ampulla

broad, extending above the cucullus; uncus simple; vesica with bunch of teeth; juxta divided, with two strong arms, spiculated on the inner surface.

Compta.

Similar form of harpe; uncus cygnated; vesica with bunch of teeth, and a curved bulbed cornutus; juxta more slender than the two preceding species, spiculated at the tip.

Cæsia. From C. S. Gregson. Pencils absent.

Harpe with corona, cucullus extending on the costal edge, elbowed, and spinose; clasper not free; ampulla strong; sacculus with quadrilateral termination; uncus simple; vesica with two short bulbed cornuti.

Dysodea; chrysozona. From S. J. Capper.

Harpe battledore, without corona, spinose; cucullus thrown to the outer edge, the oval joint possibly being a curious form of ampulla; clasper a peaked plate; sacculus terminating in a long arm, the tip of which is lobed and bent at right angles; clavus produced and peaked; uncus tongue shaped; ædæagus ends in a strong tip at the orifice; vesica with a cornutus.

Dentina. From S. J. Capper.

Harpe battledore, spinose; clasper ending in a rounded concave head; ampulla strong, and produced below the cucullus; uncus short, tongue shaped; ædæagus with a strong barb at the orifice; vesica with a short band of teeth, juxta cleft.

Peregrina.

Pencils absent.

Harpe battledore, with corona, spinose; clasper a small pointed arm; ampulla bifurcate at the tip, the inner prong having a small hole; the sacculus terminates in a lobed plate; uncus long and simple; vesica with cornutus and bunch of teeth.

The Polias differ among themselves, but have a strong generic likeness, the three species are easily distinguished specifically.

Polia nigrocincta ; xanthomista.

Pencils absent.

Harpe with the cucullus bent at right angles to the harpe, spinose; the anal angle terminating in a tooth; clasper not free; ampulla a small arm; sacculus extends nearly to the cucullus, terminating in an arm rounded at the tip, which is attached to the outer margin of the harpe; uncus broad; vesica with band of teeth; juxta peaked.

Chi.

Harpe pointed, cucullus a pointed projection arising from below the margin, spinose; clasper not free; ampulla rounded and curved at the tip, often with papillæ protruding from the sides; uncus cygnated; vesica with a band of teeth, and dentated plate above the orifice of the ædœagus.

Flavicincta.

Harpe irregularly emarginate on the margin; spinose without corona; clasper a small pillar; ampulla extends like a pollex from the base of the cucullus; clavus rounded, scobinated, and hairy; uncus short and thick; vesica with two bunches of very long teeth; juxta with a beautiful scobinated head.

Dasypolia templi.

Harpe without corona, hairy; cucullus with peaked pollex; clasper long and curved; editum high and spined; clavus slightly produced and rounded; uncus broad; ædœagus crested at the orifice; juxta peaked.

Epunda lichenea.

Harpe with cucullus divided, spinose, slightly pointed at the tip and strongly pointed at the anal angle; clasper not free; uncus with a hollow cap; vesica scobinated where it joins the ædœagus; juxta rounded and scobinated.

Lutulenta. From S. J. Capper.

Harpe squared above, emarginate on the margin, with corona, and spinose; clasper elbowed; ampulla strong, curved; uncus cygnated; vesica with a bunch of long teeth, besides two smaller bunches.

Nigra. From G. O. Day.

Harpe trigonate, with corona, cucullus not divided, strongly spined at the anal angle; clasper with small club shaped projection; ampulla strong and curved; clavus produced and rounded; uncus simple; vesica with a large bunch of teeth, and a bulbed cornutus.

Cleoceris viminalis.

Harpe without corona, spinose; clasper elbowed, terminating with a round flat plate; ampulla an arm extending towards the cucullus; uncus squat tongue shaped; vesica with bunch of teeth, a bulbed cornutus, and a comb of teeth; juxta strong.

Valeria oleagina. (See the *Plusidee*).**Miselia oxyacanthæ.**

This extraordinary asymmetrical form with its bifurcate uncus, is a complete study, and most difficult to understand.

Left harpe, long and narrow, rounded on the margin, without corona; the clasper angulated at the base, where it meets the sacculus, is short and elbowed; right harpe long and narrow, just above the sacculus it throws out a long curved arm; clasper long and curved; uncus deeply cleft forming two lobes; vesica with a bunch of teeth, and a number of strong cornuti; juxta a thickened plate; vinculum very long.

Bimaculosa. (See the *Cucullias*).**Agriopsis aprilina.**

Harpe without corona, costal margin folds over, nearly to the anal angle, forming a sort of cup; clasper strong and tapered; uncus simple; the membrane of the vesica clothed with short spines; juxta cleft and squamose, particularly at the back of the ædœagus.

Euplexia lucipara.

Harpe trigonate, with corona; cucullus divided, and hairy; below the cucullus is an angular plate, sharply pointed outwards, the harpe again projects to a peaked shoulder; the clasper is long and almost straight, with a second short arm at the base; clavus peaked and scobinated; uncus tongue shaped; vesica contains a long transparent tube.

Phlogophora meticulosa. Pencils present.

Harpe peaked, with corona; clasper long and curved; ampulla a slender arm; uncus curved; vesica with bulbed cornutus.

Trigonophora empyrea; flammea.

Harpe rounded, and pointed at the tip, with a small pillar projecting below, heavily spined on the inner margin; clasper not free; sacculus roundly peaked at the clavus; uncus very short, at the head of a dome-shaped flap arising from the tegumen; vesica with band of teeth; juxta long, producing a strong support for the ædœagus.

The Aplectas contain several forms of genitalia. Some species have a strong hook at the anal angle of the cucullus; this is so strongly marked that I consider it a guide to genera, and should therefore exclude from the genus, *herbida* and *occulta*, which obviously do not belong here. It is possible these two species, with *Miselia bimaculosa* and *Valeria oleagina*, form a connecting link to the *Cucullias*, *Plusias*, &c. As the former are not sufficiently definite to warrant their inclusion in these genera, for convenience they are described under the genus *Aplecta*.

Aplecta herbida; prasina.

Harpe rounded, without corona; clasper *Noctua* form, elbowed, curled at the tip; uncus very long and simple; ædœagus scobinated at the orifice; juxta a plate.

Occulta.

Harpe rounded, without corona, slightly pointed on the margin; clasper truncated; clavus produced, club shaped; uncus simple; vesica scobinated at the orifice, with bulbed cornutus.

Nebulosa.

Pencils present.

Harpe roughly battledore, with corona; cucullus spinose, the anal angle produced, carrying the anal spine; clasper not free; ampulla a scobinated arm; sacculus very broad, extending beyond the outer margin; uncus tongue shaped, having a round hood behind; vesica with a band of teeth.

Tincta.

Harpe roughly battledore, with corona; cucullus spinose, with an anal spine; clasper long and doubly elbowed; sacculus broad, and extending beyond the outer margin; clavus produced and large; uncus cygnated: vesica with band of teeth; juxta a long plate.

Advena.

Pencils absent.

Harpe roughly battledore, with corona; cucullus spinose, with an anal spine; clasper not free; ampulla elbowed; sacculus very broad, extending beyond the outer margin and terminating in a bulb, with a pencil of long spines in the centre; on the upper part of the sacculus is a curious small round hole; uncus simple; vesica with band of teeth,

The Hadænas. In this protean group, we get many and varied forms, *peregrina*, *dentata* and *glauca*, being probably closely connected with the *Dianthæcians*, of the others with the exception of *suasa* and *thalassina* being related the remainder are so different that genitalia fail here to indicate genera, and as in the genus *Tæniocampa*, wing markings and other characteristics must be the guide. I have therefore with the exceptions above-named, taken the *Hadænas* as they are usually arranged in the lists. The extraordinary difference in *cetusta* and *exoleta* should be noted as compared with their wing markings and general build, which some writers might put down to a case of mimicry.

Hadena thalassina. From C. H. Walker.

Pencils absent.

Harpe deeply emarginate on the margin; the costal edge being produced to a sharp curved arm, ending in a tooth; the clasper is difficult to define, it is divided, the basal part curving to a peak, the upper part extending to a rounded plate; the ampulla arises from the base of the cucullus and is a peaked plate; clavus peaked; uncus simple; vesica with a short band of teeth, and irregularly shaped small bulbed cornutus.

Suasa ; dissimilis.

Harpe deeply emarginate on the margin, the costal edge being produced to a sharp curved arm, ending in a tooth, anal angle of cucullus rounded; clasper similar form to preceding, the basal part extending to a long peaked arm, the upper part terminating in an irregularly shaped head; ampulla elbowed; clavus peaked; uncus simple; vesica with short band of teeth.

Pisi.

Harpe with spinose cucullus, which is peaked inwards; the costa is broken by two arms proceeding from its edge, the lower arm being long, the upper peaked; clasper not free; uncus cygnated; ædœagus with a strong hook at the orifice; vesica with an irregular shaped cornutus.

Atriplicis.

Harpe irregularly quadrilateral; cucullus divided, densely clothed with long straight hairs; clasper curved and pointed; uncus flattened and pointed; ædœagus scobinated at the orifice; vesica with strong irregularly shaped cornuti.

Contigua.

Harpe with similar long hair as in *atriplicis*, cucullus divided and peaked on the anal angle, from the point of which extends two small teeth; clasper curved; ampulla flattened and curved; uncus tapered; vesica with bunch of long teeth and a short bulbed cornutus.

Protea.

Harpe with an emarginate prolongation of the margin; cucullus divided, with corona, and hairy; clasper curved, with a bulbed base; ampulla a long pointed arm; uncus sickle form; vesica with three long cornuti and band of teeth.

Rectilinea.

Harpe with corona; cucullus rounded at the anal angle, spinose; the costal tube leaves the margin and extends to the opening of the cucullus; the clasper is elbowed, ending

in a foot; sacculus broad and extended towards the cucullus in a free lobe; uncus short, spatulate and rounded at tip; vesica without teeth.

Satura ; porphyrea. Pencils present.

Harpe rounded, the costal tube, soldered along the base of the cucullus, extends beyond, forming a pollex; cucullus heavily spined; clasper not free; ampulla reduced to a wart, emitting a few short spines; uncus short and tongue shaped; ædœagus has the orifice dentated; vesica with a small band of teeth; juxta cleft in the centre.

Adusta.

Harpe with corona, spinose; inner margin of cucullus extended to a blunt point; clasper reaches to the base of the cucullus, and forms a foot; ampulla a very long slender club, spined; uncus flattened and bluntly pointed; vesica with a comb of irregular teeth, and a band of teeth; the juxta terminates in two long scobinated arms.

Xylocampa lithorhiza ; areola. From
G. C. Bignell. Pencils absent.

Harpe with corona; cucullus produced in a sharp peaked pollex; clasper, an arm with a flattened lobed head; sacculus peaked above on the inner margin; uncus cygnated with a sharp curved point; ædœagus scobinated at the orifice; vesica crowded with several bunches of long teeth.

Xylomiges conspiciellaris. Pencils absent.

Harpe without corona; cucullus trigonate, and divided, with a few spines; clasper elbowed, terminating in a short rounded arm; ampulla a strong curved arm; clavus produced irregularly, spinose; uncus cygnated; vesica with a bunch of teeth, and three bulbed cornuti.

Calocampa vetusta.

Harpe rounded at the anal angle, without corona; clasper long and curved; uncus tongue shaped; vesica with bulbed cornutus, and bunches of teeth.

Exoleta.

Harpe a curious form, bifurcate, without corona, inner point small and peaked, outer of much thicker chitine is larger and also peaked, but bent at right angles: clasper a curved arm; uncus parallel to the tip which is broad and flattened; vesica has a bulbed cornutus also a slender cornutus; juxta peaked in the centre.

Solidaginis.

Harpe broad and rounded, without corona, or spines: cucullus which hardly leaves the costa, small, peaked at the anal angle; armature of harpe absent: uncus tapered; vesica without teeth.

The Xylinas bear as a rule a strong family likeness, *zinckenii* probably forming a connecting link to the *Cucullias*. The following genera require a good deal of re-arranging, and I believe the genitalia will prove an important help in the sequence. There is a certain amount of connection between the groups, which in the present classification, has unfortunately been interrupted, by interspersing several little odd genera among natural relatives. The *Cucullias*, with their narrow coronated harpes and simple clasper, lead to the *Heliothidæ*, from which should be excluded *Anarta* and *Heliaca*. The harpe of the *Heliothias*, being very closely allied to the *Cucullias*, except that the clasper is lost. *Asteroscopus*, including *Valeria oleagina* and *Miselia bimaculosa* again form another connecting link, and continue the sequence to the *Plusidæ*, which may be followed by *Habrostola* and made to include, or at any rate be followed by the *Amphipyridæ*.

Xylina rhizolitha; ornithopus.

Harpe with small cucullus divided, with a few spines of corona; clasper long and curved; ampulla extends below the cucullus in a long curved arm; clavus produced and roughly rounded; uncus tapered; vesica with small bunch of teeth.

Petrificata; socia. From J. W. Tutt and R. South
Without pencils.

Harpe with small cucullus divided, has a few spines of corona; clasper a long curved arm; ampulla extends below the cucullus in a straight arm, below this is a second peaked projection; sacculus very broad; clavus rounded; uncus cygnated; vesica with a band of strong teeth.

Semibrunnea. From J. E. Robson and R. South.
Without pencils.

Harpe peaked, without corona; clasper a stout curved arm; ampulla extends below the cucullus in a long curved arm, rounded at the tip; below this is a second plate of some size; sacculus very broad; clavus rounded; uncus cygnated; vesica with two bands of teeth.

Conformis; furcifera. From J. A. Clark.
Pencils absent.

Harpe with part corona; clasper stoutly peaked; ampulla produced and peaked; clavus scobinated; uncus terminating with a curious broad tip; vesica clothed with fine scobinations.

Zinckenii; lambda. Pencils absent.

Harpe slender, without corona; clasper curved; ampulla extends to the tip of the harpe, and is studded with numerous papillæ bearing spines; clavus slightly produced; uncus tongue shaped; vesica with two short bands of teeth.

The Cucullias may easily be differentiated by the clavus, which varies in each species, except the mythical *scrophularie*. I have failed to satisfy myself that this species really exists. The Continental dealers send out specimens of *verbasci* and *lychnitis* when *scrophularie* is ordered; sometimes in a series so sent there will be included specimens of each of these. The so-called English *scrophularie* from Kent is identical with *verbasci*. Years ago Mr. Robson sent me "true *scrophularie*," this I have figured for what it is worth, but until reliable material is forthcoming, *scrophularie* can have no place in our lists.

Cucullia verbasci. From R. South.

Harpe tapering to the tip, with a very short corona; clasper flattened on the lower surface; clavus produced and rounded; uncus straight with a curved pointed tip; vesica with a long, strong, bulbed cornutus, and a finer one about half the length.

Scrophulariæ. From John E. Robson.

Harpe long slender and parallel, with a corona of fine spines; clasper lies just below the upper half of the harpe, and is flattened on the lower surface; clavus rounded and spinose; uncus straight with a curved pointed tip; vesica with a large and small bulbed cornutus.

Lychnitis. From Eustace Bankes and R. South.

Pencils absent.

Harpe broader than the preceding species, with a full corona; clasper lies below the upper half of the harpe, and is flattened on the lower surface; clavus rounded and spinose; uncus straight with a curved pointed tip; vesica with a large and small bulbed cornutus.

Asteris. From S. J. Capper.

Harpe slightly tapered, wider above, with full corona; clasper lies on the upper third of the harpe, and is bulbed to a point; clavus produced to a small irregular knob, spinose; uncus cygnated; vesica has two strong cornuti not heavily bulbed.

Umbratica.

Harpe wide, almost parallel, with full corona; clasper, lies below the centre and is an irregular arm, bent at right angles; before the tip just above the clasper is a raised fold which probably represents the ampulla; the clavus is produced to a stout column, curved and blunt at the tip; uncus long and tapered to a point; the vesica has a strong cornutus, double the length of a second one, as well as a third small one; vinculum long.

Chamomillæ. From S. J. Capper.

Harpe widens considerably above, with full corona; clasper short, and flattened above; clavus a long club

shaped arm ; uncus short and stout, curved at the base ; vesica with two bulbed cornuti of nearly equal length ; vinculum short.

Absynthii. From C. H. Walker.

Harpe almost parallel, with full corona ; clasper lies below the centre, is wide, pointed and flattened above, and studded with short bristles ; clavus not produced ; uncus has a cobra-shaped head, ending in a point ; vesica has two cornuti, one a little longer and stouter than the other.

Gnaphalii. From A. Robinson, per H. M. Edelsten.

Harpe broad at the base, with full corona ; clasper lies just above the centre, is flattened below, and studded with short bristles above ; clavus not produced, with serrated edge ; uncus cygnated ; vesica with a single strong cornutus.

Asteroscopus nubeculosa. From Mrs. Hutchinson.

Harpe drawn to a point at the apex ; the corona very long, extending considerably along the outer margin ; the clasper is absent, the only indication being three or four spined warts ; clavus rounded ; uncus broad, pointed, and curved with the tegumen ; vesica with strong bunches of long teeth.

Cassinea ; sphinx.

Harpe rounded, without corona ; clasper a short curved arm, well spined ; the sacculus joins the outer margin in a sharp point ; uncus broad and parallel ; vesica with a bunch of regular longish teeth.

Miselia bimaculosa.

Harpe slightly wider below, with full corona ; considerably below the centre is the clasper, a strong clubbed arm with openings in the chitine ; clavus hardly produced, with long hairs ; uncus tapered ; vesica scobinated where it joins the ædœagus at the orifice, with bunches of strong cornuti of various thicknesses.

Valeria oleagina. From A. Harrison.

Pencils absent.

Harpe rounded, without corona; clasper a straight arm, slightly flattened; clavus produced, spinose; uncus wider in the centre; vesica with five cornuti, and a large and small scobinated process, the latter crested. There is little doubt these two latter species belong to the same genus.

Heliothis marginata; umbra.

Harpe parallel, rounded at the apex; the cucullus, which is undivided, bends inwards, and is thickly studded with four or five rows of spines; just below the centre of the harpe is a short straight clasper, little more than a papilla; uncus slender; the vesica has a long and a short bulbed cornutus.

Peltigera. From Eustace Bankes. Pencils absent.

Harpes widened above, with a long double corona; clasper absent; uncus simple; the vesica has a long band of ridges, like a spiral wire spring in appearance.

Armigera.

Pencils absent.

Harpes wide, parallel, and rounded above, with a double corona, the margin being thickly clothed with beautiful broad scales; uncus slender; vesica with a long band of cornuti gaining in strength towards the tip.

Dipsacea.

Pencils absent.

Harpe widens above, with double corona, clasper absent; uncus with scaphium, very long, slightly broader at the tip which is rounded, and curved outwards terminating in a hook; vesica has a long band of ridges, like a spiral wire spring, similar to *peltigera*.

The Plusias all bear a strong family likeness. With the exception of *moneta*, which has none, the remainder of the genus have a pair of long hair pencils arising from the 8th segment. All species without corona.

Plusia chrysitis.

The harpe narrows to a sharp point, outer edge angulated, each projection terminating with a marginal spine; clasper

a short arm flattened below; clavus a long clubbed arm; uncus simple; ædœagus scobinated at the orifice; vesica with a mass of very short fine teeth.

Festucæ.

Harpe not pointed, with marginal spines; clasper a slender arm; clavus very long and clubbed; uncus slender and curved; vesica with a strong cornutus.

Iota.

Harpe rounded at the anal angle, with marginal spines; clasper a slender arm; clavus a long slender club; uncus simple and curved; vesica with a strong cornutus.

V-aureum; pulchrina.

Harpe rounded at the anal angle, with marginal spines; clasper a slender arm; clavus a long slender club; uncus simple and curved; vesica with a strong cornutus.

Gamma.

Harpe wider above, anal angle angulated, with marginal spines; clasper very slender; clavus a slender club; uncus simple and curved; vesica with one strong cornutus, and a smaller curved one, heavily bulbed.

Interrogationis.

Harpe narrowed above, with marginal spines; clasper a sharply pointed curved hook; clavus very short, tapered; uncus simple and curved; vesica with curved bulbed cornutus.

Bractea. From J. E. R. Allen. Pencils absent.

Harpe not rounded, with marginal spines; clasper very long and slender; clavus an exceedingly long club; uncus exceedingly long and curved; vesica with a strong cornutus; the vinculum has two lateral flaps before the tip.

Orichalcea; chryson. From E. R. Bankes and J. W. Tutt.

Harpe angulated, with marginal spines; clasper very long and parallel; clavus long and clubbed; uncus simple, slightly larger before the tip; vesica with a short cornutus with a rounded head, and blunt curved tooth at the orifice of the ædœagus.

Moneta. From John E. Robson.

Harpe short, rounded, with marginal spines; clasper long and slender; clavus a short slender arm; uncus short and curved; vesica with a bulbed cornutus; on the dorsal side below the uncus is a round spined cap.

Amphipyra pyramidea.

Harpe simple, without armature, the apex thickly clothed with strong hairs; uncus broadens to a pointed bulb at the tip; vesica with a bunch of long teeth or spines.

Tragopogonis.

Harpe with an undivided cucullus, broader and rounded, thickly clothed with hair; clasper a short bulbed arm; clavus just raised; uncus broad; vesica with a bunch of long teeth or spines of irregular thickness.

Mania typica. From A. Tippins.

Harpe narrowed; the sacculus extends to, and joins, the cucullus, forming a hood; the clasper a strong tapered hook; uncus simple and curved; ædœagus scobinated at the orifice.

Maura. From F. Birch.

Harpe squared above; the sacculus extends to the cucullus, forming a hood; the costal tube extends beyond the cucullus in a pointed arm; the clasper is reduced to a few papillæ; uncus simple; vesica with bands of short teeth.

Habrostola urticæ; tripartita. From S. J. Capper.

Harpe peaked, the costal edge being broadly bulged out, without corona; clasper a straight arm; clavus produced and peaked; uncus sickle form; ædœagus with a double toothed process at the orifice; vesica with a mass of slender teeth.

Triplasia. From S. J. Capper.

Harpe peaked, the costal edge being bulged out, more peaked than the preceding; clasper curled at the tip; clavus peaked; uncus sickle form; ædœagus terminating at the orifice with a scobinated process, on one side; and a curved hook, or possibly a bulbed cornutus on the other; vesica with a mass of large and small spines.

Gonoptera libatrix.

This species is a very distinct one, it is usually put in a family by itself, and undoubtedly the genitalia strengthen this arrangement, it is unlike any other pattern of British *Noctuidæ*; but the strong scaphium, forming almost a mandibulate uncus, shows that at any rate it is closely connected with some of the curious little families that are now placed at the end of our *Noctuidæ*. These families are no doubt sufficiently divergent, to warrant their being separated, but as the species composing them are largely asymmetrical in the harpes, it is quite a question if they are not more closely allied to one another, than we are generally led to suppose. In the order that they come in the ordinary lists of species, *sulphuralis* and *luctuosa* are both asymmetrical. There is no possible similarity between *venustula* and *fuscula*, to suggest that they belong to the same genus. *Mi* and *glyphica* are obviously far apart, and yet bear some superficial likeness; *alchymista* is closely connected with the *Catocalas*, and may be in another genus, but certainly the same family, *pastinum* and *craccae* are strongly generic. As the genitalia throw but little light on the groups, I have thought it wise to take them as already placed in the lists.

Gonoptera libatrix.

Harpe simple, rounded above, without corona; the sacculus extends beyond the cucullus; uncus is flattened at the tip and is hooded; the scaphium is long; ædæagus finely scobinated; juxta double peaked. This is a remarkably small genital appendage compared with the size of the insect.

Anarta melanopa.

Pencils absent.

Harpe battledore, and turned over as in the *Dianthæcias*; sacculus is peaked above, and squamous; clavus rounded; uncus broad, with a square tip; vesica has a short bulbed cornutus.

Cordigera.

Harpe incurved along the costa, producing a point where the cucullus breaks away and protrudes outwards; clasper

appears to join the ampulla, and is a short arm; sacculus extends into a long squamous arm, curled at the tip; uncus short; vesica with a short band of teeth.

Myrtilli.

Harpe asymmetrical, battledore, similar to *melanopa*; left clasper a rough tapered arm; right clasper much larger; produced into a peaked flattened plate; the left sacculus extends to the base of the cucullus, the upper half being squamous, the apex is bifurcate, forming two sharp prongs; the right sacculus extends just above the centre of the harpe, into a squamous peak; uncus cygnated; vesica with a large bulbed cornutus.

Heliaca arbuti; tenebrata.

Harpe simple, the armature being only indicated by a thickening of the skin; uncus sickle form, stouter in the middle; the vesica thickly clothed with long teeth.

Agrophila sulphuralis; trabealis.

Harpe almost square above, with corona of fine spines, asymmetrical; the right clasper pointed, broader at the base than the left; the right ampulla fairly stout, clubbed, and clothed with numerous short spines; that on the left side is slender, not clubbed, and set with two or three short spines; uncus sickle form; vesica with a few short cornuti; juxta asymmetrical, right side peaked, left side not peaked; there are pencils of hair on the eighth segment.

Acontia luctuosa.

Harpe roundly peaked, asymmetrical, without corona; the right clasper is an elbowed cone, the left side being a round flattened plate with a few spines scattered over it; uncus simple; œdœagus is strongly curved; vesica has an oval scobinated plate.

Erastria venustula.

Harpe peaked, spinose; the clasper near the base of the harpe is slender, elbowed above, with a curled tip; ampulla a small papilla at the base of the cucullus; uncus simple; vesica with large bulbed cornutus.

Fuscula; fasciana.

Pencils absent.

Harpe peaked, rounded at the anal angle, below which the edge is emarginate, clasper a fold; sacculus is crested at the clavus; uncus slender; vesica has a long arm with spatulate head with scobinations upon it.

Bankia argentula.

Harpe simple, peaked, without corona or armature; uncus slender, with a very small curved hook at the tip.

Hydrelia unca; uncula

Without pencils.

Harpe tapered to a point, below the cucullus on the costa is a long peaked arm, armature absent; the uncus is slender, terminating in a large club; vesica with a brush of short spines.

Phytometra ænea; viridaria.

Pencils absent.

Harpe rounded; the cucullus is long, thickly clothed with hair; at the anal angle is a pollex; clasper very broad at the elbow, the tip open and set with short spines; uncus slender with a scaphium; vesica without armature; juxta peaked to a point, which is scobinated.

Euclidia mi.

Pencils absent.

Harpe emarginate on the margin, rounded where it meets the costa, peaked on the outer margin, without armature the sacculus extended in a long arm beyond the cucullus; uncus with a claw arising before the tip, and overlapping it, vesica clothed with numerous small teeth; juxta a squamous peak; the similarity of the formation of this species with *Gonoptera libatrix* is distinctly noticeable.

Glyphica.

Pencils absent.

Harpe asymmetrical, almost parallel, slightly broader before the tip, which is rounded and has no corona; the left sacculus branches into two long arms, the outer arm, entirely attached to the edge of the harpe, is shorter than the other and curved; the inner arm, sharply elbowed, extends to a long scobinated club, tipped with a sharp point; the right sacculus, forming a semi-circular plate where it joins the edge of the harpe, clothed with long hairs; uncus elbowed in the middle, with a raised flap before the pointed tip; ædæagus very long; vesica with minute teeth.

Catephia alchymista.

Harpe asymmetrical, square above, without corona, the costal margin on the left side extends, leaving the harpe below the cucullus, to a truncated pillar, the upper surface of which is concave; on the right side this is peaked; the clasper on the left side is a plate, broad at the base, emarginate before the tip, forming a sharp curved point; on the right side it tapers, and extends to a simple arm; the uncus ends in a long point, and has a strong scaphium; (in this species the uncus is mandibulate); the ædæagus is elbowed in the middle like a boomerang, and is without armature; the strong juxta is doubly emarginate produced laterally into two peakes, with a third peak in the centre.

The Catocalas have the largest genitalia, *sponsa* being the largest of all British species of *Noctuidæ*; they are strongly generic.

Catocala fraxini. From J. E. Robson.

Harpe without corona, the costal edge is a thick chitinous tube, to which is attached a hollow sac of thin membrane; the clasper is a short spatulate arm curled at the tip; the uncus is almost straight terminating in a curved hook; the ædæagus is very long and curiously twisted, the base being almost at right angles, and the upper part bent in the opposite direction, forming a rough letter S. The juxta is peaked and divided in the centre.

Nupta. From S. J. Capper.

Harpes asymmetrical, the left harpe of thin membrane; the right harpe peaked, the thickened costa extending considerably beyond the harpe, is dentated on the inner edge; the clasper is a curved hook, wider on the right side; the uncus is mandibulate, with scaphium; the ædæagus is long and slender; the upper and lower parts both being bent in the same direction; juxta not pointed.

Promissa. From S. J. Capper.

Harpe rounded, with an extended flap on the anal margin; clasper elbowed, curled at the tip of the arm; uncus mandibulate with scaphium; ædæagus long and slender, upper and lower parts curved in the same direction; juxta roughly peaked.

Sponsa. From Fred. Birch.

Harpe broad, squared above, the surface being quite plain with the exception of some half dozen spines; the clasper is a curved arm; uncus mandibulate with scaphium; ædœagus long and slender, bent sharply near the base; juxta peaked.

Toxocampa pastinum.

Harpe narrow, peaked, without corona; the clasper is just produced, from a long fold which emerges below the cucullus, in a small hook; the ampulla is a little wart with spines; the uncus is curved; the vesica is clothed with minute teeth; the juxta is peaked; the vinculum rounded.

Craccæ. From W. G. Sheldon and A. Harrison.

Harpe peaked; clasper a short arm curled at the tip; the ampulla arises from the surface of the cucullus; uncus is curved; vesica with small scobinated process, and short band of fine teeth; vinculum rounded.

Brephos is undoubtedly a connecting link to the *Geometers*. The species have nothing in common with any group of *Noctuidæ*.

Brephos parthenias.

Harpe simple, without trace of clasper or ampulla; the uncus is articulated to the tegumen, and is parallel above, except where it bends, when it is wider; below the uncus is a plate with a scobinated edge.

Notha. From J. E. Robson. Pencil absent.

Harpe broad to the centre, where it bulges out, above it is peaked, without armature; the uncus is tongue shaped and articulated to the tegumen; below the uncus is a thin plate with a strong edge, furnished with rows of spines; vesica with small cornutus.

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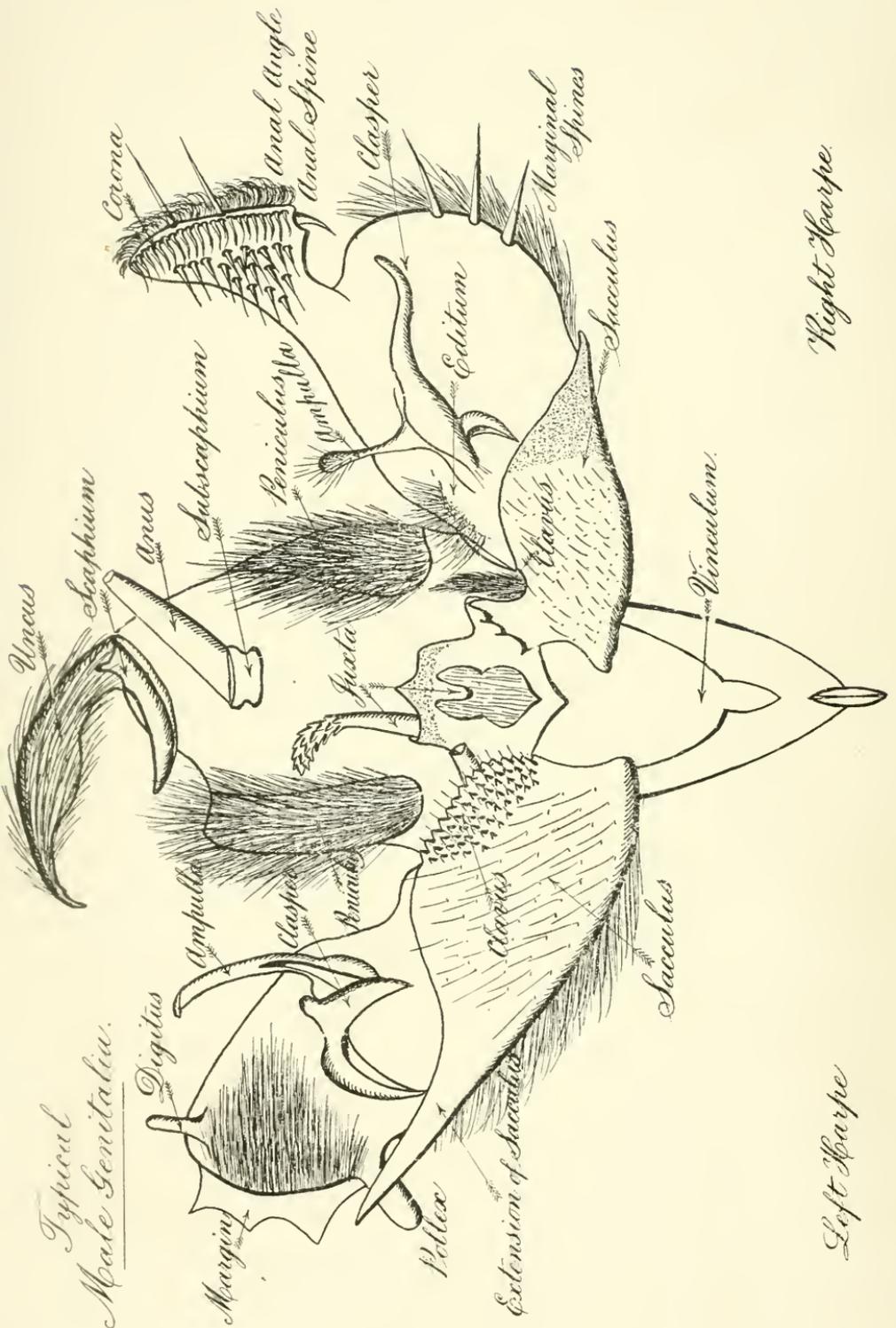
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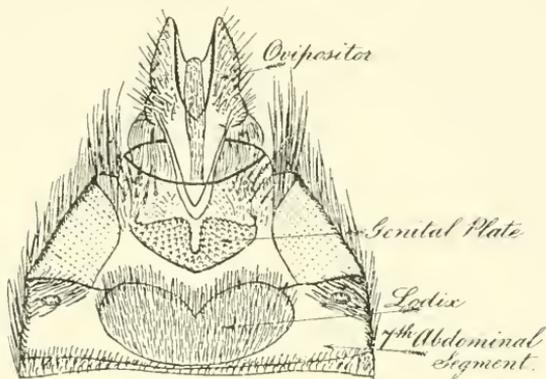
65 SOUTH JOHN ST., LIVERPOOL

Typical
Male Genitalia.



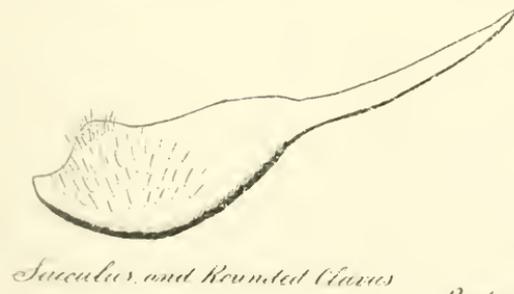
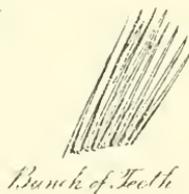
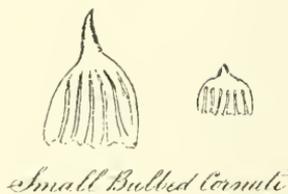
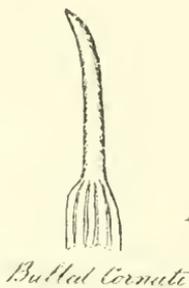
Right Sharpe.

Left Sharpe.

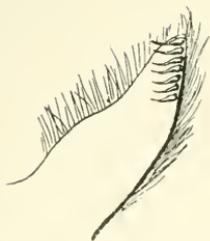


Genitalia of Male.

Penis.



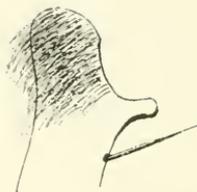
Cucullus



Peaked Harpe.



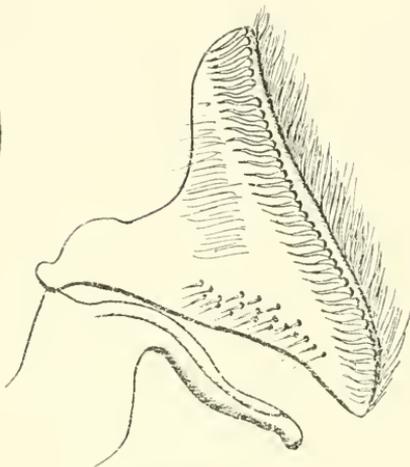
Bifurcate Harpe



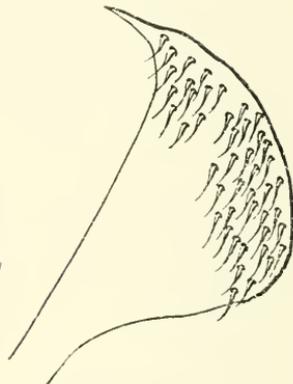
Harpe with Pellex and Marginal Spine



Bullator



Trigonate.



Bullator

Uncus



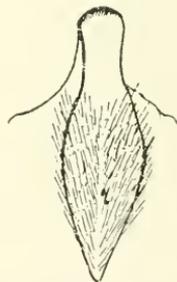
Simple Uncus



Hooked Form Uncus



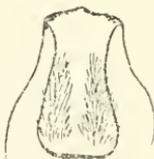
Cymbated Uncus



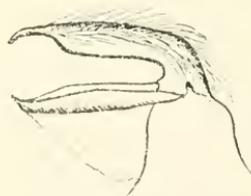
Tongue Shaped Uncus.



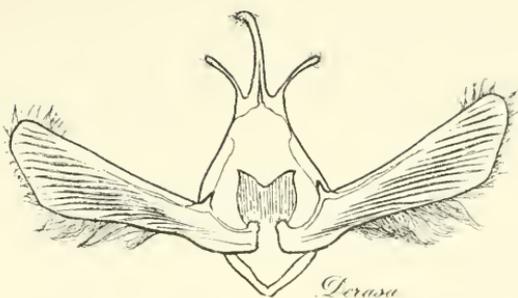
Uncus Diamond Tip



Uncus Spatulate



Uncus Mandibulate

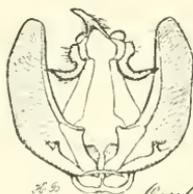


Terasa



x 30

Patis



x 50

Ocularis



x 50

Nuctiosa

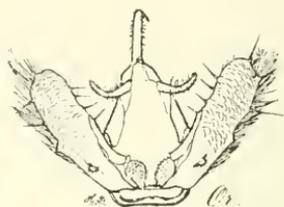


x 30

Lalula

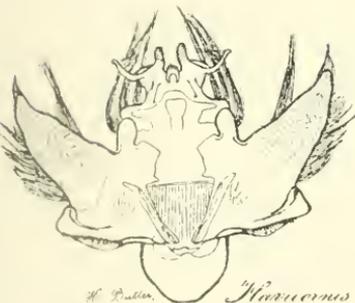


Duplaris



x 50

Cr.



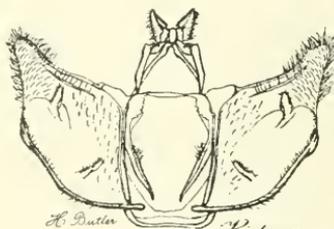
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Hauricrus



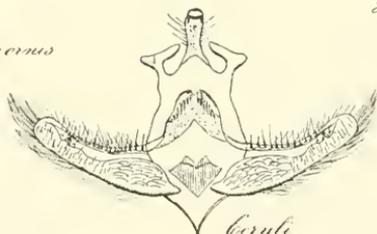
x 30

Pella



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Redens



Ceryle

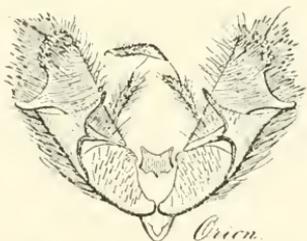


x 30

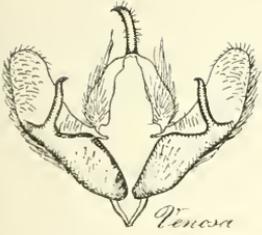
Haudifera



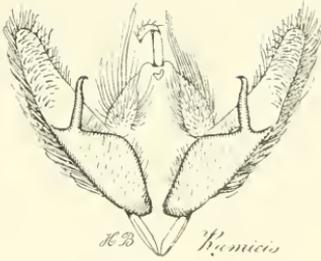
Impar



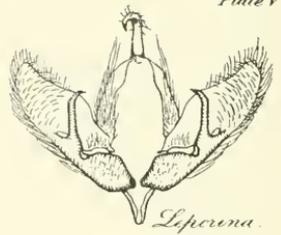
Cucu.



Venosa



H. B. *Hemiciis*



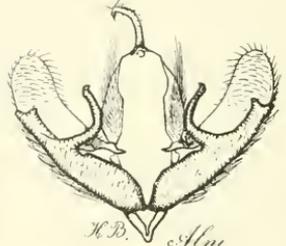
Leporena



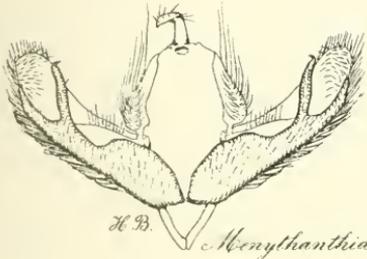
H. B. *Myrica*



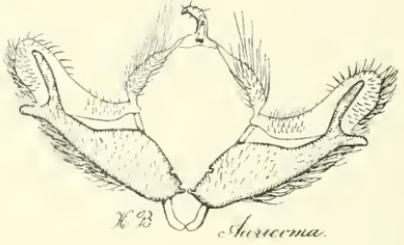
Aceris



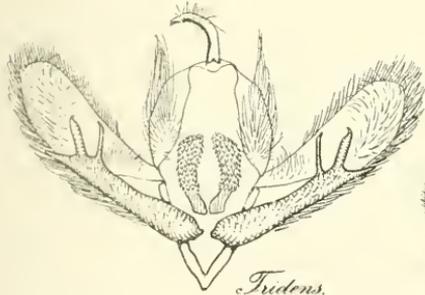
H. B. *Alni*



H. B. *Morythanthidis*



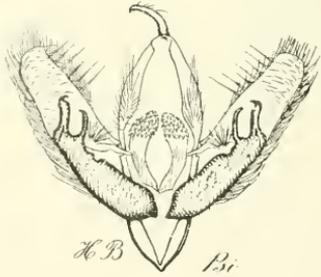
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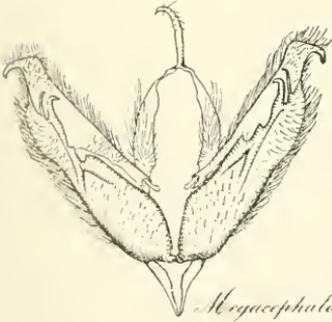
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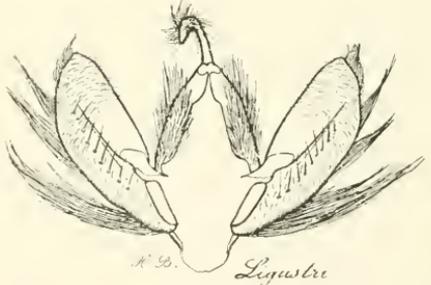
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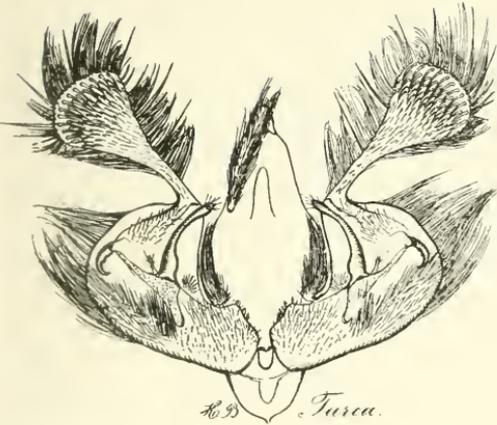
H. B. *Bi*



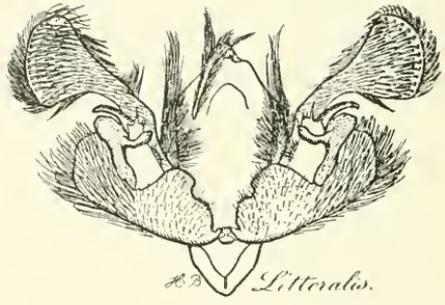
Megacephala



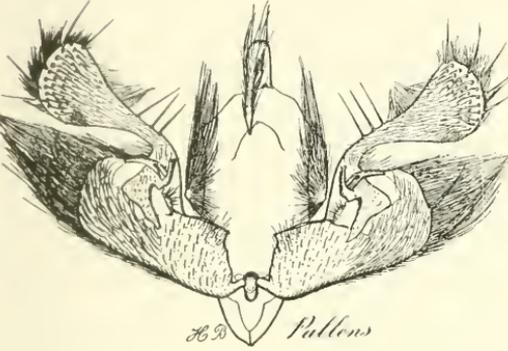
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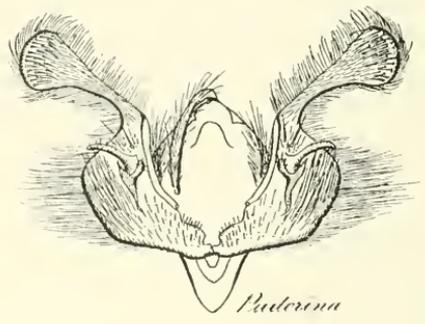
H.B. *Furca.*



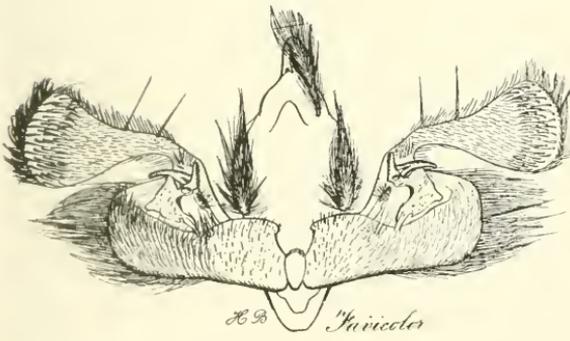
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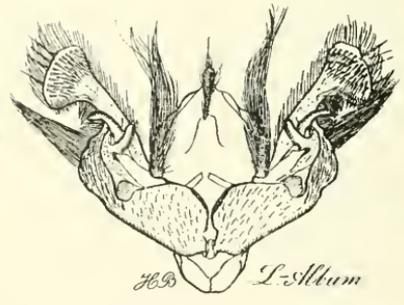
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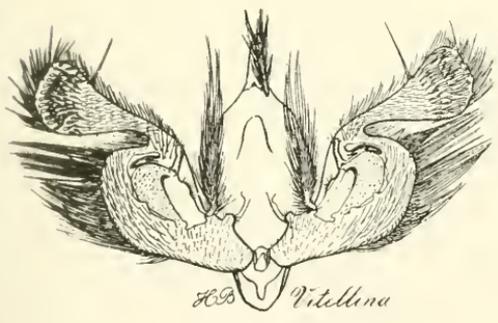
Puderina



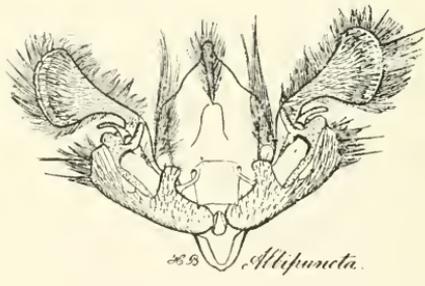
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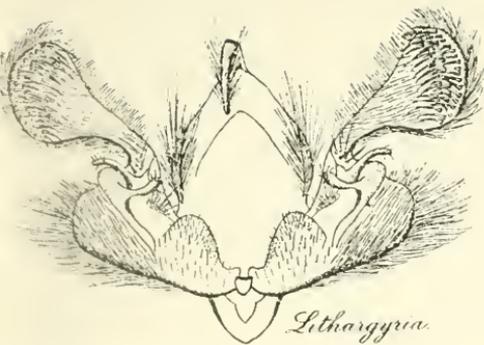
H.B. *L. Album*



H.B. *Vitellina*



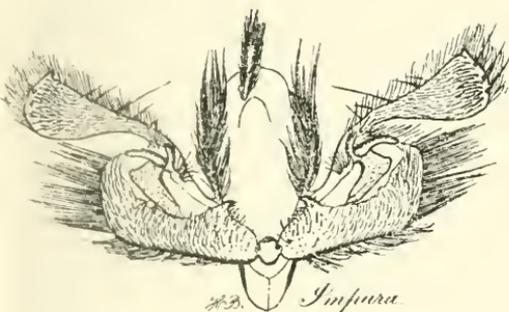
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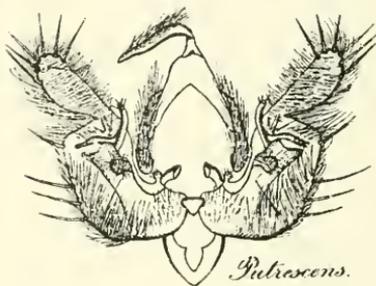
Lithargyrea.



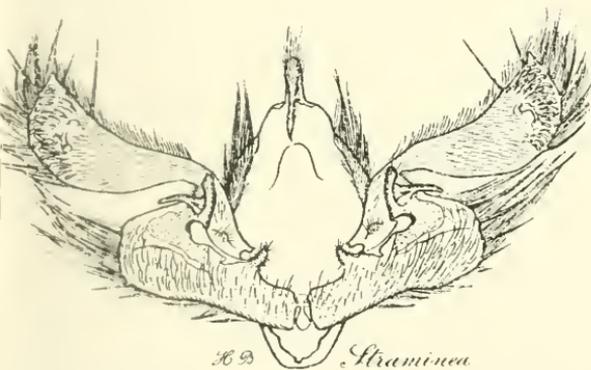
H. P. Conigera.



H. P. Impura



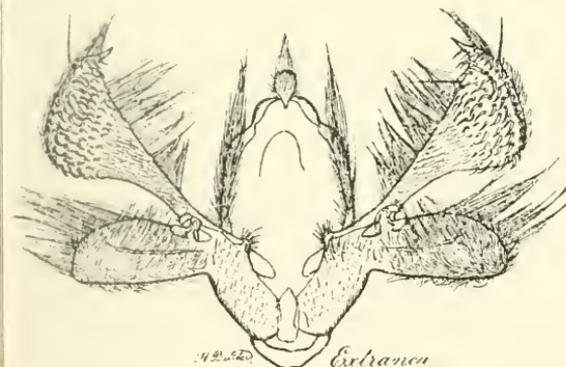
Pulviscens.



H. P. Straminea



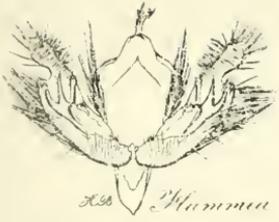
Obsoleta



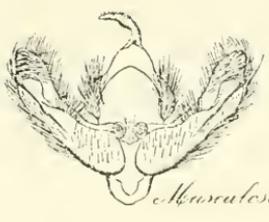
H. P. Extranea



Comma.



328 *Hammea*



Musculosa



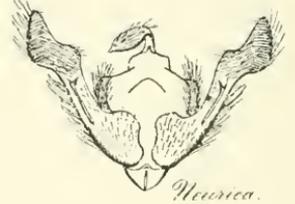
Lutea



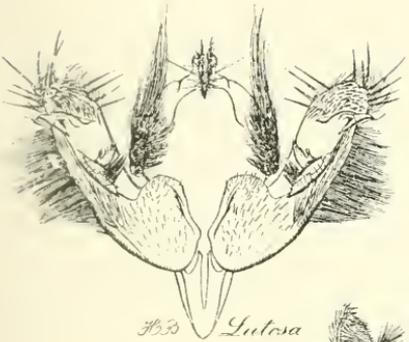
329 *Gemenipuncta*



330 *Arundinula*



Nevrica



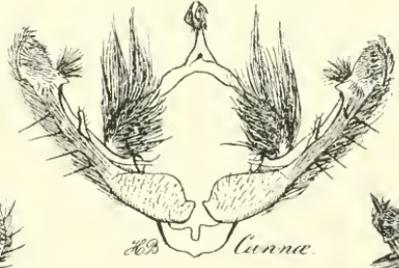
331 *Lutesa*



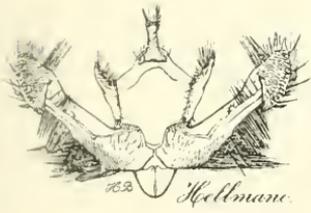
Dispecta



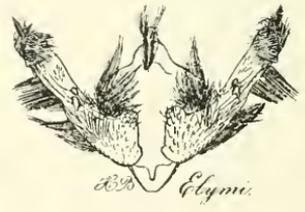
Flavoge



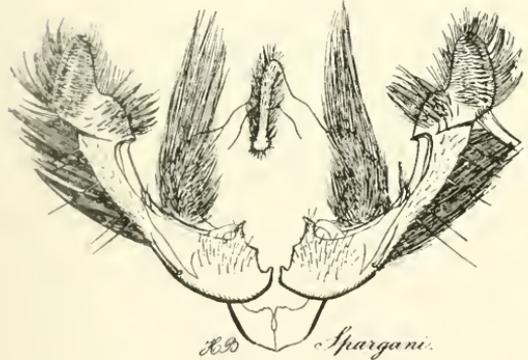
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333 *Hollmani*



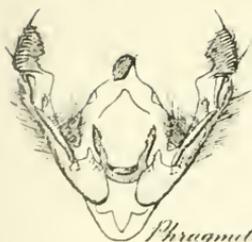
334 *Elymi*



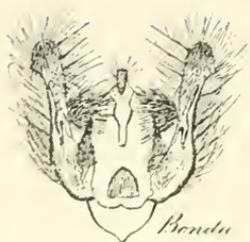
335 *Spargani*



336 *Typha*



Phragmitides



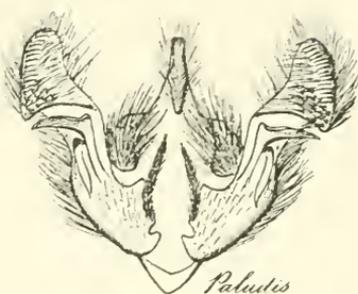
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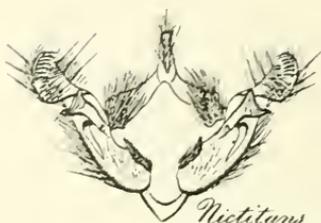
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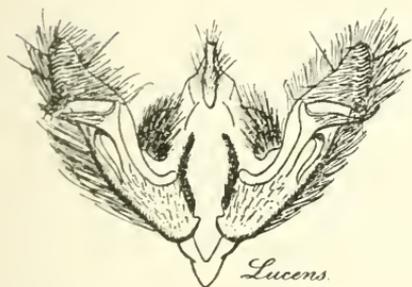
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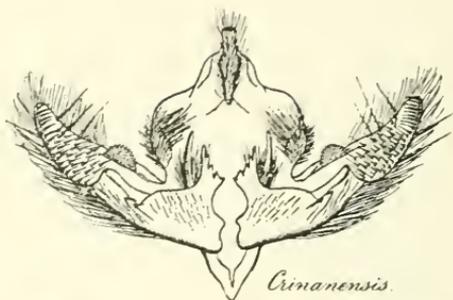
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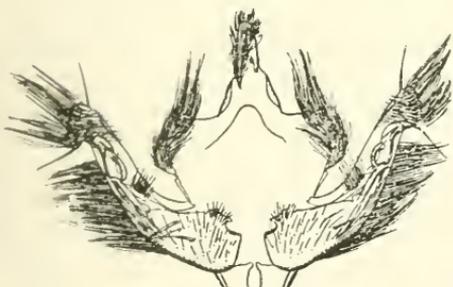
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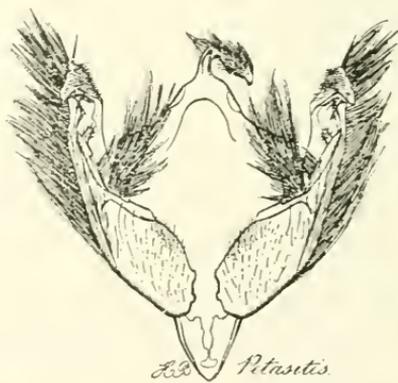
Lucens



Crinanensis



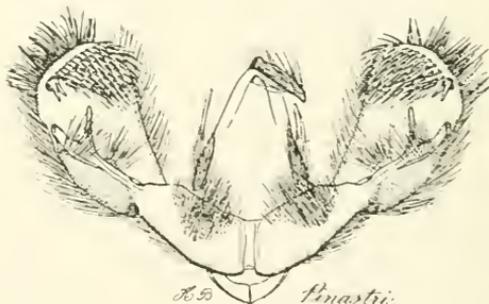
Micacea



Pitastis



Brevilinea



Pinastis

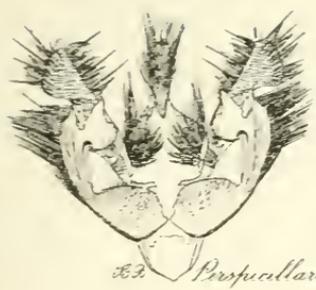


Fig. Profulcarius

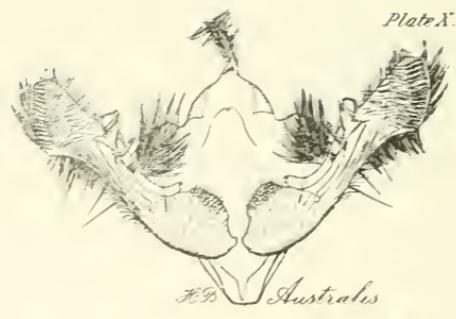
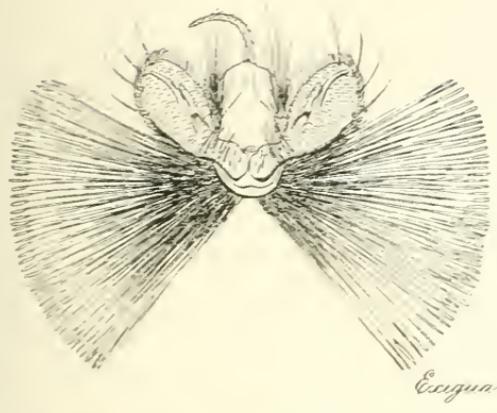


Fig. Australis



Ecigua

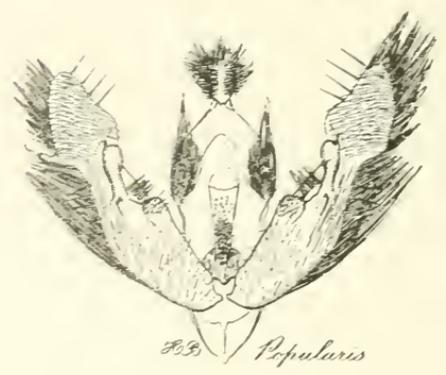
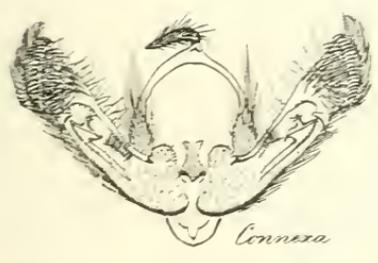


Fig. Popularis



Connexa

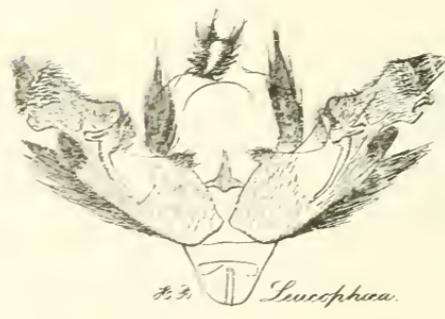


Fig. Luciphica



Hirsuta

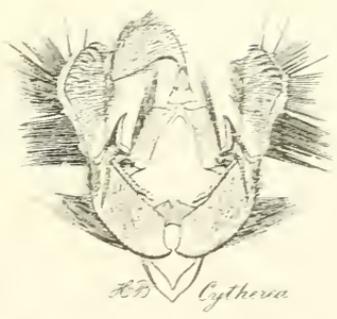
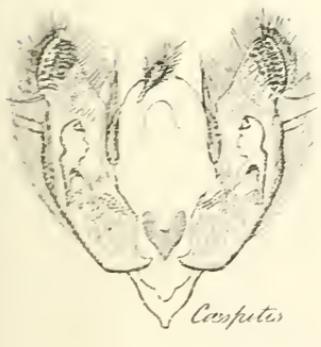


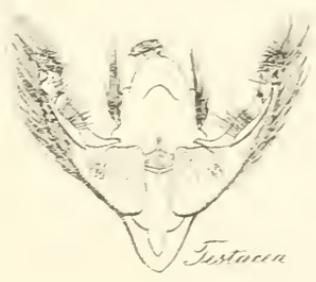
Fig. Cythera



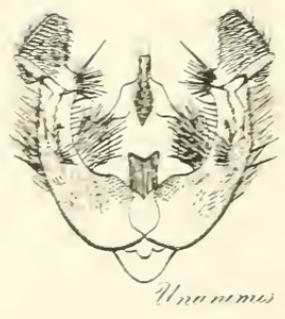
Dumereti



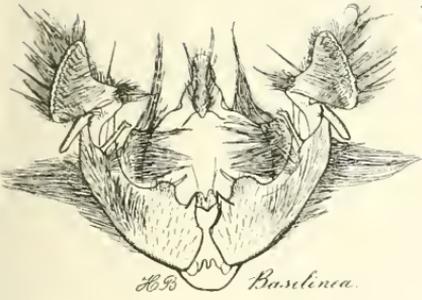
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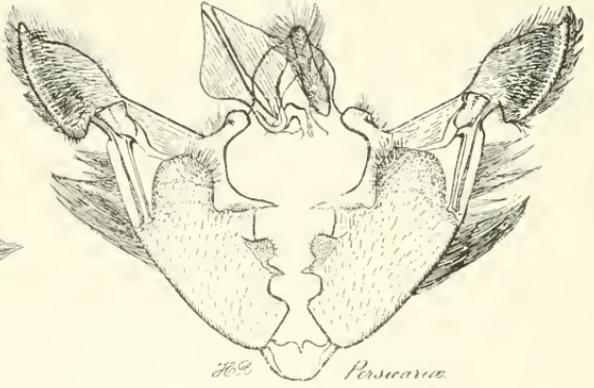
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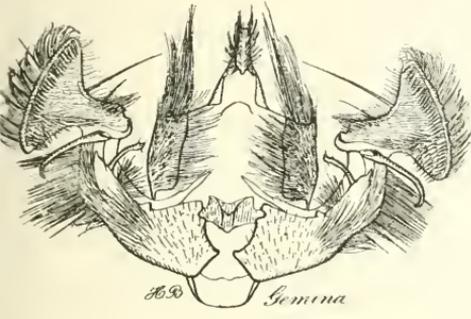
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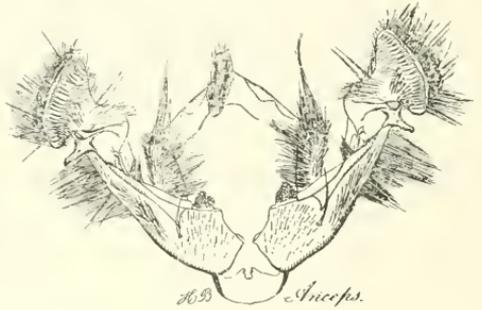
H.B. *Basileia*



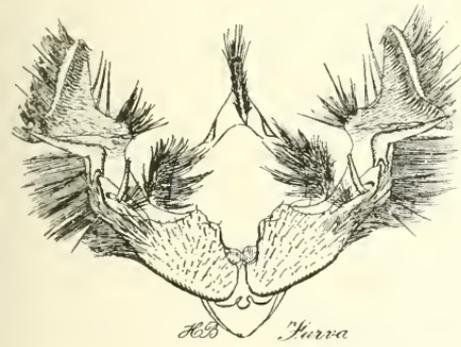
H.B. *Pescicaria*



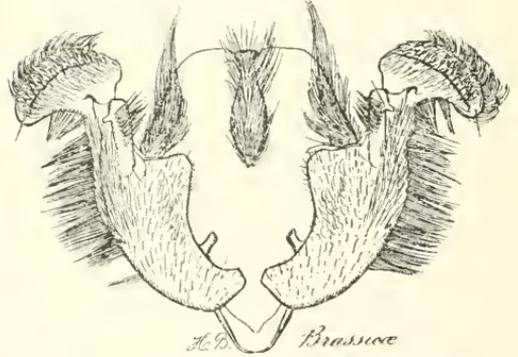
H.B. *Gemina*



H.B. *Ancops*



H.B. *Furva*



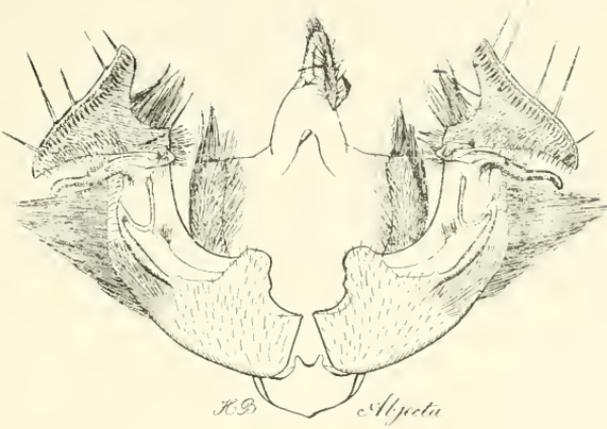
H.B. *Brassice*



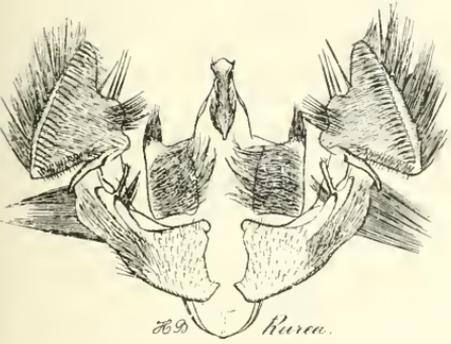
H.B. *Allicton*



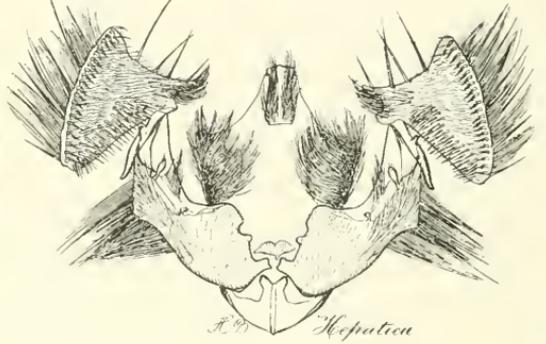
H.B. *Saponava*



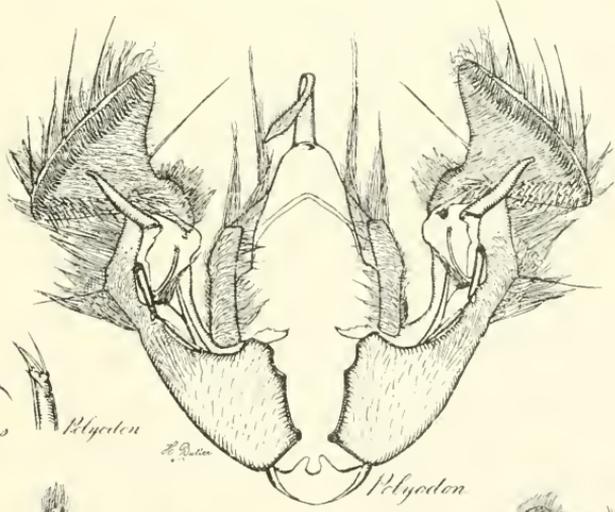
H.B. *Hyeta*



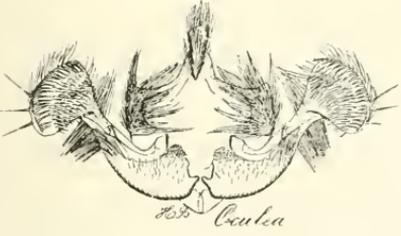
H.B. *Kura*



H.B. *Hepatic*



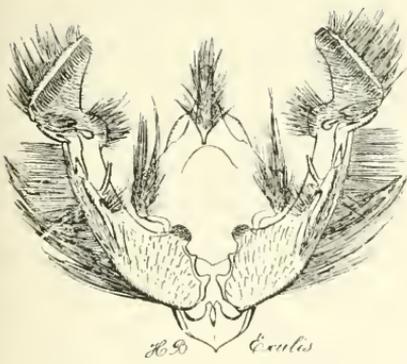
Sublustris *Polyodon* H. B. *Polyodon*



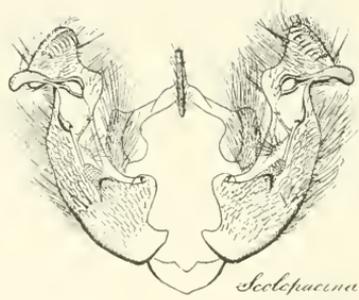
H.B. *Caula*



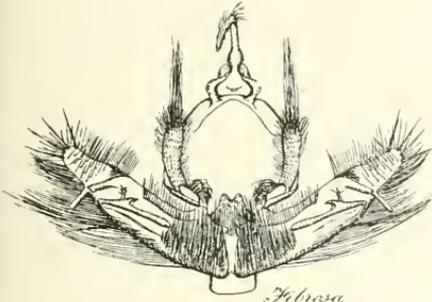
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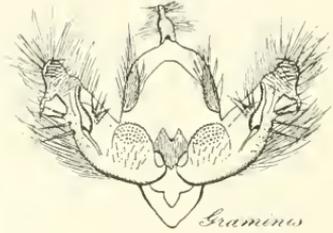
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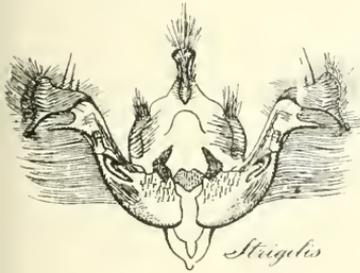
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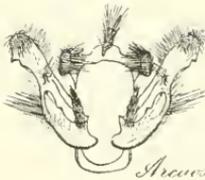
Fibrosa



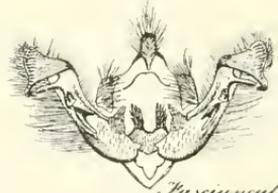
Graminus



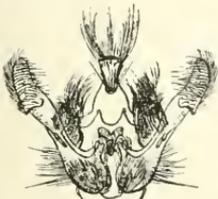
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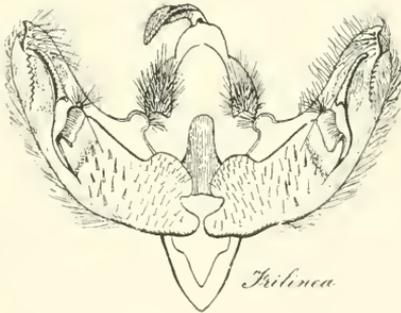
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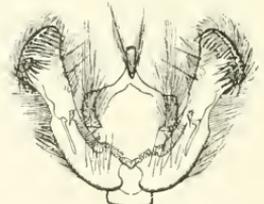
Fasciuncula



Turuncula



Trilinea



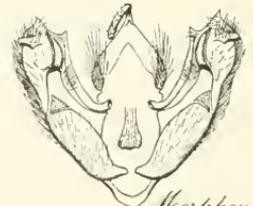
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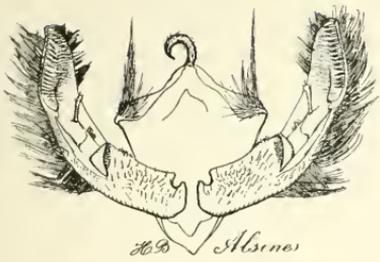
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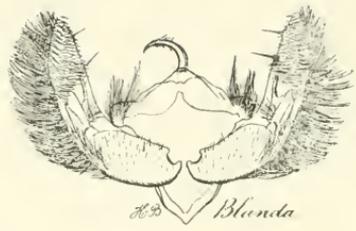
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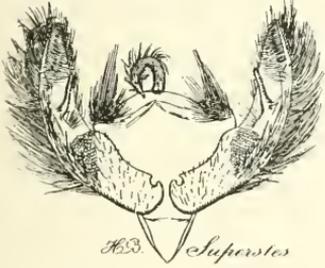
Morphicus



H.B. *Alseno*



H.B. *Blanda*



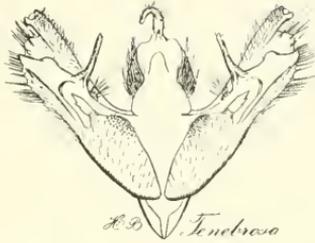
H.B. *Superstes*



Antiqua



H.B. *Cubicularis*



H.B. *Fimbriata*



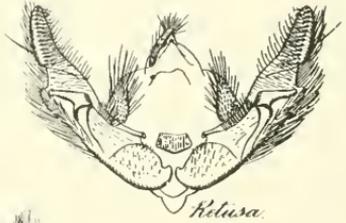
H.B. *Caliginosa*



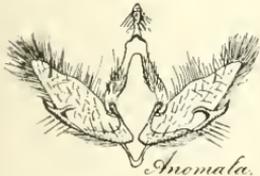
Sublata



Palustris



Kilisa



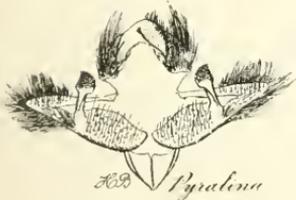
Anomala



H.B. *Fulvago*



H.B. *Circa*



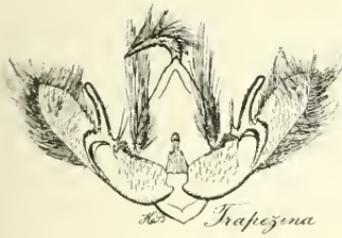
H.B. *Pyralina*



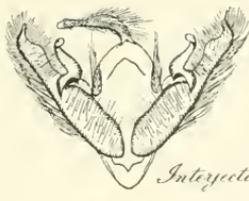
H.B. *Diffinis*



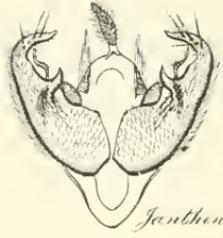
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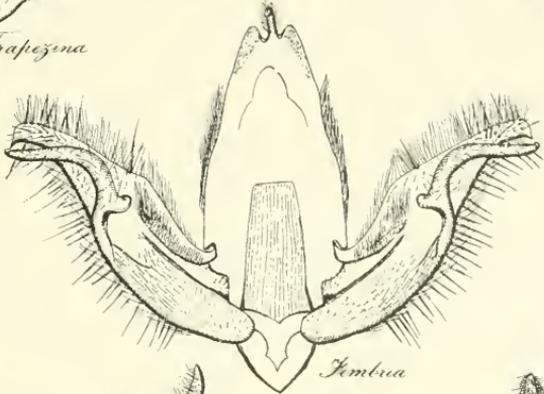
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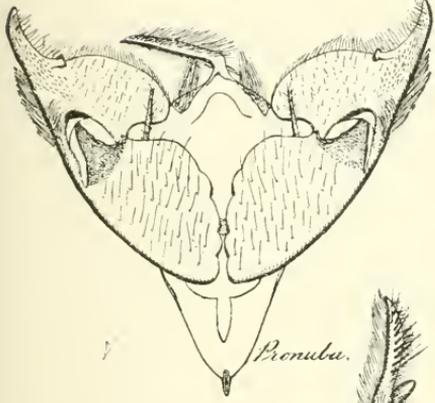
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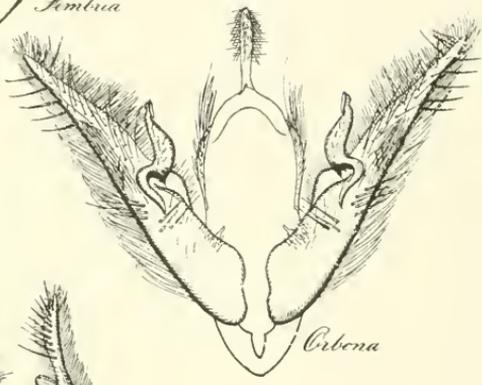
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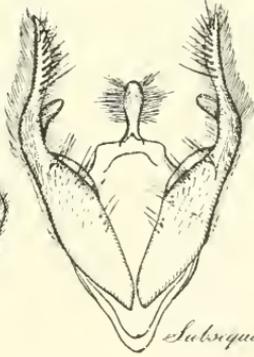
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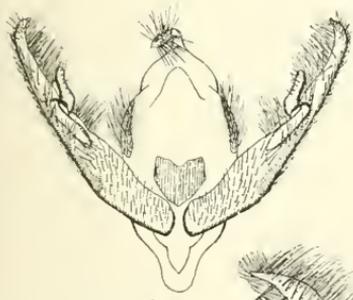
Pronuba



Orbena



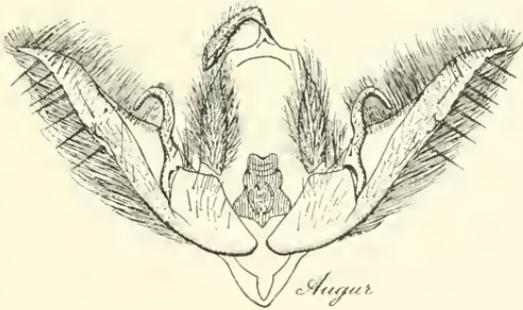
Subosqua



Ravida



Neglecta



Augur



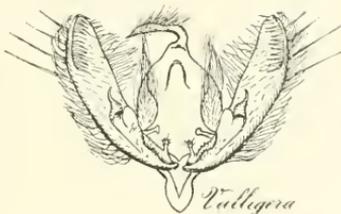
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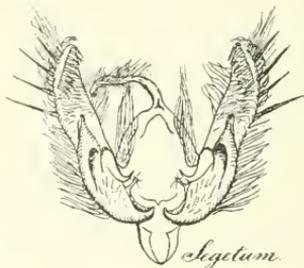
Lunigera



Cineria



Palligera



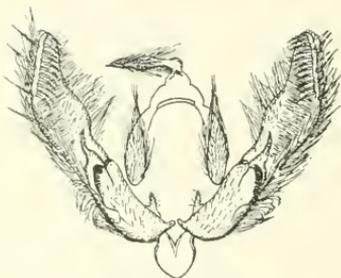
Segelum



Ripua



Puta



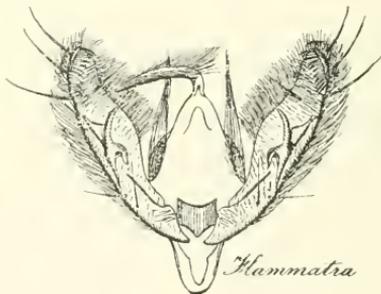
Exclamationis



Corticea



Ulve



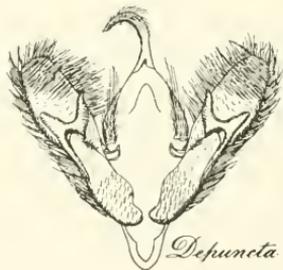
Hammatra



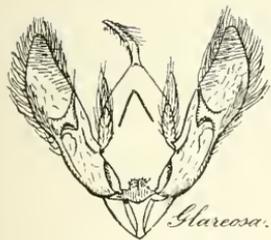
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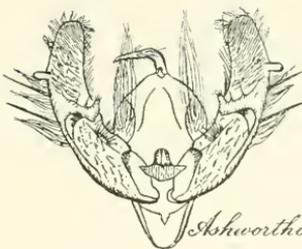
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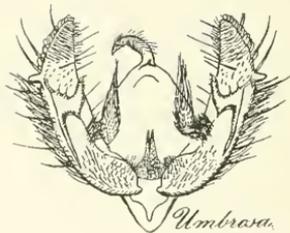
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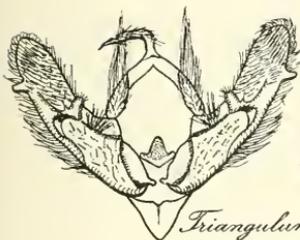
Glareosa.



Ashworthia



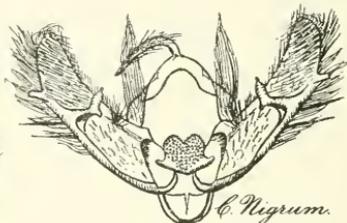
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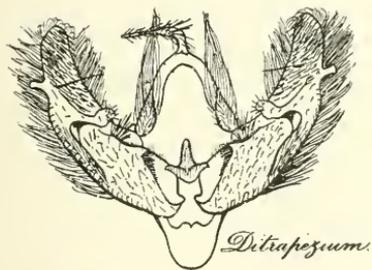
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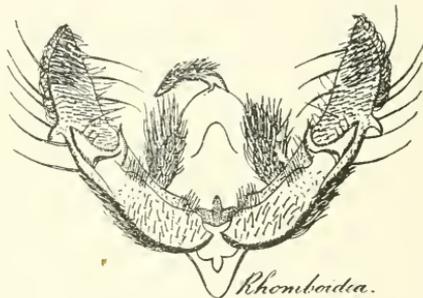
Kanthographa.



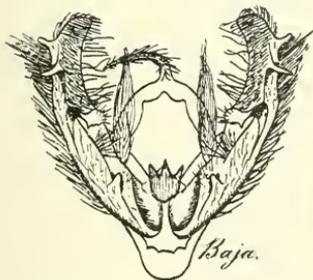
C. Nigrum.



Ditrapirosum.



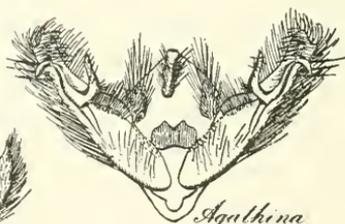
Rhomboida.



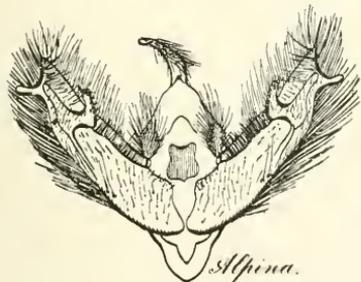
Baja.



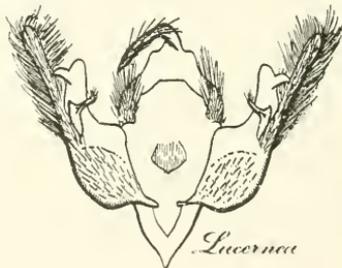
Porphyra.



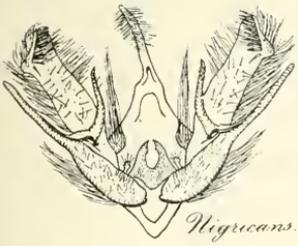
Agathina



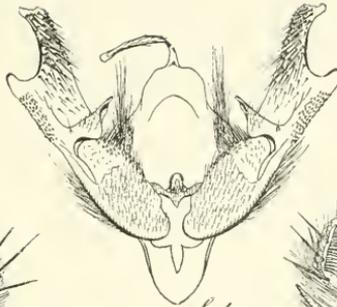
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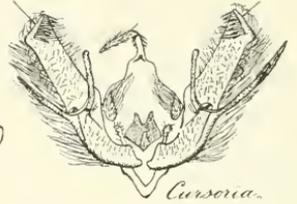
Lucornia



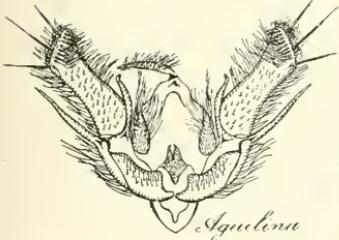
Nigricans.



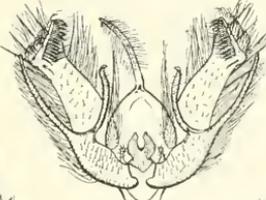
Subrosea.



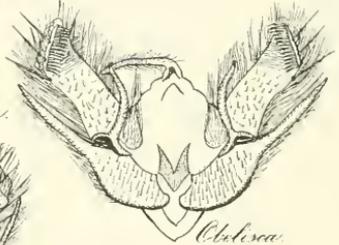
Cursoria.



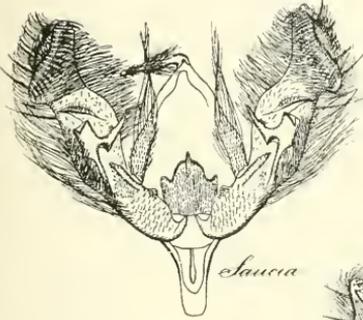
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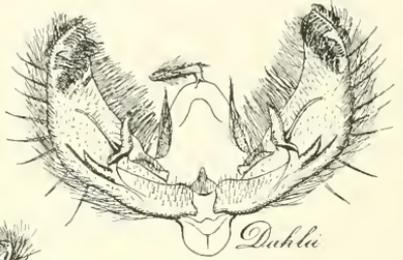
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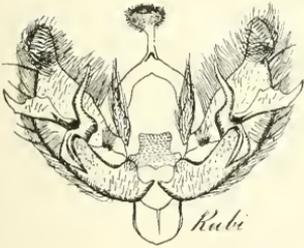
Oblitica.



Saucia



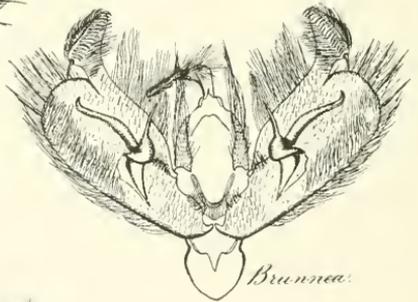
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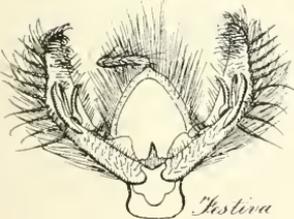
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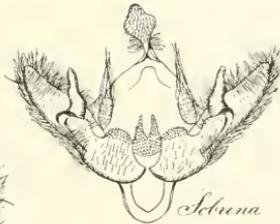
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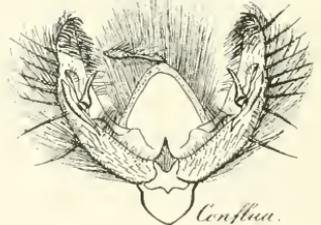
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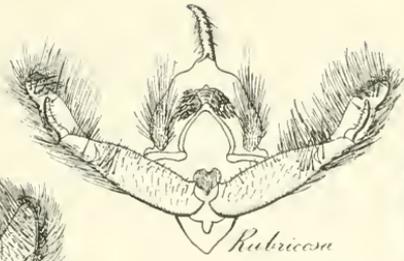
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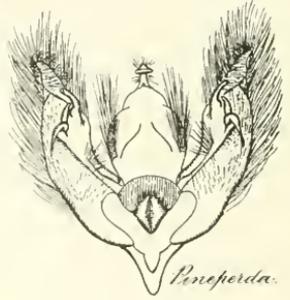
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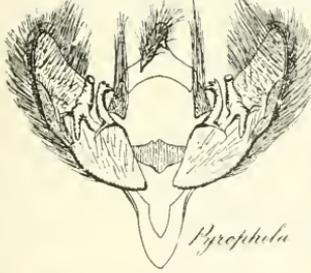
Conflua.



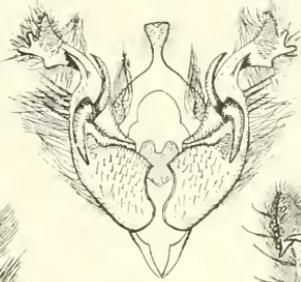
Rubricosa



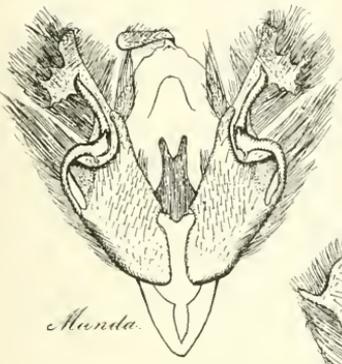
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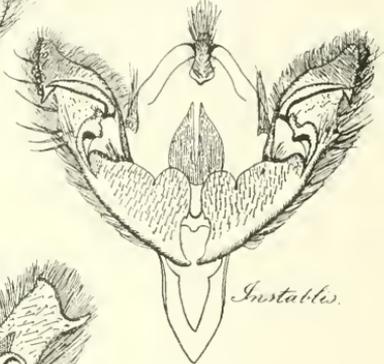
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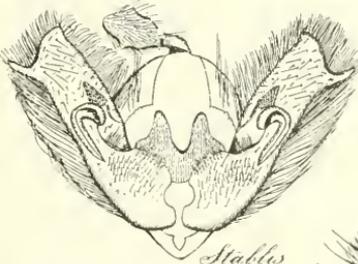
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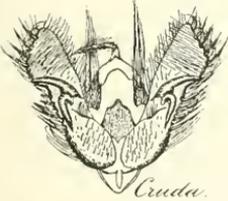
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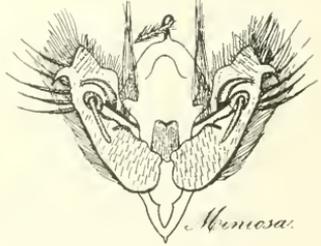
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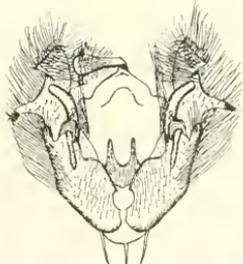
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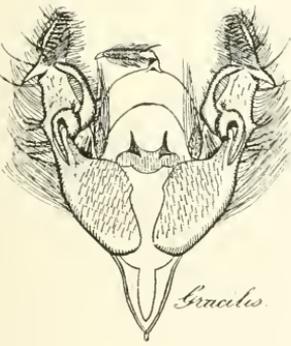
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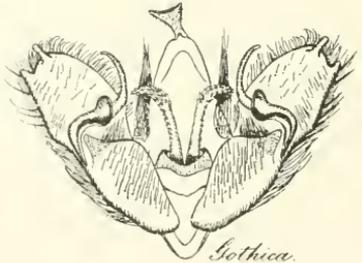
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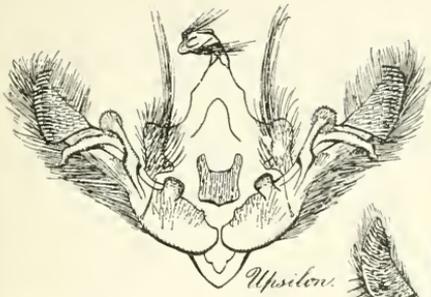
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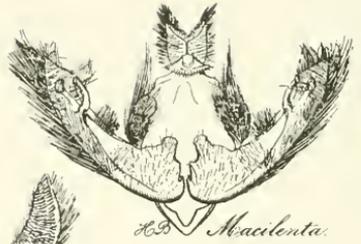
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Gothica.



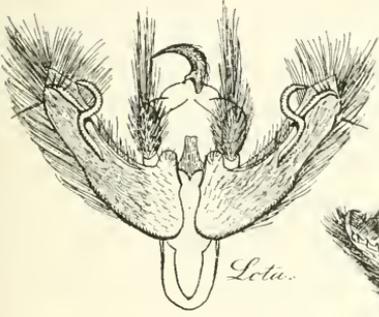
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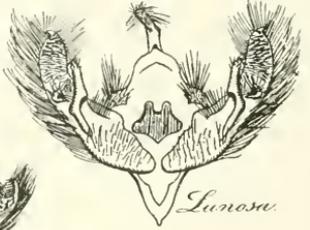
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Suspecta.



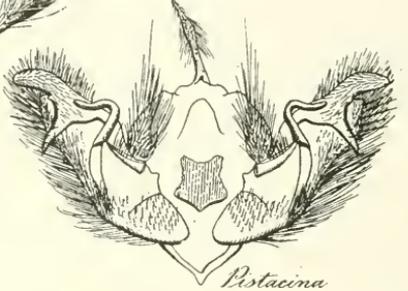
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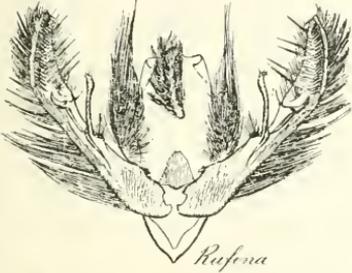
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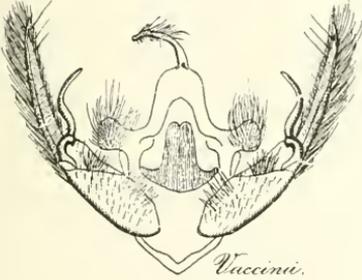
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Pistacina.



Rufa.



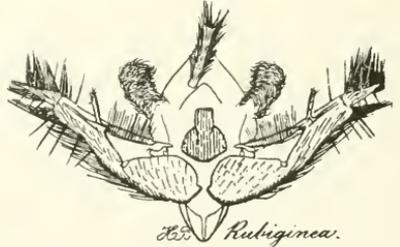
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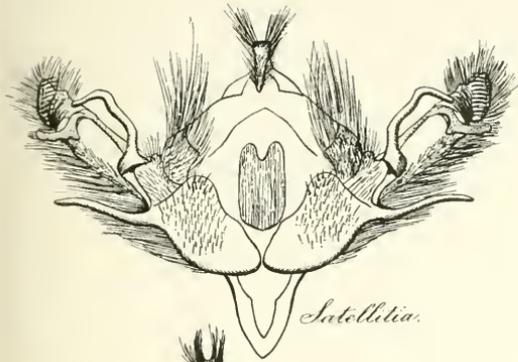
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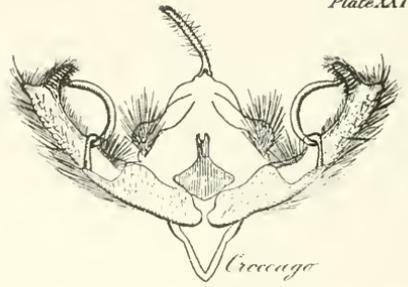
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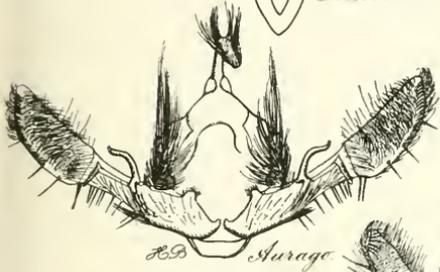
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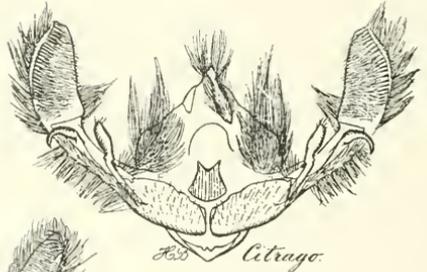
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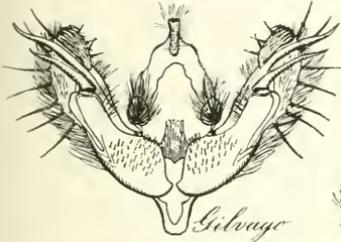
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Aurago



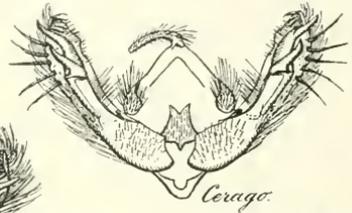
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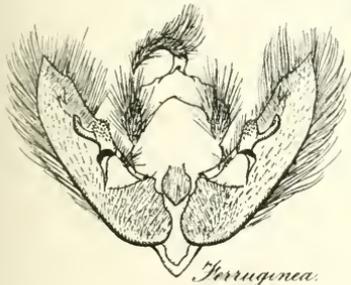
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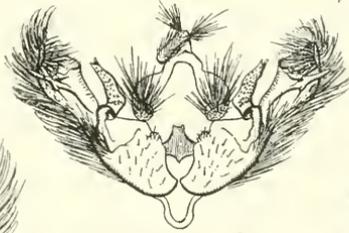
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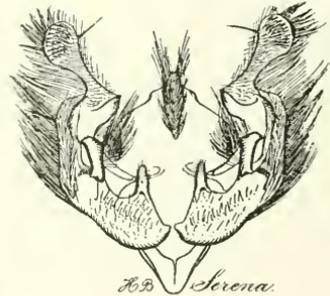
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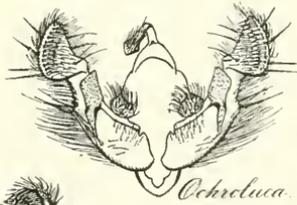
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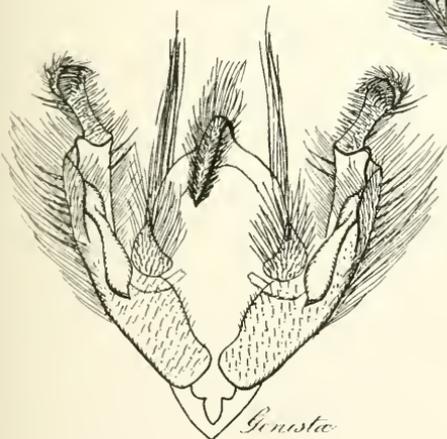
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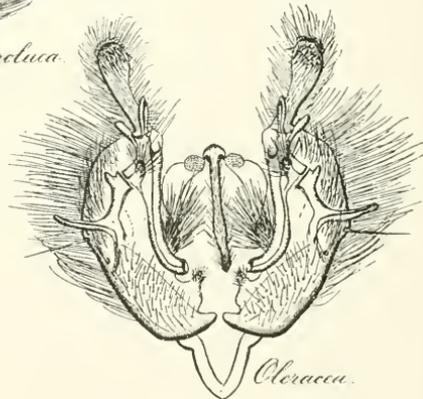
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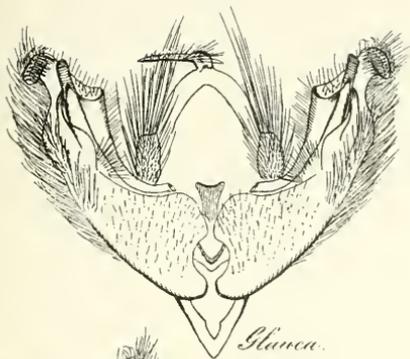
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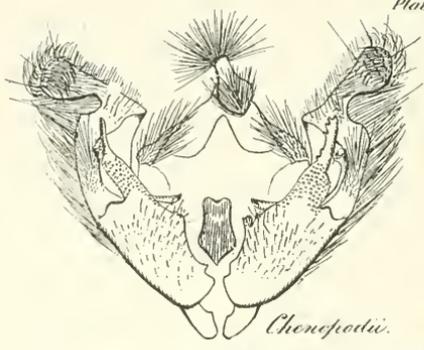
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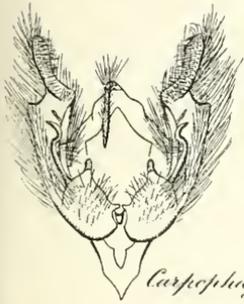
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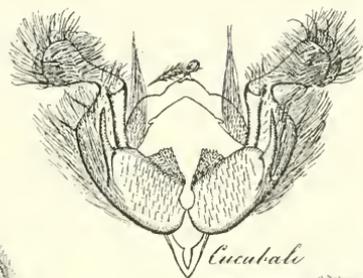
Glauca.



Chonopodii.



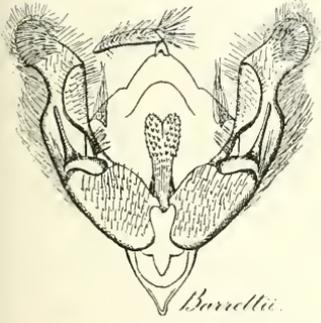
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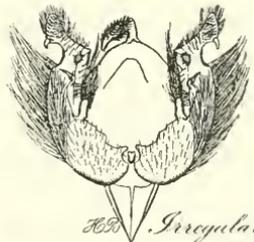
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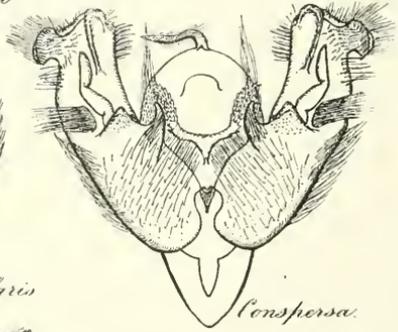
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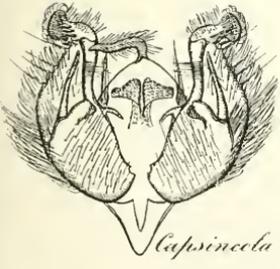
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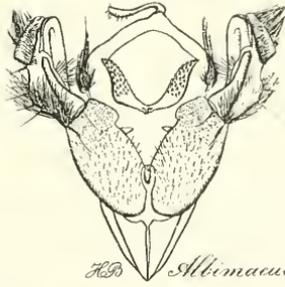
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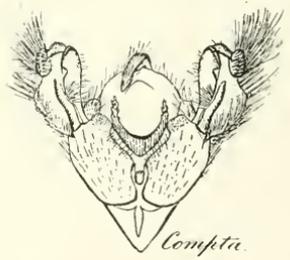
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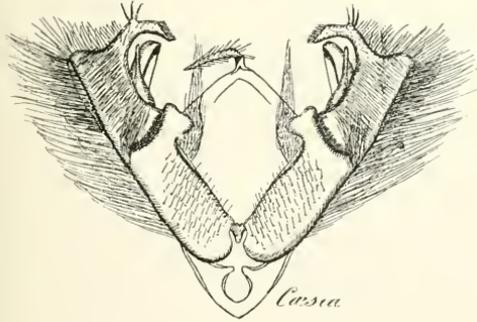
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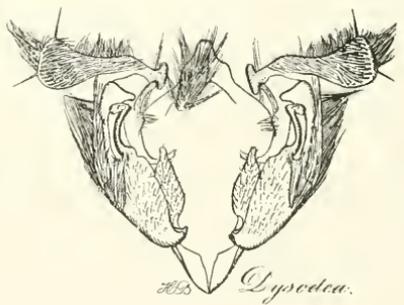
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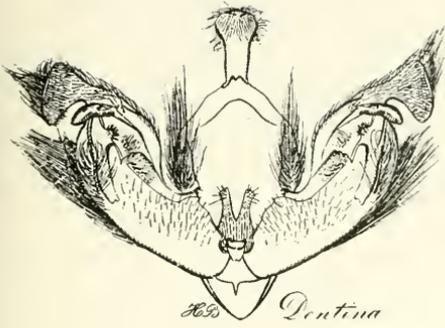
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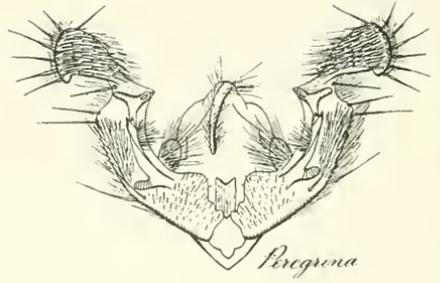
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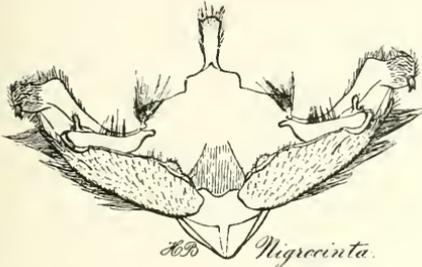
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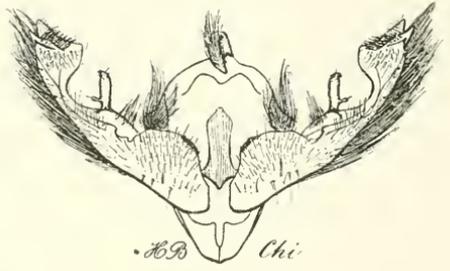
H.B. *Dentina*



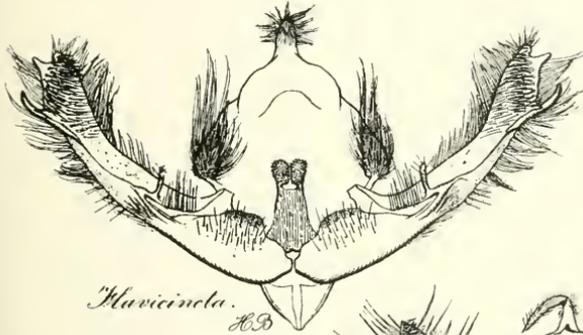
Piregona



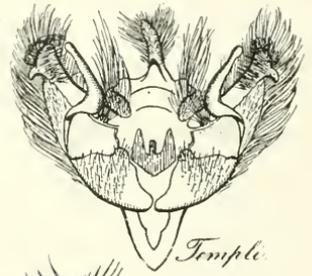
H.B. *Nigrocinta*



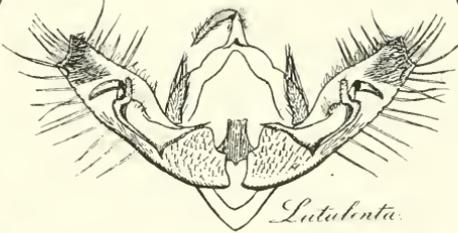
H.B. *Chi*



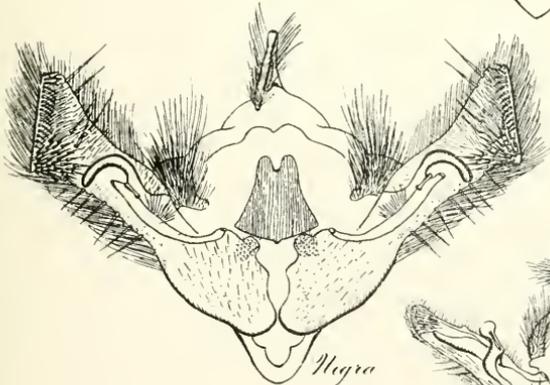
Flavicincta
H.B.



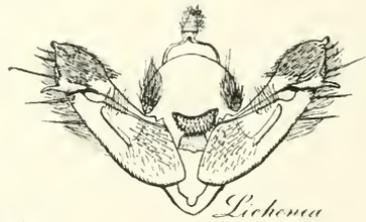
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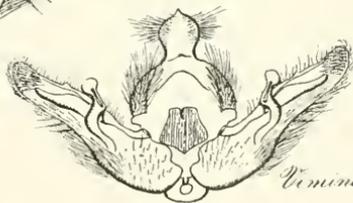
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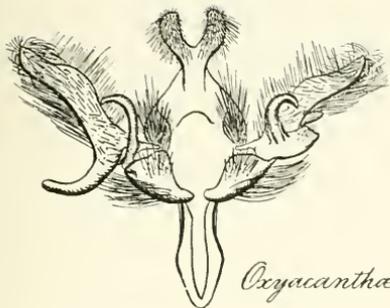
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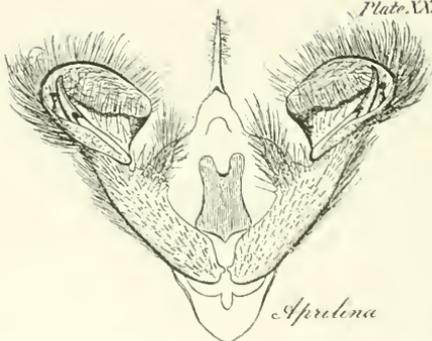
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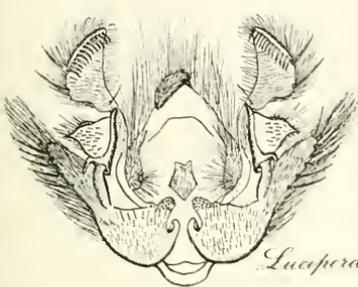
Viminalis



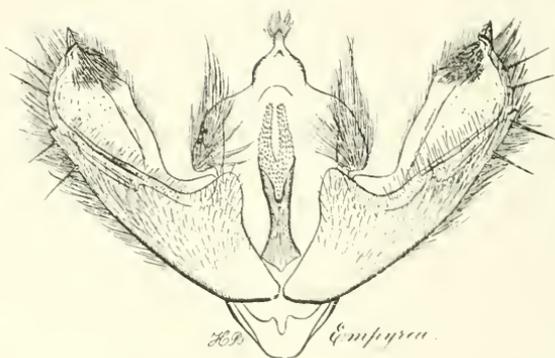
Oxyacantha



Apirelona



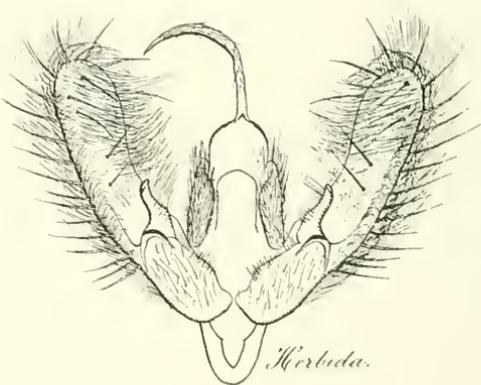
Lucifera



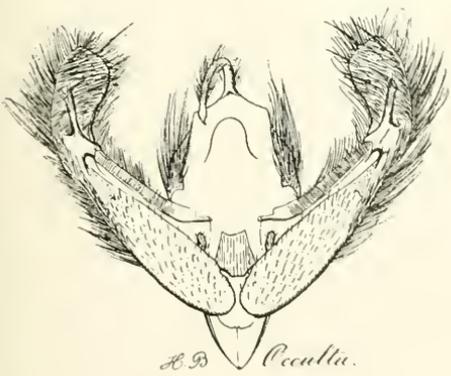
H.B. Empyrea



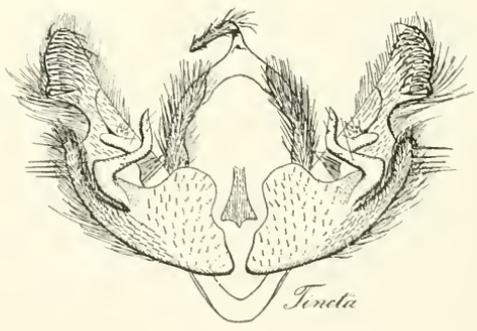
H.B. Melicolaria



Herbuda



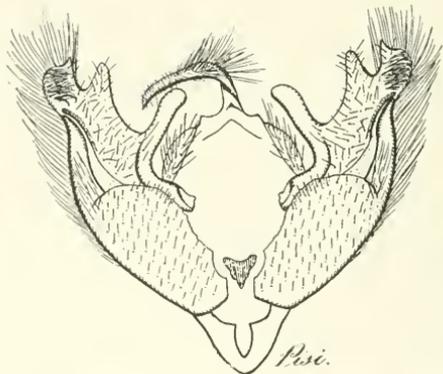
H.B. Occulta



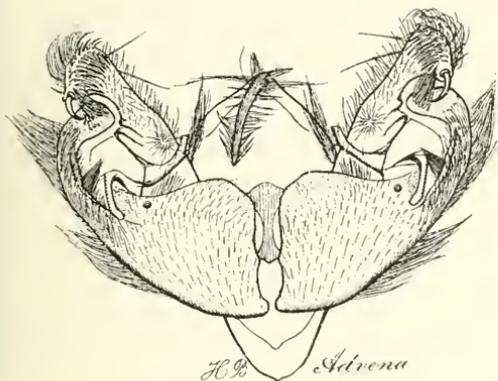
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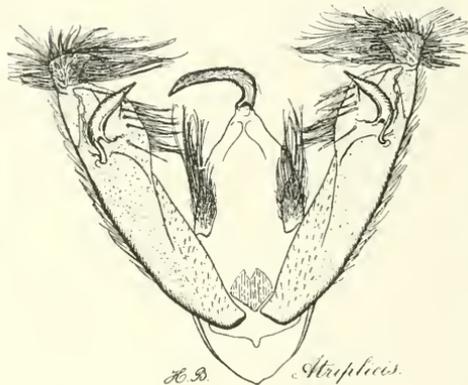
H.B. *Nebulosa*



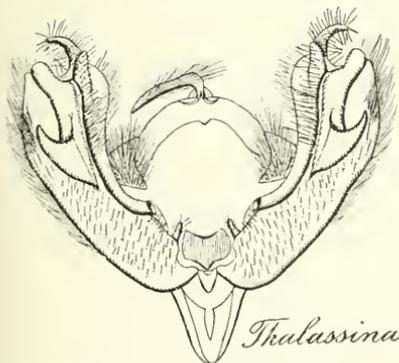
Pisi.



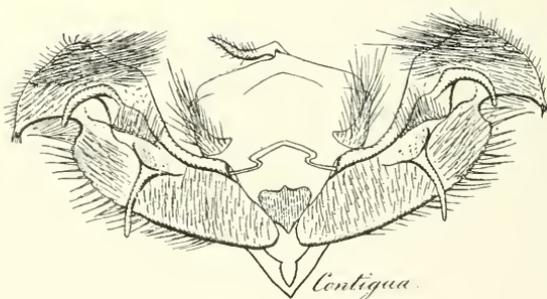
H.B. *Advena*



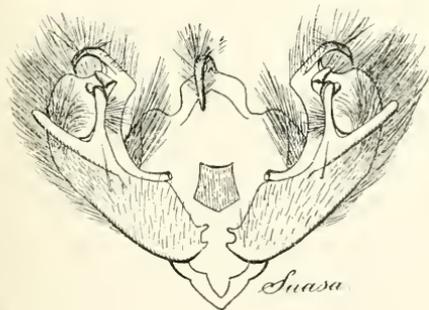
H.B. *Striplicis.*



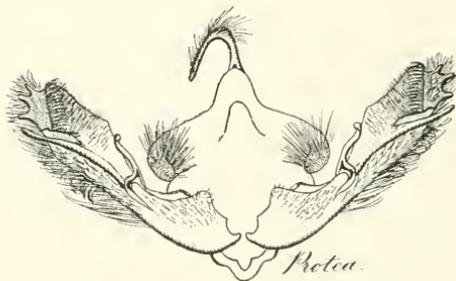
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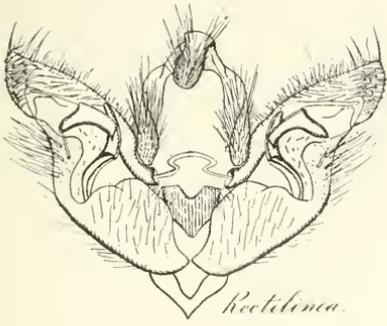
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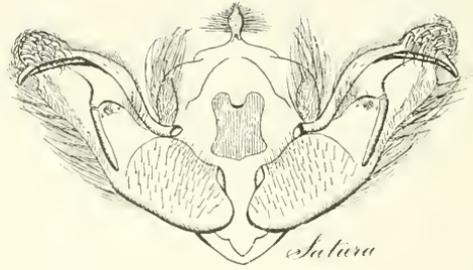
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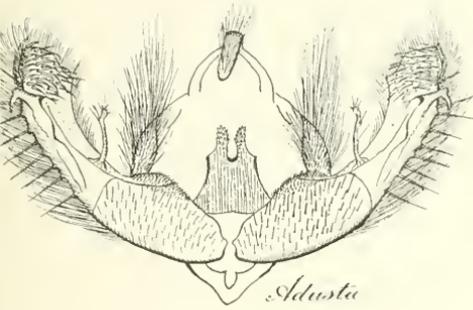
Potia.



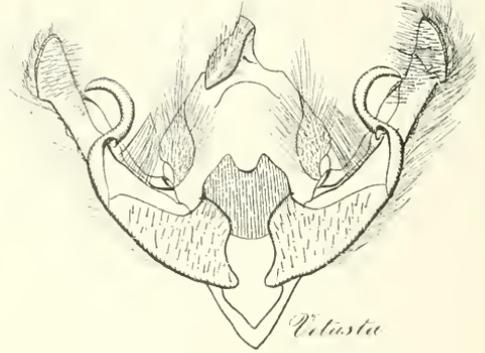
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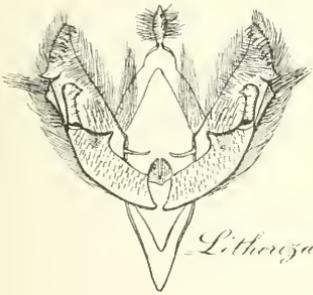
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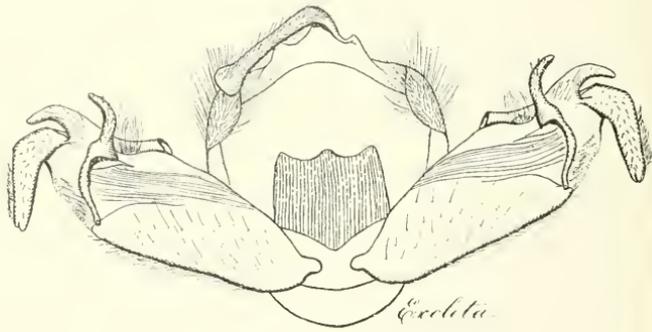
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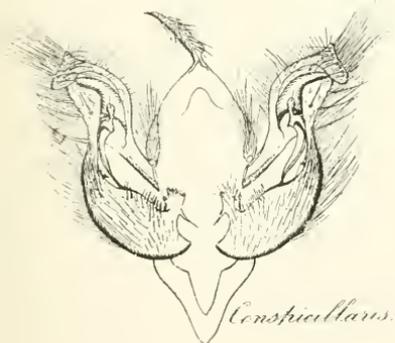
Velusta



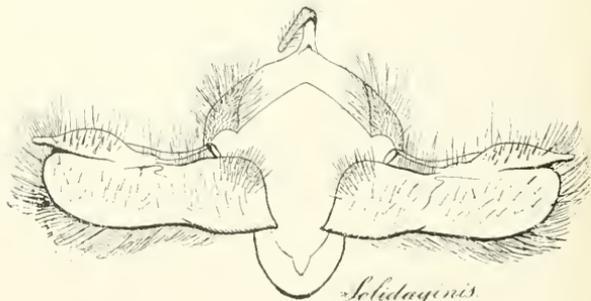
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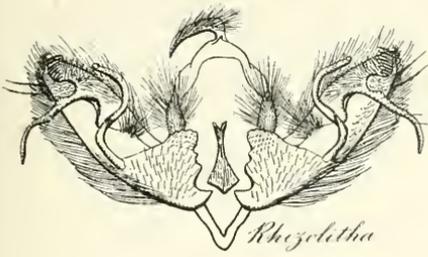
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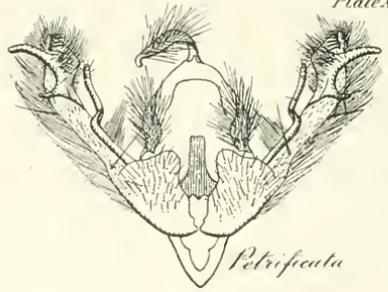
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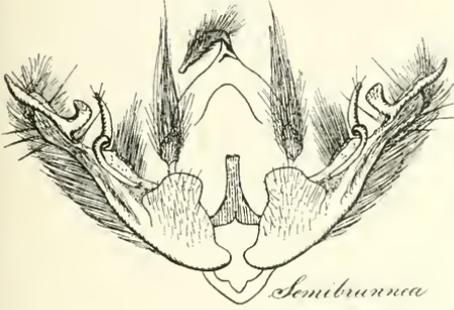
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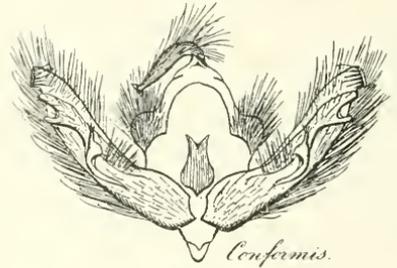
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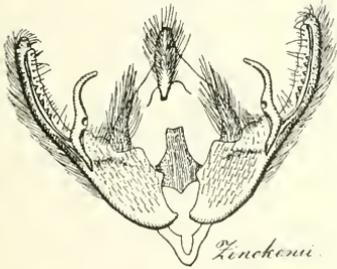
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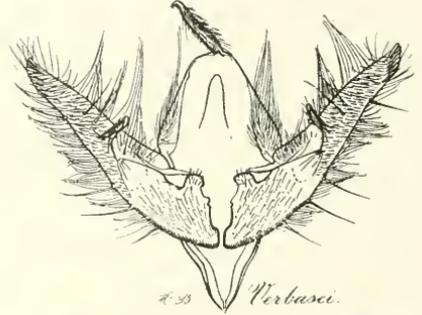
Sombrunnea



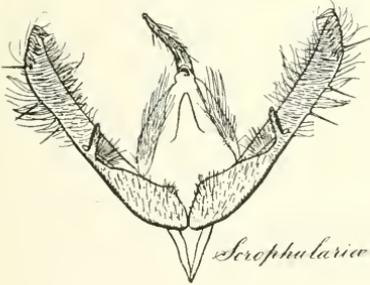
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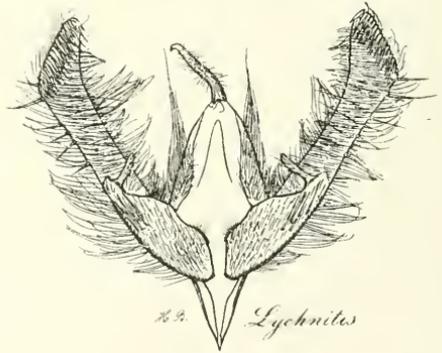
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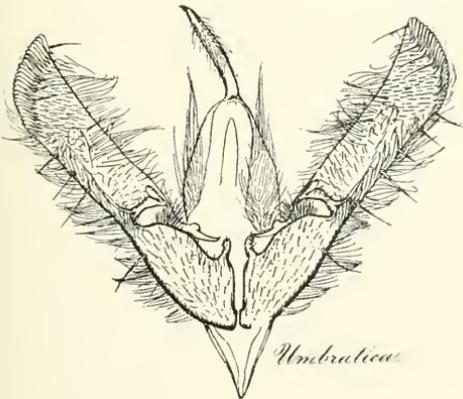
43 *Verbasci*



Scrophularia



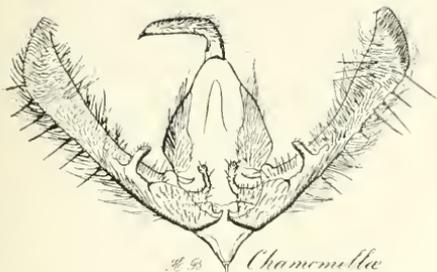
44 *Lychnitis*



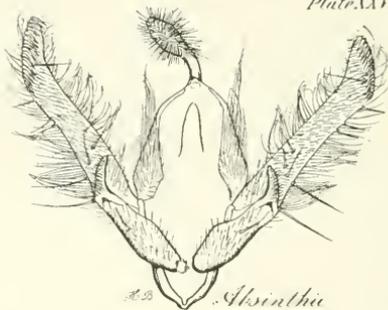
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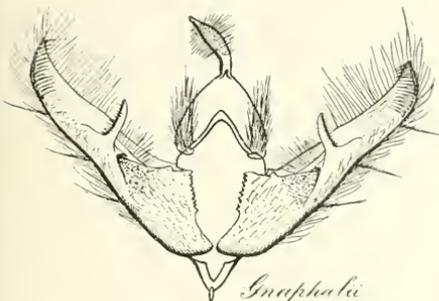
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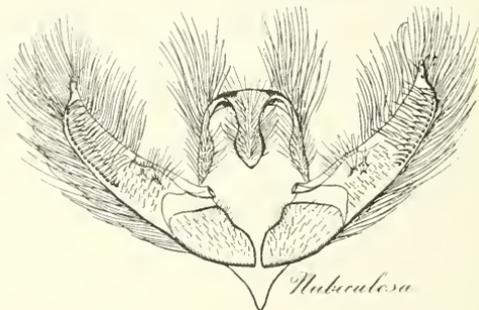
25 Chamomilla



26 Absinthii



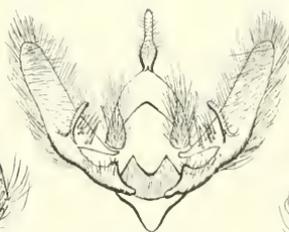
Inaphala



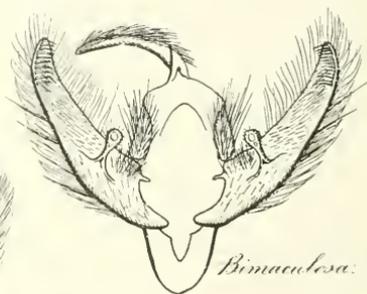
Tubiculosa



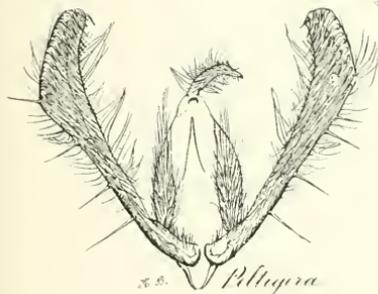
27 Cassinea



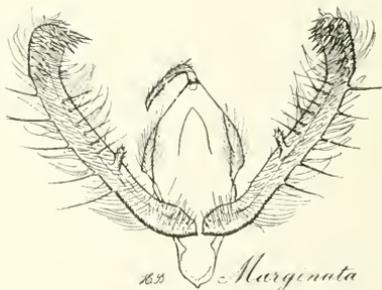
Oleracea



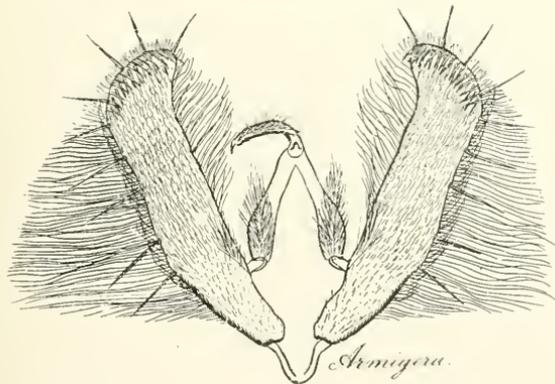
Bimaculosa



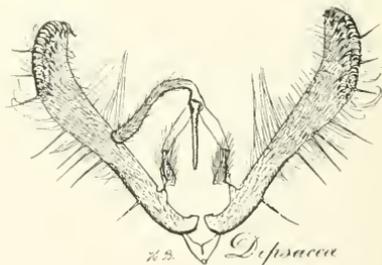
28 Alligra



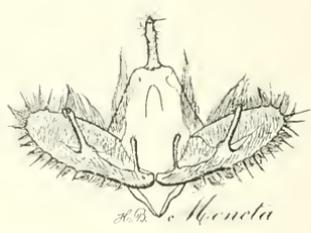
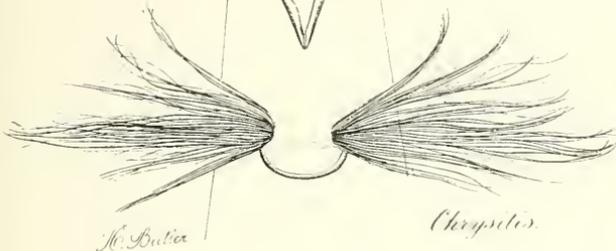
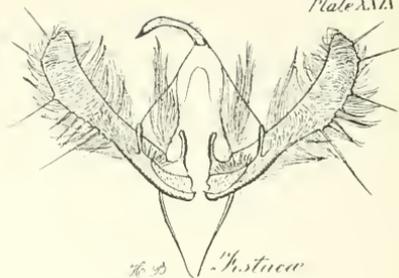
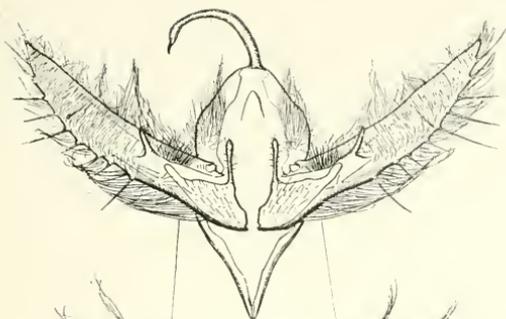
29 Margenta



Armigera



30 Depsacea

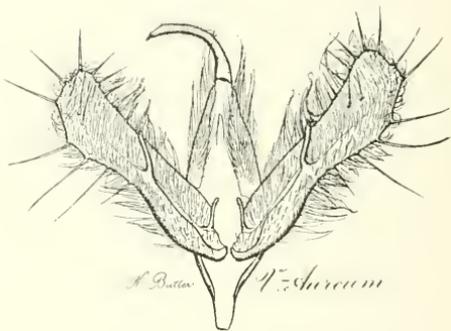
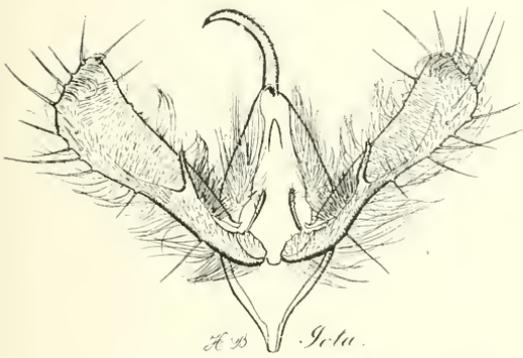


H. Bulia

Chrysolis

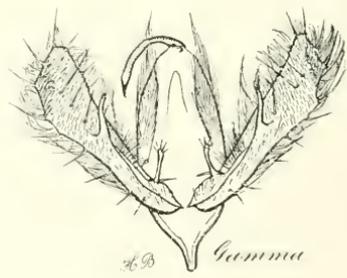
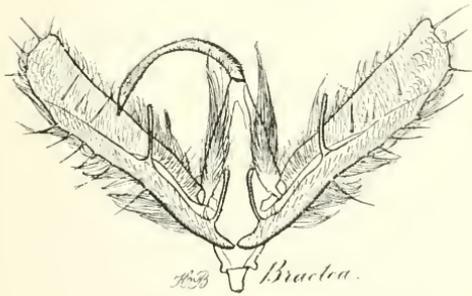
H. B. *P. Antiocha*

H. B. *M. Mencla*



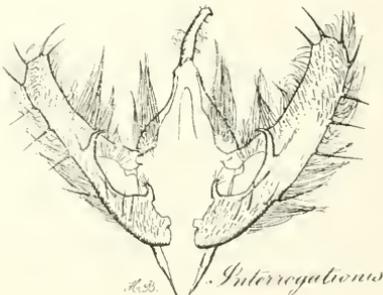
H. B. *I. eta.*

H. B. *V. Anicum*



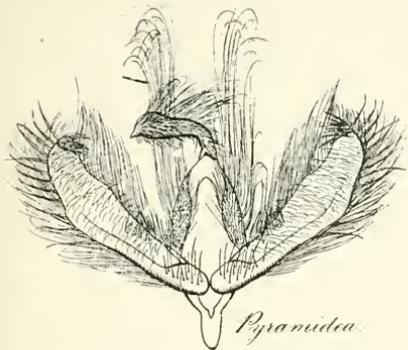
H. B. *Bractea.*

H. B. *Gemma*



H. B. *Orichalcea*

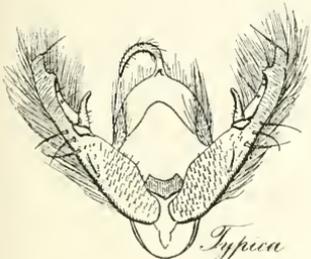
H. B. *Interrogationis*



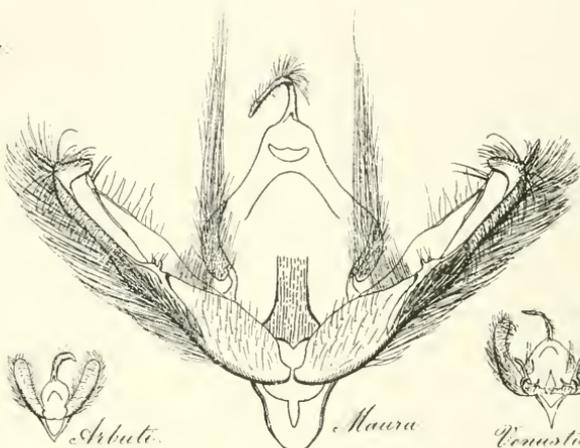
Pyranidea



Fragopegonis



Typica



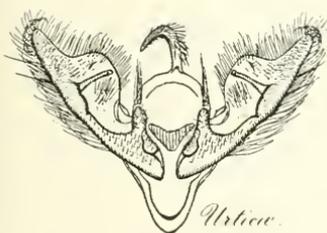
Maura



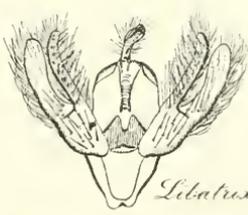
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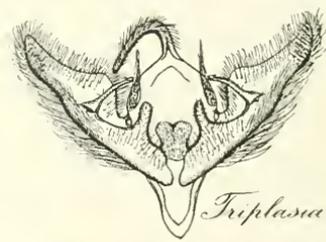
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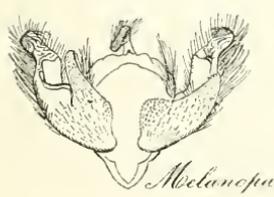
Urtica



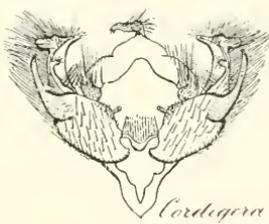
Libatrix



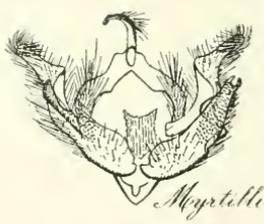
Triplasia



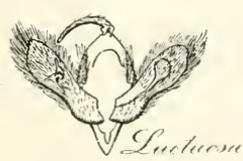
Melanopa



Cordigera



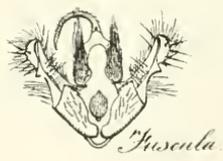
Myrtilli



Luctuosa



Sulphurales



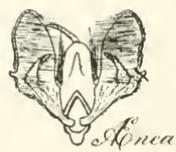
Fuscula



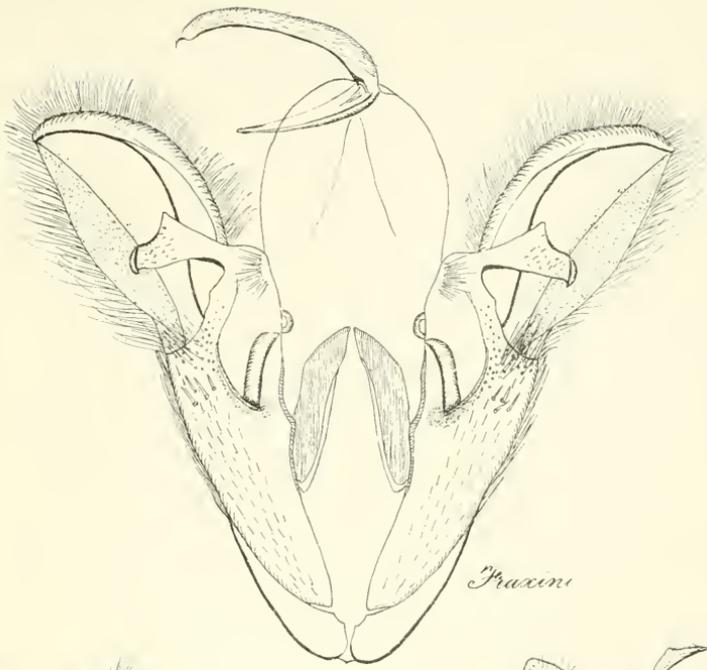
Argentula



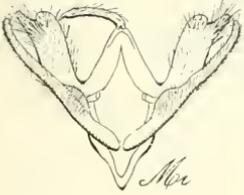
Uruca



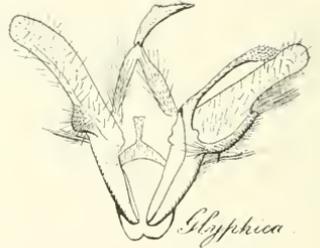
Anica



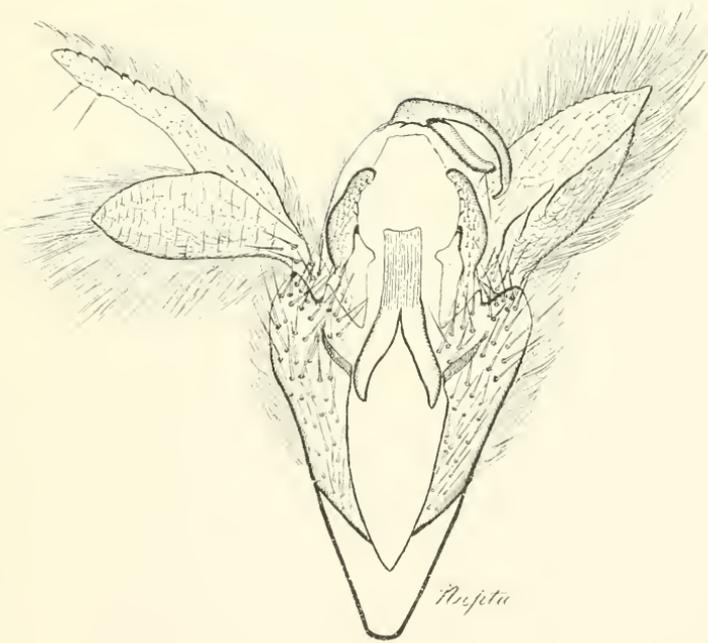
Fraxini



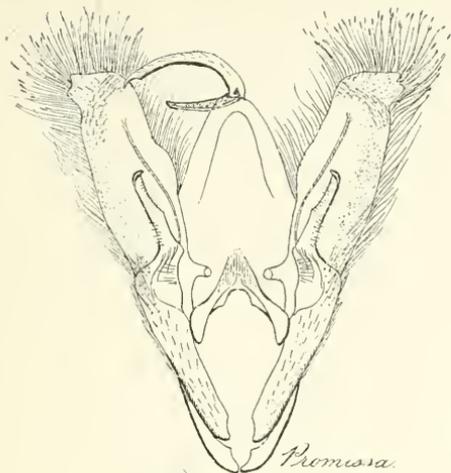
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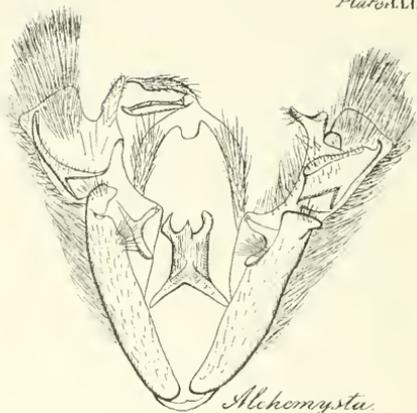
Glyphica



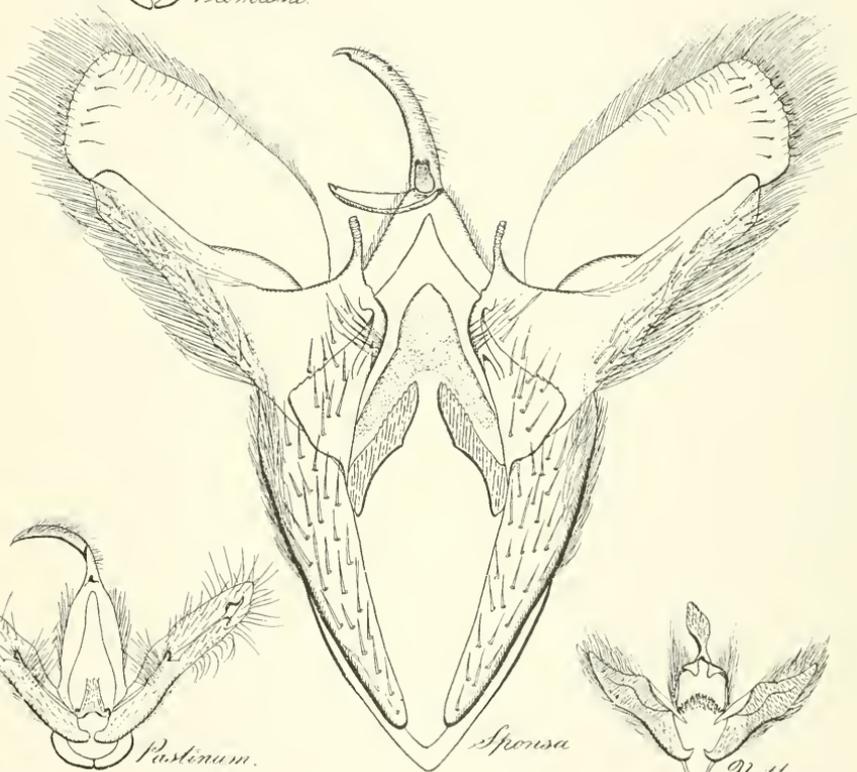
Pezeta



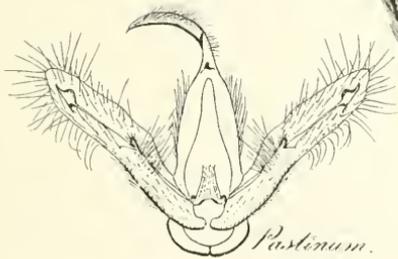
Promissa.



Alchemysta.



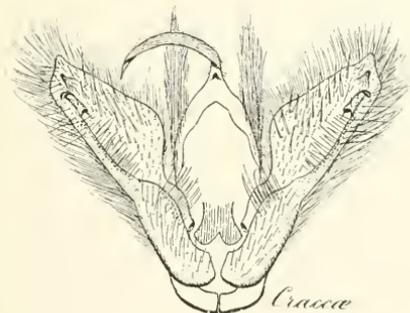
Sponsa



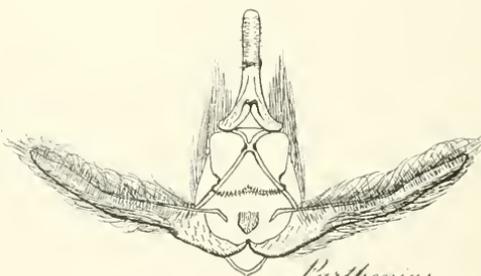
Pastinum.



Notha.



Cracca



Parthenias.



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