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SMITHSONIAN INSTITUTION.

UNITED STATES NATIONAL MUSEUM.

389
116
BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 38.

CONTRIBUTION TOWARD A MONOGRAPH OF THE INSECTS OF
THE LEPIDOPTEROUS FAMILY NOCTUIDE OF TEMPER-
ATE NORTH AMERICA.—REVISION OF THE
SPECIES OF THE GENUS AGROTIS.

BY

JOHN B. SMITH.

Professor of Entomology, Rutgers College, New Jersey.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

ADVERTISEMENT.

This work (Bulletin No. 38) is the fifty-first of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

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S. P. LANGLEY,

Secretary of the Smithsonian Institution.

WASHINGTON, *June 1, 1890.*

CONTRIBUTION TOWARD A MONOGRAPH

OF THE

INSECTS OF THE LEPIDOPTEROUS FAMILY NOCTUIDÆ

OF

TEMPERATE NORTH AMERICA.

REVISION OF THE SPECIES OF THE GENUS AGROTIS.

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JOHN B. SMITH,

Professor of Entomology, Rutgers College, New Jersey.

WITH FIVE PLATES.



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1890.

III

LETTER OF TRANSMITTAL.

SMITHSONIAN INSTITUTION,
UNITED STATES NATIONAL MUSEUM,
Washington, March 17, 1890.

Prof. G. BROWN GOODE,
*Assistant Secretary Smithsonian Institution,
In charge of National Museum:*

SIR: I have the honor to transmit the accompanying paper, which was largely prepared by Professor Smith while associated with me, and was, in fact, begun with the intention of publishing a conjoint and complete monograph. My time having been too much occupied otherwise, the original plan was abandoned, and I turned the matter all over to him when he left the Museum with the understanding that he would finish individually the synoptic and descriptive parts. The result is the present paper, and I strongly recommend that it be published as a Bulletin of the Museum.

Sincerely yours,

C. V. RILEY,
Curator of Insects.

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CONTRIBUTION TOWARD A MONOGRAPH OF THE INSECTS OF THE
LEPIDOPTEROUS FAMILY NOCTUIDÆ OF TEMPERATE NORTH
AMERICA.—REVISION OF THE SPECIES OF THE GENUS AGROTIS.

The genus *Agrotis* embraces moths of medium size as a rule, and many of them of the typical "Owlet" type. The caterpillars of many of the species are very injurious to cultivated plants, and come under the general head of "Cut-Worms," a name given them from their habit of cutting off, just at the surface of the ground, the plants upon which they feed. The genus *Agrotis*, our American species alone considered, has but two characters common to all forms: the eyes are naked and the middle and posterior tibiæ are always spinose! Beyond this, and exclusive of the family characters, there is the widest possible divergence in structure. The head may be rather small, retracted, buried in the vestiture, or it may be large and distinct; the eyes may be large and prominent, or they may be small and reniform; the front may be flat or bulging, smooth or roughened, or with a tuberculate protuberance; the palpi may be short and weak, long and slender, smoothly scaled or moderate, robust, with heavy vestiture, making the second joint appear more or less clavate. The tongue is always at least moderately strong, as is the case usually in the *Noctuidæ*. The *antennæ* may be entirely simple in both sexes, or the male may have them ciliated merely, serrated with lateral bristly tufts, or they may be lengthily pectinated. The thorax may be depressed above, flattened, or it may be robust, strongly convex; the vestiture may be scaly or hairy or a mixture of both; it may be smooth, flattened, glistening, or it may be rough, divergent, and loose; it may form a basal tuft merely, an anterior and posterior tuft, a simple ridge like, or divided anterior crest, or it may have the anterior divided crest and posterior tuftings as well. The abdomen may be depressed, flattened, truncated posteriorly, or it may be stout, cylindric, conic, with pointed tip. The middle and posterior tibiæ are always spinose; the anterior tibiæ may be entirely unarmed, they may be sparsely spinose, heavily spined at sides and tip, of full length, or shortened, broad, and flat. The primaries may be long and narrow, short and wide, apices rounded or apices produced. In habitus they may be somber, depressed, resembling *Nylina*, or they may be bright, lively in colors, resembling *Heliothis*. Some are strictly

nocturnal in habit, hiding under bark and in crevices during the day; others are largely diurnal, flying in the bright sunshine, visiting flowers, and not so usually taken at night.

The generic term *Agrotis* therefore conveys no distinct impression, and it could only result in a huge assemblage of species through which no path was visible and in which identification to any but the specialist or to one with a large collection was all but impossible. Vague efforts have been made from time to time to divide the genus and there exists an abundance of generic names and types, but the true characters were not recognized, species were erroneously associated, and the universal result was that sooner or later the proposed terms went into the synonymy and but aided to increase the already existent confusion. I have made an effort to use as far as possible existing generic terms in my division of the genus; but I have not had exotic material sufficient to give me an opportunity to study generic types, and the descriptions were in most cases useless, since they did not give the structural characteristics upon which my scheme of division was based. I have therefore felt free to propose new names for the groups into which the species have been formed, quite satisfied to have the names relegated into the patient synonymy when the study of generic types proves their identity with others already proposed.

I had at one time the strong conviction that genera were natural assemblages, capable of strict limitation and definite in extent. The study of very large material since that time has convinced me that my first impression was erroneous, that genera as such are mere artificial divisions of convenience, useful for the purpose of identification and for the expression of relationship, and that they were useful for that purpose just in proportion as they expressed clear and definite associations of characters. *Agrotis* is vague since it is definite on two points merely. *Carneades* is definite, even though species are numerous, for it conveys the association of a large series of characters in addition to that distinctive to it. The limits to which generic division may be carried will depend entirely upon the tact and individual propensities of an author and in large part also upon the tendency of the time at which he is writing. After a period of wild generic creation there comes usually a reaction in which lumping is carried to an extreme, and this is true as to species as well as genera.

For some time Mr. Grote was the only systematic worker in the North American Noctuidæ, and he steadily increased the number of generic divisions until he was in advance of the allowable at that state of our knowledge. The reaction was perhaps typified when, after becoming thoroughly imbued with the critical ideas of my Brooklyn entomological friends and teachers, I published my synopsis of noctuid genera. I there went too far in the opposite extreme, but have no apology to make for it. It acted as a check from which more careful studies have allowed a steady, and I hope healthy and permanent advance.

I have made use of the genital structure of the male for generic division in one case only, where a very large series of species agree most remarkably in structure, and the character becoming generically valuable, lost value in the recognition of species.

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 the 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. There is no universal test character, however, and as with all others so sexual characters sometimes fail. Over one hundred species referred to *Carneades* have so nearly the same form of structure that there is no sufficient variation to have specific value in doubtful cases. In some other groups, however, no two species are alike, and the widest variance within generic limits allows definite specific limitation.

The work on the *Agrotis* was done in 1884 and 1885. At that time I was employed by Professor Riley as a special agent of the Division of Entomology, and the work was done in the intervals of the economic work assigned to me. Professor Riley sent me as a basis for the work his entire collection, now in the National Museum. My own collection was very fair in the genus, and is now also in the National Museum. The Meske collection, containing many rare species and types, is now also in the Museum collection. Mr. Tepper's collection contained a very great part of Mr. Morrison's types, and these, as well as whatever else I needed for study, were freely placed at my disposal. This collection is now in the Michigan Agricultural College. Mr. Graef's collection contains many of Mr. Grote's and some of Mr. Morrison's types, and these also I had for study. Mr. Hulst as kindly allowed me the use of his material, also containing some of Mr. Grote's types. The grand collection of Mr. Henry Edwards was loaned me for study by its owner, and contained many varieties, typical or authentic, which are not or were not then elsewhere represented. Mr. Neumoegen's collection had been at that time thoroughly revised by Mr. Grote and contained a very large number of the types of Mr. Grote's later descriptions, and to this also I had free access, and Mr. Neumoegen kindly loaned me for study whatever I needed. At Philadelphia the collection of the American Entomological Society was opened to me, and at Cambridge the courtesy of Dr. Hagen enabled me to study the material there. At Salem I studied the material in the Peabody Academy of Science, containing Dr. Packard's types. At Kittery Point I spent a very enjoyable day with Dr. Thaxter, and there I had an opportunity

of identifying a number of species, some of which were loaned me for further study by Dr. Thaxter. Mrs. Fernald's collection at Orono was also studied, and to Professor and Mrs. Fernald I owe thanks for kindly hospitality as well as free opportunity to study the material in the collection. Dr. Lintner also allowed me to use some of his material not otherwise attainable. I had thus an opportunity to study all the types existing in these collections, and my descriptions and studies were largely made from the original types or carefully compared specimens. Dr. Bailey's collection has some uniques, and the doctor, then on what proved his death-bed, courteously loaned me these for study. The material then, upon which the work was originally based was not scant, and I owe to Dr. Riley the opportunity to visit all these collections and to the courtesy of the gentlemen named, as well as to others not named but gratefully remembered, the opportunity to study their material. At that time it was intended to publish a complete monograph of the noctuidæ by Dr. Riley and myself, and the manuscript as prepared by me was sent to Dr. Riley for completion by the addition of the biologic material and the addition of such studies as had been made by him in some of the groups. Circumstances prevented the carrying out of the original plans; and the publication of a complete monographic work was finally abandoned. In 1887 I published in the Proceedings of the U. S. National Museum descriptions of the new species which I had found in my original work. More recently large collections made in California produced numerous new species, necessitating re-arrangement, and to some extent the re-writing of a great portion of the manuscript. Some twenty-three of these species were published in the Transactions of the American Entomological Society for 1890, and scarcely were they in type when another accumulation of material turned up still further species. During the month of January, 1890, I arranged, under Dr. Riley's direction, a large part of the noctuid collection of the National Museum, and on that occasion deposited a number of my types in that collection.

The collection of the Museum in this genus now stands second to none in completeness. By far the greater number of species are represented, many of them by very fine series of bred specimens.

No bibliographical review of the genus will be here attempted, and after this brief history of my work and the material at command, I will proceed at once to outline my scheme of classification.

Primarily the species divide into two series upon the armature of the anterior tibiæ. In the first series the member is not at all spinose, in the second the member is spinose, the armature variable.

Rhynchagrotis is applied to a series of species in which the antennæ of both sexes are simple or merely ciliated in the male. The thorax and abdomen are depressed, the primaries subequal in most cases, the apices rectangular or rounded, the outer margin rounded or scarcely oblique. The palpi tend to form, and in most cases do form, a distinct

snout or beak, which characterizes the forms related to *cupida*, which is the typical species.

I recognize three groups in this genus based upon color, maculation, and tuftings. *Chardinyi* with yellow secondaries is typical of the first; *cupida* with complete ordinary spots, no or but indefinite thoracic tufting, is typical of the second; while the third, with V-shaped, open orbicular and more distinct thoracic tufting, is typical of the third.

Adelphagrotis also has simple male antennæ; the abdomen is not depressed but cylindro-conic, the primaries elongate, trigonate, the thorax with distinct anterior and posterior divided tufts. *Stellaris* may be considered typical of this genus.

Platagrotis is structurally close to the preceding, but the wings are wider, more frail in appearance, the thoracic tuftings indefinite. The species have an entirely different habitus, and *speciosa* may be considered typical.

Eueretagrotis contains a few species differing from all the preceding by wide primaries with strongly arched costa and rounded apices and outer margin. The antennæ are finely serrated in the male, and the thorax is prominently tufted, the crest divided. *Sigmoides* is the typical species.

Abagrotis is based upon a singularly intermediate form, with the wing form of *Rhynchagrotis*, with the serrated and bristly tufted ♂ antennæ peculiar to some of the later genera, and a distinct, keel-like, thoracic crest. The combination is unique, *erratica*, being type and only species.

Semiophora differs from all the preceding in the bipectinated male antennæ. The primaries are wide, the costa arched, somewhat as in *Eueretagrotis*. The genus is not a very compact one, the forms differing in habitus to some extent. *Catherina* is the generic type.

With this ends the series in which the anterior tibiæ are not spinose. It comprises the smaller number of species, and except in *Rhynchagrotis* there is little difficulty in identification.

In the second series two obvious divisions are possible, the first having the front of head smooth and flat; the second with the front rough, protuberant, or tuberculate. The character is easily made out by using a fine pin, which drawn over the front will with a very little care detect the nature of the structure concealed by the vestiture.

Of the first division *Pachnobia* is characterized by loose, hairy vestiture. The species have a bombyciform appearance and are generally reddish or ferruginous in color. In antennal structure they vary from simple to pectinated, further subdivision on this character being here deemed inadvisable. The other genera all have a mixed or scaly vestiture much more compactly disposed.

Setagrotis is characterized by having ♂ antennæ, with the joints laterally furnished with bristly tufts. The primaries are normally trigonate and the habitus refers rather to the later groups than where here interpolated. The generic type is *planifrons*.

To *Agrotis* I refer those species which have armed fore tibiae, smooth front mixed or scaly vestiture and pectinated male antennae. The European *segetum* is the generic type. Of our own species, *ypsilon* most nearly resembles the type in habits.

Peridroma has the male antennae simple, the fore wings trigonate, regularly widening from base, the apices marked, outer margin oblique. *Saucia* is the generic type.

Two groups are recognized in this genus. The first, of which *saucia* is also type, has the primaries quite strongly produced apically and has a divided thoracic tuft; the second, of which *incivis* is typical, has the primaries less produced apically and has no divided thoracic tuft.

Noctua, of which, among our own species, *normaniana* may be considered typical, differs from *Agrotis* in having the primaries more abruptly widening near base, the apices and outer margin rounded or at most rectangular.

Two groups may also be distinguished in the genus. The first, of which *normaniana* is typical, has the second joint of palpi clavate, and the ordinary transverse maculation is distinct; the second, of which *clandestina* is typical, has the palpi equal throughout, while the transverse maculation is obsolete or confused.

The remaining genera have the front rough, produced, or tuberculate.

Chorizagrotis has the antennae of the male simple or ciliate merely, the primaries elongate, narrow, subequal and the abdomen depressed. *Auxiliaris* is the generic type.

Rhizagrotis has the primaries normally trigonate in form and the abdomen is not depressed. *Cloanthoides* may be considered the type. The ♂ antennae are simple.

This genus is divisible into three groups. In the first, the maculation is normal, not strigose, and the ordinary spots are distinct; *abnormis* is typical. In the second, the ordinary spots are more or less obscured by longitudinally strigate marks, transverse lines when evident, single; *aclivis* is typical. In the third, the ordinary spots are more or less completely confluent, the maculation is longitudinally strigose, the transverse lines are wanting, and the colors are pale gray. *Cloanthoides* is typical of this group as well as of the genus.

The remaining genera have the male antennae serrate and bristled or pectinated, and resort must be had for a main division to the sexual characters which here become very constant in type, varying within narrow limits only. In the one division the clasper attached to the harpes is a single, long, corneous hook or a shorter beak-like process; in the other the clasper is distinctly bifurcate, the forks long and distinct.

Two genera can be recognized in the first division. *Feltia*, of which *subgothica* is typical, has the primaries short and wide, the apices are rounded, and the colors are usually dark. The form is robust and the species are very compactly built. The male antennae are variable. Two

groups are formed in this genus. In the first, of which *subgothica* is typical the orbicular is open above, V-shaped; in the second, of which *venerabilis* is typical, the orbicular is complete.

Porosagrotis is applied to a series of forms of usually pale colors, moderately long and narrow primaries in which the apices are distinct, and in which the claviform is rarely, the basal dash never, present. They differ in habitus very greatly from the preceding, and *murænula* is typical.

The remainder of the species, over one-third of the entire number, are referable to the genus *Carneades*, of which *mærens* and *citricolor* are typical. They agree in the tuberculate front, brush-like (bristled) male antennæ, heavily spinose fore-tibiae, and finally in the bifurcate clasper of the male genitalia.

This large series of species is divisible into five fairly well-marked groups. Group *wilsonii* has primaries with depressed, somewhat concave costa, the apices somewhat produced, and thus differs from all the others, in which the costa is normally straight or slightly convex. Group *quadridentata* is distinguished by the pale lines marking veins, three and four and six and seven and variably indenting the terminal space.

Group *messoria* is recognizable by the very evident median shade crossing the outer portion of median space, and forming often the only prominent bit of maculation in the species. Group *pitychrous* is largely negative, containing species which have no distinctive characters referring them to other groups. Finally, group *tessellata* contains those species in which the cell is black, or of some darker shade than ground color, between the ordinary spots. A number of species which are not referred to at all in this paper, but which appear in Mr. Grote's list, were not properly referable to *Agrotis*, even under the vague definition which allowed such a loose assemblage.

It is suggestive that so large a proportion of our species are from the western part of our country, and that those species are mostly referable to those genera in which the front is modified in some way and the tibial armature heavy. In fact the distinctive character of the western fauna is shown in the very predominance, and sometimes abnormal development of tibial and clypeal armature. The great preponderance of pale or bright colors of the species of Colorado, New Mexico, Arizona, and Utah is also worthy of note and may allow of some interesting conclusions when the facts are more completely ascertained and collated. I have attempted few generalizations since the bringing of order out of the chaos of species has been a task so great and spread over so long a period that the comprehensive view of the forms as a whole has been obscured. The scheme above outlined is capable of more definite and comprehensive statement in tabular form.

SYNOPSIS OF GENERA AND GROUPS.

- | | |
|--|------------------------------|
| 1. Anterior tibiæ not spinose..... | 2 |
| Anterior tibiæ spinose..... | 9 |
| 2. Antennæ of male simple or merely ciliated..... | 3 |
| Antennæ of male serrated and bristled..... | 7 |
| Antennæ of male pectinated..... | 8 |
| 3. Abdomen and thorax depressed; primaries subequal; outer margin and apex rounded or rectangular..... | RHYNCHAGROTIS, 4 |
| Abdomen normally cylindric or conic; wings trigonate..... | 6 |
| 4. Secondaries yellow..... | Group <i>chardinyi</i> . |
| Secondaries fuscous or smoky, not yellow..... | 5 |
| 5. Thorax not, or obsoletely, tufted; ordinary spots complete..... | Group <i>cupida</i> . |
| Thorax more or less evidently tufted; orbicular incomplete, open superiorly, | Group <i>exsertistigma</i> . |
| 6. Primaries elongate, thorax with distinct anterior and posterior divided tufts, | ADELPHAGROTIS. |
| Primaries wide and frail; thoracic tuftings indefinite; costa not arched, | PLATAGROTIS. |
| Primaries unusually wide, costa strongly arched; thoracic tuftings distinct, | EURETAGROTIS. |
| 7. Thorax with a sharp crest; wings as in group <i>cupida</i> | ABAGROTIS. |
| 8. Wings broad; costa of primaries arched..... | SEMIOPHORA. |
| 9. Front smooth..... | 10 |
| Front rough, tuberculated, or pitted..... | 15 |
| 10. Vestiture long, loose, and hairy; antennæ various..... | PACHNOBIA. |
| Vestiture mixed scales and hair..... | 11 |
| 11. Antennæ of male with joints marked laterally with tufts of bristly hair, | SETAGROTIS. |
| Antennæ of male bipectinated..... | AGROTIS. |
| Antennæ of male simple or merely ciliated..... | 12 |
| 12. Primaries regularly widening, apices distinct, not rounded..... | PERIDROMA, 13 |
| Primaries with apices rectangular or rounded..... | NOCTUA, 14 |
| 13. Thorax with distinct anterior and posterior divided crest; primaries quite strongly produced at apex..... | Group <i>sancia</i> . |
| Thoracic tufts not divided; apices of primaries less produced..... | Group <i>inciris</i> . |
| 14. Palpi clavate toward tip; transverse lines and ordinary spots distinct, | Group <i>normaniana</i> . |
| Palpi equal throughout; transverse lines and ordinary spots becoming obsolete or confused..... | Group <i>clandestina</i> . |
| 15. Antennæ of male simple or ciliate only..... | 16 |
| Antennæ of male pectinated or serrate and bristled..... | 18 |
| 16. Primaries narrow, elongate, subequal, ordinary spots always, lines usually, distinct; abdomen depressed..... | CHORIZAGROTIS. |
| Primaries normally wide, abdomen not depressed..... | RHIZAGROTIS, 17 |
| 17. Maculation normal, not strigose; ordinary spots distinct..... | Group <i>abnormis</i> . |
| Ordinary spots more or less obscured by longitudinally strigate marks; transverse lines when evident, single..... | Group <i>acciris</i> . |
| Ordinary spots more or less completely confluent, maculation longitudinally strigose; transverse lines wanting; colors pale..... | Group <i>cloanthoides</i> . |
| 18. Clasper of male genitalia consisting of a long, corneous hook, or shorter, beak-like process..... | 19 |
| Clasper of male genitalia bifurcate..... | CARNEADES, 20 |
| 19. Wings short and wide, apices not pointed; colors dark..... | FELTIA. |
| Orbicular open above, costa paler..... | Group <i>subgothica</i> . |

Orbicular complete; claviform always, basal dash usually, distinct,

Group *venerabilis*.

Wings longer and narrower; apices marked; claviform seldom, basal dash never, present, colors pale.....POROSAGROTIS.

20. Costa concave, depressed, apices of primaries produced.....Group *wilsonii*.

Costa normal, straight or convex..... 21

21. Maculation indefinite, not belonging to other groups.....Group *pitychrous*.

S. t. space crossed by pale sagittate lines on veins three and four and six and seven, variably indenting s. t. line.....Group *quadridentata*.

No sagittate marks.

A distinct transverse median shade through outer part of median space,

Group *messoria*.

No transverse median shade; cell between the ordinary spots dusky to blackish,

Group *tessellate*.

Genus **RHYNCHAGROTIS** Smith.

Anterior tibiæ not spinose; antennæ of male simple; abdomen depressed; thorax more or less depressed, obsoletely tufted, or with small divided crests. Primaries subequal, outer margin rounded; apex rounded or rectangular, palpi forming a more or less evident snout.

The above will suffice to distinguish the particular series of the *Agrotæ* to which it refers, in addition to what has already been said on the subject.

Three groups are united under this term, differing among themselves in pattern of maculation and in the type of the male genitalia.

Group *chardinyi* is easily distinguished by the yellow secondaries.

Group *cupida* contains species in which the maculation is complete and the thorax is not, or not prominently, tufted. The palpi are most evidently snout-like.

Group *exsertistigma* contains species in which the orbicular is more or less V-shaped, open to the costa which is usually more or less pallid. The thoracic tufts are always evident, but scarcely prominent.

The characters of the genitalia are discussed under the group headings.

Group **CHARDINYI**.

Anterior tibiæ not spinose, front smooth, antennæ of male simple, flattened, densely clothed with fine pubescence beneath, and with long ciliæ from each side of each joint, not pectinated as stated by Mr. Grote. The thoracic vestiture is smooth, hairy, the hairs slightly flattened. Abdomen depressed. Primaries rather short, broad, apices rectangular, outer margin straight, to the middle. Secondaries yellow with a broad black margin and yellow fringes.

This group, though placed with, and certainly very closely allied to *cupida*, yet shows so many peculiar characteristics that it would seem possible to separate it by a distinct generic term. The two species, *rufipectus* and *brunneicollis* are, however, somewhat intermediate, and as the species can hardly be referred to *Triphæna*, I prefer to leave it

here. The yellow secondaries will at once distinguish it, as no other American species is so marked.

The form found here, is said to be the Asiatic *chardinyi*. Mr. Grote first stated that the fore tibiae in his specimens were spinose, but I have never been able to discover any.

The bibliography so far as refers to our fauna, is—

Rhynchagrotis chardinyi Bdv.

1829. Bdv., Ind. Meth., 94, *Triphana*.
 1856. Gn., Sp. Gen. Noct., 1, 317, *Triphana*.
 1874. Strk., Lep. Rhop. et Het., 79, *Agrotis*.
 1883. Grt., Proc. Am. Phil. Soc., XXI, 156, *Agrotis*.
gilvipeennis Grt.
 1874. Grt., Sixth Rept. Peab. Ac. Sci., App., 24, *Agrotis*.
 1874. Grt., Can. Ent., VI, 71, *Agrotis*.
 1875. Grt., Bull. Buff. Soc. Nat. Sci., II, 301, *Agrotis*.
 1875. Morr., Proc. Bost. Soc. N. H., 18, p. 117, pr. syn.
 1876. Grt., Stett. Ent. Zeit., v, 37, 135, pr. syn.

Primaries varying in tint from reddish to dusky ocher brown with the transverse lines blackish, even, tolerably distinct; the t. p. line with a rounded outward extension opposite the cell and a slight outward tooth on vein one. Ordinary spots sometimes distinctly limited. Orbicular very oblique, attaining or fusing with the reniform inferiorly, pale with indistinct darker interior shades. Reniform upright, moderate, with darker center and pale ocher ringed. The median space is shaded with blackish posteriorly. S. t. line distinct and continued, preceded by a dark costal shade relieving two costal pale dots. Terminal line even, fringes dark. Hind wings yellow, with yellow fringes, and a very broad black margin which intrudes more or less on the central yellow field. Beneath the hind wings are yellow with narrower black hind border and faint discal point; costal region dusky. Fore wings with the center blackish, costal and terminal regions brownish, varying in tone with the upper surface. The body colors vary in tone with the fore wings, and the black margins of the hind wings vary in width, sometimes encroaching strongly on the yellow discal field.

Expanse 26–34^{mm}. 1.05–1.35 inches.

HABITAT.—Anticosti, Labrador, Maine, New York (Adirondacks), Canada, Vermont.

The above description is principally from Mr. Grote's characterization of *gilvipeennis*, which is very fair. There is considerable variation in the ground color, and in the relative distinctness of the markings, and also in the distinctness and size of the white costal spots. The genitalia of the male are very simple, the harpes with the tip rounded, not spinulose. The clasper consists of a long, very strongly curved, corneous hook, shown in figure 1 on Pl. II.

I have taken this species in the Adirondacks at an elevation of about 2,000 feet, and also in Bennington County, Vermont. It seems not rare

from Maine northward, and is attracted by light. I have not been able to compare Siberian specimens, and as Mr. Grote has accepted the relegation of his species into the synonymy, I follow Mr. Morrison's reference.

Group CUPIDA.

The species which I bring together in this group, form an aggregation rather sharply defined from the other species of the genus and entitled perhaps to distinct generic designation. They really represent in our fauna the yellow winged species of Europe for which *Triphana* has been used, and of which *pronuba* may be considered typical. The head is small, front smooth, narrow, gently rounded, not bulging; the eyes moderate, the palpi short, projected straight forward, second joint enlarged at tip, less so in the first subgroup, terminal joint minute. The front has a small pointed tuft which with the straight palpi form a short compressed snout, less evident in *rufipectus* and *brunneicollis* and again perceptible in some species of the *exsertistigma* group, but yet so evidently marked in the second subgroup that by this character alone could the species be recognized. Other characters are, however, not wanting. The thorax is depressed, smoothly clothed except in the aberrant *mirabilis*, the vestiture being scaly, with an admixture of flattened hair. Abdomen flattened, truncate at tip, the appearance most evident in virgin ♀♀ or in those which have oviposited. The gravid ♀ has the abdomen distended, cylindric, with an obtuse conic tip, and yet even then the depressed appearance remains, and is very distinct from the normal type. The primaries are comparatively narrow, subequal in most species, or when they are trigonate, then the wing is rather short, and never ample. In the typical species the ornamentation is nearly identical, differing only in minor details. The ordinary spots are always present and always complete, though occasionally they are very faintly traceable. In nearly all the species the terminal space is more or less discolorous, or at least slightly paler than the ground color, though this is variable in specimens of the same species. As a whole, the species of the group are recognizable at a glance.

Two evident subgroups may be recognized, the first containing *rufipectus* Morr., and *brunneicollis* Grt., and the other, the balance of the species. In ornamentation the species agree in having the head and collar darker than ground color, which is the case in no member of the next subgroup. The palpi are not so evidently formed into a snout, and the abdomen is longer. Among themselves the species differ in the darker color, and purplish red body vestiture of *rufipectus*, and in the narrow primaries and ample secondaries as well as pale color of *brunneicollis*. Another common character which separates them from the other species is the form of the ♂ genitalia, which are somewhat allied to *chardinyi*. Here the harpes are membranous, broad, only slightly concave, the tip slightly produced superiorly and rounded.

The clasper is long, corneous, and curved, single. In the remainder of the species, *cupida* and *alternata* excepted, one general form of clasper obtains. Clasper and harpes are practically combined in an excavate corneous main shank, with a long curved superior process. In *cupida* the same general form obtains, but from the upper inner margin projects a short finger-like process.

Alternata differs in having from the middle of the main shank a conical chitinous process prolonged into a short acute and slightly curved hook.

The species are otherwise readily separated. *Mirabilis* and *inelegans* are aberrant in having a more or less evidently discoloured thoracic disc and fore and aft tufts, which at once distinguish these species; *inelegans* has the reniform concolorous; in *mirabilis* it is pale, discoloured. *Vittifrons* and *bimarginalis* agree in the general dark color, and the broadly pallid contrasting costa, differing among themselves by the otherwise even color of *vittifrons*, and the contrasting ferruginous thorax and gray terminal space of *bimarginalis*. Together they are most nearly allied to *mirabilis*, and through it to *stellaris*, in one direction, and *exsertistigma* in the other. The remaining species are exceedingly variable in ground color, which ranges from clay yellow or drab to olivaceous gray or deep red brown, and in the details of maculation. Yet with a little care the species are easily recognized. *Minimalis* and *cupida* have elongate, narrow primaries; in the first the lines are simple, in the second they are geminate, and at the inner margin of s. t. line is a dark costal patch, which through all color variations holds its own and marks this species to a certainty. It is a purely eastern and rather northern form.

In *placida* the wings are proportionately shorter, the apex and outer margin are strongly rounded, and the species as a whole looks stouter than *cupida*. The terminal space is usually distinctly blue gray, but occasionally in a pale drab specimen, the contrast is hardly apparent. The species is usually western.

Variata, *alternata*, and *cupidissima* are wider-winged species. *Alternata* is easily recognized. It is larger than the others and the color is nearly always pale drab or clay yellow; the terminal space is always paler, and the maculation is very distinct. It is an eastern form.

Variata is also a large species with the maculation subobsolete, the lines powdery, and the terminal space pale bluish-gray; *varix* Grt. is applied to a pale form of this species. It is western.

Cupidissima is a smaller insect with usually more evident maculation and less contrasting terminal space; *orbis* and *laetula* are applied to forms of this species. It is western.

It is noticeable that while the eastern species of the second subgroup differ from the western forms, and *inter se*, in the form of the ♂ genitalia, the western forms show a remarkable agreement in this respect. Mr. Butler has made some synonymical references in this group which

I find it impossible to accept. He makes *ravix*, *variata*, and *alternata* forms of *phyllophora*, although the latter is structurally distinct from the others and referable to a different genus. Mr. Butler's paper in Trans. Ent. Soc., Lond., 1889, Pt. III, proves that he has completely missed the true basis of generic distinction in this group, and his associations of species are thoroughly superficial and structurally unwarranted.

SYNOPSIS OF THE SPECIES.

Thorax untufted or with but a feeble basal tuft.

Head and collar discolorous, brown or black.

Thorax and primaries deep carneous gray, collar black.....RUFISPECTUS.

Thorax and primaries yellowish, head ferruginous.....BRUNNEICOLLIS.

Head and collar concolorous, costa not discolorous, paler.

Primaries narrow, subequal.

Primaries elongate.

Color reddish brown, transverse lines single.....MINIMALIS.

Color from clay yellow to red brown; transverse lines geminate; a dark costal patch at inception of s. t. line.....CUPIDA.

Primaries shorter, color varying from dirty yellow to bright red brown or dark gray; terminal space usually pale gray or bluish, rarely concolorous,

PLACIDA.

Primaries evidently wider, trigonate.

Color dark brownish red to pale drab or olive gray, terminal space contrasting bluish gray, transverse lines indistinct powdered with gray, ordinary spots faintly outlined.....VARIATA.

Color clay yellow with paler contrasting terminal space, transverse lines and spots very distinct; s. t. line sinuate, uneven.....ALTERNATA.

Color varies from clay yellow to bright red, terminal space not contrasting, transverse lines faint; s. t. line more even.....CUPIDISSIMA.

Collar discolorous, primaries with costa broadly pallid.

Thorax ferruginous, outer margin of primaries bluish gray...BIMARGINALIS.

Thorax sepia-brown, primaries evenly concolorous.....VITIFRONS.

Thorax with distinct anterior and posterior tufts.

Reniform concolorous, outlined with pale scales.....INELEGANS.

Reniform large contrasting pale yellowish.....MIRABILIS.

Rhynchagrotis rufispectus Morr.

1874 Morr., Proc. Bost. Soc., N. H., 17, 165, *Agrotis*.

1876 Grt., Ann. Lye. Nat. Hist. N. Y., XI, 304, *Agrotis*.

Thorax and primaries of varying shades of bluish gray, somewhat irrorate with brown scales, collar and head dark red brown, the former tipped with gray; transverse lines geminate narrow, black, often obsolete; t. a. line forming three distinct outward curves or scallops; t. p. line slightly creulated, with a regular outward curve over the cell; s. t. space darkening gradually to the distinct black s. t. line. Ordinary spots faintly outlined by brown scales, reniform with a dark filling; at lower portion a faint brown median shade is traceable. Beneath, the ornamentation is that common to the entire group; primaries with costal and outer margin irrorate with purplish scales, else blackish;

secondaries with anterior margin irrorate with purplish scales, else gray; a common dark extradiscal line crosses both wings and the secondaries have a distinct discal lunule. The vestiture of body beneath is long, thin, purplish red.

Expands 33–37^{mm}; 1.30–1.45 inches.

HABITAT.—Northern and Eastern States, Lewis County, New York, July 29, British Columbia, Oregon.

Evidently referable here by the general habitus, yet sufficiently distinct from all except the following species to form the type of a subgroup which shall be distinguished by the shorter palpi not forming a distinct beak, by the somewhat more ample secondaries, the longer abdomen, and the form of the ♂ genitalia. Some of the western specimens are extremely difficult to separate from *brunneicollis*, different as the type forms of the species are.

Rhynchagrotis brunneicollis Grt.

1864. Grt., Proc. Ent. Soc. Phil., III, 524, pl. 5, f. 5, *Noctua*.

1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.

Primaries reddish gray, slightly irrorate with black, and more extensively with ferruginous scales; transverse lines dark-brown, distinct, but interrupted; basal line distinct, blackish, straight; t. a. line blackish, geminate, nearly straight, forming three even curves; t. p. line often indistinct, crenulate, forming black dots on the veins, as a whole the line with a rather even outward curve; s. t. line narrow, pale, indistinct, sinuous, a distinct dark costal shade at its inception often continuing as a narrow margin to the pale line; ordinary spots large, distinct, concolorous with the rest of the wing, well defined by ferruginous or darker annuli; the reniform broad, but slightly excavated externally; terminal space often somewhat darker; a faint narrow ferruginous median shade; fringes long, darker than the rest of the wing; secondaries broad, very pale grayish testaceous, immaculate, very slightly darker shaded along external margin; beneath, primaries reddish along the costa, rest of the wing blackish gray, paler along terminal margin; secondaries as above, except along costa, which is powdered with reddish gray scales; a common dark exterior line; head ferruginous brown, collar deeper dark brown; thorax else concolorous with the primaries.

Expands 35–40^{mm}; 1.40–1.60 inches.

HABITAT.—New York, Massachusetts, Maine, Canada, Northern, Eastern, and Middle States. Albany in June.

As compared with *rufipectus* this species has narrower, longer primaries, more ample secondaries, and longer abdomen. The differences in color are ordinarily so great that there is no difficulty in separating them. In some western specimens however I have been seriously puzzled to say which species was before me. The genital structure is prac-

tically identical, while the style of maculation is also the same. The difference in size and in ground color remains as the most prominent distinctive feature, and these are not always constant. I have referred these western specimens to *rufipectus*.

The species is not common.

Rhynchagrotis minimalis Grote.

1879. Grt., No. Am., Ent. i. 45, *Agrotis*.

Head, thorax, and primaries brick red, with a faint yellowish tinge, terminal space somewhat paler; secondaries and body smoky gray, fuscous. Palpi laterally dark. Primaries with transverse lines single, dark, followed by a narrow pale shade. T. a. line even, or but slightly wavy, outwardly oblique from costa. T. p. line eremulate, outwardly curved over the cell. S. t. space slightly darker, the course of the s. t. line being marked by the contrast to the paler terminal space. A terminal row of dots, fringes concolorous, orbicular small, round, pale, with darker center. Reniform small, dark, a diffuse and somewhat obscure median shade, evident below reniform.

Expands 32-38^{mm}; 1.32 inches.

HABITAT.—Colorado, Maine.

This species, of which I have had no male for dissection, is ordinarily very easily recognized. There are however, among specimens, sent me by Mrs. Fernald, some forms, which while probably rightly referred here, show a much nearer approach to *cupida* than a knowledge of Colorado specimens alone would seem to indicate. The species seems not common.

Rhynchagrotis cupida Grt.

1864. Grt., Proc. Ent. Soc. Phil., III, 525, pl. 5 f. 7, *Noctua*.

1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.

1874. Grt., Can. Ent., VI, 16, *Cerastis*.

1878. Grt., Can. Ent., X, 234, *Agrotis*.

1878. Lintner, Ent. Cont., IV, 124, *Agrotis*.

1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, *Amathes*
relata Wlk.

1865. Wlk., C. B. Mns., Lep. Het Suppl., 3, 710, *Graphiphora*.

1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, pr. syn.

Var. BRUNNEIPENNIS Grt.

1875. Grt., Can., Ent. VII, 187, *Agrotis*.

1878. Grt., Can. Ent. X, 234, an var. pr. ?

1883. Grt., Proc., Am. Phil. Soc., XXI, 155, *Agrotis*.

Varies in color of thorax and primaries from drab or clay yellow to dark red brown, more or less powdery. The more usual form is a brick or dull red, abdomen somewhat more grayish; secondaries fuscous to blackish, sides of palpi also black. The maculation is often more or less indistinct, but when fully present is as follows: All the lines gem-

inate. Basal line, black, curved t. a. line outwardly oblique, blackish, waved, included space paler; a distinct black spot on costa at inception of the outer part of the line; t. p. line even, dark brown, included space paler, a distinct black patch on costa at inception of inner line, outer line punctiform; the line makes a slight outward curve over discal cell. S. t. line initiated by a large, distinct black costal patch, then sinuate, rather as a darker shade emphasized by black venular points, followed by a narrow pale shade to hind margin. S. t. space sometimes as a whole darker than the rest of the wing. Ordinary spots distinct, annulate with a paler shade, orbicular very slightly oblique sometimes concolorous, more usually darker; reniform moderate, with an evenly blackish center, of the normal shape. Beneath, primaries reddish along the costa, otherwise blackish gray, with a more or less evident outer line; secondaries paler than above, powdered with reddish along costa, irrorate with black scales; a faint outer line and evident discal spot.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—Canada to Virginia, west to Pennsylvania; Texas.

From this typical form the variations will run to an almost complete obsolescence of maculation, and again to a darker form, the maculation black and strongly relieved. A permanent feature, which seems the specific character, is the costal spot preceding the s. t. line, and which seems to survive all sorts of modifications. The genital structure of the male is peculiar, as I have already stated, and as shown at Pl. II, f. 3. Mr. Grote has had some of the variations of this species, and he says (Can. Ent. X, 234): "What may be taken as the typical form, or that which is best marked, expands 33–35^{mm}. The wings are of a brick brown, with the stigmata filled with black; a black mark on costa at inception of s. t. line; the s. t. space a little darker than the rest of the wing; the lines well defined. A larger form from Texas expands 40^{mm}. It has been reared from the larva by Belfrage (No. 674). It is more red, more unicolorous, the markings less obtrusive. A specimen taken by Dr. Bailey is the size of the typical form, but has the subbasal and subterminal spaces entirely filled in with black. Then come three specimens in which the fore wings seem a little narrower, and the expanse smaller. One is bright orange red, all the markings obsolete. Another is more of the typical shade, but both the spots are ringed with bright yellow. The third I have decided as distinct under the name of *brunneipennis*."

Mr. Grote did not have all the variations, apparently, and was in error in considering the Texan specimens as referable here. It constitutes a very distinct species, nearer to *alternata*, and as such I have separated it in the collection of the U. S. National Museum, which contains several of the Belfrage specimens. It may be called *belfragei*, and the above comparative features will easily separate it. I believe it the only one of this group in Texas.

The type of *brunneipennis* is an extreme form, and Mr. Grote's description may therefore be reproduced:

"Allied to *cupida* but smaller; fore-tibiae unarmed; thorax and forewings of a glossy chestnut brown, somewhat reddish; none of the usual markings are noticeable. The sub-terminal space is stained with blackish. Following the s. t. line is a series of faint, pale, interspaceal fleckings; ordinary lines indicated on costal region. Hind wings blackish fuscous; abdomen beneath stained with reddish brown, as is the costal region of primaries, else the blackish wings beneath show only a common black transverse line, which fades out toward the internal margins."

Lintner, in the Ent. Cont., IV, 124, rather doubts the identity of the forms referred by Mr. Grote to this species, and describes the larval habits of the species without describing the larva itself. According to him it is sometimes quite injurious to grape, feeding on the buds.

The species is the most common eastern representative of its group.

Mr. Butler's reference of *Graphiphora velata* Wlk. as a synonym of this species, is accepted as an easy way of getting rid of Walker's name, and because the reference is probably correct.

Rhynchagrotis placida Grt.

1876. Grt., Ann. Lyc. Nat. Hist. N. Y., XI, 305, *Agrotis*.

1878. Grt., Can. Ent. x, 235, *Agrotis*.

1889. Butl., Trans. Ent. Soc., Lond., 1889, 383 = *cupida*.

"Fuscous gray. Fore wings smooth, dark fuscous. Basal and sub-terminal spaces blackish and darkest; median space a little lighter, slightly brownish; terminal space gray, contrasting. Lines even, perpendicular, pale. Transverse anterior line with a slight subcostal notch, slightly oblique; median space wide; stigmata difficult to make out, pale ringed, concolorous; median shade noticeable, obscuring the reniform. Transverse posterior line with a straight, outward costal extension beyond the point of origination, thence somewhat squarely exerted opposite the cell, and running nearly straight downwards without submedian sinus. Subterminal line indicated by the great difference in color between the two terminal spaces; fringes dark. Hind wings concolorous, rather dark fuscous, with paler, interlined fringes. Beneath, fuscous, with a slight purple shade, irrorate, with an external common band incomplete; a slight discal mark on hind wings. Terminal abdominal hairs somewhat ocherous."

The above description is from Mr. Grote, to show the type form of the species. It was from a specimen taken by Mr. Hill in Lewis County, New York, July 26.

In Can. Ent., x, 235, Mr. Grote, commenting on four specimens from Nevada, says: "One has the fore wings shaded with brown, median and terminal space both paler, markings quite distinct. Another is almost unicolorous blackish, with the shadings and markings powdery.

Again another has a reddish cast, reminding one of *cupida*, but with pale terminal space."

In my own experience the ground color varies from dark clay yellow to a purplish gray in one direction, and deep red brown, sprinkled with bluish gray, in another. The arrangement of the lines and spots is essentially as in *cupida*, but the maculation is not so evident, there is no black costal patch initiating the s. t. line, which is also more even and the terminal space is always paler, often contrasting bluish gray to a dark red ground color. The palpi are somewhat shorter, the primaries proportionately a little shorter and wider, while the size is generally decidedly smaller. The genitalia are also different from those of *cupida* as shown on Pl. II, f. 4.

Expands 25-35^{mm}; 1-1.40 inches.

HABITAT.—New York, Nevada, Colorado, Utah, Arizona.

Nothing has been written of the larva so far as I know. The species is much more common in the Western States, and is rather more nearly allied to forms at home there than to *cupida* or *alternata*.

Mr. Butler would see in this species a ♀ form of *cupida* merely.

Rhynchagrotis variata Grote.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, pl. 4, f. 12, *Agrotis*.

1883. Grt., Pr. Am. Phil. Soc., XXI, 155, *Agrotis*.

1889. Butl., Trans. Ent. Soc. Lond., 1889, 382 = *phyllophora*.

varix Grt.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.

1882. Grt., New List, an var., pr. ?

1889. Butl., Trans. Ent. Soc. London, 1889, 382 = *phyllophora*.

"Terminal space pale; this species differs by the more irregular, pale, powdery s. t. line, relieved from the pale terminal shading by the ground color of the wing obtaining beyond it. The dark fore wings are stained with ocherous. The geminate lines with pale included shades are well defined and inaugurated with black costal dots. Stigmata concolorous, ill defined; orbicular round, moderately large; reniform upright, narrow; both defined by narrow, pale yellowish annuli, a diffuse pale powdering over the place of the claviform. Collar, head and palpal tips grayish; palpi black at the sides; thorax like fore wings. Hind wings dark fuscous with interlined fringes, beneath with common line *straightly* marked with black on costa of primaries."

The above is Mr. Grote's original characterization. In my experience it varies from pale to deep red brown, occasionally more yellowish. The median lines usually consist only of the included pale shade and are often very diffuse, powdery. The form named *varix* by Mr. Grote he characterized as follows:

"Like the preceding with pale terminal space. Of a pale drab or gray olive fuscous. Markings much like the preceding [*variata*], from which it seems to differ in color, in the greater width of the geminate

lines, and particularly in that beneath, the common line is outwardly *obliquely* marked with the black on the costa of primaries. Generally paler and less distinctly marked than *variata*."

None of the characters are at all constant, and there is no point at which even the varietal line can be satisfactorily drawn.

Expand 33-40^{mm}; 1.32-1.60 inches.

HABITAT.—Colorado, Nevada, California, Arizona, Vancouver.

As already indicated the genital structure of this species agrees with that of *placida*, and to that species the present is more nearly allied. It is, however, larger, and wider winged, and the powdery transverse markings are somewhat distinctive in course as well as appearance. In a Californian specimen examined, the s. t. line was distinct, pale, sinuous, and only the outer portion of the terminal space was pale.

Rhynchagrotis alternata Grt.

1864. Grt., Proc. Ent. Soc., Phil., 11, 526, pl. 5, f. 8, *Noctua*.

1874. Grt., Can. Ent., VI, 15, *Cerastis*.

1874. Grt., Can. Ent., VI, 214 *Agrotis*.

1878. Grt., Can. Ent., X, 235, *Agrotis*.

1889. Butl., Trans. Ent. Soc., Lond., 1889, 382=*phyllophora*.

Pale to dark clay yellow; primaries irrorate with black; all the markings distinct; s. t. space darker, terminal space paler than ground color. Maculation essentially as in *cupida*. Basal line geminate, brownish. T. a. line oblique, geminate, with a simple subcostal dentation, thence undulate to internal margin. T. p. line geminate interrupted, nearly straight, but little arcuated at the disc; beyond, and close to the line is a row of dark venular dots, giving the appearance of a third line. S. t. line marked by the contrast between the dark s. t. and paler terminal space, the s. t. shading in pale specimens looking very much like a dark fascia. A series of blackish terminal dots. Ordinary spots narrowly annulate with pale, darker than ground color, the reniform slightly shaded with ferruginous. Secondaries fuscous to blackish, fringes contrasting, pale reddish yellow. Beneath the margins of both wings are reddish yellow, the disc of primaries blackish, of secondaries paler, luteous. A common, blackish extra-discal line. Palpi pale ferruginous, not black at sides, and thus this species is easily separable from all the preceding forms.

Expands 35-38^{mm}; 1.40-1.50 inches.

HABITAT.—Middle and Northern Atlantic States, District of Columbia.

This is one of the most constant species of this group, both in size and maculation. I have seen many pale specimens of *cupida* labeled *alternata*, and Mr. Grote himself is not guiltless of such errors. I have never seen the species from the Pacific States, though Mr. Grote gives this as a Californian species in Can. Ent., VI, 215, but I believe he had a well marked specimen of *cupidissima* before him rather than *alternata*,

and the same is probably true of the Nevada specimen referred to in Can. Ent., x, 235. In fact, the whole paragraph in reference to this Nevada specimen points to *cupidissima* almost without doubt. The sexual characters of the male point to *cupida* rather than the other species, and the color of the palpi seems to form a safe character for superficial classification or determination. I have never seen this species shading into red, all the red specimens proving *cupida*.

Rhynchagrotis cupidissima Grt.

1875. Grt., Can. Ent., VII, 101, *Agrotis*.
 1878. Grt., Can. Ent., x, 234, *Agrotis*.
 1878. Grt., Bull. Surv., IV, 173, *Agrotis*.
 1883. Grt., Proc. Am. Phil. Soc., XXI., 155, *Agrotis orbis* Grt.
 1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.
 1878. Grt., Bull. Surv., 174, *Agrotis*.
 1883. Proc. Am. Phil. Soc., XXI, 155, an syn. pr.?
latula Grt.
 1876. Grt., Bull. Buff. Soc. N. Sci., III, 83, *Agrotis*.
 1878. Grt., Can. Ent., x, 234. pr. syn.
 1878. Grt., Bull. Surv. IV, 173, an sp. dist.

“The Californian specimens are light red colored, with powdery geminate lines, and variable in appearance; one is pale fawn, unicolorous, without marks on primaries save indications of the stigmata and the dotted t. p. line. Again, three specimens have the orbicular somewhat V-shaped, open above. The t. p. line is more regular than in *cupida*; it is accompanied by black dots. The subterminal line is nearer to the margin than in either *alternata* or *cupida*, but it is more like *alternata* than it is *cupida* in its being irregular, accompanied with powdery black scales; it is preceded on costa by a blackish shade, as in *cupida*. The present species I formerly considered as *alternata* from the markings, and on Mr. Morrison’s authority as *cupida* from the color, but the reniform I now see is more kidney-shaped than in either the eastern *alternata* or *cupida*. I sent a specimen to Mr. Morrison to show the variability of what I supposed was his *exsertistigma*, and he informed me that the specimen was *cupida*. Afterward he returned me my specimen of *exsertistigma*, * * * which I then saw was an entirely different species. I have subsequently adopted the view that the Californian specimens were *cupida*, and that I was in error in considering them to be *alternata*. I now reject both determinations, and consider that the Californian species is allied to both *alternata* and *cupida*, and is a new species from the data given above. The habitus of *cupidissima* and size (39^{mm}) is rather that of *alternata*. The hind wings are a little paler at base in *cupidissima*, and the lunule more obvious. *A. cupida* does not as yet appear to occur in California.”

The above is Mr. Grote's original description; afterward, in *Can. Ent.*, x, 235, he refers to the species as of a "pale reddish clay color," and in the *Bull. Surv.*, iv, 173, says: "Nearest to *cupida*; similarly sized, but paler, with the orbicular incomplete superiorly. Varies by the primaries becoming clay colored without markings. Collar unlined."

Mr. Grote has confounded two distinct species in his characterizations—one with open orbicular, and one with the orbicular closed. A long series of specimens in Mr. Neumoegen's collection are all of one species and are regarded as typical, the more as Mr. Grote's references of *orbis* and *lactula* to this species is most consistent with this type.

The species is common in the Western States, and I have seen long suites, in none of which the orbicular showed any tendency to become incomplete. They vary in color from very pale luteous to a very distinct red brown, the terminal space usually a little paler, but the color very even as a whole. Sides of palpi black. Transverse lines and ordinary spots much as in *alternata*, but generally indistinct and difficult to make out. Ordinary spots usually slightly and often considerably darker and narrowly annulate with a paler shade. Secondaries and under side as in *alternata*. In size it ranges *below* the expanse given by Mr. Grote (39^{mm}), my largest specimen being 35^{mm}, ranging down to 30^{mm} (1.20–1.40 inches). The wing form is generally more trigonate than in the other species, the primaries short and broad. The genital structure is like *placida*.

Orbis was described by Mr. Grote as follows:

"Entirely concolorous drab or pale olive fuscous, shining; s. t. space barely differentiated by its darker tint. All the lines faint, geminate, as in allied species. Distinguished by its reduced, round, complete orbicular, and small, upright reniform spots, annulated with pale; the orbicular distinctly margined. Head and thorax concolorous. Hind wings concolorous fuscous with interlined fringes; beneath with discontinued common line."

In *Bull. Surv.*, iv, 174, Mr. Grote says: "Closely allied to *alternata*. Stigmata complete; orbicular very small, pale-ringed, spherical. Unicolorous olivaceous gray, shining; terminal space hardly paler. Possibly a variety of *alternata* but the spots are concolorous."

In the *Proc. Am. Phil. Soc.*, xxi, 155, the suggestion that this may be a form of *cupidissima* is made, and I believe this is correct. At all events it is easy in any series of *cupidissima* to pick out *orbis* or what fully answers to the description.

Lactula is said to be "Allied to *cupidissima*. This species is smaller, and has a line on the collar, and the thorax and fore wings of a burnt brown, strewn with ocher scales, which fill the stigmata in one specimen, and in the other leave the spots concolorous, while encircling them and filling the geminate lines. Except in color, this form differs very little from *cupidissima*, while seeming narrower and shorter winged.

All the stigmata shown. Hind wings and under surface as in *cupidissima*, which is a light red species."

In Can. Ent., x, 234, the reference to *cupidissima* is more positively made, but in Bull. Surv. iv, 173, the following are indicated as distinctive:

"Darker than the preceding [*cupidissima*], purple brown, with powdery ochrey markings; claviform indicated, collar unlined, a little smaller than *cupidissima*."

The only specimen of *latula* which I have seen labeled by Mr. Grote did not agree with this description at all and was the same as the *observabilis* of Mr. Graef's collection, belonging to the *exsertistigma* group rather than here. Mr. Grote speaks of all these forms from California only. I have them from California, Colorado, Arizona, Kansas, and British Columbia.

Rhynchagrotis bimarginalis Grt.

1883. Grt., Ann. & Mag., N. H. (Lond.), 1883, 53, *Agrotis*.

1883. Trans. Kans. Ac. Sci., VIII (1881-'82), 54, *Agrotis*.

Head, thorax, and anal tuftings orange brown to ferruginous; collar grayish; primaries deep brown, with blackish shading; costa contrasting, leather brown or reddish yellow; s. t. space black on costa, else powdered with ferruginous; terminal space gray; basal space and space between the sinuate t. a. lines powdered with ferruginous; t. p. line even, slightly crenulate; a row of venular dots through the s. t. space; ordinary spots obscured by the blackish shading; secondaries blackish gray, as is also the abdomen, save anal tuftings; beneath dusky, with common outer shade line and discal spots.

Expands 35-36^{mm}; 1.40-1.44 inches.

HABITAT.—New Mexico.

This species is so decidedly and remarkably marked that no mistake in its recognition seems possible. It is evidently referable to this group, but seems to introduce a strong tendency to the style of maculation more general in the following *exsertistigma* group. I have seen only a few specimens, and have not been able to study the male.

Rhynchagrotis vittifrons Grt.

1864. Grt., Proc. Ent. Soc., Phil., III, 527, pl. 5, f. 8, *Noctua*.

1868. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.

Head, thorax, except collar, and primaries smoky blackish; collar and costa to t. p. line creamy white; t. a. line pale, somewhat indistinct, thrice outwardly curved, oblique; t. p. line geminate, pale, included space concolorous; outer line punctiform, the line even and very slightly excurved over the cell; s. t. line lunulate, continued, pale, broadly

marked on costa; a pale streak on submedian vein through the cell; orbicular very small, punctiform; reniform moderate, pale, powdered with rusty red; secondaries white, the veins with dusky scales; beneath whitish, primaries, with a dusky s. t. shade, broadest at costa; secondaries sprinkled with brownish along costa.

Expands 33^{mm}; 1.32 inches.

HABITAT.—Colorado.

Of this peculiar species I have seen but a very few specimens, all very much alike. The male genitalia are as in *placida*, and thus confirm the reference of the species to this group. The gravid females have the abdomen conic, and at first sight do not suggest *cupida*, but a little care will show the evident resemblances even in that sex. There need never be any doubt in the identification of this species.

Rhynchagrotis inelegans Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 43, *Agrotis*.

General color dull blackish brown; head and palpi concolorous; collar with a reddish suffusion, more marked at the tip and extending to base of costa of primaries; thorax with base of patagiae, and the tips of the small anterior and posterior tufts also more reddish and slightly contrasting; primaries with a slight reddish shading basally along costa, else quite uniform, save that the median space is a trifle darker than the rest of the wing; basal line geminate, black, distinct; t. a. line geminate, blackish, distinct, outwardly oblique and quite even, a small outward curve only in the interspaces; t. p. line marked by a geminate black spot on the costa, thence indicated only by the slight contrast between median and subterminal space, outwardly well curved over the reniform, and somewhat incurved below; s. t. line prominent, a narrow, slightly irregular line of yellowish white scales, scarcely interrupted save toward costa and inner margin; claviform faintly marked; ordinary spots moderate in size, normal in form, concolorous, outlined by a narrow line of pale scales surrounding each; secondaries and abdomen smoky fuscous; beneath fuscous powdery, with a reddish shading, more marked on secondaries; an outer interrupted transverse line and a discal spot on secondaries only.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Sierra Nevada, California.

In structural characters this species is nearest to *mirabilis*. The palpi are short, scarcely forming a snout, as in *cupida*; thorax with small anterior and posterior divided crest; abdomen depressed. It is an intermediate form between the *cupida*, *exsertistigma*, and *stellaris* groups, with the wing form of the former, the tufting of the second, and the maculation of the third. Its best place is probably next to *mirabilis*. A single female, in good condition, is before me.

Rhynchagrotis mirabilis. Grt.1879. Grt., N. Am., Ent. 1, 39 *Agrotis*.

Smoky to deep black; thoracic disc discoloured reddish or pale gray, reniform contrasting creamy white. T. a. line much as in *cupida*, and tolerably well marked. T. p. line indicated by a sparse powdering of pale scales. S. t. line defined by pale scales; terminal space slightly powdered with gray. A distinct narrow deep black line from base to t. a. line. All from t. a. line to reniform black, the orbicular absorbed or appearing as a mere pale point.

Expands 36^{mm}; 1.45 inches.

HABITAT.—Colorado and Arizona.

An odd species of which I have not seen a ♂. It differs from all the other species save *inelegans*, by having distinct anterior and posterior thoracic tufts which are rendered prominent by their contrasting color. Yet the species so evidently belongs here by the general shape, that I felt no hesitation in leaving it as an aberrant member, leading to the *stellaris* type.

The ♂ genitalia I doubt not will be found to conform in all essential respects to the *placida* type.

Group EXSERTISTIGMA.

Front narrow, subequal, scarcely wider superiorly, smooth. Antennæ simple, ciliate in the ♂. Second joint of palpi so clothed as to form a club at tip. Thorax subquadrate vestiture smooth; a distinct anterior and posterior divided tuft, collar often slightly produced at middle. The genital pieces of ♂, while referable to the same structural type, yet show considerable variation. The distinguishing feature is a broad slightly excavate corneous harpe, more or less prolonged into a finger-like projection superiorly; margin sinuate to inferior angle which is more or less distinctly and acutely indicated. From this main shank there arises some distance from the end, a chitinous base, superiorly prolonged into a curved process of varying size and shape. Reference to the figures on Plate II will better explain the structures. Each examined species has some little peculiarity of its own, and no two are exactly alike.

The primaries are variable in length and shape, and run from the form typical in the *cupida* group, to that found in the *stellaris* section. In ornamentation they all agree in the trigonate orbicular which is open superiorly; usually also the costa is more or less distinctly pallid, and as a rule the cell between the ordinary spots is black, or at least darker.

Closely allied therefore in habitus and essential structural characters to the *cupida* group, yet the ornamentation alone, combined, to except *mirabilis*, with the thoracic tufting, will serve to distinguish it.

The chief difficulty in dealing with this group has not been in the separation of the species from the material at hand, for that was easy, but in the identification of the species described by Mr. Grote. Some

of the descriptions most obviously confound two or more species, and again there is very little doubt but that every one of the species has been described more than once. Still with the descriptions alone, I would have made out fairly well, but I was again thoroughly upset by the remarkable identifications made by Mr. Grote, and the unreliability of the word "type" on some of the labels, insects bearing them not agreeing at all with the description.

I found the *exsertistigma* of Mr. Tepper's collection to equal the *observabilis* of the Neumoegen collection, while the *exsertistigma* of the Neumoegen collection was different from that of the Tepper collection, and neither of them was like the type in Mr. Gräf's collection. The *discoidalis* of Mr. Hulst's collection is the *observabilis* of the Gräf collection, but not of the Neumoegen collection, and the type in Mr. Edwards's collection is entirely different from any I have seen so named. So also the *faecula* of the Neumoegen collection is different from the same species in the Edwards collection.

Some of the absolute types were inaccessible to me, and under the circumstances I have named all the species that I could not positively identify, and have given all of Mr. Grote's original descriptions for comparison. I fully expect that all the names here given by me will fall into the synonymy, but they will at least have served their purpose of positively separating the forms, and at some future time when comparisons can be made in Mr. Grote's collection in the British Museum the rectification of the synonymy can be easily noted here.

The species of the group divide readily into two sections, according as the collar is or is not black tipped.

In the series with the collar black tipped, *exsertistigma* is distinguished by the pale luteous gray color, the elongate primaries, and the depressed form.

Formalis is smaller, much more robust, shorter winged, and dark red brown or purplish in color. To this I refer *insularis* positively from the type and the description. *Emarginata* is almost certainly a form of this species without the gray shaded costa. I did not find the species in Mr. Edwards's collection, from which it was described.

Carissima Harv. was referred by its describer as allied to *formalis*, and the description is comparative and entirely insufficient to identify the species. Mr. Grote broke up Dr. Harvey's association of the species, and placed it with *intrita* and *rara*, so that the description becomes worse than useless.

Binominalis is bright red, the collar is slightly produced at middle, the tufts are very distinct, and the apices of primaries are more evident than in either of the preceding forms.

Observabilis is a species that I have not been able to identify. Mr. Grote's identifications in no case agree with his description of this species, and I have seen no specimens to agree with it. The color is dark blackish brown, the reniform dusky, and the terminal space pale, oliva-

ceous; strongly distinctive features. The remainder of the species have the collar concolorous and not black tipped.

Facula represents *formalis* of the first group in wing form and general habitus.

Distracta represents *exsertistigma* of the previous section in color and sordid, depressed appearance. It is powdery, but the powdering is evenly distributed, the s. t. space not contrasting.

Discoidalis is much like the preceding in color and habitus, but is less depressed, scarcely powdery, the s. t. space distinctly darker than the rest of the wing, and the orbicular nearly complete.

Crenulata and *confusa* agree in distinct tufting, somewhat prominent collar and produced apices of primaries, differing from each other by the dark color and concolorous costa of the former, and the bright red color and pallid costa of the latter.

Costata was referred to this series by Mr. Grote, comparing it with *exsertistigma (confusa)*, and it may refer to my species. He says, however, that the t. p. line is single, finely lunulata, and that the collar has a black line—features which seem to indicate rather the *tesselata* group where there are a number of species with the same general type of maculation.

In tabular form the species antoptically known to me are as follows:

SYNOPSIS OF SPECIES.

Collar broadly black at tip.

Smoky brown; costa, transverse lines and outer margin luteous. EXSERTISTIGMA.

Dark purplish or gray brown; transverse lines distinct; robust; primaries short, rounded outwardly. FORMALIS.

Red brown; transverse lines feebly marked; t. p. hardly traceable; less robust; primaries more elongate, and produced at apex. BINOMINALIS.

Collar not tipped with black.

Robust; abdomen short, plump; primaries short, outwardly rounded; dark blackish brown, lines faint. FACULA.

Less robust; primaries longer; abdomen more slender.

T. a. lines crossing the costal space, which is not strongly contrasting in color.

Dull luteous, powdered with black; s. t. space not darker than median space, DISTRACTA.

S. t. space darkest, orbicular tending to become complete superiorly,

. DISCOIDALIS.

Deep purplish brown; s. t. space evidently paler than median space,

. CRENULATA.

T. a. lines not crossing the broadly pallid costa.

Bright red brown, costa and collar yellow. CONFUSA.

Rhynchagrotis exsertistigma Morr.

1874. Morr. Proc., Bost. Soc. N. H., XVII, 166, *Agrotis*.

1875. Grt., Can. Ent., VII, 26, *alternata*.

1875. Grt., Can. Ent., VII, 101, an sp. dist. *alternata*.

1875. Grt., Bull. Buff. Soc. N. Sci., II, 303 an sp. dist.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 79, *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., X, 450, *Agrotis*.

Color dark clay yellow, median and submedian spaces darker, and powdered with dark fuscous or blackish. Thorax with a shade of

brown added, collar pale inferiorly, broadly tipped with black. Abdomen and secondaries dull fuscous. Transverse lines evident, geminate; t. a. line not crossing the paler costal space, the inner line running in an even curve from the submedian vein to base. Claviform pale. T. p. line evenly sinuate, included space pale. Ordinary spots concolorous, outlined by a paler line. The terminal space is paler than the s. t. space, and except as marked by this contrast, the s. t. line is not evident. Costal part of s. t. space darkest. Beneath, dull fuscous, with costal and outer margin powdered with blackish and with an extra discal line and discal lunate spot on each wing.

Expands 37^{mm}; 1.5 inches.

HABITAT.—California.

The above description was made from Mr. Morrison's type which is a female. Mr. Morrison's original description is very brief, and is as follows:

"This species resembles the eastern *alternata*, Grote, but it can be separated by the following characters: Orbicular spot open above, not subquadrate as in *alternata*. The median space is suffused with black. Claviform spot distinct and disconcolorous. The exterior line is drawn in below the cell; and lastly the collar is black above, whitish and contrasting below."

Judging from the above description Mr. Grote promptly referred the species to *alternata* as a synonym. Later, on receiving a specimen from Mr. Morrison, marked *exsertistigma* he withdraws this reference and offers a description essentially different as to coloration. Still later Mr. Grote learned that the specimen sent him by Mr. Morrison was not like the type, and he seems never to have really recognized Mr. Morrison's species. The result is the confusion indicated in the preliminary remarks on this group.

Mr. Morrison's comparisons are really very apt and the species is a good one. The thoracic tuftings are small, and the whole insect appears depressed, abdomen flattened.

None of Mr. Grote's remarks apply to this species and the figure in the Buff. Bull. refers to the form I have named *suffusa*.

Rhynchagrotis formalis Grote.

1874. Grt., Bull. Buff. Soc. Nat. Sci., II, 61, *Agrotis*.

1878. Grt., Bull., Surv., IV, 174, *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., X, 450.

var. *INSULARIS* Grote.

1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 82, *Agrotis*.

"♂ An exceedingly dark and beautiful species, with silky squamation and somewhat flattened form, and allied to our eastern *A. collaris* and *A. geniculata*, middle and hind tibiæ alone spinose, dark, intense black-

ish-brown. The collar has a narrow central pure white line, above which the prothoracic pieces are velvety black; primaries with the costal edge broadly dark ashen to the inception of the t. p. line, absorbing the superior portion of the orbicular spot; reniform gray, like the costal edge, moderate, with faint dark internal ring; ordinary lines geminate, fine, not very distinct or complete, black; the t. a. line waved, nearly perpendicular; the basal half line visible on the gray costal edge; the t. p. line roundly but not greatly exerted opposite the cell, followed by minute black and white points on the subterminal space; median space with a more ruddy brown tinge than the rest of the wing and like the thorax and tegulæ; the faintly pale subterminal line is shaded with brown and the dark fringes are brown at base and show a faint interior line; hind wings blackish without marks, with white-tipped fuscous fringes that show a broad interior line; abdomen blackish; beneath the wings are a little paler, irrorate, with a rather distinct blackish common line and black discal marks on the hind wings."

Expands 35^{mm}; 1.40 inches.

The above is Mr. Grote's description of *formalis*. The form *insularis* is described as follows:

"♀ Purple red brown with ashen costal region crossed by the geminate black transverse lines; stigmata concolorous; cell between them and before the orbicular black; reniform narrowly edged with pale, a black sub-basal curved dash, course of the lines as in *exsertistigma*, collar ashen; thorax red brown; hind wings fuscous with interlined fringes: allied to *exsertistigma*; differs in color and in the black lines, and in the more bent subterminal followed by pale points, as well as in the more rounded orbicular."

Expands 34^{mm}; 1.36 inches.

A long series of specimens from California and Vancouver prove these forms identical. The black filling of the cell is not constant and varies from a mere shade to a distinct black filling, the latter being the more usual. In the type form the costa and ordinary spots are dark gray, and the claviform is very faintly marked; the median space has a more evident reddish brown cast and the secondaries are blackish. In the variety *insularis* the color is more evenly red brown, the collar not black above but darker than the inferior portion which is tinged with yellowish, as is the costa. The ordinary spots are concolorous, outlined by the black filling of the cell, and a few yellowish scales; the secondaries have a yellowish tint. All intermediate forms are found in both sexes, and I have no doubt of their identity. The genitalia of the male are alike in both forms; they are peculiar in having the inferior angle of the harpes rounded and the clasper unusually long and strongly curved.

In my own experience the species varies in size from 35-37^{mm}, 1.40-1.48 inches, and it seems not uncommon in California, Vancouver, and British Columbia.

Rhynchagrotis emarginata Grt.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 82 *Agrotis*.

1878. Grt., Bull. Surv., IV, 174 *Agrotis*.

“♀ Resembling *insularis*, but without pale margin to primaries; abdomen flattened; this and the following species [*facula*] with *insularis* are nearest to *formalis*. Wings narrower than in *carissima*. Dark purple brown. Collar surmounted by a narrow black line. Stigmata concolorous, subequal, narrowly pale margined. Lines black, geminate, indicated on costal region, else faint, no black marks or shades. Orbicular open to costa. Hind wings darks fuscous with interlined fringes. Beneath paler; costal regions stained with purplish; common line and discal marks on hind wings. Abdomen dark fuscous above; purple stained beneath.

“Expanse 33^{mm}. No. 784, California, Mr. Hy. Edwards.”

This may be *formalis* or *insularis* but may also be a good species, since some of the forms in this group are very closely allied.

In Bull. Surv., IV, 174, Mr. Grote gives as distinctive: “Rather narrow-winged, dark purple brown; concolorous; ornamentation subobsolete; lines darker than the wing; orbicular incomplete above. Collar with a distinct, black superior edging.”

This indicates almost certainly one of the evenly colored forms of *formalis*.

Rhynchagrotis carissima Harv.

1875. Harv., in Grt. check list, p. 25.

“♂ Allied to *formalis*. Head, thorax, fore wings, and body beneath stained of a reddish purple over fuscous. Veins marked with blackish; lines obsolete, geminate, marked by included paler tint; stigmata obsolete; collar with a jet black contrasting band. Beneath the wings are blackish, irrorate; hind wings paler with line and small discal mark. California. Expanse, 34^{mm}.”

Except as a comparative description this is very incomplete. Assuming that the species is really related to *formalis* this description applies to a specimen of *insularis* Grt., before me. But Mr. Grote, who had an opportunity of knowing all of Dr. Harvey's types, and who, indeed, obtained possession of most of them, places this species near to *intrita* and *rava*, and far from the species with which it is compared. This makes me doubtful whether the suspicion of identity with *insularis* is correct; but since Dr. Harvey is usually very accurate I retain the species where he originally placed it. I have never seen a species marked *carissima* in collections, and the type is probably in Mr. Grote's collection in the British Museum.

Rhynchagrotis binominalis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 451, *Agrotis*.

exsertistigma, † Grt.

1875. Grt., Can. Ent., vii, 26, *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., x, 461, pr. syn.

Primaries red brown; costa and collar inferiorly yellowish; collar tipped with black; cell around the ordinary spots black. Transverse lines geminate; t. a. line not crossing costal pale space, else distinct; t. p. line punctiform, barely traceable; s. t. line pale, interrupted, powdery. Ordinary spots pale-ringed, orbicular invaded by costal pale space; reniform slightly cinereous; claviform faintly outlined in pale. Abdomen and secondaries smoky fuscous. Harpes of ♂ short and broad, superiorly prolonged into a cylindrical finger-like process; inferiorly into a short acute spur. The clasper consists of a single curved hook from the superior portion of harpes.

Expands 38^{mm}; 1.5 inches.

HABITAT.—California, Washington.

This is the *exsertistigma* of the Edwards collection, and like one specimen so labeled in Mr. Tepper's collection. The typical *exsertistigma* is, as Mr. Morrison described it, much like *alternata* in color and appearance.

The primaries are also more produced and have the outer margin more oblique, apex rectangular. The body is not depressed. The harpes, as compared with *formalis*, differ in the produced inferior angle and the comparatively shorter and less curved clasper.

The species seems not rare.

Rhynchagrotis observabilis Grt.

1875. Grt., Can. Ent., vii, 144 *Agrotis*.

1878. Grt., Bull. Surv., iv, 174 *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., x, 451 *Agrotis*.

“ ♀ Fore tibiae unarmed; middle and hind tibiae spinose. By the flattened abdomen allied to *epidissima*. Fore wings dark blackish brown, with the terminal space paler, somewhat olivaceous. As in *exsertistigma*, the orbicular is open, triangulate, broadly pale margined, fusing superiorly with a pale subcostal shade extending from the base of the wing above this spot. Unlike *exsertistigma*, the orbicular and reniform are black, the ground color of the median space about them being powdered with deep yellow. A black basal dash before the geminate, waved t. a. line; the latter interrupted by the subcostal shade, and with an interior pale shading. Claviform moderate, pale-edged. T. p. geminate, the inner line scalloped, the outer even, inclosing a rather broad pale space; the line is very slightly sinuate, not depressed opposite the cell. Subterminal line nearly straight, dark, with a very pale powdery exterior shade. Subterminal space darker shaded on costa, relieving the

costal dots distinctly. Terminal line dentate. Hind wings dark fuscous, with pale interlined fringes. Beneath quite pale, faintly ruddy and subirrorate, with common exterior line fading towards internal margins and discal marks. Collar pale, edged behind with black; tegulae blackish."

"Expansion, 35^{mm}."

HABITAT.—California (Behrens, No. 376).

Afterward, in the Bull. Surv., IV, 174, Mr. Grote says: "Collar with upper half black; lower part reddish or ochery. Costal margin reddish; varies by the presence of black on the cell and before the orbicular, or its absence when these places are sometimes olivaceous or reddish. A black basal dash; claviform distinct. The collar is similar to *formalis*, but the color is different, being fuscous, overlaid with reddish and olivaceous."

This species I do not know at all. Mr. Grote has labeled three different species with this name, and neither one agrees with his description. In Proc. U. S. National Museum, x, 451, I place this species in the synoptic table with *facula* on the faith of a specimen labeled by Mr. Grote and marked type, I believe, in Mr. Graef's collection. But it does not at all agree with the description, which could not possibly have been drawn from that specimen. I have therefore called it *distracta*.

I shall expect to find the type of this species the same as Mr. Morrison's *exsertistigma*.

Rhynchagrotis facula Grote.

1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 82, *Agrotis*.

1878. Grt., Bull. Surv. IV, 174, *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., x, 451, *Agrotis*.

"♀ Dark purple brown; a slight ashen costal shade invades the stigmata. Resembles *formalis* in color and ornamentation. It differs by the black filling in on the cell, by the absence of the black band and central white line on the collar, which is concolorous with the dark brown thorax, and only shows a superior black edging. The geminate lines occupy their usual position. The orbicular is open. There is an abdominal *carina*. Hind wings blackish fuscous. These species seem to lead into the *cupida* group of the genus."

To Mr. Grote's description I would add that the ordinary spots are narrowly outlined with pale scales: t. a. line complete, oblique with three slight out-curves; t. p. line punctiform, rather indistinct, evenly sinuate; s. t. line consisting of a series of pale yellow, powdery dots.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—California, British Columbia.

This species is easily recognized by the very uniform dark color, the plump, heavy body, the rather short, robust primaries and short abdo-

men. The genitalia of ♂ are like those of *observabilis*. As Mr. Grote suggests, this species closely resembles *formalis* except for the concolorous collar; the black filling in of the cell is not distinctive.

Rhynchagrotis distracta Smith, sp. nov.

observabilis † Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 454.

Clay yellow or grayish, more or less powdered with blackish. Costa slightly paler. S. t. space strongly powdered with black, but not darker than the median space. Cell as usual, black or dark filled. Transverse lines geminate, black, complete, course as in the preceding species. S. t. line pale, emphasized by a black costal patch and a slight preceding blackish shade. Secondaries fuscous. Collar concolorous.

Expands 32–34^{mm}; 1.28–1.36 inches.

HABITAT.—Washington, Oregon, California.

Varies in the direction of a more even color, the black powderings less distinct, the cell not black though dusky. The species has a peculiar sordid appearance, and the dense blackish atoms with which it is powdered, add to this appearance. It is not unlike *exsertisigma* in color and habitus though evidently distinct by the concolorous collar. This one is of the forms which was marked *observabilis* by Mr. Grote, and which I so referred as above cited.

The harpes of the male have the superior process somewhat lengthened and somewhat clavate, and the inferior angle acute. The clasper is very short and rather thick.

Rhynchagrotis discoidalis Grt.

1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 82, pl. 4, f. 9, *Agrotis*.

“♀ Fore tibiae unarmed; appearing allied to *attenta*. Fuscous or wood brown. The geminate lines as usual in this group. Cell black. Stigmata concolorous; orbicular elongate-ovate; reniform upright. Subterminal space the darkest. The general color is fuscous with a gray shade except on subterminal space. The distinctive character of this species is the black shading around the orbicular of the cell. There is a trace of the claviform. Hind wings pale fuscous with interlined fringes and the veins marked. Beneath paler with a faint line and discal mark.”

Expands 37^{mm}; 1.5 inches.

HABITAT.—Nevada.

This is slightly darker, more grayish than *distracta*, with which Mr. Grote has also confused it. This species differs in the more even coloration, the less distinct transverse lines, the dark, uniform s. t. space, and in the tendency of the orbicular to close superiorly. This last character is peculiar in this section, and while the species undoubtedly

belongs here, I should not be surprised to find a considerable modification of the male genitalia when that sex is studied. Unfortunately I had no male.

Rhynchagrotis crenulata Smith.

1887. Smith, Proc., U. S. Nat. Mus., x, 451, *Agrotis*.

Primaries deep dark brown; basal and s. t. space slightly paler, powdered with gray; costal space paler red brown; ordinary spots powdered with gray; claviform outlined with pale yellow scales. Transverse lines distinct; t. a. lines geminate, included space pale; t. p. line crenulate, course as in the preceding species; s. t. line distinct, pale yellowish, punctiform. Basal black dash distinct; cell black. Secondaries smoky fuscous. Harpes of ♂ as in the preceding species; but the projections at upper and inferior angles are longer, and there is an additional curved slender projection from upper margin. The clasper is lacking, but is replaced by a quadrate corneous plate. The additional projection of side piece probably serves the same purpose as the clasper of preceding species.

Expands 35^{mm}; 1.4 inches.

HABITAT.—California.

This is the *facula* of Mr. Neumoegen's collection, so named by Mr. Grote. The differences are so obvious, that there seems scarcely an excuse for the error. The difference in the ♂ genitalia is very decided also.

In the latter character this species and *confusa* agree closely, and they differ from all the preceding by the additional finger-like process of the harpes and by lacking the corneous hook of the clasper, the latter being represented by a subquadrate, slightly projecting plate.

Since the above was first described I have seen many specimens and there is a possibility that perhaps this species and the following—*confusa*—may turn out to be identical. I am not ready to say that it is so, but as the genitalia agree, and the difference is in maculation merely, there is a strong likelihood that it may be so.

Rhynchagrotis confusa Smith.

1887. Proc. U. S. Nat. Mus., x, 452, *Agrotis*.

exsertistigma † Grt.

1876. Grt., Bull. Buff. Soc. Nat. Sci., III, 79, Pl. 4, f. 8.

Bright red brown; costa and collar broadly pale yellow; cell before and between the ordinary spots black; ordinary spots concolorous, narrowly annulate with pale yellow; claviform outlined in same way. T. a. line distinct, not crossing costal pale space, but incurved to base; t. p. line punctiform, indistinct, geminate, included space paler; s. t. line pale yellow, narrow, powdery, emphasized by the somewhat darker

brown s. t. space. Secondaries fuscous; ♂ genitalia essentially as in *crenulata*.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Washington.

This is the form labeled *exsertistigma* by Mr. Grote in collection Graef and Neumoegen, and Mr. Tepper also had a specimen associated with *binominalis* under the same title. The superficial resemblance between *binominalis* and *confusa* is very close, but the species are undoubtedly distinct. The black collar of *binominalis* is distinctive and the difference in the genitalia is strongly marked. Four specimens of ♂ and ♀ from Messrs. Graef, Tepper, and Neumoegen examined.

Rhynchagrotis costata Grt.

1876. Grt., Bull. Buff. Soc. N. Sci., III, 80, *Agrotis*.

“♀ Allied to the preceding [*exsertistigma-confusa* mihi] but of a bright red brown. The costa broadly pallid, as is the open orbicular. The t. p. line is, however, single, dark, finely lunulate. The veins are slightly indicated. The inconspicuous, linear, dark subterminal, is near the margin. Collar with a black line. Thorax red brown, in my type not well preserved. Hind wings concolorous fuscous. Beneath, fuscous, with common line and dots.”

Expands 35^{mm}; Vancouver Island. Mr. Edwards, No. 4610.

The type is not in Mr. Edwards's collection, and Mr. Edwards states that Mr. Grote borrowed quite a number of his types for further study, and never returned them; probably they are now in the British Museum.

The present species can not well be identified except by examination of the type, for there are certainly three species confused by Mr. Grote under the name *exsertistigma*, and the fact that a single t. p. line is credited to this species renders the matter still more uncertain. It is, however, more than likely that it is to one of the species I have described as belonging to this group that the description refers.

Genus ADELPHAGROTIS Smith.

Anterior tibiae not spinose, front smooth, rather narrow, subequal. Thorax robust, subquadrate, the patagia smooth, collar rounded; a prominent anterior and distinct posterior tuft. The primaries are moderate in size, with produced apices and oblique, slightly rounded outer margin; antenna of ♂ simple, ciliate. Except of *prasina* no ♂ specimens of the species have been examined; the probabilities, however, are that the genitalia will run to the same type, viz, elongate, membranous harpes, more or less rounded at tip, and a moderate, strong, curved corneous clasper.

While agreeing in general habitus, the species differ very decidedly, and are recognizable at a glance.

Stellaris and *innotabilis* agree in the bright yellow or creamy white reniform, differing *inter se* by the pale, gray color of primaries and yel-

low collar of the former, and the dark, blackish, brown primaries and black tipped collar of the latter. *Prasina* is well known, and differs from all the other species by its large size and mossy green primaries, on which is a very prominent white patch just beyond the reniform. In this species also the posterior tufts exceed the anterior. The remaining species are abnormally marked. *Apposita* is red brown, the median space is pale, with a yellowish cast, the ordinary spots being subobsolete, while the balance of the primaries is deep brown with a powdering of black scales.

Vernilis and *infimatis* differ from all the others in the gray color, obsolescence of transverse lines, the strigose markings, and elongate, oblong orbicular. They may be distinguished by the dark ground color, complete orbicular and concolorous ground color of costa of *vernilis*, and the paler color, open orbicular and whitish costa of *infimatis*. In the former also the reniform is larger and usually paler than ground color; in the latter it is narrower, lunate, and darker than ground color.

In tabular form the species separate as follows:

Ordinary spots discolorous white or creamy yellow.	
Collar creamy yellow	STELLARIS.
Collar pale, superior half black	INNOTABILIS.
Ordinary spots when present not discolorous, contrasting.	
Transverse lines distinct.	
Size large; primaries mossy green, a large white patch beyond reniform, ordinary spots distinct	PRASINA.
Size smaller; primaries dark brown, median space much paler; ordinary spots obsolete	APPPOSITA.
Transverse lines obsolete; orbicular elongate, narrow, oblique.	
Dark gray; reniform moderate, rather paler; annulate with paler gray and black; secondaries dusky	VERNILIS.
Paler; reniform narrow, lunate, dusky, not distinctly outlined; secondaries white	INFIMATIS.

I have not used the term *Eurois* for this genus, of which *prasina* is perhaps to be considered the type, as subsequent authors have used the term for quite miscellaneous assemblages, and I prefer not to add another meaning to the term at present.

***Adelphagrotis stellaris* Grt.**

1880. Grt., Can. Ent., XII, 153, *Agrotis*.

“♀ varies in color from blackish to reddish purple, nearly as bright as *phyllophora*. Collar yellowish white, discolorous with head and thorax. Palpi with pale third article. Reniform kidney-shaped, yellowish white, discolorous. Orbicular rounded, somewhat irregular and slightly oblique, nearly concolorous with the wing, a little shaded with yellowish, both spots annulate with dark. Lines single, blackish; half line indicated; t. a. line waved; t. p. line lunulate, followed by a pale shade against which the darker veins and faint cloudy pointlets of the

line contrast; s. t. line inaugurated by a diffuse shade on costa, below which the line is exerted and followed by pale points. Hind wings pale, soiled, or fuscous shaded, with terminal line. Beneath with discal marks and common line."

Expands 32-33^{mm}; 1.28-1.32 inches.

HABITAT.—Nevada, Washington.

I have seen and examined the type specimens in the Graef collection; both are females. The median space is slightly darker and the claviform is indicated by a few pale scales.

I have seen no males, but I have no doubt that they will be found referable to this group by antennal structure. The insect seems rare, and is an easily recognized one.

Adelphagrotis innotabilis Grt.

1874. Grt., Proc. Ac. Nat. Sci. Phil., 26, 202, *Agrotis*.

1880. Grt., Can. Ent., XII, 154, *Agrotis*.

washingtoniensis Grt.

1880. Grt., Bull. U. S. Geol. and Geog. Surv., VI, 259, *Agrotis*.

"This well-marked species resembles at first sight *A. bicarnea* and *A. c-nigrum* from the Atlantic States, but differs by its smaller size and the absence of any carneous costal shades on the fore wings. Blackish; the collar is pale at base and very broadly banded with deep black superiorly. Fore wings with the transverse lines narrow, continued, geminate, accompanied by narrow pale shades. Orbicular small, spherical, lying in a deep black discal shade preceding and following it; reniform moderate, discolorous, ochraceous distinct, of the usual shape, with distinct internal ring; fringes blackish. Hind wings blackish fuscous, paler at base. Beneath paler, with a purply tinge; a faint narrow common line, a little irregular on secondaries, and discal dots. Body parts blackish."

Expanse 33-36^{mm}; 1.32-1.44 inches.

HABITAT.—California (Saucelito).

In the Can. Ent., XII, 154, Mr. Grote says: "This species may be known by the yellow brown reniform, contrasting with the concolorous blackish orbicular. The color is black above, gray below. Specimens from Washington Territory differ from my type from California by the median space being shaded with brown, the claviform outlined, and several very fine black lines cross from the two median lines over the median space inferiorly. The species is allied to *bicarnea*. The orbicular is more or less evidently quadrate and oblique."

In Bull. Surv., VI, 259, Mr. Grote describes *A. washingtoniensis* as follows: "♂ ♀ I have considered this a form of *innotabilis* (Can. Ent., 12, 154), but a larger series of specimens collected by Mr. Morrison in Washington Territory shows no nearer approach to my type of *innotabilis* from California. In *washingtoniensis* the median space is shaded with rich brown, the claviform is outlined, and several fine black lines cross the

median space inferiorly. The orbicular is more oblique and is bright brown, not concolorous as in *innotabilis*; it is somewhat larger and squarer. The collar is bicolorous in both, and else the two species are much alike."

Mr. Grote's first impression was correct, and the two forms refer to the same species. In a series of specimens from California and Washington examined by me all the characters are evanescent, and *innotabilis* shows the same cross lines in the median space, though as it is darker, the lines are very feebly marked and readily overlooked. One of the Washington specimens scarcely differs from typical *innotabilis*.

I had no male available for the study of the genitalia.

Adelphagrotis prasina Fabr.

1787. Fabr., Mant. Ins. II, 169, *Noctua*.

1952. Gn., Noct., II, 75, *Aplecta*.

1874. Grt., Bull. Buff. Soc. N. Sci., II, 163, *Eurois*.

1875. Speyer, Stett. Ent. Zeit., 36, 136, *Aplecta*.

Umber brown, more or less densely covered with mossy green scales, which usually give the predominant color to the primaries. Basal line black, followed by a white shade; t. a. line single, black, oblique, irregular, preceded by a white shade. T. p. line strongly crenulate, obscured at the costal half by a large irregular white patch. At lower part inwardly oblique constricting the median space; followed by a row of black, and then a row of white venular points. S. t. line very irregular, pale green preceded by a darker shade, and superiorly by a few sagittate black points. The claviform is short outlined with black scales. Ordinary spots large, concolorous, annulate with black. Head white with a greenish tinge. Thorax concolorous, tufts somewhat ferruginous. Body and secondaries blackish fuscous.

Expands 45-50^{mm}; 1.75-2 inches.

HABITAT.—New England and Middle States; Europe.

This is one of the few species common to the United States and Europe and is easily distinguished by its large size and the mossy green mottling of primaries and the large white patch beyond the reniform. It is common. The genitalia are simple, and have been referred to in the introduction.

The European synonymy and bibliography are not given, and the insect has been seldom referred to in American publications.

Adelphagrotis apposita Grt.

1878. Grt., Bull. Surv., IV, 170, *Agrotis*.

1883. Grt., Papilio, III, 78, *Agrotis*.

“♀ Fore tibiae unarmed. Of a burnt umber brown; thorax darker, median space narrowed, the median lines approximate; t. a. line slightly lobed, outwardly oblique, dark brown, with a broad preceding pale

shade; t. p. line indistinct, narrow, indented opposite the cell, slightly lunulate, followed by a pale shade; the median space paler than the rest of the wing. Orbicular rounded, moderate, with faint black annulus, stained with reddish, and pale; reniform near t. p. line, moderate, with dark and reddish stained center and pale border. Median shade dark and diffuse; claviform obsolete. Fringes concolorous; s. t. line fine and pale. Hind wings dark fuscous, with pale fringes. Beneath pale, with reddish tinge, irrorate; a faint common mesial line near the discal dots, which are small, and appear to be empty; on primaries a subterminal shade."

Expands 34-36^{mm}; 1.36-1.45 inches.

HABITAT.—California, Vancouver.

An easily recognized species of which I have seen females only. It is unlike any other species in the genus, and is distinguished by the pale median and heavily powdered basal and terminal spaces.

Adelphagrotis yernilis Grt.

1879. Grt., Can. Ent., XI, 57, *Agrotis*.

1879. Grt., N. Am. Ent., I, 38, *Agrotis*.

Head, thorax, and primaries dark ash gray, veins marked with blackish; transverse lines obsolete; a black basal dash, modified into the elongate claviform; orbicular slightly paler gray; elongate oval, outlined in black; reniform moderate in size, kidney-shaped; secondaries blackish; beneath, the usual lines and spots are nearly obsolete.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado, Nevada.

Easily distinguished by the simplicity of its maculation; a single ♀ is in Mr. Neumoegen's collection and I have not seen a ♂.

Mr. Grote's original description is diffuse and comparative with *albalis* and other species which differ structurally from the present; it is therefore not reproduced here, the above being sufficient to distinguish it from all its associates.

Adelphagrotis infimatis Grt.

1880, Grt., N. Am. Ent., I, 93, *Agrotis*.

Pale ash gray, costal space for half the distance to apex whitish, that color invading the elongate, narrow, open orbicular; a diffuse black basal dash, above sharply limited by the costal white space, medially extended to outline the narrow pale claviform, and curving superiorly to form the lower boundary of the orbicular; reniform narrow, darker, lunate; t. p. line indicated by a double series of venular dots, a diffuse, darker gray, longitudinal median shade, and a triangular darker patch at internal angle, the base of which rests on outer margin; abdomen and secondaries whitish; beneath as usual, save that the extra discal line is unusually crenulate.

Expands 37^{mm}; 1.5 inches.

HABITAT.—California, Washington.

Easily distinguished from the preceding with which only it is likely to be confounded, by the characters previously pointed out. The collar is black lined.

Genus **PLATAGROTIS** Smith.

Anterior tibia unarmed, front smooth, δ antennæ simple, ciliate, abdomen conic; thorax comparatively slight, vestiture rather long and somewhat divergent, no distinct tuftings; primaries frigate, ample, with moderately convex or nearly straight costal margin; apex somewhat produced or rectangular.

The maculation in all the species is distinct, all the normal markings being present. The colors are various shades of gray to black, *imperita* only having a distinct brownish tint and a reddish shade over the reniform, which is characteristic; the species are all of good size and rather easily distinguished, not only by the maculation but by the δ genitalia which are different in each examined species. *Speciosa* is largest and rather the slightest of the species, showing indeed so little of the typical *agrotid* appearance that Mr. Morrison was excusable for not at once recognizing the species as belonging to this genus. The color is a dark somewhat smoky gray and the maculation is white; the δ genitalia consists of broad harpes rounded at tip and with an obtuse inferior projection enveloping the lower branch of the bifid clasper; the clasper is stout and corneous, attached to the harpes, and with two very unequal branches; the inferior is short, thick, obtuse, straight; the superior is much longer, stout, and slightly curved. *Pressa* is a smaller species much paler in color, comparatively less robust, the maculation dark; the harpes of the male are rather long and broad, the tip evenly rounded, and as in the preceding species furnished inwardly with a row of spinules; the clasper is free from the harpes, but is very small; inferiorly the angle is rectangular, superiorly there is but a short finger-like projection. *Trabalis* is a slightly larger form than *pressa*, as pale in color, and distinguished by the large whitish ordinary spots and a yellowish-brown shade through s. t. space; of this species I have seen no δ , but probably the genitalia are much as in the following species. *Imperita* is easily distinguished from all the others in the group by the brownish tint and reddish shade over the reniform; the δ genitalia are peculiar in the shape of the harpes, which are heavier than usual and emarginate at tip, the upper finger of the emargination being decidedly the longest; the clasper is free, in general shape like *speciosa*, but the branches are more equal, the inferior longer, and the superior shorter and less curved than in *speciosa*. *Sincera* is an even pale gray form, somewhat irrorate with black, the transverse lines rather broad, very distinct; s. t. line preceded by sagittate black dashes; the δ genitalia are almost precisely like those of *imperita*.

The following table will aid in separating the species :

Largest; apex distinctly produced; color, dark gray to blackish; transverse lines, contrasting white.....	SPECIOSA.
Smaller; primaries with a yellowish tint; transverse maculation, dark.....	PRESSA.
Apex of primaries, rectangular; wings, more abruptly widening at base.	
Ordinary spots, whitish; s. t. space, yellowish brown; s. t. line not preceded by sagittate dashes.....	TRABALIS.
Orbicular whitish, reniform dusky; even gray, lines very distinct; s. t. line preceded by black sagittate dashes.....	SINCERA.
Orbicular suffused with reddish; s. t. space very narrow, gray.....	IMPERITA.

Platagrotis speciosa Hbn.

1815. Hbn., Lep. Eur. Noct., 491, *Noctua*.
 1816. Hbn., Verzeichniss, 218, *Eurois*.
 1852. Gn., Sp. Gen. Noct., II, 80, *Aplecta*.
 1866. Moeschl., Wien. Ent. Monatschr. VIII, 199, *Agrotis*.
 1883. Moeschl., Stett. Ent. Zeit., 44, 117, *Agrotis*.
perquirita Morr.
 1874. Morr. Proc. Bost. Soc. Nat. Hist., 17, 136, *Polia*.
 1880. Grt., Bull. Bkln. Ent. Soc., III, 37, pr. syn.
baileyana Grt.
 1879. Grt., N. Am. Ent., I, 92, *Agrotis*.
 1880. Grt. Can. Ent., XII, 185, pr. syn.
 1880. Grt., Bull. Bkln. Ent. Soc., III, 37, pr. syn.
mixta Wlk.
 1856. Wlk., C. B. Mus. Lep., IX, 62, *Acronycta*.
 1882. Grt., Ill. Essay, 39, pr. syn.
 var. *ARCTICA* Zett.
 1839. Zett., Ins. Lapl., 339.
 1864. Wlk., Stett. Ent. Zeit., 180, pr. var.

Dark gray to blackish, somewhat powdery. Transverse lines all distinct, accompanied by a broad white shade. Basal line distinct; t. a. line outwardly oblique, irregular. T. p. line crenulate, nearly parallel with outer margin. S. t. line narrow, even, in pale specimens obsolete, marked by a row of variably sized black spots. Claviform small, concolorous, outlined in black; orbicular large, rather oblique, oblong, whitish powdered with ground color; reniform moderate, concolorous annulate with white. Thorax mixed with considerable white. Secondaries dirty, somewhat yellowish gray. Beneath powdery with a distinct irregular common line and discal lunule. The latter more distinct on secondaries.

Expands 46^{mm}; 1.75 inches.

HABITAT.—Mountainous districts of Europe, Canada, Adirondacks, White Mountains, Vermont.

This is a very peculiar species for an *Agrotis*, and, though so well marked is rich in synonyms. *Arctica* is applied to the dark, evenly colored forms in which the white shades are narrow, and the ordinary spots somewhat reduced in size.

It has been received from Labrador, and is one of the circumpolar species extending south to the mountains of northern New York.

Platagrotis pressa Grt.

1874. Grt., Trans. Am., Ent. Soc., v, 90, *Eurois*.

1875. Grt., Check-List, pl. 1, f. 7, *Eurois*.

“ * * * The middle and hind tibiae are spinose. The antennæ simple, scaled above, and setose beneath, not brushlike in the male. The color is a dusky gray, and the species shows an affinity with *E. herbida* [*prasina*] by the primaries being more or less shaded with green, principally from the base outwardly over the reniform, and along the submedian interspace. Orbicular large, round, oblique, black ringed, with pale center and an internal annulus; the discal space around the spot and before the reniform is more or less noticeably filled in with black. Reniform also pale, with fainter internal ringlets, black ringed, well sized. The transverse lines are obsoletely geminate, filled in with white and this filling in rather strikes the eye and seems to be characteristic. The claviform is large, its upper black edge appears as a black arcuate line below the median vein, its lower edge is indistinct. The subterminal line is more or less obviously preceded by black shade dashes, usually determinate in pairs on submedian fold, between veins 4 and 6 and again subcostally; a dentate black terminal line defines the uneven margin of the wing; fringes gray. Hind wings very pale, shaded with fuscous terminally, with an irregular faint median fuscous line and black terminal linear edging; fringes whitish. Beneath very pale, subirrorate and shaded with fuscous, with a common line and discal marks. Palpi with the terminal joint white, the second black on the sides. Head whitish; thorax mixed with black. Abdomen weak, untafted.”

Expands 34–36^{mm}; 1.36–1.44 inches.

HABITAT.—Canada, Northern, Eastern and Western States. This species, though widely distributed, is not common, single specimens only being received. The differences separating it from *speciosa* have been already pointed out; the smaller size and paler color are the most obvious features.

Platagrotis trabalis Grt.

1877. Grt., Can. Ent., IX, 198, *Agrotis*.

“Whitish gray, with large stigmata and bright brown contrasting subterminal space. A basal black dash, a second above it on the cell, before the orbicular, which latter is near the t. a. line, inaugurated above it on costa by two black lines rather wide apart, with white included space. Below the t. a. line is twice waved to internal margin. Basal space whitish; basal line indicated. Sub-basal space dark gray.

Stigmata concolorous, ringed with black, very large. Claviform incomplete; orbicular a little flattened, ovate; reniform moderately excavate. T. p. line narrow, geminate, regularly and slightly scalloped, with a deeper incision opposite the cell. Subterminal space rather wide, bright brown; s. t. line faint, pale; terminal space rather narrow, dark gray. A dentate black, continuous terminal line. Hind wings pale gray, fuscous, with pale fringes touched with blackish at extremity of veins; a black terminal line. Beneath pale, powdered with dark scales; an indistinct common outer line; discal lunule filled in and prominent on hind wings, empty on primaries. Abdomen pale; thorax gray, darker shaded on tegulae. Second palpal joint outwardly black. Front white inferiorly below a frontal black line. The collar has no transverse black line, but is tipped with a darker shade."

"A second specimen * * * has the wings more obscure, the brown subterminal improminent. In the type there is merely a black line inferiorly connecting the stigmata along the median vein. In the Canadian specimen the orbicular and reniform are also connected superiorly with a black line. The lunate discal mark beneath on hind wings, distinct and large; on the primaries empty in both specimens. The common exterior shade line on the primaries is even, on hind wings, irregular."

Expands 39-42^{mm}; 1.56-1.68 inches.

HABITAT.—Massachusetts, Canada, "Middle and Eastern States."

Easily distinguished by the unusually large and pale ordinary spots. It seems rare, though I have received it a number of times for identification. Mr. Thaxter found the cocoon from which the type emerged under pine bark in April, when the larva had not yet become pupa. The cocoon was tough, not unlike that of *Cerura*. Larva dull white, with blackish markings.

Platagrotis sincera H. Sch.

1881. H. Sch., Eur., Schmett, II, 412, *Agrotis*.

Rather even gray, somewhat irrorate with black. Median line very distinct, single. T. a. line with a single outward curve from costa to vein 1, and a small curve thence to hind margin. T. p. line lunulate, outwardly curved to vein 3, then inward to inner margin; the curves more distinct than in *trabalis*, its near ally. S. t. line even, concolorous, marked by a row of preceding sagittate spots. A row of terminal lunules. Claviform small, narrow, black marked. Orbicular large round, whitish, reniform rather narrow, dusky, touching the orbicular. Secondaries pale fuscous, marked by a faint double exterior line. Beneath powdery, a distinct dusky transverse line and discal lunule. Head and thorax concolorous.

Expands 39^{mm}; 1.5 inches.

HABITAT.—Labrador.

To Mr. Moeschler I owe a specimen of this species, and it is upon his authority that I have included the species as American. It is perfectly distinct from any other American form.

Platagrotis imperita Hübn.

1823. Hübn., Zutraege, 447, 448, *Ogygia*.

1880. Grt., Can. Ent., XII, 118, *Agrotis*.

comparata Moeschl.

1862. Moeschl., Wien. Ent. Mon., VI, 131; pl. I, f. 5, *Agrotis*.

saxigena Morr.

1874. Morr., Proc. Bost. Soc., N. H., 17, 162, *Agrotis*.

Dark, somewhat fuscous or reddish brown, more or less irrorate with gray scales. Transverse lines darker, accompanied by gray shades. T. a. line rather even, outwardly oblique; t. p. line as in *trabalis* but less distinct and much nearer the s. t. line. The latter is dark, broad, and irregular. S. t. space strongly irrorate with gray. Ordinary spots large; orbicular gray, reniform discolorous reddish. Claviform small, outlined in black. Secondaries smoky fuscous. Beneath as in the preceding species but much darker. Thorax concolorous with primaries, collar tipped with white.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Labrador and mountains of Northern and Eastern States.

This is an easily recognized species, the characters of which have been already fully given. It is not common. The generic term *Ogygia* may have to replace *Platagrotis* if the type of *Ogygia* is *imperita*, of which I am not sure.

Genus **EURETAGROTIS** Smith.

Fore tibia unarmed. Head moderate, rather small, front subequal. Antennæ simple in ♀, slightly serrate, and finely ciliate in the ♂. Thorax with a distinct divided crest, more prominent, and forming distinct apical and basal tufts. Collar slightly produced at middle. Primaries wide, costa distinctly arched, outer margin obliquely rounded. The ordinary spots are normal.

The genitalia of the ♂ are after one general type. The harpes are superiorly prolonged, terminating acutely; in *sigmoides*, rather evenly dilating backward and somewhat twisted; in *perattenta* the upper margin is tolerably straight, the inferior margin very irregular. Both forms are provided with a long corneous curved hook or clasper.

In wing form and in the type of ♂ genitalia this group is allied perhaps most nearly to the *badicollis* section.

Three species are contained in it which are easily separated. *Sigmoides* and *perattenta* have the cell between the ordinary spots black; *attenta* is without this peculiarity, and the transverse lines tend to become obsolete. Of the first two, *sigmoides* is distinguished by its larger size and the prominent discolorous tufts of thorax.

The species are all eastern, and rather northern, and are not rare.

Eueretagrotis sigmoides Gn.1852. Gn., Sp. Gen. Noct., I, 325, *Noctua*.1856. Wlk., Cat. B. Mus. Het., x, 400, *Graphiphora*.

Ground color smoky brown; costa to t. p. line, and apex paler, yellowish. Cell before and between the ordinary spots, black; a black basal dash. T. a. line outwardly oblique, dentate, geminate, black, included space yellowish. T. p. line faintly geminate, lunulate, interrupted, slightly sinuate inwardly, with pale included shade. S. t. line pale, irregular; inwardly marked at costa by a blackish patch. A row of black terminal lunate dots. Claviform concolorous, evidently outlined in black. Ordinary spots concolorous, black ringed; orbicular rounded, reniform kidney-shaped. Secondaries even, fuscous. Thorax, patagia concolorous, lined with blackish; collar rich dark brown; disc of thorax pale, contrasting reddish yellow. Abdomen yellowish gray. Beneath, powdery reddish fuscous, primaries with disc darker; both wings with a darker extra discal transverse line, and a large lunate discal spot.

Expands 35-40^{mm}; 1.40-1.60 inches.

HABITAT.—New York, Pennsylvania, New Jersey, Northern, Middle, and Eastern States, Canada.

The species is not rare, and is readily known by the prominent thoracic tufting, which is discolorous, yellowish.

In badly rubbed specimens there is sometimes doubt between this species and *perattenta*, but not when the specimens are in anything like decent condition.

Eueretagrotis perattenta Grt.1874. Grt., Can. Ent., vi, 131, *Agrotis*.1832. Grt., Ill. Essay, 51, pl. 1, f. 7, *Agrotis*.

"Color of *A. attentus*, but brighter, rosy brown and more like *triangulum*, on account of the discal field before the orbicular and between the spots being suffused with dark brown shading. Orbicular spherical pale; claviform indicated in outline; a deep brown shading accompanies the basal dash. Reniform large and wider than in *triangulum*. Ordinary lines distinct, geminate, dark brown; t. p. line with its inner line distinct, lunulate; its outer line lost against the darker brown subterminal space, which is differentiated by its deeper color and which it inwardly limits. Subterminal line indicated by the difference in color between the subterminal and terminal spaces, the latter concolorous with the rest of the wing. Hind wings pale testaceous fuscous in ♂, more fuscous in ♀. Beneath, a common fuscous line and dots; the tint is testaceous with fuscous powderings; fore wings the darker, with ruddy costal edge."

Expands 32-36^{mm}; 1.28-1.44 inches.

HABITAT.—Canada, Maine, Massachusetts, New York, New Jersey, and the Northern and Eastern United States.

Distinguished from *sigmoides* by the thoracic tufting which, while evident, is not discolorous, by the concolorous costa, the somewhat darker s. t. space as compared with the rest of the wing; the more evidently outcurved t. p. line and the more yellowish secondaries. It is not rare, but scarcely a common species. The genitalia have been already described.

Eueretagrotis attentata Grt.

1874. Grt., Can. Ent., vi. 131, *Agrotis*.

"* * * Fore wings pulverulent brown, paler over the costal region, on which the inception of the geminate lines are marked in dark brown. There is a narrow deep brown basal ray extending to the dentate indistinct t. a. line. Disc not suffused with darker brown between the ordinary spots which are moderate, pale, with fine dark annuli. Orbicular spherical, complete, not pointed inferiorly as in *triangulum*. T. p. line with its pale center alone perceivable, denticulated, notched opposite the cell. The subterminal space is not differentiated by any darker tint; the subterminal line is pale, preceded at costa by a very slightly darker brown shade, not always noticeable, and not at all like the determinate mark of *triangulum*. Male hind wings almost whitish; female darker. Thorax and head like fore wings. Beneath the fore wings are brown, with the exterior line indicated; hind wings with brown costal region, else pale, with faint discal spot and a double subterminal line marked on the costal region."

Expands 34-36^{mm}; 1.36-1.45 inches.

HABITAT.—Canada, New York, Maine; Northern and Eastern United States.

This is most nearly like *perattenta*, but lacks the black filling in of cell. The costal region is generally pale powdered, at least basally, and as a rule the species is lighter in color. No male has been under examination.

Genus *ABAGROTIS* Smith.

Anterior tibiae not spinose; antennae of male with joints marked, laterally furnished with bristly tufts; thorax with a distinct keel-like crest; front smooth; wings rather short and broad, subequal, very much as in *eupida*; palpi with second joint clavate, third joint minute, forming, with the frontal vestiture, a short snout.

This genus is very distinctly characterized, and is a peculiarly intermediate or synthetic form. In wing form, palpal structure, and general habitus the resemblance to *Rhynchagrotis* is marked. Unlike that genus the antennae of the ♂ are "brush-like," very much as in *Carneades*. From the latter the smooth front will suffice to separate it, while from all other allied genera it is distinguished by the distinct, not divided, anterior crest. It has a casual resemblance to *Glwa* and allied forms, but is not depressed.

In genital structure there is a resemblance to *cupida*, which, combined with the habitual resemblance to *cupidissima*, emphasizes the correctness of the present association.

Only a single species is so far known.

Abagrotis erratica Smith.

1890. Smith Trans. Am. Ent. Soc., XVII, 41, *Agrotis*.

General color, dull ashen gray to brick red, smooth and dense in appearance. Palpi dark at side. Head and thorax immaculate. Primaries very evenly clothed, the lines not much darker and not prominently relieved. Basal line indistinct geminate. T. a. line geminate, the lines very narrow, faint, outwardly oblique, not very much angulated. T. p. line rather regularly outcurved, geminate, inner line narrow, broken below vein 3; outer line punctiform. S. t. line pale, very slightly less so than ground color, relieved by a dusky preceding line, and a general dusky coloring of the terminal space, its course very slightly irregular. In the reddish forms the transverse lines are almost entirely obsolete. Claviform wanting. Ordinary spots evenly dark filled, with a narrow defining line; small in size. Orbicular slightly oval, oblique, reniform, rather narrow, upright, very slightly constricted. Secondaries glistening, smoky fuscous, somewhat paler basally. Beneath pale powdery fuscous, with a darker outer line and discal spot.

Expands 34–37^{mm}; 1.36–1.50 inches.

HABITAT.—Sierra Nevada, California (McGlashan), California (Neumoegen).

Types of this species are with Messrs. Edwards and Neumoegen, and also in the collection of the U. S. National Museum.

Genus **SEMIOPHORA** Steph.

Anterior tibiae unarmed, front smooth; antennae of male lengthily bipectinated.

The two species separated under the above term agree in the dark red brown color, the tendency to pale, discoloured ordinary spots, obsolescence of transverse lines, and in structural details generally. Yet withal they differ habitually to such an extent that their structural identity has been overlooked.

In *eliminata* the wings are trigonate, broad and somewhat produced or at least rectangular at the apex. The vestiture consists of flattened hair forming no evident tufts.

In *catherina* the wings are proportionately narrower, the apex more obtuse. The vestiture is longer, more hairy, also forming no obvious tufts.

There is no particular agreement in the genital structure of the male, and as has been suggested no very strong character binds the species.

The differences between the two species have been already indicated. *Elimata* is the larger and is rather variable in appearance, and in details of maculation, leading to its redescription by both Messrs. Grote and Morrison.

The genus *Semiophora* is adopted on Mr. Butler's suggestion (Tr. Ent. Soc., Lond. 1889, 385) that the *elimata* of Guenée was referable to it.

Semiophora elimata Gu.

1852. Gu., Sp. Gen. Noct., 1, 333, *Noctua*.
 1856. Wlk., Cat. B. Mus., Noe., x, 400, *Graphiphora*.
 1880. Grt., Bull. Surv., vi, 566.
badicollis Grt.
 1873. Grt., Bull. Bull. Soc. Nat. Sci., 1, 136, pl 4, f, 18 *Ammaconia*.
 1875. Grt., Can. Ent., vii, pl. 1, f, 12, *Agrotis*.
 1875. Morr., Proc., Ac. N. Sci., Phil., 27, 55, *Agrotis*.
dilucida Morr.
 1875. Morr., Proc. Ac. N. Sci., Phil., 27, 55, *Agrotis*.
 1878. Grt., Bull. Surv., iv, 170, *Agrotis*.
 1879. Butl., Trans. Ent. Soc., Lond., 1879, 385, pr syn.
janualis Grt.
 1878 Grt., Bull. Surv., iv, 169, *Agrotis*.

Mr. Grote's translation of Guenée's description is accurate, and is as follows: "Fore wings pale ashen, much mixed with pale violaceous red, all the lines visible of the former color, preceded and separated by shades of the latter tint, especially the subterminal line which is very sinuous and irregular; the t. p. line is denticulate; the t. a. line forms three large teeth, all marked on costa by a deep brown mark. The two stigmata well defined, pale, separated inferiorly by a dark line; the orbicular contiguous to the t. a. line; the reniform large and regular, the terminal space ashen. Hind wings of a uniform dark gray, with fringe paler and more reddish. Beneath the fore wings are reddish. Antennæ of the male strongly pectinate. Female larger but similar."

"Expands 40^{mm}."

This description very well characterizes the average of the forms of *badicollis* Grt., where the transverse lines are fairly complete. Mr. Morrison recognized the likeness of his species, *dilucida*, but considered it as distinct. A description drawn up from a large number of species is as follows:

Head, thorax, and primaries purplish brown, variably powdered with bluish gray scales, which are sometimes so dense that the color appears an even pale gray. Secondaries and abdomen pale dull fuscous, often reddish, especially in the *dilucida* form. Beneath, warm red brown, base and disc of primaries more fuscous.

Transverse lines tending to become obsolete, always, however, well marked on costa. T. a. line obliquely from costa over orbicular, then with an inward curve embracing half the orbicular, thence with two

outward sinuations to base. T. p. line very strongly crenulate; from costa over reniform, very oblique to the end of the cell, thence inwardly and evenly rounded to inner margin. S. t. line irregular, indefinite, consisting rather of a shade than a line, often defined in dark forms by the paler terminal space. The ordinary spots vary in size and in distinctness; often the reniform is discolorous gray or yellowish. Sometimes both spots are distinctly outlined in black, and occasionally the space between is darker, and the spots are inferiorly connected by a black line. Collar often paler, usually concolorous.

The ♂ harpes are rounded at the tip, and inferiorly a corneous claw-like projection is formed. The clasper is a single, long-curved, corneous hook.

Expands 38–45^{mm}; 1.42–1.80 inches.

HABITAT.—Maine to Georgia, Canada.

Rather a variable species, and the specimens yet so much alike that they are instantaneously recognized. Three of the varieties have been named as species. *Elimata* is smaller, usually paler, and has the ordinary spots distinctly outlined; it has usually also the collar rather paler, inclining to cinereous, though this is not constant; *dilucida* Morr. is larger, usually more reddish, the markings less distinct, often obsolete; *janualis* Grt. is like this, but the reniform is discolorous. Among the specimens labeled “types” by Mr. Morrison as many of the *janualis* as of the other form are found, and Mr. Morrison evidently considered the forms as identical. In this I agree with him. In the larger forms the collar is also often paler, varying from brighter red to cinereous.

Gueneé describes the larva, after a drawing by Abbot, as having nearly the same colors as the moth, *i. e.*, the dorsal and subdorsal region reddish, the lateral ashen, without well-defined lines, and only showing some slightly darker subdorsal markings. Head ocher yellow. Collar dark brown. Feet concolorous. Pupa light red, with the membrane covering the wings mixed with greenish.

According to Abbot's figure, on Chrysanthemum.

Mr. Butler has, long since the above was written, positively referred *dilucida* to *elimata* as a synonym.

Semiophora catherina Grt.

1874. Grt., Can. Ent., VI, 116, *Matuta*.

1875. Grt., Buff. Bull., I, 124, *Matuta*.

1875. Grt., Can. Ent., VII, pl. 1 f. 7, *Matuta*.

1880. Grt., Can. Ent., XII, 187, *Agrotis*
manifestolabes Morr.

1874. Morr., Pr. Bost. Soc. N. H., 17, 176 *Agrotis*.

1880. Grt., Can. Ent., XII, 187, pr. syn.

“Dark and deep red brown; the fore wings are brighter colored outside of the t. p. line, and at the base below the median vein. The median transverse lines are hardly to be made out against the blackish

red brown color of the wing; the t. p. line is seen to be single and regularly interspaceally scalloped and accented on the nervule. The stigmata contrast by their gray color; the orbicular well sized, spherical; the reniform proportionate and inclosing a blackish inferior stain as in allied genera. The subterminal line is quite distinct, being indicated by a line of powdery grayish scales like the stigmata. There is an extremely fine gray wavy terminal line *before* the margin, formed by the outer edging of the deeper tinted marginal line, which appears as interspaceal points. Fringes light brown, cut by a fine darker hair-line (preceded by a pale line) without the middle. Hind wings pale, much soiled with fuscous and with the pale ruddy fringes. Beneath fuscous, with a rufous tinge, both wings rather dark, with discal marks and a broad vague, common shade line. Thorax like fore wings; collar above with indistinct pale edging; palpal tips pale, as is the front, else the head is rufous."

Expands 32-34^{mm}; 1.28-1.36 inches.

HABITAT.—Canada, New Jersey, Northern and Eastern States.

The color is variable, often irrorate with gray, otherwise there does not seem much variation.

The male harpes are gradually attenuate and rounded at tip, the clasper is stout, strong, single, almost rectangularly bent, and very slightly curved. The species seems rare and has been recorded as taken only in early spring (May).

Genus PACHNOBIA Gn.

Front smooth, rather broad, full; anterior tibia spinose, somewhat more heavily armed at tip. The vestiture is distinctly and lengthily hairy, fine; in *salicarum*- and *okakensis* forming perceptible divided anterior and posterior tufts, in the other species loose, divergent, or but indefinitely bunched into a basal tuft. The ♂ antennæ are variable, either simple, serrate or pectinate. The primaries also differ somewhat in form, and this affords a basis for subdivision. The ♂ genitalia are decidedly variable, in no two species exactly alike. From the other groups, with smooth front and spinose fore tibia, this group is distinguished by the long hairy vestiture and the more or less ferruginous color. The genus *Pachnobia*, as based on this group, is fairly well distinguished and should be accorded generic rank. Lederer says: Fore tibia unarmed, head retracted, bombyciform, habitus of *Tanicampa*, with a sharp crest behind collar. None of the species agree with this diagnosis, and whether the other species (except *carnea*), which Lederer places in the genus, agree with it or not is unknown to me. I retain the term, however, in the hope that it will prove available. The body is plump in *salicarum* and *okakensis*, but only moderately stout in the balance of the species. The majority of the species have the ♂ antenna strongly bipectinate.

These species are again divided according to wing shape; most of them having the costa straight or somewhat convex, the apices not produced.

Monochromatea is distinguished by the even, parallel transverse lines, the ordinary spots wanting. The type is a ♂, but in such condition that it is impossible to get at the genitalia without great risk of breakage.

Manifesta is similar, but the transverse lines are not parallel, their course normal; the ordinary spots present but as dark indefinite macula. The ♂ genitalia almost precisely like the typical form in the *murannula* group.

Ferruginoides is somewhat paler in color, the veins darker marked, the ordinary maculation neatly defined; the ordinary spots concolorous. The genitalia are distinctive. The harpes are semi-corneous; the inferior margin thickened, tapering toward the tip, and terminating in a somewhat blunt point; the clasper arises from this lower rim, is long, corneous, and curved.

In the other species of the section the costa of primaries is depressed, somewhat more so just before apex, causing the latter to appear somewhat drawn out.

Salicarium, of which *claviformis* and *orilliana* are synonyms is distinguished by the very distinct velvety dark brown claviform. The ♂ harpes are rather narrow, corneous, the tip abrupt and irregular. The clasper is a simple short corneous hook similar to that in *manifesta*.

Okakensis differs from the preceding by the lack of claviform and by the discolorous gray terminal space. The ♂ genitalia are unknown to me.

Carnea has serrate ♂ antenna, thus differing at once from all the preceding species. The cell is always dark, relieving the usually concolorous ordinary spots; the t. a. line is oblique, even. *Cinerea* represents a form of this species suffused with gray, the transverse lines very distinct.

Wockei, of which *seropulana* is a synonym, differs from *carnea* in the form of the t. a. line which is very strongly dentate on costa and outwardly bent beneath internal vein. The ♂ antennae are also entirely simple and ciliate merely. In the form of the genitalia they also differ. *Carnea* has no distinct clasper, but modified corneous harpes, curved, and at tip furcate, the tines unequal. *Wockei* has distinct broad harpes, and a clasper not unlike the side piece of *carnea*, the fork longer.

Alaska, said by Mr. Grote to resemble *carnea*, really belongs with his genus *Agrotophila*, and is an ally of *montana*. It is a very distinct species, easily recognized by the yellow claviform which crosses the entire median space. I have seen but one specimen, but recognized it immediately.

SYNOPSIS OF SPECIES.

Antenna ♂ distinctly bipectinate.

Costa convex or straight; apices of primaries not produced.

Rust red brown; ordinary spots obsolete; median lines broad, curved, parallel, single.....MONOCHROMATEA.

More intermixed with gray; transverse lines not parallel; ordinary spots present, small, black, indefinite.....MANIFESTA.

More luteous; transverse lines all narrow, distinct; ordinary spots large, concolorous, neatly outlined.....FERRUGINOIDES.

Costa depressed, concave; apex of primaries produced.

Claviform distinct, dark brown; s. t. line even, pale; terminal space darker, SALICARUM.

Claviform obsolete; s. t. line uneven; terminal space pale, steel gray, OKAKENSIS.

Antenna ♂ serrate.

Cell black between ordinary spots; claviform moderate; transverse lines usually indistinct.....CARNEA.

Antenna ♂ simple, ciliate.

T. a. line angulate or dentate on costa, outwardly bent beneath vein I..WOCKEL.

Pachnobia monochromatea Morr.

1874. Morr. Proc. Bost. Soc. N. H., 17, 165, *Agrotis*.

Ferruginous, sprinkled with black atoms. Transverse lines simple, broad, subequal, parallel, approximate, evenly curved outwardly. S. t. line and ordinary spots obsolete. Secondaries paler, reddish fuscous. Beneath paler with ferruginous scales, an incomplete common dark line. Head and thorax concolorous.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Massachusetts.

A single ♂, the type, examined. The insect is very easily recognized by the simple markings, and especially the parallel median lines. It must be rare, as I have never seen any other specimens and have heard of none taken.

Pachnobia manifesta Morr.

1870. Morr., Pr. Bost. Soc. N. H., 18, 116, *Agrotis*.

Red to ferruginous brown, more or less irrorate with black scales; the transverse lines single, dark, well defined. Basal lines distinct. T. a. line ♂ upright, thrice waved between veins, rather remote from base; ♀ much more even, oblique. T. p. line nearly parallel with outer margin. S. t. line forming the beginning of a slightly paler terminal shade; its course sinuate. Claviform obsolete; ordinary spots dark indefinite; orbicular punctiform; reniform ovate or somewhat lunate. Secondaries fuscous. Beneath fusco-ferruginous, powdery with a variably distinct common line. Head and thorax concolorous.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Long Island, New York.

The types, ♂ and ♀ are before me. The difference between the sexes in the course and position of t. a. line is remarkable, so much so that did the same variation, in addition to the difference in ground color exist in individuals of the same sex, I should have little hesitation in declaring them specifically distinct. There is no other species, however, with which this could be easily confused, for none have the same combination of structural characters combined with the same general style of maculation. Mr. Morrison says the orbicular is sometimes absent, but the presence of the basal and course of the transverse lines will prevent its confusion with the preceding.

Pachnobia ferruginoides Smith, sp. nov.

Rather reddish yellow, hardly ferruginous, veins marked with darker brown. Transverse lines single; t. a. line decidedly oblique outwardly, curved between veins; t. p. line very evenly curved throughout its course. S. t. line marked by a preceding darker shade, its course even, somewhat less oblique than outer margin. A distinct broad rather even transverse shade crosses the median space over reniform. Claviform faintly outlined. Ordinary spots distinctly outlined; orbicular large, slightly ovate concolorous; reniform narrow, kidney-shaped, somewhat darkened by the median shade. Secondaries dark; blackish fuscous, fringes pale. Beneath powdered with rusty red, a variably distinct common line and discal spot also ferruginous.

Expands 33–35^{mm}; 1.30–1.40 inches.

HABITAT.—Montana, "Black Hills."

In the ♂ the maculation is less distinct than in the ♀. In the latter sex also there are some elongate scales intermixed in the thoracic vesture, which are entirely wanting in the ♂. The species is very distinct from anything heretofore described, and seems in some way to have missed description by me in 1887, when the form was first characterized; how this happened I can not at present say, as I have no opportunity of again examining my type.

Pachnobia salicarum Wlk.

1857. Wlk., C. B. Mus. Het., XI, 717, *Hydracia*.
 1882. Grt., Ill., Essay, 42, *Pachnobia*.
orilliana Grt.
 1875. Grt., Can. Ent., VII, 154, *Pachnobia*.
 1875. Grt., Can. Ent., VII, 227, pl. 1, f. 8 = *claviformis*.
 1882. Grt., Ill. Essay, 42, pr. syn.
claviformis Morr.
 1874. Morr., Pr. Bost. Soc. N. H., 17, 162, *Agrotis*.
 1875. Morr., Pr. Bost. Soc. N. H., 18, 115, *Agrotis*.
 1880. Grt., Bull. Bkln. Ent. Soc., III, 36 = *orilliana*.
 1882. Grt., Ill. Essay, 42 = *salicarum*.

Prevailing color red or rust brown, ground color with a yellow tinge. Basal line simple, fine. T. a. line obsolete geminate, outer portion

only distinct, fine, distinctly marked on costa, its course evenly oblique. The inferior outer portion of basal space is darker. T. p. line geminate, included space of pale ground color; its course sinuate, widely bent over cell, evenly incurved beneath. S. t. line broad pale, very even. Outer portion of s. t. space shaded with pale ground color, else beyond t. p. line darker red brown. Orbicular round, moderate, concolorous; reniform normal, well sized, somewhat obscured by the broad transverse brown shade which occupies the outer third of median space. Claviform very distinct velvety deep brown, forming at once the most striking characteristic of the species. Secondaries reddish fuscous. Beneath pale, strongly powdered with rust red; a common outer line and discal spot. Thorax concolorous. Head and collar dashed with gray.

Expands 33–34^{mm}; 1.32–1.36 inches.

HABITAT.—Massachusetts, Maine, White Mountains, and northward; Canada; Hudson Bay territory.

One of the most easily recognizable of the species. There is nothing to conflict with the remarkable deep brown claviform, which forms the most salient feature of the maculation.

Pachnobia okakensis Pack.

1867. Pack., Pr. Bost. Soc. N. H., 11, 38, *Agrotis*.

1875. Morr., Psyche, 1, 40, *Agrotis*.

Rather pale rust red; terminal space steel gray; from the basal space along the costa to t. p. line sprinkled with gray. Transverse lines single, brown; t. a. line interrupted, upright or slightly oblique; t. p. line sinuate, distinct; s. t. line marked by the contrasting gray terminal space; twice outwardly dentate, then sinuate. Ordinary spots large, irregular, completely pale ringed. Claviform wanting. Secondaries brownish gray with a fuscous discal spot. Beneath powdered reddish gray with discal spot on each wing.

Expands 34^{mm}; 1.35 inches.

HABITAT.—Labrador, Mount Washington.

The type is in the Peabody Museum at Salem, and is badly eaten. The head and prothorax are entirely gone, and the body is a mere shell.

The wings were (June, 1884) still in good condition. The insect is easily recognized by the gray terminal space and the irregular, pale ringed ordinary spots. The above description was made from the type and I have never seen another specimen.

Now in Cambridge at the Museum of Comparative Zoology.

Pachnobia carnea Thunb.

1788. Thunb., Mus. Nat. Ac. Ups. Diss., 72, f. 1.

1816. Hüb., Verz., 222, *Diarsia*.

1852. Guen., Spec. Gen. Noct., 1, 342, *Pachnobia*.

1860. Moeschl., Wien. Ent. Monatschr., 1v, 163, *Pachnobia*.

1856. Wlk., C. B. Mus., Hest., x, 415, *Pachnobia*.

1875. Grt., Psyche, I, 77, 100, *Agrotis*.

Ab. CINEREA Stgr.

1861. Stgr., Stett. Ent. Zeit., XXII, 369, *Pachnobia*.

Rust red to deep-red brown; cell between ordinary spots darker to blackish. Lines often more or less obsolete; when present broad, single, even. T. a. line unusually remote from base, evenly oblique outwardly; t. p. line very near to outer margin, somewhat denticulate, its course sinuate; s. t. line indicated only by the boundary of the slightly paler terminal space. Claviform represented by a blackish mark representing some portion of an outline, never complete. Orbicular concolorous, set into the dark shading of cell, open superiorly. Reniform moderate, of normal shape, variably complete. Secondaries reddish fuscous; beneath reddish powdery, with a variably distinct common line and discal dot. Head and thorax concolorous.

Expands 32–34^{mm}; 1.30–1.35 inches.

HABITAT.—Labrador, Lapland; circumpolar.

A variable species, in which the transverse lines are usually obsolete and only the markings in the cell are visible. The aberration *cinera* is suffused with a bluish-gray tint, and the transverse lines are distinct.

Pachnobia wockei Moeschl.

1862. Moeschl., Wien. Ent. Monatschr., vi, 130, pl. 1, f. 1, 2, *Agrotis*.

1883. Moeschl., Stett. Ent. Zeit., 44, 117 (occurs in Asia?).

scropulana Morr.

1874. Morr., Pr. Bost. Soc. Nat. Hist., 17, 165, *Agrotis*.

1875. Morr., Psyche, I, 42, *Agrotis*.

1875. Grt., Psyche, I, 77=*carnea*.

1875. Morr., Psyche, I, 85, an sp. dist.

1875. Grt., Psyche, I, 100=*carnea*.

1885. Smith, Ent. Amer., I, 14=*wockei*.

1885. Smith, Stett. Ent. Zeit., 46, 223=*wockei*.

Rust or red-brown, basal and terminal space paler, grayish, cell darker, blackish; basal line distinct, black, followed by a gray shade, and terminating in an irregular basal dark patch. T. a. line preceded by a gray shade, a distinct acute outward tooth on subcostal vein, variable in length, then rather evenly oblique outwardly to vein one, beneath which there is an outward curve of variable length; t. p. line rather even, crenulate, parallel with outer margin; s. t. line paler, irregularly sinuate, at costa marked inwardly by a large brown patch. Claviform pale, outlined in black, very variable in length; ordinary spots paler gray or concolorous. Orbicular variable, usually open above, sometimes V-shaped, the lower angle rounded and varying to the typical form of *scropulana* where it is complete. Reniform upright, somewhat constricted at middle. Secondaries fuscous; beneath essentially as in the preceding species; collar inferiorly yellowish, tipped with brown.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—Mount Washington, Labrador.

To the courtesy of Mr. Moeschler I owe an opportunity of comparing his type of *wockeii* with the type of *scropulana*, received from Mr. Tepper. They are unquestionably specifically identical, though the types are apparently the extremes of the species. Other specimens from New Hampshire fill the gap completely. Mr. Grote was entirely in error in referring *scropulana* to *carnea*, and seems never to have been able to realize the distinction between them, though he himself pointed out one of the strong characters offered by the course of the basal line. The antennal differences in the male are obvious, and should not have escaped notice. Mr. Moeschler's species seems to have escaped recognition heretofore, and it is due to a liberal scientific spirit on the part of that author in sending me the specimens that I have been able to study his species.

Genus SETAGROTIS Smith.

All the tibiæ spinose, anterior not very heavily armed, and scarcely abbreviated. Front smooth, not protuberant. Antennæ with the joints marked, laterally furnished with tufts of bristly hair, resembling those of *Carneades*, but scarcely so well developed. The vestiture consists of flattened hair and scales, forming on the thorax an indefinite, anterior divided crest. The palpi are short, the second joint very broad at tip, terminal joint minute, resembling very much the structure in *cupida*.

In antennal structure this genus tends to the *Carneades* series, and furnishes another of the links connecting the extremes like *Carneades* and *Rhynchagrotis*. It resembles the latter much less than does *Abagrotis*, adding to the characters of the latter, spinose fore tibiæ and a different wing form.

Two species, *planifrons* and *congrua*, are referable here, agreeing in general type of maculation, yet easily distinguishable by a large series of characters, the most obvious of which are the black tipped collar and black basal dash in *planifrons*, while in *congrua* the collar is red-dish tipped, and there is no basal dash.

Setagrotis planifrons Smith.

1890. Smith, Trans. Am. Ent. Soc., xvii, 42, *Agrotis*.

General color a bluish ash-gray; sides of palpi blackish; collar black tipped; thorax immaculate. Primaries with a distinct vinous red shade through the lower half of the wing, less marked in the basal and terminal spaces. Basal line single, black, strongly dentate, running to the basal dash. T. a. line single, broader on costa and internal margin, strongly dentate between veins, slightly oblique outwardly. T. p. line broad, distinct, crenulate, outwardly curved over reniform, and inwardly sinuate below, the curves very even and not strong. A broad, diffuse median shade crosses the reniform, then runs parallel

and rather close to t. p. line, darkening the median space beyond, to the t. p. line. S. t. space becoming gradually darker to the s. t. line, which is defined and limited only by the contrast of this dark shade against the concolorous terminal space. A row of black terminal lunules. A black longitudinal dash at base extending to t. a. line. Claviform wanting. Orbicular concolorous, black ringed, elongate, the ends drawn out, the one reaching the t. a. line, the other to the reniform, which is narrow, lunate, incompletely defined, darkened by the transverse median shade. Secondaries white, veins a trifle soiled, and with a dirty indefinitely marked outer border. Beneath, primaries fuscous, powdery, pale costally where the outer transverse line is visible; secondaries paler, more powdery, with outer line marked across costal space only; a distinct discal spot.

Expands 34^{mm}; 1.36 inches.

HABITAT.—Northwest British Columbia.

A very handsome species, of which I have seen only a single specimen from Mr. Neumögen's collection.

Setagrotis congrua Smith.

1889. Smith, Trans. Am. Ent. Soc., xvii, 43, *Agrotis*.

Ashen gray, palpi dark at the sides; collar with a narrow, dark, transverse line, above which is a series of white scales, the tip of collar marked with a reddish, almost ferruginous shade. Thorax immaculate. Primaries with a somewhat ferruginous shade extending through the middle of the wing into the s. t. space and tinting that space nearly its full length; veins somewhat dark marked. Basal line marked on costa only. T. a. line single, marked by a distinct costal spot, from which the line is traceable through the cell, twice dentate in this course, then not again visible, except as a curved mark below the internal vein. T. p. line traceable for its entire length, single, not prominent, rather even, with little outward spurs on the veins. S. t. line indefinite, paler, interrupted, marked by the slight contrast between terminal and s. t. space created by the rusty tinging of the latter. A row of dusky terminal lunules; no basal dash, no claviform. Orbicular elongate, black ringed, connected with the reniform by a short spur line; reniform incomplete, indefinite, the inner outline only defined. Secondaries whitish, glistening, with the veins dusky and with a faint discal lunule. Beneath whitish, powdery, with a diffuse outer line on each wing visible only across the costal region.

Expands 33^{mm}; 1.36 inches.

HABITAT.—Oregon.

A single male in good condition is before me: The species agrees perfectly with *planifrons* in the generic characters, and is closely allied to that species in general type of maculation. There are so many differential characters, however, that there is not the slightest danger of confusing them.

Genus AGROTIS Tr.

Anterior tibiæ spinose, the tibiæ not abbreviated, spines moderate. Front smooth, antennæ of ♂ bipectinate or lengthily serrate and bristled. Vestiture moderately close, no distinct thoracic tuft; primaries variable in shape. In the form of the ♂ genitalia *ypsilon* and *geniculata* agree; *badinodes* differs very decidedly, while the ♂ of *violaris* I have been unable to examine.

The species of this group, agreeing as they do in structural characters, are yet totally dissimilar in general appearance and in the details of ornamentation. The species are therefore easily recognized. *Badinodes* is at once known by the brown color, and very even, pale transverse lines. The collar is also deep brown. The antennæ of ♂ are evenly bipectinate, the anterior tibia sparsely spined, and the accessory cell of primaries often open outwardly. The ♂ harpes are broad, rather short, somewhat spoon-shaped, rounded outwardly, with an acute tooth at middle of tip. The clasper is long, corneous, and curved. *Violaris* is somewhat similar to the preceding in ornamentation, but the color is bluish gray, with outer half of median space dark, reniform outlined in yellow. The primaries are narrower, but otherwise the habitus of the insect refers it here. I have not been able to examine the ♂ genitalia. *Ypsilon* is peculiar. The habitus would seem to refer it to *Saucia* and allies, but the front is distinctly smooth. The species can be recognized by the dark ground color, pale s. t. space, and a distinct saggitate black dash from middle of outer side of reniform, meeting or closely approaching similar dashes, marking two strong indentations of the s. t. line. The antennæ of the ♂ are lengthily pectinate on the upper side only, the pectinations on the outer side being short, acute. The ♂ genitalia are very close to those of the *muraenula* type, consisting of the long broad harpes, obliquely terminated at tip and furnished with spinules; the clasper is short, beak-like, corneous. The tibiæ are rather broader and more heavily spinose than in the preceding species. It is closely allied structurally to *segetum*, and seems rather to belong to a European type of structure, for with its tibial armature and genitalia the front ought to be roughened or tuberculate. *Geniculata* agrees with *ypsilon* in the sexual and tibial armature, but differs not only in wing form and ornamentation but also in having the antennæ rather serrate and bristled than pectinate. This insect also agrees in structural details with the *muraenula* group, but the front is decidedly smooth and the ornamentation entirely different. The color is dark ash gray, darker beyond t. p. line; space between the ordinary spots black.

Assuming *segetum* as the type of the genus *Agrotis*, the foregoing are the only species structurally identical with the European forms. The combination of characters is definite and easily limits the series. The small number of species agreeing with the European type is remarkable, and not less striking is the dissimilarity of the species associated

by the characters used. *Ypsilon* is the most typical species, but none of the others resemble it very closely.

The species may be separated in synoptic form, as follows:

T. p. line, pallid; even:

Primaries, wide; color, red brown; cell between stigmata, darker . . . *BADINODES*.
 Primaries, narrower; color, bluish gray; outer half of median space, fuscous.

VIOLARIS.

T. p. line, dark; irregular:

Primaries, long and narrow; antennæ lengthily pectinated; a saggitate dash from middle of outer side of reniform *YPSILON*.
 Primaries, shorter and broader; antennæ shortly pectinate and bristled; stigmata connected with black *GENICULATA*.

Agrotis badinodes Grt.

1874. Grt., Can. Ent., vi., 13, *Agrotis*.

Thorax and primaries, red brown; collar, deep blackish brown; s. t. space, a narrow median shade, and space between the ordinary spots darker. Basal and t. a. line even, narrow, darker brown; a distinct black spot on t. a. line at the median vein, marking the lower edge of orbicular. T. p. line evenly and slightly convex outwardly; darker brown, narrow, followed by a distinct pale shade which gives the characteristic appearance to the insect. The ordinary spots are large and faintly outlined; claviform faintly indicated by a black dot at outer end; s. t. line concolorous or but slightly paler, irregular, marked by the difference in color between the s. t. and terminal space. Secondaries fuscous, with a brownish shade; beneath powdered with reddish with a distinct blackish common extra discal line and discal lunule.

Expands 35–39^{mm}, 1.40–1.56 inches.

HABITAT.—Maryland, New York, Canada, eastern and northern United States.

The species is common and easily distinguished. The primaries are wide and comparatively short. The color, maculation, and pectinate antennæ form a combination so peculiar that the species is easily recognized. No life history of the species has been written.

Agrotis violaris G. and R.

1868. Grt. and Rob., Tr. Am. Ent. Soc., 1, 353, pl. 7, f. 59, ♂, *Agrotis*.

Ground color gray, irrorate with fuscous brown, outer half of median space also fuscous; s. t. space more densely mixed with dark scales than the other pale portions of wing. Basal line indistinct, t. a. line distinct, rather broad, slightly angulate on costa and internal vein, else straight. T. p. line of ground color, margined each side with the dark shading of median and s. t. space; its course slightly convex outwardly, most evidently so opposite the cell. S. t. line with three outward angulations, defined by the contrast between the somewhat darker s. t. and concolorous terminal space. The orbicular is small, faintly outlined with dark scales; reniform elongate, slightly constricted

in the middle, narrowly annulate with yellow. Secondaries fuscous, beneath paler, with the same maculation as in *badinodes*.

Expands 37^{mm}, 1.5 inches.

HABITAT.—Pennsylvania, Middle States.

Rather a rare species, but easily recognized. The primaries are narrower than in the preceding species but the general style of maculation is identical. Unfortunately I have had no good ♂ under examination. The type is a ♂, but the antennæ are gone; the description says they are serrate, the serratures diminishing toward the tip; the genitalia of the specimen appear to be missing in part, but from what remains the clasper appears to have been bifid. The front closely examined shows a barely traceable protuberance; it is not unlikely therefore that fresh and abundant material will necessitate the removal of this species to another group or genus.

Agrotis ypsilon Rott.

1776. Rott., Naturf., 41, 141, *Noctua*.
 1816. Hüb., Verzeichniss, 225, *Exarnis*.
 1883. Saund., Fruit Insects, 327, f. 338, *Agrotis*.
 1889. Butler, Trans. Ent. Soc. Lond., 1889, 380, *Peridroma*.
suffusa S. V.
 1852. Gn., Noct. 1, 268.
 1857. Wlk., C. B. Mus., Lep. x, 309, *Agrotis*.
telifera Harr.
 1841. Harris, Rept. Ins. Mass., *Agrotis*.
 1842. Harris, Inj. Insects, 323, *Agrotis*.
 1864. Grt., Pr. Ent. Soc. Phil. III, 95 pr. syn.
 1868. Riley, Rept. Ins. Mo. 1, 80, 28 pl. 1, f. 8-10, *Agrotis*.
 1881. Riley, Index and Suppl. to Mo. Repts. 55 pr. syn.
idonea Cram.
 1782. Cram., Exot., III, 150, 275, f. II. *Phalaena*.
 1852. Gn., Noct. 1, 269, pr. var.
 1857. Wlk., C. B. Mus., Lep. x, 309, pr. syn.

Ground color deep, dark purplish brown, variably suffused by a rather pale luteous shade, s. t. space pale luteous to apex, and even in dark specimens the inferior portion of basal space at least is pale. Basal line obsolete. T. a. line geminate, not very evidently defined, inwardly oblique in course, but outwardly curved between veins, a long outward curve below vein 1. T. p. line indistinctly geminate, punctiform, its course very even. S. t. line close to outer margin, very strongly dentate, the dentations marked by preceding sagittate points very obvious and black opposite the cell. The dentations are longest on veins three and four. Claviform small, outlined in black. Orbicular moderate or small, concolorous, variable in shape, narrowly outlined in black. Reniform kidney-shaped, of good size, concolorous, outwardly marked by a distinct black sagittate dash, sometimes reaching the similar dashes from the s. t. line. Secondaries dusky, with a pearly luster. Beneath, the wings are uniformly colored, the primaries black-

ish, no discal line; secondaries with a variably distinct discal spot. Collar with two narrow black lines.

Expands 37–53^{mm}, 1.50–2.12 inches.

HABITAT—United States and Canada.

One of the most common and well-known species. It is readily distinguished from all the others by the long and narrow wings, as well as the difference in color. The pale s. t. space and the black sagittate dashes from reniform and before the s. t. line give the species a characteristic appearance impossible to be mistaken and unlike any other American species. The type to which this belongs is European, as has been already suggested.

The life history has been frequently written in the works of the economic entomologists. The larva is a general feeder and has been injurious to strawberries among others.

I am entirely unable to understand Mr. Butler's synonymy of this species. He makes *saucia* Hbn. the same as *ypsilon* Rott., and cites *differens*, *ambrosioides*, *impacta* and *intecta* Walker also as synonyms. Then he adds that a specimen labeled *turris* in Mr. Grote's collection is the same as the *impacta* of Walker, and thus destroys the possibility of crediting any part of his synonymy. *Saucia* has simple antennæ, *turris* has them serrate and bristled, while *ypsilon* has them pectinated!

Agrotis geniculata G. & R.

1868. Grt. and Rob., Tr. Am. Ent. Soc. 1, 349 pl. 7, f. 54, *Agrotis*

Varying from dark ash-gray to deep fuscous or smoky; basal and transverse lines geminate; included space pale; s. t. line very irregular, narrow, pale; ordinary spots pale; intervening space black; an indistinct median shade; claviform short, narrowly outlined in black; s. t. space usually darkest, median space usually palest; t. a. line irregularly dentate and scalloped; t. p. line very irregular; variable in position and course, but usually with a single evident outward curve. Secondaries fuscous brown to smoky black, paler toward base. Beneath dull dark smoky, paler toward base of wing. Collar with a distinct black line.

Expands 33^{mm}, 1.32 inches.

HABITAT.—Northern, Eastern, and Middle States.

This insect is so variable in color and maculation, while retaining a remarkable uniformity of appearance, that a detailed description is rather that of an individual than the species. As a rule the space beyond the t. p. line is darkest, the gray predominating in the other parts of the wing. The dark space between the ordinary spots continued as a median shade adds to the peculiarity of the species and renders it easily known. From the other species of the group it has been sufficiently distinguished.

It seems not common, and its early stages are not published.

Agrotis bollii Grt.

1883. Grt. Bull. U. S. Geol. Surv., vi, 160, *Agrotis*.

hilaris Grt.

1880. Grt. Can. Ent. xii, 153, *Agrotis*.

“♂ Concolorous, silky, blackish gray, with a sprinkling of pale scales. Antennæ rather lengthily bipectinate. Head, collar, and thorax concolorous, collar a little darker tipped; palpi darker at the sides. Only the two median lines visible; these are even, pale, the inner line oblique, the outer somewhat bent, nearly straight, not inflected. A black spot on the cell against the inner line, and a second quadrate, larger at the middle. These spots follow and precede the orbicular, which with the reniform is concolorous with the wing and difficult to make out. The orbicular is V-shaped, open above; the reniform small, upright, medially constricted; both spots indistinctly pale ringed; a small spot on the line indicates the claviform. Median lines slightly marked with black on costa. Fringes concolorous. Hind wings blackish, paler at base; fringes pale, interlined. Beneath both wings blackish, with pale irrorations; a common extra medial shade line. Expanse 34^{mm}; Texas.”

Compared to *collaris* and *badinodis*; but evidently very close to *geniculata*, and possibly a suffused form of that species. Southern specimens of *geniculata* tend to become more evenly colored, and in a specimen before me the orbicular is distinctly V-shaped. Still the form described is very distinct from anything I have thus far seen.

Agrotis quarta Grt.

1883. Grt., Bull. Geol. Surv. vi, 258, *Agrotis*.

“♀. Fore tibia unarmed; rosy brown, resembling *baja*. Lines brown, badly marked; t. p. line broken into dots; subterminal line subcontinuous, nearly straight. Orbicular round, nearly concolorous, with a bright stain edging the fine incomplete annulus within. Reniform reddish orange, contrasting, upright, with incomplete brown annulus, shaded with ochrey. Beneath paler, shaded with rosy, with discal marks and exterior irregular common line. Collar brighter than the rosy brown head and thorax. Expanse 40^{mm}. Sauzalito, California.”

Seems a good species allied to *badinodis*; but entirely unknown to me. It can not be referred to the *baja* group, nor, in fact, properly to this, if, as stated, the fore tibiæ are unarmed. No ♂ seems known, but probably the antenna will be found to be pectinated. The vestiture is not described and possibly the relationship may be more nearly with the *carnea* group. The color agrees with the species of that group. It is impossible to do much with a description like the above until a specimen precisely fitting it comes to hand.

Genus PERIDROMA Hbn.

Common to the species united under this term are the following characters: All the tibiæ spinose, fore tibiæ rather heavily armed but scarcely abbreviated; front smooth; thoracic vestiture consisting of mixed scales and hair; antennæ of male simple, or ciliate merely; primaries regularly widening outwardly, apex produced or rectangular, not rounded. Two groups are united under this term, separable as follows:

Thorax with distinctly divided anterior and posterior crests, primaries quite evidently produced at apexGroup SAUCIA.
 Thoracic tufts not divided, apex of primaries not so distinctGroup INCIVIS.

Saucia may be considered the type of this genus, which contains a not too diverse assemblage of species, more particularly characterized in the remarks under the group headings. The assemblage is related rather to the Old World species, but in the *incivis* group a closer approach to the more peculiarly western forms is noticeable.

Group SAUCIA.

This group is characterized by spinose fore tibia, smooth front, simple or merely ciliate male antennæ and distinctly crested thorax. The crest is usually distinct, extending the full length of thorax, and evidently divided; rather more prominently so anteriorly. The primaries are moderately large, the apices acute, somewhat extended, outer margin oblique. Except *rudens* and *pellucidalis*, the species are well sized and have a robust appearance peculiarly their own. The normal noctuidous markings are traceable in all species, but often the transverse lines are more or less indefinite or indistinct. The ♂ genitalia vary greatly, and agree only in that the elasper is single, simple, and curved. The harpes are very different in shape, but afford no bases for grouping the species.

The species are not difficult to distinguish. *Occulta*, *præfixa*, *stricta*, and *grandipennis* are large species, with the thoracic tufting least marked. The three first named had been placed in the genus *Eurois*, but I fail to discover any character which allies these species with *pressa* and *prasina*, save the size and a general agreement in wing form.

Occulta is easily distinguished by its large size, the ashy gray primaries, and blackish secondaries. At first glance it is not unlike *Acronycta* in appearance, but the resemblance is superficial merely. The genitalia of the ♂ are characteristic. The elasper is long, curved, corneous, nearly as long as the harpe, dilated at the base, and slightly so toward the tip. The harpes are long, semi-corneous, the tip straightly cut, the upper angle only slightly prominent. *Præfixa* is smaller, but resembles *occulta* in the color and general maculation of the primaries. The secondaries are, however, pale fuscous, instead of black. A single ♀ only has come under my notice. *Stricta* is nearly,

if not quite, equal in size to *occulta*, and with practically the same markings; the ground color of the primaries, however, is red brown, and the secondaries are fuscous brown. The δ genitalia have been examined in only a single specimen, and that but superficially with a lens. From such examination they appear much like those of *occulta*. *Grandipennis*, though expanding scarcely more than *saucia*, is somewhat wider winged, and is referable at once to the large species. The color is an even yellowish brown, the costa marked with a yellowish tinge, maculation faint. The secondaries are very pale yellowish. The δ type from Mr. Neumögen's collection was the only specimen examined, and could not, of course, be dissected or broken to examine the genitalia. From outward examination the harpes are almost evenly oblong, a small superior projection similar to that of *occulta* from the tip. The clasper was invisible.

The remaining, smaller species, in which the thoracic cresting is most marked, are also easily distinguished. *Saucia* is so common and so universally known that no special characterization seems needed. *Unica* is distinguished by the pale ground color and very distinct transverse lines. The δ genitalia are very distinctive, the harpes are long, concave, somewhat dilated, and ladle-shaped toward the tip; a row of spines project inwardly at tip. The clasper is short, corneous, acute, and but slightly bent. The variety agrees perfectly with the species in this respect. The remaining species, *rudens* and *pellucidalis*, agree in having iridescent, white secondaries and creamy, or somewhat purplish gray primaries; they are also perceptibly smaller than either of the other species. *Inter se* they differ in that *rudens* has a black basal dash and a black connecting line between the ordinary spots, both of which are wanting in *pellucidalis*. The δ genitalia are practically identical. The harpes are moderately broad, suddenly and deeply emarginate near tip on lower edge, giving the terminal portion a bent ladle appearance. Inwardly at tip there is a row of short acute spines. The clasper is rather short, corneous, acute, and but slightly curved.

SYNOPSIS OF SPECIES

Size large, thoracic tuftings not prominent.

Primaries gray.

Secondaries blackish, size larger..... OCCULTA.

Secondaries fuscous, size smaller..... PREFIXA.

Primaries red brown.

Ordinary spots large; transverse maculation distinct..... ASTRICTA.

Ordinary spots small; transverse maculation obsolete..... GRANDIPENNIS.

Size smaller, thoracic tuftings very distinct.

Color yellowish to blackish.

Transverse lines usually punctiform, indistinct, ordinary spots obscured by darker atoms, all maculation obscure..... SAUCIA.

Color creamy or purplish gray.

Primaries with a black basal dash and a black connecting line between the ordinary spots..... RUDENS.

Primaries without basal dash or connecting line..... PELLUCIDALIS.

Peridroma occulta Linn.1767. Linn., Syst. Nat., IV, 514, *Noctua*.1816. Hübner, Verzeichniss, 218, *Eurois*.1852. Guen., Noct., II, 76, *Aplecta*.1874. Grt., Can. Ent., VI, 13, 70, *Eurois*.1876. Speyer, Stett. Ent. Zeit., XXXVI, 204, *Aplecta*.

Ground color rather dark ash gray; irrorate with smoky brown; maculation smoky to black. Transverse lines moderately distinct, faintly geminate, basal line scarcely evident, a slightly darker indefinite basal shade. T. a. line lunulate, moderately even, outer line most distinct. T. p. line outwardly bent over cell, thence obliquely inward to hind margin. Inner line lunulate, almost crenulate, outer line even absorbed by a dusky shade reaching half way to the s. t. line. S. t. line slightly sinuate, well-defined by a series of rather large, black sagittate spots. A row of black terminal dots. Through the median space is an indefinite dark shade, most evident between the ordinary spots on claviform. Claviform outlined; moderate in size; ordinary spots large, concolorous or paler; orbicular rounded, incompletely closed above; reniform kidney shaped. Secondaries blackish, fringes clear white. Beneath, uniform smoky gray. Head and thorax like primaries; abdomen darker, smoky.

Expands 50-53^{mm}; 2-2.12 inches.

HABITAT.—Northern and Eastern States, Canada.

Easily distinguished by its large size and pale color. It seems not uncommon, though never taken in large numbers. *Implicata* Lef. (Ann. Soc., Ent. Fr. v, 394 pl. 10 f. 4, *Hadena*) cited as synonymous or varietal to this species I consider distinct, though nearly allied. As I can not find authentic record of the species as American, it is here omitted.

Peridroma præfixa Morr.1875. Morr., Proc. Bost. Soc. N. H., XVIII, 117, *Agrotis*.

Ash gray, maculation smoky or black, somewhat sparsely irrorate with blackish. Basal line distinct, geminate; a small, dark, basal patch. T. a. line sinuate; evenly oblique outwardly. T. p. line distinctly geminate only at inception, crenulate, nearly parallel in course with outer margin. S. t. line pale, relieved by the distinct smoky s. t. shade and by a more indefinite outer shade not reaching either margin. A lunate dark terminal line. A faint, rather narrow, median shade; space between ordinary spots, dusky. Claviform very distinctly and broadly outlined; ordinary spots, large, concolorous, or paler. Orbicular, rather oblique, oblong, open above; reniform upright, kidney shaped but rather narrow, and with an unusually straight inner line. Secondaries rather pale, fuscous, darker outwardly. Beneath gray, irrorate, with fuscous brown; primaries, with somewhat paler terminal shade; secondaries, with darker extra discal shade and discal lunule.

Expands 42^{mm}; 1.68 inches.

HABITAT.—Rocky Mountains.

Very readily distinguished from the preceding, not only by the size and the color of secondaries, but by the broad, dark, inward shading to the s. t. line, which is characteristic of this species. The single ♀ specimen seen is from the collection of Mr. J. Meyer.

Peridroma astricta Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 135, *Envois*.

Red brown; basal, s. t., and terminal spaces darker. Transverse lines geminate, though not very distinct. Basal line scarcely obvious. T. a. line evenly and slightly oblique. T. p. line evenly curved over the cell, thence parallel with outer margin. S. t. line irregularly dentate, marked by the contrast between s. t. and terminal spaces, the former being darkest, the latter nearer to ground color. Claviform indefinitely outlined, of good size. Ordinary spots large, rather more grayish than ground color, distinctly, though narrowly, outlined in black. Orbicular oblique, oblong; reniform upright, slightly constricted at center. Secondaries dull smoky brown; beneath powdery, with darker common shade line and discal lunule. Thorax very dark brown; abdomen like secondaries.

Expands 50–53^{mm}, 2–2.12 inches.

HABITAT.—New York, New Hampshire, and Northern States; Canada apparently not common. Easily known by the large size and brown color.

Peridroma grandipennis Grt.

1883. Grt., Ann. and Mag. N. H., 1883, 54, *Agrotis*.

1884. Grt., Trans. Kans. Ac. Sc., VIII, 54, *Agrotis* (reprint).

Rich, purplish red brown, veins marked incompletely with black, terminal black marks distinct. T. a. line blackish, faintly geminate, dentate, a long outward submedian tooth. Other transverse lines obsolete or only marked on costa. Orbicular small, round, pale, with a dark central dot. Reniform small, indefinite, pale, centered with ground color. A slightly darker dash connects the two spots. Secondaries pale fuscous, veins marked. Thorax like primaries in color; abdomen shaded with reddish; beneath pale whitish, with darker common line and discal lunule, most evident on secondaries.

Expands 45–52^{mm}, 1.80–2.08 inches.

HABITAT.—New Mexico.

I have seen but a single ♂, from Mr. Neumoegen's collection, and could not make out the genital structure without risk to the specimen. I think they will be found to resemble those of *occulta* quite strongly.

The species seems rare, and rather local.

Peridroma saucia Hubn.

1816. Hbn., Samml. Eur. Schmett., Noct., 378, *Noctua*.
 1816. Hbn., Verzeichniss, 227, *Peridroma*.
 1852. Gu., Noct., 1, 271, *Agrotis*.
 1856. Wlk., C. B. Mus. Lep., x, 311, *Agrotis*.
 1873. Grt., Bull. Buff. Soc. N. Sci., 1, 135, *Agrotis*.
 1883. Saunders, Fruit Insects, 106, pp. 100-103, *Agrotis*.
incermis Harris.
 1841. Harris, Rept. Ins. Mass., *Agrotis*.
 1842. Harris, Injur. Ins., 323, *Agrotis*.
 1869. Riley, 1st Rept. Ins. Mo., 72, pl. 1, ff. 1-4, *Agrotis*.
 1873. Packard, Our Common Ins., 199, p. 240, *Agrotis*.
 1873. Grt., Bull. Buff. Soc. N. Sci., 1, 135, pr. syn.
 1876. Riley, 8th Rept. Ins. Mo., 37, pp. 24, 25, *Agrotis*.
 1881. Riley, Index & Suppl. to Mo. Report, 55, pr. syn.
ortonii Pack.
 1869. Pack, 1st Rept. Peab. Ac. Sci., 63, *Agrotis*.
 1874. Morr., Proc. Bost. Soc. N. H., 17, 210, pr. syn.
 Var *margaritosa* Haw.
 1810. Haw., Lepid. Britt, 157.
 1852. Guen., Noct., 1, 271, pr. syn.

Yellowish fuscous to purplish brown, more or less irrorate or suffused with black, the maculation often entirely obscured. T. a. line geminate, lunate, upright. T. p. line single, crenulate, often only punctate, sometimes obsolete, rarely very distinct; evenly curved over the cell. S. t. line indefinite, marked only by the somewhat darker shade of terminal space; a row of lunate terminal spots. Ordinary spots large, concolorous; orbicular round or oval; reniform short and rather broad; claviform short, faintly outlined; secondaries iridescent whitish, outwardly smoky, veins marked. Beneath powdery, somewhat iridescent, with a common dark outer line or shade. Expands 40-50^{mm}, 1.60-2.00 inches.

HABITAT.—North and South America, Europe, Asia.

This is one of those obscure forms so difficult to describe, the ornamentation consisting of shadings rather than markings, and scarcely two specimens appearing entirely alike. It is, however, so different from all the species associated with it that there is no danger of mistaking it for other than itself.

The term *margaritosa* applies to the nearly uniformly luteous specimens, rare in the United States, while I have somewhere named a very distinctly marked specimen without any confusing shades *unica*. The term is not sanctioned by description, and I now deem the form not sufficiently constant to require a name.

The life history has been well written by Professor Riley, and the species has been frequently treated in economic publications.

Peridroma rudens Harv.

1874. Harvey, Bull. Buff. Soc. N. Sc., II, 271, *Agrotis*.

Creamy gray, somewhat darker at base, and more or less irrorate with black scales. Transverse lines obsolete. Ordinary spots small, neatly cut, concolorous or centered, with few dark scales. A distinct black basal dash, and a broad dash connecting the ordinary spots, also black. A brownish subapical costal spot, followed by a paler apical spot. Secondaries pearly white with a narrow, dark terminal line. Beneath, pearly white; primaries powdered with black, as is the anterior margin of secondaries. Head and inferior half of collar creamy yellow. Thorax and collar dark, somewhat purplish gray.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Texas. Apparently a common species in Texas, and very readily recognized by the pale colors and the neat, contrasting black maculation.

Agrotis pellucidalis Grt.

1880. Grt. Bull. Geol. Surv., VI, 567, *Agrotis*.

rudens † Harv.

1875. Harvey, Bull. Buff. Soc. N. Sc., III, 5, *Agrotis*.

Very like *rudens* in color and general maculation, but lacking entirely the black basal dash and the connecting line between the ordinary spots. The geminate transverse lines are traceable, the t. p. usually punctiform, and the claviform spot is faintly outlined. In other respects there is no perceptible difference from *rudens*.

Expanse and locality as in *rudens*, and it seems equally common.

Group *INCIVIS*.

All the tibiae spinose; anterior moderate in length, not broadening toward the tip; spines long, slender, straight, and weak. Front broad, full, slightly narrowing inferiorly, not roughened or tuberculate. Eyes large. Antennae simple in both sexes; ciliate in the ♂. Thoracic vestiture smooth, appressed; in perfect specimens showing a small divided basal tuft, most evident in *incivis*. The primaries are rather small, smoothly scaled, with a more or less evident satiny lustre, the apex always distinct.

The harpes of the ♂ are long, rather narrow, the tips slightly enlarged, somewhat concave, the apex oblique or rounded, inwardly fringed with a row of acute spines. The clasper is simple, moderate in length and but slightly curved.

The species are few in number and easily separated. All are pale in color. *Incivis* is largest, the color carneous gray, the ordinary spots distinct, brown, and of good size; the s. t. line is distinct, but the others are either obsolete, or indicated by black venular points. The other species are more whitish, the transverse maculation entirely wanting,

and only the reniform marked by an indefinite black patch. *Tenuescens* is irrorate, with reddish-brown scales, and the secondaries are dusky. *Simplaria* and *digna* are white, the secondaries also pale; the latter has a black line crossing the collar, a feature wanting in *simplaria*.

In tabular form the species may be arranged as follows:

Primaries carneous gray, maculate with dark-brown transverse striga. Ordinary spots usually distinct and large	INCIVIS.
Primaries whitish, irrorate with reddish, reniform indefinite, black.....	TENUESCENS.
Primaries whitish, more or less irrorate with black scales.	
Collar concolorous, median vein relieved by dark scales, terminal space darker,	
	SIMPLARIA.
Collar with a distinct black line; primaries less irrorate with black.....	DIGNA.

Peridroma incisiva Gu.

1852. Guen., Noct., I, 274, *Agrotis*.
 1856. Wlk., C. B. Mus., Lep., x, 331, *Agrotis*.
 1874. Grt., Bull. Buff. Soc. N. Sc., II, 303, *Agrotis*.
 1874. Morr., Proc. Bost. Soc. N. H., XVII, 164, *Agrotis*.
 1880. French Can., Ent., XII, 14 (larva sub. nom. *lubricans*.)
 1882. French Can., Ent., XIV, 240, *Agrotis*.
alabamæ Grt.
 1874. Grt., Bull. Buff. Soc. N. Sc., 159, *Aniela*.
 1875. Grt., Can. Ent. VII, 102.
infecta Ochs.
 1816. Ochs., Nachtr., 6ⁿ, 8, *Agrotis*.
 1816. Hübner, Verzeichniss, 220, *Hapalia*.
præcox † Hbn.
 1816. Hbn., Samml. Eur. Schmett., Noct., 359, *Noctua*.
 1816. Hbn., Verzeichniss, 220 = *infecta*.
 1856. Wlk., C. B. Mus., Lep., x, 331 = *incisiva*.

Ground color of thorax and primaries varying from dark ash to a somewhat reddish gray. Primaries irrorate with blackish scales, and dark, narrow, transverse striga. As a rule, the ♀ is paler than the ♂. T. a. line obsolete or barely traceable. Claviform rarely outlined in brown, usually obsolete. Orbicular often wanting; when present annulate with brown and white, center blackish. Reniform distinct, large, black, annulate with white, and ferruginous. T. p. line usually traceable by black venular points; slightly sinuate, and nearly parallel to outer margin; when completely defined the line is denticulate. S. t. line defined by an inward ferruginous shade, and the red brown terminal space. Secondaries white, semi-transparent, anterior and outer margins dusky, blackish. Beneath primaries even, ash gray, secondaries as on upper side. Palpi black at sides, terminal joint minute. Collar with a broad, dark brown fascia.

Expands 32-38^{mm}; 1.28-1.52 inches.

HABITAT.—District of Columbia to Florida, Mississippi, Illinois, Texas, California.

This species has a distinct though small basal thoracic tuft, and is also distinguished from all its allies by the obviously defined, ordinary

spots. The male specimens are usually darker and more fully marked than the females.

The synonymy relating to *infecta* and *præcox* is from Walker, and has not been verified by me. I consider it very questionable in correctness, and do not give *infecta* priority for that reason.

The species is not rare, and the larva has been described by Prof. G. H. French.

Peridroma tenuescens Smith (Morr. MSS.).

Head and thorax whitish, with a few scattered reddish and black scales. Primaries whitish, suffused outwardly with reddish; maculation obsolete, only the black indefinite reniform being traceable. Secondaries grayish or smoky, paler at base. Beneath uniform pale gray, powdered with blackish.*

Expands 31^{mm}; 1.25 inches.

HABITAT.—Nebraska.

A single specimen in Mr. Tepper's collection has the above MSS. name of Mr. Morrison attached. It is sufficiently distinct from its allies to render separation easy. I have never seen another specimen.

Peridroma simplaria Morr.

1874. Morr., Proc. Bost. Soc. N. H., xvii, 164, *Agrotis (simplicius)*.

1875. Morr., Proc. Bost. Soc. N. H., xvii, 210, *Agrotis (simplaria)*.

1875. Harv., Bull. Buff. Soc. N. Sc., iii, 5, *Agrotis (simplicia)*.

1880. Grt., Bull. Geol. Surv., vi, 108, *Agrotis*.

Pale ash gray. Primaries sparsely sprinkled with black scales; terminal space darker, blackish, sometimes concolorous. Transverse lines obsolete; in dark specimens the s. t. line is traceable through the dark terminal portion. Claviform usually outlined by black scales. Median vein marked with black scales. Reniform blackish, indefinite, sometimes formed by two superimposed black spots. Secondaries snowy white, a few dusky scales along anterior margin. Beneath, primaries gray, inner margin paler; secondaries as above.

Expands 28–31^{mm}; 1.12–1.25 inches.

HABITAT.—Texas.

Readily recognized by the general habitus, and seems not uncommon in Texas.

Peridroma digna Morr.

1875. Morr., Proc. Bost. Soc. N. H., xviii, 115, *Agrotis*.

nigrovittata Grt.

1875. Grt., Bull. Buff. Soc. Nat. Sc., iii, 77, *Agrotis*.

White; primaries irrorate with a few black scales, sometimes forming a slightly darker terminal field. Claviform sometimes faintly indicated, but usually entirely wanting. Reniform usually consisting of

two black dots. Collar, lower half black, else white. Secondaries snowy white. Beneath clear white, irrorate with a few gray scales.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Texas.

Close to *simplaria*, but evidently distinct by the black lined collar, and the more even pale color. I have seen Mr. Morrison's type, and typical specimens of Mr. Grote's species, and despite Mr. Grote's statement that "this can not be Mr. Morrison's *digna*," the two species are unquestionably identical. Mr. Morrison's type was a fully marked but somewhat faded specimen, while Mr. Grote's material was fresh, but as a whole more lightly marked.

Genus **NOCTUA** Linn

In using the term *Noctua* for the present assemblage of species, I am guided by Guenée's selection, rather than by the result of personal investigation. Linné's original genus has been so subdivided that the very term *Noctua* has been left without a meaning, at least I am not aware that it is now used in a generic sense for any series of species. To some series the term must be applied, and as the breaking up of the *Agrotæ* offered the opportunity, I follow M. Guenée in selecting a series here as typical. Two Linnæan *Noctua* are in the *Normaniana* group, while the European representatives of the same type have several others.

As compared with the preceding, *Noctua* has spinose fore tibiæ; the armature not very heavy; the front is smooth, flat; the antennæ in the male simply ciliate; vestiture hairy, scaly, or mixed; primaries with apices rectangular or rounded; the wings rather broad or subparallel, narrow.

It is allied to *Peridroma* in most of these characters, differing in the wing form, as shown in the table.

Two series or groups, based upon the difference in structure of palpi and in general style of maculation.

Group *Normaniana* has the second joint of the palpi clavate at tip, and the ordinary transverse maculation and spots distinct, while in group *Claudestina* the palpi are equal, and the maculation tends to become obsolete or strigose. The species often have a peculiar sordid depressed or flattened appearance, which is somewhat characteristic.

Group **NORMANIANA.**

Front full, somewhat bulging; anterior tibia spinose, but not heavily armed at tip; the member moderate in length. Antennæ of ♂ simple, pubescent, or slightly serrate, the joints set with fine bristles. *Normaniana* has a long bristle at each side of each joint. Thorax untufted, or with low fore and aft tufts only; never a divided crest; somewhat depressed in the majority of the species. Primaries moderately long, in

the larger part of the species rather obtuse, the apices rounded. The palpi have the second joint always clavate at tip. The normal noctuidous maculation is usually distinct; in a majority of the species the cell between ordinary spots is darker than other portions of the wing, and in none are the spots entirely obsolete, nor is the maculation at any time strigose.

The ♂ genitalia are alike only in two species, and they are so strongly distinct in other points that the resemblance seems casual merely. As a whole the species of this group are less related among themselves than those of almost any other group. A decided feature is the character of the harpes. In other groups these usually show only an unimportant amount of variation; but here, on the contrary, the most unexpected range of variation is found.

The divisions of the group, structural characters not serving, are based on maculation.

Two divisions of similar extent are obtained by separating the species, in which the s. t. line is marked at costa with a dark spot or patch.

The division so distinguished is subdivided according to the shape of primaries. These are in the first instance obtuse, rounded at tip; in the second, the apex is at least rectangular and usually somewhat produced.

In the first subgroup the species are:

Baja, which is well known and common to Europe and the United States. In color it varies from luteous to bright red brown. Characteristic are the very distinct black spots initiating the s. t. line, and forming the only contrast to the otherwise nearly uniform coloration. The ♂ genitalia are distinctive. The harpes are long and broad, apparently formed by the junction of two pieces longitudinally. The superior portion of this combined piece is longer, separately rounded at tip. The inferior portion, also rounded at tip, is excavated or emarginate at the side, the margin somewhat irregular: at the line of junction of these pieces and not far from tip, is a long, curved, acute, corneous hook. At the base of the harpes is a semi ovate raised corneous rim, from the upper margin of which proceeds a short, somewhat circular projection.

Normaniana is narrower winged, paler, yellowish gray in color, the ordinary spots small, the cell between black, thus at once distinguished by its color; it is also distinct by the bristled antenna of ♂, above described. The genitalia are also distinctive. The harpes are long, moderately wide, oblique at tip, from the lower margin projecting a long finger, corneous in consistency. Just behind this finger the side piece becomes suddenly broader, and gives rise to an oblique corneous projection enlarged at tip. This forms the clasper.

Bicarnea is distinct in all respects. Of a deep blackish brown color, the primaries are marked with a distinct reddish brown patch at base, and a smaller, similar patch at costa over t. p. line. The antennæ are simple. The ♂ genitalia are striking. The harpes taper gradually to

the tip where they are abruptly truncate, the angles a little prominent and round. Near the base of this piece is a corneous ridge from which arises a broad hatchet-shaped piece slightly concave at underside.

With *bicarnea* ends the section with apices of primaries rounded. The remaining species of the first division have the apices at least rectangular and usually somewhat produced. *C-nigrum* is a very well known species common to both continents, distinguished by the dark primaries, and the open V-shaped orbicular, which is reddish. The thorax has distinct but low anterior and posterior tufts. The ♂ genitalia consist of broad harpes, the tip of which is oblique, the inferior angle somewhat elongated, the inner side of tip spinulated. The inferior extension of the tip is corneous, and imitates an oblique corneous ridge extending to upper margin and there produced into a short projecting spur.

Hospitalis is well defined from the preceding by the reddish-brown color. The ♀ only is thus far known.

Perconflua is closely allied in maculation, but is a broader winged species, with primaries more evidently trigonate, the apices less produced. Of this species also, I have seen no ♂.

With this species ends the first division: the remainder of the species are divided by color and maculation.

Phyllophora is a large broad-winged species, bright red brown in color, the maculation well defined, the lines irregular. The thorax is rather indistinctly tufted, the basal tuft evident. The ♂ genitalia are decidedly peculiar. The harpes are corneous, incurved around the tip, forming a cavity under the rim, partially covered by an irregular horny plate. A reference to the figure will explain better than words. It is certainly the most remarkable structure known to me in any *agrotid*.

Rubifera is a smaller, shorter winged species, darker, more sordid brown in color, with very regular transverse lines, and hardly contrasting maculation. The genitalia are of a somewhat more normal type. The harpes are broad at base, very abruptly strangulate near tip, the latter oblique, inwardly spinulate, with a bunch of diverging spines at inferior angle. The clasper is distinct, bifurcate, the inferior fork long, stout, regularly tapering to an acute tip. The superior branch is shorter, stouter, curved, also acute at tip.

Oblata, of which *hilliana* is a synonym, is a bright species more yellowish in color, with contrasting, well-defined maculation. The orbicular is large, oblique, and open superiorly. The thorax is distinctly tufted. The ♂ antennæ has something of the moniliform type. The joints fringed laterally by stiff, short hair. The genitalia are distinctive. The harpes are rounded at tip, furnished with a finger-like projection at inferior margin behind which the piece suddenly widens and becomes somewhat corneous, the widened portion gradually merged

into an oblique corneous ridge, from which proceeds a trigonate acute projection.

Rosaria is a small species with narrow primaries. It is very even in color, varying in the shade of yellowish brown, the veins usually darker: the maculation is very indistinct and only the ordinary spots are sometimes yellowish. No ♂ is thus far known.

Rava is aberrant for this or any other group, but the balance of character refers it here. The ♂ antennæ are much as in *oblata*, somewhat moniliform. The color is of a sordid luteous gray, the lines imperfectly marked. The ♂ genitalia are not unlike *bicarnea*, but the harpe narrows more toward tip where it forms a small acute hook. *Umbrata* Paek. is a synonym of this species, as I ascertained by examination of Mr. Paekard's type.

Fennica is of a different type from the preceding. The color is dark, blackish, ordinary spots contrasting yellowish, as is also the hind margin in the ♂. The primaries are long and unusually narrow. The ♂ parts are of a type not uncommon in the genus. The clasper consists of a single, subequal curved corneous hook. The harpes are broad, rather abruptly narrowed before, and obliquely rounded at tip.

Plecta is a small species, bright carmine or deep brown red in color, the costa whitish or yellow, the ordinary spots small, pale ringed. It is a very bright, easily recognizable form with genitalia like *fennica* in all essential points.

Collaris is a well-marked species; the head superiorly and the collar are deep purplish black; the primaries are dark; the transverse lines pale and very even; cell between the spots black. The ♂ genitalia are distinctive. The harpes are corneous, narrowed to tip, where they are furnished with a short spur projecting rectangularly; on the inferior margin, which is irregular, is another short and slightly curved acute projection.

SYNOPSIS OF SPECIES.

Black or dark spots or shade on costa, marking inception of s. t. line.

Apices of primaries rounded.

Color luteous to red brown; cell between ordinary spots not black, the latter large..... BAJA.

Color grayish yellow; cell between ordinary spots black, the latter small,..... NORMANIANA.

Color blackish; superior portion of basal space and a large indefinite costal patch over t. p. line, reddish..... BICARNEA.

Apices of primaries rectangular or somewhat produced.

Color dark; orbicular open; V-shaped discolorous and reddish..... C-NIGRUM.

Color red brown; orbicular complete.

Primaries elongate; t. p. line distinct..... HOSPITALIS.

Primaries shorter, trigonate; t. p. line indistinct, often punctiform..... PERCONFLUA.

No dark costal spots or patch initiating s. t. line.

Collar concolorous or paler.

Color yellow to red brown.

Size large; color bright red brown; t. p. line irregular; orbicular small, pale, round..... PHYLLOPHORA.

Size smaller; color darker, sordid; t. p. line very even, regular; orbicular large, concolorous, irregular, complete	RUBIFERA.
Color bright, more yellow; t. p. line irregular; orbicular oblong, oblique, open superiorly	OBLATA.
Color even, yellowish brown, veins darker, ordinary spots complete; size small, wings narrower	ROSARIA.
Color sordid gray; lines and spots faintly marked; vestiture unusually hairy,	RAVA.
Color blackish; ordinary spots yellowish, contrasting; internal margin in the ♂ pale; primaries narrow, elongate	FENNICA.
Color bright carmine or lake to red brown; costa pale, whitish; ordinary spots small, annulate with white; a dash from base through discal cell black; size small	PLECTA.
Collar dark purplish black; lines very even pale; cell between ordinary spots black	COLLARIS.

Noctua baja. Fabr.

1787. Fabr., Mant. Ins., II, 175, *Noctua*.
 1791. Oliv., Enc. Meth., VIII, 345, *Noctua*.
 1793. Fabr., Ent. Syst., III, 2, 709, *Noctua*.
 1793. Gmel., Ed. Linn., Syst. Nat., 2579, *Noctua*.
 1816. Hüb., Verzeichniss, 222, *Amathes*.
 1834. Hüb., Lep. Eur., Noct. IV, pl. 25, f. 119, *Noctua*.
 1852. Gn., Sp. Gen., Noct. 1, *Noctua*.
 1856. Wlk., C. B. Mus., Lep. x, 396, *Graphiphora*.
 1875. Speyer, Stett. Ent. Zeit., XXXVI, 122, *Agrotis*.
 1876. Grote, Bull. Buff. Soc. N. II., III, 80, *Agrotis*.

Luteous to red brown. Transverse lines all evident, little darker than ground color. The costal spots at inception of s. t. line only, black or blackish. Transverse lines geminate. Basal half line distinct. T. a. line, slightly and evenly convex outwardly. T. p. line very even, sinuate, curve over cell very slight. The outer line is marked with darker venular dots. S. t. line narrow, distinct, very even, parallel to outer margin. Ordinary spots large, concolorous defined by a narrow pale annulus and the slightly darker filling of cell. Reniform slightly constricted at middle, inferiorly shaded with blackish. Claviform very short, illy and usually incompletely defined. Secondaries from pale luteous to dark smoky fuscous. Beneath, powdered with reddish; a common dark extradiscal line and lunate discal spot. Thorax and head concolorous with primaries; abdomen with secondaries.

Expands 36-40^{mm}; 1.44-1.60 inches.

HABITAT.—Europe and United States.

A wide-winged species with rather long and very slightly waved fringes. Easily distinguished by the reddish color and the prominent costal spots at inception of s. t. line; these are usually, black and in the great majority of specimens the darkest part of the wing.

A very remarkable amount of variation is found in this species. Lederer says the anterior tibiae are not spinose. In all the American specimens examined spines are distinctly present, though in some cases well hidden by the vestiture. I have been unable to examine European

specimens, so I can not be certain whether we have not here as in the case of *triangulum* and *normaniana*, distinct species. On the whole, I am inclined to believe Lederer in error, because many specimens casually examined with a lens merely, appear unarmed. As to the amount of variation, that of ground color is remarkable; eastern material is more or less irrorate with red. Western specimens tend to become much more evenly colored, the color a shade of luteous. The primaries are narrower, more equal, and the secondaries have the fringes longer; the palpi are held like those of the *cupida* group, and were it not for the fact that sufficient material is at hand to prove the identity of the eastern and western forms, I might have placed some of the latter into the *cupida* group with a new name, overlooking the inconspicuous spinulation of the fore tibia. A specimen from the Rocky Mountains, received from Mr. Moeschler, would be almost infallibly placed in the *cupida* group without close examination. Mr. Moeschler indeed, whose knowledge of the *Noctuidæ* is certainly considerable, entirely failed to recognize its identity.

It is to be noted here that Speyer, in comparing the specimens of both Continents, speaks of this variability, but comes to the conclusion that they are specifically identical. However, he says also that the anterior tibiæ of specimens from both continents are unarmed.

The species is not rare, but is usually more common northwardly. *Atropos belladonna* has been recorded as a food plant of the species.

Noctua normaniana Grt.

1874. Grt., Trans. Am. Ent. Soc., v, 89, *Agrotis*.
triangulum † Auct.
 1852. Gn., Noct., i, 331, *Noctua*.
 1856. Wlk., C. B. Mus. Lep., x, 390, *Graphiphora*.
 1868. Beth., Can. Ent., i, 86, *Graphiphora*.
 1874. Grt., Trans. Am. Ent. Soc., v, 89, pr. syn.
obtusa Speyer.
 1875. Speyer, Stett. Ent. Zeit., xxxvi, 124, *Agrotis*.

Yellowish gray with a more or less evident rosy tint. Cell, except ordinary spots, black, costal spot at inception of s. t. line also black, very distinct. Maculation else fuscous. Basal line evident, t. a. line geminate, outwardly oblique, but little sinuate; t. p. line geminate, very even, upright, incurved only over cell; the inner line rather narrow, somewhat lunate; outer wider and very even; a row of venular dots just beyond outer line. S. t. line paler, well marked, sinuate, preceded by a brown shade and a few small black dots. An even somewhat diffused dusky shade crosses the median space. Claviform faintly indicated. Ordinary spots concolorous, seldom entirely complete; orbicular irregularly oval, oblique, open superiorly. Reniform narrow, lunate usually incomplete inferiorly. Secondaries smoky fuscous. Beneath powdered with blackish, a marked common line and discal lunule. Head and thorax concolorous with primaries.

Expands 35–39^{mm}; 1.40–1.56 inches.

HABITAT.—Northern and eastern United States, Canada.

This species has been very generally confounded with the European *triangulum*, from which it is nevertheless perfectly distinct. Mr. Grote in describing the species, Dr. Speyer in describing *obtusa*, and afterward Dr. Zeller pointed out the differences in ornamentation, which, however, are not greater than the variation observed in allied species. Mr. Grote found a structural character in the antennæ which have a stout bristle on each side of each joint, beside the usual ciliae. In addition the genitalia of the ♂ show evident differences; they are so nearly of the same type that community of descent is demonstrated, but the inferior finger on the harpes is in *triangulum* reduced to a mere acute spur, and there is no accessory piece furnishing the base of clasper and exceeding the harpe. On the contrary, the clasper arises from the thickened, corneous margin of the harpe and is of almost identically the same shape as *normaniana*.

The peculiar yellow gray color, and the contrasting black cell furnish well-marked characters to separate the species.

Lederer says of *triangulum* "shienen unbedornt." Speyer says this is error, but the spines are very short and indistinct. In our species they are very evident.

Noctua esurialis Grt.

1881. Grt., Can. Ent. XIII, 131, *Agrotis*.

"This species has all the tibiæ spinose. In color it is like *perconflua*, being of a pale ruddy brown over ochery. The stigmata are concolorous, and, as in *Normaniana*, set in a black spot. The orbicular nearly touches the reniform inferiorly, leaving a blackish brown V-shaped space between the stigmata. The orbicular is open to costa, oblique, widening above, preceded by a narrow black shade on the cell. Reniform widening inferiorly, constricted, upright. Lines dark; t. a. line single, marked on costa above the orbicular, sinuate, incomplete. T. p. line indicated by venular dots, as also the s. t. line, which is followed by a faint narrow pale shade and is inaugurated on costa by a curved mark. The species seems to belong to the series of *rubifera*, *perconflua*, *Hilliana*, *conchis*, *Normaniana*. Hind wings pale fuscous, with the fringes and outer edge colored like primaries. Head a little paler than thorax, with the palpi darker at the sides. Abdomen, at the sides and beneath, tinged with rosy brown. Wings beneath tinged with ruddy, especially on the margins and outside of the extra mesial fuscous line. Discal marks indicated."

Expanse 31^{mm}.

HABITAT—Washington. Collected by H. K. Morrison.

Evidently allied to *Normaniana*, but smaller and of a somewhat different color. I have nothing that I could refer to this species in any of the collections studied by me.

Noctua bicarnea Gn.

1852. Gn., Sp. Gen. Noct., 1, 328, *Noctua*.
 1856. Wlk., C. B. Mus., x, 400, *Graphiphora*.
 1889. Butler, Trans. Ent. Soc., Lond., 1889, 383, *Amathes*,
plagiata Wlk.
 1865. Wlk., C. B. Mus., Lep. Het. xxxii, 664, *Mamestra*.
 1882. Grt., Ill., Essay 44, pr. syn.
 1889. Butl., Trans. Ent. Soc., Lond., 1889, 383, pr. syn.

Smoky black, superior part of basal space and a large irregular and ill-defined costal patch over t. p. line carneous or rather pale red brown; ordinary spots with a similar tinge and narrow annuli of same color. Cell of a deeper black. Lines geminate, basal line distinct; t. a. line twice outwardly curved, oblique; t. p. line rather even, illy defined parallel with outer margin; s. t. line pale, punctiform or lunate, very regular; claviform wanting; reniform rather narrow, somewhat irregular, elongate; orbicular narrow, oblique, oblong. Secondaries smoky fuscous. Beneath smoky, with a blackish common line; secondaries paler toward base, powdery, discal lunule present. Collar brown, thorax mixed with red brown.

Expands 37-41^{mm}; 1.5-1.65 inches.

HABITAT—United States, east of the Rocky Mountains.

A very well marked species, easily recognizable by the dark color and the contrasting red brown blotches. The primaries are unusually obtuse.

The initial black patches of s. t. line are, owing to the dark ground color of wing, rather less distinct than usual, but yet always evident.

Noctua treatii Grt.

- 1875 Grt., Can. Ent. vii, 186, *Agrotis*.

“♂. Allied to *A. bicarnea* Gn., smaller and distinguishable by the evenness of the t. p. line. Fore wings dead brownish black. T. a. line rigidly oblique to submedian fold, not rounded as in its ally, and with a less prominent tooth on internal margin. A very faint yellowish shading to the line and also on the costa at the inception of t. p. line, where *A. bicarnea* is strongly marked with carneous. T. p. line shaped as in its ally, but even, geminate, the inner line not scalloped; the component lines include a pale shading. Disc velvety black between the narrow stigmata, which are concolorous with the dead black of the wing. A black shade at base below the median vein. All the transverse lines geminate; the inner of the basal and t. p., and the outer line of the t. a., marked with velvety black. In one specimen there is an absence of the velvety black shades; this one is in imperfect condition and allows of no certain description. Hind wings yellowish gray, paler than in *bicarnea*, with a noticeable terminal darker shading. Beneath with common line and strong lunule on secondaries. Head dark brown on vertex, with pale marginal lines; terminal palpal joints pale; collar brown, with a

black and pale line at base. Legs dark, pale dotted. Thorax brownish black, with pale line at base of tegulae. Abdomen like secondaries."

Expanse 34^{mm}; 1.36 inches.

HABITAT—Massachusetts.

A very close ally of *bicarnea*.

I have seen only a single specimen, which fully agrees with the above description, and this is now in the coll. U. S. N. Mus. It is much larger than given by Mr. Grote, expanding fully 40^{mm}. There is no locality label, and I have no idea where the specimen came from. It is easily known by its resemblance to *bicarnea*, but lacking the carneous shade.

Noctua conchis Grt.

1879 Grt., N. Am. Ent. 1, 43 *Agrotis*.

1880 Grt., Trans. Kans. Ac. N. Sci. VII, 66, *Agrotis*.

1882 Grt., Ill. Essay, 51, pl. 1, f. 8, *Agrotis*.

"All the tibiae spinose. Allied to *C-nigrum*; recalls *Hilliana* by the brightness of the ocher stigmata. Fore wings bright lilac gray, smooth, with a blackish tone. Base ocher, bounded by the half line. Orbicular light ocher, open to the costa, outwardly oblique. Reniform upright, wide at base, with a deep ocher interior ring. Median lines wide apart. Exterior line evenly scalloped, followed by points. Subterminal space darker, with blackish costal shade. Subterminal line followed by a pale shade line. Terminal space like s. t., gray at apices. Disc between and about the stigmata clouded with rich blackish brown. Claviform indicated. Median shade apparent below reniform. Head and collar bright ocher; tegulae brownish ocher; dorsum very pale dusty ocher. Hind wings with a pale ochery ground, shaded with fuscous. Beneath, pale, with common continued scalloped line and discal lunule open on primaries. Abdomen light brownish ocher; breast light brownish; palpi dark brown at sides. Expanse 40^{mm}."

HABITAT—Colorado.

A fair representation of this species is in the Illustrated Essay, showing it to be related to *bicarnea*, from which it differs in the discolorous orbicular, and the want of the brown patch at inception of t. p. line. I have not seen it in nature.

Noctua c-nigrum Linn.

1758. Linn., Syst. Nat. Ed. x, 516, *Noctua*.

1767. Linn., Syst. Nat. Ed. xii, 852, *Noctua*.

1816. Hbn., Verzeichniss, 223, *Megasema*.

1852. Gn., Noct., 1, 323, *Noctua*.

1856. Wlk., C. B. Mus. Lep., x, 389, *Graphiphora*.

1883. Edw., Papilio, III, 133, *Agrotis*.

Smoky fuscous with a red brown shade; basal and terminal space darker; cell blackish; costa between median lines carneous or pale red brown. Basal line single, black, very distinct, terminating in a rather indefinite black patch. T. a. line obsoletely geminate, even, oblique.

T. p. line often entirely obsolete, usually consisting of a double row of venular points. S. t. line pale, often punctiform, best marked by the slight contrast between terminal and s. t. space; the black spots on costa distinct. Claviform faintly indicated, concolorous. Orbicular open superiorly, V-shaped, pale red brown. Reniform kidney-shaped, outlined in black, the inferior portion dusky, superior portion with a reddish shade. Secondaries smoky, paler toward base. Beneath smoky, secondaries paler, powdery, a common line distinct only on costa of both wings. Thorax concolorous; collar testaceous. Thorax with a low anterior and posterior divided tuft.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Europe and North America.

It seems unnecessary to detail the characters of this well-known species: the broad pallid open orbicular contrasting with the otherwise rather dark primaries sufficiently distinguishes it. The European specimens are, as a rule, much paler and more distinctly marked than American examples, else there is no great difference.

The apices of primaries are more distinct than in the preceding species. The life history of the species has been frequently written.

Noctua hospitalis Grt.

1882. Grt., Can. Ent., xiv, 184, *Agrotis*.

1886. Grt., Can. Ent., xviii, 220 = *perconflua*.

Red brown. Basal line distinct, single, darker brown. T. a. line faintly geminate, outer line distinct, blackish, slightly irregular, outwardly oblique. T. p. line geminate, outwardly curved over cell, then parallel with outer margin; outer line punctiform, the dark venular points accompanied by pale dots. S. t. line pale, narrow, very slightly sinuate; dark costal shade at inception, distinct, brown. The median space is slightly darker brown than the rest of the wing and is crossed by an indefinite blackish shade line at outer third. Ordinary spots well sized; orbicular round, annulate with yellowish scales, concolorous. Reniform kidney-shaped, outlined by a narrow, yellow annulus, inferiorly darker, else concolorous. Claviform very faintly indicated. Secondaries smoky yellowish. Beneath smoky, powdered with red along margins; a common extra discal dark line. Secondaries with a discal lunule. Thorax concolorous; head paler with a yellowish tinge.

Expands 37^{mm}; 1.5 inches.

HABITAT.—New York.

A single ♀ specimen, the type, is in Mr. Hill's collection. It is closely allied to the European *brunnea*, but is perfectly distinct from any American species structurally allied to it. From *perconflua* to which Mr. Grote seems inclined to refer it, it differs at once in wing form. The primaries are more elongate and with more distinctly produced apices than in *perconflua*.

Noctua perconflua, Grt.

1876. Grt., Ann. Lye. Nat. Hist. N. Y., XI, 304, *Agrotis conflua* † Grt.
 1874. Grt., 6 Rept. Peab. Ac. 25, *Agrotis*.
 1874. Grt., Can. Ent., VI, 71, *Agrotis*.
 1889. Butler, Trans. Ent. Soc. London, 1889, 382=~~*Graphiphora jucunda*~~, Wlk.

Pale red brown, varying to yellowish red; the colors more or less mottled, never entirely even. Basal line distinct, blackish, obsoletely geminate. T. a. line upright, irregular, outer line black and distinct though narrow, inner line hardly and in some cases not at all traceable. T. p. line geminate, punctiform, its course sinuate. S. t. line distinct pale, sinuate. The costal patch at inception of s. t. line is distinct, red brown in color. There is a dusky median shade most distinct between stigmata. Claviform indicated, never completely outlined. Stigmata well sized, outlined by narrow pale annuli. Orbicular round concolorous. Reniform distinctly kidney-shaped, never constricted at each side of the middle; usually paler, more or less suffused with yellowish dusky in inferior portion. Secondaries pale smoky yellowish. Beneath pale, powdered with red; a distinct dusky extra discal line; secondaries with a discal lunule. Thorax concolorous with primaries, head paler, more yellowish.

Expands 31-33^{mm}—1.2-1.3 inches.

HABITAT.—Northern and Eastern States, Canada, and northward.

This is the nearest approach to *hospitalis* in our fauna and is well distinguished from that species by the obtuse apex of primaries. From *rubifera*, with which the species has been confounded, it is well separated by the shape of the reniform and the costal patch at inception of t. a. line. Unfortunately, I have not succeeded in getting a ♂ of this species. I doubt whether *conflua* occurs in America. I have never seen a specimen. Mr. Grote cites "Anticosti," but his examinations were made before he recognized the distinctness of *perconflua*, and I have seen specimens, undoubtedly this species, labeled *conflua* fide Grote. Mr. Butler says, Trans. Ent. Soc. Lond., 1889, 382, under *Amathus jucunda* Wlk., Lep. Het., x, 399 (*Graphiphora*), "This is the *Agrotis conflua* of Grote's collection, but not of Europe."

It is very probable that Mr. Butler is right, and that Walker's species is either the present species or something very like it. Mr. Grote was not certain as to what was really *conflua*, and he has labeled more than one species with this name. Without knowing exactly what Mr. Grote had as *conflua*, it would be unsafe to substitute *jucunda* for *perconflua*.

Noctua eriensis, Grt.

1878. Grt., Bull. Geol. Surv. IV, 177, *Agrotis*.

"♂ All the tibiæ armed. Size of *manifestolabes* and similarly colored. Ocher and reddish brown. Antennæ simple, and thus differing at once from its ally. Front and collar ochery; thorax reddish brown; anal hairs ochery. Base of primaries and costal region diffusely ochery; else the wing is reddish brown. Lines black, broken, illegible. Stig-

mata faint, shaded with ochery, moderately large. Subterminal line nearer the external margin and more even than its ally, preceded by dark points. Hind wings pale fuscous, with yellowish fringes. Beneath much as in *manifestolabes*, common line and discal points. One specimen, Erie County, New York. (Collected by A. R. Grote, in July.)"

An apparently well-marked species with a resemblance to some forms of *perconflua* and probably somewhat intermediate in size and appearance between that species and *phyllophora*. Not known to me in nature.

Noctua phyllophora Grt.

1874. Grt., Bull. Buff. Soc. N. Sci., II, 61, *Agrotis*.

1889. Butler, Trans. Ent. Soc., Lond., 1889, 382, *Amathes*.

dahlia Beth.

1868. Beth., Can. Ent., 1, 86, *Graphiphora*.

Bright red brown, somewhat roughly scaled; s. t. space and an indefinite median shade, darker; at base and along costa powdered with bluish gray. Basal line distinct, gray; t. a. line geminate included space paler, oblique, thrice outwardly curved in its course; t. p. line geminate, lunulate, outer line more or less punctiform, its course sinuate. A row of gray venular dots follows the outer part of the t. p. line. S. t. line irregularly dentate and sinuate, marked by the contrast between s. t. and terminal space. Claviform wanting; ordinary spots large, of normal shape, indistinctly outlined, paler, centered with ground color. Secondaries smoky; beneath uniform smoky, powdered with red. Thorax concolorous.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—Northern, Middle, and Eastern States..

A broad-winged form, perfectly distinct from any other species structurally allied. Its chief peculiarities have been already referred to.

Mr. Butler cites *alternata*, *varix*, and *variata* as synonyms, but this is a wild reference. Those species are not even generically identical with the present.

It has been usual to refer this as Guenée's var. A. of *dahlia*, but a careful comparison of the description shows that this species could not have been intended, but that a large specimen of *rubifera* must have served as model for the description.

Noctua rubifera Grt.

1875. Grt., Can. Ent., VII, 207, 227, Pl. I. f. 14, *Agrotis*.
rubi Grt.

1875. Grt., Can. Ent., VII, 207, *Agrotis*.
dahlia, var. A.; Gu.

1852. Gn., Sp. Gen., Noct., I, 332, *Noctua*.

1856. Wlk., C. B. Mus. Lep. Het., X, 393, *Graphiphora*.

Dark brown red, varying in depth; s. t. and sometimes terminal space darker; color very smooth, even. All the lines distinct; median lines geminate, of a darker shade of brown. Basal line distinct; t. a. line outwardly oblique, very little outwardly curved between veins; t.

p. line with an outward curve just below costa, thence almost straight to inner margin; the inner line more or less lunulate, the outer remarkably even, forming the boundary of the darker s. t. space; s. t. line very distinct, pale, sinuate. A diffuse dusky median shade most distinct between the ordinary spots. Claviform entirely obsolete, or but faintly indicated. Ordinary spots pale ringed, of good size. Orbicular round, concolorous. Reniform upright, constricted at middle, *the inner inferior angle somewhat extended inwardly*. Secondaries yellowish, fuscous; beneath smoky, powdered with red; a distinct extra discal dark line, and on secondaries a discal lunule. Thorax concolorous with primaries, head paler.

Expands 30–33^{mm}; 1.20–1.32 inches.

HABITAT.—Northern and Eastern States, Canada.

This species has been much confused in collections. I have before me now specimens labeled *rubi*, *rubifera*, *conflua*, and *perconflua*, and for some of these determinations Mr. Grote is responsible. The differences between this species and the European *rubi* have been detailed with painful exactness. Line for line they have been compared, and even *umbrosa* has been brought in; but scarcely one of the numerous differences have proved permanent when a large series of specimens has been compared. Yet the American species undoubtedly *looks* different, though the localization of the difference seems to be almost impossible. A comparison of the ♂ genitalia at once demonstrates the difference of the species; those of *rubifera* are figured; those of *rubi* are much like those of *normaniana*. The harpes are the same, but the clasper consists of one inferior short curved hook and a long corneous ridge forming part of harpe and extending obliquely upward from this hook to the finger-like process on superior margin. Of the very sudden dilation of the harpes so conspicuous in *rubifera* there is no trace. From *perconflua* this species can be always separated by the shape of the reniform, which does not vary greatly. Other differences will at once strike the student comparing the descriptions and figures. It was undoubtedly a large specimen of this species that was mistaken for *dahlia* by Guenee. I have a specimen agreeing perfectly with his comparative description

Noctua oblata Morr.

1875. Morr., Proc. Bost. Soc. N. H., XVIII, 116, *Agrotis*.

hilliana Harv.

1878. Harvey, Can. Ent., x, 55, *Agrotis*.

Bright rusty ochre, shaded with lilac gray, median space darkest; s. t. space with a purplish tint, terminal space paler ochreous. Transverse lines geminate, basal line distinct. T. a. line oblique; a very slight curve to vein 1, then a distinct outward curve to inner margin. T. p. line sinuate, inner line faintly crenulate; S. t. line marked only by the contrast in color between terminal and s. t. space, its course sinuate. Claviform distinctly evident though not completely outlined.

Orbicular very large, oblique, subquadrate, open superiorly; outlined in black, then with a rusty annulus; else paler than median space. Reniform upright, rather elongate and somewhat lunate; outlined in black, then a rusty annulus; a narrow central streak yellow. The cell is the darkest part of the wing. Secondaries yellow, with an exterior purplish shade. Beneath yellow, powdered with red. Thorax distinctly tufted, concolorous with primaries; head and collar yellow; abdomen yellow.

Expands 34–36^{mm}; 1.36–1.44 inches.

HABITAT.—Anticosti; New York; Nevada; California.

A well defined species allied to *perconflua*, but much lighter and with larger spots, the orbicular entirely different in form and characteristic of the species.

I have seen the types of both *oblata* and *hilliana* and find them entirely alike. The species seems confined to the north, or to mountainous regions. Mr. Hill's specimens were from the Adirondacks; the California specimens are from the Sierra Nevada.

Noctua rosaria Grt.

1878. Grt., Bull. Geol. Surv., IV, 172, *Agrotis*.

Pale, somewhat yellowish red brown, of variable intensity. Transverse lines entirely obsolete in the dark specimens, very faintly defined in paler forms; so far as traceable, geminate. T. a. line with a slight, even, outward curve; t. p. line very even, parallel with outer margin. T. p. line pale, sinuate, traceable on all specimens thus far seen. There is a distinct dusky median shade, darkest between the ordinary spots, but even this in dark specimens is hardly traceable. Ordinary spots sometimes concolorous and hardly definable, sometimes very distinct, powdered with yellowish scales, moderate in size, normal in form. Claviform very faintly indicated. Secondaries pale yellow fuscous. Beneath powdered with red, and with a more or less evident common extradiscal line and discal lunule. Head and thorax concolorous.

Expands 29–32^{mm}; 1.16–1.28 inches.

HABITAT.—California.

A very variable little species, no two specimens of which are alike. I have seen no male specimens, and very few females. There is no difficulty in recognizing the species as there is no other Californian form at all resembling it while having the same structural characters.

Noctua rava H. Sch.

1850. H. Sch., Schmett., VI, 59, suppl. f., *Agrotis*.

1860. Moeschl., Wien. Ent. Monatschr., IV, 367, *Agrotis*.
dissona † Pack.

1867. Pack., Pr. Bost. Soc. N. H., XI, 38, *Agrotis*.
umbrata Pack.

1867. Pack., Pr. Bost. Soc. N. H., XI, 37, *Agrotis*.

Sordid luteous gray, even. Lines defined, single, dark fuscous. Basal line interrupted. T. a. line upright, slightly irregular. T. p.

line strongly erenulated, parallel to outer margin. S. t. line diffuse, even. Ordinary spots concolorous, incompletely defined. The orbicular round, reniform normal, but less complete than orbicular. Claviform faintly indicated. Secondaries of a paler shade of same color as primaries. Beneath still paler with indefinite discal lunules and common line. The δ antennæ have a bunch of subequal stiff hair on each side of each joint.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Labrador.

I have compared the type of *umbrata* with the description and figures of Herrich-Schæffer and believe them undoubtedly identical. The species is well defined and easily recognizable. The vestiture, as is usual with northern species, is more hairy and somewhat loose. I have also received from Mr. Moeschler specimens identified by him as *rava*, and they are the same as Dr. Packard's *umbrata*. The suggestion that Mr. Moeschler's *dissona* may be *rava* is wide of the mark. The species seems not rare in its home.

Noctua fennica Tausch.

1837. Eversm. Bull. Soc. Imp. Mosc. I, t. 13, 4 *Noctua*.

1852. Guen., Noct. I, 270 *Agrotis*.

1857. Wlk., C. B. Mus. x, 311, *Agrotis*.

1874. Grt., Can. Ent., VI, 155, *Agrotis*.

Deep dark, somewhat blackish brown; internal margin often more or less reddish yellow; stigmata bright discolorous yellow. Transverse lines geminate, variably distinct; basal line evident; t. a. line even, *inwardly* oblique and somewhat curved: t. p. line erenulate, and somewhat sinuate, as a whole parallel with outer margin. T. p. line pale, more or less punctiform, irregularly sinuate and punctate preceded by sagittate black dashes; the two opposite cell longest. A somewhat darker shade crosses the median space. Claviform distinct very narrow, not reaching middle of median space. Orbicular variable in size, usually rather small, sometimes punctiform, oblique, ovate, or oblong. Reniform always well sized, kidney shaped; at each extremity more or less shaded with dusky. Secondaries whitish, smoky toward outer margin. Beneath powdery, with variably distinct discal spot, primaries with extra discal line.

Expands 40–50^{mm}, 1.60–2.00 inches.

HABITAT.—New York, northward to Alaska.

Readily distinguished by the elongate dark wings and the contrasting ordinary spots. My dates for the species are September.

In the male the internal margin of primaries is discolorous yellowish, in the female concolorous. This sexual difference of color I have not noticed elsewhere in the genus. This is ordinarily a rare species, but a few years ago in Canada and the northern United States there

suddenly appeared in enormous numbers a larva which was soon called the "black army worm," and when bred, disclosed this species. The invasion seems to have ceased as suddenly as it came.

Noctua plecta Linn.

1761. Linn., Fn. Suec., 321 *Noctua*.

1767. Linn., Syst. Nat. ed XII, ii, 851 *Noctua*.

1816. Hübner, Verzeichniss, 223 *Ochropleura*.

1852. Gn., Noct., 1, 326 *Noctua*.

1856. Wlk., C. B. Mus. Lep. x., 406 *Ochropleura*.

1862. Grt., Proc. Ent. Soc. Phil. 1, 218 *Chersotis*.

1874. Morr., Psyche, 1, 22 *Agrotis*.

1889. Butl. Trans. Ent. Soc. Lond. 1889, 384, *Ochropleura*.

Bright carmine or lake to deep red brown; costa yellowish white, sprinkled with carmine scales; a black shade from base through cell to its termination. Transverse lines wanting, s. t. line usually distinct, always traceable, pale, sinuate, variably distant from margin. Ordinary spots small, defined by narrow white annuli; orbicular round or but slightly ovate, center rather darker than ground color. Reniform lunate entirely powdered with white. Secondaries white, outwardly more or less powdered with dusky. Beneath whitish, margins very strongly powdered with red—on secondaries anterior margin only—a common dusky extradiscal line, venular on secondaries; discal lunule more or less evident, sometimes wanting.

Expands 29^{mm}, 1.15 inches.

HABITAT.—Canada to Texas, eastern United States, Europe.

This little species is so well marked, and so unlike any other species that it would not be easy to mistake it. The bright color, contrasting costa and small size are not paralleled elsewhere in the genus. Mr. Butler says *Ochropleura* Hbn. is a mere group of *Amathes* Hbn., and cites *O. vicaria* Wlk., Lep. Het. x, 409 as synonymous.

Noctua collaris G. and R.

1865. Grt. and Rob. Trans. Am. Ent. Soc. 1, 348, pl. 7, f. 53, *Agrotis*.

Smoky dark fuscous, sometimes paler carneous gray, with a purplish tinge. All before and between the ordinary spots, bright velvety black. The transverse lines are very regular, even, pale gray. S. t. space a little darker and by the contrast in color with terminal space, defining the s. t. line, which is irregularly sinuate and dentate. Claviform faintly indicated. Ordinary spots pale ringed, else concolorous. Orbicular variable in size and shape, open superiorly. Reniform variable in size and shape, usually kidney shaped. Secondaries fuscoluteous, uniform. Beneath powdery, with traceable carneous line and discal lunule. Head superiorly and collar rich, deep purplish black; thorax else concolorous.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—New York, northward to Canada.

Very distinct by the very even pale transverse lines, the distinct black cell, and the rich purple black collar. The species is not common and varies somewhat in the direction of an obsolescence of all maculation, though these aberrant forms are not common.

Group CLANDESTINA.

Anterior tibia spinose; of normal length, the spinulation never very heavy and sometimes sparse. The head is proportionately small and considerably retracted, the front smooth. The antennæ of the ♂ are simple in both sexes, somewhat ciliate. The palpi, except in *vocalis*, are subequal, not forming a club at tip of second joint. This is a remarkably constant character, and entitled to considerable weight because it associates species so closely allied and because the clavate form of palpi is in other groups almost universal. The thorax is more or less distinctly depressed in most species, and not at all or but inconspicuously tufted. The abdomen is also as a rule more or less depressed. The primaries are of two types, rather long, narrow, and subequal, the outer margin rounded in *clandestina*, *harile*, *piscipellis*, and *atrifrons*. These species all agree in even color, a tendency to strigose maculation, the more or less marked obsolescence of the transverse lines and the irregular, sometimes obsolete, ordinary spots.

Piscipellis and *atrifrons* have the head blackish brown in front and the ordinary spots entirely wanting. The former is larger, red-brown, and has the s. t. line distinct, pale. The latter is smaller, carneous gray, the median lines unusually approximate, the s. t. line wanting.

Clandestina and *harile* have the front concolorous, the ordinary spots outlined, but usually incompletely so; the orbicular is oval, longitudinal, an irregular projection toward the reniform. In *clandestina* the dark color is even, the transverse lines rather indefinite. In the ♀ there is a remarkable excavation on each side of the penultimate segment of abdomen beneath, more particularly described hereafter. In *harile* the peculiarity is wanting; the color is equally dark, but irrorate with gray, and the transverse lines are very broad and gray, much more irregular than in *clandestina*.

Tepperi, *lubricans* and its variety *beata* have shorter, rather more trigonate primaries, the outer margin still rounded, a broad black shade crossing the collar.

Tepperi is white, with the transverse lines and ordinary spots marked, though not complete. *Lubricans* is dark carneous gray, outwardly shaded with brownish red. The reniform only is faintly marked, and the vestiture is very smooth and somewhat glistening. The variety *beata* agrees with the type in all respects, save that the red is replaced by smoky black.

Vocalis, *pallidicollis*, and *opacifrons* have trigonate primaries, the outer margin oblique, a perceptible though very obtuse angulation being

evident at middle. The transverse lines so far as present are distinct, single, and crenulate.

Vocalis is slightly narrower winged, the ordinary spots not marked; *invenusta* is but a dark form of this species.

Pallidicollis and *opacifrons* are broader winged, the ordinary spots are distinct, more or less marked by a dark shade in cell. In the former species the head and collar are grayish white, the primaries ochereous on disk, the ordinary spots confluent. In the latter the front is blackish, the primaries are bluish gray, the ordinary spots not confluent.

Haruspica and *sierræ* are large, broad-winged species, the outer margin oblique, but rather regularly rounded.

The former has the transverse lines distinct, crenulate; the latter has them scarcely evident, but so far as traceable they are even.

So far as the genitalia of the δ are concerned, they have not been examined in *vocalis*, *pallidicollis*, *opacifrons*, and *tepperi*, females only of these species being procurable.

The other species agree in having the elasper distinct, simple, and corneous, slightly differing in length and degree of curvature. The harpes furnish the variation.

In *lubricans* the entire armature agrees with that of the *inciris* group, with which, by the bye, this species has been heretofore associated. It differs, however, in structure of palpi, the small head and the obtuse primaries.

In *clandestina*, *sierræ*, *haruspica*, and *havilæ* the harpes are alike, regularly tapering to a blunt point and semicorneous.

In *atrifrons* and *piscipellis* the harpes are broad to tip where they are emarginate, the projecting points hardly acute—the superior longest.

Clemens is in some respects intermediate between the *haruspica* and *clandestina* types, approaching most nearly to the *clandestina* series, from all of which it differs by the luteous gray color.

SYNOPSIS OF SPECIES.

Large, broad-winged species, the outer margin of primaries obliquely rounded.

Color, deep smoky brown.

Transverse lines distinct, crenulate or angulate..... HARUSPICA.

Transverse lines obsolete, even..... SIERRÆ.

Smaller species, narrower winged.

Primaries elongate, usually subequal; outer margin rounded.

Collar concolorous.

Front, concolorous; ordinary spots evident.

Color, luteous gray; transverse lines black; interrupted, irregular.

CLEMENS.

Color, deep brown; transverse lines, even, concolorous..... CLANDESTINA.

Color, brown, suffused with gray; lines irregular, broad, gray..... HAVILÆ.

Front discolorous, blackish brown, ordinary spots wanting.

Red brown; s. t. line distinct, pale..... PISCIPELLIS.

Carneous gray; s. t. line obsolete; median lines approximate..... ATRIFRONS.

Collar with a broad, transverse, black shade; wings rather wider.

White; lines blackish; ordinary spots indicated..... TEPPERI.

Deep gray shaded outwardly to red brown or blackish.....	LUBRICANS.
Primaries, trigonate; outer margin, oblique; a distinct angulation at middle.	
Palpi clavate (2d joint), ordinary spots obsolete marked; all concolorous; ash gray to blackish	VOCALIS.
Palpi subequal throughout; broader winged.	
Front blackish; ordinary spots defined, cell blackish; color, gray.	
	OPACIFRONS.
Head and collar pale gray; wings ochereous, with gray margins; ordinary spots confluent.....	PALLIDICOLIS.

Noctua haruspica Grt.

1875. Grt., Buff. Bull., 11, 212, *Agrotis*.
 1875. Grt., Proc. Ac. Nat. Sci. Phil. 1875, 424, *Agrotis*.
 1876. Grt., Bull. Geol. Surv., 11, 214, *Agrotis*.
 1885. Smith, Ent. Amer., 1, 13, *Agrotis*.
 1885. Smith, Stett. Ent. Zeit., 46, 222, *Agrotis*.
 1889. Butler, Trans. Ent. Soc. Lond. 1889, 382, *Graphiphora unimacula* Morr.
 1874. Morr., Proc. Bst. Soc. N. H., XVII, 116, *Agrotis*.
 1875. Grt., Buff. Bull., 11, 212, n. b. 1.
grandis Speyer.
 1875. Speyer, Stett. Ent. Zeit., 36, 122, var *augur*.
 1876. Speyer, Stett. Ent. Zeit., 37, 201 = var *augur*.
 1884. Moeschl, Verh. k. k. zool. bot. Ges.
 1885. Smith, Ent. Amer., 1, 13, an sp. dist., *augur*.
augur Gn.
 1852. Gn., Noct., 1, 325, *Noctua*.
 1856. Wlk., C. B. Mus., Lep. Het., x, 387, *Graphiphora*.

Even dark smoky brown. Transverse lines black, usually distinct, single. Basal line evident. T. a. line outwardly oblique, scalloped between the lines. T. p. line crenulate, parallel with outer margin. S. t. line very faint, pale, irregularly sinuate and dentate. Ordinary spots large, concolorous, of the usual shape, more or less completely outlined by a narrow black line. Claviform barely indicated. Secondaries yellowish fuscous. Beneath smoky powdery, with a common line and discal lunule dark. Head and thorax concolorous, with primaries.

Expands 44^{mm}, 1.75 inches.

HABITAT—Northern and Eastern United States, Utah and Canada.

This species will probably be found everywhere in the North and Northwest. Its large size and somber color, render it distinct.

I have pointed out for the first time in Ent. Amer., i, 13, the real distinctive characters between this species and the European *augur*. Arguments based on size and maculation would have left the matter an opinionative one for all time. The structure of the sexual characters proves the distinctness of the American form beyond all doubt.

Mr. Butler says *augur* is the type of *Graphiphora* Ochs., in which case the application of the name to the *Tawiacampa* series by Mr. Grote would be unwarranted.

Noctua sierræ Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Even smoky brown, all maculation obsolete. The transverse lines are so faintly indicated as to be hardly perceptible. In course they seem much like those of *haruspica*, but are much more even, not scalloped or crenulate. The ordinary spots also are but faintly outlined, of the same general form and size as in the preceding. The secondaries are smoky; beneath as in *haruspica*.

Expands 40-42^{mm}, 1.60-1.68 inches.

HABITAT.—Sierra Nevada, California.

Somewhat more sordid in color than *haruspica*, and with the transverse lines different and less distinct, but otherwise a very close ally.

Noctua clemens Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 41, *Agrotis*.

Pale luteous gray, with black powderings; the vestiture smooth, glistening. Head, collar, and thorax, concolorous, immaculate. Basal line distinct, geminate, black; t. a. line, geminate; outer line, broader, more distinct, the lines irregular, and, as a whole, the line irregularly out-curved and bent in the interspaces. T. p. line, distinctly geminate, interrupted; the inner line consisting of a series of irregular lunate spots; outer line, an almost evenly curved series of distinct venular dots; s. t. line pale, very slightly and irregularly sinuate, the line marked by a distinct, dusky preceding shade; a series of blackish terminal dots. A diffuse median shade darkens the cell between the ordinary spots, and is continued vaguely to the hind margin, varying in distinctness. Claviform wanting. The ordinary spots are vague, indefinite, of a very slightly paler shade than the ground color; the reniform marked with dusky. Secondaries pale smoky, somewhat whitish; the veins fuscous; beneath whitish, powdery, with an outer line and discal spot to all wings.

Expands 38-41^{mm}, 1.50-1.65 inches.

HABITAT.—California (Neumogen.)

The specimens before me are all females, and show all the characteristic features of the *clandestina* group of the genus. The species has no close allies in the group, and while evidently referable near to *clandestina* and *havela* in the table, is in some respects rather intermediate between the type of the group and *haruspica*. The abdomen of the ♀ is not depressed. There is some resemblance to *pyrophiloides* in the habitus, which, however, is not likely to prove misleading.

Noctua clandestina Harr.

1841. Harris, Inj. Insects (Flint ed.), 448, life hist., *Noctua*.
 1869. Grt., Trans. Am. Ent. Soc., II, 309, *Agrotis*.
 1869. Saund., Can. Ent., II, 35 *Noctua*.
 1869. Riley, First Rept. Ins. Mo., 79, f. 27, and pl. I f. 13, *Agrotis*.
 1873. Grt., Bull. Buff. Soc. N. Sci., I, 143, *Noctua*.
 1875. Speyer, Stett. Ent. Zeit., 36, 131, *Agrotis*.
 1881. Riley, Index to Mo. Repts., 55, *Agrotis*.
 1883. Saunders Fruit Ins. 108, f. 106, 107, *Agrotis*.
 1889. Butler, Trans. Ent. Soc. Lond., 1889, 381, = *Spalotis ravida*.
unicolor Wlk.
 1856. Wlk., C. B. Mus., Lep. Het., IX, 233, *Mamestra*.
 1869. Grt. and Rob., Tr. Am. Ent. Soc., II, 77 pr. syn.
 1877. Grt., Can. Ent., IX, 28 pr. syn.

Dark, smoky brown, outwardly a little darker. Transverse line geminate, indistinct, included space concolorous. T. a. line oblique, dentate, and scalloped. T. p. line nearly upright, crenulate. S. t. line entirely wanting, or so indistinct as to prevent its course being clearly traceable. Claviform barely indicated, never completely outlined. Ordinary spots well defined, outlined in black, concolorous or powdered with white. Orbicular ovate, longitudinal, rather small; usually connected with t. a. line by a short spur, and with reniform by a narrow dark line. Reniform of the usual shape, but rather small in size. Along the veins of fresh specimens a whitish powdering can be distinctly traced. Secondaries pale, whitish fuscous. Beneath pale, powdery, a distinct dark discal lunule, and an incomplete common line.

Expands 40-42 mm, 1.60-1.68 inches.

HABITAT.—United States, except Southern States; Canada.

Speyer, in comparing this species with the European *ravida*, discovered a curious and apparently unique structure in the ♀. The penultimate segment of the abdomen of the ♀ has on each side beneath, a deep, smooth depression or excavation, very much resembling in shape a denuded shoulder-tippet (*patagia*). This is peculiar to the species, and though, according to Speyer, indicated in *ravida* and in some other species, is nowhere so well developed. What may be its object is at present unknown. It is scarcely worth while repeating the observed differences in maculation between this species and its European congener, because the American student will not be under the necessity of making the comparison. Dr. Speyer's paper on "Europäische-amerikanische Verwandtschaften" is recommended to the student as worthy of study in these particulars.

After Speyer's careful studies I should scarcely have expected Mr. Butler to refer our species as a synonym to *ravida* absolutely without any explanation. I certainly could not accept this dictum, even if the results of my own studies did not absolutely contradict it. Mr. Butler says that in the Grote collection he found a female labelled *A. pastoralis* Grt. This may be perfectly correct, but *pastoralis* Grt. is an entirely different species from *clandestina* and the label is erroneously placed.

Noctua havilæ Grt.

1880. Grt., Bull. Geol. Surv., VI, 157, var. *clandestina*.

1881. Grt., Papilio, I, 76, an sp. dist.

1881. Butler, Papilio, I, 169, an sp. dist.

Very closely allied to *clandestina* in ground color, shape of primaries, and indeed in general habitus. Distinct by the gray, contrasting median lines which are much more strongly dentate and irregular, and by the general grayish suffusion of primaries. The ordinary spots are less distinctly indicated, but are of the same general shape as *clandestina*. The s. t. line is also much more evident, and tolerably even. Secondaries darker, fuscous. Beneath darker, with the common line and discal lunule distinct and complete.

Expands 39-41 mm, 1.56-1.64 inches.

HABITAT.—Southern California.

This species differs from *clandestina* in the grayish suffusion of primaries and the darker secondaries.

In addition, the ♀ lacks the excavation at the sides of the penultimate abdominal segment. Though closely allied, I believe the species to be distinct.

Noctua piscipellis Grt.

1878. Grt., Can. Ent., X, 233, *Agrotis*.

Red brown, uniform in color; veins often black, transverse lines usually wanting, when present punctiform; s. t. line usually distinct, pale, gray. Ordinary spots obsolete. The t. a. line is not so present as to enable its course to be traced; t. p. line evenly curved, the black dots usually accompanied by pale, gray dots. Secondaries whitish, smoky toward outer margin. Beneath whitish, powdered with reddish toward apices; a distinct dusky common line, no discal spots. Thorax concolorous; front deep blackish brown.

Expands 35-40 mm, 1.40-1.60 inches.

HABITAT.—Colorado, Nevada, Arizona.

A very distinct species. Usually the primaries have the veins marked with black, and this is like the type, but specimens occur almost uniform brown, and in some the t. p. line is tolerably well indicated but always punctiform. The palpi are subequal; the primaries comparatively narrow, outer margin rounded.

Noctua atrifrons Grt.

1873. Grt., Bull. Bull., I, 97, *Agrotis*.

1883. Grt., Trans. Kans. Ac. Sci., VIII, 47, *Agrotis*.

Gray with a reddish tint, veins somewhat marked with black scales, ordinary spots obsolete; median lines often punctiform, unusually approximate; s. t. line very indefinite but traceable. T. a. line evenly

oblique outwardly; t. p. line sinuate, inwardly bent on submedian space and thus approaching the t. a. line. Secondaries whitish, veins dusky. Beneath pale, powdery toward apices; a distinct common line. Front dusky; wings narrow.

Expands 35–38^{mm}, 1.40–1.50 inches.

HABITAT.—Colorado, Arizona, New Mexico.

Closely allied to the preceding, and distinct from it by the somewhat smaller size, the approximate, usually evident transverse lines, and the obsolete s. t. line. An Arizona specimen from Mr. Neumøgen's collection is almost uniform in color, and has a yellowish tint to the secondaries. It seems scarce distinct enough to receive a separate and specific name, though assuredly not typical of the species.

Noctua tepperi Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 452, *Agrotis*.

White, sparsely irrorate with black scales; transverse lines single, fuscous. T. a. line oblique, slightly and rather evenly convex outwardly. T. p. line sinuate, perceptibly angulate over the cell. S. t. line broad, diffuse, unusually remote from, but nearly parallel to, outer margin. A row of distinct terminal dark spots. Ordinary spots indefinite, concolorous. Orbicular small round; reniform moderate, of normal form, rather small, the outer and inferior margin black. Secondaries whitish, darker outwardly. Beneath white, powdery. Thorax concolorous, collar distinctly tipped with black.

Expands 34^{mm}, 1.35 inches.

HABITAT.—Montana.

A very distinct species, easily recognized by the pale color combined with the black tipped collar. A single specimen only in Mr. Tepper's collection.

Noctua lubricans Gn.

1852. Gn., Sp. Gen. Noct., i, 323, *Noctua*.

1856. Wlk., C. B. Mus., Lep. Het., x, 393, *Graphiphora*.

1864. Grt., Proc. Ent. Soc. Phil., iii, 525 = *clandestina*.

1869. Grt., Trans. Am. Ent. Soc., ii, 309, au sp. dist.; *Agrotis*.

Var. beata Grt.

1883. Grt., Ann. Mag. N. H. (London), 1883, 54, *Agrotis*.

1883. Grt., Trans. Kans. Ac. Sci., viii, 54, *Agrotis*.

1885. Smith, Can. Ent., xvii, 6, pr. syn.

Ground color, bluish gray; somewhat glistening. Outwardly shaded from dark red to blackish, transverse lines varying in color to same extent. Basal line evident; t. a. line single oblique, scalloped, distinct. T. p. line hardly distinct, dark, even. S. t. line pale, but little irregular. A distinct median shade line nearest to t. p. line. Claviform and orbicular wanting; reniform faintly indicated by two parallel black marks, not

connected either above or below, and often obsolete. Secondaries pale, outwardly smoky. Beneath pale, powdered with reddish or blackish gray. Collar distinctly black-tipped.

Expands 34^{mm}; 1.35 inches.

HABITAT.—United States, generally; Canada.

A handsome and easily recognized species, occurring in two distinct forms. The eastern specimens have the outer portion of primaries more or less evidently a deep red brown, which in the extreme western specimens is replaced by blackish brown. This latter form was described by Mr. Grote as *beata*. The color is the only difference discoverable between the forms, and that is not sufficient for specific separation. I have seen a number of specimens in which the question as to whether it was *lubricans* or *beata* could only be decided by knowing where the specimens were taken.

Noctua vocalis Grt.

1879. Grt., Can. Ent., XI, 56, *Agrotis*.

1882. Grt., Ill. Essay, 51, pl. 2, f 15, *Agrotis*.

invenusta Grt.

1883. Grt., Trans. Kans. Ac. Sci., VIII, 48, *Agrotis*.

Pale to dark ash gray; transverse lines simple, darker; a distinct narrow longitudinal basal black line. T. a. line upright, evenly denticulate. T. p. line sinuate, crenulate; curved outwardly over cell, and inwardly on submedian space. S. t. line obsolete. Ordinary spots traceable, not distinct, concolorous. Orbicular ovate, a spur extending toward reniform which is normal in size and shape, but very incompletely outlined. Secondaries smoky, paler toward base. Beneath whitish, powdery, darker toward apices; a distinct common dark line and discal lunule. Head and thorax concolorous.

Expands 35–38^{mm}; 1.40–1.50 inches.

HABITAT.—Colorado, Nevada, New Mexico.

The apices of primaries are at least rectangular or even less. The second joint of palpi is distinctly clavate at tip.

I have the type of *invenusta*, and a typical specimen, bearing Mr. Grote's label *vocalis*, and they are undoubtedly identical; *vocalis* is the paler form, the maculation distinct; *invenusta* is darker, the maculation not distinct, but line for line the same. Except the difference in ground color, I find no distinguishing features, and this is not specific.

Noctua opacifrons Grt.

1878. Grt., Bull. Geol. Surv., IV, 170, *Agrotis*.

Gray, often with a reddish tint, cell between the ordinary spots more or less distinctly black. Transverse lines simple, black. Basal line evident. T. a. line slightly oblique outwardly and nearly even. T. p. line strongly crenate, its course parallel with outer margin. S. t. line often

obsolete, sometimes indicated by a slightly darker shade in s. t. space, which then forms a faint contrast in color to the concolorous terminal space. Ordinary spots moderate, concolorous, never complete, marked only by the otherwise blackish cell. Secondaries smoky fuscous, paler toward base; a distinct discal lunule. Beneath pale, powdery, with an ochreous or reddish suffusion, a common dusky shade line and distinct discal lunule. Thorax concolorous, front blackish brown.

Expands 35^{mm}; 1.40 inches.

HABITAT.—New York and northward.

Very distinct from the other dusky fronted species by the broader wings, the rectangular apices and the blackish cell. The very distinctly crenate t. p. line adds a characteristic appearance to the species.

Noctua pallidicollis Grt.

1880. Grt., Bull. Geol. Surv., vi, 154, *Agrotis*.

cinereocollis Grt.

1876. Grt., Buff. Bull., ii, 79, pl. 4, f. 6, *Agrotis*.

1880. Grt., Bull. Geol. Surv., vi, 154, n. b. l.

Ocherous; costal and outer margin of primaries gray. Transverse lines obsolete, barely indicated, simple. T. a. line even, oblique. T. p. line angulate over cell, else parallel to outer margin. S. t. line indicated by the contrast between the s. t., and paler terminal shade. A fine, longitudinal black basal line. Ordinary spots pale, moderate in size, confluent, outlined by somewhat deeper ochreous brown. Orbicular ovate, the outer end extended and connected with reniform. Secondaries whitish, outwardly dusky and with a faint discal lunule. Beneath whitish, ochreous, powdery, with a distinct dusky common line and discal lunule. Thorax concolorous; head and collar grayish white, the latter tipped with ground color.

Expands 34^{mm}; 1.35 inches.

HABITAT.—California.

The only specimen known to me is a ♀ marked "Type" by Mr. Grote. Although the male is not at hand, I have little doubt but that the species belongs here, rather than with *attenta* and *sigmoides* with which Mr. Grote placed it. The palpi are slender and equal throughout; the primaries have the apex rectangular or very slightly produced. In coloration it is unique, and therefore very easily recognized.

Genus CHORIZAGROTIS Smith.

Anterior tibræ spinose, moderately well armed at tip. Front moderate, produced into an acute or cylindrical tubercle. Antenna of ♂ simple, ciliate. Thorax depressed, untufted, or with an indefinite basal tuft only. Abdomen depressed, somewhat flattened; in *terrealis* only, normal. The primaries are elongate, rather narrow, subequal, the apices somewhat rounded. *Terrealis* here also is an exception, the primaries

being proportionately rather shorter, and more trigonate. The δ genitalia of the group are all of the same type, and are decidedly unique. The harpes are narrow, short, tapering towards tip, which is obliquely rounded. The clasper has a long, very stout, somewhat flattened and straight inferior fork, which is also often somewhat enlarged at tip. From the superior margin proceeds a stout, very strongly curved claw, of variable length and shape. This type is common to all species of the group, and is found nowhere else in the genus.

The species are closely allied and care is requisite in separating them.

Auxiliaris, the type of the group is also the best marked of the species; the costa, inner margin, s. t. space, an apical patch, a sub-median dash, and the inferior half of the collar are bright yellow; and this is distinctive of the species. The clasper of δ has the inferior portion long, little enlarged at the tip; subequal. The superior portion is very short, and curved, the tip subacute.

Introferens is very closely allied, but is somewhat smaller and the yellow is sordid; the primaries are also somewhat wider. The δ clasper is distinctive; though much shorter than in the preceding, the inferior portion is yet much heavier, the tip enlarged and excavated, spoon-like. The superior portion is much longer, strongly curved, the tip irregular. *Sorrer* is known to me in the η only; it is much smaller than either of the preceding, and, retaining the same typical ornamentation, replaces yellow by bluish gray.

Agrestis is again a large species but very evenly colored, gray over luteous or buff; the transverse lines are distinct, as are also the ordinary spots; the reniform is inferiorly dusky. The clasper has the inferior portion very long, cylindrical, slightly tapering to the tip, which is not at all enlarged, and while not acute or pointed is yet the smallest point of the process. The superior portion is very short, curved, and rather acutely terminated.

Inconcinna, with the same maculation so far as it is traceable, is more reddish brown, more evenly colored and decidedly smaller. The clasper has the inferior portion moderate in length and slightly and evenly dilated before tip. The superior portion is also moderately long, greatly curved, the tip obtuse.

Terrealis is very distinct in coloration, as has been already noted. The clasper is very nearly like that of *inconcinna*, but the forks are not at all enlarged toward or at tip.

SYNOPSIS OF SPECIES.

Abdomen distinctly depressed; colors fuscous to gray.

Costa, internal margin, s. t. space, sub-median dash and collar bright yellow; size

large AUXILIARIS.

The same portions sordid, luteous; size smaller INTROFERENS.

The same portions bluish gray; size still smaller SORROR.

Primaries uniform in ground color.

Transverse lines and ordinary spots distinct; claviform present, size large.

AGRESTIS.

Transverse lines and ordinary spots very faint; claviform wanting; size much smaller.....INCONCINNA.
 Abdomen less depressed, conic; color dark fuscous brown.
 Costa reddish; cell between ordinary spots black.....TERREALIS.

Chorizagrotis auxiliaris Grt.

1872. Grt., Buff. Bull., 1, 96, *Agrotis*.

1875. Grt., Proc. Ac. Nat. Sci., Phil., 1875, 422 *Agrotis*.

1875. Grt., Bull. U. S. Geol. Surv., III, 118, *Agrotis*.

Fusco luteous; costal and interior margin, s. t. space, except at costa, a submedian dash, and ordinary spots yellow; the latter powdered with white. Median vein white, other veins marked with dusky. A black basal mark, reaching t. a. line; the latter geminate, outer line black, included space yellow, visible only between median and s. m. vein. T. p. line single, punctiform, parallel to outer margin. S. t. line narrow, white sinuate and dentate, an apical whitish patch. Terminal space somewhat darker. Ordinary spots distinct, powdered with white scales. Orbicular oblique ovate, moderate in size. Reniform large, kidney-shaped. All before and between ordinary spots dusky. Claviform distinctly outlined, concolorous reaching almost to the middle of median space. Secondaries smoky fuscous, somewhat paler at base. Beneath dusky, powdery; secondaries more whitish. A common line and discal lunule on all wings. Collar inferiorly yellow. Head and thorax concolorous.

Expands 44-50^{mm}; 1.75-2 inches.

HABITAT.—Colorado, Texas, California.

An easily recognized species: The primaries are unusually elongate and subequal, even for this group, and the bright yellow maculation and whitish ordinary spots are characteristic. This species was in Professor Lintner's collection as *perexcellens*.

Many of the specimens named *auxiliaris* in collections are really referable to the next species.

Chorizagrotis introferens Grt.

1875. Grt., Proc. Ac. Nat. Sci., Phil., 1875, 423 *Agrotis*.

1876. Harv., Buff. Bull., III, 74, pl. 3, f. 10, *Agrotis*

In maculation like *auxiliaris*; but this species smaller in size; the yellow is sordid, often sprinkled with bluish gray, and the balance of the wing is but little darker and not contrasting. Secondaries and under side as in *auxiliaris*. Collar dull luteous.

Expands 40-44^{mm}; 1.60-1.75 inches.

HABITAT.—Colorado, Texas, California, Arizona.

Very closely allied to *auxiliaris*, than which it is much more common. So closely are the two allied that but for the very distinct variance in the male genitalia I should have called them identical; yet

though there is little absolute difference in maculation, the less contrasting colors and sordid appearance of the whole insect readily distinguish the species.

It is more than probable that large specimens of this species are generally found in collections as *auxiliaris*, and indeed I have seen examples so named by Mr. Grote, who in his new list places this species as a variety.

Chorizagrotis sorror Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 453, *Agrotis*.

Color of primaries gray, a more or less evident fuscous tint in median and terminal space; in the former not invading the costal region or hind margin, and leaving a gray dash through submedian space. All between and before the ordinary spots blackish. A black sub-basal spot. T. a. line geminate, dark, included space gray, not crossing costal space, outwardly curved between veins. T. p. line single, crenulate, parallel with outer margin. S. t. line gray, sinuate, marked by the dark terminal space, and a preceding dark shade. Claviform very faintly outlined, concolorous. Ordinary spots gray with dusky center, outlined in black; moderate in size, normal in form. Head and thorax gray; collar with a black line. Secondaries fuscous, veins dark marked. Beneath gray, powdery.

Expands 35^{mm}; 1.4 inches.

HABITAT.—Montana.

Two ♀ specimens from Mr. Hulst furnish the types. The male characters will undoubtedly be found to be much like those of *auxiliaris* and *introferens*, to the latter of which the new form is closely allied. In this group, however, of which *auxiliaris* is typical, the species seem to present absolutely no variation, and the apparent contrary shown in some collections arises simply from the fact that two and sometimes three species are very generally mixed. The maculation and habitus is nearly alike, but structurally the species differ very decidedly in the form of the ♂ genitalia.

In this species the yellow is entirely replaced by bluish gray, and there are no distinct contrasts except in the cell, which is the darkest part of the wing.

Chorizagrotis agrestis Grt.

1876. Grt., Bull. Geol. Surv., III, 118 (var. *auxiliaris*.)

mercenaria Grt.

1878. Grt., Bull. Geol. Surv. IV, 171 *Agrotis*.

flexilis Morr MSS.

Uniform bluish gray over luteous; the latter color very evident in the outer half of median space. All the lines evident, geminate, variably distinct in the specimens. T. a. line widely curved between the veins. T. p. line parallel with outer margin, outer line often very faint. A nar-

row dusky line crosses median space near t. p. line. Outer third of s. t. space and terminal space except an apical patch, darker. The narrow, pale, irregularly dentate s. t. line crosses this darker space. Ordinary spots concolorous or slightly paler, the reniform with an inferior blackish patch. In shape much as in *auxiliaris*, with which the species also agrees in secondaries and under side. Head, collar, and thorax concolorous.

Expands 44–46^{mm}; 1.75–1.85 inches.

HABITAT.—Kansas, Colorado, California, Texas, Nebraska.

Five specimens are before me, each from a different State; one the type of *flexilis* Mon. which so far as I can find was never described. Another labeled *agrestis* by Mr. Grote long since, and still another labeled *mercenaria* also by Mr. Grote. All these specimens differ somewhat in distinctness of maculation, but not otherwise. I have since seen many specimens which prove the correctness of the above reference.

Chorizagrotis inconcinna Harv.

1875. Harv., Buff. Bull., III, 5, *Agrotis*.

Reddish fuscous, densely sprinkled with bluish gray. Ordinary spots concolorous, narrowly outlined in black; then narrowly annulate with white or gray. Reniform with an inferior dusky patch. In shape and size the spots are like those of *mercenaria*. Claviform obsolete. Median lines obsolete; so far as traceable they are like those of *mercenaria*. S. t. line distinct, narrow, pale, sinuate, and irregularly dentate, accompanied by a slightly darker shade. A very faintly traceable shade through median space near t. p. line. Secondaries and under side precisely as in *mercenaria*.

Expands 33–38^{mm}; 1.30–1.50 inches.

HABITAT.—Arizona, Texas.

This species is like *mercenaria* in maculation so far as the maculation is traceable; but the much more uniform, darker color, smaller size, and entire obsolescence of claviform will suffice to distinguish the species, even without reference to the ♂ sexual pieces.

Chorizagrotis immixta Grt.

1880. Grt., Bull. Geol. Surv. VI, 259, *Agrotis*.

“♂ This species is paler than *inconcinna*, the ♂ antennæ more lengthily bristled, the fringes of the hind wings entirely pale. Pale grayish brown, the line indistinct but strongly indicated by double black costal marks. The stigmata small, not dark ringed, paler than the wing, very inconspicuous. The s. t. line relatively well marked, broken. Hind wings whitish with veins soiled, a faint terminal border and the fringes entirely pale; beneath with a dotted sub-marginal line. Fore wings

beneath smoky with an even curved extra-mesial line. Discal marks indicated. Head and thorax pale brown; second joint of palpi blackish at the side. Tarsi dotted."

Expanse 32^{mm}.

HABITAT.—Texas, May 12; Belfrage No. 518 (red label).

"The exterior line on primaries is unusually removed outwards towards the s. t. line. This can not be a form of *auxiliaris*, but it is not improbable that *inconcinna* is a form of that protean and widely distributed species."

I am not at all certain that I know this species. I have never seen any specimen authoritatively determined and I have had two species in my hands to either of which the description may apply, and have named both as *immixta*. One species, named for Mr. Neunloege, from British Columbia, is probably incorrect. Some specimens in the National Museum from the Belfrage collection are probably correct.

Chorizagrotis terrealis.

1882, Grt., Trans. Kans. Ac. Sci. VIII, 47, *Agrotis*.

Dark fuscous brown, costa brick red; cell, except ordinary spots, blackish; a black basal dash. T. a. line geminate, traceable only between median and s. m. veins. T. p. line obsolete; s. t. line indicated by a few pale atoms and the slight contrast between s. t. and the rather darker terminal space. Its course sinuate, hardly dentate. Claviform distinct, narrow. Orbicular ovate, oblique, dark gray. Reniform normal, kidney-shaped, also gray. Secondaries smoky fuscous, somewhat paler toward base. Beneath smoky, secondaries somewhat paler, especially near base, and with a distinct discal lunule. Head and thorax concolorous with primaries; collar inferiorly dark brown.

Expands 37^{mm}; 1.5 inches.

HABITAT.—New Mexico.

This species is very easily distinguished from any of the preceding by the very uniform dark color absorbing the transverse lines, and by the contrasting reddish costa. This form has the abdomen less depressed than either of the others, and thus forms in a manner the connecting form between this and allied groups.

Genus RHIZAGROTIS Smith.

All the tibiae spinose, front rough and protuberant, hardly with a cylindrical projection; antennae of male simple, ciliate. Primaries normally wide, the costal and inner margins not parallel, as in *Chorizagrotis*. The two genera, *Rhizagrotis* and *Chorizagrotis*, agree in the structure of front and fore legs, and are the only genera combining simple male antennae with these characters. The peculiar wing form and habitus of the *auxiliaris* type well separate the species allied to it. With the exception of a single species, which I have named *abnormis*,

and ranked as a group, there is a general tendency to a strigose character of maculation, the ordinary transverse lines becoming more or less obscured, and sometimes entirely wanting. Of these the species ranged under group *aclivis* are dark in color and have the ordinary spots normal, not confluent; the species of group *albalis* are pale, whitish or with a yellowish tinge, the ordinary spots more or less completely confluent.

Group ABNORMIS.

As already indicated, the character separating the single species of this group from the others with which it is structurally allied is found in the presence of the normal noctuid maculation, as compared with the strigate type of the other species.

Rhizagrotis abnormis Smith.

1890, Smith, Trans. Am. Ent. Soc. xvii, 41, *Agrotis*.

The general color is carneous gray, variably shaded or suffused with a more reddish tint. Palpi brown at sides; a broad blackish transverse band at base of collar. Primaries with basal line present, geminate, black, dentate. T. a. line geminate brown or blackish, the inner line faint, included space paler in dark specimens, concolorous in pale examples; upright, outwardly angulate below costa, in the submedian interspace, and again below the internal vein. T. p. line single, or with the outer part of geminate line indicated only by a dusky costal spot and a short dusky shade, its course outcurved over, and very close to reniform, then very evenly parallel to outer margin. S. t. line very slightly paler, outwardly angulated on veins 3 and 6, emphasized by a distinct dusky preceding shade, which in pale specimens sometimes becomes the most prominent feature. A narrow, interrupted, dark terminal line. Claviform very faintly indicated by a few dark scales. Orbicular well sized, oval, oblique, sometimes not completely defined posteriorly, narrowly black ringed, concolorous in pale specimens, paler in darker examples. Reniform narrowly black ringed, of the gray ground color with a more leaden gray filling, prominent inferiorly. Secondaries of the usual dirty gray brown, somewhat paler in the male, discal spot evident. Beneath powdery fuscous, paler in the male, with distinct, though sometimes interrupted outer line and an evident discal spot on all wings.

Expands 34–37^{mm}; 1.37–1.50 inches.

HABITAT.—Sierra Nevada, California. (McGlashan).

The species at first sight seems allied to some forms in the *tessellata* group. The genital structure is different, however, the clasper not being bifurcate.

Group ACCLIVIS.

Anterior tibiae strongly spinose, the terminal armature heavier; front broad, not much inflated, rough, granulate rather than tuberculate. Antennae of ♂ simple or ciliate merely. The primaries are at least

normally wide, the apices rectangular. The ♂ genitalia are variable, agreeing only in that the clasper is always simple, not more than half the length of the harpes; the latter obliquely rounded at tip and inwardly furnished with a row of short spines. The maculation of primaries agrees in the somewhat strigose character, more or less obscuring the ordinary spots, and in the somewhat paler costa, *apicalis* furnishing the only exception to the latter character. The thorax is furnished with evident, though not conspicuous, fore and aft tufts.

The species are few, and they are readily distinguished. *Proclivis* is largest, and is separable at once by the unusually wide primaries, which are also very dark in color; the orbicular is round. The ♂ genitalia are distinctive. The clasper has a very short, acute, inferior projection, the superior hook being moderately long, not greatly curved, and moderately enlarged at tip. The harpes are broadly rounded at apex.

Aclivis is similar but smaller, somewhat paler, the maculation much more distinct, the orbicular is longitudinal, elongate, narrow. The ♂ genitalia are very peculiar. The harpes are much as in *proclivis*, but the clasper is much curved, somewhat flattened, dilated at tip, the dilation concave at inner side, and the whole looking for all the world like a dilapidated soup ladle.

Albicosta is uniformly dark in color, the black cell, and pale costa, and ordinary spots only relieving the uniformity; the orbicular is round. The ♂ genitalia have little in common with the preceding species, but resemble *fennica* in another group. The harpes are long, the tip oblique, with the upper angle acute or drawn-out. Clasper short, stout, dilated at middle, and with a short beak-like twist at tip.

Apicalis is an unique and easily distinguished species, uniform in color, the veins a little darker, transverse lines distinct, unusually close together, and the ordinary spots indistinct. The chief distinctive feature, however, is a blackish shade extending from reniform to apex, giving the species the characteristic appearance to which it owes its name. The clasper is simple, tapering to the tip and tolerably well curved.

SYNOPSIS OF SPECIES.

- Primaries unusually wide; color very dark; orbicular rounded, with a central dot PROCLIVIS.
- Primaries narrower.
- Orbicular elongate, more or less absorbed in the broadly pale costa..... ACLIVIS.
- Orbicular rounded; costal space pallid; cell before and between ordinary spots black; color else dark ALBICOSTA.
- Ordinary spots indefinite; color evenly pale, veins only marked; a distinct broad dark shade from reniform to apex..... APICALIS.

Rhizagrotis proclivis Smith.

1837. Smith, Proc. U. S. Nat. Mus., x, 453, *Agrotis*.

Very dark, smoky brown, or blackish; costal region broadly tinged with red brown; a reddish suffusion accompanying also the t. p. and s. t. line. T. a. line indistinct, nearly upright to vein 1, then with a wide

outward curve to hind margin; the line on close examination is geminate. T. p. line crenulate, narrow, single; its course parallel with the outer margin. S. t. line very faint, irregular, punctiform. Two longitudinal black dashes cross the line opposite the cell and terminate at outer margin. Claviform short, distinct, dark, but somewhat indefinitely outlined. Ordinary spots indistinctly outlined, concolorous with costa, faintly centered with darker scales. All the veins are more or less evidently marked with black scales. Secondaries blackish, towards base paler. Beneath smoky, powdery, all wings with discal spots. Secondaries paler with a distinct extra discal dark line, beyond which the wing is as dark as on primaries. Head and thorax like primaries; patagia with considerable red intermixed.

Expands, 37^{mm}; 1.50 inches.

HABITAT.—Arizona.

Well defined by the dark color and unusually broad wings; there is a suggestion of *herelis* or allies in the habitus that is at first misleading. The simple ♂ antennæ are decisive.

Rhizagrotis acclivis Morr.

1875. Morr., Ann. Lyc. Nat. Hist., XI, 83 (Feb'y), *Agrotis*.
opaca Harv.

1875. Harv., Buff. Bull., II, 72 pl., 3 f. 1 (July), *Agrotis*.

Dark, smoky brown, or blackish; base, costal space, and all beyond t. p. line paler, more luteous, strigose. T. a. line outwardly curved between veins, not traceable above median vein. T. p. line continuous, narrow, slightly crenulate, its course parallel to outer margin. S. t. line punctiform, the dots elongate, whitish, outwardly marked by black dashes; three opposite cell most distinct, and narrowly continued to t. p. line. Claviform short, concolorous, distinctly outlined. Orbicular elongate, narrow, longitudinal. Reniform upright, normally formed. The spots pale, narrowly outlined in black; center slightly darker luteous. Secondaries smoky, paler toward base. Beneath as in the preceding species. Head dark, thorax, and especially the patagiæ, sprinkled with reddish.

Expands, 29–33^{mm}; 1.15–1.30 inches.

HABITAT.—New York (?), Arizona, Texas.

Two specimens of this species, both males, are before me; the type, said to be from New York, is larger and somewhat sordid in appearance—evidently not fresh; the second is from southwestern Arizona, is smaller and very distinctly marked—evidently fresh. The ♂ genitalia are absolutely alike in the specimens, and I have no doubt they are identical, but I do doubt New York as the correct locality for the type. I believe that in this case Mr. Morrison has made a mistake. This species is very like *proclivis*, but is yet undoubtedly distinct. Dr. Harvey's type was evidently much like my Arizona specimen. There is no mistaking the species.

Rhizagrotis albicosta Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 451, *Agrotis*.

Very dark, smoky brown; cell, except ordinary spots and a basal dash, black; costal space and ordinary spots reddish clay yellow. All the veins more or less evidently marked. T. a. line very faintly indicated between median and s. m. vein, else obsolete; t. p. line wanting; s. t. line indicated only by a few indefinite black marks opposite the cell. Orbicular round, small, with a punctiform dark center. Reniform normal, annulate with somewhat paler yellow. Secondaries pearly white, with smoky outer border. Beneath, primaries blackish, secondaries pearly white. Thorax concolorous with primaries, with a somewhat purplish tint.

Expands, 32-42^{mm}; 1.25-1.68 inches.

HABITAT.—New Mexico, Arizona, Colorado foot-hills.

This neatly marked species is very easily recognized by the obsolete transverse lines and the pearly white secondaries.

The Colorado specimens, collected by Mr. Bruce, are distinctly larger and brighter in color, the strigation less evident. The lines are all traceable, but not evident. The habitus remains the same and the generic characters, once recognized, the specific reference is certain.

Rhizagrotis apicalis Grt.

1880. Grt., Bull. Geol. Surv., VI, 153, *Agrotis*.

Almost uniform luteous brown, veins marked with black; a blackish shade from reniform along costa to apex. Transverse lines approximate, narrow, black, even. T. a. upright. T. p. angulate over the cell. S. t. line obsolete. Ordinary spots very faintly defined, concolorous, complete, normal. Two longitudinal dark lines opposite cell from t. p. line to margin. Secondaries smoky; at base paler. Beneath powdery, primaries smoky, secondaries paler. Head and thorax concolorous with primaries.

Expands, 32^{mm}; 1.25 inches.

HABITAT—Colorado, New Mexico.

This is one of the most simply marked and most easily recognizable of our species of "*Agrotis*," but it does not seem to be one of the most common.

Group CLOANTHOIDES.

Anterior tibiae moderately spinose, not so heavily armed at tip. Front full, rather broad, rough, granulate, hardly tuberculate. Antennae ♂ simple, ciliate. Thorax untufted, or at most with an indefinite basal tuft. The primaries are moderate, apices rectangular, slightly produced; the colors are gray and black; transverse maculation obsolete, replaced by longitudinal strigate markings. Ordinary spots either more or less confluent or obscured by the strigae.

The genitalia of the ♂ in the two species of which they are known are after one type. The harpe is moderate in length, decreasing in width to the tip, where it is obliquely truncate. At the inferior margin, near the base of clasper, is a short, acute semi-corneous projection. The clasper is short, stout, straight, or very feebly curved at base, tapering regularly and somewhat rapidly to tip. In *lagena* it is longer than in *cloanthoides*. The species are easily separated.

lagena is at once distinguished by the usually confluent ordinary spots, combined, of a bottle shape; they are always at least approximate, and usually confluent. *Albalis* is separable by the very distinct strigate maculation and strongly dentate dark terminal space.

Cloanthoides is but a synonym of *albalis*, based upon a cleanly marked specimen. Mr. Graef has the type of *cloanthoides* and both the Hulst and Meske collections have specimens named *albalis* by Mr. Grote, and agreeing with his description, which are undoubtedly the same.

SYNOPSIS OF SPECIES.

Collar with a black line; ordinary spots usually confluent, bottle shaped...LAGENA.
Collar unlined; ordinary spots faintly indicated; longitudinal strigose maculation very distinct; terminal space strongly dentate.....CLOANTHOIDES.

Rhizagrotis lagena Grt.

1875. Grt., Can. Ent., VII, 26, *Agrotis*.

Pale yellowish gray; veins more or less marked with black; a black, indefinite basal dash; cell somewhat dusky fuscous, the fuscous streak continued to outer margin. Terminal space somewhat darker, deeply and irregularly indented on all the veins. Transverse lines all obsolete. Ordinary spots distinctly present, narrowly outlined in black, annulate with white; orbicular narrow, elongate, decumbent, usually reaching to and connected with the upright, lunate reniform, giving the combined spots a bottle-shaped appearance. In some specimens the spots are not quite connected, but all that I have seen have them very closely approximated at least. Secondaries white; a narrow dusky line at margin. Beneath powdery, white; an extra discal punctiform dusky line on secondaries.

Expands 38–40^{mm}; 1.50–1.60 inches.

HABITAT.—Arizona, Montana, Utah, California, Nevada.

A very well-marked species allied in appearance to *hollemanii*, belonging to an entirely different group. A specimen of *hollemanii* in Mr. Neumoegen's collection is labeled *lagena* by Mr. Grote. The simple male antennæ will always distinguish this species from the other.

Rhizagrotis albalis Grt.

1878. Grt., Bull. Geol. Surv., IV, 175, *Agrotis*.

cloanthoides Grt.

1880. Grt., Bull. Geol. Surv., VI, 153, *Agrotis*.

Gray, varying in shade, veins strigate with black, median lines lost. A distinct black basal dash; cell slightly dusky, hind margin narrowly

fuscous. Terminal space very irregular, fuscous, projecting a long tooth inwardly opposite cell, and a second on submedian interspace. The space is completely cut on veins 3 and 4 by indentations of the s. t. line, which is marked by black cuneiform spots. Ordinary spots small, indefinite, obscured or entirely absorbed in the strigate maculation; orbicular small, V-shaped, connected by the ochery shading with the small, upright whitish ringed reniform. Secondaries white, with a narrow dusky outer margin. Beneath whitish; powdery.

Expands 32-35 mm; 1.30-1.40 inches.

HABITAT.—Nevada, Colorado.

I have seen the type of this species from Dr. Bailey's collection and the type of *cloanthoides* from Mr. Graef's collection. The former looks like a washed out specimen of the latter, but the markings are identical. I have seen other specimens, principally of the *cloanthoides* form, and believe the type of *albalis* to be a faded specimen, which can not well be matched among fresh material.

Genus FELTIA Wlk.

The distinctive characters of the species grouped under the present term are spinose and quite heavily armed fore tibiae; protuberant, rough front, pectinated or serrate antennae, usually wide wings with dark colors and a tendency to a radiate type of maculation. With this genus begins the series of forms in which the ♂ genitalia are after a single type, so that the type can be used in the subdivisions of the series of species. In the species grouped here, the harpes are as a whole oblong, the sides not straight, but tolerably parallel, the tip obliquely rounded, the margin inwardly set with spinules. The clasper consists of a single, simple, curved hook, variable in length, but very much alike in the species, so that it does not afford very good characters. There is one other—the following—genus which agrees in all these structural features, but differs essentially in habitus and wing form and in which the clypeal projection becomes cylindric, and more developed in type.

I have recognized two groups or series of species, the one, of which *subgothica* is typical, characterized by the open, V shaped orbicular and paler costa, the other, of which *venerabilis* may be considered the type in which the orbicular is complete or at least not open to the costa, and in which the radiate type of maculation is sometimes strongly developed.

There are two aberrant species, *annexa* and *malefida*, with narrow wings and more normal type of maculation, that should perhaps have also ranked as a group and must at least rank as a subdivision of the *venerabilis* series. The species of both groups are confused, and perhaps in the allies of *vancouverensis* the solution here, is not the true one. The difficulty of applying the proper insects to existing names is a consid-

erable one, and owing to the fact that considerable variation exists within the species, their limitation is not easy. In the U. S. National Museum collection are several series of bred specimens which will aid in the study. The ♂ antennæ will undoubtedly aid in the separation of the species as they have done in the *subgothica* series. This group I have most carefully studied and believe the arrangement entitled to be called final. The antennæ of the male here afford valuable guides, and confirm the existing separation of the forms while adding another species in a Texan form that has been variously denominated *subgothica* and *triosa*. Dr. Riley has bred *subgothica*, *jaculifera*, and *herelis*, and the larvæ differ and further confirm the difference of the species. He has in view the preparation of a paper treating these species from the biologic side.

Group SUBGOTHICA.

This group contains species closely allied in general appearance and structure—so closely allied, indeed, that four of them have been generally considered by some as varieties of one and the same species. In structure the species agree in the main with group *reuerabilis*. The tibiæ are all spinose, the anterior broadening somewhat at tip, the terminal spines strong. The front is rugose, broad, and full, apparently alike in the species. The thorax is quadrate, with a distinct, though rather low divided crest. The ♂ antennæ are serrate, differing somewhat in the species. In all these characters the species agree with the *reuerabilis* group and differ from it only in ornamentation—the open triangular orbicular at once separating the species from those of the latter group. The harpes of the ♂ also agree in form with those of the *reuerabilis* group; the clasper is single, long, acute, and but slightly curved.

Of the species, *olivia* is readily distinguished by the white secondaries and constricted reniform. In the remainder of the species the reniform is more or less evidently lunate, and the secondaries are dusky. *Subgothica* is small and pale, the secondaries being dusky only toward the margin. The ♂ antennæ are serrate, the joints on each side with branched spines. *Jaculifera* and *herelis* are both larger, and have dusky secondaries; *herelis* is darker, with a brownish tint, and with the maculation not so distinct, but seems otherwise so closely related that were it not for the differences in the ♂ antennæ I should not hesitate to refer them as identical. In *jaculifera* the joints are much as in *subgothica*, but the branched spines and serrations longer, while *herelis* has the joints very short, broad, with long simple lateral bristles and short spinules and ciliæ.

Pectinicornis, which most nearly resembles *jaculifera*, has the antennal joints like *herelis*, but with longer branches and even longer ciliæ.

In *olivia* the antennæ are more like *jaculifera*. Figures of all these forms are given.

In synoptic form the species stand—

Reniform distinctly constricted at middle; secondaries white	OLIVIA.
Reniform lunate, not constricted.	
Secondaries pale, with broad dusky margin; costa, median streak and s. t. space of primaries caraceous	SUBGOTHICA.
Secondaries blackish brown.	
Antenna ♂ with joints half wider than long, inwardly armed with branched spines, outwardly ciliate. S. t. line and paler space of primaries evident	JACULIFERA.
Antenna ♂ with joints twice as wide as long, on each side with a long bristle and cilia to each joint. S. t. line and pale space of primaries indistinct or wanting	HERELIS.
Antennæ ♂ as in <i>herelis</i> ; but lateral branches twice as long, lateral bristles also longer	PECTINICORNIS.

I have accepted Mr. Butler's identification of Guenee's *jaculifera*. If Guenee confused three species under one name, one of them at least ought to be retained as typical.

Feltia olivia Morr.

1876. Morr. Pr. Bost. Soc. N. H. XVIII, 233, *Agrotis*.

Reddish clay yellow; median vein and outlines of ordinary spots marked with white. An indefinite dark patch at base. T. a. line not crossing costal space; geminate; lunate between veins. Claviform short, outlined in black. Cell, except ordinary spots, blackish. Ordinary spots concolorous. T. p. line wanting. A paler apical patch. S. t. line traceable, inwardly marked by black saggitate spots, outwardly by the dark terminal space. Fringes dusky, a yellow line at base. Secondaries pearly white, veins and margins smoky. Beneath gray, powdered with blackish, both wings with discal lunule.

Expands 39^{mm}, 1.5 inches.

HABITAT.—Utah.

The species is very easily distinguished from the others in this section by the character given in the table. The serrations of the ♂ antennæ are also longer, and rather more like pectinations than in any of the other species save *pectinicornis*.

One specimen only (the type) from Mr. Tepper's collection.

Feltia subgothica Haw.

1829. Steph., Ill. Br. Ent. Haust., II, 126 pl. 22 f. 3, *Agrotis*.

1839. Wood, Ind. Ent., 36, pl. 9 f. 149, *Agrotis*.

1856. Fitch, First and Second Rept. Ins., N. Y., 314, pl. 3, f. 1, *Agrotis*.

1873. Grt., Buff. Bull. I, 99, *Agrotis*.

1874. Lintner, Ent. Cont. III, 161, *Agrotis*.

1882. Riley, Papilio II, 41, *Agrotis*.

1883. Saund., Fruit Ins. 328, f. 329, *Agrotis*.

jaculifera var., Gn.

1852. Gn., Sp. Gen. Noct. I, 262, pl. v f. 4, *Agrotis*.

1856. Wlk., C. B. Mus., Lep. Het. X, 327, *Agrotis*.

1869. Riley First Rept. Ins. Mo. 82, pl. 1, f. 11, *Agrotis*.

1873. Grt., Buff. Bull. 1, 99, pr. syn.
 1881. Riley, Index to Mo. Repts., 52, pr. syn.
 1882. Riley, Papilio II, 41, *Agrotis*.
duccus Wlk.
 1856. Wlk., C. B. Mus., Lep. Het. IX, 203, *Feltia*.
 1868. Grt. and Rob., Trans. Am. Ent. Soc., II, 77, pr. syn.
 1869. Bethune, Can. Ent. 1, 86, pr. syn.
 1889. Butler, Trans. Ent. Soc. Lond., 377, pr. syn.

Ground color gray, with a smoky tinge; costal space, median vein, internal margin and s. t. space more or less densely flecked with white scales. Basal line distinct on costa, outwardly oblique to median vein, then inwardly angulate, distinctly white across the subbasal dark space. T. a. line straight from median to submedian vein, then with a wide outward lunation to hind margin. Claviform reaching middle of wing, blackish, surmounted by a pale streak. Cell, except ordinary spots, blackish. T. p. line lunulate, single, often indistinct, its course sinuate. A dark subapical patch. Terminal space blackish. S. t. line marked with deep black spots, strongly indenting the terminal space on veins 3 and 4. Orbicular of the same color as costal space; reniform discolorous, yellow, with a somewhat darker center. Secondaries pearly white, veins and outer margins smoky. Beneath, primaries blackish, inner margin paler; secondaries as above. Collar with narrow alternately dark and paler lines; patagiæ pale yellowish white, margined with smoky black.

Expands 31–37^{mm}; 1.25–1.50 inches.

HABITAT.—United States and Canada.

This is one of our most common species, and variable as it is in size, brightness of color and comparative depth of the pale and dark shades, the maculation is yet remarkably constant. Western specimens are as a rule somewhat larger and darker than the eastern material. Characteristic is the deep indentation into the terminal space made by the s. t. line on veins 3 and 4, and by this character alone the species can be distinguished from the others often confounded with it. The white secondaries and generally paler color are also characteristic.

Feltia jaculifera Gn.

1852. Gn., Sp. Gen., Noct. 1, 262, *Agrotis*.
 1869. Riley, First Rept. Ins. Mo., 82 f. 29 b, *Agrotis*.
 1873. Grt., Buff. Bull. 1, 99 = *subgothica*.
 1881. Riley, Index to Mo. Repts., 55 = *tricosa*.
subgothica † Pack.
 1869. Pack., Guide, 306, f. 238, right-hand fig.
 1883. Saund., Fruit Ins., f. 329, right hand fig.
tricosa Lint.
 1874. Lint., Ent. Cont. III, 159, *Agrotis*.
 1875. Harv., Buff. Bull. III, 5, *Agrotis*.
 1882. Riley, Papilio, II, 44 = var. *subgothica*.
 1883. Grt., Proc. Am. Phil. Soc. XXI, 156, an. sp. dist. ?
 1889. Butl., Trans. Ent. Soc., Lond., 1889, 377 = *jaculifera*, type.

Of the same general appearance as *subgothica*, but differing as follows: The color is more even, the contrasts less distinct. Median vein not white; claviform short, outlines only black. S. t. line not indented on veins 3 and 4, and as a whole nearer the outer margin. The reniform also is not discolorous, but of the same color as are the light shades. There is a strong reddish tint in primaries, and the secondaries are entirely dusky.

Expands 35–37^{mm}; 1.40–1.50 inches.

HABITAT.—United States east of Rocky Mountains; Canada.

The above differences are constant, and may be relied upon to distinguish the species from *subgothica* under all circumstances. It is not so common as *subgothica*, though like it, frequents golden rod in the daytime.

The above synonymy is given on the authority of Mr. Butler, who says positively “*tricolor* Lint., is typical *jaculifera*; *herelis* is a poor variety.” Under all circumstances Guenee’s name must stand for one of the forms, since he had all three before him, and as *herelis* was first separated, the name would ordinarily be applied to the *tricolor* form. The Texan form which I have called *pectinicornis* was probably not before Guenee when he wrote. I think, however, that Harvey had this form from Texas as the basis of his note in Buff. Bull. 117, 5.

Feltia herelis Grt.

1873. Grt., Buff. Bull. 1, 99, *Agrotis*.

1874. Lint., Ent. Cont. 111, 160, *Agrotis*.

1882. Riley, Papilio II, 44 = *subgothica*, var.

1883. Grt., Proc. Am. Phil. Soc. XXI, 156, an. sp. dist.

jaculifera Gn. var. B.

1852. Gn., Sp. Gen., Noct. 1, 262, *Agrotis*.

1873. Grt., Buff. Bull. 1, 99, pr. syn.

The differences in maculation between this species and *tricolor* are difficult to define, though the insect is at a glance separable, and undoubtedly a distinct species. It is usually larger, darker, somewhat purplish in color, the costa and orbicular often entirely concolorous. The reniform varies from yellow to concolorous with the paler parts of wings pale median dash always present, and reaching the t. p. line. Secondaries almost uniformly blackish.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—With *tricolor*.

As a whole this species is larger and somewhat more robust than the preceding. The structure of the ♂ antenna is easily made out, and is the best character to distinguish it. The t. a. line in this as well as *tricolor* differs from that of *subgothica* in being oblique instead of straight across the space between median and submedian veins. From *pectinicornis* this species differs in the antennal structure, as well as in the uniform, darker color.

Feltia pectinicornis sp. nov.

This species is intermediate in appearance between *subgothica* and *jaculifera*. In details of maculation it is very like *jaculifera*, while the color is more like *subgothica*; from both the antennal structure separates it. On an average it is smaller than either of its allies. It lacks the dentations on veins 3 and 4 which characterize *subgothica*, but has the paler, strigate costal region, and the black markings in the interspaces between veins 2 and 3, 3 and 4, and 4 and 5, extending from the median vein to the t. p. line. The claviform is short, as in *jaculifera*.

Thus far I have seen the species from Texas only.

Feltia evanidalis Grt.

1878. Grt., Bull. Geol. Surv. IV, 172, *Agrotis*.

"Allied to *subgothica*, a little stouter than that species, paler colored, and the antennæ are more strongly bristled. Thorax and abdomen soiled pale ochery. Fore wings colored like *subgothica*, the claviform shorter, surmounted by a broad, pale stripe, which extends to internal angle; reniform more rounded, stained with light yellow; subcostal, median, and submedian veins striped with white at base. Orbicular whitish, triangulate, absorbed superiorly, subterminal space and terminal much as in *subgothica*. Hind wings whitish, with broad diffuse borders. Beneath pale, with discal points; those on primaries pale ringed. Size of *subgothica*, or a little larger. California."

Seems a good species but is entirely unknown to me. It may be the Californian representative of the other species of this group, though in all the Californian material in the Museum and which I have lately received from Messrs. Edwards and Neumoegen there is nothing to correspond with it, though *subgothica* is represented in all sendings.

Group VENERABILIS.

All the tibiæ spinose; anterior pair slightly abbreviated, flattened, the terminal armature heavy and claw-like. Front broad, full, pitted or slightly tuberculate, differing in the species, and even in the specimens of the same species, never smooth. The antennæ of the ♂ are pectinate or evidently serrate and bristled. The harpes of the ♂ are moderate in length, rather broad, oblique at tip, the angles rounded. The clasper in the majority of species is rather short, stout, and not greatly curved. *Stigmosa* has it somewhat longer, but of the same general shape, while *annexa* and *malefida* agree in this respect precisely with the *subgothica* group. The body is stout, robust, the vestiture thick and long, hairy. The thorax is quadrate, convex, and in well-preserved specimens a distinct though not prominent longitudinal crest is evident. Except in the comparatively narrower and shorter wings no decided structural character seems to separate this group from *sub-*

gothica and allies, but the style of maculation is entirely different in most species, and they all have either the orbicular entirely complete or entirely obsolete. The costa is never pallid, but on the contrary, where there is any difference in general shade, the costal region is the darkest portion of the wing. Two well-defined subgroups are indicated by the antennal structure. In the first, the antennæ (δ) are distinctly bipectinate, the pectinations ciliate, in the second they are serrate, the serrations furnished with branched spines. In no two species are the δ antennæ exactly alike; but as they vary to an extent in specimens of the same species, and as the variation is one of degree rather than kind, the character is not one made use of here, except in instances where species else not easily separable can be thus readily distinguished.

The species with pectinate antennæ are but three in number, and are readily distinguished. *Circumdatus* is recognizable at a glance by the reddish brown terminal space and inner margin, as well as the oblong upright discolorous reniform. *Gladiatoria*, of which *morrisoniana* is a synonym, is distinguished by the pale venular streaks, showing some resemblance to *subgothica*, especially in the distinct pale streak surmounting the claviform. The s. t. line is always visible, pale in color, and preceded by a series of sagittate black spots. *Venerabilis* is a darker species, often considerably powdered with white or gray; the veins are narrowly marked with black, the transverse maculation obsolete.

From the species in the second division of the group, *annexa* and *malefida* may be separated by the longer, acute elasper of the δ , as well as by the larger, more distinct head and more elongate primaries. *Annexa* is always readily known by the small ordinary spots, connected by a neat distinct black dash. In *malefida* the ordinary spots are large, and not connected.

Of the remaining species, *gravis*, of which *vapularis* is a synonym, is distinguished by its small size, and the annulate ordinary spots. The reniform is somewhat constricted, and at its inner inferior angle often sends out a slight spur, sometimes connecting with the orbicular. *Vancouverensis*, of which *semiclarata* is a synonym, is an exceedingly variable species, scarcely two specimens being alike. The color varies from dirty reddish yellow to bright yellow brown, often irrorate, with bright purplish gray scales. Usually a deep black claviform is a prominent feature in the appearance of the specimens, but sometimes this is hardly traceable. From *gravis* the species is distinguished by the larger size and lack of pale annuli to the ordinary spots. The paler forms of this species I have often seen in collections labeled *aeneipennis*. Indeed, Mr. Grote himself is not guiltless of some errors of this nature in collections. The type of *aeneipennis* is more evenly colored, with obsolete maculation, and with much broader and more lengthily bristled δ antennæ. *Volubilis*, of which *stigmosa* is a synonym, also varies greatly, some of its variations coming close to some forms of *vancouverensis*. It

may be distinguished by the usually ovate orbicular, and the strongly dentate s. t. line which is often wanting. In *vancouverensis* the s. t. line is lunate, but tolerably even and always traceable.

The following table will illustrate the differences:

Male antennæ distinctly bipectinate.

Terminal space, ordinary spots, and inner margin of primaries discolorous, reddish; ground color, blackish brownCIRCUMDATA.

Terminal space of primaries concolorous.

Transverse lines and ordinary spots obvious, veins more or less relieved by paler streaksGLADIARIA.

Transverse lines and orbicular obsolete, costal margin, claviform and veins blackish; else dirty yellowish gray.....VENERABILIS.

Male antennæ serrate, bristled and ciliate; not pectinate.

Head rather small, retracted, primaries proportionately short and narrow. Secondaries dusky.

Ordinary spots distinctly annulate with pale yellow, reniform constricted, inferiorly produced inwardly into an acute tooth often reaching the orbicular.....GRAVIS.

Ordinary spots not annulate with pale.

Primaries somewhat narrower.

Orbicular round; s. t. line rather even, though somewhat variable. Claviform distinct, usually black or darker than ground color..VANCOUVERENSIS.

Maenlation indistinct, as in preceding; color yellowish; antennæ of ♂ more strongly serrate, bristles longer.....AENEIPENNIS.

Primaries wider; orbicular usually ovate; s. t. line often lacking; when present very irregular, strongly dentate.....VOLUBILIS.

Head wider, more free, primaries proportionately longer and narrower. Secondaries clear pearly white.

Orbicular small, round, connected with reniform by a distinct black dash. Claviform faintly outlinedANNEXA.

Orbicular larger, outwardly extended; no black connecting dash; claviform very large, distinct blackMALEFIDA.

Feltia circumdata Grt.

1883. Grt. Ann. Mag., N. H. (Lond.), 1883, 53, *Agrotis*.

1883. Grt., Trans. Kans. Ac. Sci. VIII, 54, *Agrotis*.

Thorax and primaries smoky blackish brown. Primaries with terminal space evenly yellowish or leather brown, joining a broad band of similar color along inner margin. Ordinary spots distinct discolorous leather brown. Transverse lines indistinct geminate. T. a. line very strongly angulate. T. p. line lunulate, its course sinuate. Secondaries fuscous with reddish or violet fringes. Beneath, powdered with reddish; a common extra discal line, and distinct discal dot on each wing. Abdomen brownish fuscous, antennæ yellow.

Expands 31-34^{mm}; 1.25-1.35 inches.

HABITAT.—New Mexico.

This species is so distinct that a lengthy description is unnecessary. The introduction and synoptic table give the differences from other species.

Feltia gladiaria Morr.

1874. Morr., Pr. Bost. Soc. N. H. xvii, 162, *Agrotis*.
 1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 59, *Agrotis*.
 1880. Grote, Bull. Geol. Surv. vt, 163, *Agrotis*.
morrisoniana Riley.
 1874. Riley, Pr. Bost. Soc. N. H. xvii, 286, *Agrotis*.
 1874. Morr., Pr. Bost. Soc. N. H. xvii, 214, *Agrotis*.

Smoky blackish fuscous, often paler; veins pale, most evidently so below the middle; transverse lines indistinct; t. a. line geminate, lunate; t. p. line even, lunulate; s. t. line even, pale, preceded by very distinct black sagittate dashes. Claviform elongate, pale ringed; reniform very large, usually not entirely closed below, but entered by the pale dash along median vein. Occasionally the spots are connected. Beneath evenly gray, distinct discal lunules on each wing. Secondaries above dirty fuscous or smoky.

Expands 30–32^{mm}; 1.15–1.25 inches.

HABITAT.—East of Rocky Mountains.

A common and widely distributed species, often found in September on golden rod during the day. The inward inferior tooth of the reniform recalls *gravis*, while the very distinct median pale dash gives an idea of *subgothica* and allies.

Examination and comparison of the types proves the identity of *morrisoniana* with this species. There is absolutely no perceptible difference between them.

Feltia venerabilis Wlk.

1856. Wlk., C. B. Mus., Lep. Het. x, 328, *Agrotis*.
incallida Wlk.
 1856. Wlk., C. B. Mus., Lep. Het. x, 330, *Agrotis*.
 1869. Grt. and Rob., Trans. Am. Ent. Soc. II, 78, pr. syn.
 1889. Butler, Trans. Ent. Soc. Lond. 377, pr. syn.

Primaries fuscous brown, often densely sprinkled with gray scales; costal region blackish, a very narrow blackish terminal space, limited by the very irregular and strongly dentate s. t. line. Other transverse lines obsolete; claviform outlined; reniform finely outlined, filled with the costal dark shade; orbicular sometimes not traceable, when present narrow, elongate, often connected with reniform by a narrow neck-like process; veins narrowly black; secondaries brownish to blackish fuscous. Beneath powdery fuscous or dark gray. Collar blackish. In pale specimens the thoracic vestiture is strongly intermixed with white.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Canada, Eastern and Middle States.

Not uncommon, and also a day flyer. The obsolescence of the transverse maculation and the darker costal space makes this an easily recognized species.

Feltia gravis Grt.1874. Grt. Buff. Bull. II, 155, *Agrotis*.1875. Grt., Can. Ent. VII, 25, *Agrotis*.*rapularis* Grt.1876. Grt., Buff. Bull. III, 81, *Agrotis*.

Color varying from carneous gray to dark blackish brown. In the darker specimens the color is even, in the paler forms the costal region is darker. Transverse lines always traceable, though not very distinct; t. a. line geminate, upright, and very slightly irregular; t. p. line crenulate, usually followed by a row of venular dots; s. t. line punctiform, spots yellowish, preceded by sagittate dashes. Claviform reaching middle of wing, distinctly ringed and usually filled with black. Ordinary spots distinct, pale ringed; orbicular moderate in size, variable in form; reniform large, constricted at middle, with a more or less evident inward projection inferiorly, which sometimes takes the form of a narrow yellow line, reaching to orbicular or even the t. a. line. Secondaries smoky to blackish fuscous. Thorax and head like primaries. Beneath powdery, with distinct extra discal line and discal spot on all wings.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—California.

I have typical specimens of both the species, and have no doubt of their identity. The pale form is *gravis*, the dark form *rapularis*. A series of ten specimens completely fills the gap between the extremes and shows them to be only variations. In structure they are identical.

Feltia vancouverensis Grt.1873. Grt., Buff. Bull. I, 134, pl. 4, f. 4, *Agrotis*.*hortulana* Morr.1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 430, *Agrotis*.*semiclarata* Grt.1881. Grt., Can. Ent., XIII, 132, *Agrotis*.1882. Grt., Ill. Essay, 52, pl. 1, f. 9, *Agrotis*.1889. Butl., Tr. Ent. Soc. Lond., 1889, 378, *pr. syn.**clodiiana* Grt.1881. Grt., Papilio I, 76, *Agrotis*.1882. Grt., Ill. Essay, 52, pl. 1, f. 10, *Agrotis*.

Varies from leather brown to deep red brown, often strongly irrorate with gray or white scales. T. a. line obsolete; t. p. line single, crenulate, of a deeper shade of brown than ground color, outwardly curved at inception, then parallel with outer margin. S. t. line indefinite, often punctiform, marked usually by the somewhat darker terminal space, and a row of preceding sagittate dashes. A more or less defined median shade crosses the wing somewhat beyond the middle. Claviform always distinct, reaching near to the middle of the wing; usually outlined and filled with black, but often only of a deeper shade of the ground color. Ordinary spots distinct, of ground color, defined by a

whitish (never yellow) annulation and by the darker, usually black space filling the cell between. Median vein often with pale line. Secondaries fuscous. Beneath powdery, with indefinite common line, and distinct discal lunule. The thoracic vestiture is usually considerably intermixed with whitish hair.

Expands 35–40^{mm}; 1.40–1.60 inches.

HABITAT.—Vancouver, California, Colorado, Washington, Utah.

A decidedly variable species, the pale more unicolorated forms of which are usually marked *aeneipennis* in collections.

The type of *vancouverensis* is large and fully marked; that of *semiclarata* smaller, and with the transverse markings obsolete. A series of eighteen specimens proves the undoubted identity of the forms. *Clodiana* also is but a form of this species with the maculation somewhat obscured. The figure in the illustrated essay is very poor. *Hortulana* Morr., is one of the forms allied to *aeneipennis*. To give a better illustration of the forms, the original description of each is reproduced."

Agrotis vancouverensis Grote.

"♂ Light brown with pale shadings. A very broad distinct basal dash, widening outwardly, extends into the median space, apparently concealing the claviform. T. a. line strongly dentate inferiorly. Discal spots set in the black filling of the cell. Transverse posterior line unusually sharply denticulate; the pale subterminal line preceded by large cuneiform brown marks. An interrupted black terminal line on the margin; fringes light brown. Hind wing fuscous without markings, save from the reflection of the black and distinct discal titure of the under surface; fringes as on primaries. Beneath fuscous without markings except the discal spots, which are unusually broad on the secondaries. Thorax above brown with darker lines on the collar."

"Expanse 40^{mm}.

"HABITAT.—Vancouver's Island.

"A rather large, broad-winged species, allied to *A. obeliscoides* and *A. venerabilis*, differing by the dentate and distinct transverse posterior line."

Agrotis hortulana Morr.

"Expanse 37^{mm}. Length of body 15^{mm}.

"Eyes naked. Antennæ of the male serrate, with the serrations pubescent. Front and vertex yellow brown. Collar with a brown central line. Thorax yellowish gray, with a dorsal divided tuft. Abdomen rounded, untufted; the lateral tufts brownish.

"Anterior wings uniform, faded yellow gray, with the ordinary markings nearly obsolete; veins darker than the ground; traces of the ordinary spots; the subterminal line is faintly seen, preceded by a series of faded enneiform marks. Posterior wings white. Wings beneath uniform whitish gray."

"HABITAT.—San Francisco, California.

"This species seems to be distinct from the numerous Californian species published by Mr. Grote, many of which are unknown to me."

I have seen this species—I think in the Cambridge collection—and it is as I stated on a previous page one of the obscurely marked forms of *vancouverensis*.

Agrotis semiclarata Grt.

"♂ ♀ Allied to *gravis* and *vancouverensis*, smaller than the latter and without the pale cast of *gravis*. A thick, dark brown basal dash extending into the claviform, and faintly cut by the t. a. line. Rich brown, with the costal region (especially in the ♂) suffused with darker. Spots concolorous; cell shaded with black. S. t. line pale, without the small teeth at the middle and below apices of its allies. Head and collar rich yellow brown; tegulae shaded with pale, but not so pale as in *gravis*. Beneath the costal half of secondaries is fuscous, leaving the lower portion of the wing, including the border, pale; a spot and common line. Above the hind wings are fuscous and rather dark in both sexes. This species may be known by the hind wings beneath being half pale, including the lower portion of the border, which is usually darker. The three species, *gravis*, *vancouverensis*, and *semiclarata* are nearly allied; their eastern allies seem to be *colubilis*, *venerabilis*, and *stigmosa*."

The figure in the Illustrated Essay is very characteristic and recognizable, and renders determination easy. Butler says it is the ♀ of *vancouverensis*, but I have seen both sexes of the form.

Agrotis clodiana Grt.

"♂ All the tibiae spinose; fore tibiae with longer terminal spines. Eyes naked. Antennae brush-like. Allied to *gravis*, but without the distinct stigmata. Fore wings of a curious purplish brown, with a shading of yellowish. Orbicular small, concolorous, round, with a paler yellowish annulus; reniform concolorous, transverse, moderate, ringed like the orbicular. Claviform indicated, small median shade, blackish, diffuse. Lines illegible; fringes with a narrow, pale yellowish line at base. Hind wings pale, soiled with fuscous along the margins. Head and collar russet brown, collar with a pale line above a deeper shade; thorax mixed pale and brown. Beneath fore wings dark; hind wings pale, with discal marks and faint common line."

"Expanse, 38^{mm}. Washington Territory.

"A female specimen, also collected by Mr. Morrison, probably belongs here. The fore wings are entirely obscure yellowish brown, with the markings lost."

The figure of this species in the Illustrated Essay is poor, but yet recognizable and renders identification certain.

Feltia aeneipennis Grt.

1876. Grt., Buff. Bull. III, 81, *Agrotis*.

Leather brown, with all maculation subobsolete; but so far as traceable it is the same as in *vancouverensis*. The claviform, however, is barely traceable, and never forms a prominent feature in the specimen. The thoracic vestiture is somewhat less even and looser, but else I can find no distinctive feature, except the form of antennæ to separate this species. The joints of the ♂ antenna, as compared with that of *semiclarata*, are broader, shorter, serrate on both sides, the serrations longer. The ♂ genitalia are exactly as in *semiclarata*.

Expands 37^{mm}; 1.50 inches.

HABITAT.—California; Washington.

The great majority of specimens of *aeneipennis* that are found in collections are really pale forms of *vancouverensis*, and Mr. Grote himself never was quite sure of the limits of this species or of the forms he called *vancouverensis* and *semiclarata*; nor indeed could he be so without closer comparison between them than could be made between single specimens, superficially examined.

The National Museum collection contains a long series of specimens which I refer to this species. Many of them are bred, as are also many specimens of *vancouverensis*. When the larvæ of these species are described and the bred series closely studied, other characters may be found rendering separation more easy.

Feltia volubilis Harv.

1874. Harv., Buff. Bull., II, 118, *Agrotis*.

stigmosa Morr. pl. 2, f. 8.

1874. Morr., Proc. Bost. Soc. N. H. XVII, 163, *Agrotis*.

Varies in ground color from light reddish gray to dark blackish brown, costal region always darker, varying from reddish to black brown; the t. a. line is usually distinct, single, beginning on costa unusually distant from base, slightly irregular, and *inwardly* oblique to internal (submedian) vein, then with a wide outward curve to inner margin: the line is most obvious in dark specimens. T. p. line often obsolete more obvious in pale specimens, crenulate, and with a single even outward curve. S. t. line obsolete or very narrow, pale, very close to the outer margin, and very strongly and irregularly dentate, some of the teeth touching the outer margin; claviform always distinct, outlined, but rarely filled with black; ordinary spots narrowly outlined with black; orbicular usually more or less distinctly ovate; a narrow black dash between the spots and an outward sagittate black dash from middle of outer side of reniform, sometimes meeting a sagittate dash from one of the long dentations of the s. t. line. Secondaries pale to dark fuscous; beneath, powdery with a more or less evident common line and discal lunule. Head and thorax of the color of palest part of primaries.

Expands 37^{mm}; 1.5 inches.

HABITAT.—United States and Canada.

Also a variable species; the pale forms are *volubilis*, the dark specimens *stigmosa*. The western specimens are as a rule narrower winged than the eastern forms, and I have seen some marked *semiclarata*. The strongly dentate s. t. line is, however, characteristic of this species and renders it easily recognizable.

Feltia annexa Treitschke.

1825. Tr., Schmett. Eur. v. 154, *Agrotis*.

1829. Steph., Ill. Br. Ent. Haust. II, 117, pl. 22, f. 2, *Agrotis*.

1862. Gn., Sp. Gen. Noct. 1, 268, *Agrotis*.

1882. French, Can. Ent. XIV, 207, life history.

1889. Butler, Trans. Ent. Soc. Lond., 1889, 378, *Agrotis*.

Ground color clay yellow; a patch along costa beyond middle and lower half of basal space darker; veins marked with blackish; transverse lines obsoletely indicated, and so far as traceable very irregular. S. t. line moderately well marked pale, close to margin marked with a few sagittate dashes; ordinary spots small, distant, connected by a neat black dash. Claviform faintly outlined but always traceable. Secondaries clear snowy white, a few blackish scales along anterior margin. Beneath primaries powdery, secondaries indescent.

Expands 37–44^{mm}; 1.50–1.75 inches.

HABITAT.—New York, south and west to California, Texas, Cuba.

Not an uncommon species, and with *malefida* easily distinct from all the preceding by the white secondaries, the general habitus and the form of the δ genitalia. From *malefida* it is distinguished by the small ordinary spots connected by a neat black dash. I have taken this species on Long Island, but do not know of its occurrence farther north. It is not included in the lists in Lintner's Entomological Contributions; it extends west, however, to the Pacific coast and south to Cuba and into South America. The larval history has been elsewhere referred to in economic publications, but these I have not cited.

Mr. Butler cites *A. anteposita* Gn., and *A. decernens* Wlk., as synonyms to this species.

Feltia malefida Gn.

1852. Gn., Sp. Gen. Noct. 1, 267, *Agrotis*.

1856. Wlk., C. B. Mus. Lep. Het. x, 328, *Agrotis*.

1875. Harv., Buff. Bull. III, 5, *Agrotis*.

Pale clay yellow, with a strong admixture of pale gray scales; costal region and terminal space darker; veins marked with black scales. Transverse lines irregular and indefinite. T. a. line geminate, with a strong inward angulation on submedian vein; t. p. line crenulate, with a single even outward curve, situated unusually near the outer margin; s. t. line narrow, feebly marked, strongly dentate, so near the outer margin that some of the teeth touch it, thus interrupting the

narrow terminal space. Claviform distinct beyond the t. a. line, large, dark. Orbicular elongate, bottle shaped, outlined and centered with blackish. Reniform large, outlined with black and almost filled with smoky brown. Secondaries clean white, margins and veins sometimes more or less evidently dusky; beneath as in *annera*. Thorax concolorous with primaries, patagiae strongly irrorate with gray; collar blackish, with a distinct black line.

Expands 40-44^{mm}; 1.60-1.75 inches.

. HABITAT.--New Jersey, south to Cuba, west to California.

Not uncommon in its localities and easily distinguished from its allies are already pointed out. The species is not uncommon in the District of Columbia, and I have it from New Jersey, but I believe not farther north. Its range south and west is parallel with that of *annera*. The early stages have been described by Dr. Riley in some Agricultural Report.

Genus POROSAGROTIS Smith.

All the tibia spinose, armature of anterior pair very heavy. Front somewhat bulging, tuberculate, and pitted. Antenna of ♂ serrate and bristled or pectinate, the branches ciliate; pectinations moderate in length. Primaries somewhat variable in shape; most obtuse in *rileyana*, the apices most produced in *dollii*. Thorax stout, hairy, the tuftings indefinite; in the ♂ the abdomen is furnished with loose, long hair, forming indistinct tuftings. The ♂ genitalia are alike in all the species, and this character is the distinguishing feature of the group, which else is closely allied to *pitychrous* and the forms in which the lengthily bifurcate type of clasper is so constant. In this genus the harpes are broad and moderately long; the outer margin is very oblique, the upper angle long drawn out. The clasper consists of a simple, short, curved, corneous hook. This peculiarity is the one character which distinguishes this genus, and the absolute identity in this respect of the species is remarkable indeed.

Two well-marked subgroups are indicated by the character of the ♂ antennæ. The first, of which *muraenula* is typical, has the antennæ serrate and bristled; of the same type as in the great mass of species in the groups with furcate clasper; the ordinary spots are illy defined, scarcely more than dusky blotches; the transverse maculation is very simple, often obsolete, and the species are very uniformly colored.

Four of the species belong here. Of these, *muraenula* is eastern, of a uniform bright ash gray color, the maculation reduced to a minimum, the transverse lines almost obsolete.

Catenula is western, and the close ally of the preceding; differing in the more yellowish east of primaries, and the distinct transverse lines.

Obesula, also western, is very different from both the preceding. It is more robust, the primaries more equal, the apices rounded. The color here is also even yellowish gray, but the line is more sordid, and broken by numerous fine but very irregularly distributed fuscous points.

Mimallonis is well distinguished by the red brown color of primaries, which is unique in the genus, and suggests *gagates* of the *pitychrous* group of *Carneades*.

The second subgroup is distinguished by having the ♂ antennæ shortly bipectinate, the branches ciliate. The fringes of secondaries are unusually long—this character most evident in the ♂—and the maculation is much more completely noctuidiform than in the preceding subgroup. The ordinary spots are well defined and the transverse lines are always evident. Three species may with certainty be referred here.

Of these *fusca* is most aberrant; its large size, the uniform fuscous color, and the simple t. p. line and completely defined ordinary spots serve to at once distinguish it.

Rileyana is distinguished by the uniform color, the upright t. a. line, the unusually short obtuse primaries, and the very heavy tibial armature, the latter recalling *Schivria*, while the maculation much resembles that of *catenula*.

Orthogonia is remarkable for the neat and complete maculation, and this is the only species in which the claviform is distinct.

Dollii is a pretty species, with confused maculation, the color being a dark gray in the median and terminal space and fusco-luteous elsewhere. The orbicular is elongate, at once separating this species from all the preceding. The apices of primaries are also more produced than in any other species of the group.

The other species, *milleri* and *pluralis*, which I have referred here, are known to me only in the ♀ sex, so that the reference to this group is based upon superficial characters apparently allying them to *dollii*. I believe the ♂ will be found to have the clasper peculiar to the group as well as pectinate antennæ of this section.

Milleri is easily distinguished by the dark gray color, white ordinary spots, and two pink longitudinal shades; the one below median vein, the other beyond reniform. The orbicular is bottle shaped, the small end resting on the t. a. line.

Pluralis is also unique in coloration. The margin of primaries is gray, the disc luteous, and the cell fuscous. The orbicular is subquadrate.

SYNOPSIS OF SPECIES.

Color uniform; ordinary spots indefinite; ♂ antennæ serrate.

Primaries uniform, pale ash gray; transverse lines obsolete.....MURAENULA.

Primaries tinged with yellow; transverse lines distinct.....CATENULA.

Primaries luteous, sordid; evenly irrorate with fuscous atoms; transverse lines punctiform; form plump, heavy.....OBESULA.

Primaries paler luteous, irregularly irrorate with black; transverse lines better marked and form slight.....SATIENS.

Primaries even, red brown; transverse lines fine.....MIMALLONIS.

Color less uniform; ordinary spots normal; noctuidous maculation usually distinct; ♂ antennæ shortly pectinated.

Orbicular round.

Color fuscous; claviform small; lines distinct; t. a. very small, curved between veins FUSCA.

Color pale luteous; claviform wanting..... RILEYANA.

Color darker; claviform very distinctly marked ORTHOGONIA.

Orbicular elongate, oval; transverse lines fine, irregular; maculation confusedly gray over luteous..... DOLLII.

Orbicular bottle shaped; submedian and subapical shade pink MILLERI.

Orbicular quadrate; reniform constricted; margin gray; disc luteous; color darker; veins white PLURALIS.

Porosagrotis muraenula Grt. and Rob.

1868. G. & R., Trans. Am. Ent. Soc. I, 352, *Agrotis*.

1869. Beth., Can. Ent. I, 86, *Agrotis*.

1875. Harv., Buff. Bull. III, 73, pl. 3, f. 3, *Agrotis*.

? *vetusta* Wlk.

1856. Wlk., C. B. Mus., Lep. Het. IX, 78, *Mythimna*.

1882. Grt., Ill. Essay, 41, ? pr. syn.

Even, powdery ash gray; ordinary spots indefinite, blackish; t. a. line indicated by costal spots only; t. p. line punctiform and very indistinct; the points venular and very small; a terminal row of triangular black spots; secondaries clear white, outwardly somewhat powdered with black; beneath white, powdery; primaries somewhat darker.

Expands 37-40^{mm}, 1.50-1.60 inches.

HABITAT.—Canada; United States, west to the Mississippi, south to Georgia.

This species is not uncommon and is very easily distinguished by its bright color and almost entire lack of maculation. I have taken in on golden rod in September during the day.

Mr. Grote in commenting on Mr. Walker's species says the type is a white *Agrotis* very much rubbed and scarcely recognizable. Should the suggestion that it is the same as *muraenula* prove well founded, *vetusta* must, I am afraid, be used for this species.

Porosagrotis catenula Grt.

1879. Grt., North Am. Ent. I, 44, *Agrotis*.

Pale, yellowish gray, powdered with black atoms; ordinary spots very indefinite, blackish; t. a. line evident though not very distinct, single with three outward curves, that below vein I widest; t. p. line nearly parallel with outer margin, strongly crenulate, tending to become punctiform; a distinct black dot preceded by a clear white dot marking each vein; a row of terminal lunules; secondaries white, sometimes with smoky outer border; beneath white; primaries blackish on disc.

Expands 31-39^{mm}, 1.25-1.55 inches.

HABITAT.—Colorado, Montana, New Mexico.

Closely allied to *muraenula*, from which, however, it differs in the yellowish tint to primaries and the well-marked transverse lines. It is undoubtedly the western representative of that species and may possi-

bly, when the intervening territory is fully explored, prove a variety. The range of size in the species is unusual.

Specimens of both *murdenula* and *catenula* seen since the above was written increase the probability that they are varieties of the same species.

Porosagrotis obesula Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 456, *Agrotis*.

Rather dark yellowish gray, irregularly mottled with darker fuscous points and short lines; ordinary spots very indefinite dusky, fuscous; a fuscous subapical patch initiating the punctiform s. t. line. Transverse lines distinct, punctiform interrupted. T. a. line upright, curved between veins. Basal line distinct, geminate. T. p. line crenulate parallel with outer margin. S. t. line punctiform, even fuscous. Terminal space more densely irrorate with dark atoms. Secondaries white. Beneath, white, powdery, disc of primaries darker; a common darker extra discal line distinct only near anterior margin of secondaries but entirely crossing primaries.

Expands 38^{mm}; 1.5 inches.

HABITAT.—Montana.

The ♂ antennæ are unusually thick, the body robust, head broad, primaries obtuse. As a whole this species strikes one as being the most plump of the entire group. A single specimen only is thus far known. Received from Rev. George D. Hulst.

Porosagrotis satiens Smith.

1890. Smith, Trans. Am. Ent. Soc., xvii, *Agrotis*.

General color luteous gray, palpi brown at sides, head and thorax else immaculate. Primaries black powdered, irrorate, the ordinary maculation confused and indefinite. Basal line black, interrupted, geminate, always marked on costa at least. T. a. line marked by a geminate black costal dot and very indefinite below this, but as a whole outwardly oblique. T. p. line geminate, inner line crenulate, not very well marked, outer line a series of venular dots variably distinct; as a whole its course very even. Beyond its middle the s. t. space begins to darken to the outer margin, the terminal space being much darker than ground color, almost blackish; through this dark space the s. t. line is distinct as a series of large pale spots not much paler than ordinary ground color. A series of black terminal spots. A vague indication of a basal dash. Claviform moderate, concolorous, black marked but not completely defined. Orbicular oval, elongate, quite variable in size, black marked, then with a pale annulus, center concolorous or very little darker than ground color. Reniform large, kidney-shaped, very indefinitely and quite incompletely outlined; concolorous. In some specimens the cell is distinctly black before orbicular and between that and the reniform. Secondaries in the ♂ pearly white, in

the ♀ darker, outwardly smoky, veins dark marked, fringes white. Beneath white, with black powderings, without lines in the ♂, with an incomplete outer line and discal spot to all wings in the ♀.

Expands 34–38^{mm}; 1.38–1.52 inches.

HABITAT.—Northwest British Columbia; one ♂, two ♀.

In all structural characters this insect is nearest to *obesula* m., but has not the plump, heavy look so striking in that species; the ground color here is paler, and much more irregularly marked than in *obesula*, where the dark atoms are regularly distributed. The antennæ are as in *marcnula* rather than *obesula*, the latter having them unusually heavy.

Porosagrotis mimallonis Grt.

1873. Grt., Buff. Bull., 1, 98, *Agrotis*.

1878. Grt., Bull. Geol. Surv., IV, 175, *Agrotis*.

rufipennis Grt.

1875. Grt., Can. Ent., VII, 83, *Agrotis*.

1875. Grt., Can. Ent., VII, 226, pr. syn.

Bright brownish red, terminal space slightly darker. Transverse lines very indistinct, narrow, blackish single. T. a. line upright, slightly irregular. T. p. line obsolete through the lower half of its course; nearly parallel with outer margin. Orbicular indefinite, dusky, sometimes (♀'s in my experience) with a few yellowish scales. Reniform usually dusky, indefinite; but in some ♀ specimens I have seen, the spot was considerably mixed with pale yellowish scales, and tolerably well defined. The s. t. line is obsolete, though its course may be traced by the slight contrast in color between terminal and s. t. space. Secondaries white, outwardly dusky. Beneath pale, powdered with red; most densely on primaries. Head and thorax like primaries; abdomen yellowish, powdered with red.

Expands 35–37^{mm}; 1.40–1.50 inches.

HABITAT.—Montana, New York.

Rather a peculiar distribution for this insect. The New York specimens I have seen had the transverse lines heavier, all distinct; the t. p. line crenulate. The western specimens are more smoothly scaled, and the color is more even. I can find no further difference, entitled to specific value, between them. Structurally they seem alike, but I have not examined a New York ♂.

Porosagrotis fusca Bd.

1834. Bd., Icon., pl. 48, 4, *Agrotis*.

1864. Moeschl., Wien. Ent. Monats., VI, 197, *Agrotis*.

♂ *septentrionalis* Moeschl.

1862. Moeschl., Wien. Ent. Monats., IV, 133 pl. i, 3, *Agrotis*.

1870. Moeschl., Stett. Ent. Zeit., XXXI, 268, pr. syn.

Yellow or grayish fuscous, transverse lines distinct, dark; t. a. geminate; t. p. single. T. a. line oblique, very strongly curved between the veins, and more especially so beneath vein 1, where the outer point of

the curve nearly touches the t. p. line. T. p. line much as usual; outwardly curved over the cell and slightly sinuate or entirely straight below. S. t. line sinuate, marked by a series of preceding sagittate dashes. Claviform short, narrow, dusky; orbicular usually small, round, neatly outlined with black, concolorous; reniform lunate, dusky, outlined in black. Secondaries fuscous. Beneath fuscous, with indefinite line and discal dot. Head and thorax concolorous; vestiture hairy.

Expands 37-40^{mm}; 1.5-1.6 inches.

HABITAT.—Labrador.

An aberrant species to refer to this group, but which will fit in nowhere else. It is perhaps entitled to a subgroup, including it alone. With its structural peculiarities the color is unique. The ♂ clasper is practically like this group, but somewhat shorter and rather more robust. The whole appearance is more heavy or robust than any other species, and the primaries are wider. The ♀ differs in the greater proximity of the transverse lines and in having the orbicular larger.

Forosagrotis worthingtoni Grt.

1880. Grt., North Am. Ent., 1, 91, *Agrotis*.

“Male antennæ bipectinate; eyes naked, all the tibiæ spinose. Size moderate, ornamentation simple, color pale mouse gray. Thorax shaded with brownish. Anterior line faint, single, marked with black dots on the veins. Claviform absent, orbicular a small black ringlet or dot, reniform upright, narrow, moderate, pale yellowish with interior black line, situated near posterior line. The latter single, blackish, nearly perpendicular, distinctly marked by black dots followed by pale points on the veins. Subterminal line inconspicuous. A terminal broken black line. Hind wings pale, powdered with fuscous, with a terminal broken black line, else above and below without the usual spots and lines. Fore wings beneath unlined, dark gray, concolorous, contrasting with the whitish secondaries which are also concolorous, merely showing a slight dark shading on the veins in place of the usual line and a minute dot on the discal cross vein.”

1 ♂ from northern Indiana.

Expands 30^{mm}.

Apparently a good species allied to *fusca*, but much smaller. Nothing in the material before me at all answers this description.

Porosagrotis rileyana Morr.

1874. Morr. Pr. Bost. Soc. N. H., xvii, 166, *Agrotis*.

*1875. Morr., Proc. Ac. N. Nat. Sci., Phil., 1875, 58, *Agrotis*.

Dull yellowish gray; ordinary spots blackish, not clearly defined but with an indefinite buff annulus. The reniform is especially large, kidney-shaped. Transverse lines single, very distinct; t. a. line upright, crossing orbicular. T. p. line hardly crenulate distinct, parallel with outer margin. S. t. line very faintly traceable, irregular. Terminal

space slightly clouded with dusky. Secondaries white. Beneath all wings with discal lunule, primaries dusky. T. p. line faintly reproduced. Secondaries white.

Expands 31-34^{mm}; 1.25-1.35 inches.

HABITAT.—Illinois, Missouri, Kansas, New Mexico.

A peculiar species in many respects; the ♂ antennæ are pectinate rather than serrate, the pectinations ciliate. The primaries are rather shorter more obtuse than usual, the fringes of secondaries longer; the front is less roughened than in the other species of the group, and the anterior tibiæ are unusually heavily armed at tip. As a whole the *Heliothid* type is very strongly marked in this species and it is not at all improbable that with sufficient material at hand its nearest allies will be found to be *Anthoecia nobilis* and *packardii*. The fore tibiæ are short and broad and have two heavy claws at inner side of tip and a series of five or six heavy claw-like spines outwardly. The species is left here rather for present convenience than from any conviction that it belongs where placed.

Porosagrotis orthogonia Morr.

1876. Morr., Proc. Bost. Soc. N. H., xviii, 239, *Agrotis*.

Luteous gray; basal and s. t. spaces paler; all the lines and spots well marked. Basal line evident, marked with white outwardly; t. a. line inwardly bent on costa, straight to vein 1, then outwardly curved to hind margin; the line marked inwardly with white. T. p. line even or but slightly lunate between veins outwardly marked with white; outwardly curved over cell, and inwardly sinuate to hind margin. S. t. line distinct white, irregular, prominently dentate on veins 3 and 4. All the veins more or less evidently marked with white. Claviform distinct, concolorous outlined in black, reaching to middle of median space. Orbicular large, round, paler, centered with darker scales. Reniform large upright centered with rather bluish or smoky black scales. Head and thorax mixed yellow gray. Secondaries blackish, paler at base. Beneath whitish powdered with black; primaries dusky on disc.

Expands 31-36^{mm}; 1.25-1.45 inches.

HABITAT.—Colorado, New Mexico, Nebraska, Arizona, Utah.

Like the preceding this species has pectinate and ciliate ♂ antennæ, the pectinations shorter than in *rileyana*; the tibial armature is heavy, and the fringes though shorter than in *rileyana* or even *dollii* are longer than usual in the genus. The ♀ fringes are not so long as those of the ♂.

Porosagrotis dollii Grt.

1882. Grt., Can. Ent., xiv, 216 *Agrotis*.

Gray, washed with luteous or ochereous the yellow tints most evident in basal and s. t. space. Transverse lines very faint; chiefly distinct by the contrast between the slightly darker, less yellow median

space, and the luteous basal and s. t. space. Terminal space like median space. T. a. line very irregularly angulate, a long tooth on vein 2, constricting median space. T. p. line irregularly dentate, its course sinuate. S. t. line traced by a series of buff cuneiform spots, and the slightly contrasting terminal space. Ordinary spots indefinite; orbicular elongate, marked with white scales, centered with gray; reniform upright, hardly lunate, and somewhat constricted, inferiorly marked with white. Thorax and head like primaries. Secondaries white. Beneath powdery; secondaries white, primaries somewhat dusky.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Arizona.

This very pretty species is readily recognized by its irregularly mottled appearance, which it is very difficult to describe. Structurally it is as Mr. Grote suggests very close to *rileyana*; the ♂ antennæ are pectinate and ciliate, the fringes are unusually long, and the fore tibiæ are very heavily armed, though not so formidably as in the allied species.

Porosagrotis milleri Grt.

1875. Grt., Buff. Bull., III, 78, pl. 4, f. 4, *Agrotis*.

Gray: from the base outwardly over the claviform, across the median space runs a pink shade; beyond the reniform is a similar shading. S. t. space largely whitish before the irregular black s. t. line. Distinctly marked; lines single, black, denticulate; t. a. line with a single deeper inward inflection below submedian fold. Claviform large, distinctly outlined; orbicular funnel-shaped, the narrow portion reaching t. a. line; reniform narrow, elongate, lunate; all the spots whitish with distinct black annuli. Secondaries fuscous, fringes white. Beneath, white over fuscous; a common black shade line marked on the veins of the secondaries. Thorax and head, gray; collar with a dark line; patagiæ marked with pink.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Sierra Nevada, California.

The type from Mr. Edwards' collection only examined. Unfortunately this is a ♀, so the position assigned the species is liable to change. I believe the ♂, when discovered, will be found to have pectinate antenna.

The species is easily recognized and is one of our handsomest *Agrotis*.

Since the above was written, the species has been found in some numbers. There is a bred specimen in the collection of the U. S. National Museum, and Mr. Edwards has several specimens. I do not know whether any of these are males, and Mr. Edwards' collection is at present inaccessible.

Porosagrotis pluralis Grt.1878. Grt., Bull. Geol. Surv., iv, 174, *Agrotis*.1880. Grt., Bull. Geol. Surv., vi, 144, *Agrotis*.1882. Grt., Ill. Essay, 55, pl. 2, f. 16, *Agrotis*.

Gray, the middle portion of primaries suffused with yellow ochereous. Transverse lines barely traceable, very slightly paler than the space through which they pass. S. t. line distinct, pale, inwardly shaded with fuscous, two evident teeth on veins 3 and 4. A slightly paler apical patch. All the veins more or less evidently marked with white, veins 3 and 4 and 6 and 7 unusually distinctly so. The cell except ordinary spots and a shade over veins 2, 3, and 4, fuscous. Orbicular pale, moderate in size, somewhat oblique. Reniform upright, constricted at middle, and inferiorly dilated; annulate with white, the center dark gray. Secondaries smoky, paler at base. Beneath, powdery white; disc of primaries more dusky. Head and thorax gray mixed with blackish, margins of patagiae yellowish buff.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Nevada.

The ♀ type from Dr. Bailey's collection is the only specimen examined, and the place assigned to the species is therefore liable to be erroneous. The general habitus of the species seems to place it here, and I think that the ♂ when discovered will have pectinate antennae.

Genus **CARNEADES** Grt.

Fore tibiae strongly spinose, with longer lateral spines at tip, which is somewhat broadened. Front of head rough, tuberculate, with usually a central depression. Palpi distinct, normally developed, reaching to about middle of front. Antennae in the male with the joints marked laterally with tufts of bristly hair; in the female simple with single short ciliations, sometimes scarcely pubescent. Wings trigonate, apices marked but not prominent, outer margin oblique, rarely rounded save in the *quadridentata* series. Harpes of the ♂ oblong with oblique tip, which is inwardly set with a series of spinules. Clasper bifurcate, the forks varying in proportion.

The strong distinctive feature of the genus is in the last character—the forked clasper of the male genitalia. In all other characters it agrees perfectly with that section of *Porosagrotis* of which *muraenula* is the type. The series with this character constitutes by far the most numerous group of the genus *Agrotis* auct. The greater proportion of the species are western, and the greater part of the western *Agrotid* fauna belongs to this genus. In structural characters and somewhat in habitus the resemblance to the Heliothinae is marked. It is a fact of very great interest that this fauna of the far west should so preponderate in species which have the heavy tibial armature and modified frontal structure.

Besides containing very much the greater number of species, the

species are also most closely allied. The large degree of uniformity in genital structure robs us of one of our safest and most certain guides, while the extreme range of variation in many of the forms makes the limitation of species difficult. It is in this series, too, that constant additions are being made to the species. Scarcely a collection reaches my hands that does not contain some markedly distinct species, and our work of a monographic nature must remain partly tentative until the western region has been so thoroughly explored that the additions are not so constant.

In adopting the generic term *Carnecades* I have consulted convenience and merit more than priority. Mr. Grote in this case recognized the frontal structure as differing from *Agrotis*, but he was evidently ignorant of how many species agreed with his generic type in this respect. His earlier genus, *Eucoptocnemis* for *fimbriaris*, I have not used because I am not sure the insect really belongs here. I have seen it but never had a chance to study it. I know positively that many of the exotic and European species must find a place in this same series, but have not been able to apply the generic terms which exist in abundance to any type with which I was acquainted. So large an assemblage, agreeing so closely in structural characters, proved difficult of subdivision, since I was reduced to characters of maculation and coloration. Some little intelligence and care will therefore have to be applied in referring some of the species to their respective series.

First in the line I place a small group of which *wilsonii* is typical. It differs from all the others in the longer wings and depressed costal margin. The appearance is somewhat like the *auxilliaris* series from which the structural characters well separate it.

Following this is the group *quadridentata*, which is characterized by the name of its type. Veins 3 and 4 and 6 and 7 are marked with white, and strongly indent the s. t. line, the spurs usually attaining the outer margin. The feature is a distinctive one and there is only one species in which there is room for doubt as to its reference here. The species are not very well separated and there may be more or less than I have indicated.

Group *pitychrous* differs by the general indefiniteness of maculation. Sometimes the color is uniform, sometimes the lines are wanting, and sometimes the lines are indicated or even fairly distinct, and the ordinary spots are vague and indefinite. The median shade line is never present, and the cell is never black filled. Most of the species are readily referred here, and only a few, which will be more particularly referred to hereafter, are liable to cause doubt.

Messoria is typical of another group, all the members of which have the median shade line evident. The cell is never distinctly black filled, and the lines are sometimes the only definite feature of maculation. Some of the species here, which vary in the line of an obsolescence of maculation, may create doubt with a small number of specimens, but

can in all cases be correctly referred with a sufficient material. Finally come those species of which *tessellata* is typical, and which agree in always having the cell dark or black filled in well-marked specimens. The transverse lines may be present or absent, but the ordinary spots are always outlined in part, at least, by the intermediate black or dusky shade.

The description of each group is very fully given and exceptional characters are noted. I have left the full characterization to each, even at the risk of some repetition, as I considered it well to have each capable of standing alone.

The synopsis of genera and groups renders another table unnecessary.

Group WILSONII.

Anterior tibiae spinose, rather heavily armed at tip. Front prominent, tuberculate, rough. Antennæ ♂ serrate and bristled, of the same type as in allied groups. Thorax quadrate with indefinite, inconspicuous tuftings. Primaries moderate, costa depressed, slightly concave, apices produced. This feature of the primaries is peculiar to the species of this group.

The genitalia of the ♂ have the harpes short and rather broad, the clasper bifurcate, the tines subequal and reaching almost to the tip of the harpes. The inferior branch of the fork is straight, regularly tapering to an acute point; the upper is more equal, slightly curved and not acute at tip.

Two species only belong to this group, closely allied, but yet easily separated.

Wilsonii is a pretty, brightly marked species with pale ordinary spots and distinctly paler yellow or red s. t. space; the t. p. line is distinct; the s. t. line not marked.

Lacunososa is closely allied, but darker, much more evenly colored. The t. p. line is obsolete; but the s. t. line is distinct preceded by black sagittate dashes.

Nothing is known of the early stages of the species.

In maculation and habitus this series is intermediate between the *quadridentata* and *tessellata* groups, and resembles more particularly the *ochrogaster* series in the latter group. The peculiar wing form, however, allows me to head the genus with this small series.

Carneades wilsonii Grt.

1873. Grt., Buff. Bull., I, 135, pl. 4, f. 3, *Agrotis*.

1874. Grt., Buff. Bull., II, 62, *Agrotis*.

specialis Grt.

1874. Grt., Buff. Bull., II, 62, *Agrotis*.

1882. Grt., Ill. Essay, 54, pl. 2, f. 14, *Agrotis*.

Fusco luteous to bright red of various intensity; costa to apex, narrow inner margin, and s. t. space paler luteous. Basal line marked in cell, white, margined each side with a blackish shade. T. a. geminate,

upright, sinuate, not reaching costa; included space whitish. T. p. line lunulate, interrupted, single; sharply defining the paler s. t. space, its course inwardly oblique even, hardly curved over cell. S. t. line not defined; marked only by the contrast in color between terminal and s. t. space. This outline is very irregular; the terminal shade sends in a broad angulation opposite the cell, is much narrowed on veins 3 and 4, and again broader to hind margin. Claviform concolorous, narrowly outlined in black, short and rather broad. Ordinary spots well defined, narrowly annulate with white, centered with pale yellowish. Orbicular irregularly ovate; reniform normal. Secondaries yellowish fuscous. Beneath white, powdery; primaries with disk smoky; all wings with dusky discal lunule. Head and thorax concolorous; collar inferiorly whitish yellow.

Expands 37–44^{mm}; 1.5–1.75 inches.

HABITAT.—California.

A pretty and well defined species with no peculiarities, not already enumerated; it varies from luteous to bright red brown, the latter being typical of *specialis*. Mr. Edwards' collection shows both forms. The antennal difference noted by Mr. Grote exists in terms only. *Wilsonii* equally has "tufts of bristles on the joints" and at the same time both forms have them "brush-like."

The U. S. Museum collection contains a very pretty series of this species showing the very wide range of variation in ground color. Scarcely two specimens are entirely alike, and yet the characteristic appearance of the species is so marked that no mistake is possible in its recognition.

Carneades lacunosa Grt.

1878. Grt., Bull. Geol. Surv., IV, 72, *Agrotis*.

Fuso luteous, sordid; cell darker, shaded with blackish, costa very slightly paler. A darker longitudinal basal shade crossed by the narrow basal line and limited outwardly by the t. a. line. This latter as in *wilsonii*, but less distinct. T. p. line very faintly indicated, obsolete geminate; its course as in *wilsonii*. S. t. line distinct narrow, pale, limiting the somewhat darker terminal space; preceded by a row of sagittate black spots, its course sinuate, not greatly divergent at any part of its course. Ordinary spots essentially as in *wilsonii*, but not so contrasting, the center being almost concolorous. Secondaries and underside as in *wilsonii*.

Expands 35–39^{mm}; 1.40–1.50 inches.

HABITAT.—California.

With essentially the same maculation this species is yet very distinct from *wilsonii* by the obsolete t. p. line and well marked s. t. line. The collar is concolorous, but is crossed by a dark line. The species is credited to Mr. Morrison in lists, but I can not find that he ever described it. Mr. Grote's description above cited is the first appearance of the species in literature so far as I know, and he should be credited with it.

Carneades æqualis Harv.

1876. Harv., Can. Ent., VIII, 36, *Agrotis*.

“♀. Allied to *Wilsonii* and especially resembling some of the varieties of that species, but distinguishable by the s. t. line not being twice more prominently indented, but pale, dentate throughout its length, and by the concolorous terminal space and larger stigmata. Hoary olivaceous fuscous with a tinge of brown; claviform indicated; orbicular large, irregularly elongate; reniform wide; cell shaded with brown. T. p. line geminate, regularly lunulate. Fringes brown discolorous. Hind wings fuscous, deepening in tint outwardly, with pale, faintly interlined fringes and long, narrow discal streak; beneath whitish, irrorate on costal region, with faint terminal shade and discal mark; primaries fuscous. Thorax and head concolorous with fore-wings.

“Expanse 38^{mm}. California.”

Apparently a good species allied to *lacuosa*. Entirely unknown to me in nature. I can not identify it with any of the numerous Californian species known to me.

Group QUADRIDENTATA.

This is characterized by strongly armed anterior tibiae, prominent, roughened, and somewhat tuberculate front, serrate and strongly bristled male antennæ and bifurcate elasper. The distinctive character separating it from the other group with which it agrees in structure is found in the ornamentation. Peculiar to it is the maculation from which the typical species has received its name; veins 3 and 4, and to a less extent veins 6 and 7, are marked with pale streaks, extending to and strongly indenting the terminal space. In addition, the ordinary spots are always distinct, the costa usually perceptibly paler, the orbicular often oblong and open superiorly, the median vein more or less marked with white, and a more or less distinct submedian pale dash. On the whole this group is rather closely allied to *subgothica* through *flavidens*, and to *venerabilis* through *brevipennis*. The other species more evidently resemble the other groups nearest allied in the structure of the male genitalia. In this latter character the species agree tolerably well among themselves. Except in *olivalis* the lower fork is longest and tolerably straight. In *niveilinea*, *flavidens*, and *plagigera* this lower fork reaches to or exceeds the tip of the harpes, the tip somewhat curved and not pointed. In the other species the lower fork is stout, straight, regularly tapering to an acute point, and does not reach the tip of the harpes. *Olivalis* is unique in having the lower fork very short and stout, rapidly tapering to an acute tip. The upper fork and the harpes show little variation, the former being nearly evenly and equally curved, and the latter being oblong and rounded or obliquely truncate at tip. As a matter of fact the genitalia are not exactly alike in any two species; but the differences are so slight and so difficult to

express in words that a reference to the figures of the plates, where all important types are figured, is deemed sufficient.

The species are not numerous, but some of them are closely allied, and not a little confusion is found in collections. In separating the species of the series with dusky secondaries I am not at all satisfied that I have hit the best solution of the problem. The present scheme worked well when prepared, and does still in the vast majority of instances, but material since seen indicates new species which will probably render a re-arrangement necessary. A character not appreciated when the synopsis was prepared is found in the s. t. line and the upper two of the pale outward dentations. Without a complete re-study of the material this can not now be made use of except as indicated in the descriptions. I may have given some erroneous determinations in this group by reason of the overlooking of this feature, and placing too much stress on the form of the orbicular—a character not so satisfactory in point of constancy as I had supposed.

The group may be divided into two, nearly equal series, by the color of the secondaries and the ground color of the primaries. In the first series the secondaries are white, and the primaries show yellow or yellowish gray as the predominating color. In the second series the secondaries are yellow fuscous or smoky, and the primaries darker gray or fuscous.

Among the first series *recula* may be distinguished by its small size, clear, bright yellow ordinary spots, and other ornamentation, the contrasting dark shadings bringing this maculation into prominent relief. *Cicatricosa* and *quadridentata* are larger, with similar markings but less intense color. These species are hopelessly confounded in collections even by Mr. Grote. Both species vary in brightness of color and somewhat in maculation. *Cicatricosa* may be distinguished by the open, V-shaped orbicular and the constricted reniform; *quadridentata* has the orbicular closed, somewhat variable in size and shape, and the reniform lunate or kidney-shaped. The types of all of the preceding species have been examined by me. *Nireilinea*, which has been labeled *quadridentata* in some collections, is easily distinguished by the white-line crossing the thorax back of the collar.

Insertans and *brevipennis* differ in the oblong, elongate orbicular. In the former the ordinary spots are connected or fused, the orbicular not oblique, the form not unusually stout. *Brevipennis* is an unusually stout species with oblique orbicular, not fused or connected with reniform. The thorax is very heavy and large, the anterior tuft most prominent, the abdomen very short and scarcely exceeding secondaries.

Plagigera is a well-marked species of the second series, nearly allied to *brevipennis*. The ordinary spots are narrow, well marked, outlined in black, then annulate with white, else concolorous; the orbicular is oblong, oblique, open superiorly; the t. p. line is very indefinite, usually punctiform and somewhat irregular. The pale deuts on veins 6 and 7 do not cross the s. t. line.

Yet nearer, perhaps, to *brevipennis* is *oblongistigma*, which is rather well distinguished by the uniform sordid, smoky color and the narrow, oblong, concolorous ordinary spots. The orbicular is open superiorly, oblique. The cell around the ordinary spots is black, and there is a black basal dash. The dents on veins 6 and 7 cross the s. t. line.

Olivalis is a puzzling species, standing almost midway between *plagivora* and *ridingsiana*. It has the narrow, oblong orbicular of the former and the marked t. p. line of the latter; the somewhat more yellowish fuscous secondaries turn the scale of resemblance to *ridingsiana*, and the ♂ genitalia confirm this. The pale dents of veins 6 and 7 do not cross the s. t. line.

Ridingsiana differs from the previous species of the series in having the orbicular rounded and complete. The costa is concolorous, the veins only flecked with white scales. The dents on veins 6 and 7 do not cross the s. t. line.

Flavidens is a large species and is very distinctly marked. The costa is yellow, the median stripe is very distinct, and the ordinary spots are annulate with pale yellow. The pale dents on veins 6 and 7 cross the s. t. line.

Flavicollis is like the preceding in general habitus, but differs by the yellow collar, the even and very distinct s. t. line, and the rounded apices of primaries. The pale dents do not cross the s. t. line on veins 6 and 8.

Perexcellens is one of the handsomest of our species, and the best marked of this group. It is very large—sometimes expanding over two inches—the maculation essentially like *flavidens*, but much brighter, suffused with reddish to lilac gray. The apices of primaries are somewhat produced, the dents on veins 6 and 7 do not cross the s. t. line, while on veins 3 and 4 the indentation of the line is not great. It is the only species of the series in which the group character is not prominently marked. In tabular form we have the following:

SYNOPSIS OF SPECIES.

Secondaries white, primaries gray to yellow.

Smallest; ordinary spots and median stripe, clear yellow.....RECUA.

Larger; the yellow paler, more white.

Orbicular, open above; V-shaped.....CICATRICOSA.

Orbicular, round, complete.

Collar paler gray or yellow, no white line crossing thorax....QUADRIDENTATA.

Collar concolorous, a distinct white line crossing thorax behind collar,

NIVELLINEA.

Orbicular oblong.

Ordinary spots fused, orbicular not oblique, abdomen normal.....INSERTANS.

Ordinary spots not fused, orbicular oblique, abdomen short, conic,

BREVIPENNIS.

Secondaries dusky, primaries darker.

Orbicular narrow, oblique, open superiorly.

Ordinary spots concolorous, relieved by black filling of cell; t. p. line obsolete,

OBLONGISTIGMA.

- Ordinary spots outlined in black, annulate with white; t. p. line punctiform and somewhat irregular; secondaries whitish *PLAGIGERA*.
 T. p. line well defined, even; secondaries yellowish *OLIVALIS*.
 Orbicular rounded, complete.
 Costa concolorous, size small, pale colors white *RIDINGSIANA*.
 Costa and pale colors yellowish.
 Collar concolorous; thoracic tuft yellow; apices of primaries rectangular, *FLAVIDENS*.
 Collar yellow inferiorly; thoracic tuft concolorous; apices of primaries rounded *FLAVICOLLIS*.
 Collar white inferiorly, limited by a black line; size very large; pale colors suffused with reddish or lilac, very bright; apices of primaries somewhat produced *PEREXCELENS*.

Carneades recula Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Deep smoky brown; costal and submedian spaces, inner margin at base, a subapical patch and ordinary spots yellow. S. t. line distinct, yellowish, indented as usual by the four pale streaks, and marked inwardly by black enneiform dashes. Secondaries white. Beneath white. Head and inferior half of collar white or creamy. Thorax luteous, intermixed with both black and white hair and scales. Abdomen yellowish white.

Expands 25^{mm}; 1 inch.

HABITAT.—Oregon.

This small and very distinct species is recognized by the contrast in color of primaries. It must be very pretty when perfect; but all the known specimens are rubbed and also imperfectly spread. All the examples thus far seen in collections come from Mr. Hy. Edwards.

Carneades cicatricosa G. & R.

1865. Grt. & Rob., Proc. Ent. Soc. Phil., IV, 492 pl. 3, f. 4, *Agrotis*.

Ground color yellowish white. Costa marked with blackish scales; in the cell there is only a small triangular spot marking the anterior boundary of the V-shaped orbicular, and a narrow space between spots dark fuscous. T. a. line marked only below median vein; t. p. line curved over the cell, thence straight to internal margin; extended slightly along the veins; space between reniform and t. p. line dark. S. t. line well marked, even, scarcely indented on veins 3 and 4; outwardly marked by the dark terminal space, inwardly by a row of lunate spots. Claviform well defined, dusky. Basal space below median vein dusky. Secondaries white. Beneath white. Head and thorax luteous. Collar inferiorly and patagiae near sides, white.

Expands 29–31^{mm}; 1.20–1.25 inches.

HABITAT.—Colorado.

It is difficult to describe an insect like this, in which the ground color may be either one thing or the other so far as predominance is concerned, and where the maculation is so irregular. The V-shaped orbicular

lar, constricted reniform, and unusually distinct and even s. t. line are characteristic, however, and may be relied upon to distinguish the species. It seems rare, very few specimens having passed through my hands.

Carneades quadridentata G. & R.

1865, Grt. & Rob., Proc. Ent. Soc. Phil. iv, 491, pl. 3, ff. 2 and 3, *Agrotis*.

Deep luteous brown or olivaceous; costa to t. p. line, internal margin and submedian stripe yellowish; s. t. space also paler than ground color. Ordinary spots complete, outlined in black, whitish, with faint yellowish center. T. a. line single, with two wide outward curves. T. p. line lunulate, very even; s. t. line narrow, pale, inwardly marked by a series of approximate black lunules. Claviform faintly marked, concolorous. The dentations on veins 3 and 4 cross the s. t. line and almost attain the outer margin; on veins 6 and 7 they half way cross the terminal space. Secondaries white, a few black scales along outer margin. Beneath primaries dusky, secondaries white; sometimes the primaries are also pale. Head and thorax concolorous; collar inferiorly yellow, patagiæ white. Occasionally a reddish tinge replaces, or is mixed with the yellow of primaries but the maculation remains the same.

Expands 30-32^{mm}; 1.20-1.28 inches.

HABITAT.—Colorado.

A very neatly marked species, not at all common in collections. I believe I have seen this from New Mexico and Arizona, but can not be certain. The character of the s. t. line will very readily separate it from the preceding which it otherwise resembles in habitus.

Carneades niveilinea Grt.

1882. Grt., Can. Ent. xiv, 216, *Agrotis*.

In maculation very like *4-dentata*; so like, that recapitulating all points seems useless, and only points of difference will be given. The size is greater, the color darker, the yellow on costa and veins replaced by white, else by reddish. The collar and patagiæ are concolorous, but there is a white stripe crossing the thorax just behind collar, which will at a glance identify this species. Secondaries and beneath as in *4-dentata*.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Arizona, New Mexico.

Seems not uncommon species where found, and is very constant. Rarely a rubbed specimen will be confused with *quadridentata*.

Carneades insertans Smith.

1890. Smith, Trans. Am. Ent. Soc. xvii, 45, *Agrotis*.

General color a rather sordid yellow. Head and palpi immaculate, collar with a distinct black central line above which the color is somewhat more dusky. Thorax with black scales intermixed, forming an

incomplete line margining the patagiae. Primaries with the median lines practically obsolete, the t. a. line traceable only by a single loop below the claviform and the t. p. line marked only by geminate costal dots. A basal black streak, to which is attached the loop-like claviform. The cell is black around and between the ordinary spots, which are connected; an unbroken black line margining both. Orbicular elongate, with a slightly darker core; a narrow spur extending to the reniform, which is moderate in size and kidney-shaped. A black spot below reniform. The s. t. and terminal spaces are prominently marked by the four pale streaks so characteristic of the *4-dentata* series of this genus; the black intermediate dashes distinct; no distinct s. t. line. Secondaries clear, pure white. Beneath white, somewhat powdery, without line or spot.

Expands 33^{mm}; 1.32 inches.

HABITAT.—British Columbia, Spencer's Bridge.

The type is a unique male from Mr. Neumoegen; easily distinguished from all the members of the group by the united ordinary spots and elongate orbicular.

Carneades brevipennis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 455, *Agrotis*.

Ash gray, with somewhat darker shadings through center and in terminal space. Orbicular oblique, open superiorly; reniform oblique, elongate, somewhat constricted in the middle. Both the spots are defined by a narrow, black line and a pale interior ring; else concolorous. Claviform very distinctly outlined. Transverse lines faint, in one specimen entirely obsolete. T. a. line geminate, visible only in submedian space. T. p. line not traceable at all. S. t. line white, indefinite, indented to half the extent of terminal space on veins 3 and 4. Apex pale. Secondaries white, with blackish terminal line. Beneath white, primaries rather densely, secondaries sparsely powdered with black scales. Head and collar inferiorly paler; else thorax concolorous.

Expands 36–38^{mm}; 1.45–1.50 inches.

HABITAT.—California, Colorado, Nevada.

A very peculiar species, recognizable by its burly form and unusually short abdomen. The head too is somewhat retracted, but in other respects it does not differ from the other species with which we have placed it. There are several specimens in the collection of the U. S. National Museum, taken by Mr. Bruce in Colorado.

Carneades oblongistigma Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 454, *Agrotis*.

Ground color an even, very dark gray or dirty fuscous. Cell before and between ordinary spots, blackish; a blackish basal dash; terminal space darker; claviform filled with blackish. Transverse lines obsolete; s. t. line concolorous, marked by the darker terminal space, and

a row of sagittate black dashes inwardly. The usual dentations cross the s. t. line, and reach nearly to the outer margin. The orbicular is open superiorly, oblique, oblong, somewhat variable in size, sometimes reduced to a mere line. The reniform is narrow, lunate. Secondaries smoky fuscous. Beneath pale, somewhat iridescent, powdery; secondaries with a distinct discal spot. Thorax concolorous with primaries; collar with a mesial black line.

Expands 30-32^{mm}; 1.20-1.25 inches.

HABITAT.—Montana, Black Hills.

This species recalls *idahoensis*, and is indeed very closely allied to it; differing obviously, however, by the dentations typical of this group.

Carneades plagigera Morr.

1874. Morr., Proc. Bost. Soc. N. H. xvii, 163 *Agrotis*.

1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 57 *Agrotis*.

Smoky fuscous, strongly irrorate with white. Costal region strongly marked with white scales, as is also the inner margin and the s. t. space; a white apical patch. Transverse lines not well marked. T. a. line distinct only in the submedian space where it forms a slightly angulate outward curve. T. p. line crenulate, often punctiform, its course below the cell nearly straight or slightly incurved. S. t. line bisinuate, indented, but not crossed by the ordinary marks on veins 3 and 4. The basal line is indicated by a double black spot at base. Claviform concolorous, narrowly outlined in black. Orbicular elongate, narrow, oblique, almost longitudinal. Reniform narrow, slightly constricted at middle, upright. Secondaries dirty white with a fuliginous cast. Beneath whitish, powdered with gray. Head and thorax concolorous, the latter marked with white at base of patagia.

Expands 31-35^{mm}; 1.35-1.40 inches.

HABITAT.—Colorado, Montana, Nevada, Kansas, Washington, Illinois.

This species may be always recognized by the dirty whitish, not yellowish, secondaries. This character will serve to at once separate it from *olivalis* which is else closely allied to it. From *oblongistigma* the species is distinct by the fact that the ordinary dents do not cross the s. t. line

Carneades olivalis Grt.

1879. Grt., N. Am. Ent. 1, 43, *Agrotis*.

Dark olive or grayish, costal region powdered with white; transverse lines not very distinctly marked, but still evident. T. a. line distinct below median vein, narrow, black, outwardly curved between veins. T. p. line single, evenly crenulate, and nearly parallel with the outer margin. S. t. line white, narrow, indented as usual on veins 3 and 4. The ordinary spots are concolorous, narrowly outlined in black and with an inner somewhat powdery, white annulus. Orbicular narrow, oblong,

oblique, open superiorly. Claviform concolorous, outlined in black. There is a pale apical patch connecting with a pale shading to the t. p. line. Median and submedian veins powdered with white scales. Submedian pale dash scarcely traceable. Secondaries smoky fuscous, with a faint yellowish tinge. Beneath deep smoky brown, with a darker common line and discal spot. Thorax concolorous, collar inferiorly powdered with gray.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Colorado.

This species forms the intergrade between *ridingsiana* and *plagigera* while sufficiently distinct, I think, from each. The points of resemblance have been already noted.

Carneades ridingsiana Grt.

1875. Grt., Bull. Buff. Soc. Nat., Sci. II, 305, *Agrotis*.

The maculation of this species is almost exactly like that of *4-dentata*, but the color is much darker. The t. a. line is outwardly oblique and takes a wide outward bend below vein 1; the s. t. line is not so strongly indented on veins 3 and 4; but in all other respects the primaries are marked like *4-dentata*. Secondaries yellowish fuscous. Beneath soiled whitish, powdery. Head and thorax concolorous with primaries; collar inferiorly gray.

Expands 31–32^{mm}; 1.25 inches.

HABITAT.—Colorado, Arizona, New Mexico.

This species except for the much darker color, and almost concolorous costa is identical in maculation with *4-dentata* and different from the preceding species of this section by the complete, rounded orbicular.

It is in the series from *plagigera* to *ridingsiana* that is usually confused and which requires care in separation. By close attention to the distinctive characters given there ought to be little trouble in the majority of cases; but occasionally an unfortunate specimen will occur which does not agree with anything but itself and which requires tact to place.

Carneades flavidens Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 455, *Agrotis*.

Dark blackish fuscous; costa yellowish; submedian dash yellow, and very distinct; s. t. space powdered with white, paler. Basal line indicated by black spots on median vein; t. a. line geminate, distinct below subcostal, outwardly curved to inner vein, then very oblique outwardly to inner margin. T. p. line single, lunulate, interrupted by the yellow s. m. dash; its course almost parallel with outer margin. S. t. line narrow, concolorous, marked by a row of internal black spots and indented by the usual pale streaks on veins 3 and 4, and 6 and 7, the latter confluent and forming a pale patch. Ordinary spots distinct, normal; narrowly defined with black, within annulate with yellow centered with

dark buff. Claviform very long, extending to middle of wing, narrowly outlined with black, else concolorous. Secondaries smoky fuscous, paler toward base. Beneath, primaries smoky, blackish; secondaries paler, powdery. Head and thorax concolorous; disc tufted with yellowish. In some specimens the yellow becomes pinkish, whether naturally so or because the insect may have been affected by cyanide, it is impossible to say.

Expands 34–36^{mm}; 1.35–1.45 inches.

HABITAT.—Colorado, Arizona.

This species has a very strong superficial resemblance to *subgothica* and allies, principally marked by the very evident submedian dash and long claviform. It however evidently belongs here by the structural characters. The distinct yellow maculation and dark ground color separates this from all the preceding forms.

Carneades flavicollis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 456, *Agrotis*.

Dark red brown; all except ordinary spots, claviform, basal space, and terminal space darker; costa broadly yellow; ordinary spots powdery white. Submedian dash distinct, though not broad, yellow. T. a. line distinct below costal space, outwardly oblique and curved between the veins. T. p. line lunate, single, interrupted parallel with outer margin. S. t. line even, distinct, yellow, inwardly marked by sagittate black dashes; usual dentation reaching to but not crossing or greatly indenting s. t. line. A pale patch at apex. Ordinary spots complete, narrowly black lined, normal in size and form. Secondaries smoky fuscous. Beneath with a faint rufous tinge, powdery. Head and thorax concolorous with primaries, collar inferiorly yellow.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Montana.

The unique type in Mr. Tepper's collection is a ♀, but probably belongs to this group. The rounded apices of primaries well distinguish this species from all others and may indicate that its allies are elsewhere.

Carneades perexcellens Grt.

1880. Grt., Bull. Geol. Surv., vi, 156, *Agrotis*.

excellens Grt.

1875. Grt., Trans. Am. Ent. Soc., v, 115, *Agrotis*.

1880. Grt., Bull. Geol. Surv., vi, 156, n. b. l.

docilis Grt.

1880. Grt., Bull. Geol. Surv., vi, 259, *Agrotis*.

Blackish fuscous; costa, internal margin, a variably broad submedian dash and s. t. space gray, reddish, yellow, or lilac, all the colors very bright and clean. Apical patch always somewhat bluish white. Ordinary spots pale; white more or less irrorate with yellowish; orbicular oblique, moderate in size, irregularly ovate; reniform lunate,

sometimes narrow, sometimes broad, kidney-shaped. Claviform moderate, outlined and sometimes filled with black. T. a. line geminate; included space pale; obsolete on costa, angulate between veins. T. p. line crenulate, course as usual except that in some specimens it is more incurved beneath cell. S. t. line usually very distinct, white or yellow, sometimes interrupted, always dentate on veins 3 and 4, and always preceded by a row of black sagittate spots. Cell before, between, and beyond ordinary spots to t. p. line black. A basal black mark. Secondaries pale fuscous. Beneath, variable, powdery, with a common line and discal lunule. Head and thorax concolorous, more or less mixed with whatever the pale color of primaries may be. Collar inferiorly also pale, limited above by a black line.

Expands 45-50^{mm}; 1.80-2 inches.

HABITAT.—Colorado, Oregon, Vancouver, California.

A remarkably pretty and well-marked species, very variable in color. *Docilis* is based on a large specimen in which lilac predominates. The fine series before me proves its identity with the normal form of *perecellens* in which the pale colors are gray and yellowish.

Group PITYCHROUS.

Front full, produced into a navel-shaped, or wedge-like, projection, Antennæ of male serrate and bristled, of female entirely simple, rarely ciliate. Anterior tibiae spinose, usually rather heavily armed at tip. Thoracic vestiture often hairy, particularly in the male, seldom forming definite tufts, but tending to an anterior divided tuft and loose basal bunches. The primaries are somewhat variable in shape, but never subequal, with rounded outer margin and apices; usually they are somewhat elongate, regularly widening outwardly, with rectangular or somewhat produced apices. The maculation is usually more or less confused, often decidedly variable, never clean-cut and distinct. There is no really typical form of marking, for everything tends to obsolescence in greater or less degree.

The genitalia are true to the bifurcate type of clasper, varying considerably within a very narrow limit. Special or peculiar modifications are noted under the specific name.

The species of the group are not capable of separation into broad, well marked sections, but split up into little aggregations of from two to four.

One of the largest of these series is separable by a broad black line crossing the collar.

Bicollaris has a strongly marked superficial resemblance to the *cupida* group, which indeed misled Mr. Grote in his listing of the species. The structural characters, however, are typical of the present group. The color is clay yellow, the maculation rather indefinite.

Brocha is entirely different; the color is gray, with a more or less marked rufous shade, mottled with fine transverse strigæ; the ordi-

nary lines obsolete. The genitalia of the δ are peculiar; the harpes taper to a rather acutely rounded tip, the clasper is very broad and heavy, the inferior branch very thick at base, tapering rather abruptly to an acute tip, the upper branch slightly curved, not much longer than the inferior, perceptibly enlarged toward the tip.

Sponsa is a rather uniform, very dark gray species with all the maculation indistinct. The primaries are rather short and wide.

Cogitans is luteous gray, the transverse lines obvious. It differs from all the preceding by a distinct black basal streak.

The three species, *hollemani*, *atristriga*, and *biclavis* have the black-lined collar, and have the ordinary spots confluent, neatly outlined by a whitish line. The tendency is to a strigate type of maculation, while the transverse lines are obsolete.

Hollemani has dusky secondaries, and the primaries are dark and gray. The species is variable in size and has no contrasts in shade or marking.

Atristriga has the secondaries white with a broad dusky outer margin. The primaries have an oblique paler shade extending inward from the apex, and another extending inwardly over veins 3 to 4.

Biclavis is pale gray with white strigations, and the secondaries are white. These three species are distinct from all others in the group and easily separable *inter se*.

None of the other species have a black-lined collar. Associated by the dusky secondaries and dark colors of the primaries is a small series rather distinctly separated from the others.

Perpolita is very dark blackish brown, somewhat greasy in appearance, and with rather short, broad wings. The genitalia of the male are somewhat peculiar. The harpes are somewhat corneous, the edges incurved, the whole tapering to an acute tip. The clasper is normal, except that the upper branch is rather more curved than usual.

Fumalis is very dark gray; the transverse lines distinct, black, single; t. p. strongly crenulate. The ordinary spots are indefinite.

Perfusca is a smaller species, more fuscous in color, and with all the markings obsolete.

Pastoralis is a blackish, somewhat roughly scaled species, the transverse lines not visible, the ordinary spots neatly picked out with yellow scales. From the range of variation noted in a series of bred specimens of my *infelix*, there is a possibility that it may prove but a strongly marked form of *pastoralis*, though the typical form is close to *perexcellens* in appearance.

Finis is a smaller, somewhat narrower winged, and rather paler species. The lines and ordinary spots are all distinct, and there is a red brown shade through sub-basal and s. t. space.

Velleripennis with black primaries is easily distinguished by its pure white secondaries.

Atomaris is a close ally and may possibly prove a race of the preceding. The color is paler, powdery, the maculation usually distinct.

Texana and *gagates* are distinguished by somewhat more produced apices of primaries, the colors leaving the gray to black type and getting toward fuscous or brown; the secondaries dusky. *Texana* is a large species, the maculation fairly evident, the ground color varying from a clay-yellow shot with reddish to a rather deep red brown, the maculation becoming indefinite and sub-obsolete. *Gagates* is smaller narrower-winged, red brown, the ordinary spots always distinct, dusky, the transverse lines obsolete.

The balance of the species vary from a pale ash to a darker shade of the same color, mingled with a variable quantity of yellow and red.

Three species have pure white secondaries. *Citricolor* has bright lemon yellow primaries, the terminal space rather darker. *Misturata* is sordid luteous, evenly colored, the ordinary spots and transverse lines visible. *Moerens* is a close ally of *citricolor*, but with a paler rusty shade, the lines more distinct. This species is omitted from the synopsis because I did not have it for comparison when the tables were made up. It is the type of the genus.

Four species have the secondaries pearly gray, somewhat iridescent.

Dolis has the primaries very pale, even bluish gray, the t. p. line indicated by a row of whitish, lunate spots.

Scandens is a very variable species in the shade of gray, but it is always distinguishable by the well-defined s. t. line, which is preceded by a distinct, darker shade.

Choris differs obviously; it is of a rather dark shade of gray, the transverse lines rather even and well defined, the ordinary spots distinct, completely outlined.

Remota is paler with a decided carneous shade, the ordinary spots distinctly marked.

In the remaining species the secondaries are dusky or fuscous.

Three of the species have comparatively narrower, moderately elongate wings, much as in the immediately preceding forms, but narrower than the other species in the same series.

Pitychrous varies in shade from a rather pale clay yellow to rather dark fuscous gray. The median and terminal spaces are always darker, the ordinary spots evident and discoloured, s. t. line even.

Infraeta is a smaller species, clay yellow, sordid, the median and terminal spaces darker, s. t. line very irregular, ordinary spots not discoloured.

Luteola is very evenly colored, sordid clay yellow, with concolorous ordinary spots. The orbicular is very small, the s. t. line even, somewhat remote from outer margin.

The remaining two species are shorter and wider winged, the wings more distinctly triangular.

Serricornis is an ochreous species with prominent s. t. line preceded by a distinct dark shade, the remaining maculation indistinct.

Tetrica is much more evenly colored, gray over a luteous base; all the lines evident, but none distinct.

As a whole, the species in this group are decidedly variable, and while with care there should be no serious difficulty in recognizing the species, yet hasty or ill-considered comparison is nowhere more likely to blunder than here. I have endeavored to give the specific peculiarity of each species, but it must be recollected that probably some of the forms vary more than even the large material at my command indicated. Single specimens should always be very cautiously determined where they are at all off type.

In a more condensed form the scheme appears in the following table:

SYNOPSIS OF SPECIES.

- Collar with a black transverse line or shade.
- Ordinary spots not confluent.
 - No longitudinal line at base.
 - Primaries luteous, maculation indistinct..... BICOLLARIS.
 - Primaries gray, costal space darker, mottled with fine transverse striga,
 - BROCHIA.
 - Primaries evenly dark gray, wider; maculation faint SPONSA.
 - A distinct longitudinal black line.
 - Luteous gray, transverse lines obvious..... COGITANS.
 - Ordinary spots confluent, primaries strigate.
 - Secondaries dusky, primaries dusky, strigate with white..... HOLLEMANI.
 - Secondaries white, with a broad soiled outer margin; primaries dusky, a pale apical shade, and a similar pale shade below cell to near outer margin..... ATRISTRIGATA.
 - Secondaries white, primaries gray, strigate with white BICLAVIS.
- Collar concolorous, without transverse black line or shade.
- Primaries dull dark gray to black, secondaries dusky.
 - Primaries purplish black, ordinary spots incompletely outlined in deep velvety black..... PERPOLITA.
 - Primaries deep dark gray, transverse lines distinct, single, t. p. crenulate; ordinary spots indefinite..... FUMALIS.
 - More fuscous, maculation all subobsolete..... PERFUSCA.
 - Blackish, lines obsolete, ordinary spots neatly defined by yellowish scales,
 - PASTORALIS.
 - Somewhat paler, all maculation evident, a purplish shade through basal and s. t. space FINIS.
 - Primaries black, secondaries white, maculation obsolete, ordinary spots neatly outlined VELLERIPENNIS.
 - Primaries more smoky, secondaries white, ordinary spots not distinctly outlined, transverse maculation obvious..... ATOMARIS.
 - Primaries fuscous to brown, apices produced, secondaries dusky.
 - Larger, wider winged, all maculation traceable..... TEXANA.
 - Smaller, narrower winged, transverse lines wanting, ordinary spots dusky,
 - GAGATES.
 - Primaries varying from ash to yellow gray.
 - Secondaries white.
 - Primaries bright yellow, terminal space darker, ordinary spots obsolete,
 - CITRICOLOR.
 - Primaries even, luteous; spots complete..... MISTURATA.
 - Secondaries pearly white iridescent.

- Primaries even, somewhat bluish gray; t. p. line punctiform, the points lunate.....DOLIS.
- Primaries yellowish to carneous gray, maculation obsolete, s. t. line only distinct, marked by a darker preceding shade.....SCANDENS.
- Primaries dark gray, transverse lines and ordinary spots distinct....CIORIS.
Primaries carneous gray, pale; ordinary spots distinctly marked...REMOTA.
- Secondaries dusky to blackish.
- Narrower winged.
- Clay yellow or paler to dark fuscous gray, median and terminal spaces darker, ordinary spots distinct, pale; s. t. line even.....PITYCHROUS.
- Smaller, luteous; median and terminal spaces darker, ordinary spots concolorous, s. t. line very uneven.....INFRACTA.
- Even, luteous; all maculation traceable, but faint; t. p. line very evenly crenulate; s. t. line rather even, somewhat remote from margin,
LUTEOLA.
- Wider winged, the primaries comparatively shorter, more trigonate.
- Primaries reddish ochereous, s. t. line very distinct, marked by a darker preceding shade; t. p. line punctiform.....SERRICORNIS.
- Primaries luteous, shaded with gray, very even; s. t. line indefinite, maculation else perceptibly marked.....TETRICA.

Carneades bicollaris Grt.

1878. Grt., Bull. Geol. Surv., IV, 173, 174, *Agrotis*.

1883. Grt., Proc. Am. Phil. Soc., XXI, 155, *Agrotis*.

Grayish luteous, sometimes with a reddish shade, all maculations indistinct. T. a. line geminate, slightly oblique outwardly, barely waved between veins. T. p. line sinuate, rather obsoletely geminate. S. t. line sinuate, slightly paler, relieved by a preceding, somewhat darker shade, variably distinct and complete. Ordinary spots more or less completely defined, concolorous or with a somewhat dusky shade, rarely orbicular entirely obsolete. Claviform with a bare trace in one specimen, usually obsolete. Secondaries fuscous. Beneath yellow fuscous, powdery; a variably evident common line and distinct discal spot. Head and thorax concolorous, collar with a broad black line.

Expands 33-37^{mm}; 1.30-1.50 inches.

HABITAT.—California, Arizona, Nevada.

This species has a certain false air of the *cupida* group that misled Mr. Grote in his description of the species and in his subsequent arrangements and lists.

Two ♀ specimens from Arizona agree with typical California specimens in structure and in detail of maculation, but the color is much more even, shot with reddish, and the primaries have the outer margin evidently more oblique. Possibly with a larger material this form may prove distinct.

Carneades brocha Morr.

1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 56, *Agrotis*.
bochus Morr.

1874. Morr., Proc. Bost. Soc. N. H., XVII, 163, *Agrotis*.

Somewhat bluish gray, the costa and outer margin shaded with brownish, the wing marked with narrow, irregular brown striga. Trans-

verse lines obsolete; the t. p. line punctiform, dots venular. Claviform wanting. Ordinary spots indefinite. Orbicular usually wanting or obsolete; reniform dusky lunate; a somewhat indefinite median shade crosses the median space over reniform. Secondaries white, narrowly margined with dusky. Beneath, white, powdery, a common dusky transverse line and discal spot; the line on secondaries punctiform. Thorax and head concolorous, collar broadly dark brown inferiorly.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado, Nebraska, Nevada, Kansas.

A distinct species easily recognizable by the strigate transverse motting of primaries, entirely different from anything else in the group.

Carneades sponsa Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 457, *Agrotis*.

Very dark gray, the lines and ornamentation obsolete. The lines apparently geminate; t. a. line wavy; others not traceable. The ordinary spots are just sufficiently indicated to prove them of ordinary size and shape. Secondaries fuscous. Beneath paler, more fuscous gray, with a darker common line and discal spot. Head and thorax concolorous; collar with a median distinct black line.

Expands 32^{mm}; 1.25 inches.

HABITAT.—Washington.

A single ♀ specimen. The species is much like *perfusca*, but differs by the distinct black line of collar and the somewhat shorter, more obtuse primaries. The ground color also is a distinct gray rather than fuscous, and I have no question as to the specific distinctness of this form.

Carneades cogitans Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 46, *Agrotis*.

General color ashen gray with a slight luteous tint. Head and thorax unicolorous; collar with a median transverse black line. Primaries in some specimens with fine blackish powderings, usually very even and smoothly colored without shadings or contrasts of any kind. Basal line in a fully marked specimen geminate, distinct on costa and traceable to the basal dash; in other specimens it is entirely obsolete. T. a. line geminate, the two lines equally distinct, strongly oblique outwardly and outcurved in the interspaces; sometimes almost entirely obsolete. T. p. line single, fine, crenulate, strongly outcurved over cell, and then almost parallel with the outer margin; in some specimens nearly obsolete, but generally traceable. S. t. line usually entirely wanting, rarely indicated by a vague dusky shading. A series of black terminal lunules. A distinct narrow longitudinal basal line to the t. a. line, beyond which the claviform is more or less indefinitely marked with a few black scales. Orbicular concolorous, slightly ovate, usually distinctly outlined in black, sometimes with a preceding black line, sometimes with a narrow line connecting it with the reniform. The reniform is inwardly well defined

by a curved black line, outwardly vague and indefinite, but usually traceable. Secondaries in the male pearly with a smoky tinge; in the female somewhat darker. Beneath white, powdery, with a variably distinct outer line and discal spot to all wings.

Expands 38–44^{mm}; 1.50–1.75 inches.

HABITAT.—California (Neumoegen).

Four specimens ♂ and ♀ are before me, no two of which are alike and which yet vary very slightly. The transverse lines are more or less obsolete, and the concolorous ordinary spots with their narrow black outline and markings are somewhat variable in shape and in their relations to each other. In type of marking there is a curious resemblance to *clandestina*, but the coloration and wing form are quite different. The thoracic tufting is not distinct, but is well indicated. The vestiture is rather loose.

Carneades hollemani Grt.

1874. Grt., Can. Ent., VI, 156, *Agrotis*.

Fuscous, more or less irrorate or strigate with white; costal space usually distinctly white; the terminal space is darker, strongly indented on some veins, 3 and 4 particularly, by white streaks. A distinct basal black streak, invading the cell and surrounding the white confluent, somewhat bottle-shaped, ordinary spots, claviform narrowly outlined with black. All transverse lines obsolete. Secondaries fuscous. Beneath paler, powdery, with undefined discal spots. Head and thorax concolorous; collar with a broad black shade.

Expands 31–36^{mm}; 1.20–1.40 inches.

HABITAT.—California; Arizona; Colorado.

A uniquely-marked species, resembling *lagena* of an entirely different group. The confluent ordinary spots, combined somewhat more gourd than bottle-shaped, and the white strigate maculation is entirely unique in the structurally allied species. The anterior tibia is less heavily armed at tip than most species of the group. It somewhat resembles *insertans* of the preceding group, but differs in the group characters.

Carneades atristrigata sp. nov.

Ashen gray, black powdered; collar with a black transverse line. Primaries heavily black powdered, all the transverse maculation obsolete. Orbicular elongate, narrow, fused with the small, upright reniform, also all the normal maculation absent. A paler shade runs from the end of the cell to the apex, and veins 3 and 4 are white marked nearly to the margin, lightening that region. The fringes are cut with white. Secondaries white, with a broad, soiled outer margin.

Expands 30^{mm}; 1.20 inches.

HABITAT.—Northwest British Columbia.

The ordinary spots are small and scarcely distinct. The specimen is

a poor one and badly rubbed, and would not have been described but that it was a male, with the affinities so distinct as to render its recognition certain should other specimens be turned up.

Carneades biclavis Grt.

1879. Grt., Bull. Geol. Surv., v, 206, *Agrotis*.

1882. Grt., Ill. Essay 53, Pl. 1, f. 12, *Agrotis*.

Color of primaries pale yellowish gray. Ordinary spots fused; the white orbicular lying on the cell and entering the upright reniform, which is more angulate and less bent than in *lugena*, and centrally stained with ochreous; the ordinary spots edged with black, except superiorly. A black basal dash extends into the long, whitish and prominent claviform, finely edged with fuscous. Median lines obliterate. S. t. line indicated by a curved series of interspaceal black marks. Veins inconspicuously and finely marked in white. Secondaries pure white. Beneath white, slightly fuscous on the cell. Thorax whitish gray.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Arizona.

This species is unknown to me in nature, but its resemblance to *hollemani* is so marked that it can be referred nowhere else. Mr. Grote fortunately gives antennal structure of the ♂ which makes the reference more positive.

Carneades perpolita Morr.

1876. Morr., Proc. Bost. Soc. Nat. Hist., XVIII, 237, *Agrotis*.

1878. Liut., Ent. Cont., iv, 123, *Agrotis*.

Deep shining blackish brown, transverse lines obsolete, ordinary spots concolorous, outlined by narrow black lines; variable in shape and occasionally connected or even confluent. Secondaries smoky fuscous, paler at base. Beneath smoky, the costal and outer margins of both wings darker. A distinct discal lunule. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Northern, Eastern, and Middle States, Maine, New York.

A very simply marked species, and once sectionally placed entirely unmistakable. I have the type, which is the largest specimen I have seen, and which has a distinct brown tint, less evident in the other specimens. It seems rare, and most of the specimens seen by me have come either from Mrs. Fernald or from Mr. Hill.

Carneades fumalis Grt.

1873. Grt., Bull. Bull., 1, 98, *Agrotis*.

1878. Grt., Bull. Geol. Surv., iv, 174, *Agrotis*.
permunda Morr.

1874. Morr., Proc. Bost. Soc. Nat. Hist., xvii, 163, *Agrotis*.

Dark ash-gray, unicolorous; transverse lines distinct, apparently simple. T. a. line outwardly oblique, curved between veins, and be-

neath vein one making a longer outward reach, greatly contracting the median space. T. p. line strongly dentate, its course nearly parallel to the outer margin. S. t. line obsolete; claviform wanting; orbicular obsolete, or very faintly defined; reniform dusky, indefinite, lunate. Secondaries smoky fuscous, somewhat paler at base. A distinct discal lunule. Beneath dusky, secondaries paler, powdery; a distinct common darker line and discal lunule. Head and thorax concolorous.

Expands 34–36^{mm}; 1.35–1.45 inches.

HABITAT.—Canada, New York, Massachusetts, Maine, District of Columbia, Northern, Middle, and Eastern States.

Very distinct by the dark ash-gray color and the blackish single very irregular transverse lines. The species is found not commonly throughout the Middle and Eastern States, westward to the Mississippi.

The reference of *permunda* Morr. to this species is made on the faith of a specimen so named in the Meske collection, and there is nothing in the description which does not perfectly accord with this reference.

Carneades perfusca Grt.

1883. Grt., *Papilio*, III, 77, *Agrotis*.

Uniformly dark fuscous, all the markings obsolete. Ordinary spots concolorous, moderate; orbicular round, reniform wide; both marked by whitish scales. Secondaries yellowish fuscous. Beneath paler; secondaries with two shade bands and discal mark. Head and thorax concolorous.

Expands 33^{mm}; 1.30 inches.

HABITAT—California, Colorado, Arizona.

An obscurely marked species, compared to *messoria*, but none of the markings are evident. It is somewhat variable in color, the Colorado specimen being rather more grayish. It has been sufficiently distinguished from *sponsa* to which it is perhaps most nearly allied. This is sometimes a confusing species. The lines are occasionally somewhat evident and the *messoria* resemblance may become marked enough to create doubt.

Carneades pastoralis Grt.

1875. Grt., *Can. Ent.*, VII, 68, *Agrotis*.

Dark fuscous to dull black, occasionally slightly powdered with gray; the ornamentation variably indistinct, never entirely complete. Transverse lines geminate; t. a. upright, but little curved between veins; most distinctly so beneath vein 1; t. p. line very evenly curved, parallel with outer margin, slightly lunulate. S. t. line pale powdery, very indistinct; sometimes marked by indistinctly darker sagittate marks. Ordinary spots always defined, somewhat variable in size and shape; narrowly outlined in black, then annulate with yellow; the annuli variably distinct and sometimes consisting only of scattered scales; the center is concolorous; usually the spots are normal in size and shape,

though sometimes smaller. Claviform short, narrow, outlined. Secondaries smoky, base paler. Beneath pale, powdered with dusky; an incomplete common line and discal lunule. Head and thorax concolorous, mixed with a few yellowish scales.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT—Vancouver, Colorado, Arizona, Washington, Nevada; northwestern British Columbia.

This is a somewhat narrow-winged species, very variable within comparatively wide limits, and yet at the same time recognizable from the fact that there is no other structurally allied species with which it can easily be confounded. A series of specimens from northwestern British Columbia, which I refer here show an almost immaculate form, varying to one in which the ordinary spots are yellow powdered; in none of the specimens are the transverse line at all traceable, yet I can scarcely consider it a distinct species. The black form of *infelix* to which attention has been already drawn, may ultimately prove to connect the two names into the most widely variant species known to me.

. *Carneades finis* Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 457, *Agrotis*.

Sordid brownish fuscous, a more distinctly rusty brown shade in subbasal and s. t. space. Transverse lines geminate variably distinct, but evident in all observed specimens. T. a. line oblique, outwardly curved between veins, not more prominently beneath vein 1. T. p. line even, slightly crenulate, parallel with outer margin. S. t. line pale, narrow, very slightly and irregularly sinuate. Claviform concolorous, short, evidently outlined. Ordinary spots rather large; orbicular round, reddish gray, powdery; reniform kidney-shaped, narrowly annulate with yellow, the yellow somewhat encroaching in the middle, outwardly. Secondaries dull yellowish fuscous, paler toward base, the veins and a discal lunule dusky. Beneath powdery, more perceptibly toward apices; an exterior distinct dusky line, and dusky discal spot. Head and thorax concolorous; collar with a transverse brown line, the patagiæ at base of primaries tipped with ferruginous.

Expands 34^{mm}; 1.35 inches.

HABITAT.—Black Hills, Montana.

This species is nearest to *pastoralis*, but is smaller, and the primaries are more obtuse. The distinct transverse lines and the well-marked brown shades in s. t. and subbasal spaces render it very distinctly recognizable, though they somewhat obscure the relationship to this group.

Carneades velleripennis Grt.

1874. Grt., 6 Rept. Peab. Ac. Sci., 25, *Agrotis*.

Smoky black, the transverse maculation indistinct or entirely obsolete; the ordinary spots large, concolorous, more or less completely

defined by a narrow deep black line. Secondaries white, toward the margin powdered with a few blackish scales. Beneath, primaries smoky, powdery; an evident discal dot; secondaries white, along costal margin powdered with black; a blackish powdery discal lunule. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Canada, Middle and Eastern States, west to California.

Distinguished by the almost uniformly black primaries and white secondaries. From dark forms of *pastoralis* in which the maculation is obsolete, this species is distinguished by the white secondaries, and the much shorter, more stumpy primaries. The species is a very recognizable one, and not uncommon locally.

Carneades atomaris Smith.

1890. Smith, Trans. Am. Ent. Soc. xvii, 47, *Agrotis*.

Head, thorax and primaries deep smoky or blackish brown. Palpi darker at sides, collar with a tip of luteous scales, thoracic crest with an admixture of hoary scales. Primaries with a luteous shading through the centre of the wing. All the maculation obscure, indistinct, yet all traceable. Basal line marked on costa only by a geminate black spot. T. a. line geminate, sometimes traceable through the cell, somewhat out-curved between veins and with a long outcurve below the internal vein. T. p. line geminate, marked on costa, evenly outcurved over reniform; inner line finely crenulate, outer scarcely marked, except by the slightly paler included shade. S. t. line paler, interrupted, sometimes almost obsolete. Claviform present, outlined in black. Orbicular round, moderate in size, very indistinctly outlined. Reniform rather large, normal in form, slightly more leaden black, not very definitely outlined. Secondaries (♂), pure white, a narrow dusky marginal line. Beneath white, powdery, with an interrupted outer line and discal spot to all wings.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—California (Neumoegen. Collection U. S. National Museum).

This seems the California representative of *velleripennis* which is also said to occur there. A large series in the Museum collection is all referable to this species. I shall not be at all surprised, however, if it prove but a geographical race of the Eastern form. The ground-color is more luteous and powdery, and the maculation is more distinct than in its ally.

Carneades texana Grt.

1863. Grt., Proc. Ent. Soc. Phil. II, 273, pl. 6, f. 2, *Agrotis*.

1881. Grt., Papilio, I, 127 et 153? = *segetum*.

1883. Grt., Papilio, III, 176, an. sp. dist. *segetum*.

Luteous to red brown; rather evenly colored, markings usually present though very variably distinct, and never greatly contrasting. Me-

dian lines geminate. T. a. line nearly upright, roundedly angulate between veins. T. p. line parallel with outer margin, somewhat paler. S. t. line very indefinitely marked by the darker terminal space, sometimes entirely obsolete. Claviform wanting, or but faintly marked. Orbicular concolorous, round, narrowly defined. Reniform large, dusky, slightly constricted at middle and marked by a slightly paler annulus. Secondaries, whitish to yellowish fuscous. Beneath powdery, with somewhat darker discal spots. Head and thorax concolorous.

Expands 40–44^{mm}; 1.60–1.75 inches.

HABITAT.—Texas and Arizona.

A large species, not difficult of recognition, though variable in color. The wings are rather large, the outer margin oblique. The species has been doubtfully referred as synonymous with *segetum*, with which it has little indeed in common. *Segetum* is a very distinct species allied in markings to *messoria*, the antenna, however, very distinctly bipectinate, according to my arrangement close to *ypsilon*. I have seen no American specimens of *segetum*, and do not believe that such exist.

Carneades gagates Grt.

1875. Grt., Can. Ent. VII, 68, *Agrotis*.

1880. Grt., Bull. U. S. Geol. Surv. VI, 162, *Agrotis*.

Red brown, the transverse maculation obsolete. Median lines indicated by geminate spots on the costa. S. t. line pale, narrow, irregular, sometimes only marked by the somewhat darker terminal space. Ordinary spots normal in size and shape, pale ringed, blackish. Secondaries, fusco-luteous, paler toward base; the veins and a discal lunule darker. Beneath, powdered with reddish and black, all wings with an evident discal spot. Head and thorax concolorous.

Expands 37–40^{mm}; 1.50–1.60 inches.

HABITAT.—Colorado, California.

Very readily distinguished by the brown color, the darker ordinary spots and obsolete transverse lines. Except in the depth of ground-color I have noted no appreciable variation.

Carneades citricolor Grt.

1880. Grt., Can. Ent. XII, 154, *Agrotis*.

1880. Grt., Bull. Geol. Surv. VI, 160, *Agrotis*.

1883. Grt., Can. Ent. XV, 26, *Carneades*.

Lemon yellow, terminal space and antepical costal patch dusky, fuscous or brownish. Transverse lines variably distinct, geminate. T. a. line oblique, curved between veins. T. p. line about even with outer margin, slightly lunate between veins. S. t. line very irregular, limiting the dark terminal space. A row of small terminal dots. Claviform wanting. Orbicular dusky indefinite, more or less completely obsolete. Reniform large, dusky, indefinite, but tending to become inferiorly

enlarged. Secondaries, pure white. Beneath, pure white. Primaries powdered with gray toward apices, with a distinct discal dot. Head and thorax concolorous.

Expands 35–36^{mm}; 1.40–1.45 inches.

HABITAT.—Colorado, Utah, Arizona.

Very easily recognized by the bright lemon-yellow color of primaries and the pure white secondaries of both sexes. It scarcely needs reiteration that Mr. Grote's reference of the species to *Carneades*, as a distinct genus, was based upon ignorance of the variation of structure peculiar to the genus.

The vestiture is entirely hairy.

Carneades misturata Morr.

Luteous, with a variable sprinkling of black scales; veins, especially the median, marked with white scales. Transverse lines distinct, though not contrasting, geminate. T. a. line outwardly oblique, moderately curved between veins. T. p. line somewhat paler, slightly crenulate, its course evenly parallel with outer margin. S. t. line pale, often marked only by the slight difference in color between s. t. and terminal spaces, the latter being darker; the line tolerably even; a row of dark terminal dots. Claviform faintly indicated. Ordinary spots concolorous. Orbicular small, round. Reniform somewhat constricted at the middle, dilated inferiorly. Secondaries, white; beneath, white. Primaries, powdered with gray outwardly, and with a distinct discal spot. Head and thorax concolorous.

Expands 34–35^{mm}; 1.35–1.40 inches.

HABITAT.—Colorado.

Resembles *citricolor* in its pure white secondaries, but otherwise very distinct. It is hardly to be confounded with any species of this group. I can not find that Mr. Morrison has ever described this species. It does not seem to be in Mr. Grote's list, and the name in Mr. Tepper's collection, I believe, was probably a MSS. one, overlooked in publishing.

Carneades moerens Grt.

1883. Grt., Can. Ent., xv, 4, *Carneades*.

1883. Grt., Papilio, III, 30, *Carneades*.

“Of a faded, rusty yellowish fuscous. Lines fuscous, double, rather indistinctly scalloped. Stigmata concolorous, the orbicular round, with central dark dot; the reniform indistinct, with an inferior stain. Terminal space a little darker than the wing. Collar with a faint line. Thorax like fore wings. The untufted abdomen yellowish. Hind wings pale, with diffuse pale fuscous s. t. shading; a mesial line. Beneath pale, with a common faint line and rather long discal streaks.”

Expands 31^{mm}; 1.25 inches.

HABITAT.—Arizona.

The species is not unlike *pitychrous* in maculation and color, but has white secondaries. It is a close ally of *citricolor*, but with more the ground-color of *misturata*.

Mr. Grote, in establishing his genus *Carneades*, seems not to have been aware how large a proportion of the species of *Agrotis* shared the structural peculiarities attributed to this genus.

Carneades dolis Grt.

1880. Grt., N. Am. Ent., 1, 91, *Agrotis*.

An even, pale ash gray, all maculation obsolete. The t. p. line only is evident, white, single, interrupted, somewhat lunate. The s. t. line is indicated by a few white scales and is apparently very irregular. Fringes of primaries with a yellowish line at base. Secondaries whitish fuscous, paler toward base; fringe white. Beneath, white, powdery, a distinct discal dot and incomplete transverse line on each wing. Head and thorax concolorous.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado.

Another species with uniformly gray primaries and yet not to be confounded with the rather unusually numerous forms with wings almost or quite as evenly colored. About every group has a species with uniformly pale gray primaries, and yet even without reference to the structural differences each has a habitus so peculiarly its own that there is but little danger of confusion.

Only the unique type of the species in Mr. Hulst's collection is thus far known to me.

Mr. Butler says this species is indistinguishable from the *Chera biviata* Hbn., which occurs in the Alpine regions of Europe; but I can scarcely accept this conclusion without closer comparison than Mr. Butler seems to have made in the preparation of his paper.

Carneades scandens Riley.

1869. Riley, first Rept. Ins. Mo., 76, pl. 1, f. 5 and 7, *Agrotis*.

1874. Riley, sixth Rept. Ins. Mo., 6, *Agrotis*.

1875. Grote, Buff. Bull, II, 306=*muracnula*.

1875. Harv., Buff. Bull, III, 73, pl. 3, f. 4, an sp. dist.

1881. Riley, Gen. Index and Suppl. to Mo. Rept., 75, *Agrotis*.

1881. Grt., Papilio, 1, 127 = *messoria*?

1882. Riley, Papilio, II, 43, an sp. dist.

1883. Saund., Fruit Insects, 107, f. 105, *Agrotis*.

Ash gray, with various additions of yellow or red, changing the tone of ground color considerably. Transverse lines marked by geminate costal spots, else obsolete. S. t. line prominent, pale, interrupted, sinuate; marked by a preceding dusky shade, varying from fuscous to carmine, red brown. Orbicular, often entirely obsolete, more usually distinguishable as a rounded spot of the shade with which the gray base is suffused. Reniform usually perceptibly defined, of the ordinary form and size, inferiorly with a dusky shade, else concolorous. Secondaries

whitish with a double outward dusky shade, and a dusky discal spot. Beneath whitish, powdery, each wing with a faint discal spot and incomplete common line. Head and thorax concolorous. Thoracic vestiture, hairy.

Expands 29–37^{mm}; 1.15–1.50 inches.

HABITAT.—East of Rocky Mountains.

A very variable species in the shade with which the gray ground color is suffused. A remarkably large and handsome specimen from Utah is shaded with a rich carmine. Eastern specimens are, as a rule, smaller and more yellow in color than western examples. Mr. Grote has made very persistent efforts to get this species into the synonymy somewhere, but without any remarkable amount of success heretofore.

The early stages have been described by Professor Riley.

Carneades choris Harv.

1876. Harv., Can. Ent., VIII, 37, *Agrotis*.

Grayish fuscous; rather evenly sprinkled with dark scales, the tint very even and smooth in appearance; veins marked. Transverse lines rather broad, distinct, geminate, the included space paler. T. a. line outwardly oblique, very slightly wavy; t. p. line parallel with outer margin, rather even; s. t. line, narrow, pale, interrupted, its course sinuate. Claviform outlined. Ordinary spots distinct; orbicular round, moderate; reniform well sized, inferiorly somewhat enlarged. Secondaries whitish with dusky external line. Beneath whitish, powdered with gray, a distinct discal lunule; primaries with a dusky transverse line.

Expands 35–37^{mm}; 1.40(♀)–1.50(♂) inches.

HABITAT.—Colorado, Nevada.

There is considerable difference between the sexes of this species; the ♂ is paler, the transverse lines unusually approximate; s. t. line subobsolete; ordinary spots paler; the ♀ is darker, the transverse lines normally separated; s. t. line distinct, ordinary spots annulate with pale, else concolorous. This is a perfectly distinct and well-marked species, entirely unlike any other described form.

The specimens before me do not quite agree with what Dr. Harvey says of the species. His type is a ♂, and, compared with the example before me, the latter has the t. p. line more evidently marked and the orbicular is hardly elongate, nor the reniform narrow. Still I do not think I have a distinct species.

Carneades remota Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 48, *Agrotis*.

General color a pale, carneous gray. Palpi blackish at sides, else head and thorax immaculate, concolorous. Primaries with a reddish suffusion apparent in the median space, and the terminal space dusky. Basal line geminate, distinct, brown. T. a. line geminate, incomplete, slightly

outcurved in the interspaces. T. p. line indistinctly geminate, as a whole well exerted over the reniform and thence rather evenly oblique to the inner margin; inner part of line fine, crenulate, outer line represented by venular dots distinct only below vein 5. S. t. line indefinite, irregular, forming an outward curve on veins 3 and 5, and again near apex; relieved by the dark terminal space. Claviform small, concolorous, incompletely outlined. Ordinary spots paler ashen gray; orbicular outlined in black, oblique, somewhat irregular oval. Reniform large, kidney-shaped, narrowly pale lined, incompletely outlined inferiorly, outwardly with a pale, more yellowish blotch. A very narrow, interrupted, terminal line. There is a slightly deeper shade of reddish between the ordinary spots, but nothing like a distinct dark shading. Secondaries soiled whitish, with a darker outer margin. Beneath, primaries fuscous, with paler powdery outer and costal border. Secondaries paler, powdery, with an incomplete outer line and a diffuse discal spot.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Sierra Nevada, California (McGlashan).

This is perhaps nearest to *choris*, but quite distinct from it. The maculation is more distinct than in any other member of the group so far as the spots are concerned and approaches the *tessellata* group, without, in the specimens before me, raising any question as to the propriety of referring the species here.

Carneades pitychrous Grt.

1873. Grt., Bull. Bull. 1, 82 *Agrotis*.

personata Morr.

1876. Morr., Proc. Bost. Soc. N. H., xviii, 238, *Agrotis*.

1880. Grt., Can. Ent. xii, 187, pr. syn.

Ocher yellow, to dark, somewhat bluish gray shaded with fuscous. Median and terminal spaces darker; costa in the more deeply colored specimens gray. Transverse lines variably complete, often subobsolete, sometimes very distinct, geminate; t. a. line upright, obtusely angulated between the veins; t. p. line very even, parallel with outer margin. S. t. line pale, usually rather evenly sinuate, sometimes marked with a preceding darker shade, rarely slightly indented on veins 3 and 4. Claviform usually indicated, rarely complete. Ordinary spots usually well defined, orbicular in pale specimens sometimes indefinite, but usually paler than ground color, reniform, always defined, paler than ground color, inferiorly darker. Often the outer third of median space is perceptibly darker than the other portion and sometimes there is a distinct dark shade in the cell, between the spots. Secondaries dusky to blackish, paler toward base; beneath whitish; primaries through center darker; a variably distinct common line and a dusky discal dot. Head and thorax concolorous.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—Canada and United States east of the Mississippi.

A common and variable species difficult to characterize except by a description of individuals. Common to all forms is the pale somewhat discolorous reniform, the inferior portion dusky; the general difference in shade of s. t. and terminal space is also constant, as is the slighter difference in shade in the median space itself. About every other character varies. The extreme pale form is generally larger, the lines obsolete, and a tendency to a pale longitudinal shade through the middle of the wing; this I consider the typical *pitychrous* form. The other extreme is smaller, the colors dark, the differences in shade decided, transverse lines complete; this is the *personata* of Mr. Morrison, the type of which is before me. Intergrades of all shades and sizes occur, and usually in these intermediate forms the costa is distinctly gray. As a rule the ♂ is paler and the secondaries are dirty white, darker outwardly. The thoracic vestiture is very strongly intermixed with scales. This species has been taken by me in some numbers on golden-rod in September, usually late in the afternoon—from 3 to 6 p. m. I do not remember taking it at Sugar.

Carneades infracta Morr.

1875. Morr., Proc. Bost. Soc. Nat. Hist., xviii, 115, *Agrotis*.

Fusco-luteous, median and terminal spaces darker. Median lines geminate, distinct. T. a. line upright, but little curved between veins; t. p. line with a wide outward angulation over cell; incurved beneath. An evenly marked exterior shade from apex to inner margin just inside the s. t. line; the latter pale, narrow, and unusually irregular and strongly sinuate, its course mostly through the dark terminal shade. Ordinary spots concolorous with pale portions of wing, well defined; orbicular large, round; reniform moderate, outer side strongly incurved at middle. Claviform outlined, small. Secondaries uniform pale yellowish fuscous. Beneath pale, powdery, with common dark line and discal spot. Head and thorax concolorous.

Expands 28^{mm}; 1.12 inches.

HABITAT.—Colorado, Texas.

A small species with narrow primaries; not unlike some forms of *pitychrous*; but the very irregular s. t. line will serve to separate this form.

Carneades luteola Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 457, *Agrotis*.

Luteous, with a reddish shade, and somewhat irrorate with black; a darker shading to outer portion of median space; entire terminal space dark. Transverse lines geminate. Basal line evident. T. a. line slightly oblique outwardly and hardly wavy. T. p. line with outer parts distinct near costa only; inner portion distinct, fine, evenly crenulate. S. t. line concolorous, preceded by a dusky shade, its course very even; the line itself narrow, and somewhat remote from outer margin. Clavi-

form obsolete; orbicular small, round, concolorous; reniform somewhat indefinite, inferiorly shaded with dusky. Secondaries dirty white, outwardly dusky. Beneath pale, powdery, a reddish tinge along costa; a common outer dark line and distinct discal spot. Head and thorax concolorous.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Arizona.

A sordid, indefinitely marked species, distinct, however, from the nearly allied species; from *infraeta* it differs by the even s. t. line, and very even t. p. line. From the *personata* form of *pitychrous* it differs by the concolorous ordinary spots and very small orbicular; the median space is not darker and the s. t. line is farther from the margin than in *pitychrous*.

Carneades serricornis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 458, *Agrotis*.

Reddish ochreous, powdery; s. t. line with a distinct preceding dark shade; terminal space incompletely dusky. Basal and t. a. lines geminate; the latter slightly oblique, outwardly curved between veins. T. p. line punctiform, geminate, the dots venular, small. S. t. line very distinct, slightly paler, but emphasized by the preceding dark shade; its course irregularly sinuate. Claviform wanting; orbicular obsolete, very faintly pale ringed; reniform dusky, lunate, obsoletely pale ringed. Secondaries whitish, outwardly dusky. Beneath pale, powdered with reddish and gray; an undefined discal dot on each wing. Head and thorax concolorous, vestiture mixed.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Southern California.

Obviously distinct from anything else in the group; recognizable by the reddish shade to primaries, the very distinct s. t. line and lunate dusky reniform. The primaries are comparatively shorter and somewhat broader than any other species except perhaps *tetrica*.

Carneades tetrica Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 458, *Agrotis*.

Gray over reddish luteous, color very even; all maculation indistinct; lines geminate. T. a. line upright, very even. T. p. line parallel with outer margin, also remarkably even. S. t. line somewhat paler, very faintly indicated, sinuate. Claviform wanting, orbicular large round, concolorous, marked with black scales; reniform inferiorly dusky, indefinite, rather large in size. Secondaries dusky, paler toward base. Beneath pale, powdery, with discal lunule on all wings. Head and thorax concolorous; vestiture mixed.

Expands 35–37^{mm}; 1.4–1.5 inches.

HABITAT.—Texas, Nevada.

The wings are rather wider than most species of the group. The very even color and the remarkably even median lines will serve to identify this form which conflicts with none at all allied to it in shape of primaries.

The Nevada specimen in Mr. Tepper's collection is somewhat darker than those from Texas, and the maculation is still more completely obsolete.

Group MESSORIA.

Anterior tibiae spinose, the terminal armature heavy; the member itself somewhat abbreviated, flattened and broad toward tip. The front full, tuberculate, the projection centrally depressed, or knob-like and roughened, granulate. The thorax is moderate, usually with an indefinite posterior tuft, occasionally with a divided anterior crest, never entirely untufted. The vestiture is entirely hairy in some species, mixed with flattened scales in others. The antennae of the male are serrate, the joints strongly bristled. Primaries moderate, the apices at most rectangular and often somewhat produced. The distinctive feature characterizing the group is a distinct dark shade line through the median space, and the species grouped by this character, though colorational merely, are closely allied. The genitalia are all of the same bifurcate type; the lower branch is stout, straight, more or less tapering to the tip, variable in length in the species; the upper branch is more slender, subcylindrical, curved, usually shorter than, but occasionally exceeding the inferior branch in length. The variation in this structure is so decidedly one of degree rather than kind, that the figures must be left to explain the small apparent distinctions.

The group is divisible into two series, well distinguished at the extremes, but closely approaching at the middle; yet there is little difficulty in most cases in properly referring a species even though it is impossible for me to express the difference as briefly as I should like.

The first series, of which *bostoniensis* may be considered typical, is characterized by almost entirely hairy vestiture of thorax, never forming a distinct divided tuft, but gathered usually into an indistinct tuft posteriorly. The species are of moderate, or large size, the colors generally based on a shade of gray with various admixtures of yellow or red; the apices of primaries are produced, the outer margin oblique.

The maculation in the majority of species is indistinct, the median shade being often the most prominent feature. The ordinary spots are obsolete and indefinite except in *extrane* and *trifasciata*, which, however, well agree in wing form with the typical species. The secondaries except in the two species above cited, and *comosa* and *bifasciata*, are white in the male, dusky in the female. The four species last cited are the aberrant ones of the series. The two former, however, as already stated have the wing-form, while *comosa* has the vestiture entirely hairy and *bifasciata* has the ordinary spots obsolete, the transverse lines simple.

Of the second series *messoria* is typical. The vestiture is very strongly intermixed with scales usually modified into a distinct, anterior divided tuft. The wings are more equal, the outer margins not so oblique, on the whole, less trigonate. The secondaries are never white in either sex. The maculation of primaries is usually well marked, the t. p. especially, which is strongly crenulate. The ordinary spots are usually very distinctly outlined and well sized, and where that is not the case, the dark color of primaries, the resemblance in form and other maculation to *messoria* is so striking that hesitation is not often necessary in placing a species.

In the subgroup *bostoniensis*, the typical species is remarkable for the dark color of primaries, and the blackish secondaries of the female.

Caenis, of which *muscosa* is a synonym, has the gray of primaries suffused with reddish, and the transverse lines of the same color.

Medialis replaces the reddish by yellow or white, the lines similar, but evidently geminate.

Feniseea has the ground color a pale luteous, the lines still more evidently geminate and becoming crenate, showing an evident tendency to the next section.

Extranca is even darker in ground color than *bostoniensis*, with the wing form of *caenis* and the transverse lines and ordinary spots distinct.

Trifasciata resembles the preceding so much that I at first inclined to the belief that they were color varieties; but closer comparison shows them to be distinct. This species has the primaries distinctly red brown, the orbicular larger, and the reniform differently shaped.

Bifasciata is smaller than either of the preceding, and unique, not only in coloration, but also in the broad, black and closely approximated median lines. The ordinary spots are obsolete.

Comosa still more strongly resembles the *messoria* group, but has the vestiture entirely hairy, the ordinary spots obsolete; the color is reddish and the t. p. line is very strongly denticulated.

In the *messoria* series there are two very well marked divisions possible, based upon average size—a difference of about .20 inches or 5^{mm} separating them.

Of the larger species, three have a distinct claviform.

Messoria is dark gray or fuscous, all the maculation very distinct. There is some variation in ground color, but on the whole the species is so true to type, that once known it will scarce be again mistaken. Some species have a reddish shade similar to the next.

Rubefactalis has a distinct red cast to the primaries, a black shade preceding the s. t. line, and a broad, black transverse line on collar.

Fauna seems to follow most naturally, though, from the horrible condition of the type, it is as much guess-work as anything else to assign an exact position to the species, and the type is the only specimen I have seen. The orbicular is irregular and the claviform linear, acute at tip. The ground color is pale red brown,

Pleuritica comes close to *messoria* but has a peculiar rusty yellowish tint to primaries which is characteristic. The resemblance to *pitychrous* which Mr. Grote emphasizes in his description I entirely fail to see. The species does not appear in the synopsis as I had not recognized it when that was written and have no specimens at hand now to place it properly. The remaining species of the larger series lack the claviform.

Brunneigera is close to *rubefactalis* in appearance, but lacks the claviform, and the ordinary spots are indistinct.

Incallida is a smooth even bluish ash gray in color, the median shade upright, very broad, distinct, diffuse, contrasting; the secondaries of the female blackish.

Intulentus is luteous in ground color, the median shade narrow, vague, indefinite; secondaries of female luteo-fuscous.

Annilipes is a whitish gray, powdery form with a very prominent, curved narrow median shade.

Murdocki is one of the handsomest of our species. The basal and sub-terminal spaces are a bright rusty red or yellow, the median space a fine blue gray more darkly shaded outwardly. It is unique in appearance, and easily recognizable.

Quinquelinea is a simply-marked, fuscous gray species of rather even color, with simple black transverse lines, differing thus obviously from all the other members of the subseries. The remaining species of the group are smaller than any of the preceding; not so much absolutely, but habitally, seeming slighter in most cases.

Friabilis is a very dark form in which all the markings of *messoria* are present, sometimes quite distinctly. The general tint is more blue gray where *messoria* is fuscous, but otherwise the species might be considered as a dwarfed form.

Fuscigera is a still smaller, paler gray, the transverse lines broad, very distinct and somewhat approximate.

Orbicularis is a paler, somewhat longer winged species, in which the median lines, in contrast with the preceding, are widely separated.

Microuyx is a very short-winged, robust species, of the typical *messoria* color and general style of maculation, but the lines are indistinct and the orbicular is unusually large, gray.

Intrita is well marked; equally robust and short winged as the preceding, the color is a mixture of rust red and black, the lines distinct, geminate, the included space pale; t. p. line unusually even. As a whole, the species of each little group are closely allied, and yet each affords one or more distinctive characters, the knowledge of which renders specific recognition easy.

SYNOPSIS OF SPECIES.

Vestiture hairy, thorax with basal tuft only.

Secondaries, at least of ♂, white; primaries gray to yellow.

Primaries very dark gray; median shade line the only distinct maculation,

is also distinct and crossing, the reniform is somewhat darker at that point. Secondaries ♂ white, ♀ black. Beneath pale, powdered with blackish; a distinct discal lunule, and an imperfect extra discal line.

Expands 37–41^{mm}; 1.50–1.65 inches.

HABITAT.—Middle, Eastern, and Northern States, Canada.

Easily recognized by the almost uniform dark ash-gray color. The difference in color of secondaries in the sexes is unusual, and not paralleled to the same extent in the genus. The vestiture is woolly, long.

Carneades cænis Grt.

1879. Grt. N. Am. Ent., 1, 44, *Agrotis*.

muscosa Grt.

1883. Grt. Can. Ent., xv, 26, *Agrotis*.

1887. Smith, Proc. U. S. Nat. Mus., x, 460, pr. syn.

Gray, suffused with reddish; the ordinary spots concolorous, very illy defined. Transverse lines usually obsolete; in pale specimens distinct, red-brown, single. T. a. line upright, with an outward curve below vein 1; t. p. line very even, parallel with outer margin; s. t. line pale, accompanied by a darker reddish shade. The median lines marked at costa with distinct geminate spots; median shades very distinct with a slight outward curve; deeper brown in color. This shade is distinct, even when all other maculation is obsolete. Secondaries ♂ white, ♀ dusky. Beneath pale, powdery primaries darkest. An indefinite discal lunule.

Expands 37–44^{mm}; 1.50–1.75 inches.

HABITAT.—Colorado.

A very pretty and well-marked species: *muscosa* Grote, of which I have the type, is based on a dark specimen in which only the median shade line is distinct. It is a ♀, and in all the females the maculation tends to become obsolete.

Carneades medialis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 459, *Agrotis*.

Grayish white to ocher yellow, more or less irrorate with black scales; the transverse lines diffuse, powdery, dark, geminate; s. t. line also rather broad, diffuse; all the lines even; ordinary spots dusky, not defined, traceable; the usual median dark shade is distinct in most specimens. Secondaries ♂ white, ♀ dusky; beneath white, sparsely powdered with gray; indefinite gray discal spots and common line.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—Texas.

Seems not uncommon in Texas and is a very distinct species. It was in the Belfrage collection named *muraenula*, but is a very different species. The ♂ specimens seem inclined to pale yellowish, giving the insect a cursory resemblance to *citricolor*, than which it is much larger.

Carneades feniseca Harv.1875. Harv., Buff. Bull., III, 74, pl. 3, f. 6, *Agrotis*.1875. Grt., List Noctuidæ, 25, *Agrotis*.

Grayish clay yellow; the transverse lines fuscous, moderately distinct, geminate; basal line evident; t. a. line upright or but slightly oblique; but little angulate between veins; t. p. line crenulate, nearly parallel with outer margin; s. t. line diffused, indefinite; ordinary spots concolorous, illy defined; size and shape much as in the preceding species; claviform faintly indicated in some specimens. The median shade is distinct, diffuse. Secondaries ♂ white, ♀ dusky; beneath as in the preceding species.

Expands 34–38^{mm}; 1.35–1.55 inches.

HABITAT.—California.

Distinguished by its uniform luteous gray color, but otherwise in habitus very near to the preceding species.

Carneades extranea Smith.1887. Smith, Proc. U. S. Nat. Mus., x, 459, *Agrotis*.

Dark ash gray; the transverse lines distinct; basal line evident; t. a. line faintly geminate, upright, scarcely lunate between veins; t. p. line even, outwardly curved over cell, inwardly slightly sinuate to hind margin. The terminal space is somewhat darker shaded, relieving the concolorous, very irregular s. t. line. Median shade distinct, diffuse, outwardly shaded so as to reach the t. p. line and thus darken the outer third of median space. Ordinary spots concolorous, distinctly outlined; orbicular small, round; reniform elongate, upright, rather narrow; secondaries ♀ yellow fuscous, of ♂ unknown; beneath fusco-luteous, powdery, an indefinite common line and discal lunule, darker.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Montana.

A single ♀ specimen only in Mr. Tepper's collection. It is readily distinguished from all the others of the group by the dark gray color, the distinct ordinary spots, and the outwardly darker median shade. The insect has a casual resemblance to the species of *Ammaconia* both in maculation and wing form.

Carneades trifasciata Smith.1887. Smith, Proc. U. S. Nat. Mus., x, 460, *Agrotis*.

Deep red brown, slightly irrorate with bluish gray; the transverse lines black. Basal line evident. T. a. line rather remote from base, single, upright, slightly irregular. T. p. line about parallel with outer margin, single, not very even in width, somewhat powdery. S. t. line punctiform pale, very even. Median shade darkening cell between ordinary spots, approximating t. p. line inferiorly and connected with it

at inner margin. Claviform evident, very small. Ordinary spots large, orbicular round, not entirely defined, powdered with gray; reniform kidney shaped, outlined with black, the sides well marked with yellowish scales. Secondaries ♀ fuscous, ♂, ? . Beneath, smoky, powdered, with reddish gray; an inconspicuous common darker line.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Mount Hood.

A single ♀ specimen in Mr. Tepper's collection. The species is well defined, and easily recognized by the color alone.

Carneades bifasciata Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 460, *Agrotis*.

Ferruginous at base, outwardly shading into blackish. Transverse lines broad, single, black, approximate. Basal line evident. T. a. line evenly oblique. T. p. line with a wide outward curve over cell, then running about parallel to outer margin. Median shade even, distinct, from costa at inception of t. p. line to hind margin at termination of same line; its course straight. Ordinary spots obsolete; traceable, but so faint and indefinite as not to be easily discerned. Secondaries reddish fuscous. Beneath fusco-luteous, powdery, with an indefinite common line and discal lunule.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Arizona.

A single ♂ specimen from Mr. Doll. The species is so well marked that no difficulty will be found in recognizing it. It is aberrant for the group in which I have placed it, but it fits nowhere else as well.

Carneades comosa Morr.

1876. Morr., Proc. Bost. Soc. N. H., XVIII, 238, *Agrotis*.

A rather pale brick red; the line blackish, stigmata obsolete. T. a. line upright, with three outward scallops, geminate. T. p. line single, parallel with outer margin, very strongly erenulate. The terminal shade is slightly darker and there is a similar shade preceding and relieving the concolorous sinuate s. t. line. Orbicular obsolete; reniform dusky, lunate; claviform wanting. The median shade is rather well defined upright, and nearly central both of wing and median space. Secondaries reddish fuscous. Beneath, powdered with reddish, an indefinite common line and discal spot. Head and thorax concolorous.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Colorado.

The type, a ♂, from Mr. Tepper's collection, is in horrible condition, but yet sufficiently well marked to be recognizable. The vestiture is entirely hairy and the insect in its present state has some resemblance to the *Pachnobia* group of the genus.

Carneades messoria Harris.

1841. Harris, Rept. Ins. Mass., *Agrotis*.
 1862. Harris, Iuj. Insects, Flint ed., 444, *Agrotis*.
 1885. Riley, Ent. Amer., 1, 176, *Agrotis*.
spissa Gn.
 1852. Gu., Sp. Gen. Noct., 1, 261, *Agrotis*.
 1880. Grt., Bull. Geol. Surv., VI, 566, *Agrotis*.
 1889. Butl., Trans. Ent. Soc. Lond., 1889, 379, pr. syn.
spissa Wlk.? nec. Gn.
 1856. Wlk., C. B. Mus., Lep. Het., x, 327, *Agrotis*.
 1877. Grt., Can. Ent., IX, 28, pr. syn.
lycarum † Grt.
 1874. Grt., Can. Ent., VI, 155.
cochrani Riley.
 1868. Riley, Prairie Farmer, July, 1868, *Agrotis*.
 1869. Riley, First Rept. Ins. Mo., 75, *Agrotis*.
 1874. Grt., Can. Ent., VI, 155, pr. syn.
 1881. Riley, Suppl. and Index to Mo. Rept., 76, pr. syn.
 1881. Grt., Papilio, 1, 126, pr. syn.
 1882. Riley, Papilio, II, 41, *Agrotis*.
repentis Grt. and Rob.
 1868. Grt. and Rob., Trans. Am. Ent. Soc., 1, 350, pl. 7, f. 58, *Agrotis*.
 1873. Grt., Buff. Bull., 1, 96, *Agrotis*.
 1873. Grt., Buff. Bull., II, 53 = *cochrani*.
 1881. Grt., Papilio, 1, 126 = *messoria*.
balanitis Grt.
 1873. Grt., Buff. Bull., 1, 97, pl. 3, f. 14, *Agrotis*.

Dark ash gray with a luteous tint, to a somewhat smoky red brown; the transverse lines always distinct, black, the ordinary spots always defined. T. a. line variable in course and direction, and somewhat in the extent of the outward curves between veins. Usually the line is oblique. There are two small angulations above the median vein, and two wide outward curves below. T. p. line obsoletely geminate, crenulate, parallel to outer margin, or somewhat more upright. S. t. line pale, sinuate, marked by a more or less evident darker terminal and s. t. shade, the latter narrow. The median shade is distinct, crossing outer half of reniform and usually darkening it inferiorly, then running parallel and very close to t. p. line. Orbicular round, concolorous, distinctly and completely outlined by a narrow black line. Reniform large, kidney-shaped, the sides often relieved by yellowish scales. Claviform always obvious, and usually distinct, of variable size, but usually short. Secondaries, ♀ various shades of smoky to yellowish fuscous; ♂ paler, often whitish, with darker outer margins. Beneath powdery, with more or less evident common line and discal spots. Thorax concolorous, collar with a narrow black line.

Expands 31–40^{mm}; 1.25–1.60 inches.

HABITAT.—United States and Canada.

This species found from Atlantic to Pacific, and from Canada to the Southern States, is at once the most constant and one of the most

variable of our species. Usually the markings, and especially the ordinary spots, are constant and prominent, and give the insect a very distinctive appearance. Rarely the orbicular is ovate, and occasionally bottle shaped. A tendency in specimens from the West and Southwest is to become suffused with reddish, and some western specimens are among the largest seen. One form, paler than the typical specimens, and with a reddish tint, has been named *var. confracta*, by Mr. Morrison in Mr. Tepper's collection. I can not find, however, that the name was ever published. A form from Washington is decidedly reddish, so that it was marked "*rufefactalis*" by Mr. Grote; but I believe all these forms had better remain under the typical name until large and complete collections will warrant a sound judgment as to their specific or varietal standing. *Balanitis* Grt. was applied to a dark form, in which the t. p. line curves inwardly below cell, and the orbicular is small. Specimens before me have this peculiarity, and also the black lateral line of abdomen, mentioned by Mr. Grote. *Confracta* Morr., from the same locality, shows these peculiarities, which are not usually present in eastern specimens. A very large series before me proves the specific identity of all these forms.

Mr. Grote suggests that the *spissa* of Walker is not the species described by Guenée, and I am inclined to believe he is right. Mr. Butler, however, in the Trans. Ent. Soc. London, for 1889, positively refers *spissa* Gn. to *cochrani* Riley, which = *messoria* Harr. On this latter point I can say that I have seen Harris' types in the collection of the Boston Society of Natural History, and there is no doubt whatever of the identity of the name with the species now current under it. To bring Guenée's idea of *spissa* before the student I copy Mr. Grote's translation, which is sufficiently accurate:

"*Agrotis spissa* Guen., Noct., 1, 261.

"This greatly resembles *crassa*, but the species is smaller (35^{mm}), of a grayish-brown testaceous, the veins darker and relieved by a slightly paler ground, especially the median and its last branch; markings like *crassa*, but there is a great disproportion between the two stigmata; the t. p. line forms a dash entering below the fourth inferior nervule, and on the inner margin, below the submedian vein, it is elongated in such a way as to touch the top of the mark formed by the extra basal line; the cuneiform marks of the s. t. line are more regular and more equal; the hind wings are darker and more uniform.

"Am. Sept. Coll. Bdv. Two bad specimens."

Carneades pleuritica Grt.

1875. Grt., Check List, 1875, 47, *Agrotis*.

"♂ allied in structure and color to *pitychrous*, larger (40^{mm}), without the costal or other pale shading, of a uniform gray with a yellow brown staining. Orbicular spherical, gray, black ringed, with dark center, larger than in its ally; claviform short, narrow, without the continu-

ous streak; t. p. less faintly indicated; all the lines geminate; terminal space darker than the wing. Hind wings whitish at base, with broad vague border; fringes white tipped, interlined, whereas in *pitychrous* they are pure white. Thorax concolorous with primaries; patagie marked with white on the shoulder. Beneath pale with faint outer lines and discal marks; a common dark terminal marked line more distinct on hind wings. There are no enneiform or vein markings before the s. t. line of primaries in this species, which is as large as *messoria* and resembles dark specimens of *pitychrous* in color. Canada."

This species puzzled me for some time. To the kindness of Mr. Thaxter I finally owed sight of the species, and found it closely related *messoria* rather than *pitychrous*, but with the peculiar yellowish tinge described by Mr. Grote. I have seen it from Maine, New Hampshire, and northern New York.

Carneades rubefactalis Grt.

1880. Grt., Bull. Geol. Surv., vi, 154, *Agrotis*.

Brick-red, suffused with blackish through the median space, a prominent, even dark shade preceding s. t. line. Lines geminate, black, included space of ground color; their course essentially like those of *messoria*. Ordinary spots concolorous, small; orbicular round; reniform excavated at outer side. Claviform faintly marked. Collar with a broad black line. Secondaries pale fuscous. Beneath essentially as in *messoria*.

Expands 33-35^{mm}; 1.30-1.40 inches.

HABITAT.—Washington, Colorado.

This species is closely allied to *messoria*, but distinct by the small orbicular and reddish color of thorax and primaries. The broad black line on collar is also distinctive, though in *messoria* there is a similar but less distinct line.

Carneades fauna Morr.

1876. Morr., Proc. Bost. Soc. Nat. Hist., xviii, 237, *Agrotis*.

Sordid reddish luteous, somewhat irrorate with black; the transverse lines indistinctly marked, geminate, included space concolorous. T. a. line outwardly oblique and curved between veins. T. p. line crenulate sinuate, nearly parallel as a whole with outer margin. S. t. line obsolete. The median shade is diffuse, indefinite, darkening cell between ordinary spots. The latter are concolorous, completely defined; orbicular irregularly elongate; reniform upright oval, sides nearly parallel. Claviform outlined, narrow, somewhat elongate. Secondaries yellowish fuscous. Beneath, yellowish fuscous with somewhat darker discal lunules. Head and thorax concolorous. Vestiture strongly mixed with scales.

Expands 37^{mm}; 1.5 inches.

HABITAT.—California.

This is another of Mr. Morrison's famous types, from Mr. Tepper's collection. Mr. Morrison has distributed by all odds the most miserably preserved lot of specimens as types that has ever been my ill fortune to see. The present species, if a perfect specimen ever comes to hand, will require care in identifying.

Carneades brunneigera Grt.

1875. Grt., Buff. Bull., III, 80, *Agrotis*.

1880. Grt., Bull. Geol. Surv., VI, 260, *Agrotis*.

Grayish red to red brown; transverse lines distinct, blackish. Ordinary spots concolorous. Basal line evident, geminate. T. a. line distinct geminate, upright or slightly oblique, outwardly curved between veins. T. p. line crenulate, obsoletely geminate, its course sinuate. S. t. line concolorous, marked with a dark accompanying shade. Claviform wanting; orbicular entirely obsolete, or very faintly, hardly perceptibly outlined. Reniform also indefinite, often not traceable, but usually outlined, or at least distinct as a dusky lunule. The median shade is dusky, diffuse rather beyond the center of the m. space. Head and thorax concolorous. Secondaries fuscous. Beneath fuscous, powdery; a distinct darker transverse line and discal spot.

Expands 33-35^{mm}; 1.30-1.40 inches.

HABITAT.—California, Washington, Vancouver, Colorado, Louisiana.

The type from Vancouver is rather distinct red brown; a ♂ specimen from Colorado is nearly equal to the type in color. Three other specimens shade off into a distinct rather reddish gray, the maculation remaining tolerably alike. The obsolescence of the ordinary spots, especially the orbicular, compared with the distinctness of the transverse lines, is characteristic of the species.

Carneades incallida Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 50, *Agrotis*.

General color pale ashen gray. Palpi brown at sides; a dusky line across the front; collar dark tipped. Thorax unicolorous, concolorous. Primaries with slightly darker suffusion beyond the median shade. Basal line geminate, black, upright, lunulate, the outer line broad, the inner narrower and fainter. A broad black median shade, somewhat diffuse outwardly. T. p. line black, lunulate, geminate, the outer line distinct near costa only, a strong outcurve over reniform, and a slight incurve in the submedian interspace. S. t. line irregular, interrupted, pale, marked by a very distinct smoky preceding, and a somewhat less evident following shade. Claviform wanting, orbicular barely traceable, concolorous; reniform marked only by an indefinite dusky spot. Secondaries deep smoky brown. Beneath very dark smoky brown with white powderings along the costa, broader on secondaries. A broad diffuse outer band, distinct only through the paler parts of the wing.

Secondaries with a discal spot. Vestiture of breast ash-gray, tarsi and tibiae black ringed.

Expands 37^{mm}; 1.50 inches.

HABITAT.—Sierra Nevada, California.

This species has a casual resemblance to *munis*, *opipera*, or *dissona*, but is perhaps nearer to the Alpine *simplonia* than to any of our own species. It is very distinct from its associates in every respect. There is but a single female from Mr. Edwards' collection known to me.

Carneades luteulenta Smith.

1890. Trans., Am. Ent. Soc., XVII, 50, *Agrotis*.

General color a luteous gray; sides of palpi dusky, a dusky line extending from the eyes to the base of primaries; head and thorax else immaculate. Primaries slightly blackish powdered, more distinct along the inner margin, and darkening the terminal and outer part of s. t. space. Basal line geminate, not well marked. T. a. line geminate, outwardly slightly oblique, moderately outcurved in the interspaces, a long outcurve below internal vein; inner part of line obsolete, outer very distinct. T. p. line narrow, crenulated, parallel with the outer margin, inferiorly becoming indefinite; outer part of line marked only near costa and not continued as a series of venular dots. Median shade indefinite, diffuse, best marked between the ordinary spots, and with some difficulty traceable below. Beyond the t. p. line the s. t. space darkens to the outer margin interrupted by the very fine, pale, irregular, and partly obsolete s. t. line. No dark terminal line or lunules, a pale yellow line at base of fringes. Claviform wanting. Orbicular round, pale ringed, not prominent, scarcely even distinct. Reniform large, very vague, not outlined, marked by a yellowish curved line, which constitutes the outer margining line, and by a slight lateral extension of the median shade. Secondaries smoky fuscous, outwardly somewhat darker. Beneath paler, more whitish, powdery, with an outer line and discal spot on all wings; primaries with disc fuscous and outer line incomplete.

Expands 34^{mm}; 1.35 inches.

HABITAT.—Sierra Nevada, California.

Very closely allied to *brunneigera* Grote, with which it agrees in all structural characters and in the ornamental characters determining its reference to the *messoria* group. It differs in the pale ground color, the greater size of the ordinary spots and the distinct outer shade combined with the partly obsolete s. t. line.

Types, a male in the Rutgers College collection; others in collections of Hy. Edwards and U. S. National Museum.

Carneades annulipes Smith.1890. Smith, Trans. Am. Ent. Soc., XVII, *Agrotis*.

General color ashen gray with a reddish shade, with blackish powderings. Palpi darker at sides, head somewhat pallid in front, collar with a very vague transverse line composed of dark powderings. Thorax evenly and not heavily powdered. Primaries with the dark powderings becoming more prominent outwardly, slightly suffusing the outer part of median space and becoming most prominent as a heavy smoky brown shade before the s. t. line, the terminal space dusky but not so dark as the outer part of s. t. space. Basal line apparently single, brown, not very distinctly marked. T. a. line geminate, evenly outcurved, slightly irregular; the outer part of the line is distinct, brown, rather broad, the inner vague, not well marked superiorly, but easily traced through the lower part of its course. Median shade very distinct, brown, rather definitely limited, very nearly parallel with the t. a. line. T. p. line distinctly geminate, rather widely outcurved over reniform and slightly incurved below; inner line distinctly crenulate, outer line somewhat vague except through costal region. S. t. line pale, somewhat diffuse and very even, starting from the pale apical space. Claviform wanting. Orbicular and reniform slightly paler, not outlined, very vague and indefinite, at first sight apparently wanting. Secondaries smoky whitish, somewhat iridescent. Beneath whitish, powdery, primaries darkest and with trace of an outer line; secondaries more powdery along costa and without outer line or discal spot.

Expands 29^{mm}; 1.16 inches.

HABITAT.—Oregon.

A very distinct species of which I have only one ♀ specimen in good condition. It has all the characters of the *messoria* group, and according to the tabular arrangement comes nearest to *brunneigera*. It is, however, decidedly smaller than that species and the color is more gray; the prominent median shade, and the dusky terminal parts of the wing are distinctive. The tarsi are ringed with brown, the legs also of the same grayish white as the underside.

The type I have deposited in the U. S. National Museum.

Carneades murdocki Smith.1890. Smith, Trans. Am. Ent. Soc., XVII, 49, *Agrotis*.

Head and thorax a rather bright yellowish red, almost ferruginous, without mark or spot. Primaries with basal and subterminal space of the same red brown color as thorax. Median space bright bluish gray, outwardly dark shaded. Terminal space dusky. Basal line faintly marked. T. a. line geminate, very even, with an even, rather small outward curve; inner line brown, outer line broader, black. T. p. line geminate, even, outwardly curved over reniform, slightly incurved

beneath; inner line black, distinct, outer line indefinite, incomplete, brown. S. t. line marked by the contrast between the evenly dark terminal space and pale s. t. space, its course irregular. A dusky costal shade in s. t. space before apex, leaving a paler apical spot. A pale line at base of fringes. Claviform wanting. Orbicular large, round concolorous, faintly outlined by a pale ring. Reniform large, kidney-shaped, inferiorly dark filled, obscured by the median shade which crosses the spot and then runs rather diffusely and close to the t. p. line, darkening the outer part of median space. Cell between the spots also dusky. Secondaries whitish, soiled, with a faint reddish suffusion. Beneath pale, powdery, disc of primaries darker; an outer line and discal dot to all wings.

Expands 30^{mm}; 1.20 inches.

HABITAT.—Northwest British Columbia, Utah.

This very handsome species is readily recognized among its congeners by the strong contrast between the blue-gray median and reddish yellow or rusty red basal and s. t. spaces. It has all the characters of the *messoria* group, but is unique among them all. The specimen now before me is from Mr. Neumoegen. I received it some time since from Mr. Edwards, who had it, I think, from Utah. Some years since I received the first specimen from the late Capt. D. H. Murdock, Fort Thornburgh, Utah, and this specimen is now in the U. S. National Museum. From Captain Murdock I received many good species, and it is matter for extreme regret that so good a collector in so fine a locality should have lost his life so unfortunately.

Carneades quinquelinea Smith.

1890 Smith, Trans. Am. Ent. Soc., XVII, 49, *Agrotis*.

General color fuscous gray. Head concolorous, collar with a dusky central line; thorax concolorous. Primaries evenly colored, the transverse lines blackish. Basal line distinct, single. T. a. line distinct, upright, very slightly angulate; median shade line distinct, broad, very irregular. T. p. line single, narrow, crenulate, its course as a whole very nearly parallel to the outer margin. S. t. line consisting of a narrow, dark shade line followed by some pale scales relieving and defining the same; an interrupted, very narrow terminal line. Secondaries and abdomen pale smoky fuscous. Claviform wanting, ordinary spots barely traceable, concolorous, reniform inwardly marked by a small black dot. Beneath pale, powdery fuscous, with an outer line and discal spot on all wings.

Expands 35^{mm}; 1.40 inches.

HABITAT.—Sierra Nevada, California.

This simply marked form is allied in appearance to *tristicula* or *fusca*, but with the characters of the present group so far as they can be made out from the single female before me. The single transverse lines are distinctive in this series,

Carneades friabilis Grt.

1875. Grt., Can. Ent., VII, 187, pl. 1, f. 5, *Agrotis*.

Even dull fuscous to ash gray, the markings usually indefinite but on the whole exactly like *messoria*. Secondaries and underside also like *messoria*.

Expands 31–33^{mm}; 1.25–1.30 inches.

HABITAT.—New York, Maine, Canada, California.

Very closely allied to *messoria*, but darker, ash gray, more evenly colored, the transverse lines and ordinary spots often scarcely evident, and the size perceptibly smaller.

Mr. Grote curiously failed to recognize the true relationship of the species by comparing it with *bostoniensis*, with which its resemblance is decidedly remote.

The species seems rare in the Eastern States, but, if my identification is correct, the species is more common in California. A series of specimens received from Messrs. Edwards and Neumoegen, from California, were at first regarded as a local form of *messoria*. Mr. Neumoegen, however, pointed out a specimen named *friabilis* by Mr. Grote in his collection, which was evidently the same as the Californian series. The western specimens are more ash gray than *messoria*, and have a less amount of the fuscous admixture than eastern specimens.

Carneades fuscigera Grt.

1874. Grt., Can. Ent., VI, 155, *Agrotis*.

Even dull fuscous gray, the lines blackish, more or less distinctly geminate. Ordinary spots outlined, concolorous. Basal line evident. T. a. line rather remote from base, upright, curved between veins, the outer line most distinct, broad. T. p. line sinuate, lunulate, broad. The curve over cell wide; inward curve below less evident. S. t. line sinuate, slightly paler. Claviform very faintly indicated. Orbicular round, rather large. Reniform constricted at middle, more or less incompletely outlined. Secondaries smoky, paler at base; an indefinite extra discal line and lunule reflected from beneath. Beneath whitish, powdery, a very distinct broad dusky common line and discal lunule. Head and thorax concolorous.

Expands 29–32^{mm}; 1.15–1.30 inches.

HABITAT.—California.

Distinguished by the rather small size and the very even color.

Carneades orbicularis Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 460, *Agrotis*.

Luteous gray; transverse lines distinctly geminate, dark fuscous. Ordinary spots defined, paler. Basal line defined, marked by black points beneath median vein. T. a. line upright, slightly denticulate; the included space marked with gray. T. p. line even, very narrowly

eremulate, its course parallel with, and unusually close to outer margin, making the median space very broad. S. t. line narrow, somewhat paler, its course sinuate; a terminal row of black dots. The median shade is not well marked and is central to the median space. Claviform concolorous, not distinctly outlined. Orbicular round, pale gray. Reniform moderate, kidney-shaped, annulate with gray, centered with ground color. Secondaries pale yellowish fuscous. Beneath whitish, powdered, a darker discal lunule. Head and thorax concolorous. Expands 32^{mm}; 1.25 inches.

HABITAT.—Nevada.

A well-marked species, with rather narrow wings; it is easily distinguished by the widely separated median lines and pale orbicular. A single ♀ is in Mr. Tepper's collection.

Carneades micronyx Grt.

1878. Grt., Bull. Geol. Surv., IV, 171, *Agrotis*.

Primaries fuscous, with a whitish gray cast; transverse lines geminate, indistinct. T. a. line upright, very slightly waved. T. p. line faintly lunulate, about parallel with outer margin. S. t. line concolorous, narrow, sinuate, shaded each side with darker fuscous. Claviform wanting. Orbicular large, round, gray. Reniform concolorous, incompletely outlined. The median shade darkens the cell between stigmata and runs rather close to t. p. line beneath median vein. Secondaries dark fuscous. Beneath pale fuscous, with common, even, subdentate line and discal marks. Collar with a distinct black transverse line.

Expands 30^{mm}; 1.20 inches.

HABITAT.—California.

This species is very distinct; the body is heavy, the primaries comparatively short, obtuse. The obsolescent maculation, the dark ground color, and large round gray orbicular make a combination at once recognizable. Withall, its resemblance to *messoria* is striking.

Carneades intrita Morr.

1874. Morr., Proc. Bost. Soc. Nat. Hist., XVII, 164, *Agrotis*.

1875. Grt., Can. Ent., VII, 68, *Agrotis*.

Ferruginous, shaded with black. Transverse lines distinct geminate, included space paler. Basal line evident. T. a. line oblique, scalloped between the veins. T. p. line very even, parallel to outer margin. S. t. line narrow, somewhat indefinite, strongly sinuate. Claviform evident, concolorous. Ordinary spots pale ringed, centered with ground color, of normal size and shape. The dusky median shade darkens the cell between the ordinary spots, then curves under reniform and runs parallel with and close to the t. p. line. Secondaries yellowish fuscous, paler toward base. Beneath, primaries smoky, secondaries whitish,

both powdery, with incomplete common line and faintly marked discal lunule. Head and thorax dark; base of patagiae at sides ferruginous

Expands 31–33^{mm}; 1.25–1.30 inches.

HABITAT.—Vancouver; California, Arizona.

A short winged species, readily recognizable by the peculiar rusty and black color and the very even pale t. p. line.

Group TESSELLATA.

Front full, tuberculate or roughened; anterior tibiae spinose; antennae of male serrate and bristled; thorax indistinctly or not at all tufted, rarely with a distinct anterior crest. Genitalia of the same type as in the other groups of the genus. The distinguishing feature of the present group is found in the ornamentation, and principally in the usually large, often pale, ordinary spots, and the black or other dark stained cell relieving them. Negatively there is no distinct median shade, and there are no obvious dentations crossing or indenting the s. t. line. In the more typical forms the primaries are perhaps a little broader and more trigonate than in the typical forms of the other groups; but this does not hold true of all the species.

As a whole the group is fairly well separable from the others of the genus, but some of the species show variations which may create doubt. Care is therefore necessary in placing single specimens of some forms, and the general descriptions of ornamental and color characters must not be too literally construed.

Wherever possible, a questionable form should be compared with specimens of the group types, and the relationship is then usually evident and the chances of error are reduced to a minimum.

Of the species referred here *fernaldi* is at once separable by the broad, even, blue gray transverse lines. It is a large wide-winged form and very distinct. It seems also very rare.

A small group of species of mountain or high northern habitat is readily recognizable by luteous or gray color of primaries, hairy vesture, and simple transverse lines. These species have a distinctive habitus, and are also well distinguished *inter se*.

Opipara is ash gray with dark median space. The cell, claviform, basal dash, and transverse line on collar are black. This is the species mistaken by Moeschler and Staudinger for a variety of *islandica*.

Tristicula has the basal dash and the black line on collar, but the transverse maculation is obsolete and only the dark cell is prominent.

Munis, of which *sublatis* is a synonym, lacks the black basal dash and transverse line of collar. The median lines, however, are distinct, the outer portion of median space is darker, and the ordinary spots are large, distinct, concolorous.

Dissona is closely allied, but less strongly marked; an obvious distinguishing feature is found in the woolly clothing of breast. In *munis* it is white, in the present form black.

All the other species of the group have distinctly geminate transverse lines. One series lacks all trace of a basal black dash, which in the other series is always distinct. The typical forms lack this basal dash.

Of this first series *euroides* is a narrow-winged form, bluish white in color, with the large ordinary spots prominently relieved by the black cell.

The other species vary from carneous gray to fuscous brown or blackish, all possible shades being represented.

The secondaries are dusky in both sexes of the following seven species:

Atticola is easily distinguished from all its allies by lacking all trace of a claviform. The species varies greatly in ground color, but is usually some shade of yellowish red. The maculation is very often scarcely traceable, and in such specimens the group characters are not notable and point rather to *pitychrous* than to *tessellata*. With a good series at hand the reference here is easy.

Rufula and *basiflava* are closely allied species which may eventually be merged into geographical forms of the same. In both the orbicular is incomplete superiorly and the basal space is paler. *Rufula* is the paler, yellowish red in color, median space darker, contrasting somewhat with the basal and s. t. spaces. *Basiflava* is altogether a darker, more powdery form. The basal space is not much paler, and the median and s. t. spaces are concolorous. The former is from New Mexico, the latter from British Columbia and Sierra Nevada.

Satis is red brown in color, the ordinary spots powdered with yellow, the cell usually not much darker between them. The lines are not relieved.

Rena is a carneous gray species, sometimes more reddish, without any distinct contrasts. The transverse lines are usually more or less obsolete, the ordinary spots rarely completely outlined, the space between them not much darker. Altogether a very inconspicuous though distinct species.

Insignata, under which term I include *declarata*, *campestris*, *decolor*, and *verticalis*, has the color smooth, even; the transverse lines sometimes very distinct; ordinary spots large, narrowly lunulate with yellow. *Campestris* is that form in which the color is uniform, dark, the transverse lines distinct. *Decolor* has the lines partly obsolete, the brown colors relieved in basal and s. t. spaces by luteous, sometimes contrasting quite strongly. *Verticalis* is more like *decolor*, but replaces the lighter shades by carneous gray, deepening to brownish in the darkened regions. The latter is a local form, found in Montana and Colorado, and is quite constant.

Tessellata is distinguished by rougher vestiture, the color not smooth and even, but coarse, powdery; the transverse lines are not so cleanly cut, nor the ordinary spots so well defined. The latter are powdered with gray.

Albipennis is like *insignata* in evenness of color and general appearance, and has been confused with it. It is, however, smaller, and the secondaries are white in the male, dusky in the female.

Spectanda and *pallipennis* have the secondaries white in both sexes. The former is a rather small, narrow winged form with very neat, sharply defined maculation, resembling *albipennis*. The latter has pale fuscous primaries with complete but very illy defined maculation; it is one of the characterless species which are with difficulty referred to an appropriate group, and which there may be difficulty in recognizing.

Basalis, *solitaria*, and *nostra* differ from all the preceding by longer wings with the apices of primaries more evident.

Basalis is a pale red brown, with the basal space gray; the ordinary spots are large and pale in color.

Solitaria is of much the same color, but the basal space is not pale, and the ordinary spots are small and yellow; the transverse lines gray.

The remaining species have an evident black dash at base of primaries.

Ochrogaster varies from yellow to bright red brown; the transverse lines obsolete; the primaries are long and narrow, subequal, and thus distinct from the remaining members of the series.

Two color divisions are indicated in the balance of the species; the first of various shades of brown, the costa usually paler; the second ash or darker gray, with somewhat longer primaries, apices more distinctly marked.

Idahoensis is dull fuscous brown, the costal region gray; ordinary spots also gray, distinct; orbicular oblique, oblong, open superiorly.

Furtivus is very like the preceding, but the orbicular is V-shaped, and there is a series of distinct sagittate spots preceding the s. t. line.

Westermanni is allied, but is more sordid in appearance; the ordinary spots not so well defined, orbicular rounded, but incompletely outlined superiorly. In addition the costa is strongly convex where in *idahoensis* it is straight.

Obeliscoides has the transverse lines distinct, the costal region and ordinary spots whitish; reniform unusually large, contrasting; orbicular complete; s. t. line narrow, paler, rather even, costa arched.

Infelix is larger, has the costal region yellow, ferruginous, or gray; orbicular round, complete; reniform not unusually large; s. t. line defined only by the difference in color between s. t. and terminal spaces, preceded by a series of sagittate black spots; costa not arched. This is a distressingly variable species, becoming dull black in some specimens, without obvious maculation save the outlines of the ordinary spots, and then likely to be confused with *pastoralis*, from which, however, it is, I believe, distinct. Other specimens become lilac shaded and then resemble *perexcellens*.

Islandica is also allied to *obeliscoides*, but separable by the concolorous costal region and ordinary spots. The basal space is paler.

Divergens (versipellis) is more nearly allied to *tessellata*, but is very easily distinguishable by the white marked subcostal and median veins and the white powdered annuli of the ordinary spots.

Redimicula is very distinct by its generally dark color, very large and evenly pale gray ordinary spots, basal space gray above the black dash, and short, stumpy primaries.

Atrifera is a somewhat luteous form, the transverse lines indistinct, ordinary spots concolorous, cell incompletely dark.

Tesselloides and *silens* are the ash-gray species. The former is darker, the transverse lines are more evident, and the vestiture is coarser. The latter is pale, the transverse lines are obsolete, and the vestiture is smooth, even.

SYNOPSIS OF SPECIES.

Transverse lines distinct, broad, pale.....FERNALDI.

Transverse lines distinct, single, black; primaries dull ashen gray.

Basal dash present, collar black lined.

Median space darker; ordinary spots and transverse lines sharply defined,

OPTIPARA.

Unicolorous, pale luteous; transverse lines obsolete; ordinary spots indefinite,

TRISTICULA.

Basal dash and line of collar wanting.

Woolly clothing of breast pale.....MUNIS.

Woolly clothing of breast black.....DISSONA.

Transverse lines geminate variably distinct.

Basal dash of primaries wanting.

Color bright, bluish white, wings parallel, rather long.....EUROIDES.

Colors, reddish to brown, to blackish, wings trigonate, apices not evidently produced.

Secondaries in both sexes dusky.

Claviform wanting; color pale reddish.....ALTICOLA.

Claviform present.

Orbicular incomplete superiorly; basal space somewhat paler.

Color yellowish red, contrast between basal, s. t. and median space distinct.....RUFULA.

Color dull luteous brown, with black powderings; basal space but little paler; no contrast between s. t. and median spaces.....BASIFLAVA.

Orbicular complete.

Color red brown, rather even; ordinary spots yellow powdered; cell usually not much darker between the spots.....SATIS.

Color even, varying from carmine to reddish gray; no contrasts; lines usually more or less obsolete.....RENA.

Color gray to dark fuscous brown or blackish, even; median and terminal spaces darker, contrasting; ordinary spots large, concolorous,.....INSIGNATA.

Color red brown to blackish, rough, powdery; maculation less clear cut; ordinary spots powdered with pale scales.....TESSELLATA.

Secondaries of male white, of female dusky.

Primaries evenly colored, dark; ordinary spots large, dark; t. p. line obsolete.....ALBIPENNIS.

Secondaries white in both sexes.

Primaries luteous gray, even; the maculation distinct, clear cut.....SPECTANDA.

Primaries sordid whitish, maculation all present but indistinct.....PALLIPENNIS.

- Color pale red or luteous brown, wings longer, apices more produced.
 Basal space pale; ordinary spots large, pale.....BASALIS.
 Basal space concolorous; ordinary spots small, yellow; transverse lines pale,
 SOLITARIA.
 Color luteous brown; ordinary spots large; tuftings gray tipped; ordinary
 lines narrow, not pale.....NOSTRA
 Basal dash of primaries present.
 Primaries elongate, subequal, color yellow to dark red brown; transverse lines
 obsolete, ordinary spots concolorousOCHROGASTER
 Primaries shorter, more trigonate, apices rectangular.
 Costa blue gray, ordinary spots gray; orbicular oblong, oblique, open superi-
 orly, costa straight.....IDAHOENSIS.
 As before; orbicular V-shaped; a series of distinct sagittate spots before s. t.
 lineFURTIVUS.
 As before; orbicular round, incomplete; costa convex; maculation obsolete,
 WESTERMANI.
 Costal region and ordinary spots white, contrasting; reniform unusually large;
 wings wider, costa arched.....OBELISCOIDES.
 Costal region and ordinary spots yellow to ferruginous, to lilac gray; size
 larger; costa less arched; wings narrower.....INFELIX.
 Costal region and ordinary spots clay yellow, not contrasting; primaries more
 even, sub-parallelISLANDICA.
 Costa concolorous; subcostal and median veins white; ordinary spots ringed
 and powdered with whiteDIVERGENS.
 Costal half of basal space, and the large ordinary spots bluish gray; primaries
 stumpyREDIMICULA.
 Dull luteous; transverse lines obsolete; ordinary spots rather small. ATRIFERA.
 Primaries long, trigonate, apices produced; colors gray.
 Dark gray, powdery; ordinary spots paler; transverse maculation distinct,
 TESSELLOIDES.
 Pale, whitish; ordinary spots concolorous; transverse maculation indistinct,
 SILENS.

Carneades fernaldi Morr.

1875. Morr, Proc. Ac. Nat. Sci. Phil., 1875, 429, *Agrotis*.

1882. Grt., Ill. Essay, 53, pl. 1, f. 11, *Agrotis*.

Fuscous brown, washed with lilac gray; transverse lines very distinct, even, geminate, the included space gray; the basal space most densely powdered with gray scales. T. a. line very oblique outwardly, its course very slightly sinuate; t. p. line nearly parallel to outer margin; the inferior portion of median space very narrow. S. t. line lilac gray, irregular; inwardly determinate, outwardly shading into a gray suffusion of the terminal space. Claviform small, outlined. Ordinary spots large, defined, powdered with gray; cell before and between the spots black. Secondaries dusky, a marked discal and terminal pale line. Beneath dusky, with an extra discal pale common line and darker discal spots. Head and thorax lilac gray.

Expands 37^{mm}; 1.5 inches.

HABITAT—Maine.

A very handsome species and so well marked that there can be no mistaking it. I have seen only the type in Mrs. Fernald's collection.

Carneades opipara Morr.

1874. Morr., Proc. Bost. Soc. N. H., xvii, 165, *Agrotis*.
 1875. Morr., Psyche, i, 42, *Agrotis*.
 1875. Grt., Psyche, i, 77 = *islandica*.
 1875. Morr., Psyche, i, 85, an. sp. dist., *islandica*.
 1876. Grt., Psyche, i, 99 = *islandica*.
 1876. Grt., Stett., Ent. Zeit., xxxvi, 135 = *islandica*.
 1885. Smith, Ent. Amer., i, 15, an. sp. dist., *islandica*.
 1885. Smith, Stett. Ent. Zeit., xlvi, 223, *Agrotis*.
 labradorensis Stgr.
 1881. Stgr., Stett. Ent. Zeit., xlii, 419, *Agrotis*.
 1883. Moeschl., Stett. Ent. Zeit., xlii, 117, *Agrotis*.
 1885. Smith, Stett. Ent. Zeit., xlvi, 223 pr. syn.
 islandica † Auct.
 1876. Grt., Stett. Ent. Zeit., xxxvi, 135, *Agrotis*.
 1878. Pack., Bull. Geol. Surv., iv, 555, pl. f. 10, *Agrotis*.
 1883. Moeschl., Stett. Ent., xlii, 117, *Agrotis*.
 1885. Smith, Stett. Ent. Zeit., xlvi, 223, pr. syn.

Ash gray, median space strongly and variably suffused with black; a costal patch in s. t. space dusky. Transverse lines distinct, single; t. a. line upright, very little waved; t. p. line finely crenulate, about parallel to the outer margin; s. t. line even, preceded by a series of sagittate black dashes. A basal black streak. Claviform distinct, black. Ordinary spots distinctly outlined, gray; reniform with a central dusky line. Orbicular variable in size, usually small; round. Cell filled with black. Secondaries dusky; a darker discal and terminal shade line and discal lunule. Beneath pale, with a distinct, broad, powdery, transverse line, and a distinct discal lunule on each wing. Head and thorax concolorous; collar with a broad black shade.

Expands 32–37^{mm}; 1.25–1.50 inches.

HABITAT.—New Hampshire, Mount Washington, Labrador.

Mr. Grote was correct in referring *opipara* and *islandica* Moeschl. (*nee* Stgr.) as synonymous. The error is Moeschler's, in failing to recognize the distinction between the forms, and Mr. Grote's for so positively condemning Mr. Morrison's species on insufficient grounds. Mr. Morrison was also correct in describing his specimen as distinct. The Labrador specimen before me is smaller, rather shorter winged, than the Mount Washington specimens, but not otherwise distinct. Unfortunately all are females, and I can not find in literature any description of a male. It is barely possible, therefore, that the species does not belong to this group.

Carneades tristicula Morr.

1875. Morr., Proc. Ac. Nat. Sci., Phil., 1875, 429, *Agrotis*.

Pale, somewhat luteous gray, the transverse lines obsolete; s. t. line indicated by a row of fuscous spots. A basal black dash. Ordinary spots concolorous, large, incompletely outlined; a triangular black spot before orbicular; a quadrate patch between the spots.

Secondaries pale, outwardly dusky. Beneath pale; discal lunules dusky, rather indefinite. Head and thorax concolorous; collar with a black band.

Expands 37^{mm}; 1.5 inches.

HABITAT.—Maine.

Easily distinguished by its incomplete markings. The type which is before me is not fresh, and seems somewhat faded as well as a little rubbed; the lines are faintly traceable and are single; fresh specimens I think will have them fairly distinct.

Carneades mnis Grt.

1879. Grt., North Am. Ent., 1, 38, *Agrotis*.

sublatis Grt.

1880. Grt., North Am. Ent., 1, 91, *Agrotis*.

Ash gray with faint lilac tinge; median space more or less evidently suffused with fuscous, forming an evident transverse shade line parallel with and close to t. p. line; cell very distinctly black, relieving the large concolorous ordinary spots. Transverse lines distinct, single; t. a. line upright and nearly straight to vein 1, then widely bent outwardly to inner margin; t. p. line evenly crenulate, parallel to outer margin. S. t. line tolerably even, preceded by a distinct dark shade. Claviform outlined, sometimes sending a spur almost across the median space. Reniform with a more or less evident dusky internal line. Ordinary spots seldom completely outlined. Secondaries yellowish fuscous. Beneath pale; a very distinct broad common line and lunate discal spot. Head and thorax concolorous.

Expands 34–37^{mm}; 1.35–1.50 inches.

HABITAT.—Colorado, Nevada.

This species, by the presence of a distinct transverse shade across median space, conflicts somewhat with the diagnosis of the group; but the whole habitus and the distinct dark cell so evidently places it here that we had rather make it exceptional than associate it with species with which it otherwise bears no very close relationship.

The type of *sublatis*, a ♂, is before me. Mr. Grote in his description falls into the singular error of describing the antenna as simple. They are very distinctly serrate—brush-like, as Mr. Grote terms this structure. There is no doubt of the specific identity of the two forms.

Carneades dissona Moeschl.

1860. Moeschl., Wien Ent. Monatschr., IV, 365, pl. 9, f. 4, *Agrotis*.

1885. Smith, Ent. Amer., 1, 14, *Agrotis*.

1885. Smith, Stett. Ent. Zeit., XLVI, 223, *Agrotis*.

rava Pack.

1868. Pack., Proc. Bost. Soc. Nat. Hist., XI, 38.

Pale ash gray with a lilac tint. Transverse lines not very distinctly marked; t. a. upright, tolerably even; t. p. very finely crenulate, par-

allel with outer margin; s. t. line even, marked with a preceding dusky shade; a distinct transverse shade parallel with and close to t. p. line. Claviform indistinct, rather long and narrow. Ordinary spots moderate, concolorous; reniform with dark, sometimes buff, central shade. Secondaries dusky fuscous. Beneath pale, powdery; a distinct discal lunule. Head and thorax concolorous.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Labrador.

I have seen ♂ and ♀ specimens from Mr. Moeschler. Very closely allied to *munis*, but smaller; easily distinguished by the blackish woolly clothing of the underside; the same parts of *munis* white. There is a difference in wing form between the sexes, those of the ♀ being narrower, and some in maculation, the ♀ being somewhat more completely marked. The ♂ was sent by Mr. Moeschler sub. nom. *simplonia*, and was not recognized by its describer as belonging with the female type.

Carneades euroides Grt.

1874. Grt., Proc. Ac. Nat. Sci. Phil., 1874, 202, *Agrotis*.

perpura Morr.

1874. Morr., Proc. Bost. Soc. Nat. Hist., xvii, 164, *Agrotis*.

Bluish white, about the tint of New York City milk. Basal space somewhat powdered with black, a dusky shade through terminal space, and cell before and between ordinary spots, black. Transverse lines geminate; t. a. upright, outwardly curved between veins; t. p. lunulate, somewhat less oblique than outer margin; s. t. line marked by preceding black triangular spots. A lunate terminal line. A very faint dusky transverse shade. Claviform broad, concolorous, narrowly outlined. Ordinary spots very large, concolorous; reniform with a narrow, dusky central line. Orbicular open superiorly. Secondaries fuscous. Beneath white, powdery; disc of primaries smoky; a distinct lunate discal spot on secondaries. Head and thorax concolorous; collar with a broad black line.

Expands 37–40^{mm}; 1.5–1.6 inches.

HABITAT.—California, Washington.

A very distinct species; the primaries are rather narrow. The pale color, large ordinary spots, and black cell, will easily separate this from all allied forms.

Carneades alticola Smith.

1890. Smith, Trans. Am. Ent. Soc., xvii, 51, *Agrotis*.

General color a mixture of red and clay yellow, varying to a definite bright red-brown or deep brick-red. Collar with a dusky central line, not apparent in dark specimens. Primaries always with a darker shade before the s. t. line, and usually the terminal space also is darker. In fully marked specimens the maculation is as follows: Basal line geminate, indistinct, included space paler than ground color; t. a. line

geminate, slightly oblique, strongly outcurved between veins, included space paler; t. p. line very even, parallel with outer margin, geminate, inner line crenulate, fine, included space pale, outer line vague, often wanting; from this point the s. t. space usually begins to darken to the pale s. t. line, which is very irregular, sinuate, outwardly curved over veins 3 and 4, and again over veins 6 and 8, intervening inward angle quite sharp. Claviform wanting; orbicular round, or a trifle oblique, pale ringed, with concolorous, or somewhat paler center; reniform large, kidney-shaped, pale ringed, incompletely outlined inferiorly, where it is somewhat dark filled, outwardly pale marked; the cell between the ordinary spots is usually darker, sometimes black, and in such case in pale specimens a distinct, dark, median shade crosses the wing from that patch. From this complete maculation the variation is in the direction of obsolescence; the basal and t. a. lines are the first to go; then the t. p. line becomes indistinct, and the pale included space alone is sometimes seen crossing the wing; then this goes and only the s. t. line remains, and this is evident in all the specimens; the darker preceding shade is also permanent, but variable in intensity, while the terminal space may be either darker, concolorous with, or paler than the ground color. The ordinary spots are always traceable, but vary in the line of obsolescence. The most strongly modified specimen is dark brown-red, with all save the s. t. line lost, the preceding shade very slightly marked, ordinary spots concolorous, the pale defining line very narrow. Secondaries in the ♂ soiled whitish, with a narrow dusky outer border; in the ♀ fuscous. Beneath powdery, primaries more reddish, secondaries whitish, no outer transverse line, secondaries without distinct discal spot.

Expands 31–35^{mm}; 1.25–1.40 inches.

HABITAT.—Sierra Nevada, California.

A large series of this interesting species is before me, showing what I hope is the entire range of variation of the species which is a difficult one to place in a table by reason of its variability. It is very close to what I have determined at *satis* Harvey, but differs in having no claviform, in lacking the gray powderings of primaries, in wanting the black defining lines to the ordinary spots, and in lacking the common transverse line of the underside. From *rufula*, to which it is also allied, it differs in having the median space concolorous and the orbicular always complete. Single specimens of the species, with partly obsolete maculation, may be difficult to locate properly.

Types are with Messrs. Edwards and Neumoegen, and in the U. S. National Museum collection.

Carneades rufula Smith.

1887. Smith, Proc. U. S. Nat. Mus., x, 461, *Agrotis*.

Somewhat yellowish red brown; median space darker, red brown. Cell, except ordinary spots, still darker, more blackish. Transverse lines geminate, included space pale. T. a. line oblique, outwardly

curved between veins. T. p. line finely and evenly crenulate, parallel with the outer margin. From this line, which is like the basal space, very pale yellowish red brown, the color becomes evenly darker to the outer margin, nowhere, however, as dark as the median space. S. t. line narrow, pale, interrupted, sinuate. A row of terminal dark lunules. Claviform moderate, incompletely outlined, pale. Ordinary spots pale with whitish annuli, moderate in size; the orbicular suboval, not completely closed superiorly. Head and thorax concolorous. Secondaries blackish. Beneath rusty, powdery, with broad, diffuse common line and distinct discal spot on all wings.

Expands 31^{mm}; 1.25 inches.

HABITAT.—New Mexico, 7,000 feet.

A single ♂ specimen in good condition from Prof. F. H. SNOW. The species is very distinct and easily recognized by the very pale basal space and neatly defined, evenly darker median space.

Since the species was described I have seen a few specimens which indicate a degree of variability in the contrast between the median and basal spaces. One specimen is almost uniformly pale red, but the dusky cell still remained to mark its allies.

Carneades basiflava Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 52, *Agrotis*.

Deep, dull luteous brown, with black powderings, varying to quite deep blackish brown. Collar concolorous, or sometimes head and collar paler with a ferruginous tinge, and with a variably evident dark transverse line, less distinct in the pale (♂) specimen, black in the dark (♀) specimen. Primaries with basal space paler, the contrast most marked in the male. Basal line distinct, black, angulate, geminate. T. a. line distinct, geminate, the inner line somewhat indistinct but not obsolete, outer line black; the course very even and nearly upright from costa to internal vein, then with a long outward curve to inner margin. A faint, diffuse, and indefinite median shade forms the dark shading between the ordinary spots. T. p. line evenly and not strongly curved over reniform, very slightly incurved below; the line is geminate, the inner crenulate, the outer very even; included space concolorous or with ashen powdering. S. t. space slightly paler; a narrow, indefinite, pale s. t. line, which is slightly sinuate and preceded by a series of somewhat triangular dark spots. A row of blackish terminal lunules. No basal dash or mark. The costa is slightly paler, but not at all discolored or contrasting. Claviform distinct but small, black bordered. Orbicular inwardly oblique, oval, not complete superiorly, black margined, slightly paler. Reniform of fair size, kidney-shaped, not complete inferiorly, black margined and with a paler annulus. The cell is darker, but not distinctly black between the ordinary spots. Second-

aries smoky, paler and more yellowish in the male. Beneath dark smoky, primaries with an outer line marked on costal space only; secondaries paler discally, with a small discal spot and an outer line, beyond which the margin is darker.

Expands 29–30^{mm}; 1.16–1.20 inches.

HABITAT.—Northwest British Columbia.

This species is allied to *satis* and *rufula*. From the former it differs by the incomplete orbicular. It is a darker, shorter winged species, with the cell more definitely dark filled. From *rufula* it differs in the dark color and the lack of the distinct contrast between the median space and the basal and s. t. spaces. The orbicular is as in *rufula*, but the under side is much darker, with the maculation not marked. Two specimens, ♂ and ♀, are before me, differing very decidedly in appearance. The male is paler, the maculation more distinct, and the pallor of the basal space is more evident. The female is darker throughout, the tendency along the costa and in the ordinary spots to a cinereous powdering, the contrast between basal and median space not well marked. The species is not a strongly marked one, but is distinct, I think. Though most difficult to separate from the species above named, it really gives the impression, in the ♀ more especially, of *tessellata*. It can not well be that species, however, variable as it is. It is a good deal more likely eventually to turn out a variety of *rufula*.

Carneades *satis* Harv.

1876. Harv., Can. Ent., VIII, 36, *Agrotis*.

Red brown, powdered with gray; transverse lines geminate T. a. outwardly oblique, curved between veins T. p. lunulate, outwardly curved over cell, inwardly beneath S. t. line sinuate, preceded by a dusky shade or dark spots; terminal space a little darker. Claviform outlined, concolorous. Ordinary spots large, concolorous; black ringed, and marked with a few yellow scales. Secondaries fuscous. Beneath fuscous, powdery, with distinct discal spot and obsolete common line. Head and thorax concolorous; collar with a black line.

Expands 28–32^{mm}; 1.12–1.28 inches.

HABITAT.—California, Nevada, Montana.

A small species, rather illy defined. The resemblance to the typical forms of the group is obvious, but the cell is not so distinctly black, rather powdered with dark. Dr. Harvey's description is unusually poor and comparative with another species, itself described only comparatively. From Mr. Edwards' collection I have a specimen labeled *satis* and from Mr. Tepper's collection one so determined by Mr. Grote. Several other specimens agree with these, but none are entirely like the description. The type, I understand, came into Mr. Grote's hands, and his identification is probably correct and therefore here adopted.

Carneades rena Smith.

1890. Smith, Trans. Am. Ent. Soc., xvii, 53, *Agrotis*.

General color varies from a very pale carneous gray to a distinct reddish gray, the change being rather one of intensity than color. Head and thorax immaculate, palpi dark at sides. Primaries with the maculation not strongly contrasting, transverse lines sometimes obsolete; in fully marked specimens basal line distinct, geminate, black. T. a. line very slightly outcurved, irregular, geminate; outer line blackish, broad, distinct; inner line faint and more even. T. p. line geminate; outer line punctiform, inner line narrow, crenulated, its course rather even, and not strongly outcurved over reniform. S. t. line pale, narrow, very slightly irregular, relieved by a distinct dark, rather narrow preceding shade. A narrow interrupted dark terminal line. This maculation may be wanting in part or entirely. One specimen lacks all but the merest trace of the t. p. line; usually the s. t. line remains distinct. Claviform small, incompletely outlined, in pale specimens entirely wanting. Orbicular large, round, slightly irregular, narrowly pale ringed, a black spot filling the space between orbicular and t. a. line and another dusky shade filling the interval to the reniform; the color of the included space is very slightly paler than ground color; reniform large, upright, kidney shaped, narrowly outlined in pale, with a leaden gray filling, becoming blackish inferiorly. These ordinary spots are constant in the series examined though the distinctness varies, as does also the color of the filling between them. Secondaries soiled white to pale fuscous, the difference not sexual. Beneath, primaries fuscous, powdery, pale at costa, with an outer transverse line visible only at costa and a large discal spot; secondaries much paler, powdery, with a distinct outer shade line and large discal spot.

Expands 31–33^{mm}; 1.25–1.32 inches.

HABITAT.—Sierra Nevada, California.

The series before me, by the kindness of Mr. Edwards, shows quite a long range of variation within comparatively narrow limits. There is little or no change in ground color nor in the relative position or course of the lines or spots, while the whole transverse maculation may be almost completely gone and only the ordinary spots remain. In structure it fully agrees with *tessellata* and *insignata*, and with the latter of these species it is most nearly allied, being closest to the form described as *verticalis* by Mr. Grote. It differs essentially from this, however, in the shape of the ordinary spots, and especially in not having any contrast whatever between median and s. t. space—a marked feature in all the *insignata* forms. Judging from the number of specimens sent by Mr. McGlashan the species is not uncommon.

Two specimens referable to this species in Mr. Neumoegen's collection, marked California, without indication of special locality, have the ground color a luteous brown or reddish, with a faint gray shade

over all, and the cell between the ordinary spots more distinctly dusky. Otherwise the maculation is practically identical, and I can not think that we have here a distinct species.

Carneades insignata Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 330, *Agrotis*.
 1889. Butler, Trans. Ent. Soc., Lond., 1889, 379, *Agrotis*.
declarata Wlk.
 1865. Wlk., C. B. Mus., Lep. Het. Suppl., xxxii, 663, *Mamestra*.
 1882. Grt., Ill. Essay, 43, *Agrotis*.
 1883. Grt., Proc. Am. Phil. Soc., xxi, 156, *Agrotis*.
 1885. Saund. Can. Ent., xvii, 32, *Agrotis*.
 1883. Butl., Trans. Ent. Soc. Lond., 1889, 379 pr. syn.
tritici † Gn.
 1852. Gn., Sp. Gen. Noct., i, 228, *Agrotis*.
 1889. Butler, Trans. Ent. Soc., Lond., 1889, 379 pr. syn.
decolor Morr.
 1874. Morr., Proc. Buff. Soc. Nat. Hist., xvii, 162, *Agrotis*.
 1875. Morr., Can. Ent., vii, 214, *Agrotis*.
 1877. Morr., Buff. Bull., iii, 212, *Agrotis*.
campestris Grt.
 1875. Grt., Can. Ent., vii, 118, pl. 1, f. 6, *Agrotis*.
 1875. Grt., Proc. Ac. Nat. Sci. Phil., 1875, 423, *Agrotis*.
 1875. Morr., Can. Ent., vii, 214 = *decolor*.
 1875. Grt., Can. Ent., vii, 227 = *decolor*.
 1877. Grt., Bull. Geol. Surv., iii, 118, *Agrotis*.
 1873. Grt., Bull. Geol. Surv., iv, 175, *Agrotis*.
 1889. Butler, Trans. Ent. Soc., London, 1889, 379 pr. syn.
 var. *VERTICALIS* Grt.
 1880. Grt., Bull. Bklu. Ent. Soc., iii, 29, *Agrotis*.
 1885. Smith., Can. Ent., xvii, 6 = *declarata*.

Ground color from carneous gray to deep blackish or bright rust red brown; terminal space always, median space usually a shade or two darker than other parts of wing; cell between ordinary spots and to t. p. line black or blackish brown; lines geminate, variably distinct, and varying in course, especially t. a. line. S. t. line variably distinct, pale, sometimes only marked by the limit of the dark terminal space. Claviform distinct, outlined, variable in size and shape. Ordinary spots very large, concolorous, outlined in black, annulate with yellow scales. Secondaries dusky to dark fuscous. Beneath powdery, variable in shade, a more or less incomplete common line and discal lunule.

Expands 31-34^{mm}; 1.25-1.35 inches.

HABITAT.—Nova Scotia, Canada, northern United States east of Rocky Mountains.

A very decidedly inconstant species. Thirty or more specimens are before me, and except for the variety *verticalis* no two are alike. It is difficult to describe such a species as this, which varies so in color, and even in maculation. The wings are comparatively rather short, broad, trigonate, the apices rectangular. The ordinary spots are always very large and distinct, contrasting against the dark filling of

cell. This, the usually very distinctly geminate transverse lines and the smooth squamation, will ordinarily suffice to distinguish the forms of the species.

Verticalis is applied to a tolerably constant bright carneous gray form from Colorado and Montana; none of the other forms are well enough marked to receive separate designation.

The only species with which the present is likely to be at all confused are *tessellata* and *nigripennis*, and the differences authorizing those species are pointed out in the descriptions thereof.

The synonymy of the species as I have it at present is in compliance with Mr. Butler's references in the Transactions of the Entomological Society of London for 1889. There does not seem much room for error in so strongly marked a species. The distribution is wide, but does not seem to extend southward. The species occurs in northern New York, but I have not seen it from Long Island. It does not seem to be found in the Central States, but re-appears in the high Western plateaus.

Carneades lewisi Grt.

1873. Grt., Buff. Bull., 1, 137, pl. 4, f. 10, *Pleonectopoda*.

“♂ Reddish purple brown, not unlike *Agrotis plecta* or *leucostigma* in general color, but more robust, and without the pale longitudinal shades on primaries. Transverse lines obliterate; median lines dark, narrow, faint; t. p. line subluminate, projected opposite the cell, running evenly to internal margin. Ordinary spots large, concolorous, with a narrow, pale, powdery edging separated by the black, well defined shade which fills up the cell and is slightly apparent before the orbicular. Median shade apparent below the orbicular and approximate to the t. p. line. Subterminal line, pale. Terminal space duller, paler, less red than the rest of the wing; no terminal line, fringes concolorous. Hind wings pale, testaceous fuscous, silky, without marks above or below. Head and thorax reddish; feet pale dotted; abdomen a little darker than secondaries. Costal edge of primaries with antecapical pale dots, visible on the red-stained costal edge beneath. The forewings beneath are like secondaries without marks.”

Expands 34^{mm}; 1.36 inches.

HABITAT.—Colorado. (Coll. T. L. Mead.)

In the description of the genus *Pleonectopoda* Mr. Grote well defines the characters of the *tessellata* group. There is thus no doubt of the position of the species which I am strongly inclined to believe a mere variety of *tessellata*. I have specimens agreeing perfectly with the description as to color, but all have the t. a. line perfectly distinct, and none are immaculate beneath. On these two points apparently rests the claim of this insect to rank as a species. It must be provokingly close to some of the reddish forms of *tessellata*, but may be entirely distinct.

Carneaðes tessellata Harris.

1845. Harris, Rept. Ins. Mass., *Agrotis*.
 1860. Harris, Inj. Ins. Flint ed., 445, *Agrotis*.
 1877. Grt., Bull. Geol. Surv., III, 118, *Agrotis*.
 1883. Saund., Fruit Insects, 328, f. 340, *Agrotis*.
maizi Fitch.
 1856. Fitch, 2d Rept. Ins. N. Y., 313, *Agrotis*.
 1865. Fitch, 9th Rept. Ins. N. Y., 237-249, pl. 4, f. 2, f. 3, *Agrotis*.
 1874. Grote, Can. Ent., VI, 118, pr. syn.
 1878. Lintn., Ent. Cont., IV, 122, pr. syn.
nigricans † Riley.
 1869. Riley, 1st Rept. Ins. Mo., 87, *Agrotis*.
atropurpurea Grt.
 1877. Grt., Bull. Geol. Surv., III, 118, *Agrotis*.

Ash gray to dark red brown, irrorate with black, the vestiture rough, squammose. Transverse lines as in *insignata* but less distinct and finer. S. t. line usually distinct, yellowish, sinuate, often preceded by a darker shade, the terminal space darker. Claviform faintly marked. Ordinary spots usually well sized, powdered with gray or yellow; orbicular often small, round; reniform powdery, often obscured by a dusky shade. Secondaries fuscous, paler toward base. Beneath, as in *insignata*.

Expands 32-35^{mm}; 1.25-1.40 inches.

HABITAT—Canada and United States.

Compared with *insignata*, this species differs in the less even squammose vestiture of primaries; the color also less clear and definite. The cell is not so distinctly black, and the ordinary spots are powdery. While it is difficult to locate the difference, yet the distinctness of this form is at once obvious.

Mr. Grote's variety *atropurpurea* is based upon the merest difference in shade and is a pure synonym.

There is a considerable amount of variation in this species, and exactly where it ends I can not yet say. It is not impossible that of the Californian forms some may yet be considered worthy of a specific name. Several specimens were in a lot received from Mr. Edwards, all from the Sierra Nevada, California, and which I separated at first under the term *intrusa*. More careful comparisons and studies lead me to the belief that we have to do with a variety of *tessellata*, merely differing from the eastern form principally in a distinct reddish suffusion of the primaries, and an infusion of yellow into the secondaries. The cell between the ordinary spots is not so distinctly black in some specimens, and in these the median shade is somewhat more apparent, one specimen showing quite a strong resemblance to the *messoria* forms. The term *intrusa* may be used to denote this reddish powdered form with the ordinary spots pale and contrasting, the head and collar distinctly more reddish. The size and other characters resemble the type. Specimens of this form labeled *intrusa* m. are in the collection of Rutgers

College, collection of Hy. Edwards, and collection of U. S. National Museum.

This form may be rather closely related to Mr. Grote's *strigilis*, which I do not know.

Carneades albipennis Grt.

1877. Grt., Buff. Bull., III, 118, *Agrotis*.

1878. Grt., Bull. Geol. Surv., VI, 175, *Agrotis*.

1883. Grt., Proc. Am. Phil. Soc., XXI, 156, *Agrotis*.

♀ *nigripennis* Grt.

1880. Grt., Bull. Geol. Surv., VI, 159, *Agrotis*.

1882. Grt., New List, 25 pr. syn.

Fuscous to deep blackish brown; the general appearance very like some forms of *insignata*, and this form can best be described comparatively. Smaller, somewhat narrower winged, the transverse lines much more faintly marked and finer; t. p. line usually obsolete; ordinary spots size and form as in *insignata*, but concolorous with darkest portion of wing (except cell). Secondaries ♂ white, ♀ fuscous. This latter character is distinctive of the species.

Expands 31^{mm}; 1.25 inches.

HABITAT.—East of Rocky Mountains, Canada.

This is a very pretty and distinct little species, which is easily recognizable by the smooth even coloring and dusky, large-sized ordinary spots. The white secondaries of the male as compared with the dusky color of the female easily separate the species from all the allied forms

Carneades spectanda Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 54, *Agrotis*.

General color a rather bright luteous gray with a glaucous tint over all. Head somewhat darker, with a considerable admixture of black scales. Inferior part of collar also dusky, limited by a distinct transverse black line above which are white scales. The patagiæ are also somewhat darker and margined with black scales. Primaries very smooth in general color, the terminal space and costal portion of s. t. space darker, more powdery, cell filled with black about the pale ordinary spots. Basal line black, geminate, distinct. T. a. line geminate, well marked on costa, incurved on costal vein, thence slightly oblique outwardly to internal vein and a long outward curve below. T. p. line geminate, outcurved over reniform, then nearly parallel with outer margin; inner line narrow, crenulate, distinct; outer line even, much less evident. S. t. line narrow, pale, sinuate, marked by the darker terminal space. A series of black terminal lunules, and a yellow line at base of fringes. Claviform moderate in size, concolorous, distinctly outlined in black. Orbicular moderate in size, slightly irregular, but hardly oblique, distinctly black ringed and with a very narrow border of pale scales. Reniform moderate in size, of the normal form, with a

paler central line. Secondaries ♀ white, the veins dark marked. Beneath white, primaries somewhat smoky, and with a trace of an outer line.

Expands 33^{mm}; 1.32 inches.

HABITAT.—California (Neumoegen).

A single female only of this pretty and sharply defined species is at hand. It has all the appearance and structural peculiarities of the *tessellata* group. The white secondaries of the ♀ ally it with *pallipennis*, while the maculation of primaries is much more like *albipennis*, or even *insignata*. Some clearly marked specimens of *tessellata* resemble this species, but the white secondaries are always distinctive. Had the specimen been a male the white secondaries would not have been so important, as the female may have dusky secondaries when those of the ♂ are white. The reverse, however, is never the case within my experience.

Carneades pallipennis Smith.

1887. Smith., Proc. U. S. Nat. Mus., x, 461, *Agrotis*.

Pale whitish gray, powdered with fuscous; terminal space darker. Transverse lines geminate; t. a. slightly oblique and moderately curved between veins; t. p. crenulate, outwardly angulate on costa over cell, then obliquely in a rigid line to internal margin. S. t. line denticulate, narrow, pale, marked by a preceding dark shade. A very faint median shade. Claviform obsoletely indicated. Ordinary spots moderate, normal in shape, incompletely outlined; cell between, dusky. Secondaries pure white. Beneath white; powdery toward apices; an incomplete, imperfectly marked common line. Head and thorax concolorous.

Expands 31–33^{mm}; 1.25–1.30 inches.

HABITAT.—Colorado, northwest British Columbia.

There is no difficulty in recognizing this species once it is referred to this group, but it might with almost equal justice have been referred to *messoria* and associated with *orbicularis*. The black shading on cell is indefinite; the median shade more or less evident on each specimen. It might even have been referred to the *pitychrous* group without doing violence to the arrangement. In truth this is one of those unfortunate forms that fit nowhere and has no decided characteristics. It is one of those species that there is a temptation to utterly destroy to get rid of it.

A ♀ specimen from British Columbia, received since the above was written, has the median shade less marked, the darkening of the cell between the spots distinct, and a black spot before the orbicular. The reference to this group is therefore fully justified.

Carneades basalis Grt.

1879. Grt., N. Amer. Ent., i, 38, *Agrotis*.

Pale, rather rusty red brown, basal space yellowish gray, terminal space darker brown. T. a. line indicated on costa and below middle,

geminate, upright, limiting the pale basal space. T. p. line punctiform, subobsolete. S. t. line distinct, pale, irregular. Ordinary spots large, pale, well defined; orbicular open superiorly. Claviform faintly indicated, small. Secondaries pale, outwardly fuscous. Beneath pale, powdery toward apices and along costal margin; an indefinite common line and an obsoletely marked discal lunule. Head and thorax ferruginous.

Expands 37-40^{mm}; 1.5-1.6 inches.

HABITAT.—Colorado.

Very distinct by the red color and pale basal space. It shows by its wing form and habitus the relationship of the group to the *bostoniensis* section of the *messoria* group. The cell between the spots is only slightly darker.

Carneades solitaria Smith.

1885. Smith, Stett. Ent. Zeit., XLVI, 223, *Agrotis*.

Rusty, somewhat yellowish red; powdered with black scales; most distinctly in the median space. Transverse lines pale, gray, even, not well defined. S. t. line also gray but little sinuate. Terminal space powdered with black. Claviform obsolete. Ordinary spots distinct, moderate, yellowish. Orbicular round, reniform normal. Cell between the spots but little darker. Secondaries blackish. Beneath deep smoky gray, powdery; discal lunules evident. Head pale, thorax carneous gray.

Expands 33^{mm}; 1.32 inches.

HABITAT.—Labrador.

A single specimen from Mr. Moeschler, ticketed "? var. *conflua*." Typical *conflua* does not occur in America so far as I have been able to discover. The present species is certainly not *conflua* and agrees with no other form known to me. It has the wing form and somewhat similar color of *basalis*, from which it differs in smaller size, neatly defined, ordinary spots and lack of basal pale space, as well as by the blackish secondaries.

Carneades nostra Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 55, *Agrotis*.

General color a somewhat luteous brown, varying a little in shade. Sides of palpi darker, the front sometimes with dark scales. Collar with a somewhat faintly marked median transverse line. Thoracic tuftings gray tipped, sometimes the entire thorax somewhat darker in shade than the ground color. Costal region powdered with gray, more broadly at base, terminal space blackish, not greatly contrasting, and somewhat variable in the amount of the dark shading; on apical blotch gray powdered. Basal line present, geminate, not well marked. T. a. line geminate, very slightly oblique, with a distinct outward curvature in the interspaces; the line is sometimes barely traceable, and the two parts are generally equally distinct. T. p. line nearly parallel with the outer margin, the inner line finely crenulated, outer line reduced

to a row of small venular dots which are sometimes wanting; sometimes the entire line is scarcely traceable. S. t. line irregular, concolorous, marked only by the dusky terminal space and by a vague preceding shade; a series of small terminal lunules. Claviform indefinitely outlined, concolorous. Orbicular oval, of good size, black ringed, gray powdered. Reniform large, kidney shaped, narrowly black ringed, concolorous or slightly paler, somewhat leaden filled inferiorly. The spots are always distinct, but somewhat variable in point of definition, sometimes incompletely outlined. The space between the spots is darker, but never black or prominent. One specimen shows a black spot preceding the orbicular, and another has the entire maculation obscured, the ground color paler than normal. Secondaries smoky fuscous, the veins darker, discal lunule of underside visible. Beneath powdery fuscous, with a discal spot on all wings and a variably distinct outer line. In one specimen the line is wanting entirely.

Expands 38-40^{mm}; 1.50-1.60 inches.

HABITAT.—Sierra Nevada, California.

This species is allied to *basalis* and *solitaria*, having all the structural characters of the *tessellata* group. In superficial appearance it strongly resembles *saucia*, and I am very sure I have seen the species mixed with *saucia* in collections. The tuberculate front and the structure of the antennæ will serve to distinguish the present species at once. It has the wing form of *saucia* rather than *tessellata*, and by this character and the dusky terminal space bears some resemblance to the *cinereomaculata* form of *ochrogaster* Gn.

The species seems tolerably common judging from the number of specimens sent.

Types in the Rutgers College collection, collection of Hy. Edwards, and collection U. S. National Museum. Mr. Neunöegen also has specimens in his collection.

Carneades ochrogaster Gn.

1852. Gn., Sp. Gen., Noct., 1, 327, *Noctua*.

1856. Wlk., C. B. Mus., Lep., Hct. x, 408, *Ochropleura*.

1880. Grt., Bull. Geol. Surv., vi, 566, *Agrotis*.

cinereomaculata Morr.

1874. Morr., Proc. Bost. Soc. N. H., xvii, 164, *Agrotis*.

1875. Grt., Can. Ent., vii, 226, *Agrotis*.

1875. Grt., Proc. Ac. Nat. Sci. Phil. 1875, 423, *Agrotis*.

gularis Grt.

1875. Grt., Proc. Ac. Nat. Sci., Phil. 1875, 424, *Agrotis*.

♀ *turris* Grt.

1875. Grt., Can. Ent., vii, 226, *Agrotis*.

1880. Grt., Bull. Geol. Surv., vi, 582, = *gularis*.

From bright clay yellow suffused with reddish to distinct red brown. In pale specimens median space more brown or reddish; terminal space darker fuscous; costa somewhat paler. A distinct basal black shade reaching to t. a. line and continued beyond that line as the black clav-

iform. Cell black, defining the ordinary spots; orbicular variable in size and shape, usually round, concolorous, powdered with gray, or entirely pale; rarely incomplete; reniform always distinct, complete, large, outlined by a black line annulate with yellowish, centrally clouded with dusky. Transverse lines often obsolete; when present, t. a. upright, sinuate, not crossing pale costal space; geminate; t. p. illy marked, somewhat extended on the veins, parallel with outer margin. S. t. line pale, marked on costa and below vein 6 by a preceding dusky shade. Secondaries dull fuscous. Beneath variable, powdery, with distinct discal spots. Head and thorax concolorous, collar with a dark line; thorax with low anterior and posterior divided tufts.

Expands 37-40^{mm}; 1.5-1.6 inches.

HABITAT.—Canada, Northern and Eastern States, Michigan, Missouri, Colorado.

A very distinctly marked and easily recognized species. The synonymy was caused in part by some confusion of identification between Mr. Grote and Mr. Morrison. Mr. Morrison's type is a very pale form in which the ordinary spots are gray. He did not recognize the type form of *turris* as being the same species, and hence, apparently, Mr. Grote's error. (See Can. Ent., 7, 226.)

I have no doubt of the correctness of this identification of Guenée's species.

Carneades idahoensis Grt.

1878. Grt., Bull. Geol. Surv., IV, 171, *Agrotis*.

Fuscous red brown, the costa broadly gray, as are also the ordinary spots. A distinct basal dash black; cell black; claviform narrowly outlined in black. Transverse lines obsolete, very faintly traceable. S. t. line pale, irregularly dentate, often barely visible. Orbicular oblique, oblong, open superiorly; reniform moderate, kidney-shaped. Secondaries pale fuscous. Beneath powdery, pale; an exterior common line and discal lunule, darker. Head and thorax concolorous; collar with a black line.

Expands 32-36^{mm}; 1.30-1.45 inches.

HABITAT.—Idaho, Colorado, Nevada.

A very easily recognizable species; very distinct from anything else in the group, except, perhaps, *westermani* and *furtivus*, from each of which it has been already sufficiently distinguished. It bears a more than casual resemblance to some of the forms referred to the *quadridentata* group of the genus.

Carneades furtivus Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 56, *Agrotis*.

Ground color varying from fuscous gray to bright red brown. Head and thorax evenly concolorous, collar with a central black, transverse line. Primaries with costal space to t. p. line pale, discolorous, in the

brown specimens most prominently so. Basal line wanting; at all events not traceable. T. a. line usually obsolete, in one well marked brown specimen traceable as a pale, outwardly oblique line, without definite margins, and angulate in the interspaces. T. p. line geminate, rather even, pale, outcurved over the cell and slightly incurved inferiorly; inner part of line usually distinct, outer part not well defined; in some specimens the line is not traceable below the costa. S. t. space darker costally, a distinct dark shade and a series of sagittate blackish spots preceding the narrow, pale, and slightly irregular s. t. line; terminal space darker than ground color. In a brown specimen with well marked t. p. line the s. t. is decidedly paler than the median space, and this is the case to a variable extent where the t. p. line is marked. A black basal dash, interrupted by the t. a. line, the small loop-like claviform continuing the dash beyond the line; this spot is very variably distinct, but usually not completely outlined. Cell around the ordinary spots dusky to black. Orbicular variable in shape, always open superiorly. V-shaped to oblong, oblique, the change being made by cutting the outer horn of the V; in color like the costal region, sometimes with a darker center. Reniform moderate in size, kidney-shaped, white ringed, the center concolorous with costa or somewhat darker. Secondaries smoky fuscous, with a variably evident discal lunule. Beneath powdery with a very variable distinct outer line and a more uniformly defined discal spot to all wings.

Expands 35-38^{mm}; 1.38-1.50 inches.

HABITAT.—California (Neumoegen).

Three very strongly dissimilar specimens, all females. The species is most nearly allied to *idahoensis*, differing principally in the very distinct shade containing still darker sagittate spots preceding the s. t. line, which is less dentate than in its ally. The variations have been indicated in the description.

Carneades westermanni Stgr.

1857. Stgr., Stett. Ent. Zeit., 1857, 303, *Agrotis*.

Smoky fuscous brown; the costa broadly gray. All the lines obsolete. A basal black line; cell blackish; claviform marked. Ordinary spots concolorous, gray powdered. Orbicular round, open above; reniform not distinctly outlined. Secondaries fuscous; a dusky lunule evident. Beneath dusky, powdery; a distinct dark discal lunule. Head and thorax concolorous; collar inferiorly gray, marked with a black line.

Expands 32^{mm}; 1.30 inches.

HABITAT.—Labrador, Greenland.

Allied to *idahoensis*, but at once distinct, not only by the obvious differences in maculation, but also by the shape of primaries, which in this species have the costa very strongly convex, whereas in the former

the costa is straight. The specimen under examination I believe came from Moeschler by the courtesy of Mr. Cramer. I have never seen another anything like it.

Carneades obeliscoides Gn.

1852. Gn., Sp. Gen. Noct., II, 293, *Agrotis*.
 1856. Wlk., C. B. Mus. Lep. Het., x, 331, *Agrotis*.
 1878. Graef., Bull. Bklu. Ent. Soc., I, 9=*obelisca*.
obelisca 4 Wlk.
 1856. Wlk., C. B. Mus. Lep. Het., x, 323, *Agrotis*.
sesatilis Grt.
 1873. Grt., Buff. Bull., I, 100, *Agrotis*.
 1875. Grt., Buff. Bull., II, 203, pr. syn.
 1875. Grt., Can. Ent., VII, 102, pr. syn.
 1878. Graef., Bull. Bklu. Ent. Soc., I, 9=*obelisca*.

Red brown, or darker; median space deeper brown; cell black; costa to t. p. line white or pale gray. Transverse lines distinct, geminate; t. a. not crossing costa, oblique, curved between veins; t. p. oblique, sinuate, slightly crenulate. S. t. line pale, interrupted very irregular; terminal space somewhat darker; a slightly darker costal patch preceding s. t. line. A black basal dash. Claviform rather large, distinctly outlined, surmounted by a broad paler streak. Stigmata distinct, usually round and generally complete; outlined in black; a distinct white annulus, the center concolorous. Reniform large, complete, pale or white, a concolorous lunule toward inner margin. Secondaries fuscous; often paler toward base. Beneath variable, powdery with discal, and s. t. common transverse shade lines, discal lunules usually evident. Head and thorax concolorous; collar with a somewhat indistinct transverse line.

Expands 31-37^{mm}; 1.20-1.50 inches.

HABITAT.—East of Rocky Mountains.

Easily distinguished from all others of the group by the large trigonate primaries, the white costa, strongly arched in most specimens, and large discolored reniform.

Carneades infelix Smith.

1890. Smith, Trans. Am. Ent. Soc., XVII, 57, *Agrotis*.

General color red-brown, varying in shade. Head and collar inferiorly either gray or yellow, with a ferruginous admixture, contrasting; a black transverse line across the middle of the collar limits the pale space superiorly, and above this line the collar is concolorous with thorax. Thoracic disk in the specimen even, concolorous; in another the entire color is darker, the tuftings are gray tipped, the patagia with gray powderings and margined with black. Primaries with costal region discolored yellow, with a ferruginous or an ash-gray powdering, gradually merging into the ground color before the inception of the t. p. line. Basal line whitish, loop-like, cutting a disk out of the

basal black streak. T. a. line visible only in the s. t. interspace, where it crosses the black basal dash in the form of an outcurved pale line margined with deep black. T. p. line narrow, single, finely crenulated, slightly outcurved over reniform, thence very evenly parallel with the outer margin. This in the ♀; in the ♂ no trace of the line is visible. In the ♂ the color is even unbroken through the median and s. t. space to the s. t. line, which arises from a gray apical spot and is punctiform and very slightly irregular, the spots preceded by sagittate black dashes; beyond this line the narrow terminal space is slightly more dusky, and there is a row of small black terminal dots; in the ♀ a grayish suffusion along the black marked veins relieves and lightens the s. t. space, intensifies the black sagittate dashes and makes the terminal space darker by contrast; the maculation, otherwise, is as in the ♂, save that the s. t. line is more evident and some of the spots are connected, showing that the line is distinctly dentate on veins 3 and 4. Claviform distinctly black margined, variable in size and form, center concolorous, surmounted with an also variable pale yellowish streak crossing the median space. Orbicular oval, oblique, complete, black ringed, then with a pale annulus, center of the color of costal region; reniform large, kidney shaped, contrasting yellowish, inferiorly dark grayish marked. In the ♀ the entire internal margin is gray marked. Secondaries evenly fuscous, with a row of terminal darker lunules, fringes paler.

Expands 41–45^{mm}; 1.65–1.80 inches.

HABITAT.—California (Neumoegen).

This handsome and well-marked species comes nearest to *obeliscoides* in the *tessellata* group, but is perhaps as nearly allied to *perexcellens* of the *quadridentata* group. From the latter it is distinct by the lack of the prominent dentations of the s. t. line; from the former by its very much larger size, the more produced primaries, different s. t. line, and other details of maculation. The line of variation is in the same direction as in *perexcellens*, the specimens before me showing strong differences, while evidently referring to the same species.

Since the above was written I have seen a series in the U. S. National Museum, which runs from the form above described to a uniform black, the maculation scarcely identifiable.

Carneades islandica Stgr.

1857. Stgr., Stett. Ent. Zeit., 1857, 232, *Agrotis*.

Dull luteous, median and terminal space darker, cell black, costa and large ordinary spots concolorous with palest colors of primaries. T. a. line obsoletely geminate, not crossing costa, straight to vein 1, outwardly curved below. T. p. line evenly oblique from cell to hind margin, crenulate. S. t. line very indefinitely marked by the contrast between s. t. and terminal spaces. Claviform distinct, dark. Ordinary spots essentially as in *obeliscoides*. Secondaries fuscous. Beneath

powdery, an external common line and discal spot. Thorax and head concolorous; collar with a dark line.

Expands 39^{mm}; 1.55 inches.

HABITAT.—Iceland, Labrador.

Closely allied to *obeliseoides*, the typical maculation entirely present. It differs from that species in the comparatively longer, narrower primaries, the non-contrasting ordinary spots, and in the position of the t. p. line, which in *obeliseoides* is very close to the reniform, but in *islandica* is far beyond it, half way to the outer margin. This widens the median and narrows s. t. space in this species.

The description is introduced here only because the species has so long been catalogued in our lists and has been entirely mistaken. I do not think it has ever been found in North America, but very likely will be found in Alaska or in the Hudson Bay territory. The locality (Labrador) given by Staudiger is based upon *opipara* Morr., which is not this species at all.

Carneades colata Grt.

1881. Grt., Can. Ent., XIII, 131, *Agrotis*.

“♀ Like *versipellis*, but a little larger and without the white lines on the veins. Entirely dark, purply brown; thorax and head reddish brown. Stigmata a little hoary; orbicular large, open; reniform wide; claviform indicated. Lines very faint; an indistinct, paler shade following the t. p. line; the terminal space also indistinctly paler. Hind wings concolorous dark fuscous. Mount Hood, one fresh female specimen. Can not be confounded with any other species from the color and its affinity with *versipellis*.”

No specimen to which this description could be fitted has been found as yet. The characters given would seem to indicate a species close to *tessellata*, but the open orbicular forbids the suggestion that it may be a form of that protean species.

Two female specimens in Mr. Neunmoegen's collection, seen since the above was written, may perhaps be referable here. They were taken in the Sierra Nevadas, and agree fairly well with the above description, save that in one case the orbicular is complete and in the other it is simply not completely outlined above. I have named these specimens *colata* provisionally, until an opportunity for the study of the type occurs. The species is correctly placed near *versipellis*, which it resembles in the manner suggested by Mr. Grote.

Carneades divergens Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 327, *Agrotis*.
versipellis Grt.

1875. Grt., Can. Ent., VII, 172, pl. i, f. 9, *Agrotis*.

1879. Grt., Bull. Geol. Surv., v, 206, *Agrotis*.

1889. Butler, Trans. Ent. Soc. Lond, 1889, 380 pr. syn.

Red to dark blackish brown; terminal space usually a little darker; cell black; subcostal and median vein distinctly white to end of cell;

a black, sometimes diffuse, basal patch. Transverse lines essentially as in *obeliscoides*, but the median space is somewhat more narrowed inferiorly. S. t. line distinct, pale, sinuate, and slightly dentate. Ordinary spots moderate, defined, annulate, and powdered with white. Orbicular ovate, oblique; reniform upright, rather narrow, kidney-shaped. Claviform evident, distinctly outlined, variable in size. Secondaries fuscous. Beneath powdery, variable in color; a more or less distinct common line and discal spot. Head and thorax concolorous; the collar with a distinct black line.

Expands 32-34^{mm}; 1.25-1.35 inches.

HABITAT.—Northern States to Colorado, California.

This species has the appearance and maculation of *obeliscoides*, without the pale costa and ordinary spots of that species; but with white subcostal and median veins which render this species very evidently distinct. Though widely distributed, the species is not common, and I have thus far met with no record of its capture in the Southern States. From California I have specimens not differing to any extent from our eastern forms, and in the Sierras it seems more common than in the east. In substituting *divergens* for *versipellis* as the name of this species, I follow Butler in his identification of Walker's type. Walker records his specimen from Nova Scotia.

Carneades redimicula Morr.

1874. Morr., Proc. Bost. Soc. N.H., xvii, 165, *Agrotis (redimacula)*.

1875. Morr., Proc. Ac. Nat. Sci. Phil., 1875, 75, *Agrotis*.

1879. Strk., Rept. Chief Eng., 1878-'79, v, 1861, *Agrotis*.

Reddish to dark fuscous brown, washed with bluish gray; median and terminal space darkest. Costal portion of basal space paler gray; basal black dash diffuse. T. a. line obsolete marked below median vein; outwardly oblique geminate. T. p. line indistinctly marked, evenly sinuate. S. t. line pale subobsolete, sinuate, most generally marked only by the difference in shade between s. t. and terminal spaces. Claviform marked. Ordinary spots very large, even bluish gray; well defined. Secondaries fuscous, paler toward base. Beneath variable in shade, powdery, a distinct discal lunule on each wing. Head and thorax concolorous; collar inferiorly gray, followed by a distinct limiting black line.

Expands 30-33^{mm}; 1.20-1.30 inches.

HABITAT.—Northern States east of Rocky Mountains; Canada.

A rather small form with short, broad primaries, and very large evenly gray ordinary spots. The gray so largely predominates that it gives the impression of a much more even coloring than actually exists. The difference of color in basal space is a distinctive feature. The insect is not rare and yet is not very abundantly represented in collections. Mr. Strecker records it from Colorado in September, Mr. Hill says July 30 in the Adirondacks.

Carneades atrifera Grt.1878. Grt., Bull. Geol. Surv., IV, 173, *Agrotis*.1880. Grt., Bull. Geol. Surv., VI, 260, *Agrotis*.

Grayish fuscous, the narrow terminal space somewhat darker. A black shade at base; cell black. T. a. line geminate oblique, curved between veins. T. p. line obsolete or very faint. S. t. line unusually close to margin, faint. Veins somewhat marked with darker fuscous. Claviform faintly outlined, rather large. Ordinary spots moderate, concolorous, or slightly paler; orbicular oval not quite closed superiorly. Secondaries pearly gray, outwardly darker. Beneath pale, powdery; a distinct discal lunule. Head and thorax concolorous; collar with a distinct black line.

Expands 31–34^{mm}; 1.25–1.35 inches.

HABITAT.—Sierra Nevada, California; Maine.

A very distinct form, readily recognized by even fuscous color, rather obsolete transverse lines and distinct ordinary spots. It conflicts with none other in this group. The geographical distribution is worthy of note, and indicates that the species will be found in British Columbia.

Carneades tesselloides Grt.1880. Grt., Bull. Geol. Surv., VI, 566, *Agrotis*.

Fuscous, washed with various shades of gray; terminal space usually darker; costal region paler gray. Transverse lines geminate, not distinctly marked course much as usual. S. t. line distinct pale, sinuate. Basal dark dash diffuse, somewhat indistinct; cell variably darker. Claviform outlined, not distinct. Ordinary spots large, gray; orbicular ovate, often not quite complete superiorly. Secondaries whitish to fuscous. Beneath, pale powdery. Head and thorax concolorous; collar with a black line.

Expands 31–38^{mm}; 1.25–1.50 inches.

HABITAT.—California, Arizona, Montana.

A near ally of *silens*, but much darker and more definitely marked, yet the maculation aside from its depth or definition is identical, and I regard the distinctness of the species as not free from doubt, the more so as this species is exceedingly variable in size, ground color, and distinctness of maculation.

Carneades silens Grt.1875. Grt., Can. Ent., VII, 67, *Agrotis*.

Whitish over pale fuscous; costal region and ordinary spots gray. Transverse lines geminate barely traceable. S. t. line obsolete. Terminal space slightly darker; veins faintly dark lined. A distinct black basal streak; cell blackish. Claviform faintly marked. Ordinary spots moderate, defined; orbicular oval, not quite closed above. Secondaries white. Beneath white, powdery. Collar with a black line; head and thorax concolorous.

Expands 33^{mm}; 1.5 inches.

HABITAT.—California, Nevada, Arizona.

Easily recognizable by the pale color and lack of transverse maculation. It conflicts with no other species of the group except perhaps *tesselloides*, and it may eventually claim that species as a variety. There is, however, an ashen gray tinge to *tesselloides* which is replaced in this species by a yellowish tint. The difference is not a very great one, but suffices to change very completely the habitus of the species.

Carneades strigilis Grt.

1876. Grt., Buff. Bull., III, 81, *Agrotis*.

“♀. All the tibia spinose, belonging to the *tessellata* group. Forewings, thorax, and head blackish fuscous, somewhat olivaceous; at base of head and collar some ochrey scales. The transverse lines are obsoletely geminate; the white or gray included shades are prominent and relieve the accompanying dark transverse lines. Lines dentate, nearly perpendicular. Stigmata moderately large, shaded with whitish; claviform concolorous, barely indicated. Terminal space a little paler. S. t. line fine, powdery gray; fringes concolorous. Hind wings pale fuscous, with paler interlined fringes. Beneath translucent centrally with powdered costal region, faint discal mark and line.”

Expands 32^{mm}; 1.28 inches.

HABITAT.—Vancouver Island (Mr. Hy. Edwards).

I have not been able to identify this satisfactorily. There are two or three doubtful forms in this group to which I have hesitated in applying names, and to one or the other of them—all from California—this name may prove applicable.

SPECIES UNKNOWN TO ME.

Agrotis dapsilis Grote.

1880. Grote, Bull. Geol. Surv., VI, 582, *Agrotis*.

Front smooth, vestiture hairy, antennæ of ♂ bipectinate. Pale ash-gray, powdered with blackish. Transverse lines consisting of a series of blackish, vcnular spots. S. t. line faintly marked by a slight difference in tint between s. t. and terminal space. A dusky terminal line. Orbicular a small blackish spot. Reniform narrow, dusky, upright. Secondaries outwardly dusky.

Expands 31^{mm}; 1.25 inches.

HABITAT.—Florida.

To the kindness of Mr. Thaxter, I owe an opportunity of examining the type. It is in miserably poor condition, and it is impossible to say certainly where it belongs in the series. The middle legs alone remain; a stump about 1^{mm} long of the left antennæ is all that remains of those organs; and last and most provoking there is a ♀ body pasted on what

was obviously a ♂. The species is thoroughly aberrant for an *Agrotis*, but there is not enough of it remaining to dispute the generic reference.

It seems to suggest my *tepperi* to some extent and may find a place near it when good fortune turns up other specimens.

Agrotis littoralis Pack.

1868. Pack., Proc. Bost. Soc. Nat. Hist., XI, 36, *Agrotis*.

♂ of a uniform glossy, pale, luteous, tawny brown; antennæ well pectinated; palpi very large and stout, with long cilia beneath; third joint long, porrect, cylindrical, acute. Front concolorous with thorax and abdomen being of a pale brown. Fore wings smooth, on the basal third of the wing a black, irregularly, quadridentate line, the teeth between the nervures pointing outwards between the median, s. m., and internal nervures, but directed inwards on the median space, then curving outwards on the costa nearly to the middle of the inner discal circle, which is large and formed by a simple, brown, unshaded ring. The outer reniform spot is large and shaded on the inner half, especially on the lower end at the origin of the mesial nervures. Beyond is a simple line, broadly curved opposite the reniform, from the outer third of the costa to the inner third of the hind margin. Beyond is a parallel line of dark streaks of uniform length, and beyond is a submarginal line, diffusely shaded inwards and forming a diffuse, triangular, dusky spot on the costa, below which is an angular sinus; on the submedian fold it is bent inwards. A marginal dark line, scarcely interrupted at the nervures. Fringe long, concolorous with the rest of the wing. Hind wings a little more dusky than the anterior pair; pale on the costa, edge dark, fringe pale, tawny, concolorous with the costa. Thorax darker than the body. Beneath dusky, with a diffuse, dusky, discal spot and two parallel dusky lines. Beyond, a broad paler margin. On the hind wings is a lunate discal spot, and an outer, diffuse, duskier-shaded spot on the costa. Length of body .62, fore wing .60 inch.

Differs in its fore wings, being of a uniform tawny color, with a plain ringlet and large reniform dot, with the rows of dots beyond; and by the well pectinate antennæ. Labrador, Caribou Island.

Apparently near *manifesta*, but very different from anything known to me. I did not find this in the Peabody Museum, and never saw anything like it elsewhere.

Agrotis hero Morr.

1876. Morr., Proc. Bost. Soc. N. H., XVIII, 23^d, *Agrotis*.

1880. Grt., Bull. Geol. Surv., VI, 160, *Agrotis*.

“Related to *collaris* and *badinodis* Grt., separated from them by the unarmed fore tibia. Collar black and discolorous above. Thorax concolorous with the anterior wings. Anterior wings crossed by two fine simple dark brown lines, the first preceded, the second followed by a pale accompanying shade. Ordinary spots not very well defined,

shaped as in *collaris*, the orbicular preceded by a black spot. Median shade distinct passing between the spots; s. t. space darker brown; s. t. line indefinite. Posterior wings uniform dark brownish gray, discal dots present. Beneath brownish gray, with discal spot and a common diffuse median line."

Expands 32^{mm}.

HABITAT.—Massachusetts.

Entirely unknown to me.

Agrotis drewseni Stgr.

1857. Stgr., Stett. Ent. Zeit., 1857, 302, *Agrotis*.

"Cinerea, albido-conspersa, alarum anticarum lineis transversis, punctis anticis fasciaque externa nigricantibus. Magn. 29–30^{mm}, ♂ ♀.

Habitus of *islandica*, primaries still longer and narrower. ♂ antenna serrate and shortly bristled. Ground color dirty ash gray. Collar with a black line. Primaries most like bright specimens of *A. cysaria*, but ash instead of yellowish gray. At base and costal space strongly sprinkled with white atoms. At the costal margin in addition are a few obsolete dark spots. Median lines sharply defined, black; t. a. inwardly margined with white; t. p. line S-shaped, in the middle with four acute points. Ordinary spots somewhat paler than ground color; claviform wanting. In one ♂ specimen there is between the spots a bent black transverse line, strongest at hind margin, almost attaining anterior margin. At outer third is a paler, indefinite transverse shade which, as in *islandica*, has no sagittate marks, or has them but faintly indicated. Between this and the outer margin is a darker shade which does not attain the anterior margin. In the paler basal space a rudimentary transverse line is visible, strongly margined outwardly with white. Fringes ash gray, mixed, with a darker line at base. Beneath, dirty whitish gray, at the anterior margin with darker atoms. Cell rather darker. Secondaries uniformly gray; fringes white, at the base yellowish. Beneath dirty white at outer margin darker, at anterior margin with darker atoms. An indefinite discal spot.

HABITAT.—Greenland.

This species is apparently close to *munis* Grt. (= *sublatis* Grt.), and indeed it is somewhat difficult to mark exactly what the differences between the two can be. Still I have hesitated to make them synonyms without seeing specimens more nearly agreeing with the too detailed description.

Agrotis nanalis Grt.

1881. Grt., Can. Ent., XIII, 131, *Agrotis*.

"♀. The smallest species known to me. All the tibiæ spinose; eyes naked; body untufted. A slender species which may be compared to *opaca*. The fore wings are blackish with the lines lost. The stigmata are concolorous, difficult to make out. The orbicular is elongate, the

reniform vague; upright, broad; the spots are picked out by a brown shading which fills the cell and marks the subcostal and median veins. S. t. line a vague blackish even shade. Hind wings concolorous fuscous griseous, with the veins soiled and a faint discal mark. Beneath griseous, the primaries a little brownish. The costal preapical dots visible beneath and to be made out on the upper surface. Abdomen like hind wings. Head brownish; tegulae blackish; disc of thorax paler. Expanse 26^{mm}; Nevada."

Nothing to which this description will fit is known to me.

Agrotis viralis Grt.

1880. Grt., Bull. Geol. Surv., vi, 260, *Agrotis*.

"♂. Antennae ciliate beneath. Fore tibiae unarmed, unless accidentally the spines are broken off, which sometimes occurs. Pale faded yellow fuscous, collar with a faint line. The lines obsolete. A blackish dash at base; another below it on internal margin; a dash across the submedian space, and the cell before and between the stigmata darker shaded. Stigmata pale, concolorous moderate. Orbicular outwardly oblique near the reniform at base; both stigmata incompletely dark ringed. S. t. line indicated; s. t. space paler; terminal space darker. Hind wings paler, nearly concolorous with fore wings; darker shaded along outer border. Body concolorous; beneath without markings; hind wings quite pale. Expanse 38^{mm}. Habitat—Nebraska."

No species to which this description could apply is known to me.

Agrotis juncta Grt.

1878. Grt., Bull. Geol. Surv., iv, 171, *Agrotis*.

"♂. Size of *Treatii*, which this species resembles in its dead black primaries. Collar black at base, pale tipped. Head pale; thorax brown; abdomen pale fuscous. Fore wings with the t. a. line rounded, black; attached to it is the black pale-margined claviform. Ordinary spots concolorous, large, finely outlined with pale and fused below; the claviform apparently touching the orbicular at base. S. t. line followed by small, pale marks. Hind wings pale fuscous. Beneath pale, with indistinct common line, and discal marks obsolete. Nova Scotia (*Mr. Roland Thaxter*). One specimen."

Would seem to be a very distinctly marked form allied to *hollemanni*, but possibly not belonging to that group. Mr. Grote gives us no structural characters whatever to serve as an index to its position. On the list he places it before *haruspica* and close to *innotabilis*, two structurally different species.

Agrotis fishii Grt.

1878. Grt., Bull. Geol. Surv., iv, 175, *Agrotis*.

"♂. ♀.—In color and appearance resembling *janualis*, but the tibiae are all spinose. Obscure purple gray. The orbicular obsolete. Lines

fine, black, single, dentate. Half line visible. T. a. line erect, with two small subequal projections on cell and below costa. Median shade outwardly oblique, running to lower extremity of reniform; this latter is moderate, and filled in with greenish-white scales. T. p. line dentate, forming points on the veins. Subterminal line with a blackish, preceding shade at its inception on costa, interrupted, forming two marks opposite the cell very slightly margined outwardly with greenish white. A terminal black line almost continuous. Hind wings fuscous with reddish fringes. Thorax concolorous purple gray; no line on collar. Beneath body and legs obscure purplish, abdomen reddish. Wings reddish, fuscous with common dark shade line, and discal marks equally distinct. Oldtown, Maine (Mr. Charles Fish). The primaries are more pointed at apices than in *janualis*. The dark shade before s. t. line and obsolete orbicular are strong characters. The male antennæ are pyramidal-toothed, ciliate; hind wings pale fuscous."

"Expansion 33^{mm}."

Mr. Grote has associated the species with *baja* in the check-list; but the structure of antennæ will hardly suffer it to remain there. Yet we are unable at present to assign a certain position to it. It seems in some respect, *i. e.*, the single lines, allied to the *carnea* group; but very different from any species known to me.

Somewhere I have seen a specimen named *fishii* by Mr. Grote, and this was very like *catherina* Grt. I do not find that I made any note of it, however.

Agrotis tenuicula Morr.

1874. Morr., Proc. Bost. Soc. N. H., xvii, 163.

"Habitus and markings of *Agr. conflua* Tr., from which it differs in the uniform gray color of the posterior wings, the presence of two distinct cuneiform markings before the subterminal line and below the costa, and in the size of the subterminal space which is much wider than in *conflua*."

Expanse 33^{mm}.

HABITAT.—New York.

The chances are that this is a form of *perconflua* Grt., but I am not prepared to make the reference definitely. I have no idea who could have furnished the type of the species and have never seen any specimens so named.

Mamestra insula Wlk.

1856. Wlk., C. B. Mus., Lep. Het., ix, 234, *Mamestra*.

1873. Grt., Bull. Buff. Soc. N. Sci., ii, 15, *Hadena*.

1883. Grt., Ill. Essay, 43, *Agrotis*.

"Foem.—Obscure ferrugineo-fusco; abdomen fusco-cinereum; alæ anticæ lituris basalibus et costalibus nigris; lineis transversis undulatis duplicatis nigris ex parte testaceo marginatis, lineâ exteriori transversâ undulata incompleta testacea, maculis reniformi et orbiculari magnis ex parte testaceis; posticæ cinereæ marginibus fuscis.

“*Female*.—Dark ferruginous brown. Abdomen brownish cinereous. Fore wings with black marks at the base and along the costa, and with transverse undulating black double lines, which are partly bordered with testaceous; an exterior incomplete transverse undulating testaceous line; reniform spot and orbicular spot large, partly testaceous, the latter somewhat oval. Hind wings cinereous, with brown borders and pale cinereous ciliæ. Length of the body 7 lines; of the wings 16 lines.

“*a*. Orilla, West Canada. From Mr. Bush’s collection.”

It is impossible to apply this description. Mr. Grote, whose reference of the species to *Agrotis* has been followed, gives no suggestion as to the species it most resembles or where its allies are to be found.

Agrotis patula Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 329.

“*Mas.*—Cervina; antennæ mediocriter pectinatæ; thorax pilis nonnullis albidis; abdomen basi pallidum; alæ anticæ latiusculæ, lituris nigricantibus; claviformi elongata, orbiculari subpyriforme, lineis duabus exterioribus transversis angulosis, lunulisque marginalibus; posticæ pallide cinereo-cervinæ.

“*Male*.—Fawn color. Antennæ moderately pectinated. Thorax with some whitish hairs. Abdomen paler toward the base. Fore wings rather broad, with the usual marks blackish; claviform spot elongate; orbicular subpyriforme; reniform as usual; two exterior transverse zig-zag lines and a row of marginal lunules. Hind wings pale cinereous fawn color. Length of the body 7 lines; of the wings 16 lines.

“*a*. Rocky Mountains. Presented by the late Earl of Derby.”

Nothing answering sufficiently well to this description is known to me. The pectinated antennæ, however, narrow the possibility of association somewhat.

Agrotis hæsitans Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 329.

“*Mas.*—Obscure cervina; palpi fuscii; antennæ nigræ, mediocriter pectinatæ; abdomen pallidum; alæ anticæ lituris basalibus, striga discali, strigis exterioribus, fascia incompleta, macula subquadrata, lunulisque marginalibus nigris, orbiculari et reniformi indistinctis; posticæ cinereæ, margine fuscescente ciliis albidis.

“*Male*.—Dull fawn color. Palpi brown. Antennæ black, moderately pectinated. Abdomen paler than the thorax. Fore wings with black marks at the base, with a slight black streak in the disk, with an incomplete black band, with exterior black streaks, and with black marginal lunules; a black, subquadrated spot between the orbicular and reniform spots which are indistinct. Hind wings cinereous, brownish toward the border; ciliæ whitish. Length of the body 6 lines; of the wings 14 lines.

“*a*. United States. Presented by E. Doubleday, Esq.”

Agrotis radix Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 332.

"Ferrugineo fusca; thorax nigro fasciatus; abdomen cinereum, lateribus ferrugineis; alæ anticæ lineis nonnullis transversis undulatis pallidioribus et obscurioribus, linea submarginali anguloso albida, striga basali lunulisque marginalibus nigris orbiculari et reniformi obscuriore marginatis, hæc maxima, illa subovata; posticæ cinereæ, marginibus obscurioribus. Mas.—Antennæ ciliatæ; abdomen valvulis apicalibus magnis luteo pilosis.

"Noctua radix Barnston MSS.

"Ferruginous brown. Thorax with a black band. Abdomen cinereous ferruginous along each side. Fore wings with several undulating paler and darker lines, the submarginal line angulose and whitish; a black basal streak and black marginal lunules; orbicular and reniform spots with darker borders, the former irregularly oval, about half the size of the latter, which is very large. Hind wings cinereous with darker borders.

"*Male*.—Antennæ ciliated. Abdomen with large apical valves, whose hairs are somewhat luteous. Length of the body, 6 lines; of the wings, 16 lines.

"*a*. St. Martin's Falls, Albany River, Hudson's Bay. Presented by Dr. Barnston.

"*b*. Nova Scotia. From Lieutenant Redman's collection."

Agrotis perlentans Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 332.

"Mas.—Fusca; antennæ simplicis aut vix ciliatæ; abdomen cinereum; alæ anticæ striga discali interrupta nigricante; orbiculari et reniformi indistinctis pallido marginatis; posticæ cinereæ, macula discali marginesque fusciscentibus.

"*Male*.—Brown. Antennæ simple or hardly ciliated. Abdomen cinereous. Fore wings with a blackish streak between the base and the orbicular spot, and between the latter and the reniform spot; spots indistinct, with pale borders. Hind wings cinereous with a brownish discal spot and brownish borders. Length of the body, 6 lines; of the wings, 14 lines.

"*a*. New York. Presented by E. Doubleday, Esq."

Agrotis mollis Wlk.

1856. Wlk., C. B. Mus., Lep. Het., x, 333.

"Foem.—Cana; thorax ferrugineo fuscoque fasciatus; abdomen cinereum; alæ anticæ ferrugineæ, lineis transversis canis nigresque, exteriore arcuata, submarginali undulata, striga brevi discali atra; orbiculari subovata, reniformi vix excavata.

"Noctua mollis, Barnston MSS.

Female.—Hoary. Thorax with ferruginous and brown band. Abdomen and hind wings cinereous. Fore wings mostly ferruginous; the usual transverse lines hoary and blackish, and very distinct; the exterior one curved, the submarginal one undulating; a short discal deep black streak extending to the reniform spot and interrupted by the orbicular one; the latter is irregularly oval, and not much smaller than the reniform, which is hardly excavated. Length of the body, 7 lines; of the wings, 14 lines.

“*a*. St. Martin’s Falls, Albany River, Hudson’s Bay. Presented by Dr. Barnston.”

Graphiphora illapsa Wlk.

1857. Wlk., C. B. Mus., Lep. Het., xi, 744.

Poem.—Subferrugineo-cinerea; palpi nigro fuscii, apice pallidi; thorax antice nigro fasciatus; abdomen cinereum; alæ anticæ nigro conspersæ, lituris costalibus lineisque valde incompletis nigris, orbiculari obsoleta, reniformi e lituris nigris, fasciis duabus latus ferrugineis lineaque intermedia albida exterioribus; posticæ cinereæ, ferrugineo marginatæ.

Female.—Cinereous, with a slight ferruginous tinge. Palpi blackish brown, with pale tips. Thorax with a black band in front. Abdomen cinereous. Fore wings minutely speckled with black, with black costal marks, and with very incomplete black transverse lines; orbicular spot obsolete; reniform indicated by some black marks; a broad exterior ferruginous band, partly divided by a whitish line from the pale ferruginous marginal band. Hind wings cinereous, ferruginous towards the borders. Length of the body, 14 lines; of the wings, 26 lines.

“*a*. St. Martin’s Falls, Albany River, Hudson’s Bay. Presented by Dr. Barnston.”

This is intimately associated with *augur* by Mr. Walker, the latter species being credited to the same locality. It may be something very like *Pachnobia*, or possibly a form nearly allied to *elimata* Gn.

Agrotis ordinata Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 691.

Poem.—Cinerea, nigro conspersa, palpi porrecti, articulo 3^o brevissimo; antennæ subsetulosæ; tibiæ basi fasciculatæ, alæ anticæ lineis quator nigris, 1a 2a que duplicatis, 1a abbreviata, 3a dentata, 4a denticulata, spatio marginati fuscescente lineam submarginalem angulosam includente, orbiculari et reniformi magnis nigro marginatis; posticæ pallide cinereæ, puncto discali venis spatioque marginali obscurioribus.

Female.—Cinereous, black speckled. Palpi porrect, extending a little beyond the head, second joint clothed with rather long hairs; third joint conical, very minute. Antennæ very minutely setulose. Abdomen paler, extending a little beyond the hind wings. Femora fringed on the inner side; tibiæ and tarsi spinose, the former with a

tuft of hairs above at the base. Fore wings with four transverse black lines; the first and second lines double, first near the base, abbreviated hindward; second at half the distance between the first and the orbicular mark; third dentate, somewhat diffuse, between the orbicular mark and the reniform mark; fourth denticulate, beyond the reniform mark; submarginal line zig-zag, of the ground hue, but distinguished by the brownish shade which it traverses. Marginal line black, festooned; orbicular and reniform marks large, with black borders, which are interrupted in front, the former slightly elongated and oblique, the latter of the usual form. Hind wings pale cinereous, darker toward the exterior border. Discal points and veins also darker; fringe white. Length of the body, 8 lines; of the wings, 18 lines.

“West Canada. In the Rev. Mr. Bethune’s collection.”

This description applies very fairly well to some pale forms of *mesoria*, and the species must be close to the latter from the characters given.

Agrotis vetusta Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 691.

“Mas.—Fuscescente cinerea; palpi oblique ascendentes, articulo 3^o longi-conico; antennæ robustæ, setulosæ; alæ anticæ nigro conspersæ, striga basali liturisque paucis nigris, orbiculari annuliformi, linea submarginali cinerea angulosa, punctis marginalibus nigris; posticæ pallide cinereæ, fuscescente marginatæ.

“Male.—Brownish cinereous. Palpi obliquely ascending, not rising so high as the vertex; second joint clothed with short closely applied hairs; third joint elongate-conical, acute, very minute. Antennæ stout, very minutely setulose. Abdomen cinereous, extending somewhat beyond the hind wings; apical tuft very large. Fore wings thinly black speckled, with a blackish basal streak, and with a few indeterminate black marks behind the orbicular mark and near the exterior border; orbicular mark composing a rather large black ringlet; reniform mark of the usual shape; submarginal line cinereous zigzag; marginal points black. Hind wings pale cinereous, brownish towards the exterior border. Length of the body, 10 lines; of the wings, 24 lines.

“West Canada. In the Rev. Mr. Bethune’s collection.”

Mr. Grote has suggested that this may be the same as *muranula* G. and R., but this can scarcely be so if the description is at all to be relied upon.

Agrotis reticens Wlk.

1865. Wlk., C. B. Mus., Lep. Het., xxxii, 692.

“Foem.—Fuscescente cinerea, nigro conspersa, palpi oblique ascendentes, articulo 3^o minimo; antennæ subsetulosæ; alæ anticæ lineis tribus nigris duplicatis; 1a, indeterminata; 2a, dentata; 3a, denticulata; spatia marginali nigricante lineam submarginalem angulosam

fuscescente cineream includente; orbiculari et reniformi nigro marginatis; posticæ cinereæ, apud marginem obscuriores, puncto discali venisque nigricantibus.

“Female.—Brownish cinereous, minutely black speckled. Palpi obliquely ascending, not rising near so high as the vertex; second joint with short hairs; third, extremely small. Antennæ very minutely setulose. Abdomen cinereous, extending a little beyond the hind wings. Fore wings with three transverse double black lines, first near the base, very incomplete; second, dentate on the inner side of the orbicular mark; third, denticulate beyond the reniform mark. Submarginal line zigzag, of the ground hue, but distinguished by the blackish shade which it traverses; marginal line composed of black lunules; orbicular and reniform marks blackish bordered, the former oblique and oblong, the latter of the usual form. Hind wings cinereous, darker toward the exterior border; discal point and veins blackish; fringe whitish. Length of the body, 7 lines; of the wings, 18 lines.

“West Canada. In the Rev. Mr. Bethune's collection.”

Of the other names in the lists *A. niveivenosa* Grt. is an *Hadena*; *A. planalis* Grt. is a *Teniocampid*, exact genus not made out from the specimen; *A. pyrophiloides* Harv. is not referable to the *Agrotids*, but has not yet received any place; *Pachnobia ataska* Grt. is an *Agrotiphila* and belongs near *Anarta* rather than *Agrotis*. Mr. Morrison's names are all accounted for, and his species, with two exceptions only, identified. I believe I have all of Guenée's species properly placed, and only the Walkerian species are in doubt. Of these I have given transcripts of all referred to *Agrotis*. They may belong almost anywhere else, and on the contrary there is every reason to believe that some of his species of *Mamestra* are really referable to this group of genera. It will require careful comparison by some one with a thorough knowledge of our own fauna to identify these species satisfactorily.

Mr. Strecker, in his *Lep. Rhop. et Het.*, 79, records *Agrotis porphyrea* Hbn. from Labrador, a determination which I deem extremely questionable. Staudinger gives central and boreal, not arctic, Europe in the distribution, which does not accord well with a Labrador habitat. I have therefore omitted all reference to the species elsewhere, but call attention to the matter here for what it is worth.

APPENDIX.

Since the manuscript of this revision was handed in, only a few months ago, a number of species differing from all previously described have come into my hands, and these are for completeness described here and inserted in their proper places in the list of species. It has proved inexpedient to insert them in the body of the paper without too much change in the text; but I have in all cases in the descriptions indicated the nearest allies, and differentiated the species from those with which they most nearly resemble.

Large as is the assemblage here, many undescribed forms are still in collections, and every sending from the far western States brings to light new species. In the U. S. National Museum are some species, represented sometimes by one, sometimes even by several, bred specimens which I could not place satisfactorily to myself and which are therefore omitted. It is hoped that the present paper, by substituting a natural arrangement for the confused mixture in Mr. Grote's lists, will facilitate the proper determination of species in the collections.

Agrotis aurulenta sp. nov.

Ground color of head, thorax and primaries pale, whitish luteous, with a variably distinct reddish suffusion. Head and thorax immaculate. Primaries usually with basal and t. a. lines obsolete; in a specimen with a strong reddish suffusion the lines well defined, of the ground color, without darker margins; t. a. line then decidedly angulated. T. p. line very even, nearly parallel with the outer margin, marked by a series of venular short dashes, beyond which is a lighter shade line; in the suffused specimen the median space is reddish, and the contrast between it and the s. t. space defines the course of the line better. S. t. line traceable, slightly paler, somewhat irregular. A row of small terminal lunules. Claviform wanting. Orbicular round, small, slightly darker centered, with a somewhat paler annulus; obsolete in pale specimens. Orbicular moderate, somewhat constricted centrally, slightly paler ringed, inferiorly blackish powdered. Veins more or less blackish marked, especially the median and internal. Secondaries in the male soiled whitish, in the female blackish. Beneath white, with a more or less evident discal spot on primaries.

Expands 31-37^{mm}; 1.25-1.50 inches.

HABITAT.—Colorado, Nebraska, Arizona.

Four specimens, three males and one female, all from the collection U. S. National Museum, are before me. Three of these are from Mr. Bruce, collected, one ♂, "foothills near Denver," and this is the smallest and an almost immaculate specimen, the venular marks of t. p. line only being distinctly traceable; one ♀, "Platte Cañon, 6,500 feet," and this is the largest, the transverse maculation obsolete, the dusky markings of the veins most distinct; the third specimen is also a ♂, "Omaha, Nebr., June," and this has a distinct reddish shade to the t. p. line, all the maculation very well defined. The fourth specimen, without marked locality, is a ♂, which was given me years ago by Mr. George Frank, who had several others in his collection, I think, from Arizona. I suspected at that time that it might be my *medialis*, but it is evidently distinct generically; the specimen is most nearly like the Denver ♂, but is somewhat more distinctly marked. The antennæ are shortly pectinated and the wing form is like *ypsilon*. It is the only whitish species I have yet seen referable to *Agrotis* as restricted by me.

Agrotis ingeniculata sp. nov.

General color of head, thorax, and primaries an ashen fuscous gray, the maculation all distinct. Thorax quadrate, without obvious tuftings. Collar with a central whitish line superiorly margined with a brown line tipped with whitish, which is inferiorly margined by blackish. Patagiæ gray margined, the gray limited inwardly by a blackish line. Primaries with basal line distinct, geminate, inner line black, included space paler whitish gray. T. a. line distinct, geminate; outer line black, included space whitish; at costa the line touches the orbicular in such a way that the outer line seems to encircle that spot, resuming its course on the costal vein, below which it is even, only slightly sinuate. T. p. line distinctly geminate only on costa, below which only the inner line is distinct, crenulate, almost parallel with outer margin. S. t. line very irregular, concolorous, limiting an ash-gray apical spot, defined below this by the darker terminal space and a vague, interrupted dusky preceding shade, most distinct opposite the cell. A very distinct narrow transverse shade line from lower edge of reniform, close to and parallel with t. p. line to inner margin. A series of dark terminal lunules. Claviform short, distinct, black margined, the margin diffuse inwardly and partly filling the spot. Orbicular large, somewhat irregular, outlined in black, within which is a white annulus, incomplete at the inner costal angle; center paler fuscous. Reniform large, kidney shaped, black margined, and within this a white annulus; center concolorous with a narrow whitish central line. The cell is darker around the ordinary spots, and a dark blotch precedes the apical pale patch. Secondaries smoky fuscous, paler basally. Beneath, primaries dark, smoky, secondaries grayish powdery; both wings with an outer line and discal lunule; terminal space rather paler, powdery. Expands 39^{mm}, 1.55 inches.

HABITAT.—Colorado.

A single perfect male from Mr. J. Angelman's collection, collected by Mr. Bruce. The species is a very distinct one, structurally allied to *geniculata*, than which it is much larger, but with much the same general appearance. It is a broad-winged species, resembling in that character *badinodes*. The front is bulging, but perfectly smooth. The antennal pectinations are very short, unlike those of *geniculata*, and shorter than in any other of the species referred to *Agrotis* as restricted by myself. The genitalia agree closely with those of *geniculata*, of which they may be considered the western representative.

Feltia longidens sp. nov.

Ground color of head and thorax pale luteous. Head immaculate; collar with a transverse blackish line, patagiæ black margined. Primaries with the median lines obsolete; t. p. barely indicated by venular dots opposite the cell. S. t. line concolorous, marked by the dusky terminal space and by a series of preceding, black, sagittate spots. This dark terminal space is interrupted on each vein, all of which send a ray of the ground color to the outer margin, giving the wings a characteristic radiate appearance which is unique. A black basal dash to which is attached the narrow, concolorous, loop-like claviform, which is narrowly black margined. A fine black line runs from the end of the claviform to the s. t. line. All the veins below the costal series are marked with blackish. The costal region is a paler shade of ground color, which also invades the orbicular; the latter is oblique, almost quadrate, the baso-costal side wanting; narrowly black margined. Reniform large, upright, normally shaped, finely black ringed, then with a rather broad paler annulus, leaving the center concolorous. Surrounding the reniform is a darker fuscous shade. Secondaries pure white in both sexes. Beneath, primaries smoky, the veins paler; secondaries white.

Expands 31-32^{mm}, 1.24-1.28 inches.

HABITAT.—Las Vegas, New Mexico.

Two specimens, a fairly good male and a very poor female, from Mr. Neumøgen's collection, taken by Mr. Meeske. The species is congeneric with *subgothica* and allies, which it resembles in habitus, but from all of which it differs by the radiate markings through the terminal space and by the pure white secondaries.

Porosagrotis dædalus sp. nov.

General color of head, thorax, and primaries pale fuscous gray, shaded with white. Collar marked with a fuscous line near tip. Patagiæ with a dusky fuscous margin. Primaries with the transverse maculation completely obsolete, the s. t. line only being even, indicated by a series of distinct or even prominent black sagittate spots or dashes, varying greatly in distinctness in the specimens before me. The claviform is

distinct, black lined, making a long narrow loop from base almost to the middle of the wing. The orbicular is reduced to a dusky or blackish indefinite elongate streak. The reniform is replaced by a blackish lunule at the end of the cell, around which is a variably diffuse and undefined shading. The veins are black marked, and with narrow accompanying whitish shades, which are most prominent on veins three, four, six, and seven. A whitish subcostal shading and a paler more yellowish shade from the end of the claviform to near the anal angle. Secondaries whitish fuscous, darker in the female. Beneath whitish, primaries with disk dusky, both wings with a discal lunule. Expands 37-39^{mm}, 1.50-1.55 inches.

HABITAT.—Colorado.

Four specimens, ♂ and ♀, are before me, all of them collected by Mr. Bruce—one of them from Mr. Angelman, the others from the collection U. S. National Museum. All are very much alike, differing only in the relative brightness of the maculation.

The genus *Porosagrotis* is proposed for a series of species of which *muracula* is type, agreeing with *Carneades* Grt. in structure save as to the ♂ genitalia, the clasper in *Carneades* being lengthily bifurcate, while in the new genus it is always a single curved corneous more or less hook-like process. The present species is allied to *orthogonia* and *dollii* in the shortly pectinated antennæ, having the wing form of the latter species. The strigate maculation and the narrow loop-like claviform easily distinguish it from all its allies. The body is very robust, and the thoracic vestiture thick, giving the species a very plump appearance.

Carneades neomexicana sp. nov.

Ground color of head, thorax, and primaries a somewhat yellowish brick-red. Head inferiorly whitish. Collar inferiorly bright pale gray and tipped with the same color. Patagiæ marked discally with bright blue-gray, the thoracic tuftings, which are evident, marked by the same shade. Costal region of primaries bluish-gray, this shade sometimes extending also along internal margin, along the apical venules, and always along the median vein, branching on veins four and five and indenting the terminal space. Basal line indicated below median vein, geminate, paler, defining lines blackish. T. a. line distinct only below costal region, paler, outer defining line black, inner concolorous. T. p. line pale, geminate, the defining lines scarcely darker, usually indistinct below veins three and four, and sometimes the line is obsolete below the cell. S. t. line concolorous, marked by the dark terminal space and a dusky preceding shade, indented usually about half way across the terminal space on veins three and four. A series of fine terminal dots. Claviform small, black margined. Orbicular oblong, oblique, usually open to costa, black winged, then with a whitish annulus, center of palest shade of ground color. Reniform upright, moderate in size, normal in form, with a very narrow black and slightly paler annulus, centre uni-

form of a pale shade of ground color. All around and between the ordinary spots darker. A paler shade through submedian interspace, not reaching the anal angle. Secondaries of the male white, veins dusky, powdered; female dusky, paler basally, veins still darker. Beneath white, powdery, disc of primaries, and in ♀ of secondaries also, darker.

Expands 30–33^{mm}; 1.20–1.30 inches.

HABITAT.—New Mexico.

Several specimens collected by Mr. Meeske are in the collections of Messrs. Hulst and Neumøgen. The species is a close ally of *quadridenta* Grt., and I should not be greatly surprised if it eventually proved a local variety of that species. The most striking character is the peculiarly bright reddish yellow ground color, contrasted by the blue-gray costal region and thoracic marking. The orbicular is oblique instead of round in all the specimens before me, and altogether the form is different from anything I have seen before, although many specimens of *quadridentata* have passed through my hands.

Carneades teleboa sp. nov.

Head, thorax, and primaries a faintly reddish, very pale luteous. Head and thorax immaculate. Primaries with basal and t. a. lines wanting. T. p. line very faintly distinguishable as a narrow line slightly darker than the ground color, a little emphasized on the veins. S. t. line vague, indefinite, irregular, concolorous, faintly traceable through the powdering of black scales that slightly darkens the outer part of the wing. A broad diffuse shade of black powderings crosses the wing a little beyond the middle. Orbicular obsolete. Reniform indefinite black powdered, forming a prominent feature at the outer margin of the powdery median shade. Secondaries pure white, immaculate. Beneath white; primaries with a slight reddish tinge, the black reniform spot marked; secondaries immaculate.

Expands 28^{mm}; 1.12 inches.

HABITAT.—Las Vegas, New Mexico.

A single female specimen from Mr. Neumøgen, collected by Mr. Meeske. The species is allied to *pedalis* in ground color and habitus but differs obviously by the obsolete transverse maculation and the broad, diffuse, powdery median shade. The tarsi are annulate with black.

Carneades lineifrons sp. nov.

A very pale whitish luteous. Head with a transverse dark line, thorax immaculate. Basal line geminate, the marginal lines interrupted, blackish, included space concolorous. T. a. line geminate, outwardly oblique, slightly irregular, the marginal lines widely separated, not interrupted; included space concolorous. T. p. line geminate, inner line crenulate distinct, evenly outcurved; outer line punctiform, represented by a row of venular dots. S. t. line concolorous, feebly

sinnate, relieved by the blackish terminal space and a blackish preceding shade. A distinct, broad, blackish, lunate transverse line through the outer part of median space. Claviform wanting. Orbicular large, concolorous, incompletely ringed by a powdery black line. Reniform moderate in size, blackish powdery without distinct defining line. Secondaries shading from soiled whitish at base to blackish at outer margin; veins smoky, discal spot of under side visible. Beneath whitish, primaries with disc blackish, a distinct outer line and a discal spot; secondaries with discal spot only.

Expands 33^{mm}; 1.30 inches.

HABITAT.—Colorado.

A single male specimen in good condition from collection U. S. National Museum, taken by Mr. Bruce,

The species is quite peculiar by the dark transverse line of front, which is not found in any of its allies. It is close to *pedalis* in type of maculation but exclusive of the ground color, the lack of the distinct orbicular and the dusky secondaries are quite sufficient to distinguish it. The tarsi are not annulate.

Carneades pedalis sp. nov.

General color of head, thorax, and primaries a fine reddish yellow, or topaz. Head and thorax immaculate. Primaries, basal line geminate, slightly paler, the outer defining line interrupted, blackish, powdery; t. a. line geminate, paler, very even and almost upright; marked on costa by two black spots, from the inner of which extends a black powdering relieving the line. T. p. line geminate, paler, marked costally by black spots, from the outer of which extends a curved black line reduced to a powdering below the cell; the inner line is defined only by the pale included shade and is crenulate; the general course is very even below the costal outcurve. Through the center of the wing is a rather broad, black, slightly irregular median shade line, which is the most prominent feature of the wing maculation. Beyond the t. p. line the s. t. space becomes powdery, darkening to black outwardly, and relieving the concolorous s. t. line, which is rather irregular and very distinct, except near anal angle, where the black shade is powdery. A row of narrow terminal lunules. Orbicular small, round, pale ringed, with concolorous center. Reniform moderate in size, normal in form, with an indistinct pale outline filled with black powderings. Claviform wanting. Secondaries pure white. Beneath white, primaries with a slight reddish suffusion, the dark reniform reproduced; secondaries immaculate. Tarsi annulate with black.

Expands 34^{mm}; 1.36 inches.

HABITAT.—Colorado.

A single male specimen only of this very pretty and distinctly marked species is before me, from the U. S. Museum collection, taken by Mr. Bruce. It belongs to the *messoria* group of the genus, but is unique in

every respect. The ringed tarsi ally it to *annulipes*, with which, however, it has little else in common.

Carneades xyliniformis sp. nov.

Ground color of head, thorax and primaries somewhat bluish ash-gray. Collar with a distinct black transverse line. Patagiae decidedly blackish gray. Primaries strongly powdered with bluish white to the median shade, beyond which it is distinctly darker, black powderings replacing the white. Basal line geminate, concolorous, the defining lines narrow and black. T. a. line geminate, concolorous, the defining lines narrow and black, quite widely separated on costa, but quite approximate in the submedian interspace; very irregular, as a whole outwardly oblique, angulate on subcostal, outcurved in median and submedian spaces, and with a long outward curve below internal vein. A broad black median shade from costa over orbicular, outwardly oblique to the median vein, there obtusely angulate and almost upright to the hind angle; outwardly the shade grades off rather easily to the t. p. line, forming a little the darkest part of the wing. T. p. line crenulate, the inner line only defined, hardly distinct, outcurved over reniform, and then about parallel with outer margin. A darker, somewhat triangular ante-apical costal blotch outwardly defining the s. t. line, which else is barely traceable as a very narrow sinuate pale line. A narrow crenulate terminal line cutting into the fringes on the veins and giving the margin a scalloped appearance. Claviform large, concolorous, neatly black margined. Orbicular large, oval, narrowly black ringed, then with a wider whitish ring, else concolorous. Reniform large, kidney shaped, black ringed, slightly paler than ground color. Secondaries smoky fuscous with darker terminal line and pale fringes. Beneath ash-gray, powdery, primaries darker; both with an outer dusky line and discal spot.

Expands 40^{mm}; 1.60 inches.

HABITAT.—Las Vegas, New Mexico.

A single female from Mr. Neumøgen, collected by Mr. Meeske in 1889. This species is unique in appearance and has a strong habitual resemblance to *Litholomia napa*. In the synoptic table it falls readily into the *messoria* group and into the typical series, while really reminding one more in color and wing form of *euroides* of the *tessellata* group. The species is unique wherever placed, and is readily recognizable.

Carneades conjuncta sp. nov.

Ground color an even ashy fuscous. Head and thorax immaculate. Primaries with transverse lines geminate, the included space somewhat paler than ground color. Basal line evident, the defining lines equally distinct and black, even. T. a. line with an even outcurve, somewhat drawn in on the veins; outer line broad, distinct, blackish;

inner line more vague, but yet distinct. T. p. line outcurved over reniform, then evenly oblique to the hind margin: inner line black, narrow, crenulate, outer line scarcely defined, even. S. t. line sinuate, broad, rather diffuse, slightly paler than the ground color, outwardly marked by a few black scales. A row of terminal lunules, median shade vague, marked by a costal spot and below the cell by a diffuse blackish powdering parallel with the t. p. line. Claviform wanting. Orbicular moderate in size, round, black ringed, evenly paler than ground color. Reniform moderate in size, kidney shaped, rather incompletely black ringed, concolorous or slightly paler. Secondaries white, in the male immaculate, in the female with veins and outer margin slightly soiled. Beneath white, primaries powdery, with an outer line and discal spot, most evident in the female; secondaries in the male immaculate, in the female with a distinct discal spot.

Expands 36^{mm}, 1.45 inches.

HABITAT—Las Vegas, New Mexico.

A somewhat rubbed male, and a good female in Mr. Neumøgen's collection, taken by Mr. Meeske in 1889. This species is perhaps nearest to *brunneigera*, but distinct by the ashen fuscous color and white secondaries of both sexes. It has at first sight some resemblance to pale forms of *messoria*, but lacks the claviform. The median shade is vague, and this is one of the forms in which care is required in placing in its proper group.

Carneades perturbata sp. nov.

Rather pale luteo-fuscous in ground color of head, thorax and primaries. Head and thorax with black scales intermixed, forming a rather indefinite margin to patagiæ. Primaries with basal and s. t. spaces paler than median and terminal spaces. All the transverse lines geminate. Basal line well marked, the defining lines equally distinct, black, included space concolorous. T. a. line distinct, inner defining line scarcely less marked than the outer, which is black. Its course is outwardly oblique, outwardly curved in the interspaces. T. p. line outcurved over cell, then nearly parallel with outer margin: inner line distinct, lunulate rather than crenulate, outer line even, darker fuscous than ground color. S. t. line defined only by the difference in shade between s. t. and terminal spaces, and marked by a few irregularly placed black points; irregular in course, quite strongly indented on veins 3 and 4, without however resembling in other ways the *quadridentata* series. A series of black somewhat lunate terminal spots. Fringes with a pale line at base. Median shade line rather indistinct, upright, touching inner margin of reniform and reaching the hind margin at the same point with t. p. line. Claviform concolorous, distinctly outlined in black. Orbicular rather small, somewhat irregular, black ringed; somewhat paler than ground color, slightly darker centrally. Reniform well sized, somewhat constricted centrally, black

ringed, only slightly paler than ground color, somewhat darker at extremities. Secondaries of male white. Beneath, primaries pale fuscous gray, outwardly powdery, with a dusky shade line and faint discal spot; secondaries immaculate.

Expands 34^{mm}, 1.35 inches.

HABITAT—Colorado.

A single male specimen, collected by Mr. Bruce is in the collection U. S. National Museum. This is an evident ally of *messoria*, which it resembles closely in all the maculation of primaries, but from which it differs obviously by the pure white secondaries. It is also smaller than the average *messoria*, and the body, compared with the wings, is more robust in appearance.

LIST OF GENERA AND SPECIES.

Species followed by an asterisk are represented in the collection of the U. S. National Museum.

Genus RHYNCHAGROTIS Smith.

- R. chardiniyi Bdv.*
gilvipeennis Grt.
 §
 R. rufipectus Morr.*
 R. brunneicollis Grt.*
 R. minimalis Grt.*
 R. cupida Grt.*
velata Wlk.
brunneipennis Grt.
 R. placida Grt.*
 R. variata Grt.*
varix Grt.
 R. alternata Grt.*
 R. belfragei Smith.*
 R. cupidissima Grt.*
orbis Grt.
lvtula Grt.
 R. bimarginalis Grt.
 R. vittifrons Grt.
 R. inelegans Smith.
 R. mirabilis Grt.

§

- R. exsertistigma Morr.
 R. formalis Grt.*
 var. *insularis* Grt.*
 R. emarginata Grt.
 R. carissima Harv.
 R. binominalis Smith.*
exsertistigma † Grt.
 R. observabilis Grt.*
 R. facula Grt.*
 R. distracta Smith.*
 R. discoidalis Grt.
 R. erenulata Smith.*
 R. confusa Smith.*
exsertistigma ‡ Grt.
 R. costata Grt.

Genus ADELPHIAGROTIS Smith.

- A. stellaris Grt.
 A. innotabilis Grt.
washingtoniensis Grt.

- A. prasina Fabr.*
herbida Hbn.
 A. apposita Grt.*
 A. vernilis Grt.
 A. infimatis Grt.

Genus PLATAGROTIS Smith.

- P. speciosa Hbn.*
perquirita Morr.
baileyana Grt.
mixta Wlk.
 var. *arctica* Zett.
 P. pressa Grt.*
 P. trabalis Grt.*
 P. sincera H. Sch.
 P. imperita Hbn.*
comparata Moeschl.
saxigena Morr.

Genus EUERETAGROTIS Smith.

- E. sigmoides Gn.*
 E. perattenta Grt.*
 E. attenta Grt.*

Genus ABAGROTIS Smith.

- A. erratica Smith.*

Genus SEMIOPHORA Steph.

- S. elimata Gn.*
badicollis Grt.
dilucida Morr.
janualis Grt.
 S. catherina Grt.*
manifestolabes Morr.

Genus PACHNOBIA Gn.

- P. monochromatea Morr.
 P. manifesta Morr.
 P. ferruginoides Smith.*
 P. salicarum Wlk.*
orilliana Grt.
claviformis Morr.
 P. okakensis Pack.
 P. carnea Thunb.*
 ab. *cinerea* Stgr.

P. wockei Moeschl.*
scropulana Morr.

Genus SETAGROTIS Smith.

S. planifrons Smith.
S. congrua Smith.

Genus AGROTIS Tr.

A. badinodes Grt.*
A. violaris G. & R.
A. aurulenta Smith.*
A. ypsilon Rott.*
suffusa S. V.
telifera Harr.
idonea Cram.
A. geniculata G. & R.*
A. ingeniculata Smith.
A. quarta Grt.
A. bollii Grt.
hilaris || Grt.

Genus PERIDROMA Hbn.

P. occulta Linn.* §
P. praefixa Morr.
P. stricta Morr.*
P. grandipennis Grt.
P. saucia Hbn.*
iermis Harr.
ortonii Pack.
var. *margaritosa* Haw.
P. rudens Harv.*
P. pellucidalis Grt.* §
P. incivis Gn.
alabamae Grt.
? *infecta* Ochs.
P. tenuescens Smith.
P. simplaria Morr.*
P. digna Morr.*
nigrovittata Grt.

Genus NOCTUA Linn.

N. baja Fab.* §
N. normaniana Grt.*
triangulum † Auct.
obtusa Spey.
N. esurialis Grt.
N. bicarnea Gu.*
plagiata Wlk.
N. treatii Grt.*
N. conchis Grt.
N. c.-nigrum Linn.*
N. hospitalis Grt.
N. perconflua Grt.*
conflua † Auct.
? *jucunda* Wlk.

N. eriensis Grt.
N. phyllophora Grt.*
dahlia † Beth.
N. rubifera Grt.*
rubi † Grt.
dahlia † Gn.
N. oblata Morr.*
hilliana Harv.
N. rosaria Grt.*
N. rava H. Sch.*
umbrata Pack.
N. fennica Tausch.*
N. plecta Linn.*
vicaria Wlk.
N. collaris G. & R.* §
N. haruspica Grt.*
unimacula Morr.
grandis Spey.
N. sierrae Harv.
N. clemens Smith.*
N. clandestina Harr.*
unicolor Wlk.
N. havilae Grt.*
N. piscipellis Grt.
N. atrifrons Grt.
N. tepperi Smith.
N. lubricans Gn.*
var. *beata* Grt.*
N. vocalis Grt.
iurenusta Grt.
N. opacifrons Grt.*
N. pallidicollis Grt.
cinereocollis || Grt.

Genus CHORIZAGROTIS Smith.

C. auxiliaris Grt.*
C. introferens Grt.*
C. sorror Smith.*
C. agrestis Grt.*
mercenaria Grt.
flexilis Morr.
C. inconcinna Harv.*
C. immixta Grt.*
C. terrealis Grt.

Genus RHIZAGROTIS Smith.

§
R. abnormis Smith.
§
R. proclivis Morr.
R. acclivis Morr.
opaca Harv.
R. albicosta Smith,*

R. apicalis Grt.

§

R. lagena Grt.*

R. albalis Grt.*

clauanthoides Grt.

Genus FELTIA Wlk.

F. olivia Morr.

F. longidens Smith.

F. subgothica Steph.*

jaculifera Gn. in part.

duccus Wlk.

F. jaculifera Gn.*

tricolor Lint.

F. herelis Grt.*

jaculifera var. Gn.

F. pectinicornis Smith.*

F. evandialis Grt.

§

F. circumdata Grt.

F. gladiaria Morr.*

morrisoniana Riley.

F. venerabilis Wlk.*

incallida Wlk.

F. gravis Grt.

rapularis Grt.

F. vancouverensis Grt.*

clodiana Grt.

semiclarata Grt.

hortulana Morr.

F. aeneipennis Grt.*

F. volubilis Grt.*

stigmata Morr.

F. annexa Tr.*

F. malefida Gn.*

Genus POROSAGROTIS Smith.

P. muranula G. & R.*

vetusta Wlk.

P. catenula Grt.*

P. obesula Smith.*

P. satiens Smith.

P. mimallonis Grt.*

rufipennis Grt.

P. fusca Bdv.

septentrionalis Moeschl.

P. worthingtoni Grt.

P. rileyana Morr.*

P. orthogonia Morr.*

P. daedalus Smith.*

P. dollii Grt.

P. milleri Grt.*

P. pluralis Grt.

Genus CARNEADES Grt.

C. wilsonii Grt.*

§

specialis Grt.

C. lacunosa Morr.*

C. aequalis Harv.

§

C. recula Harv.*

C. cicatricosa G. & R.*

C. neomexicana Smith.

C. quadridentata G. & R.*

C. niveilinea Grt.*

C. insertans Smith.

C. brevipennis Smith.*

C. oblongistigma Smith.*

C. plagigera Morr.*

C. olivalis Morr.*

C. ridingsiana Grt.*

C. flavidens Smith.*

C. flavicollis Smith.*

C. perexcellens Grt.*

docilis Grt.

§

C. bicollaris Grt.*

C. brocha Morr.*

C. sponsa Smith.*

C. cogitans Smith.*

C. hollemani Grt.*

C. atristrigata Smith.

C. bielavis Grt.*

C. perpolita Morr.*

C. fumalis Grt.*

C. perfusca Grt.

C. pastoralis Grt.*

C. finis Smith.*

C. velleripennis Grt.*

C. atomaris Smith.*

C. texana Grt.*

C. gagates Grt.*

C. citricolor Grt.*

C. misturata Morr.*

C. mærens Grt.

C. dolis Grt.

C. scandens Riley.*

C. choris Harv.

C. pleuritica Grt.*

C. remota Smith.

C. ptychros Grt.*

personata Morr.

C. infracta Morr.

C. luteola Smith.*

C. serriicornis Smith.*

C. tetrica Smith.*

§

C. bostoniensis Grt.*

C. cænis Grt.*

muscosa Grt.
 C. *medialis* Smith.*
 C. *fenesica* Harv.*
 C. *extranea* Smith.
 C. *trifasciata* Smith.
 C. *bifasciata* Smith.*
 C. *comosa* Morr.
 C. *xyliniiformis* Smith.
 C. *messoria* Harr.*
 cochrani Riley.
 repentis G. & R.
 lycarum † G. & R.
 spissa Gn.
 balanitis Grt.
 confracta Morr.
 C. *perturbata* Smith.*
 C. *rubefactalis* Grt.
 C. *fauna* Morr.
 C. *brunneigera* Morr.*
 C. *conjuncta* Smith.
 C. *incallida* Smith.
 C. *lutulenta* Smith.*
 C. *annulipes* Smith.*
 C. *pedalis* Smith.*
 C. *lineifrons* Smith.*
 C. *teleboa* Smith.
 C. *murdocki* Smith.*
 C. *quinquelinea* Smith.
 C. *friabilis* Grt.*
 C. *fuscigera* Grt.*
 C. *orbicularis* Smith.
 C. *micronyx* Grt.
 C. *intrita* Morr.*

§

C. *fernaldi* Morr.
 C. *opipara* Morr.*
 islandica † Grt.
 C. *tristicula* Morr.
 C. *munis* Grt.*
 sublatis Grt.
 C. *dissona* Moeschl.
 C. *euroides* Grt.
 perpura Morr.
 C. *alticola* Smith.*
 C. *rufula* Smith.*
 C. *basiflava* Smith.*
 C. *satis* Harv.
 C. *rena* Smith.*
 C. *insignata* Wlk.*
 illata Wlk.
 declarata Wlk.
 campestris Grt.

decolor Morr.
 var. *verticalis* Grt.*
 C. *lewisii* Grt.
 C. *tessellata* Harr.*
 maizi Fitch.
 atropurpurea Grt.
 C. *albipennis* Grt.*
 ♀ *nigripennis* Grt.
 C. *spectanda* Smith.
 C. *pallipennis* Smith.*
 C. *basalis* Grt.*
 C. *solitaria* Smith.
 C. *nostra* Smith.*
 C. *ochrogaster* Gn.*
 cinereomaculata Morr.
 gularis Grt.
 turris Grt.
 C. *idahoensis* Grt.*
 C. *furtivus* Smith.*
 C. *westermanni* Stgr.
 C. *obeliscoides* Gn.*
 sexatilis Morr.
 C. *infelix* Smith.*
 C. *islandica* Stgr.
 C. *divergens* Wlk.*
 versipellis Grt.
 C. *colata* Grt.
 C. *redimicula* Morr.*
 C. *atrifera* Grt.
 C. *tesselloides* Grt.*
 C. *strigilis* Grt.
 C. *silens* Grt.

SPECIES NOT PLACED.

Agrotis dapsilis Grt.
 fishii Grt.*
 juneta Grt.
 viralis Grt.
 nanalis Grt.
 drawseni Stgr.
 littoralis Pack.
 hero Morr.
 tennicola Morr.
 radix Wlk.
 mollis Wlk.
 perlentans Wlk.
 patula Wlk.
 hesitans Wlk.
 insula Wlk.
 ordinata Wlk.
 reticens Wlk.
 illapsa Wlk.

EXPLANATION OF PLATES.

The figures are numbered consecutively, but not regularly arranged on the following plates.

PLATE I.

An ideal species in which all the ordinary Noctuid maculation is present. The lettering is as follows:

b.—basal line or half line—here it is geminate.

t. a.—*t. a.*, or transverse anterior line—also geminate.

t. p.—*t. p.*, or transverse posterior line—also geminate, outer line emphasized on the veins, line sinuate.

s. t.—*s. t.*, or subterminal line—line sinuate, preceded by a dusky shade.

t.—terminal line, dots or lunules.

m.—median shade or line.

The basal space is between the body and the *t. a.* line; median space between the *t. a.* and *t. p.* lines; *s. t.* space between the *t. p.* and *s. t.* lines; terminal space between the *s. t.* line and outer margin.

cl.—claviform spot.

or.—orbicular spot.

ren.—reniform spot.

The reniform and orbicular are the “ordinary spots” or the “stigmata” of some authors.

b. d.—basal dash.

a. p.—apex of primaries—with a pale apical spot.

h. a.—hind angle of primaries.

c. m.—costal margin.

o. m.—outer margin of primaries; *o. m.*¹, same of secondaries.

i. m.—inner margin of primaries; *i. m.*¹, same of secondaries.

h. a.—hind angle of primaries.

d. s.—discal spot on secondaries.

e. l.—exterior line on secondaries.

apex—apex of secondaries.

s. m.—submedian, or internal vein.

an.—anal angle of secondaries.

The fringes are omitted in the figure.

PLATE II.

1 Harpe and clasper of *R. chardinyi*.

2 “ “ *R. brunneicollis* and *rufipectus*.

3 “ “ *R. cupida*.

3a Head of *R. cupida*, showing the palpal form usual in the genus.

4 Harpe and clasper, essentially alike in *cupidissima vittifrons*, *rariata*, *placida*.

5 Harpe and clasper of *R. alternata*.

6 “ “ *R. belfragei*.

6a “ “ *R. formalis*.

7 “ “ *R. binominalis*.

8 “ “ *R. distracta*.

9	Harpe and clasper of <i>R. crenulata</i> and <i>confusa</i> .
10	" " <i>A. prasina</i> .
11	" " <i>A. vernilis</i> .
12	" " <i>P. speciosa</i> .
13	" " <i>P. pressa</i> and <i>P. fusca</i> .
14	" " <i>P. imperita</i> .
15	" " <i>E. sigmoides</i> .
16	" " <i>E. perattenta</i> .
17	" " <i>A. erratica</i> .
18	" " <i>S. elimata</i> .
19	" " <i>S. caltherina</i> .
20	" " <i>P. salicarum</i> .
21	" " <i>P. carnea</i> .

PLATE III.

22	Harpe and clasper of <i>P. woekci</i> .
23	" " <i>S. congrua</i> .
24	<i>Agrotis badiuodes</i> , harpe and clasper; <i>a</i> , body structure from above; <i>b</i> , venation; <i>c</i> , antenna of male; <i>d</i> , fore tibia.
25	<i>Agrotis ypsilon</i> , harpe and clasper; <i>a</i> , body structure from above; <i>b</i> , same from side; <i>c</i> , antenna of ♂; <i>d</i> , fore tibia of ♂; <i>e</i> , fore tibia of ♀.
26	Wanting.
27	Harpe and clasper of <i>A. geniculata</i> .
28	" " <i>P. occulta</i> .
29	" " <i>P. saucia</i> .
30	" " <i>P. rudcus</i> and <i>pellucidalis</i> .
31	" " group <i>incivis</i> , and of <i>N. lubricans</i> .
36	" " <i>N. phyllophora</i> .

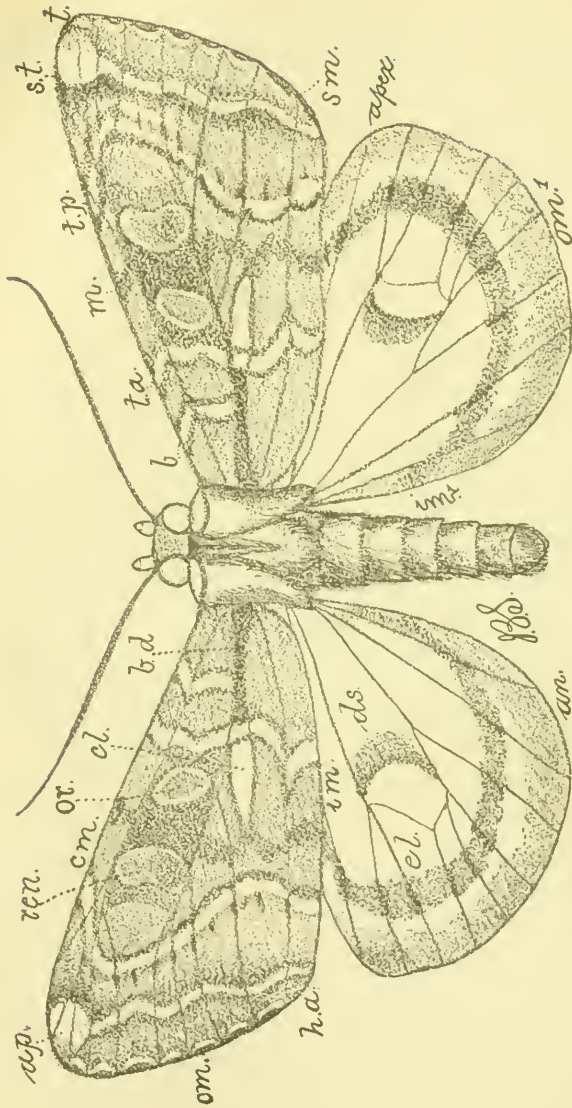
PLATE IV.

32	Harpe and clasper of <i>N. baja</i> .
33	" " <i>N. normaniana</i> .
34	" " <i>N. bicarnea</i> .
35	" " <i>N. c-nigrum</i> .
35a	Palpus of <i>N. c-nigrum</i> .
37	Harpe and clasper of <i>N. rubifera</i> .
38	" " <i>N. oblata</i> .
39	" " <i>N. rara</i> .
40	" " <i>N. fennica</i> .
41	" " <i>N. plecta</i> .
42	" " <i>N. clandestina</i> , <i>sierra</i> and <i>haruspica</i> .
43	" " <i>N. collaris</i> .
44	" " <i>N. atrifrons</i> .
45	" " <i>C. auxiliaris</i> .
46	" " <i>C. introfrens</i> .
47	" " <i>C. agrestis</i> .
48	" " <i>C. incoucinna</i> .
49	" " <i>C. terralis</i> .
50	" " <i>R. proclivis</i> .
51	" " <i>R. acclivis</i> .
52	" " <i>R. albicosta</i> .
53	" " <i>R. apicalis</i> .
54	" " <i>R. lagena</i> .
55	" " <i>R. albalis</i> .

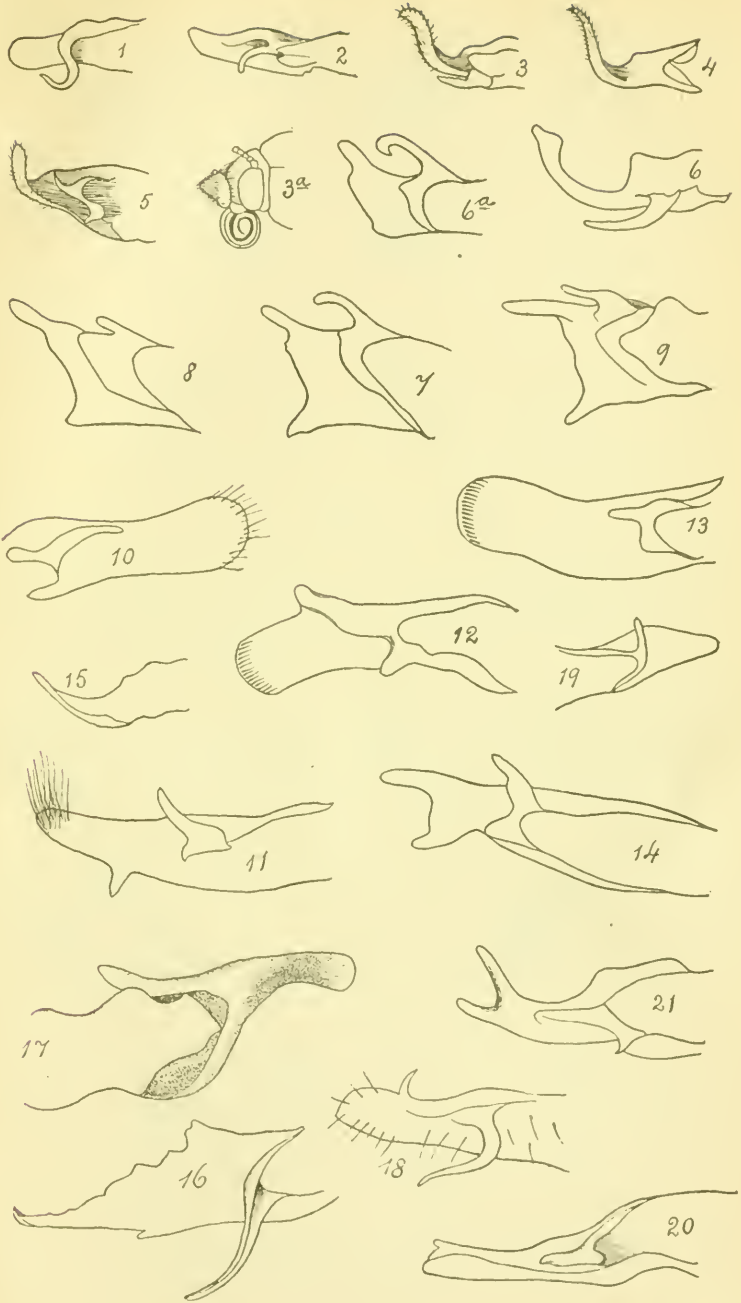
- 56 *Feltia subgothica*: *a*, harpe and clasper—that of *jaculifera*, *herelis*, *annexa*, and *malefida* is the same; *b*, structure of body from side; *c*, anterior tibia; *d*, palpus; *e*, antennal joint from top; *f*, antennal joint, cross-section, ♂.
- 57 *Feltia jaculifera*: *c*, antennal joint from top; *f*, antennal joint, cross-section, ♂.
- 58 *Feltia herelis*: *c*, antennal joint from above; *f*, cross-section of antennal joint, ♂.
- 59 *Feltia pectinata*: *c*, antennal joint from above; *f*, cross-section of antennal joint, ♂.

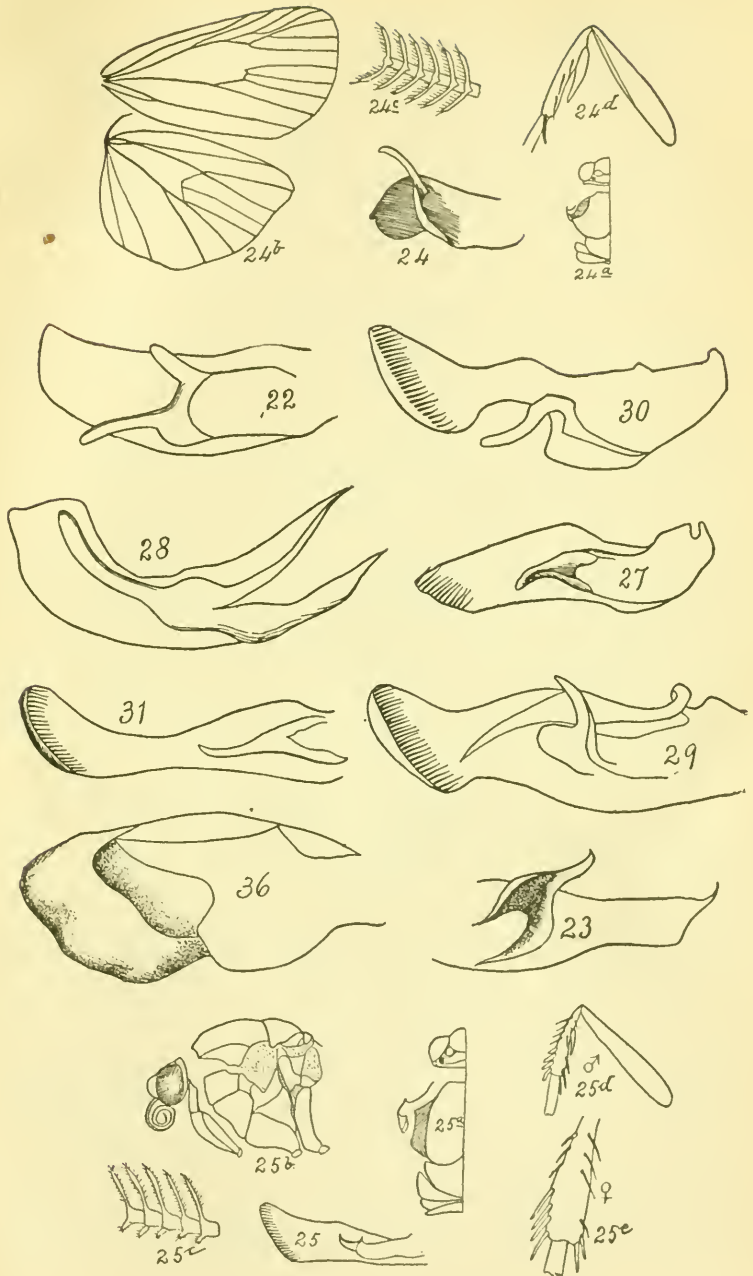
PLATE V.

- 60 *Feltia gladiaria*: *a*, harpe and clasper—*venerabilis*, *rancourecensis*, and *gravis* are the same; *b*, antenna of ♂; *venerabilis* is the same; *c*, anterior tibia; *d*, front of head.
- 61 *Feltia rotubilis*: *a*, harpe and clasper; *d*, front of head.
- 62 Harpe and clasper of *Porosagrotis*: All the species are essentially alike in this, so far as examined.
- 63 Harpe and clasper of *Carneades wilsonii*.
- 64 “ “ *Carneades insignata*; with this agree *albipennis*, *teselloides*, *infelix*, *intrita*, *tristicula*, *redimicula*, *micronyx*, *abnormis*, *versipellis*, *atrifera*, *messoria*, *brunneigera*.
- 65 Harpe and clasper of *C. niveilinea*, *flavidens*, *vena*, *cogitans*.
- 66 “ “ *C. ptychrous*, *velleripennis*, *insertans*.
- 67 “ “ *C. canis*.
- 68 Harpe and clasper of *C. bifasciatus*, *gagates*, *choris*, *satis*, *oblongistigma*, *turris*, *fuscigera*, *veula*, *ciatricosa*, *serricornis*, *tessellata*, *fortunalis*, *lacunosa*.
- 69 Harpe and clasper of *C. pastoralis*.
- 70 “ “ *C. bicollaris*.
- 71 “ “ *C. bostoniensis*.
- 72 “ “ *C. perpolita*.
- 73 “ “ *C. scandens*.
- 74 “ “ *C. brocha*.
- 75 “ “ *C. pallipennis*, *misturata*, *sublatis*.
- 76 “ “ *C. obeliscoides*.
- 77 “ “ *C. citricolor*, *basalis*.
- 78 “ “ *C. comosa*, *plagigera*, *infracta*.
- 79 “ “ *C. fenesica*.
- 80 “ “ *C. rubefactalis*.
- 81 “ “ *C. hollemauni*.
- 82 “ “ *C. fumalis*, *tetrica*.
- 83 “ “ *C. finis*, *medialis*.



IDEAL AGROTID, SHOWING THE NORMAL MACULATION AND HABITUS.

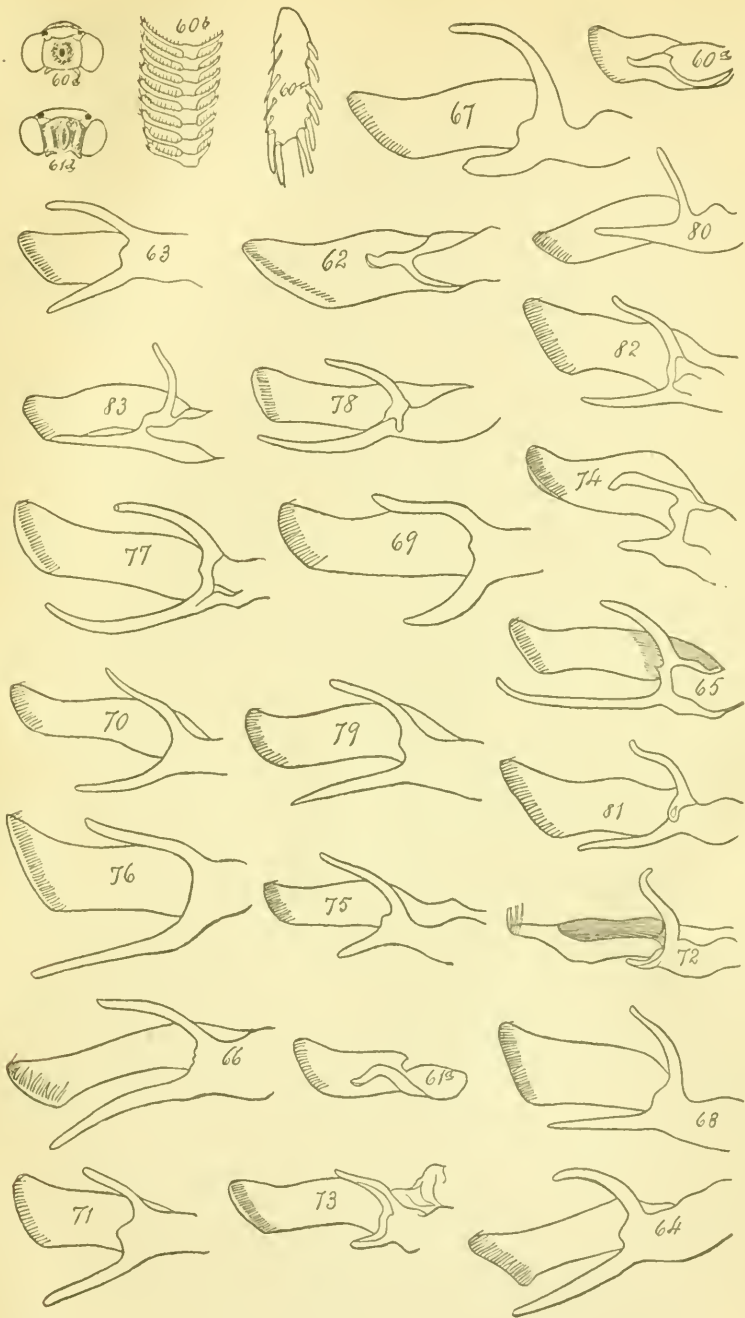




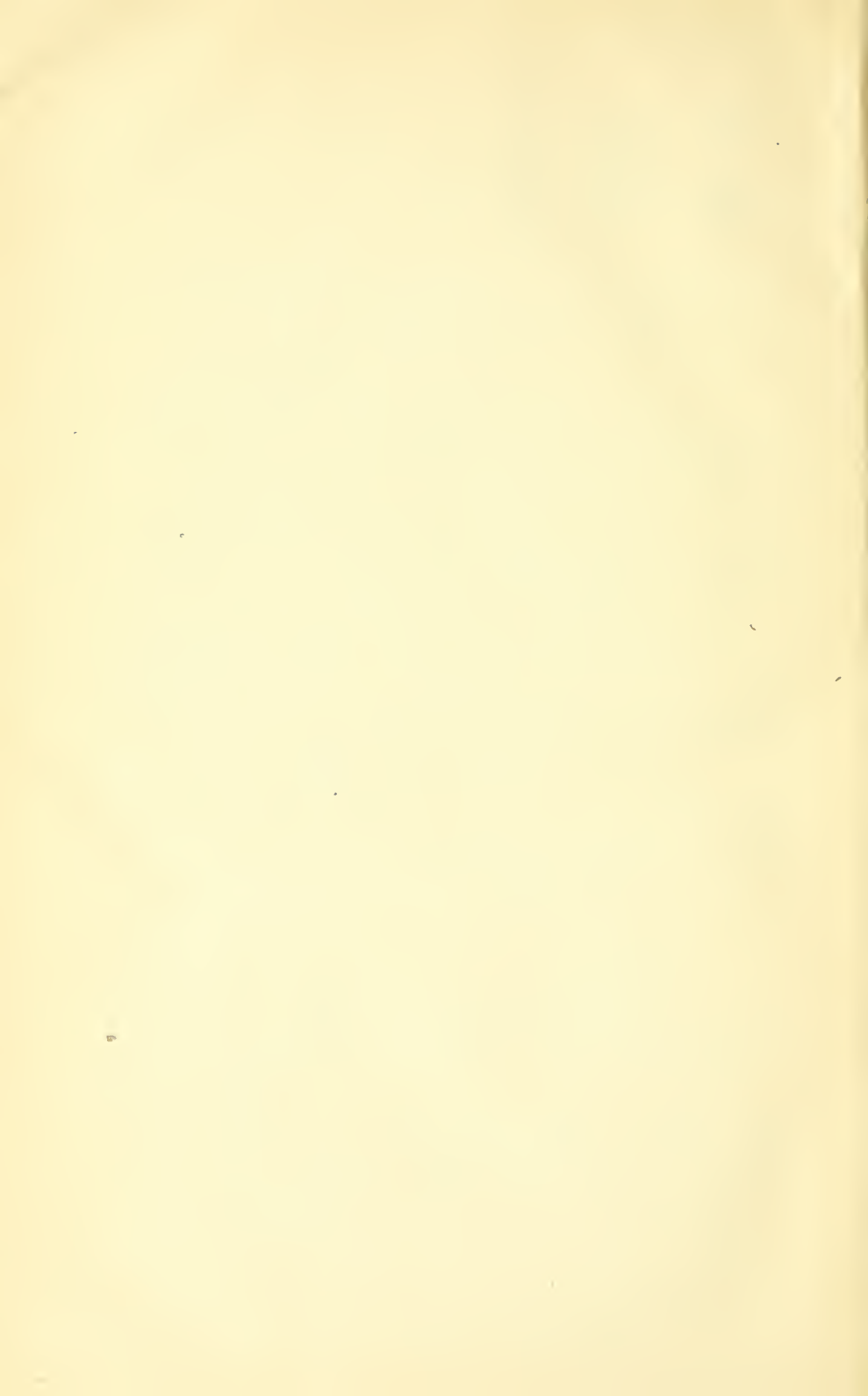




SEXUAL AND OTHER CHARACTERS OF AGROTIDS.



SEXUAL AND OTHER CHARACTERS OF AGROTIDS.



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