

DEPARTMENT OF THE INTERIOR.
UNITED STATES GEOLOGICAL SURVEY OF THE TERRITORIES.
F. V. HAYDEN, U. S. GEOLOGIST-IN-CHARGE.

SYNOPSIS
OF THE
ACRIDIDAE OF NORTH AMERICA.

BY
CYRUS THOMAS, Ph. D.

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DEPARTMENT OF THE INTERIOR.

REPORT

OF THE

UNITED STATES GEOLOGICAL SURVEY

OF

THE TERRITORIES.

F. V. HAYDEN,

UNITED STATES GEOLOGIST-IN-CHARGE.

IN FIVE VOLUMES.



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VOLUME V.

ZOOLOGY AND BOTANY.

PREFATORY NOTE.

The present memoir, entitled "A Synopsis of the Acrididæ of North America," by Professor Thomas, is offered for publication at this time with the belief that it is a substantial contribution to Natural History. It is one of the results of the author's connection with the Survey for the past four years. It forms the first part of Vol. V, which is intended to include only special papers on subjects connected with the recent Zoology and Botany of the Survey. The catalogues, with brief descriptions of the new species that are collected from year to year, will appear in the annual reports, while the more elaborate descriptions, with the illustrations of the new or little-known species, will be included in this volume. The Fishes and Reptiles will be elaborated by Professor Cope, the Botany by Professor Porter, Hemiptera by P. R. Uhler, Coleoptera by Dr. Horn, Birds by Dr. Coues, and Mammals by Professor Gill.

We trust that this array of names of men so eminent in these special departments will be a sufficient guarantee for the value of this work.

I beg to extend to all these gentlemen my cordial thanks for their kind co-operation.

F. V. HAYDEN,
United States Geologist.

OFFICE U. S. GEOLOGICAL SURVEY OF TERRITORIES,
January 10, 1873.

PART I.

SYNOPSIS

OF THE

ACRIDIDAE OF NORTH AMERICA.

BY

CYRUS THOMAS, Ph. D.

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LETTER TO THE GEOLOGIST IN CHARGE.

WASHINGTON, D. C., *January 1, 1873.*

DEAR SIR: During my connection, for the past four years, with the Geological Survey of the Territories conducted under your charge, I have been enabled to collect a large number of specimens of Orthoptera, especially of Acrididæ; and having made the study of this family a specialty for several years past, I conceived the idea of preparing a monograph or synopsis of the species thereof found in the United States. Having mentioned this idea to you, I am happy to say that you heartily approved of it, and gave me all the encouragement and aid therein consistent with the other and more practical duties of the Survey. By this encouragement and aid, and the use of the name of the Survey, I have succeeded in collecting together a large number of specimens, representing not only almost all the previously-described species, but also a number of new ones, most of which have been described and reported, from time to time, for publication in your annual reports; a few are herein noticed for the first time. I herewith present the result of my labors in this direction, trusting that it may prove acceptable, and that it may contribute something, be it ever so small, to the advancement of scientific knowledge. It is possible that a delay of another year would have enabled me to render it more complete and satisfactory; but I have concluded it is best to bring it before the public as soon as possible, as it will be one aid to entomologists in determining new species, and thus enable them the sooner to complete the list of the species of this important family which belong to the North American fauna. I have entitled it a "Synopsis," instead of "Monograph," because I have not had an opportunity of inspecting all the described species, nor of examining many of the original types of other authors.

In order to render it as complete and as useful as possible, I have added descriptions of the species found in other parts of North America, but which do not belong to the United States fauna. These descriptions are chiefly from the authors by whom they were originally described, as I have had an opportunity of inspecting but few of the species, and very few of them have been figured.

The types of all the new species which I have described have been placed in the Agricultural Department, where they will be preserved, thus affording a ready means of reference in future investigations. Quite a number of these have been figured by Professor Townend Glover, and will be found in his "Illustrations of North American Entomology—Orthoptera," published in quarto during the past season.

An examination of this synopsis will show that about one hundred and twenty species of this family, exclusive of the Tettiginæ, are described as belonging to the United States, and as representing twenty-five genera. The total number of Acrididæ, exclusive of Tettiginæ, described in Fischer's *Orthoptera Europea*, is but seventy-seven, representing twenty genera. I have described as new forty species and four genera, and have also introduced six other genera not hitherto known to be represented in the United States. In two instances I have adopted generic names (equivalents) different from those used by Mr. Scudder; this has been done in order to conform to the present usage of European orthopterologists. I have modified and somewhat changed the arrangement of the entire order, Fieber's system, considered as descending, being used as a basis; but I find since the publication of your last report (1871), in which I sketched this arrangement, that I have been in part anticipated by Brunner de Wattenwyl, of whose plan I have seen but an outline. I have adopted an arrangement of the various divisions of the family, which I may claim, in great part at least, as my own; whether valuable or not must be determined by future investigations and use.

I take pleasure in acknowledging the favors received from the Smithsonian Institution in the preparation of this work; and also desire to express my thanks to the Agricultural Department for the use of the specimens of Orthoptera deposited there, and for the assistance rendered in procuring specimens from various parts of the United States.

Very respectfully, your obedient servant,

CYRUS THOMAS.

Professor F. V. HAYDEN,
United States Geologist.

AUTHORITIES.

The following list is confined almost exclusively to those authorities which contain descriptions of the genera and species of *Acrididæ* belonging to the North American fauna, or in which some important information will be found in regard thereto. Some works, as will be seen, are included which are wholly devoted to exotic species; but where such are named it is because they contain original generic descriptions, and are therefore necessary to be examined in order to obtain a full history of the North American *Acrididæ*. The full titles, when not given here, will generally be found in the introductory part of Mr. Scudder's Catalogue of the Orthoptera:

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- BURMEISTER (Hermann). Handbuch der Entomologie. Berlin, 1832-55. 5 vols., 8vo. Vol. II, pt. ii, 1838, contains the Orthoptera. Vol. I has been translated by W. E. Shuckard, under the title "Manual of Entomology," London, 1836, 8vo.
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PART I.

THE ACRIDIDAE OF THE UNITED STATES.

THE UNITED STATES

THE ARCHIVES OF THE UNITED STATES

INTRODUCTION.

In order that this synopsis may be useful to those who have not time nor desire to devote much attention to entomology, yet for practical purposes or pleasure wish to identify species, I give such explanations as are necessary for this purpose,

ACRIDIDÆ is the name of a family of insects belonging to the order ORTHOPTERA. This order embraces a large number of species, which differ much in appearance and characters, and are known in this country generally by the common names earwigs, cockroaches, devils-horses, walking-sticks, grasshoppers, and crickets. Each of these names, except the next to the last, represents a distinct family of the order, thus :

Earwigs.....	Forficulidæ.
Cockroaches.....	Blattidæ.
Devils-horses.....	Mantidæ.
Walking-sticks.....	Phasmidæ.
Grasshoppers.....	{ Acrididæ.
	{ Locustidæ.
Crickets.....	Gryllidæ.

It will be seen that the common name, grasshoppers, embraces two families, *Acrididæ* and *Locustidæ*, but these are quite easily distinguished from each other. *Locustidæ* includes those species usually found on the grass and trees, which have very long thread-like antennæ—generally longer than the body of the insect; the tarsi, or feet, are four-jointed, and the female has an exerted ovipositor more or less curved and sword-shaped. Most of the species have wings, yet there are a number entirely wingless, which reside on the ground.

Acrididæ includes those species which usually reside on the ground, and are distinguished from the *Locustidæ* by the following characters: The antennæ are comparatively short, never exceeding the body in length, and composed of from fifteen to twenty-five joints;* the tarsi are three-jointed; the

* The antennæ of some exotic species are shorter than the head, and consist of but six to eight joints; the statement in the text applies to North American species.

female is furnished at the tip of the abdomen with four very short corneous pieces, two of which curve upward and two downward. This family includes the locusts of the eastern continent (the seventeen-year locust of the United States is a very different insect, belonging to an entirely different order). The common red-legged grasshopper, which often does much injury to the crops in the States, is a familiar example of this family, and the destructive grasshopper of the West is another.

The Acrididæ undergo an imperfect metamorphosis; that is to say, the larvæ and pupæ resemble the perfect insects, except in size and in the development of the wings. This is also true of all orthopterous insects, and forms one of the characteristics of the order.

THE EXTERNAL STRUCTURE AND TERMINOLOGY.

In describing the insect it is to be understood as in its natural position—on its feet, the front legs standing forward, the middle and posterior ones backward, and the wings closed. As a matter of course, to examine the wings we must spread them, and to see the under side of the insect we must reverse it; but the rule applies to the relative position of the parts described. The vertex of the head is considered the extreme front, and the tip of the abdomen the extreme posterior. “Anterior” or “before” will then signify in the direction of the front of the head; “posterior” or “behind,” the opposite direction; “above,” toward the upper surface or back; and “beneath” or “below,” toward the under surface. The entire external surface is considered as divided into four planes, reaching from one extremity to the other, as follows: The “back” or “dorsum,” which is the upper surface, horizontal; the under or “ventral” surface also horizontal; and the “sides” as vertical planes. It is true, there are wide variations from this theoretical form, especially in those species which approach a cylindrical shape, or where the dorsum of the pronotum is raised into a high, sharp crest; yet, by retaining the idea of this theoretical form, the shape and position of the parts may be more easily understood where figures cannot be introduced. This idea is to be retained throughout, even in describing the separate parts; thus, we speak of the dorsum or back and sides of the head, the dorsum of the thorax, &c. “Longitudinally” and “length” will then signify in the direction of the length of the body; “transverse” and “width,” from side to side; “height” and “depth,” up and down. It may appear useless to add such explanations as

these, yet those who are but beginners in entomology are frequently puzzled, in reading the description of a part of the body of an insect, to know in what sense the author uses these terms; for example, whether "length" means in the direction of the longest diameter of the part, or in the direction of the length of the insect; but by knowing that these terms are always used with reference to the whole insect, there will be no difficulty in understanding the description. It often happens that by following this rule rigidly the width of a part exceeds its length, yet this must not cause us to vary from it.

The body of the insect is naturally divided into three distinct parts, each bearing certain appendages.

First. The *head* (Fig. 1, *hd*) and its appendages, the *antennæ* (Fig. 1, *an*), and *palpi* (Fig. 2, *pi*).

Second. The *thorax* (Fig. 1, *th*) and its appendages, the wings and legs.

Third. The *abdomen* (Fig. 1, *ab*) and its appendages, the *cerci* (Fig. 1, *cr*), and *ovipositor* (Fig. 1, *ov*).

The *head* varies considerably in shape, yet the typical form may be considered an oblate spheroid, with the longitudinal diameter (from the neck through to the face) the shortest, and its perpendicular diameter longest. In some species the upper portion of the front is prolonged into a cone or pyramid of greater or less length (as in *Tryxalis*, *Opomala*, &c.); in one genus (*Acrolophitus*) the vertex rises obliquely upward in the form of a short cone or pyramid. Viewed from the side it presents, in many species, a triangle, the face, which forms the longest line, being directed from the vertex obliquely under toward the breast (*Opomala*, *Oxycoryphus*, *Stenobothrus*, &c.); in other species it presents a parallelogram, the greatest length being up and down (*Ædipoda*, *Acridium*, *Caloptenus*, *Pezotettix*, &c.)

In describing the head, its external surface may be considered with reference to four planes—the dorsum, the two sides, and the front.

If a line be drawn across the back part from the posterior margin of one eye to the posterior margin of the other, the portion lying behind this line, reaching to the margin of the pronotum, will represent the *occiput*.*

* I am aware that I embrace in this area the portion called the vertex by some entomologists, the term *occiput* being applied by them to that part of the skull surrounding the occipital foramen. But as no use of the under portion of this division of the skull is made in describing genera or species, I have limited the term to the upper part, and have extended the area forward to the eyes. This necessarily limits the vertex. But if we take into consideration the fact that in this family the mouth is bent downward

The *vertex* (Fig. 1, *vx*) is the portion included between the eyes, and extends forward to the point where the head commences to descend to the face; the extreme anterior point is sometimes called the *fastigium*. The variations in the form and surface of the vertex afford important generic and specific characters. In a few instances it ascends anteriorly, is sometimes horizontal, but is generally more or less deflexed; is advanced and pointed or triangular in front (*Tryxalis*, *Opomala*, *Stenobothrus*, *Tragocephala*); is obtusely rounded and blunt without carvings (*Boopedon*); is narrow and slightly furrowed (*Caloptenus*); and is broad and even transverse, that is, broader than long. Sometimes the margins are raised so as to inclose a *foveola*, or shallow cell, between the eyes, which is called the *median foveola* or *central foveola* of the vertex. The shape and character of this foveola appear to be constant in the species, and even in some genera, hence its importance; but caution is to be observed in comparing dried specimens, especially dried alcoholic specimens, with descriptions taken from living specimens, and the reverse, as the shrinking often causes considerable variation from what it is when living. The *lateral foveolæ* are two small cells situated on the margin of the vertex, one on each side near the front border of the eye, sometimes on the upper surface near the edge; in other species immediately below the margin on the deflexed portion. These are sometimes linear (*Stenobothrus*, Pl., Fig. 9), sometimes very small and triangular (*Ædipoda*), or quadrangular (Pl., Fig. 17*a*), but in many genera are wholly absent.

The *face* (*facies*) is the deflexed portion in front extending downward from the antennæ to the transverse suture, which separates it from the *clypeus*; it is generally traversed, up and down, by three *carinæ*, or keels, more or less distinct; the *median carina* or *frontal costa* is the one extending down the middle from the fastigium, and in which the middle ocellus is placed (this ocellus is shown in Pl., Fig. 17, as a round dot between the antennæ). This carina is generally more or less sulcate or channeled; when the channel

and under toward the breast, thereby lengthening the back part of the occiput, this definition will not be found so much at variance with the use of these terms in other orders. I would refer to the figure of *Necrophorus americanus*, in the "Classification of the Coleoptera of North America," by Dr. LeConte, page xvii. Here the occiput includes all that part of the skull behind the eyes, and the vertex that between the eyes. While Burmeister (Manual of Entomology, vol. 1, Pl. 3, Fig. 11), in *Carabus glabratus*, places the vertex entirely behind the eyes, and calls the portion between the eyes the "sinciput," limiting the occiput (Fig. 12) to a narrow ring around the neck.

* As there is but one plate, which is placed at the end of this work, it will be referred to simply as Pl., without number; and Fig., without the addition Pl., always refers to the wood-cuts.

is deep, dividing it into two keels, the face is said to be *quadricarinate*. The two *lateral carinæ* extend downward from the front margin of the eyes, often bending outward toward the corners of the face. Between the frontal costa and lateral carinæ are the *antennal foveolæ*, or pits, in which the antennæ are inserted. The cheeks (*genæ*) are the convex portions of the sides below and rather behind the eyes.

Sometimes the face is deflexed; that is, directed under and backward toward the breast (*Tryxalis*, Pl., Fig. 12; *Opomala*, Pl., Fig. 16; *Oxycoryphus*, Pl., Fig. 6; *Pyrgomorpha*, Pl., Fig. 10, &c.); but generally it is vertical, or nearly so (see Pl., Figs. 1, 3, 4, and 5).

The portion of the head described constitutes the skull, on which are placed the eyes (*oculi*), the simple eyes (*ocelli*), and the *antennæ*. The position and shape of the eyes afford both generic and specific characters; as regards position, whether on the sides or advanced near the front, approximate to, or distant from each other, prominent or the opposite, oblique or vertical; in respect to the shape, whether they are globose, ovoid, elliptical, elongate, or pyriform.

There are three simple eyes (*ocelli*); one (*ocellus*) is placed immediately above the base of each antennæ and near the margin of the eye, and one in the frontal costa between the antennæ.

The *antennæ* (Fig. 1, *an*) are inserted in the front of the head a little below the eyes, and consist of a number of joints, varying, according to the species or genera, from fourteen to twenty-four;* they seldom exceed one-half of the body in length, but (in the North American species) are always longer than the head; the usual form is cylindrical, but in many species they are enlarged and prismatic at the base, and in a few are somewhat enlarged at the tips. The joints are numbered from the base toward the apex, the first joint being the largest and sub-globose, or somewhat flattened. The face is terminated below by a transverse suture, called the *clypeal* or *nasal suture* (see Pl., Fig. 17). The *clypeus* (Fig. 1, *cl*; Pl., Fig. 17*b*) is the next piece below the suture, and is usually in the form of a transverse parallelogram, and "tucked" at the sides. Attached to the lower margin of this is the *labrum* (Fig. 1, *lb*; Pl., Fig. 17*c*) or upper lip, the lower corners rounded, and the lower margin generally notched; the upper half has a quadrangular impression, giving this portion the appearance of a separate square

* In some exotic species, as the *Proscopia*, the number is reduced to seven or eight.

piece. The suture which separates the upper lip from the clypeus may be called the *labial suture*.

The labrum covers the *mandibles*, or strong corneous upper jaws, which are furnished on the inner margin with strong teeth or serratures, presenting both cutting and grinding surfaces, thus admirably adapting them to the voracious habits of these vegetable-eaters.

Immediately behind these are the *maxillæ*, or under jaws; the basal portion or body is somewhat triangular in form; the outer lobe (*galea*) is slightly dilated, and has a small joint at the base; it is hollowed on its inner margin, which covers the inner lobe. The latter is elongate and narrow, terminating at the apex with two sharp teeth. Near the base of these jaws are attached the *maxillary palpi*, one *palpus* to each jaw; these appendages resemble short antennæ, and consist of five joints, the first and second being minute, the other three are longer and usually about of equal length.

The under side of the mouth (or in *Acrididæ*, as in many other families of insects, we might more properly say the back or hinder part) is covered by the *labium*, or lower lip, which is large, and consists of two lobes; the outer lobe is more or less circular in form, its surface near the exterior margin being crossed by an indenture, which gives to it, when closed, the appearance of a mandible. This member is also furnished with two appendages (*labial palpi*), resembling the maxillary palpi, but are shorter, and composed of but four joints, the first or basal joint being very small, and often scarcely perceptible. The tongue (*lingua*) is well developed, thick, fleshy (and somewhat spatulate in form in *Acridium americanum*); it is situated immediately forward of the labium and between the maxillæ, and its minutely pappillate surface certainly indicates that the sense of taste is well developed.

The head is connected with the thorax by the *neck* (*collum*), which is but a short cylindrical ring, usually hid by the pronotum; it is not used in describing genera or species.

The *thorax* (Fig. 1, *th*) is the middle portion of the body, to which are attached the six legs, and also the four wings, when present. In order to accommodate the strong muscles necessary to the motion of these members, it is the most robust of the three parts of the body. It consists of three parts, each composed of several pieces: the front portion, which bears the first pair of legs, is the *prothorax*; the middle portion, which bears the middle pair of legs and the upper wings (*elytra*), is the *mesothorax*; the pos-

terior portion, which bears the third pair of legs and the under wings (*wings proper*), and to which the abdomen is joined, is the *metathorax*.

The different surfaces of these divisions are distinguished by separate names: thus, the dorsal portion of the prothorax is the pronotum (Fig. 2, *pr*), and the ventral portion the *prosternum*; the dorsal portion of the mesothorax is the *mesonotum*, and is usually covered by the pronotum; the ventral portion is the *mesosternum*; the dorsal portion of the metathorax is the *metanotum*; the ventral surface the *metasternum*. The whole of the under surface of the thorax taken together is the *sternum* (Pl., Fig. 8, shows the sternum of *Acridium americanum*).

The most important of these divisions, in describing genera and species, is the *pronotum*; this is the shield which covers the front part of the body immediately behind the head (Fig. 2, *pr*), reaching down the sides nearly or quite to the insertion of the front legs; it usually extends back on the dorsum of the thorax, so as to cover the base of the elytra (wood-cut, Fig. 2, *pr*; see also Pl., Figs. 1, 2, 3, and 5); but in the sub-family *Tettiginæ* it extends back over the abdomen to its extremity (see Pl., Fig. 14). Its surface is considered with reference to three planes—the upper surface (*dorsum*), and the two sides; but there are wide variations from this typical form. When these areas are clearly distinguishable (as in *Pyrgomorpha*, Pl., Fig. 10; *Oxycoryphus*, Pl., Fig. 6; *Romalea*, Pl., Fig. 2; *Brachycephus*, Pl., Fig. 4, and many other genera) there is a raised line, sharp angle, or obtuse ridge running along each margin of the dorsum, where it connects with the side (this is represented in Pl., Fig. 4, by the double line, which, starting immediately back of the eye, runs to the upper margin of the scale-like elytra); these are called the *lateral carinæ*. In most species of the family there is a raised line or keel along the middle of the pronotum called the *median carina* (wood-cut, Fig. 1, *mc*); this is sometimes but an indistinct line (see Pl., Figs. 9, 10); in other species it is quite distinct; in some slightly elevated, when it is said to be *sub-cristate*; and sometimes (see Pl., Fig. 1) it is quite elevated, when it is called *cristate*. The term *carina* is sometimes, though with doubtful propriety, applied to the obtusely-rounded angle formed by the deflection of the sides of the pronotum from the dorsum (as in *Caloptenus*, Pl., Fig. 5, and even in *Pezotettix*, Pl., Fig. 15, where the pronotum is almost cylindrical). I have, therefore, in some cases introduced the term *humerus* or *humeral angle* to represent this part when it cannot properly

be called a carina. In some cases the sides slope upward to the median carina, leaving no lateral carina or angle (as in *Tropidolophus*, Pl., Fig. 1, and *Tropidacris*); in other cases (as in *Mesops*, *Boopedon*, Pl., Fig. 11; some species of *Opomala*, &c.) the pronotum is cylindrical. The lateral carinæ afford important generic and specific distinctions, by their relation to each other, shape, &c., as to whether they are parallel or convergent, straight or curved, continuous or interrupted. The front margin of the pronotum seldom presents any angular points, being usually obtusely rounded or truncate; but the posterior extremity generally extends backward, in a rounded or angular form, upon the base of the elytra; in a few cases (as *Chrysochraon*, and some species of *Pezotettix* in which the elytra and wings are wanting) the posterior margin is truncate. The *posterior lateral margins* are the hind margins running down from the extremity of the dorsum to the posterior angle of the sides.

The body of the pronotum is generally divided into four lobes by three transverse sutures or impressed lines (these are quite distinct in Fig. 2 of the plate); the lobe, or portion next the head, is the *anterior lobe*, the hindmost one the *posterior lobe*, the other two the middle lobes. In many species the two anterior impressed lines are indistinct or wanting, but the posterior one is nearly always present, except in the *Tettiginæ*. These lines are sometimes designated by the numbers 1, 2, and 3, beginning with the front one and counting backward.

The general form of the pronotum affords very important characters; sometimes the width is uniform and the sides are *parallel*; sometimes they *diverge posteriorly*; at other times they approach each other in the middle, in which case the pronotum is said to be *constricted*, but this term applies only when the narrowest point is between the extremities. Its surface also varies—is smooth, punctured, rugose, or tuberculate.

The *mesonotum* and *metanotum* are hid by the pronotum and the wings, and are not used in descriptions except in the case of a few wingless species of *Pezotettix*.

The *prosternum*, or under side, of the prothorax is short, and is either smooth—that is, it is without either tubercle or spine—or it is furnished with an obtuse tubercle, or a conical spine, called the *prosternal spine* (Pl., Fig. 8, *sp*). The species furnished with this spine are said to have the prosternum *armed* or *mucronate* (*Opomala*, *Mesops*, *Romalea*, and all of the group *Acridini*);

when the prosternum is without a spine it is *smooth* or *unarmed* (as *Tryxalis*, *Pyrgomorpha*, and the entire groups *Ædipodini* and *Tettigini*). This spine is either subcylindrical or cuneiform, obtuse or acute, straight or curved, &c.; these differences furnishing either generic or specific characters. Those species without the prosternal spine generally have the prosternum marked with a transverse curved groove more or less distinct.

The *mesosternum* is the broad piece of the under side that lies between the middle legs, and is marked with one or more indentures. It varies slightly in form, and may be used in describing species, though I believe this has not been done except in a few instances in Fischer's *Orthoptera Europea*. The pieces in front of the middle legs, extending obliquely up the sides, are the *episterna* of the mesothorax; the pieces situated externally to and adjoining the insertion of the middle legs are the *epimera* of the mesothorax.

The *metasternum* is the under surface of the metathorax, and is situated between the bases of the hind legs, and is usually marked with a single or double indenture in the middle. The *episterna* and *epimera* of the metathorax correspond very nearly in relative position with those of the mesothorax.

These thoracic rings on their internal face furnish support for the strong muscles necessary for the various movements of the wings and legs; and if we strip them of their appendages, and cut off the posterior projection of the pronotum, limiting it to the length of the prothorax, we will at once see that they are true homologues of the abdominal segments, changed from the typical form only so far as is necessary for the support and operation of the organs of locomotion.

The *legs*, as in other insects, are divided into several parts or joints as follows: The *coxa* (Fig. 2, *cx*) is the basal joint by which the leg is connected to the body; it is short in *Acrididæ*, but is usually enlarged. The *trochanter*, which is the next joint, is small, and can be best seen in the anterior pair of legs. The third piece or joint is the thigh (*femur*), and is the largest portion of the leg (Fig. 2, *fm*). The fourth piece is the *tibia* or shank (Fig. 2, *tb*), and is attached to the tip of the femur. The terminal portion, which rests upon the ground, is the *tarsus* or foot (Fig. 2, *tr*), and is composed of three joints; the first, or basal, and the third (or terminal) joints being longer than the second (or middle) joint. The first has two transverse indentures on the under side, which give it the appearance, when seen on this side, of being three pieces, thus making the tarsus appear five-jointed; but seen from above,

this shows but one, and the entire tarsus but three joints. The third or terminal joint is furnished at the tip with two claws (*ungues*), between which in all the groups except *Tettigini* there is a circular piece or pad (*pulvillus*, Fig 2, *pl*).

The posterior legs are much longer and stouter than the anterior or middle pair, in order to fit these insects for leaping. The thighs or *femora* are swollen or incrassated near the base* to accommodate the muscles necessary for this purpose. The external face, which is sometimes called the *disk*, is marked by numerous alternate minute ridges and furrows running obliquely inward and forward from each margin toward a longitudinal middle furrow, giving the entire disk a pinnate appearance; hence these minute ridges are sometimes alluded to as the *pinnæ* of the femur. The disk is bounded above and below by a small but usually distinct carina. Along the middle of the upper edge runs another keel, to which the name *upper* or *superior carina* is frequently applied. This is sometimes simply a raised line or angle; but in other cases, especially in some genera of the group *Ædipodini*, it is quite prominent. The inferior edge is generally channeled for the reception of the tibia when folded up. The outer margin of this channel or sulcus is the *lower* or *inferior carina*, and generally corresponds in prominence with the upper one. The femur affords some useful characters in describing species, by its length as compared with that of the abdomen; by its size, whether comparatively slender (Pl., Fig. 1) or broad (Pl., Fig. 5), by the greater or less prominence of its carinæ, &c.

The method by which the tibia is articulated with the femur admirably adapts it for leaping. The apex of the femur is suddenly expanded vertically, but deeply channeled, leaving a plate on each side, between which the base of the tibia is inserted. This has here two short right-angular bends, the articulation being at the sides of the first angle with the lateral plates of the femur; thus leaving a short lever extending upward, to which the strong extensor muscle is attached. The flexor muscle is attached beneath in the

* The *base* is the end by which a part is joined to the body directly or indirectly; thus the base of the abdomen is the part by which it is joined to the thorax. The base of the antennæ is the part by which they are connected with the head; the base of the elytra or wings, the part by which they are joined to the thorax; and the base of the tibiæ is the part which joins the femur and not the end that rests on the ground. *Tip* or *apex* always signifies the part or end opposite the base. The only doubtful use of these terms is that with respect to the pronotum, the *tip* in this case being the posterior extremity.

second angle, which enables the insect to draw the tibia upward into the channel of the femur.

The posterior tibiæ are furnished at the apex with about four strong spines, pointing downward, to give secure footing in leaping. The posterior face is furnished for about two-thirds of its length from the apex with two rows of spines, one row on each margin.

The organs of flight consist of two upper wings, *elytra*,* and two under wings, to which the name *wings* (*alæ*) is usually applied.

The *elytra* (Fig. 1, *el*) are generally in the form of an elongate oval, or an elongate parallelogram narrowed at the base and rounded at the apex. In the perfect insect they usually reach to or extend beyond the tip of the abdomen; but there are numerous exceptions to this rule, in many species being much shorter than the abdomen, and in a few wholly wanting. When the *elytra* are absent, the wings are also absent. When folded and at rest a portion lies horizontally upon the back, the remainder and much the larger portion being deflexed vertically against the sides of the abdomen. The upper edge, which forms the margin of the suture along the back when they are closed, is usually termed the *posterior* or *anal margin* by most authors, as they consider them spread; but I usually employ the word "upper" in alluding to this portion, as I consider them closed when describing them. I also usually call the opposite edge the *lower margin*—by most authors named the *costal* or *anterior margin*. The area of each *elytron* is divided into three *fields* by two strong longitudinal nerves; the larger of these nerves (or veins, as they are sometimes called), which runs a little distance from and sub-parallel to the anterior or lower margin, is the *externo-median* nerve; the other, which runs from near the middle of the base obliquely upward toward the posterior or upper margin, usually reaching it a little beyond the middle, is the *interno-median* nerve. The three fields into which the area is divided have received different names in order to designate them without circumlocution: The *anal*, *posterior*, or *upper* field is the portion between the interno-median nerve and upper margin, and rests horizontally on the abdomen when the *elytra* are closed. The *anterior*, *marginal*, or *lower* field is the portion between the externo-median nerve and lower margin, being the lower area on the side when the *elytra* are closed. The *discoïdal*, *intermediate*, or *middle* field is the space between the two nerves mentioned; it is very often referred to simply

*By some authors these are termed *hemelytra*, by others *tegmina*. Walker usually calls them *fore-wings*.

as the *disk* of the elytra. The *angle* of the elytra is the longitudinal ridge formed along the interno-median nerve by the sudden flexure from the horizontal to the vertical portion when closed.

When describing the wings they are supposed to be fully spread (Fig. 1, *wg*).^{*} The terms *disk* and *base* are sometimes, though not properly, used interchangeably, referring to the moiety of the wing next the body. At other times *disk* is properly applied to the middle portion. I use the term *sub-marginal area* to designate that portion between the anterior margin and next strong nerve; *margin*, when used without any qualification, signifies the front margin. The *nerves*, or *veins*, are the ribs which run from the base to the outer margin,[†] and form the lines of plication when at rest. The *nervules*, or *veinlets*, are the minute transverse ribs running from one nerve to another. When these are placed regularly like the rounds of a ladder, they are called *scalariform*. In many species, especially of *Ædipodini*, the basal half of the wing is colored red, yellow, or some other bright color, which is often bounded exteriorly by a black or fuscous band, extending across the face from the anterior to the posterior margin, generally curving along the latter to or toward the *posterior* or *anal angle*; in other species the greater portion of the wing is black or fuscous, while in a large number the entire wing is pellucid.

The *abdomen* is the posterior part of the body which is attached to the metathorax (see Fig. 1, *ab*). It is generally sub-convex on the under side, and slightly compressed laterally or sub-carinate above. It is composed of some eight or nine corneous rings or segments, which decrease in size toward the apex (though in some genera, as *Caloptenus* and *Pezotettix*, the terminal segments of the male are somewhat enlarged). The typical number of segments of the abdomen, according to Lacaze-Duthiers ‡ (who is followed by Dr. Packard in his "Guide to the Study of Insects"), is eleven. But if we count the dorsal segments in the female to and including the point where the upper and lower plates separate for the extrusion of the ovipositor, there are really but nine. It is true that the ninth, which folds over the upper valves of the ovipositor, shows two transverse folds besides the terminal piece over which the pre-anal plate rests; each of these is counted as a segment by Lacaze-

^{*} Only the portion of the wing next the base is here shown, the apical half being omitted.

[†] In Fig. 1 these appear as rays running outward from the point where the abdomen joins the thorax; those from *wg* back to the abdomen belong to the wing.

[‡] Ann. des. sci. nat. XVII, 1852, (recherches sur l'armure génitale féminine des insectes orthoptères), 207.

Duthiers, thus making the eleven; but the incisions marking these folds are incomplete, not reaching the lower margin of the plate. Between the second of these folds and the terminal piece on each side issues a short process, not extending beyond the apex of this piece; these appendages are the *cerci* (Fig. 1, *cr*).

Fischer* says the abdomen in both the male and female consists of nine distinct segments. Westwood† remarks that the inferior surface of the abdomen in the male consists of eight segments, but only of seven in the female. Lacaze-Duthiers says the sub-genital plate is formed by the seventh *sternite* (ventral segment); yet, in his figure, Pl. XII, Fig. 1, it is marked as the eighth. If we consider the piece which projects forward into the posterior margin of the metasternum (see Pl., Fig. 8, the square piece in the middle of the posterior margin with an oblong projection forward), as belonging to the venter, and as representing the first sternite, which I am inclined to think it does, then there are eight ventral segments (sternites) in the female and nine in the male.

Each abdominal ring is, or is supposed to be, composed of six pieces soldered together, three to each lateral half; but, for all the purposes of the present work, we may consider them as composed of but two pieces or plates—an upper or dorsal plate called the *tergite* or *dorsal segment*, and the lower plate called the *sternite* or *ventral segment*. The under surface of the abdomen as a whole is the *venter*.

On each side of the basal segment is a large cavity, either of a semi-orbicular or lunar shape, which is closed on the inside by a very slender skin of a whitish color. This is the *tympanum*, and is supposed by some entomologists to have a certain influence upon the act of stridulation, while others believe it to be the organ of hearing; the latter appears to be the more generally received opinion at present.

The apex of the ventral portion in the males curves upward somewhat in the form of the prow of a vessel; this curved portion, in some species, appears to form the last ventral segment (sternite), but in others a transverse impression is seen separating the apical surface from the rest. This apical portion has received several different names; as, *sub-genital lamina*, *sub-anal plate* (Fig. 2, *sap*), &c. In some genera and species (*Tryxalis*, *Mesops*, some *Opomala*, &c.), the tip is entire; while in others it is notched.

* Orthop. Europ., 286.

† Mod. Classf. Insec., I, 457.

The *pre-anal lamina* or *super-anal plate* is the triangular piece which in both sexes lies over the anal aperture.

The *ovipositor* (Fig. 1, *ov*) of the female consists of four corneous pieces, two of which curve upward and two downward, usually called the *valves*; but Lacaze-Duthiers, who has made the genital organs a special study, applies different names to the separate pairs, thus: the upper pair are his *episternites*, because they are above the little central piece, which he considers the representative of the ninth sternite; the lower pair are his *tergo-rhabdites*.*

Dr. Packard† says, "The ovipositor, with its accessory pieces, consists of a sub-genital plate formed by the seventh sternite; the ninth segment is complete, and the blades (*tergo-rhabdites*), composing the ovipositor, consist of three secondary pieces united together between them."

INTERNAL STRUCTURE.

It is impossible to convey a correct idea of the internal structure without the aid of figures, which I am unable to give in the present work; and, moreover, I have nothing to add to what has already been published by Marcel de Serres, Burmeister, Léon Dufour, Siebold, Lacaze-Duthiers, and others, yet the following general statements may be of some interest to the young entomologist into whose hands this work may fall.

The nervous system, according to Léon Dufour,‡ consists of a double nervous chord, extending from the head to the tip of the abdomen along the lower part of the body, expanding at various points into ganglia, which emit a greater or less number of branches to the right and left. These ganglia are classed in three groups, according to the part of the body in which they are situated—*cephalic*, *thoracic*, and *abdominal*. The cephalic ganglion is the largest of the number, and is deeply emarginate in front, giving it the appearance of being somewhat bilobed; in *Tryxalis* this feature appears to be most strongly marked. In each of the thoracic divisions there is a ganglion, that of the metathorax presenting the largest number of branches. The abdominal ganglia, of which there are some six or seven, are all small except the last, which is next in size to that of the head, emitting to each side three important branches, connected, doubtless, with the generative organs. This

* Why he calls these *tergo-rhabdites*, when they are below the sternite, I do not understand (see his Plate XII, Fig. 2, *i*).

† Guide to Study Ins., 567.

‡ Recherches sur les orthoptères, &c., Inst. de France, tom. 17, 1841.

system is more prominently developed in the *Acrididæ* than in any other family of the order, which has induced Léon Dufour to give them the highest rank in the order.

The digestive system consists of an alimentary canal extending almost direct from the mouth to the extremity of the abdomen, which is divided by constrictions into four apartments or divisions. The first (*œsophagus*) is somewhat inflated in its posterior half, giving it a sub-conical shape, and is contained in the thorax. The *proventriculus* proper, which is found in other families of this order, is wanting in the *Acrididæ*, its functions, according to Léon Dufour, being performed by the *pyloric valve*, which is situated at the posterior extremity of the first portion, where it joins the next. The second, according to the author named, is the *chylific ventricle*, and is the longest portion of the canal, though not more expanded than the posterior portion of the *œsophagus*; its form is sub-cylindrical. The two last divisions are somewhat smaller than the previous ones, and constitute the intestines. The hepatic organ consists of a number of simple, elongate, cylindrical filaments, uniting with the digestive apparatus at the junction of the second and third apartments.

The salivary glands are but slightly developed in this family, reaching their simplest form in the *Tettiginæ*.

The respiratory apparatus of the *Acrididæ* does not differ materially from that of other insects, consisting of a number of elastic anastomosing tubes or tracheæ, which have their origin and communicate with the external air at the stigmata, or little mouths, one of which is placed on each side of the thoracic and first eight abdominal segments.

The ovaries consist of two tubes, which are attenuate for a short distance near the base (posterior extremity, where they unite), but beyond which they are inflated, terminating at the extremity in a long, slender, cylindrical tube. From the inner side of the inflated portion extend a number of multilocular tubes, tapering to the extremity; these, when fully expanded, resemble, in their position and appearance, with regard to the main tubes, the teeth of a comb; but their natural position is one of great beauty, folded together from each side, with their points projecting forward, appearing like delicate chains. The seminal receptacle consists of a pedunculated vessel, whose closed extremity is dilated into a pea-shaped vesicle, forming the *capsula seminis*.

It has been repeatedly stated that the species of this family lay their

eggs in a cocoon-shaped mass, covered with a tough, glutinous secretion, varying in number from fifty to one hundred. This may be a very common method, but is by no means universal. It is the method followed by the migratory locusts of Europe, and, from what I learn, I am satisfied it is the same with the destructive migratory species (*Caloptenus spretus*) of the West; but it is not the method followed by *Acridium americanum*, which I have noticed digging into and depositing its eggs in the hard-trodden ground. I have also obtained the eggs of *C. femur-rubrum* in rotten wood, where they were placed, without any apparent regularity, and without connection by any glutinous secretion. Mr. S. I. Smith has noticed the same thing in regard to *Chlœältis conspersa*, except that the eggs are placed in two rows.

All the species, so far as I am aware, lay elongate-cylindrical eggs, those of *Chlœältis conspersa*, according to Mr. Smith, being about 0.25 of an inch in length, while those of *Ædipoda corallipes*, according to my own observations, are about 0.30 of an inch long, and slightly bent. The young of the latter species, just before leaving the eggs, are exactly like the young larva, the legs being neatly folded against the sides of the venter and sternum, the tarsi resting against the sternum; the antennæ are laid down over the sides of the face.

The eggs are usually laid in the latter part of the summer or in autumn, and remain in their place of deposit until the following spring or summer, when they are hatched; yet it would appear, from the number of larvæ we often see late in autumn, that some species in the southern and central portions of the United States produce more than one brood in the year; but our information is not sufficient to speak positively on this point.

These insects attain their full growth by simple moltings, the larvæ and pupæ resembling the perfect form, except in size and development of the wings. According to Zinnani, the Italian *Calopteni* undergo their first molting about the fortieth day after exclusion from the egg, the second about twenty days afterward, and the third about sixteen days later; but the number of moltings does not appear to be uniform in the different genera, six being the number usually given by the different authors. According to Köppen,* *Pachytylus migratorius* moults four times, the fourth moult producing the perfect insect.

The sounds which are made by the Acrididæ, according to Mr. Scudder and

*Horæ Soc. Ent. Ross., iii., pp. 89-246, teste Zool. Rec., IV, (1867). 459.

Landois are produced in two ways: first, by rubbing the inner surface of the hind legs against the outer surface of the elytra; and, second, by rubbing together the upper surface of the front edge of the wings and the under surface of the elytra. According to Landois,* the inner surface of the hind femur is furnished along the lower margin with a longitudinal row of minute, elegant, lancet-shaped, elastic teeth, varying in number from eighty-five to ninety-three, which are scraped across the nerves of the elytra, thus producing sound.

The species which employ the first method stridulate while at rest, producing a low buzzing sound; this is the usual, though not universal, method of the *Stenobothri*. Those *Acrididæ* which produce sounds by rubbing their wings and elytra together, stridulate only during flight, and, as remarked by Mr. Scudder,† “are nearly all confined to the genus *Ædipoda*,” producing a sharp crackling sound, resembling the noise of burning stubble.‡ Each species appears to have its peculiar note, so that, having a knowledge of the Orthoptera of a given locality, we can at once distinguish the species by the sound made. The soft, pattering sound made by some species of *Acridium* and *Caloptenus* during flight is probably due simply to the beating of the air by the wings, as it does not appear to be confined to sex; the males only of grasshoppers being furnished with apparatus for producing notes.

* Zeitschrift für wissenschaft. Zoolog., XVII, 1867, 117.

† Proc. Bost. Soc. Nat. Hist., XI (1867), 313.

‡ From this fact we may safely conclude that the species mentioned in the Book of Joel was an *Ædipoda*, and most probably *Ædipoda* (*Pachytylus*) *migratoria*.

EXPLANATION OF WOOD-CUTS.

Acridium americanum, Drury (Figs. 1 ♀ and 2 ♂).

Fig. 1.

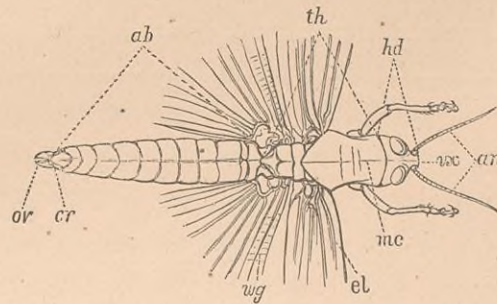


Fig. 1.—*hd*, head; *th*, thorax; *ab*, abdomen; *an*, antennæ; *vx*, vertex; *mc*, median carina of the pronotum; *el*, elytra; *wg*, wing; *cr*, cerci; *ov*, ovipositor.

Fig. 2.

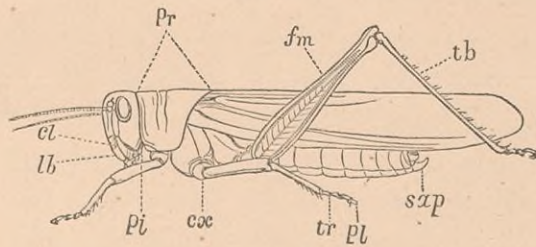


Fig. 2.—*cl*, clypeus; *lb*, labrum; *pi*, palpi; *pr*, pronotum; *cx*, coxa; *fm*, femur; *tb*, tibia; *tr*, tarsus; *pl*, pulvillus; *sap*, sub-anal plate.

CLASSIFICATION.

Although I have devoted much time to the study of the *Orthoptera* for a number of years past, yet my opportunities for examining exotic species and types of foreign genera have been too limited to enable me to form an arrangement of the various divisions and subdivisions wholly satisfactory to myself. Yet in a work of this kind, as some system must necessarily be adopted, it is proper that I should indicate that which I prefer, as it must, to a greater or less degree, determine the characters selected to distinguish the different groups, and the comparative value I attach to them.

It is comparatively easy to arrange the different families and groups of *Orthoptera* in a continuous series, if we select some prominent character, and confine ourselves to its form or development; but when we attempt to classify according to the development of the entire insect in its various stages—that is, according to a natural system—we experience great difficulty, and consequently find entomologists arriving at very different conclusions. If we select alternately the external anatomy, the nervous system, digestive apparatus, genital organs, &c., we shall find that each will lead to a result different from the others. For example, if we take the nervous system as our guide, the result will be to place the *Acrididæ* at the head of the order, and, according to Léon Dufour, the *Orthoptera* at the head of the class. On the other hand, if we examine the digestive apparatus, we find the salivary glands and alimentary canal of the same family the least developed of any in the order, except possibly the *Forficulidæ*. Lacaze-Duthiers, who has studied with much care the genital organs of the various orders, states that, if we take the development of the ovipositor as a guide, the divisions of this order will arrange themselves as follows: *Locustidæ*, *Gryllidæ*, *Mantidæ*, *Phasmidæ*, *Blattidæ*, *Acrididæ*, *Forficulidæ*; thus placing all the families of the non-saltatorial genuine *Orthoptera* between the two sections of the *Saltatoria*. If we take the embryological development as a guide, I am inclined to think, judging from the shape of the egg in the different families and the embryo of the *Acridii*, that the *Locustidæ* would stand near the head, while the *Acrididæ* would drop to the foot; but the embryology has not been sufficiently studied

to speak with confidence on this point, yet this conclusion corresponds precisely with the result of Lacaze-Duthiers's examination of the genital organs. These contradictions are so well balanced that the preponderance is not sufficiently marked to form the basis of a system of classification; and hence we find the families arranged by different authors in almost every possible combination.

Before presenting some of these arrangements as examples of the foregoing statements, it is, perhaps, proper that I should state, that while I do not hold the Darwinian doctrine of development by natural selection, yet I am rather disposed to accept the idea of "acceleration and retardation" in a somewhat modified form, and as limited within the range of the different "branches." Yet this theory has for its basis, and is really but a slight modification of the opinion, long held by many naturalists, that the highest form of a given type (one of the grand divisions of the animal kingdom), in its passage from the germ to the adult state, assumes for a time the lower and intermediate forms of that type.

This theory, properly limited and modified, I am disposed to accept, even with the additional ideas of acceleration and retardation; yet this I believe to be wholly distinct from and incompatible with the theory of absolute development of higher from lower forms, as generally understood. I would not have alluded to this subject in this work, except for the fact that at the present day all attempts at classification appear to be more or less influenced by the opinion entertained in regard thereto.

In a natural arrangement the various groups stand exactly in the same relation to each other that they would if developed from the lower to the higher forms; and this must necessarily be the case, whether the doctrine of development be true or false.

The position of the *Acrididæ* in the division *Articulata* will be found by tracing the various subdivisions as follows, the order given being descending:

	{	Class Insecta.
Grand division Articulata		Class Crustacea.
		Class Annelides.

The highest of these three classes is Insecta, which is again divided into three subordinate divisions, as follows:

	{	Sub-class Insecta.
Class Insecta		Sub-class Arachnida.
		Sub-class Myriapoda.

The sub-class Insecta, or true hexapod insects, is the highest in this series. It divides into orders, as follows:

I. Those in which metamorphosis is distinct :

1. Pupa inactive :

Orders : Hymenoptera, Coleoptera, Lepidoptera, Diptera.

2. Pupa active :

Orders : Hemiptera, Orthoptera.

3. Pupa variable :

Order : Neuroptera.

II. Those which do not undergo metamorphosis :

Orders : Anoplura, Thysanura.

The order given here is considered as descending, but the arrangement of the series is by no means a settled question with entomologists. I prefer that of Dr. Packard, given in his "Guide to the Study of Insects," to any other which I have seen. This system, starting with the Neuroptera as the lowest in the scale, ascends in two branches—one through the Diptera and Lepidoptera to the Hymenoptera; the other through the Orthoptera and Hemiptera to the Coleoptera, the latter branch not reaching quite as high a point as the other. He places the Orthoptera, not directly above the Neuroptera, but sub-parallel to that order.

Illustrating the positions and relations of these various groups by the idea of development of the higher from the lower, and omitting the intermediate steps, we would consider the Orthoptera as arising from the Crustacea, the intermediate non-metamorphosing groups—*Anoplura* and *Thysanura*—as representing those which had been retarded, and as connecting more directly with the *Neuroptera*. Following out this idea, I would, as a matter of course, so arrange the various families of *Orthoptera* as to bring those which approach nearest to the Crustacean form to the foot of the series, except so far as necessarily modified by organization and development. And this brings us again to the consideration of the arrangement of the various families of the order.

Linnæus,* in the later editions of his "Systema Naturæ," separates the *Forficula* from the rest of the *Orthoptera*, and unites them with the *Coleoptera* as its last genus. The rest of the order he places under Hemiptera, thus :

* For a more complete statement of the arrangement by Linnæus, see Mr. Scudder's paper on the "Arrangement of the families of Orthoptera," Proc. Bost. Soc. Nat. Hist., XII (1869), 228.

1. *Blatta*.—(Blattidæ.)
2. *Mantis*.—(Mantidæ and Phasmidæ.)
3. *Gryllus*.—(Gryllidæ, Locustidæ, and Acrididæ.)

The third group, which embraces the three families Gryllidæ, Locustidæ, and Acrididæ of the present day, he divides as follows:

1. *Acrida*.—Head conical, as long as the thorax; antennæ ensiform.
(Acrididæ in part.)
2. *Bulla*.—Thorax carinate; antennæ shorter than the thorax; filiform.
(Acrididæ in part.)
3. *Acheta*.—Tail with two setæ.
(Gryllidæ.)
4. *Tettigonia*.—Tail of the female sword-bearing; antennæ setaceous.
(Locustidæ.)
5. *Locusta*.—Tail simple; antennæ filiform.
(Acrididæ in part.)

Westwood, in his "Modern Classification of Insects," separates the Forficulidæ from the rest of the Orthoptera, and raises it to a distinct order, to which he applies the name Euplexoptera, placing it next the Coleoptera; the remaining families are arranged in the following descending series:*

Sec. I. Cursoria.....	Blattidæ.						
Sec. II. Raptoria.....	Mantidæ.						
Sec. III. Ambulatoria.....	Phasmidæ.						
Sec. IV. Saltatoria.....	<table style="border: none; display: inline-table;"> <tr> <td style="font-size: 2em; vertical-align: middle;">}</td> <td style="padding-left: 5px;">Achetidæ (Gryllidæ).†</td> </tr> <tr> <td style="font-size: 2em; vertical-align: middle;">}</td> <td style="padding-left: 5px;">Gryllidæ (Locustidæ).</td> </tr> <tr> <td style="font-size: 2em; vertical-align: middle;">}</td> <td style="padding-left: 5px;">Locustidæ (Acrididæ).</td> </tr> </table>	}	Achetidæ (Gryllidæ).†	}	Gryllidæ (Locustidæ).	}	Locustidæ (Acrididæ).
}	Achetidæ (Gryllidæ).†						
}	Gryllidæ (Locustidæ).						
}	Locustidæ (Acrididæ).						

Serville, in his "Histoire des orthoptères," adopts the following arrangement, which, according to Fischer, is ascending:

Sec. I. Cursoria.....	<table style="border: none; display: inline-table;"> <tr> <td style="font-size: 2em; vertical-align: middle;">{</td> <td style="padding-left: 5px;">Forficulariæ.</td> </tr> <tr> <td style="font-size: 2em; vertical-align: middle;">{</td> <td style="padding-left: 5px;">Blattariæ.</td> </tr> <tr> <td style="font-size: 2em; vertical-align: middle;">{</td> <td style="padding-left: 5px;">Mantides.</td> </tr> <tr> <td style="font-size: 2em; vertical-align: middle;">{</td> <td style="padding-left: 5px;">Phasmidæ.</td> </tr> </table>	{	Forficulariæ.	{	Blattariæ.	{	Mantides.	{	Phasmidæ.
{	Forficulariæ.								
{	Blattariæ.								
{	Mantides.								
{	Phasmidæ.								

* Fischer (Orthop. Europ., 291) evidently alludes to this arrangement of Westwood as ascending; but this is certainly a mistake, as he expressly places Orthoptera below Coleoptera, and connects by Forficulidæ (Euplexoptera) Mod. Classf., I, 29.

† The names in parentheses are the present equivalents of those opposite, thus: the Achetidæ of Westwood is our Gryllidæ, &c.

Sec. II. Saltatoria } Gryllides.
 } Locustariæ.
 } Acridites.

Burmeister, in his "Handbuch der Entomologie," excludes the Forficulidæ, forming them into an order under the name Dermaptera, and arranges the other families in the following ascending series ;

Blattina.
 Mantodea.
 Phasmodea.
 Acridiodea.
 Locustina.
 Gryllodea.

Mr. Scudder adopts substantially the same order in his paper on the "Arrangement of the families of Orthoptera,"* which is there given in the following descending series :

Gryllides.
 Locustariæ.
 Acrydii.
 Phasmida.
 Mantides.
 Blattariæ.
 Forficulariæ.

Fischer de Waldheim † excludes Forficulidæ, and places the other families in the following order :

Blattidæ.
 Mantidæ.
 Phasmidæ.
 Gryllidæ.
 Locustidæ.
 Acrididæ.

L. H. Fischer, in his "Orthoptera Europæa," removes the Forficulidæ, for which he adopts the name Labiduroidæ of Dumeril, and arranges the remaining families in the following ascending order :

* Proc. Bost. Soc. Nat. Hist., XII (1869), 228.

† I have not seen his work.

Sec. I. Cursoria.....	Blattina.
Sec. II. Gressoria.....	{ Mantodea. Phasmodea.
Sec. III. Saltatoria.....	{ Gryllodea { Gryllodea fossoria. Gryllodea genuina. Locustina. Acridiodea.

Fieber's arrangement* is as follows (supposed to be descending):

Tribe I.—Orthoptera genuina :

Sec. I. Cursoria.....	Blattina.
Sec. II. Gressoria.....	{ Mantodea. Phasmodea.
Sec. III. Saltatoria.....	{ Acridiodea. Locustina. Gryllodea.
Sec. IV. Fossoria.....	{ Gryllotalpina. Xyodea.

Tribe II.—Harmoptera Forficulina.

Walker, in his "Catalogue of the Saltatorial Orthoptera (Dermaptera)," remarks that he prefers the system of Fischer, who considers *Acridium* to represent the highest group.

The latest and perhaps the best arrangement (if it is to be considered as descending) is that of M. Brunner de Wattenwyl, as follows, and is simply a reversal of the arrangement of Burmeister and Scudder :

Forficularia.
Blattaria.
Mantodea.
Phasmodea.
Acridiodea.
Locustodea.
Gryllodea.

At the time my "Notes on the Saltatorial Orthoptera of the Rocky Mountain Regions" was written I had not seen, or, at least, my attention had not been called to, this system of Brunner de Wattenwyl. If it is considered as descending, it agrees exactly with the order I adopted in that paper, which

* Grundlage zur Kenntniss der Orthopteren Oberschlesiens, von Oberlehrer Kelch.

is as follows, and which, as yet, I see no reason for changing, although, as there stated, I have some doubt as to the proper position of the Forficulidæ :

Sub-order I.—Pseudo-Orthoptera Fam. 1.—Forficulidæ.

Sub-order II.—Orthoptera genuina :

Tribe 1. Cursoria Fam. 2.—Blattidæ.

Tribe 2. Gressoria { Fam. 3.—Mantidæ.
Fam. 4.—Phasmidæ.

Tribe 3. Saltatoria :

Sec. 1. Brevicaudes Fam. 5.—Acrididæ.

Sec. 2. Ensicaudes { Fam. 6.—Locustidæ.
Fam. 7.—Gryllidæ.

While I believe this is the most natural arrangement of the genuine Orthoptera that can be adopted, I do not consider the series as continuous throughout, but look upon the Locustidæ and Gryllidæ as parallel to each other, some genera of the former standing higher in the series than any of the latter, while other genera reach, perhaps, a lower point in the scale.

The arrangement of the subdivisions of the Acrididæ, although differing considerably in the works of the various authors, yet, in regard to the relative position of the groups, has been subject to much less variation.

I give below some examples illustrating the method which has been adopted in reference to these subdivisions.

Linnæus, in the 13th edition (12th reformed) of his "Systema Naturæ," divides this family into three groups :

- * Head conical, longer than the thorax; antennæ ensiform *Acrida*.
** Thorax carinated; antennæ shorter than the thorax; filiform *Bulla*.
*** Tail simple; antennæ filiform *Locusta*.

The first of these corresponds to Truxalides, the second to Acrydia, and the third to Grylli of Fabricius.

Serville's arrangement is as follows :

- I. A pulvillus more or less distinct between the claws of the tarsi;
mouth not covered. *Spongiphori*.
A. Antennæ sub-conic, not more than 8 joints, shorter than the
head, which is pyramidal or horizontal; body always apterous.. *Proscopides*.
B. Antennæ as long or longer than the head, and prothorax united,
multi-articulate:
a. Face more or less oblique; antennæ ensiform; head pyr-
amidial or prolonged in front. *Truxalides*.

b. Face vertical :

- * Antennæ rarely ensiform; their joints distinct; vertex flat, triangular; front advanced between the antennæ in a blunt cone *Conophori*.
 ** Antennæ filiform or setaceous; articles indistinct; front convex. *Acridites*.
 =. Prosternum spined *Mucronati*.
 = =. Prosternum unarmed *Mutici*.

- II. Pulvilli absent; mouth covered; pronotum extending over the abdomen *Tetricidites*.

Burmeister's arrangement cannot be shown without inserting his entire list of genera; but as it is that upon which Mr. Scudder's is based, I give the entire synoptical table :

- I. Hind legs saltatorial; femora enlarged at the base :
- A. Anterior margin of the prosternum not elevated, truncate :
- a. Antennæ 6-7-jointed; each sex apterous *Proscopia*.
 b. Antennæ more than 8-jointed :
1. Antennæ distinctly acuminate :
- a. Joints of the antennæ triquetrous *Truxalis*.
 aa. Joints of the antennæ flat; margins acute; prosternum armed :
 b. Pronotum cylindrical; median carina slightly elevated *Copiocera*.
 bb. Pronotum cristate :
- c. Each margin acute; each sex winged; antennæ ensiform *Xiphocera*.
 cc. Each margin rounded; male, winged; female, apterous or sub-apterous; antennæ moniliform at the apex *Pamphagus*.
 bbb. Pronotum flat; median carina elevated *Rhomalea*.
 aaa. Joints of the antennæ terete, globose, or claviform *Pæcilocera*.
2. Antennæ not acuminate toward the apex; either filiform or clavate.
- a. Prosternum spined; mandibles and maxillæ acutely dentate :
 b. Median carina of the pronotum much elevated; the lateral margins rounded :
- c. Median carina cristate behind *Monachidium*.
 cc. Median carina cristate in front or equally elevated *Acridium*.
 bb. Median carina scarcely elevated :
- c. Margins of the pronotum acute :
- d. Face oblique *Oxya*.
 dd. Face vertical *Caloptenus*.
 cc. Margins of the pronotum rounded; no median carina *Ommatolampis*
 aa. Prosternum not spined; mandibles not dentate; maxillæ obtusely dentate ;
 b. Head obtuse, perpendicular *Ædipoda*.
 bb. Head sub-acute; face deflexed *Gomphocerus*.
- AA. Anterior margin of the prosternum elevated; mouth covered :
- a. Each sex winged :
 b. Pulvilli between the claws of the tarsi *Ommexecha*.
 bb. Pulvilli absent *Tetrix*.
 aa. Each sex apterous *Batrachotetrix*
- II. Posterior legs scarcely saltatorial; femora not enlarged at the base .. *Pneumora*.

The following are the larger sections of Fischer's synoptical arrangement of the European Acridii in his "Orthoptera Europæa:"

- I. Anterior margin of the prosternum truncate, not elevated:
- A. Antennæ triquetrous near the base, acute toward the apex, rarely filiform; elytra and wings present. (This includes *Tryxalis*, *Pyrgomorpha* and *Opomala*.)
- B. Antennæ depressed or sub-filiform (rarely clavate or sub-clavate at the apex):
- a. Prosternum unarmed. (This includes *Chrysochraon*, *Oxycoyphus*, *Paracinema*, *Stenobothrus*, *Epacromia*, *Stauronotus*, *Edipoda*, *Sphinctonotus*, *Pachytylus*, *Thrinax*.)
- b. Prosternum with an equally elevated protuberance, not standing out free. (Includes *Stetheophyma*, *Parapleurus*.)
- c. Prosternum distinctly spined. (Includes *Porthetis*, *Cuculligera*, *Acridium*, *Caloptenus*, *Pezotettix*, and *Platyphyma*.)
- II. Anterior margin of the prosternum elevated; the mouth inclosed by ample folds as with a muffler; meso- and meta-sternum transverse, arcuate:

- A. Each sex winged; pulvilli wanting..... *Tettix*.

Mr. Scudder indicates the following arrangement of the subdivisions in the tables at the end of his "Catalogue of the Orthoptera of North America:"

- I.....Proscopidæ.
- II.....Truxalidæ.
- III }Conophori { Xiphoceridæ.
- IV }Pœciloceridæ.
- V.....Mucronati.
- VI.....Mutici.
- VII.....Tetricides.

All of these sub-families, except the first, are represented in the North American fauna, and all, except the first and fourth, in the United States.

Walker's arrangement of the Acrididæ in his "Catalogue of the Dermaptera Saltatoria," is not complete; but as it is the most extensive that has been published, I insert it, so far as it refers to the larger subdivisions which he terms "limited families:"

- A. Claws of the tarsi furnished with pulvilli.....*Spongiphori*.
- a. Antennæ 6-8-jointed.....Fam. 1.—Proscopidæ.
- aa. Antennæ multi-articulate:
- b. Head produced; face very oblique:
- c. Elytra narrow.....Fam. 2.—Tryxalidæ.
- cc. Elytra broad.....Fam. 3.—Trigonopterygidæ.
- bb. Face sub-oblique or erect:
- c. Antennæ acuminate:
- d. Joints of the antennæ flat:
- e. Antennæ ensiform; females winged. Fam. 4.—Xiphoceridæ.
- ee. Antennæ moniliform near the apex. Fam. 5.—Pamphagidæ.
- dd. Joints of the antennæ terete.....Fam. 6.—Phymatidæ.

- cc. Antennæ filiform ; joints indistinct :
 d. Prosternum spined.....Fam. 7.—Acrididæ.
 dd. Prosternum unarmed.....Fam. 8.—Ædipodidæ.
 B. Claws of the tarsi without pulvilli.....Fam. 9.—Tettigidæ.

Brunner de Wattenwyl's plan, of which I have seen but a short abstract,* appears to vary considerably from all the foregoing. It may be indicated by stating that the North American genera, so far as named, would stand as follows; the first approaching the Phasmidæ and the last the Locustidæ: Tryxalis, Oxycoryphus, Chrysochraon, Stenobothrus, Gomphocerus, Stauronotus, Stetheophyma, Ædipoda, Pyrgomorpha, Tettix, Acridium, Pezotettix, Caloptenus, Platyphyma. Why Pyrgomorpha is taken away from the vicinity of Tryxalis, and placed after Ædipoda, and near to Tettix, I cannot possibly imagine, and am inclined to think that Walker has made some error in his list.

An examination of these different arrangements of the leading divisions of the family will show us that the authors agree in selecting the same leading characters by which to distinguish the principal groups. The first and most prominent of these is the strongly-marked difference between the Tettigi and the rest of the family. The extended pronotum, the elevated prosternum, covered mouth, and absence of pulvilli at once mark this as a separate group in the eyes even of an unscientific observer, each of these characters being peculiar to it, and any one of them sufficient to distinguish it from the rest of the family. This, therefore, will require us to divide the family into two chief divisions, which may very properly be termed *sub-families*, ACRIDINÆ and TETTIGINÆ.

In the Acridinæ, which is much the larger portion of the family, the prolongation of the head in front in the form of a cone or pyramid and the usually accompanying oblique face, form the chief characteristics of a large group, and as these reach the maximum in the Proscopini, and are accompanied by a slender body bearing a strong resemblance to the Phasmidæ, they are therefore very properly considered as forming the connecting link with that family.

So far we experience but little difficulty in our attempts to classify; but as we recede from the Phasmidæ in the direction of the Locustidæ, the head decreases in length, losing gradually its conical form, the face approaches the vertical position, and one after another of the accompanying characters fades

* Walk. Cat. Dermap. Salt., V, Supp., 114.

away, while others appear so gradually that it is difficult to fix the boundaries of the groups. The connection between the Proscopini and Tryxalini is sufficiently marked to bring them into conjunction in a continuous series; but passing downward from the latter, the question arises, shall we be guided by the sub-conic front, oblique face, and slender body, or shall we select, as ruling characters, the acuminate antennæ and prosternal spine? In the former case the *Ædipodini* must necessarily follow Tryxalini, and then we would scarcely be justified in thrusting a group between the *Ædipodini* and *Acridini*; yet *Xiphocerini* appears misplaced if located below either of these groups. Another difficulty, in arranging a single series, is experienced in forming the connection with the *Locustidæ*—not that we fail to find genera in the two which are sufficiently assimilated for this purpose—but, to do this the *Tettigi* must be thrown back into the middle of the family, as Walker indicates Brunner de Wattenwyl has done. Yet, any one who has studied this order must have noticed the strong resemblance between the *Tettigi* and *Tridactyli*; and the anatomical researches of Léon Dufour show this external similarity to be more than fancied, for he remarks, “The genus *Tetrix* (*Tettix*), founded by Latreille, appears to have been created by nature to serve as the connecting link between the *Tridactyli* and *Acridii*.” It is evident, then, if we are guided by these prominent characters, we must place the *Tettigi* as near as possible to the *Gryllidæ*, and that *Tettiginæ* as a sub-family must stand below (according to the descending series I have adopted) *Acridinæ* as a sub-family.

I have not had an opportunity of studying either the *Trigonopterygi* or *Xiphocerides*, and therefore hesitate to suggest an arrangement including these groups; nevertheless, I propose the following as perhaps approximating a natural arrangement of the various groups of *Acridinæ*:

I.—Sub-fam. ACRIDINÆ.

Divis. 1.—CONOCEPHALIDES.

Group 1.—*Proscopini*.

Group 2.—*Tryxalini*.

Group 3.—*Trigonopterygini*.

Divis. 2.—ORTHOCERIDES.

Group 4.—*Ædipodini*.

Group 5.—*Acridini*.

Divis. 3.—XIPHOCERIDES.

Group 6.—*Xiphocerini*

Group 7(?)—*Phymatini* (?).

II.—Sub-fam. TETTIGINÆ.

Group 8.—*Tettigini*.

By this arrangement the second and third divisions are considered as parallel, the former connecting with the first division by the form of the head, while the latter also connects with the first division by the form of the antennæ. As a matter of course, these characters are not the only affinities. By this plan the transition from *Tryxalis*, through *Opomala*, *Pyrgomorpha*, *Oxycoryphus*, *Stenobothrus*, &c., to the typical *Ædipodæ*, is natural and gradual; whether the same thing is true in regard to the other branch, I am unable to say.

As it is necessary in a synopsis or catalogue to form one continuous series, I shall place the groups in the order that they are numbered.

As will be seen, I use the termination *idæ* to designate the families; *inæ* to designate the sub-families; and *ini* for the next lower division; this appearing to conform to modern usage in other departments of zoology. By adopting this method, the comparative importance of the group is at once known by the termination of its name.

The relations of the sub-families and groups to each other may be seen by the following somewhat artificial synoptical table:

- I. Anterior margin of the prosternum truncate, not elevated; claws of the tarsi furnished with pulvilli; pronotum shorter than the abdomen. Sub-fam. 1.—*Acridinæ*.
 - A. Antennæ 6-8-jointed; not longer than the head. Group 1.—*Proscopini*.
 - AA. Antennæ multi-articulate; longer than the head:
 - a. Head produced in front in the form of a cone or pyramid; face very oblique; antennæ ensiform, triquetrous:
 - b. Elytra narrow. Group 2.—*Tryxalini*.
 - bb. Elytra very broad. Group 3.—*Trigonopterygini*.
 - aa. Face sub-oblique or vertical:
 - b. Antennæ filiform, sub-depressed or clavate; joints indistinct:
 - c. Prosternum unarmed. Group 4.—*Ædipodini*.
 - cc. Prosternum spined. Group 5.—*Acridini*.
 - bb. Antennæ acuminate; joints distinct; front more or less advanced between the antennæ in the form of a blunt cone:
 - c. Joints of the antennæ flat. Group 6.—*Xiphocerini*.
 - cc. Joints of the antennæ terrete. Group 7.—*Phymatini*.
- II. Anterior margin of the prosternum elevated; claws of the tarsi without pulvilli; pronotum extending to tip of the abdomen. Sub-fam. 2.—*Tettiginæ*.
 - A. Prosternum unarmed. Group 8.—*Tettigini*.

In this arrangement the two groups, Xiphoceridæ and Pamphagidæ, given by some authors are included in Xiphocerini, as the differences between the two do not appear sufficient to raise them to the dignity of groups; but I confess my lack of acquaintance with the generic forms belonging to these divisions.

All of these groups, except the first, third, and seventh, have representatives in North America, and also in the more limited Orthopteral fauna of the United States, as will be seen by reference to the following synoptical table of genera:

*Classification of North American Genera.**

I.—Sub-fam. ACRIDINÆ.

Group 1.—*Proscopini*.

Has no representatives in North America.

Group 2.—*Tryxalini*.

Genera: *Tryxalis*, *Achurum*, *Mesops*, *Opomala*, *Ichthydion*, *Pegasidion*, *Sphenarium*, *Pyrgomorpha*.

Group 3.—*Trigonopterygini*.

Has no representatives in North America.

Group 4.—*Ædipodini*.

Genera: *Hippiscus*, *Machærocera*, *Oxycoryphus*, *Chrysochraon*, *Acrolophitus*, *Pedi-oscertetes*, *Stenobothrus*, *Gomphocerus*, *Stetheophyma*, *Tragocephala*, *Tomonotus*, *Ædipoda*, *Tropidolophus*, *Hippopedon*, *Stauronotus*, *Leprus*, *Boöpedon*, *Brachypeplus*.

Group 5.—*Acridini*.

Genera: *Dactylotum*, *Pezotettix*, *Platyphyma*, *Ommatolampis*, *Caloptenus*, *Pæpedetes*, *Pedies*, *Calacris*, *Chromacris*, *Acridium*, *Tropidacris*, *Lophacris*, *Monachidium*.

Group 6.—*Xiphocerini*.

Genera: *Rhomalea*, *Xiphocera*.

Group 7.—*Phymatini* (?).

Has no representatives in North America (?).

II.—Sub-fam. TETTIGINÆ.

Group 8.—*Tettigini*.

Genera: *Tettix*, *Tittigidea*, *Batrachidea*, *Choriphyllum*.

I do not feel any great confidence in regard to the position of the following genera, named by Mr. Saussure, as I have seen neither figure nor speci-

* The genera in *italics* are represented in the United States fauna.

men of them: Achurum, Ichthydion, Hippopedon, Hippiscus, Leprus, Pœpedetes, Pedies, Pegasidion, and Machærocera—they are Mexican. I think, from Charpentier's figure and description of Dactylotum, that it belongs near Pezotettix, and, therefore, have placed it there. The transition from Acridini to Xiphocerini, by Lophacris and Rhomalea, would be gradual, but for the intervention of Monachidium; I am not acquainted with this genus, and have given it the present position at a venture. The passage to the Tettigi is abrupt, and, unless the gap is filled by newly-discovered forms, must necessarily remain so.

GEOGRAPHICAL DISTRIBUTION OF THE GENERA AND SPECIES OF NORTH AMERICAN ACRIDIDÆ.

It is somewhat difficult to determine the boundary-lines of the different North American Orthopteral districts, but the most natural appears to be the division into seven districts, as follows:

1. British America;
2. Eastern United States (from the west line of Missouri, or eastern border of the Great Plains, to the Atlantic coast);
3. The Rocky Mountain district;
4. The Pacific coast;
5. Mexico;
6. West Indies;
7. Central America.

I will, therefore, adopt this division, distinguishing between the northern and southern portions of Nos. 2 and 3 by the letters *n* and *s* in decided cases.

Distribution of the genera.

Tryxalis.....	2s	Pedioscertetes.....	3s
Achurum.....	5	Stenobothrus.....	1,2,3,5,6,7
Mesops.....	2,3	Gomphocerus.....	2
Opomala.....	2,3,5,6,7	Stetheophyma.....	1,2 <i>n</i>
Ichthydion.....	5	Tragocephala.....	2,3,4
Pegasidion.....	5	Tomonotus.....	3,5
Sphenarium.....	5,6	Tropidolophus.....	3
Pyrgomorpha.....	2s	Hippopedon.....	5
Hippiscus.....	5	Stauronotus.....	3
Machærocera.....	5	Œdipoda.....	1,2,3,4,5,6,7
Oxycoryphus.....	3,5	Leprus.....	5
Chrysochraon.....	1,2,3	Boöpedon.....	3
Acrolophitus.....	3	Brachypeplus.....	3,5

Distribution of the genera—Continued.

Dactyloctenium	5	Tropidacris	2s,5,7
Pezotettix	1,2,3,4,5	Lophacris	5
Platyphyma	3n,5	Monachidium	7
Ommatolampis	3,5	Rhomalea	2s,5
Caloptenus	1,2,3,4,5	Xiphocera	5
Pæpedetes	5	Tettix	1,2,3,5,6
Pedies	5	Tettigidea	2
Calacris	5	Batrachidea	2,5
Chromacris	2s	Choriphyllum	6
Aceridium	2,3,5,6,7		

Total number of genera, 45.

Distribution of species.

Tryxalis brevipennis, Thos.....	2s	Chrysochraon punctulatum, Thos..	2n
Achurum sumichrasti, Sauss	5	abdominalis, Thos...	3n
Mesops wyomingensis, Thos.....	3	Aerolophitus hirtipes, Thos.....	3
chlorizans, Thos.....	2s,5(?)	Pedioscertetes nevadensis, Thos...	3s
Opomala carinata, Thos	2	Stenobothrus occipitalis, Thos.....	3
aptera, Scudd.....	2n	coloradus, Thos.....	3
brachyptera, Scudd.....	2n,3n	tricarinatus, Thos....	3
punctipennis, Serv.....	2s	admirabilis, Uhl.....	2,3
bivittata, Serv.....	2s,3	subconspersus, Walk..	2s
neo-mexicana, Thos	3s	speciosus, Scudd.....	2n
varipes, Serv.....	2s	maculipennis, Scudd..	2,3
marginicollis, Serv	2s	æqualis, Scudd	2n
crassipes, Walk.....	5	bilineatus, Scudd....	2n
mexicana, Sauss.....	5	propinquans, Scudd..	2n
stenobothroides, Walk...	7	curtipennis, Scudd...	2,3
Ichthydion mexicanum, Sauss.....	5	clavatus, Thos.....	3
Pegasidion volitans, Sauss	5	occidentalis, Sauss...	2s
Sphenarium purpurascens, Charp..	5,6	brunneus, Thos.....	3
mexicanum, Sauss....	5	quadrimaculatus, Thos	3
Pyrgomorpha brevicornis, Walk...	2s	gracilis, Scudd	2,3
punctipennis, Thos..	2s	pelidnus, Thos	2n
Hippiscus ocelote, Sauss.....	5	mysticus, Sauss	5
Machærocera mexicana, Sauss.....	5	viatorius, Sauss	5
Oxycoryphus obscurus, Thos	3	gregarius, Sauss	6
toltecus, Sauss	5	tepanecus, Sauss.....	5
burkhartianus, Sauss.	5	mexicanus, Walk....	5
mexicanus, Sauss.....	5	decisus, Walk.....	6
aztecus, Sauss.....	5	arctatus, Walk.....	7
totonacus, Sauss.....	5	viridissimus, Walk...	7
zapotecus, Sauss.....	5	nobilis, Walk.....	5
montezuma, Sauss...	5	Gomphocerus simplex, Scudd.....	2n
tibialis, Walk	5	Stetheophyma lineata, Scudd.....	2n
Chrysochraon viridis, Thos.....	2	gracilis, Scudd....	1,2n
conspersum, Thos...	1,2	platyptera, Scudd..	2n

Distribution of species—Continued.

Tragocephala obiona, Thos.....	3	Ædipoda pardalina, Sauss.....	5
pacificæ, Thos.....	4	sumichrasti, Sauss.....	5
infuscata, Harr.....	2	mexicana, Sauss.....	5
viridifasciata, Harr..	2	tolteca, Sauss.....	5
Tomonotus sulphureus, Sauss.....	2,3	tentatrix, Walk.....	5
xanthopterus, Thos.....	2	speciosa, Walk.....	7
carinatus, Thos.....	2n	transtrigata, Walk.....	5
tenebrosus, Thos.....	2n,3	pallidipennis, Burm.....	5
mexicanus, Sauss.....	5	Lepus elephas, Sauss.....	5
nietanus, Sauss.....	5	Boöpedon nubilum, Thos.....	3
otomitus, Sauss.....	5	flavofasciatum, Thos....	3s
Tropidolophus formosus, Thos.....	3	Brachypeplus magnus, Girard.....	3
Hippopedon saltator, Sauss.....	5	virescens, Charp.....	5
Stauronotus elliotti, Thos.....	3	Dactylotum bicolor, Charp.....	5
Ædipoda venusta, Stål.....	4	Pezotettix obesa, Thos.....	3n
marmorata, Uhl.....	2n	picta, Thos.....	3s
costalis, Scudd.....	2s	glacialis, Scudd.....	1,2n
wyomingiana, Thos.....	3	manca, Smith.....	2n
collaris, Scudd.....	3	borekii, Stål.....	4
æqualis, Uhl.....	2	zimmermannii, Sauss....	2s
verruculata, Scudd.....	1,2n	longicornis, Sauss.....	2s
sordida, Burm.....	2,3	nebrascensis, Thos.....	3
longipennis, Thos.....	3s	unicolor, Thos.....	2
carolina, Serv.....	2,3	edax, Sauss.....	2s
fenestralis, Serv.....	2s	scudderi, Uhl.....	2
eucerata, Uhl.....	2n	borealis, Scudd.....	1,2n
haydenii, Thos.....	3	dodgei, Thos.....	3s
gracilis, Thos.....	3	septentrionalis, Sauss...	1
kiowa, Thos.....	3	mexicana, Sauss.....	5
cineta, Thos.....	3	sumichrasti, Sauss.....	5
plattei, Thos.....	3	Platyphyma montana, Thos.....	3n
maritima, Uhl.....	2n	azteca, Sauss.....	5
undulata, Thos.....	3	mexicana, Brunn.....	5
carlingiana, Thos.....	3	Ommatolampis viridis, Thos.....	3
trifasciata, Walk.....	3	mexicana, Sauss.....	5
hoffmannii, Thos.....	3s	Caloptenus turnbullii, Thos.....	3
neglecta, Thos.....	2,3	repletus, Walk.....	4
montana, Thos.....	3n	scriptus, Walk.....	4
corallipes, Hald.....	3	bilituratus, Walk.....	4
haldemannii, Scudd.....	3	fasciatus, Walk.....	
paradoxa, Thos.....	3	occidentalis, Thos.....	3
rugosa, Scudd.....	2,3,4(?)	punctulatus, Uhl.....	2n
discoidea, Serv.....	2	femur-rubrum, Burm. 1,2,3,4(?)	
phænicoptera, Germ.....	2,3	spretus, Uhl.....	1,2,3
parviceps, Walk.....	4	griseus, Thos.....	2n
atrox, Scudd.....	3n,4	bivittatus, Uhl.....	2,3
pellucida, Scudd.....	2n	differentialis, Thos.....	2,3
haitensis, Sauss.....	6	extremus, Walk.....	1

Distribution of species—Continued.

Caloptenus arcticus, Walk.....	1	Acridium olivaceum, Serv.....	6
selectus, Walk.....	5	Tropidacris dux, Scudd.....	2s,5,7
mexicanus, Walk.....	5	Lophaeris velasquezii, Scudd.....	5
borealis, Fieb.....	1	Monachidium superbum, Stål.....	7
Pœpedetes corallinus, Sauss.....	5	Rhomalea centurio, Burm.....	2s
Pedies virescens, Sauss.....	5	marci, Serv.....	2s
Calacris pudica, Walk.....	5	eques, Burm.....	5
Chromacris colorata, Walk.....	2s	pedes, Sauss.....	5
Acridium frontalis, Thos.....	3	pecticornis, Walk.....	5
unilineatum, Walk.....	2n	auricornis, Walk.....	5
rubiginosum, Harr.....	2s	Xiphocera pygmaea, Sauss.....	5
alutaceum, Harr.....	2n	inclarata, Walk.....	5
emarginatum, Uhl.....	2,3	Tettix granulata, White.....	1,2n
americanum, Dru.....	2s	ornata, Harr.....	2
ambiguum, Thos.....	2s	arenosa, Burm.....	2
obscurum, Burm.....	2s	cucullata, Burm.....	2
shoshone, Thos.....	3s	femorata, Scudd.....	2
inscriptum, Thos.....	6	triangularis, Scudd.....	2n
pectoralis, Thos.....	6	rugosa, Scudd.....	2s
concolor, Thos.....	5	oxycephala, Burm.....	2s
simulatrix, Thos.....	6	harrissii, Pack.....	2n
diversiferum, Thos.....	(?)	mexicana, Sauss.....	5
cubense, Sauss.....	6	chichimeca, Sauss.....	5
toltecum, Sauss.....	5	azteca, Sauss.....	5
picifrons, Walk.....	5	purpurascens, Serv.....	6
vitticeps, Walk.....	5	Tettigidea lateralis, Scudd.....	2
scutellare, Walk.....	5	polymorpha, Scudd.....	2
vicarium, Walk.....	5	Batrachidea cristata, Scudd.....	2n
strenum, Walk.....	5	carinata, Scudd.....	2n
varipes, Walk.....	6	tolteca, Thos.....	5
luridescens, Walk.....	7	Choriphyllum rhombeum, Walk.....	6
proprium, Walk.....	5	plagiatum, Walk.....	6
pantherinum, Walk.....	5		

Total number of species, 227.

NOTES ON SOME UNITED STATES SPECIES.

It is possible that *Tryxalis brevipennis* does not belong here; but, being found in a bottle of insects collected in Florida by Professor Glover, I have ventured to place it in our fauna.

Mesops chlorizans is an extreme southern form, Florida being the only place at which it has been found in the United States. It is quite probable that it is identical with *Opomala mexicana*, Sauss. *O. aptera*, Scudd., and *O. brachyptera*, Scudd., are the only northern species of the latter genus, which, as a whole, is southern. It is also worthy of notice that the northern species have the organs of flight much abbreviated or partially wanting.

The species of *Pyrgomorpha* are southern, Tennessee being the most northern and western locality at which they have been found.

Chrysochraon extends from Canada into the Southern States and as far west as the Rocky Mountains, but *C. abdominalis*, Thos., is the only species that has been observed west of the plains. The genus, as a whole, appears to be northern.

Acrolophitus and *Pedioscertetes* are western forms, the former being confined chiefly to the eastern base of the Rocky Mountains from the southern border of Colorado to Central Wyoming; the latter has been found only in the southeast part of Nevada.

Stenobothrus is represented throughout the greater portion of North America; *S. curtipennis*, Scudd., appears to be more widely distributed than any other species, extending from New England in the east, and Red River of the North in the central portion, south into the Southern States, and west to the Rocky Mountains. *S. admirabilis*, Uhl., is confined chiefly to a middle belt running west from Eastern Maryland to and even upon the plains of Kansas; it is possible it is found in the Southern States.

Stetheophyma has been observed only in the northeast and at the Red River settlements of British America.

Tragocephala is not a well-defined generic form; standing between the two chief divisions of the *Œdipodini*, it partakes somewhat of the characters

of both. It extends east and west from the Atlantic to the Pacific, but its northern and southern range is not known. *T. viridifasciata* is common from Maine to Mississippi and from Florida to Nebraska.

Tomonotus, although given here as a distinct genus, is by no means a well-defined group, some of the species approaching so near some *Ædipoda* that there are no generic characters by which to separate them. It is represented throughout the United States and in Mexico. The specimens of *T. sulphureus*, from the south (Tennessee especially), which I have examined, appear to have the crest of the pronotum slightly more elevated than those from more northern and western sections. *T. xanthopterus* and *T. carinatus* are probably only varieties of *T. sulphureus*.

T. tenebrosus is widely distributed over the west, from the western line of Minnesota south to Indian Territory, west to the Rocky Mountains, along which it ranges from New Mexico to Southern Montana.

The only species of *Stauronotus* found in the United States appears to be confined to the higher plains and plateaus of the Rocky Mountain regions.

Tropidolophus is represented by the single species *T. formosus*, first discovered and named by Mr. Say. It is confined to the plains along the east base of the Rocky Mountains in Colorado.

Ædipoda, even as at present generically restricted, is the widest spread genus of the entire family, and to it belong the earliest geological remains of the family. It contains some of the most destructive species of the eastern continent; but in North America only one species (*Æ. atrox*) is known to be migratory, and this is confined, in its migrations, to California.

Æ. carolina, the most common and perhaps the best known species, is found everywhere throughout the United States, unless it be California; and I presume it is found there, but, so far, I have no positive evidence of it. Throughout this broad extent of country and the widely differing climates, it varies very little from its eastern type, not enough to constitute a variety.

If *Æ. corallipes*, *haldemannii*, *paradoxa*, *rugosa*, and *discoidea* be considered as varieties of but one species (*discoidea*), as future investigations may prove to be the case,* then it will have to be counted as one of the very common and generally distributed species of this ubiquitous genus. *Æ. rugosa* is found from New England to Dakota and south to the Potomac and Ohio; *Æ. corallipes* and *haldemannii*, from Eastern Nebraska to Utah; *Æ.*

* See my discussion of this question in Hayden's Geol. Surv. Territories, 1872, p. 720.

discoidea, throughout the Southern States; and *Æ. paradoxa*, from Utah north to Montana.

Boöpedon is confined to the plains east of the Rocky Mountains from Wyoming south.

Brachypeplus is found from Southern Dakota to Mexico.

Pezotettix obesa has been found only at high points, 7-10,000 feet above the sea, in Southern Montana and near Yellowstone Lake, Wyoming; *P. picta*, along the east base of the Rocky Mountains in Colorado south to New Mexico; *P. glacialis* and *manca* are confined to the extreme northeast; *P. borckii* to California.

Platyphyma is scarcely generically distinct from *Pezotettix*, and should be merged into that genus. *P. montana*, found at high altitudes in Southern Montana, is the only species known in the United States, but other species have been obtained in Mexico.

Ommatolampis viridis, our only species of this genus, ranges from Southeast Nebraska to Southern Colorado.

Caloptenus is another genus that is represented in all portions of the earth. Although found on the great plains of the West, it appears, as a general rule, to seek points of rank vegetation. To this genus belongs our destructive migratory species of the West, *C. spretus*, which does more injury to farmers' crops than all the rest of the family combined. I have traced it north and south from Lake Winnipeg to Texas, and east and west from the borders of Missouri and Iowa to Nevada. It does not appear to pass west of the Sierra Nevada range, but more evidence on this point is needed before it can be positively stated. I am inclined to think it is not abundant in Arizona or New Mexico, but am not positive on this point. I have met with some stray specimens in Southern Illinois. *C. femur-rubrum* is one of the most common grasshoppers in the States; is found from Canada to the Gulf of Mexico, and from the Atlantic to the Rocky Mountains, and Walker says it is met with on the Pacific coast; but I very much question the correctness of this statement; in fact, I have some doubt whether the Rocky Mountain variety belongs to this species. *C. bivittatus*, I believe, inhabits all parts of the United States except California; and, although preserving the marks of identity, varies greatly in size and general color.

Acridium, as a generic form, which, though well marked, is difficult to describe, appears to be southern, though represented in the North. I am not

acquainted with *A. unilineatum*, Walk. *A. rubiginosum*, though found in New England and as far west as Illinois, appears to be most numerous in the oaklands from Maryland to Tennessee. *A. alutaceum* is a New England species, and in the West (Missouri, Kansas, and Nebraska) appears to be replaced by *A. emarginatum*, the two being very closely allied. *A. americanum* is a southern species, extending as far north as Maryland and Illinois.

Tropidacris dux, the giant of the family (for Scudder's *T. rex* is but a variety of this species), belongs to the tropics, and is included in our fauna upon the authority of Mr. Scudder that he possessed a specimen from Texas.

Rhomalea centurio (*R. marci* is probably but a variety of this species) is a southern form extending north in the Atlantic States to North Carolina (possibly to Virginia), and in the Mississippi Valley to Missouri. Walker's *R. gigantea* from Missouri is evidently *R. centurio*.

I add here a table for the purpose of aiding in the determination of the United States genera. It is made as simple and concise as possible, and will require but little study even on the part of the youngest entomologist to understand it. It is artificial, and, as a matter of course, no attempt is made in it to retain the genera in their natural order. I have endeavored in it to seize upon the most prominent distinguishing characters of the genera.

Synoptical table of the United States genera.

- I. Pronotum not extending back to the tip of the abdomen; pulvilli present between the claws of the tarsi :
- A. Prosternum spined :
- a. Pronotum strongly crested; crest notched; insects very large, more than three inches long..... *Tropidacris.*
- aa. Pronotum not cristate; species of various sizes, but none three inches long :
- b. Antennæ acuminate; joints distinct :
- c. Head produced in front; face very oblique :
- d. Pronotum cylindrical; without lateral carinæ; joints of the antennæ flat or triquetrous..... *Mesops.*
- dd. Pronotum somewhat compressed on the sides; lateral carinæ more or less distinct; joints of the antennæ flat or triquetrous..... *Opomala.*
- cc. Head not produced; face sub-vertical; joints of the antennæ sub-cylindrical..... *Rhomalea.*
- bb. Antennæ filiform; joints indistinct :
- c. Front border of the pronotum notched..... *Chromacris.*
- cc. Front border of the pronotum not notched :
- d. Wings as long or longer than the abdomen :

- e. Median carina of the pronotum somewhat prominent; lateral carinae absent; eyes elongate; extremity of male abdomen not swollen *Acridium*.
- ee. Median carina of the pronotum not prominent; lateral carinae present, distinct or obtusely rounded; eyes not elongate; extremity of male abdomen swollen:
- f. Eyes closely approximate above; vertex sub-hexagonal; pronotum sub-cylindrical *Ommatolampis*.
- ff. Eyes not closely approximate above; vertex longitudinally channeled; lateral carinae of the pronotum sub-distinct more or less obtusely rounded *Caloptenus*.
- dd. Wings abortive or wanting:
- e. Prosternal spine truncated at the tip *Platyphyma*.
- ee. Prosternal spine not truncated at the tip *Pezotettix*.
- AA. Prosternum not spined; smooth or but slightly tuberculate:
- a. Prosternum smooth, not tuberculate:
- b. Antennae enlarged at the base; joints flat and distinct.
- c. Head produced in front into an elongate cone, ascending; face very oblique *Tryxalis*.
- cc. Head sub-conical, not or but slightly ascending; face oblique:
- d. Face slightly curving inward below the vertex; antennae distinctly ensiform, about twice the length of the head; elytra longer than the abdomen *Pyrgomorpha*.
- dd. Face straight; antennae somewhat ensiform, a little longer than the head; elytra shorter than the abdomen. *Oxycoryphus*.
- bb. Antennae filiform or clavate; joints indistinct:
- c. Antennae clavate (a flat club at the tip) *Gomphocerus*.
- cc. Antennae not clavate:
- d. Median carina of the pronotum, whole length of the pronotum, raised into a high, arched, and slightly denticulate crest *Tropidolophus*.
- dd. Median carina wanting, slight, distinct, sub-cristate or cristate only on the posterior lobe:
- e. Vertex ascending obliquely in front of the eyes in the form of a short triangular pyramid:
- f. Median carina of the pronotum cristate on the posterior lobe *Aerolophitus*.
- ff. Median carina of the pronotum slight throughout *Pedioscertetes*.
- ee. Vertex not ascending in front of the eyes:
- f. Posterior margin of the pronotum truncate *Chrysochraon*.
- ff. Posterior margin of the pronotum rounded or angular:
- g. Elytra in the form of ovate scales; species large, incapable of flight *Brachypeplus*.
- gg. Elytra of the usual form:
- h. Vertex acuminate in front of the eyes; head narrow:
- j. Face somewhat oblique, straight; lateral foveolae of vertex when present linear *Stenobothrus*.
- jj. Face slightly oblique, somewhat rounded; lateral foveolae of the vertex triangular or obsolete *Tragocephala*.

- hh.* Vertex not acuminate in front of the eyes; head globose :
j. Vertex obtusely rounded without lateral foveolæ; pronotum sub-cylindrical *Boöpedon.*
jj. Vertex more or less obtuse, foveolate; pronotum more or less distinctly tricarinate :
k. Vertex very obtuse; lateral foveolæ short quadrate; disk of the pronotum marked with a white cross..... *Stauronotus.*
kk. Vertex more or less obtuse, varied; lateral foveolæ triangular :
l. Median carina of the pronotum sub-cristate, slightly arcuate on top, or straight; not denticulate, continuous; frontal costa, above the ocellus, slightly bi-sulcate..... *Tomonotus.*
ll. Median carina of the pronotum various but not sub-cristate, generally more or less notched or interrupted; frontal costa not bi-sulcate above the ocellus..... *Ædipoda.*
aa. Prosternum obtusely tuberculate *Stetheophyma.*
- II. Pronotum extending backward to the extremity of the abdomen:
 A. Pronotum arched roundly *Batrachidea.*
 AA. Pronotum nearly or quite horizontal :
 a. Antennæ 13-14-jointed..... *Tettix.*
 aa. Antennæ 22-jointed..... *Tettigidea.*

ACRIDIDAE.

DESCRIPTIONS OF THE GENERA AND SPECIES FOUND IN THE UNITED STATES, ARRANGED IN THE DESCENDING ORDER PROPOSED IN THE PRECEDING INTRODUCTION.

FAM. ACRIDIDÆ, WALK.

Gryllus Bulla, *Acrida*, and *Locusta*, Linn.; *Gryllus*, Fab.; *Gryllides*, Zettst.;
Locustidæ, Leach.; *Acrydii*, Latr.; *Acridites*, Serv.; *Acridiodes*, Burm.

Anterior and middle legs equal or nearly equal in length, much shorter than the posterior pair; posterior legs elongate, fitted for leaping; the femora enlarged near the base. The tarsi three-jointed; the first joint, which is usually the longest of the three, and much longer than the second, has the under side marked by two cross impressions, which give it the appearance, when seen on this side, of being composed of three pieces; the terminal or third joint is furnished with two strong claws. The elytra and wings, when in repose, rest partly horizontal on the back of the abdomen, and partly deflexed against the sides. The antennæ are shorter than the body, seldom exceeding half its length, and composed of from six to twenty-four joints; they are either filiform, flattened, or ensiform, rarely clavate. The ovipositor consists of four short corneous pieces, two curving upward and two curving downward. Most of the species possess wings; but in a few these organs are wanting.

SUB-FAM. I.—ACRIDINÆ.

Spongiphori, Serv.; *Chæradotrachelia*, Fieb.

The anterior margin of the prosternum truncate, not elevated; the mouth free and uncovered; the face either vertical or more or less oblique (sloped under and backward toward the breast); the posterior extremity of the pronotum is either truncate, rounded, or angular, and extends backward, at farthest, but a short distance upon the base of the elytra; the tarsi are furnished with pulvilli, or little pads, between the claws. The species vary in length from half an inch to four inches.

This sub-family admits three divisions, as follows:

- A. Head produced in front into a cone or pyramid; face quite oblique; antennæ triquetrous..... *Conocephalides*.
- AA. Head obtuse or sub-conic; face vertical or sub oblique; antennæ not triquetrous:
 - a. Antennæ filiform or clavate..... *Orthocerides*.
 - aa. Antennæ acuminate..... *Xiphocerides*.

DIVIS. 1.—CONOCEPHALIDES.

The head produced in front in the form of a cone or pyramid; face quite oblique, generally straight; antennæ enlarged near the base, and acuminate toward the apex; joints flattened or triquetrous, and distinct; the body generally slender; and the posterior femora but moderately or slightly enlarged near the base.

This division may be subdivided into two sections, distinguished from each other by the length of the antennæ and number of joints contained:*

- A. Antennæ shorter than the head..... *Microcerides*.
 AA. Antennæ longer than the head..... *Macrocerides*.

SEC. 1.—MICROCERIDES.

Head elongate-conical; face very oblique, nearly horizontal; antennæ conic, shorter than the head, consisting of not more than six or eight joints; contains but one group, *Proscopini*.

GROUP 1.—PROSCOPINI.

Proscopides, Serv.; *Proscopidæ*, Scudd.

There are no representatives of this group found in the United States; and up to this time none have been discovered in North America.

SEC. 2.—MACROCERIDES.

Antennæ longer than the head, multiarticulate. This section contains two groups, *Tryxalini* and *Trigonopterygini*:

- A. Elytra narrow..... *Tryxalini*.
 AA. Elytra broad..... *Trigonopterygini*.

GROUP 2.—TRYXALINI.

Gryllus acrida, Linn.; *Truxalides*, Serv.; *Truxalidæ*, Scudd.; *Tryxalidæ*, Walk.

The head produced in front in the form of a cone or pyramid; the face quite oblique but not horizontal; the antennæ enlarged near the base, their

*The entire sub-family might be separated into two divisions by these characters, as all except the single group *Proscopini* have the antennæ longer than the head.

joints prismatic or flattened, with the lateral margins acute, distinct. The body is comparatively slender and graceful, but not so linear and phasma-form as in the preceding group; the posterior femora are not so much enlarged at the base as in the remaining portion of the sub-family, although slightly more so than in the preceding.

Those who reverse the arrangement adopted here, and consider the passage from the *Phasmidæ* to the *Acrididæ* as ascending, find in this group some strong arguments in favor of that view, as in some respects, although well defined, it is more generalized than any of the following groups. Here we find the cylindrical form and elongate conical head approaching the *Proscopiæ*, but these two characters are no longer united, at least the maximum of each is not found in any one species. Here, too, we find what might be claimed as the initial point, or point of divergence, of the two great branches of the remainder of the sub-family, the *Ædipodiform* and the *Acridiform*; starting with the smooth prosternum, we continue with it through *Pyrgomorpha*, *Oxycoryphus*, *Stenobothrus*, &c., to the typical *Ædipodæ*; on the other hand, starting at the same point with the tuberculiform prosternal spine in the *Opomala*, we pass through the *Xiphoceridæ*, to the typical *Acridii*.

This group is represented in the United States by four genera, *Tryxalis*, *Mesops*, *Opomala*, and *Pyrgomorpha*.

Synoptical table of the genera.

- | | |
|--|----------------------|
| A. Prosternum smooth, not spined: | |
| a. Head elongate-conical, ascending | <i>Tryxalis</i> . |
| aa. Head shorter than the pronotum, sub-pyramidal, horizontal above, or but slightly ascending. | <i>Pyrgomorpha</i> . |
| AA. Prosternum armed with a spine or tubercle: | |
| a. Pronotum cylindrical; eyes not prominent..... | <i>Mesops</i> . |
| aa. Eyes somewhat prominent; pronotum usually distinctly tricarinate..... | <i>Opomala</i> . |

TRYXALIS, Charp.

Gryllus Acrida, Linn.; *Truxalis*, Fabr.; *Troxallis*, Fisch. d. W.

Body elongate, slender. Head ascending obliquely in the form of an elongate cone; face very oblique; eyes elongate oval, very oblique, and placed well forward; vertex elongate, broad, and more or less tricostrate, the margins expanding over the antennal foveolæ. Antennæ as long or little longer than the head, broad near the base, acuminate at the apex, triquetrous. Pronotum short, tricarinate; sides parallel or nearly so; posterior margin angled

or truncate. Elytra and wings usually as long as the abdomen, sometimes abbreviated. Abdomen long and slender. Anterior legs very short and slender; posterior legs long and slender, the femora but slightly enlarged at the base. Prosternum without spine or tubercle, narrow.

Section.—Head ascending. Pronotum with the sides parallel; anterior border sub-truncate; posterior border truncate. Elytra and wings abbreviated. Posterior femora shorter than the abdomen.

Tr. brevipennis, sp. nov.

Female.—Top of the head longer than the pronotum; median carina not very distinct, obtuse, a slight sulcus along each side. Vertex broad, that in advance of the eyes about equal to the eyes in length; the median carina distinct on this portion, slightly sulcate; each side of the margins expanding horizontally, and but slightly curved up. The entire head is elongate conical; the four carinæ of the face minute and obscure. The antennæ scarcely longer than the head, ensiform, triquetrous. Eyes elongate ovate, equal in length to one-third the top of the head; rather prominent, almost horizontal. Pronotum short, tricarinate, the three carinæ equal; front border obtusely rounded, and advanced somewhat upon the back part of the head; hind border truncate; the anterior lateral margins as they ascend slope obliquely forward; the posterior lateral margins curve inward, leaving a somewhat acute angle below. Elytra very short, not extending beyond the insertion of the posterior legs; narrow, lanceolate; longitudinal nerves prominent; not meeting above. Wings minute. Abdomen very long, sub-cylindrical, slightly carinated above; ovipositor moderately long; super-anal plate longitudinally indented or grooved. Posterior femora considerably shorter than the abdomen, slender.

Color (alcoholic).—Almost uniform pale greenish-yellow—doubtless green when living—immaculate; the antennæ, vertex, and posterior femora pale rufous.

Dimensions.—Length, 1.7 inches; top of the head, 0.28 inch; elytra, 0.25 inch; hind femora, 0.76 inch; hind tibiæ, 0.74 inch.

Florida (from Professor Glover's collection).* Pl., Fig. 12.

* I find this somewhat anomalous species in a bottle of Orthoptera collected by Professor T. Glover at Pilatka, Florida. Its occurrence there was certainly unexpected to me; but he says he made the collection there in person, and most of the other specimens in the same bottle are well-known types of the United States fauna. The specimens may not be fully developed, but, judging from the ovipositor, they must be very nearly perfect. The short wings and short femora may require the formation of a new genus.

MESOPS, Serv.

Body small, slender, cylindrical. Head elongate, produced in front into a cone or pyramid; vertex generally flat and horizontal in front of the eyes; face very oblique. Eyes not very prominent, sometimes transverse, and placed midway between the antennæ and pronotum; but in the United States species these are oblique and placed well forward. Antennæ ensiform, prismatic or flattened, about as long as the head and thorax. Pronotum short, cylindrical; lateral carinæ obsolete; median carina feeble. Anterior and middle legs quite short; posterior legs long and slender, the femora but slightly enlarged at the base and slightly bent. Prosternum spined. Mesosternum and metasternum usually more or less channeled. Elytra (when present) straight, narrow, and usually shorter than the abdomen; wings as long as the elytra. Abdomen long and cylindrical. Sub-anal plate of the male elongate and lanceolate.

I have slightly modified Serville's generic description, which is controlled too much by the position of the eyes. The short anterior and middle legs, slender cylindrical body, and lanceolate sub-anal plate of the male should separate such species from *Opomala*. By the slight modification here made, this genus can receive those species which agree in every other respect save the position of the eyes, and thus prevent the necessity of forming several genera.

M. wyomingensis, Thos., Proc. Acad. Nat. Sci. Phil., 1871.

Syn., *Opomala wyomingensis*, Thos., Geol. Surv. Ter. 1871, 446.

Small, slender, and cylindrical; elytra reaching the fifth abdominal segment; sub-anal plate of the male prolonged, lanceolate. Pale green, sometimes tinged with red, unspotted.

Female.—Frontal cone elongate, pointed, flat above, scarcely margined; a shallow foveola each side under the lateral margin. Face very oblique, quadricarinate; carinæ sharp, divergent, reaching the clypeus. Eyes oblong-ovate, situated near the antennæ. Antennæ ensiform, triquetrous. Pronotum about as long as the head, truncate anteriorly and posteriorly, cylindrical. Elytra narrow, lanceolate, reaching the fifth segment; wings small, pellucid. Abdomen cylindrical, elongate, slightly enlarged toward the apex; upper corniculi of the ovipositor scarcely exerted. Prosternal spine quite short and blunt. Mesosternum slightly furrowed longitudinally on each side.

Color (after immersion in alcohol).—Pale greenish-yellow, immaculate; a bright pea-green when living.

Male.—Differs from the female as follows: Much smaller and slenderer. Vertex more pointed; slightly margined. Abdomen turned up at the apex, terminating with a sharp lanceolate extension of the last ventral segment. Antennæ, face, vertex, occiput, pronotum, posterior femora, and abdominal appendages pale carneous; a whitish stripe extends from the lower border of the eye to the base of the middle legs. Intermediate varieties are common.

Dimensions.—♀ Length, 1.05 inches; elytra, 0.52 inch; posterior femora, 0.5 inch. ♂ Length, 0.78 inch.

Wyoming Territory (Thomas). Figured, Glover, Ills. Am. Ent. Orth., Pl. xi, Fig. 8.

M. chlorizans.

Syn., *Stenacris chlorizans*, Walk., Cat. Dermap. Salt., IV, 652.

Opomala mexicana (?), Sauss., Rev. et Mag. Zool., XIII, 1861, 156.

Male.—Very similar in form and size to *Opomala fasciculata*, Charp. Vertex very narrow between the eyes; suddenly expanding in advance of these, triangular in front, the part in advance of the eyes is horizontal and slightly rugulose, the part between the eyes roundly deflexed, thus forming a kind of transverse indentation between the two parts. The face very oblique; the frontal costa prominent between the antennæ, but below this deeply sulcate, forming two slender but not prominent carinæ; lateral carinæ minute. Antennæ slightly enlarged near the base, not much flattened, minutely and thickly punctate throughout—but a moderate magnifier is required to see these distinctly—about as long as the head and thorax. Pronotum cylindrical, without carinæ, thickly punctate; the three transverse impressions somewhat distinct, the second is situated about the middle of the pronotum; posterior lobe obtusely rounded; sides of the mesothorax and metathorax thickly punctured. Elytra very narrow, extending beyond the tip of the abdomen, slightly curved up at the apex; wings a little shorter than the elytra. Posterior femora much shorter than the elytra, and a little shorter than the abdomen; the disk convex; the pinnæ and median sulcus almost obliterated; terminal joint of the posterior tarsi very long and slender. Super-anal plate subquadrate, with a flat, blunt tooth at the apex; sub-anal plate very long, with a small tooth each side at the apex, and the middle

prolongation somewhat spatulate in form, with the sides curved or rolled upward. Pectus concave.

Color (alcoholic)—Uniform pale greenish-yellow; doubtless green when living. Tips of the antennæ fuscous; tips of the spines of the posterior tibiæ piceous.

Dimensions.—Length, 1.1 inches; elytra, 0.9 inch; posterior femora, 0.5 inch.

Florida (Glover). Saint John's Bluff, E. Florida (Walker).

Walker (*l. c.*) places this in "Group 2" of his genus *Stenacris*, which he locates—probably on account of the form of the antennæ—among the Acrididæ proper. The following are the characters given of this group:

"Body very slender, nearly cylindrical. Head smooth, elongate; tip of the vertex flat, prominent, conical; front (face) much retracted; keels slight; inner keels converging near the face; outer keels diverging. Eyes elliptical, oblique, not prominent. Antennæ slender, slightly flattened, a little longer than the head and prothorax together. Prothorax finely scabrous, hardly widening hindward; keel hardly perceptible; transverse impressed lines very slight; fore border and hind part of each side slightly rounded; hind border more rounded. Prosternal spine slender, slightly compressed and oblique, rounded at the tip. Legs long, slender; spines of the hind tibiæ short. Fore wings very narrow, as long as the body."

His specific description is as follows:

"*Male*.—Testaceous green. Head and prothorax with a whitish-green stripe on each side. Eyes livid. Antennæ tawny. Wings pellucid. Fore wings with green veins. Veins of the hind wings black, glaucous toward the base and along the interior border. Length of the body, 10 (?) lines; expansion of the fore wings, 24 lines."

Notwithstanding the slight differences between the specimen I have described and this description, I am satisfied it belongs to Walker's species. It is also quite possible that they belong to *Opomala mexicana*, Sauss. (Rev. et Mag. Zool., XIII, 1861, 156), as they agree very closely with that species; but it appears rather strange that Saussure should have overlooked the peculiarity of the vertex and anal plates, unless his specimens were females; if they were, this may account for the difference in size, my specimen, and Walker's also, being much smaller than the measurement he has given.

OPOMALA, Erichs.*Opsomala*, Serv.; *Xiphicera*, Perty.

Head pyramidal; face very oblique, with four carinæ more or less distinct. Antennæ reaching the apex of the pronotum, more or less enlarged near the base; the joints prismatic. Eyes somewhat prominent, oblique, placed near the front and close to the antennæ. Pronotum usually tricarinate, sometimes sub-cylindrical and the carinæ sub-obliterated; sides straight, parallel or nearly so, truncate in front, truncate or obtusely rounded behind; transverse impressions generally indistinct. Elytra straight, lanceolate, sometimes reaching to tip of the abdomen, sometimes abbreviated. Prosternum furnished with a short, obtuse spine. Anterior and middle legs short; posterior generally long and slender.

Synoptical table of the species.

A. Apterous	<i>carinata</i> .
AA. Elytra present:	
a. Elytra much shorter than the abdomen:	
b. Wings wanting.....	<i>aptera</i> .
bb. Wings present, but minute.....	<i>brachyptera</i> .
aa. Elytra as long or very nearly as long as the abdomen:	
b. Elytra marked with spots.....	<i>punctipennis</i> .
bb. Elytra without spots:	
c. Pronotum and head with a brown stripe each side:	
d. Vertex short, obtuse; lateral carinæ of the pronotum indistinct.....	<i>bivittata</i> .
dd. Vertex long, somewhat pointed; lateral carinæ of the pronotum distinct.....	<i>neo-mexicana</i> .
cc. Stripes on the sides yellow or absent:	
d. Elytra opaque, uniform green; cone of the vertex long, pointed.....	<i>varipes</i> .
dd. Elytra semitransparent, grayish-green; cone obtuse.....	<i>marginicollis</i> .

O. carinata.Syn., *Mesops carinatus*, Walk., Cat. Dermap. Salt., III, 501.

Female.—Piceous, apterous. Head and pronotum with three carinæ. Head longer than the thorax; the part in front of the eyes shorter than that behind them, rounded and not attenuated on the fore border; front with two carinæ, which diverge toward the face. Eyes fusiform, flat, hardly oblique. Antennæ lanceolate, slightly dilated, nearly as long as the head and thorax. Pronotum longitudinally and very slightly rugulose, truncate in front and at

the apex. Prosternum furnished with a transverse ridge. Sheaths of the oviduct lanceolate. Legs slender.

Dimensions.—Length, 1.4 inches.

United States (Walker).

Walker places this species with doubt in *Mesops*, but the tricarinate pronotum certainly forbids it a place in that genus, notwithstanding the other characters. I have, therefore, ventured to remove it to *Opomala*, although I have seen no specimens.

O. aptera, Scudd., Proc. Am. Ent. Soc., II, 305.

Female.—Prolongation of the vertex equals the length of the eye; sides parallel; front rounded. Carinæ of the pronotum distinct, rather sharp. Elytra slender, lanceolate, nearly abortive. Wings wanting.

Color.—Head streaked with reddish testaceous and dull yellowish; upper edge of the clypeus bordered with whitish; labrum and clypeus dotted with fuscous; joints of the palpi blackish at base; antennæ brown. Pronotum, abdomen, and appendages brownish.

Dimensions.—Length, 1.4 inches; antennæ, 0.3 inch; posterior femora, 0.6 inch; elytra, 0.25 inch.

Pennsylvania (Scudder).

O. brachyptera,* Scudd., Bost. Jour. Nat. His., VII, 454.

Vertex triangular; margins elevated; a median carina. Face, with the four carinæ distinct, divergent below, reaching the clypeus. Antennæ scarcely reaching the apex of the pronotum. Sides and carinæ of the pronotum parallel; posterior transverse impression distinct. Elytra about half as long as the abdomen; wings very short. Abdomen slender, slightly keeled above. Prosternal spine only a blunt protuberance.

Color.—Brown; dotted faintly above with black. A faint dark stripe extending from the lower border of each eye along the side of the pronotum. Hind femora with a row of black dots on the upper edge; terminal lobe

* This specific name has been used some two or three times in this genus. *Acri-dium brachypterum*, Haan (Verz. Nat. Gesch. Ned. Ind. Bez. Ins., 150), has been transferred by Walker to this genus with this name, but Scudder's name, being the oldest, takes precedence. I think Schaum (?) has described a species from Madagascar under this name, but I have no means of reference at present at hand to confirm this opinion or ascertain the date. See also Gerst. Arch. Naturg., XXXV, 216.

dark. Spines tipped with black. The female is more uniformly brown than the male, with numerous minute dusky dots; the elytra and wings shorter than in the male.

Dimensions.—Length, ♀ 1.15 inches; ♂ 1.05 inches; hind femora, 0.52 inch.

Massachusetts (Scudder); Eastern Wyoming (Thomas).

O. punctipennis, Serv., Hist. Orthop., 590.

Syn., *Aceridium punctipenne* (?), De Haan, Bijdr. Kenn. Orthop., 144.

Female.—Cone of the vertex short; sides margined; round and obtuse at the point; occiput flat. Disk of the pronotum flat, feebly tricarinate. Elytra and wings as long as the abdomen.

Color.—Yellowish-green. Head green; on each side of the occiput a longitudinal yellow stripe. Elytra opaque at base, remainder semi-transparent; internal margin grayish; there is a series of unequal fuscous dots along the disk, those near the apex becoming paler. Wings transparent with a yellowish tinge. Legs yellowish green.

Dimensions.—Length, 1.25 inches.

North America (Serville); Carolina (De Haan).

O. bivittata, Serv., Hist. Orthop., 589.

Syn., *Aceridium bivittatum* (?), De Haan, Bijdr. Kenn. Orthop., 143.

Female.—Face tricarinate; carinae prominent; the median sulcate but scarcely double. Vertex rather short, round, and slightly margined in front, scarcely as long as broad. Pronotum slightly contracted in the middle; lateral carinae indistinct, median distinct. Prosternal point short, tuberculiform. Elytra and wings passing the abdomen.

Color.—Yellowish-green; often tinged with reddish-brown. Behind each eye starts a dark-brown or black stripe, which reaches the posterior border of the pronotum. Elytra opaque from the base to the middle, transparent beyond, tinged with brown; the first half of the internal margin has a longitudinal greenish stripe, and a similar stripe near the anterior margin, but not reaching quite half the length of the elytra. Wings transparent; nerves and nervules of the apical half dark. Legs greenish; the femora striped above with reddish-brown.

Dimensions.—Length to tip of elytra, 1.50 to 1.65 inches; posterior femora, 1 inch; posterior tibiae, 0.95 inch; elytra, 1.08 inch.

Carolina (De Haan); North America (Serville); Florida (Walker); Nebraska (Scudder in Hayden's Report); Kansas (Dodge); Nebraska and Kansas (Thomas). Figured, Glover, Ills. Am. Ent. Orth., Pl. vi, Fig. 24; Pl. xi, Fig. 7.

O. neo-mexicana, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 77.

Female.—Vertex elongate, semi-elliptical, slightly margined. Face more oblique than in *O. bivittata*, and head longer; tricarinate; the frontal costa sulcate. Antennae ensiform, triquetrous, reaching tip of the pronotum. Pronotum distinctly tricarinate; carina equal, straight, parallel. Elytra and wings about as long as the abdomen. Prosternal spine short and very obtuse.

Color (after immersion in alcohol).—Face yellow, dotted with red, paler below; a broad, roseate stripe on the occiput bordered with yellow. A reddish-brown stripe on each side from the eye to the posterior margin of the pronotum; median carina, same color; rest of the pronotum yellow. Elytra semi-pellucid; base and stripe along the dorsal sub-margin roseate. Wings transparent; nerves mostly ochreous, a few near the apex dusky. Legs pale rufous; femora reddish above, yellow beneath; spines tipped with black.

Male.—Much smaller; last ventral segment elongate, pyramidal, entire; the opening on the upper surface. Median stripe of the dorsum broader than in the female. This species is much like *O. bivittata*, possibly a variety.

Dimensions.—Length, ♀ 1.62 inches; to tip of elytra, 1.50 inches; posterior femora, 0.88 inch. Length, ♂ 1.25 inches.

Northeastern New Mexico, Wyoming (Thomas).

O. varipes, Sery., Hist. Orthop., 588.

Syn., *Acridium varipes* (?), De Haan, Bijdr. Kenn. Orthop., 144.

Cone of the vertex long and pointed; face carined. Pronotum chagrined, tricarinate; four distinct transverse impressions. Prosternal point large. Antennae ensiform.

Color.—Head greenish; lateral carinae of the face yellow. Pronotum greenish, margined with yellow. Prosternal point yellowish. Elytra opaque,

a uniform green; nerves prominent; wings transparent, somewhat clouded. Abdomen of a yellowish green. Anterior and middle legs green; the femora yellowish beneath; posterior femora green, yellow beneath; posterior tibiæ reddish at base and apex, yellowish in the middle, the spines corresponding in color with the parts; first two joints of the posterior tarsi reddish, last green.

Dimensions.—Length, 2.25 inches.

North America (Serville); Carolina (De Haan).

O. marginicollis, Serv., Hist. Orthop., 591.

Syn., *Acridium marginicolle* (?), De Haan, Bijdr. Kenn. Orthop., 143.

Female.—Cone of the vertex obtuse; eyes oblong, straight. Disk of the pronotum punctured; carinæ indistinct. Elytra straight, lanceolate; apex pointed, long as the abdomen. Wings as long as the elytra. Antennæ somewhat ensiform.

Color.—Head and body of a grayish-green. A yellow stripe extends from the lower border of the eye across the sides of the pronotum to its posterior extremity. Elytra semi-transparent, grayish; wings pellucid. Legs the color of the body.

Male.—Much smaller than the female.

Dimensions.—Length, ♀ 1.25 inches; ♂ 1 inch.

North America (Serville); Tennessee (De Haan).

PYRGOMORPHA, Fisch.

Head rather short, sub-conic; occiput short; vertex slightly produced in front of the eyes, carinated each side. Eyes oblong, usually equally removed from the tip of the vertex and the pronotum, oblique. The face seen from the side curves slightly inward below the vertex; frontal costa narrow to the ocellus, wider and sulcate below; lateral carinæ sinuate or curved. Antennæ about twice the length of the head, 18–20 joints, from the third to the ninth sub-triquetrous. Pronotum tricarinate or sub-tricarinate; sides straight or slightly converging anteriorly; the transverse incisions more or less distinct; truncate in front; apex rounded or obtuse-angled; longer than the dorsum of the head. Prosternum transverse, unarmed; pectus as broad as the head. Elytra and wings present. The four anterior tibiæ shorter than the femora, sub-

sulcate in front. Posterior femora not longer than the abdomen; but slightly pinnate; moderately dilated at the base; attenuate toward the apex.

This genus was first given by Serville as a sub-genus of *Tryxalis*, who separated it by the following characters:

“Head slightly elevated; eyes approach the anterior border of the pronotum. Antennæ not so long; their joints slightly enlarged. Pronotum without prominent carinæ. Species of small size.”

P. brevicornis, Walk., Cat. Dermap. Salt., III, 500.

Syn., *Gryllus* (*Acrida*) *brevicornis*, Linn., Syst. Nat., 12th ed., II, 692.—Cent. Ins. Rar., 15.—Amœn. Acad., VI, 398.

Truxalis brevicornis, Fabr., Ent. Syst., II, 27.—Thunb. Mem. Acad. St. Petersb., V, 264.—Nov. Act. Upsal., IX, 84.

viridulus,* Pal. Beauv. Ins. Orth., 81, Pl. 3, Fig. 4.

notoclorus, Pal. Beauv. Ins. Orth., 80, Pl. 3, Fig. 3.

Acridium ensicorne (?), De Geer, Ins., 3, p. 499, No. 16, Pl. 42, Fig. 7.

As I have seen no specimen of this species, and only the figures of Palisot. Beauv., and a figure in Professor Glover's plates, supposed to be of this species, I have concluded to give the short descriptions of the older authors, no description having been published by any recent authority:

Linnæus (Syst. Nat., ed. Gmelin, tom. 1, pars IV, No. 2056) describes it thus, under the following division:

“Antennæ ensiform; head conical, longer than the thorax.” “Acridæ or Truxalides, Fabricius.”

“*G. brevicornis*.—Green; head somewhat prominent; antennæ compressed, longer than the thorax. America meridionali.”

In Amœn. Acad., VI, 398, the following is added:

“Similar to *Europæis*. Head sub-conic in front, but not prominent.”

Thunberg, Mém. Acad. St. Petersb., V, 264:

“*Truxalis brevicornis*, green, unspotted; thorax convex, very slightly costate; on each side a crenate line along the head and thorax. Antennæ depressed, linear. Hemelytra passing the abdomen one-third their length; wings hyaline, scarcely an inch long. Habitat, East and West Indies. *T. brevicornis*, Fabr., Ent. Syst., 2, p. 27.”

In Nov. Act. Upsal., IX, 84, the description is the same; but here he gives the following synonyms:

“*Gryllus brevicornis*, Linn., Syst. Nat., I, 3, p. 692.

* Walker's quotation of De Geer under this name is an error.

"*Acridium ensicorne*, De Geer, Ins., tom. 3, p. 499, Tab. 42, Fig. 7.

"*Truxalis brevicornis*, Fabr, Syst. Ent., p. 279; Ent. Syst., II, p. 27;" and adds as habitats, "America meridionali and Africa."

De Geer (Ins., 3, p. 499, No. 16) gives the following description:

"*Acrydium (ensicornu)*. Green; head conic; antennæ compressed; wings hyaline.

"*Gryllus acrida (brevicornis)*. Head prominent, green; antennæ compressed, long as the thorax, Linn., Syst., ed. 12, p. 692, No. 2. Received from Pennsylvania by M. Acrelius. It is of medium size, about sixteen lines in length; the elytra a little longer than the abdomen. The head is elongate and conical above, flat in front, in an oblique plane, so that the mouth appears as though hid under the prothorax. The eyes and the antennæ are placed at the highest point of the conic part of the head. The antennæ, which are as long as the head and thorax, are flat and enlarged at the base, but acuminate at the apex; the eyes large, oval. The dorsum of the pronotum forms a continuous plane with the head; has three slightly elevated carinæ. The elytra are straight; and the posterior femora are of the same length as the abdomen."

Pal. Beauvois, Ins. Orth., 80, Pl. iii, Fig. 3:

"*Truxalis notochlorus*.—Fuscous; head conical; antennæ longer than the thorax; head, thorax, elytra, and the wings above green; wings below pale yellowish; posterior femora longer than the abdomen. Saint Domingo, in the humid savannas. This species is remarkable for the color of the back, which is entirely green."

"*Truxalis viridulus* (p. 81, Pl. iii, Fig. 4).—Head conic; elytra green above; sides spotted with fuscous; head and thorax pale green; wings yellowish; antennæ shorter than the thorax; posterior femora a little longer than the abdomen. Same country as the former. It is possible that this species is the female of the preceding."*

P. punctipennis, sp. nov.

Female.—Vertex slightly ascending, nearly in the same plane as the dorsum of the pronotum, rounded in front; margins slightly raised; no lateral foveolæ; the advance in front of the eyes not quite equal to the length of the eye; a very slight median carina. Face quite oblique; seen from the side, curves slightly inward below the vertex; regularly widening from the apex of the eyes

* The figures appear to confirm this opinion.

downward, rounded transversely; the carinæ generally slight and obtuse, but sometimes slightly prominent; frontal costa slightly prominent between the antennæ, but not prominent below, gradually expanding below, more or less sulcate; lateral carinæ more or less distinct, nearly straight, reaching the corners of the face. Antennæ about as long as the head and pronotum, enlarged and flattened at the base, acuminate at the apex, triquetrous. Eyes oblong ovate, oblique, and placed well forward near the antennæ. Pronotum a little longer than the head, truncate in front; hind border very obtusely angled; sides flat, perpendicular, straight and very near or quite parallel; tricarinate, the three carinæ about equal, distinct, but not prominent, straight, parallel; posterior transverse incision situated a little behind the middle, bends forward in the middle, and cuts the median carina; the two anterior incisions sub-obsolete; the posterior margin of the side somewhat regularly though slightly curved inward, the lower posterior angle being sub-acute. Elytra and wings pass the posterior femora, and are about as long as the abdomen; the former are narrow and obliquely truncate at the apex. Abdomen sub-cylindrical, elongate, slightly enlarged at the apex; the upper valves of the ovipositor unusually long and exerted. Posterior femora shorter than the abdomen, not reaching the extremity of the elytra, slender, being but slightly enlarged at the base.

Color (after immersion in alcohol).—Some specimens pale greenish-yellow, evidently green when living; others with a rufous tinge or shade pervading the whole surface and almost obliterating the green; the latter variety is generally a little smaller and the head and vertex slightly more ascending than in the other variety. The lateral carinæ of the pronotum and a narrow stripe immediately below them brown. Antennæ, anterior legs (sometimes the middle ones also), the inside and upper portion of the posterior femora, and posterior tibiæ rufous. The face, sides of the thorax, and posterior legs are all bright rufous. Elytra semi-transparent, with fuscous dots along the disk, forming a single row along the basal third, but scattered over the apical portion. Wings pellucid, tinged with yellowish at the base; nerves of the anterior portion roseate in the green variety, somewhat dusky in red variety.

Dimensions.—Length, 1.75 inches; elytra, 1.25 inches; hind femora, 0.75 inch; hind tibiæ 0.7 inch. East Tennessee (Thomas).

Remark.—This appears to be a distinct species, although it approaches some of the descriptions of *P. brevicornis*, especially the *Tr. viridulus*, Pal. Beauv

GROUP 3.—TRIGONOPTERYGINI.

Trigonopterygidae, Walk.

This group is distinguished from the preceding by its broad elytra. It has no representatives in North America.

DIVIS. II.—ORTHO CERIDES.

In this division the head is obtuse or sub-conic; where it approaches the conical or pyramidal form it is generally less distinct than in the preceding division, and such species are separated from that division by the form of the antennæ. The face is sub-oblique or vertical; therefore, the term "oblique," when applied to species or genera of this division, is to be understood as limited, and as compared with the vertical face.

The antennæ are generally filiform, the joints cylindrical, or slightly flattened and indistinct; in a few species they are slightly enlarged near the base; and in a few instances clavate.

In the United States Acrididæ the genus *Oxycoryphus* appears to form the connecting link between this and the previous division, the shape of the head and form of the antennæ making it somewhat difficult to determine in which it should be placed.

This division is distinguished from the *Xiphocerides* chiefly by the form of the antennæ.

It embraces that portion of the family included by Serville under "*Acridites propriè dicti*;" and contains but two groups, *Ædipodini* and *Acridini*.

A. Prosternum smooth or but slightly tuberculate..... *Ædipodini*.
AA. Prosternum armed with a spine *Acridini*.

GROUP 4.—ÆDIPODINI.

Mutici, Serv., Scudd; *Ædipodidae*, Walk.

This group is distinguished by the vertical or sub-vertical face; filiform antennæ with indistinct joints; and absence of a prosternal spine, the prosternum being either smooth or (in one genus only—*Stetheophyma*) slightly tuberculate. There are some apparent variations from these characters, which

render it somewhat difficult to locate some of the genera; for example, *Oxycoryphus*, *Chrysochraon*, and most of the species of *Stenobothrus* have the face somewhat oblique, and in general appearance approach *Opomala* and *Pyrgomorpha*; but from the former they are at once distinguished by the absence of the prosternal spine, and from the latter by the less oblique and straight or sub-convex face and by the form of the antennæ; but in regard to the last character, the distinction between *Pyrgomorpha* and *Oxycoryphus* is slight. In the slope and shape of the head and form of the thorax, *Chrysochraon* makes the nearest approach (of the United States genera) to *Pyrgomorpha*; the *Stenobothri* in general appearance approach *Opomala*.

The following are the United States genera belonging to this group, placed in what I conceive to be their natural order, considered as descending. It will be observed that I take the diminishing obliquity of the face and increasing convexity of the vertex as my chief guides in this arrangement:

Oxycoryphus, *Chrysochraon*, *Acrolophitus*, *Pedioscirtetes*, *Stenobothrus*, *Gomphocerus*, *Stetheophyma*, *Tragocephala*, *Tomonotus*, *Cedipoda*, *Tropidolophus*, *Stauronotus*, *Boöpedon*, *Brachypeplus*.

This group admits of two tolerably well-marked sections, depending chiefly upon the direction of the face and form of the pronotum.

In order to aid, as far as possible, in locating species in the genera to which they belong, I add the following table of the genera of this group, which gives the characters a little more fully than in the general table which stands at the commencement of the family, and which is somewhat differently arranged:

Synoptical table of the genera.

- A. Prosternum smooth, not tuberculate:
- a. Vertex ascending in front of the eyes in the form of a cone or triangular pyramid, pointing obliquely forward and upward:
 - b. Median carina of the pronotum minute on the anterior and middle lobes, but elevated into an arcuate crest on the posterior lobe. *Acrolophitus*.
 - bb. Median carina of the pronotum minute throughout; no part elevated. *Pedioscirtetes*.
 - aa. Vertex horizontal or deflexed:
 - b. Face oblique, straight:
 - c. Hind border of the pronotum truncated *Chrysochraon*.
 - cc. Hind border of the pronotum produced into an obtuse or acute angle:
 - d. Antennæ very short, scarcely longer than the head, somewhat enlarged and flattened near the base. *Oxycoryphus*.

- dd.* Antennæ filiform or clavate, medium length; vertex generally (but not always) with lateral foveolæ, which are linear:
- e.* Antennæ clavate (a flat club at the apex)..... *Gomphocerus.*
- ee.* Antennæ filiform, not clubbed at the apex..... *Stenobothrus.*
- bb.* Face vertical, or nearly so:
- e.* Head and body compressed on the sides, narrow; vertex acuminate in front; lateral foveolæ sub-distinct or obsolete; face somewhat oblique or curved..... *Tragocephala.*
- cc.* Head globose, not compressed; vertex not acuminate in front; face vertical:
- d.* Median carina of the pronotum elevated into a high arcuate and slightly denticulate crest; no lateral carinæ..... *Tropidolophus.*
- dd.* Median carina of the pronotum sub-cristate, slightly arcuate or nearly straight, not denticulate; lateral carinæ wanting on the anterior, and acute or sub-acute on the posterior, lobe..... *Tomonotus.*
- ddd.* Median carina of the pronotum only a raised line, or but slightly elevated:
- e.* Vertex without lateral foveolæ:
- f.* Pronotum sub-cylindrical, without lateral carinæ; elytra shorter than the abdomen, but not in the form of scales..... *Boöpedon.*
- ff.* Pronotum with the disk flat, distinctly tricarinate; carinæ entire; elytra in the form of scales; insects unable to fly.... *Brachypeplus.*
- ee.* Vertex with lateral foveolæ:
- f.* Lateral foveolæ of the vertex triangular..... *Ædipoda.*
- ff.* Lateral foveolæ of the vertex quadrilateral..... *Stauronotus.*
- AA. Prosternum slightly tuberculate..... *Stetheophyma.*

SECTION I.—Face somewhat oblique, straight; sides of the pronotum and head flat and generally perpendicular; disk of the pronotum usually flat, forming nearly a right angle with the sides; the median carina (except in *Acrolophitus hirtipes*) minute. Vertex somewhat advanced in front of the eyes. The pronotum approaches the sub-cylindrical form in some of the *Stenobothri*. The posterior femora are less enlarged near the base than in the following section; and the upper and lower carinæ are not prominent.

The following genera belong to this section: *Oxycoryphus*, *Chrysochraon*, *Acrolophitus*, *Pedioscertetes*, *Stenobothrus*, *Gomphocerus*.

I am not acquainted with *Stetheophyma*, but give it a place in the next section provisionally.

OXYCORYPHUS, Fisch.

Body medium size. Head somewhat pyramidal; face oblique; occiput and vertex ascending; the vertex produced in front of the eyes, triangular, blunt or sub-acute at the apex; its upper margin acute, with a lateral branch to each ocellus, including on each side a triangular foveola. The extremity of

the vertex continuous with the frontal costa, which is slightly sulcate or flat; the margins acute; the lateral carinae slightly divergent. Antennae but little longer than the head, with about twenty joints; from the third joint flattened sub-triquetrous, acuminate at the apex. Eyes oval or sub-reniform, oblique. Pronotum truncate in front, angulate posteriorly, constricted behind the anterior margin or parallel, tricarinate; the carinae distinct but not elevated, the lateral inwardly angulate near the front, divergent posteriorly or parallel. Prosternum unarmed, tumid in the middle. Elytra and wings present, generally as long as the abdomen, but sometimes shorter. Legs slender; the four anterior femora sub-compressed; the posterior femora much compressed, dilate near the base.

Division I (Sauss., Rev. et Mag. Zool., XIII, 1861, 314).—Tip of the vertex sub-acute. Pronotum not constricted; the posterior extremity obtuse-angled; the transverse sulcus situated behind the middle; lateral carinae acute, equal throughout, and in our only species parallel.

Ox. obscurus, Thos., Geol. Surv. Terr. 1871, 466.

Female.—Head conical; occiput ascending; the vertex ascending in the same line with it, convex, with a slight median carina, most distinct in front; margins of the vertex slightly elevated, obtuse, and terminating behind at the upper canthus of the eyes; the vertex sub-conical; tip glabrous. Face quite oblique, nearly straight; frontal costa sulcate, parallel to the ocellus, below which it gradually and regularly expands; lateral carinae distinct, sharp, curving slightly forward at the top in front of the eyes, nearly straight and rapidly diverging below. Antennae somewhat ensiform, flattened, a little longer than the head; joints short. Eyes elongate, pyriform, acuminate above, oblique. Pronotum a little longer than the head, tricarinate; the carinae equal, distinct, and parallel; sides compressed, perpendicular; sub-truncate in front; posterior margin obtuse-angled; transverse incision behind the middle; posterior lobe thickly covered with shallow punctures; the posterior lateral angle is a right angle. The elytra narrow, about three-fourths the length of the abdomen. Wings nearly as long as the elytra. Abdomen carined; valves of the ovipositor obtuse, hairy on the margins, the upper ones strongly curved. The legs slender; the femora compressed; posterior femora nearly as long as the abdomen.

Color (dried after long immersion in alcohol).—Pale rufous. Elytra

semi-transparent toward the apex. Wings pellucid, with pale rufous nerves.

Dimensions.—Length, 0.93 inch; elytra, 0.5 inch; posterior femora, 0.5 inch; posterior tibiæ, 0.42 inch.

Wyoming Territory (Thomas). Figured, Glover., Ills. Am. Ent. Orth., Pl. xiii, Fig. 13.

CHRYSOCHRAON, Fisch.

Podisma, Heyer; *Gomphocerus*, Fisch., *olim*; *Chorthippus*, Fieb.; *Chloëaltis*, Harr., Scudd.

Shape much like *Opomala* and *Pyrgomorpha*, to which it is closely allied. Eyes rather short, somewhat acuminate at the apex, placed near the vertex, oblique, and rather distant from each other. The back of the pronotum and head in one plane, horizontal. Head produced in front between the antennæ in the form of a short blunt pyramid. Vertex rather broad between the eyes, triangular in front, slightly convex, without foveolæ, sub-emarginate. Frontal costa broad, either sulcate or partially sulcate, expanding and fading below: lateral carinæ distinct, somewhat divergent; face oblique and straight. Antennæ short, filiform, sub-depressed, and joints sub-distinct. Clypeus and labrum narrow. Pronotum short; compressed at the sides, which are flat, straight, and parallel or very nearly so; tricarinata, the three carinæ distinct but not elevated; transverse incisions slight; truncate in front, and truncate or sub-truncate behind. Elytra abbreviated, shorter than the abdomen, except in *Ch. punctulatum*, where they are about equal to it in length; ovate-lanceolate. Middle legs longer than the anterior pair. Prosternum unarmed, but slightly swollen.

Synoptical table of the species.

- A. Elytra less than half the length of the abdomen in the female *abdominalis*.
- AA. Elytra half as long, or more than half the length of the abdomen ..
 - a. Female green or pale brown; male green above..... *viridis*.
 - aa. Brown without any green:
 - b. Elytra about as long as the abdomen..... *punctulatum*.
 - bb. Elytra shorter than the abdomen *conspersum*.

Ch. abdominalis, sp. nov.

Female.—Large size; body elongate; elytra very short. Vertex blunt, short, not expanding in front of the eyes, convex; margins not elevated, obtuse. Face moderately oblique; frontal costa flat, not sulcate, sometimes

convex above the ocellus; lateral carinæ slight. Pronotum slightly constricted in the middle; lateral carinæ slightly curved inward a little in advance of the middle, expanding somewhat posteriorly; posterior lobe densely punctured on the disk and sides; the transverse impressed line distinct, curved, situated a little behind the middle; hind border obtusely rounded; the sides have each two shallow broad indentures, rendering them a little uneven. Elytra short, not reaching the tip of the third abdominal segment; wings shorter. Abdomen elongate, somewhat compressed, slightly carined above. Posterior femora slender, shorter than the abdomen. Antennæ slightly enlarged and flattened near the base; joints unusually distinct, almost moniliform.

Color (after long immersion in alcohol).—Almost uniform dull brownish or ash-yellow. Antennæ rufous, dusky at the tips. Palpi, anterior and middle legs, and posterior femora rufous; spines of the posterior tibiæ yellow at base, tips black.

Dimensions.—Length, 1.15 inches; elytra, 0.25 inch; posterior femora, 0.60 inch.

Montana (Thomas).

Remark.—As will be seen by the above description, this species varies somewhat from the typical form of the genus in the slightly curved lateral carinæ of the pronotum and in the antennæ; yet a single glance is sufficient to convince any Orthopterologist that it belongs here.

Ch. viridis, Thos.

Syn., *Chloëaltis viridis*, Scudd., Bost. Jour. Nat. His., 1862, vol. VII, 455.

Vertex broad, slightly expanding in front of the eyes, beyond which the sides converge so as to form a right angle, rounded at the apex; the edge more or less upturned, so as to form a lunar or semicircular depression behind it; frontal costa scarcely sulcate above the ocellus in the female, sub-sulcate in the male. Pronotum with the sides compressed, vertical, parallel; the three carinæ distinct, equal, parallel; the transverse impressions indistinct, the posterior much behind the middle. Elytra ovate lanceolate, about half as long as the abdomen in the female, three-fourths its length in the male. Sub-anal plate of the male turned up, somewhat pointed, entire at the tip. Posterior femora in the female about as long as the abdomen.

Color.—Of the male, whole of the upper surface green; sides a dirty

brown, sometimes with a black streak extending back from the eye. Front of the head yellowish-brown or yellow. Front and middle legs greenish, tinged with reddish-brown; posterior femora greenish-yellow; tibiæ fuscous, spines tipped with black. Female varies in color from almost entire pale-green to dark-brown, with a dark stripe running back from each eye along the upper margin of the sides of the pronotum; disk of the elytra marked with two or three fuscous dots; hind tibiæ reddish-brown.

Dimensions.—♀ Length, 1 inch; pronotum, 0.21 inch; hind femora, 0.6 inch; elytra, 0.42 inch. ♂ Length, 0.6 inch; pronotum, 0.14 inch; hind femora, 0.4 inch; elytra, 0.3 inch.

Connecticut (Scudder), Southern Illinois, Nebraska (Thomas). Figured, Glover, Ills. Am. Ent. Orth., Pl. x, Fig. 5.

Ch. conspersum, Thos.

Syn., *Chloëaltis conspersa*, Harr. Report, 184.

abortiva, Harr. Report, 184.

Stenobothrus melanopleurus, Scudd., Bost. Jour. Nat. Hist., 1862, vol. vii, 456.

Vertex broad, expanded to a blunt point on each side in front of the eyes, from which the sides converge so as to form little less than a right angle, blunt at the tip; edges a little upturned; a very slight median carina; frontal costa with a shallow sulcus two-thirds its length. Eyes not large or prominent, slightly elongated. Antennæ slender, slightly flattened, reaching to the middle of the elytra in the male. Pronotum with the sides nearly straight, or slightly converging in the middle; median carina sharp, rather more distinct than the lateral; front and posterior margins straight. Elytra in the male reaching nearly to the tip of the abdomen, obovate, lanceolate, suddenly swollen on the costal border about two-thirds of the way from the apex to the base, internal border full and curved evenly from the base to the tip; in the female the elytra reach about the middle of the abdomen.

Color.—Male: head above, dorsum of the pronotum, sides of the meso- and meta-thorax, the face and sides of the head below the eyes, and the elytra light lilac-brown, varying in intensity in different specimens; sides of the head behind the eyes shaded with black. Antennæ dark-brown, darkest at the tips. Sides of the pronotum and of the first two or three abdominal segments shining black. Abdomen light-brown above, banded with black; light-yellow beneath; sides, except on the first two or three segments, dark reddish-brown. Fore and middle legs brown; hind femora light yellowish-

brown above, with one or two broad dark-brown bands, light-yellow below; apex black; hind tibiæ yellowish-red, black at the base and tips.

The female differs from the male in being darker, and in wanting most of the black on the sides of the pronotum. Head, dorsum of the pronotum, and elytra frequently mottled or even blotched with dark-brown; sides of the pronotum like the dorsum, except a small patch of black on the upper posterior angle.

Dimensions.—♀ Length, 0.8 to 0.9 inch; elytra, 0.30 to 0.37 inch; hind femora, 0.50 to 0.55 inch. ♂ Length, 0.65 to 0.70 inch; elytra, 0.35 to 0.40 inch; hind femora, 0.40 to 0.45 inch.

Massachusetts, New Hampshire, eastern shore of Lake Winnipeg, British America (Scudder); Maine (Smith). Figured, Glover, *Ills. Am. Ent. Orth.*, Pl. vi, Fig. 11, and Pl. x, Fig. 12.

Ch. punctulatum, Thos.

Syn., *Chlœaltis punctulata*, Scudd., *Bost. Jour. Nat. Hist.*, 1862, vol. VII, 455.

Vertex broad, much as in *Ch. viridis*, but slightly more prominent. Sides of the pronotum very nearly parallel, slightly divergent posteriorly; lateral and median carinæ distinct, sharp. Elytra and wings reach the tip of the abdomen.

Color.—Vertex edged with reddish-brown; a narrow reddish-brown band extends along the lateral carinæ of the pronotum to the eye, edged below with black; it extends also slightly upon the base of the elytra. The abdomen, sternum, fore legs, and parts of the mouth (except the black mandibles), reddish-brown. Hind tibiæ yellowish-brown, their spines tipped with black; all the tarsi darker. Elytra green with scattered small brownish spots.

Dimensions.—♀ Length, 0.95 inch; pronotum, 0.19 inch; hind femora, 0.54 inch; elytra, 0.70 inch.

Connecticut (Scudder).

ACROLOPHITUS, Thos.

Head pyramidal, short; the dorsum ascending anteriorly; the vertex ascending obliquely between the antennæ in the form of a short pyramid. Eyes ovate, placed high and well forward. Face long, narrow, slightly oblique, and straight; carinæ distinct. Antennæ stout, passing the thorax, filiform or slightly flattened; the joints near the base sub-elongate. Maxillary palpi of medium

length; terminal joints sub-equal, rather short; labial palpi proportionally longer; ultimate joint longest. Pronotum short, but longer than the head, compressed at the sides; sides of the anterior lobes sub-parallel; posterior lobe diverging; the median carina on the anterior lobes indistinct and obtuse; on the posterior lobe it is elevated into a sharp crest, regularly curved on the top; lateral carinae sub-distinct on the posterior lobe, obliterated on the anterior lobes; the three transverse incisions distinct, the posterior one is bent abruptly forward in the middle, around the front point of the crest; anterior margin obtusely rounded; posterior margin acute-angled in the male, right-angled in the female. Elytra narrow, extending beyond the extremity of the abdomen; wings nearly as long as the elytra. Legs long; the femora slender; the tibiae stout, pilose. The prosternum not spined; the anterior portion somewhat transversely tumid; pectus narrow.

A. hirtipes, Thos., Geol. Surv. Terr., 1870, 278.

Syn., *Gryllus hirtipes*, Say, Amer. Ent., III, Pl. xxxiv.—Le Conte's ed., I, 78, Pl. xxxiv, Fig. 1.

The vertex extends obliquely upward in front of the eyes, about equal to the length of the latter, acute-angled at the apex; a slight transverse impression between the upper angles of the eyes; not margined, and without foveolæ. Frontal costa rather narrow, slightly expanding below, more or less distinctly sulcate from the apex downward; lateral carinae somewhat distinct, nearly straight, slightly diverging; the face is gradually widened from the eyes to the clypeus. The pronotum as described in the generic description. Posterior femora slender, but slightly enlarged at the base, equaling or passing the abdomen; all the legs are covered with minute hairs.

Color.—Pale-green, without any distinct spots. Head and elytra green, the former sometimes with lighter and darker shades. The pronotum varies in color from a greenish-yellow to a pale-brown, the abdomen generally corresponding. The elytra are generally of a uniform pale-green, though sometimes they are marked with indistinct spots of darker green. Wings pale greenish-yellow on the basal third; the apical third pellucid; the middle third occupied by a broad, transverse, fuscous band, diminished and curving inward on the posterior border. Antennæ red.

Dimensions.—♀ Length, 1.3 inches; elytra, 1.12 inches; hind femora, 0.75 inch; hind tibiae, 0.75 inch. ♂ Length, 1 inch.

Colorado, Wyoming (Thomas).

PEDIOSCERTETES, Thos.

Back of the head ascending; vertex rises obliquely in front of the eyes in the form of a triangular pyramid; frontal costa distinct above the ocellus, fading below; face sub-oblique. Pronotum regularly expanding posteriorly, subtricarinate, the front lobes being rounded, so that the lateral carinæ are indistinct; median absent or but a minute line; front margin truncate; hind margin rounded; the three transverse impressions distinct. Elytra and wings extending beyond the abdomen. Posterior femora slender, a little shorter than the abdomen in the female; first joint of the posterior tarsi as long as the other two. Metasternum broad; the prosternum narrow, unspined, the transverse groove distinct. This insect, seen from above, tapers considerably from the metathorax to the head, which is quite narrow, but elongate perpendicularly. Resembles, in general appearance, *Acrolophitus*, to which it is closely allied, but from which it differs in wanting the crest on the pronotum, and in the posterior margin thereof being rounded.

P. nevadensis, Thos., Phil. Acad. Nat. Sci., 1873.

The tip of the vertex separated from the portion between the eyes by a curved sulcus, which runs from the upper canthus of one eye to that of the other; this portion of the vertex obliquely ascending and triangular; no median or lateral foveola. Frontal costa prominent and narrow between the eyes, and slightly sulcate; the portion below the ocellus indistinct, a little broader than that above, expanding below and slightly sulcate; lateral carinæ indistinct, parallel; face somewhat oblique, narrow. Eyes oblong, ovate, oblique. Antennæ extending about one-fourth their length beyond the pronotum, robust, very slightly depressed, and apparently enlarged toward the apex. Front lobes of the pronotum rounded, sub-cylindrical; lateral carinæ obsolete on the front lobes, obtuse on the posterior lobe; median carina is but an indistinct line; three transverse incisions distinct, but not profound, the posterior one situated a little behind the middle; the posterior border is regularly rounded, nearly semi-circular; the posterior lateral margin curves inward at the humerus, but makes no angle; the posterior lobe is distinctly broader than the head. Elytra of moderate width; wings rather narrow; both extend slightly beyond the abdomen. The abdomen comparatively enlarged and deep at the base; the valves of the ovipositor slender and acute. The posterior femora are quite slender, being but slightly enlarged at base;

posterior tibiæ cylindrical. The body and legs more or less covered with small hairs.

Color (after immersion in alcohol).—Dull greenish-yellow, showing the original color to have been green—probably light pea-green—which is almost entirely uniform on the head, thorax, elytra, and legs, without spots. The antennæ are dusky at the tips. There is a slight rufous tinge on the posterior lobe of the pronotum and base of the elytra; the apical portion of the latter is translucent. Wings pale-yellow at base—probably greenish-yellow in the living individual—with a moderately broad fuscous band across the disk; apex transparent, with dark nerves. Spines of the posterior tibiæ yellowish, very slightly or not at all tipped with black.

Dimensions.—♀ Length, 1.25 inches; elytra, 0.80 inch; posterior femora, 0.60 inch; posterior tibiæ, 0.65 inch; pronotum, 0.25 inch.

Nevada (from Lieutenant Wheeler's collection.)

STENOBOTHRUS, Fisch.

Acridium, De Geer, Oliv.; *Ædipoda* (in part), Serv.; *Gomphocerus*, Thunb. Burm., Fisch. (*olim*); *Chloëaltis* (in part), Harr.; *Podisma*, Latr.; *Chorthippus*, Fieb.

Body medium size or small, elongate. Head sub-conic in front; face more or less sloped obliquely backward and under toward the breast; vertex in front of the eyes somewhat prominent, horizontal; the lateral foveolæ (when present) are linear; when they are absent the margins of the vertex are obtuse. The frontal costa is generally sulcate throughout, or from the middle ocellus downward; lateral carinæ distinct. Eyes sub-rotund or sub-angulate. The antennæ generally exceed the head and pronotum in length, and are sub-compressed or sub-cylindrical, clavate in the male of one species. The pronotum has the disk more or less flattened, seldom gibbous; the sides somewhat compressed; the front margin truncate; the hind margin obtuse-angled or obtusely rounded; the three carinæ usually distinct, but not elevated—the median straight entire, the lateral straight or curved inward at or in advance of the middle. Elytra and wings sometimes abbreviated, sometimes as long or longer than the abdomen, generally narrow. Legs slender; the posterior femora somewhat elongate, and but moderately enlarged at the base. Prosternum unarmed; narrow.

Synoptical table of the species.

- A. Vertex without lateral foveolæ :
- a. Median carinæ of the pronotum sub-cristiform *occidentalis*.
 - aa. Median carinæ of the pronotum linear :
 - b. Top of the head minutely tricarinate *tricarinatus*.
 - bb. Top of the head smooth :
 - e. Lateral carinæ of the pronotum parallel *coloradus*.
 - cc. Lateral carinæ of the pronotum more or less approximate in the middle :
 - d. Face nearly vertical *quadrimaculatus*.
 - dd. Face oblique :
 - e. Green, with fuscous serratures along the elytra ; large size... *admirabilis*.
 - ee. Chief color brown, or striped with brown ; small size :
 - f. Head ascending ; antennæ somewhat acuminate *occipitalis*.
 - ff. Head horizontal ; antennæ filiform *speciosus*.
- AA. Vertex with lateral foveolæ or flat spaces representing them :
- a. Elytra unspotted *curtipennis*.
 - aa. Elytra spotted :
 - b. Lateral carinæ of the pronotum parallel *sub-conspersus*.
 - bb. Lateral carinæ of the pronotum approximate in the middle :
 - c. Elytra extending beyond the tip of the abdomen :
 - d. Elytra chiefly green *maculipennis*.
 - dd. Elytra brownish *propinquans*.
 - cc. Elytra equal to or shorter than the abdomen :
 - d. Face nearly vertical, curved below *brunneus*.
 - dd. Face oblique, straight or nearly so :
 - e. Edges of the vertex raised *æqualis*.
 - ee. Edges of the vertex not raised *bilineatus*.

I cannot locate *pelidnus*, but it would appear to belong with *maculipennis* and *propinquans*; *gracilis*, Scudd., is omitted from the table for the same reason, though evidently closely allied to *maculipennis*.

Division I.—Face oblique; head sub-conical.

Sub-division 1.—Antennæ slightly enlarged near the base, somewhat acuminate at the apex, and slightly flattened or sub-triquetrous.

This sub-division includes but one species, *St. occipitalis*, Thos., which possibly future investigations may show to be generically distinct.

St. occipitalis, sp. nov.

Head ascending, pyramidal; occiput elongate, convex; vertex short, not expanding in front of the eyes, sub-hexagonal, margins raised; no regular lateral foveolæ, but on each side, under the projecting front, there is often a shallow, triangular depression. Face quite oblique, straight; frontal costa

distinct and narrow above the ocellus, fading and diverging below it, upper portion sharply sulcate; lateral carinæ distinct, curving outward. Antennæ about as long as the head and thorax, slightly enlarged near the base, and acuminate at the apex, sub-triquetrous or slightly flattened. Pronotum about as long as the head, slightly constricted in the middle; median carinæ slight; lateral carinæ nearly obliterated, especially on the anterior lobes, slightly approximating in the middle, nearly parallel thence to the front, diverging posteriorly; hind border sub-truncate. Elytra and wings about as long as the abdomen. Hind femora reach the extremity of the abdomen.

Color (dried after immersion in alcohol).—A broad, brown stripe on each side extends from the upper corner of the eye, widening on the head, extending along the upper part of the side of the pronotum, and reaching to the hind margin, a small portion passing over the diverging part of the lateral carinæ; usually a brownish stripe extends from the vertex along the back of the head to the pronotum. Elytra pale-brown, with a row of fuscous dots along the disk.

Dimensions.—♀ Length, 0.78 inch; elytra, 0.6 inch. ♂ Length, 0.62 inch.

Colorado, Wyoming, and Southeast Idaho (Thomas).

From the description the generic position of this species appears doubtful, but the general appearance to the eye is evidently that of *Stenobothrus*, therefore I place it here, though it is possible it belongs to *Epacromia*.

Subdivision 2.—Antennæ filiform, or slightly flattened, especially toward the apex.

Section 1.—Lateral carinæ of the pronotum straight, or very nearly so, parallel or very slightly approximate in the middle, and but slightly elevated.

St. coloradus, Thos.*

Syn., *St. bicolor*, Thos., Geol. Surv. Terr., 1871, 465.

Lateral foveolæ wanting. Two broad, brown stripes reaching from the vertex to the tip of the elytra.

Vertex scarcely expanding in front of the eyes; margins scarcely raised, obtuse; a slight, indistinct median carinæ; the tip obtusely rounded. Face

*It appears that Walker (Cat. Dermap. Salt., V, Supp., 78) has restored the *bicolor* of Charp., as distinct from *biguttulus*, Burm.; therefore, as this part of his catalogue was published a short time in advance of my description, it becomes necessary for me to change the name of my species.

quite oblique, arcuate; frontal costa broad, expanding below, not sulcate, but slightly depressed at the ocellus; lateral carinæ distinct, diverging rapidly; each side of the frontal costa there is a curved impression. Eyes ovate, oblique, acuminate above. Pronotum same length as the head, truncate in front, and obtusely rounded behind, sub-cylindrical, sub-tricarinate, the three carinæ being very slight, close together, and parallel; the posterior transverse sulcus a little behind the middle, it alone cuts the median carina. Antennæ somewhat flattened, not longer than the head and thorax. Elytra narrow, a little longer than the abdomen; wings nearly same length. Abdominal appendages of the female very short, the upper valves not passing the last abdominal segment; sub-anal plate of the male triangular, entire at the tip. The lateral carinæ of the pronotum in the male are very indistinct and farther apart than in the female; in each sex these are but mere threads, not affecting the sub-cylindrical shape of the prothorax. Posterior femora about as long as the abdomen.

Color (dried after immersion in alcohol).—Parts of the mouth, venter, and sternum pale-yellow; face dull-yellow; eyes brown. Two very regular brown stripes, starting from the tip of the vertex (one from each side near the upper angle of the eye), gradually enlarging, run along the sides of the head and pronotum, and along the central part of the elytra to the tip. The intermediate stripe along the dorsum and the space on the sides below the brown stripes are dull-yellow. An obscure, brownish band extends obliquely downward and backward from each eye, and a more distinct stripe of the same color marks the lower part of the sides of the pronotum, generally bordered by narrow but distinct yellow lines. Wings pellucid, the nervules near the apex dusky, the rest ochereous. Posterior femora with three dark bands. When living the posterior tibiæ are blue, but after long immersion in alcohol they change to a dull-yellow; spines black at the tips. Anterior legs pale-brown. The brown markings are often tinged with a lilac shade.

Dimensions.—♀ Length, 0.81 to 0.90 inch; elytra, 0.65 inch; posterior femora, 0.52 inch. ♂ Length, 0.62 inch; elytra, 0.60 inch.

Var. *unicolor*.—The median or dorsal space brownish, which, uniting with the brownish stripes, gives the entire back a brownish color.

Hab.—Colorado and Wyoming (Thomas). Var. *unicolor* found near Fort Fetterman, Wyoming Territory.

Remark.—This species approaches very near to *Epacromia*, and is closely allied to *St. epacromoides*, Walk

St. tricarinatus, sp. nov.

Female.—The top of the head tricarinate; three distinct but minute parallel and approximate carinæ running from the front border of the pronotum to the vertex, the median continuous to the tip, the lateral bend suddenly outward opposite the upper canthus of the eyes, and from thence forward are continuous with the raised margins of the vertex. The vertex not expanding in front of the eyes; no lateral foveolæ. Face oblique, nearly straight; frontal costa rather broad, narrowest above, regularly and gradually expanding below, flat; margins square. Eyes oblique, acuminate above. Antennæ not reaching the tip of the pronotum, large, flattened, enlarged almost into a club at the apex; joints quite short and sub-distinct. Pronotum very slightly contracted in the middle, expanding slightly hindward; the three carinæ about equal, the lateral somewhat approximate, a little in advance of the middle; very slightly divergent from this point forward, a little more divergent posteriorly; hind border obtusely rounded. Elytra and wings about as long as the abdomen; posterior femora about same length.

Color (dried after long immersion in alcohol).—Face dull-yellow; top of the head and pronotum sometimes dark-brown, sometimes ash-brown. Upper half of the sides of the pronotum usually light-brown, yellowish below. Elytra pale-brown, translucent at the apex; a row of oblong, dark spots along the middle field, some four or five, often running together and forming a stripe. Wings transparent at base (probably slightly colored when living); apex somewhat fuliginous, with black nerves. Posterior femora sometimes striped along the disk with brown.

Dimensions.—Length, 0.87 inch; elytra, 0.56 inch; posterior femora, 0.5 inch.

Wyoming (Thomas)

St. admirabilis, Uhler, Proc. Ent. Soc. Phila., 1864, 553.

Large size; lateral foveolæ of the vertex wanting; elytra and wings as long as the abdomen; general color green, striped with fuscous and carneous.

Vertex prominent, not expanding in front of the eyes; margins slightly elevated, obtuse; no middle foveola, but a slight depression each side within the margins, which are separated by a dim median carina, that extends back across the occiput. Face straight, very oblique, quadricarinate; the carinæ straight, diverging below and reaching the clypeus. Eyes pyriform,

oblique, pointed at the apex. Antennæ somewhat flattened and often slightly enlarged near the base. Pronotum about as long as the head, contracted slightly in the middle; the three carinæ distinct, cut a little behind the middle by a cross incision, the lateral curving inward slightly on the anterior lobe. Elytra, wings, and posterior femora passing the abdomen.

Color.—Face and sides of the head green; antennæ and palpi carneous; eyes brownish; a pale reddish-brown or carneous stripe reaches from the vertex to the hind border of the pronotum, bordered each side by a dark fuscous stripe. Sides of the pronotum green, with a fuscous stripe along the middle; the posterior lobe punctured on the sides. Middle field and upper margin of the elytra green; the green of the middle field serrated above by the notches of the fuscous portion, which occupies the upper (posterior) half; lower (anterior) margin fuscous. Wings transparent, tinged with greenish-yellow at the base; nerves dusky; apex slightly fuliginous. The upper half of the disk of the posterior femora green, lower half yellowish or reddish; posterior tibiæ pale at base, apical portion dusky; spines yellowish, tipped with black. Alcohol changes the green and carneous to a pale dull-yellow; otherwise the markings remain unchanged, except that they are somewhat faded.

Male—The following, discovered the present season, I take to be the male of this species, though the evidence on this point is not positive: Head above slightly ascending to the vertex, giving the whole head an upward bend; front conical; face much sloped. Vertex without lateral foveolæ, margins slightly raised, with two inclosed depressions separated by a slight median ridge, which runs forward to the fastigium. Frontal costa quite broad and flat, very slightly sulcate below the ocellus, margins angled; lateral carinæ distinct; the face is sloped backward toward the breast so much that the angle it forms with the upper surface is less than forty-five degrees. The pronotum is short, scarcely exceeding the length of the head; sides compressed, nearly parallel, expanding very slightly posteriorly; tricarinate; the carinæ about equal, being simply raised lines, very nearly parallel, severed once by the minute posterior sulcus a little behind the middle; front margin sub-truncate; posterior margin sub-truncate, rounded; the lateral margins descending almost straight to the lower angle. Elytra and wings passing the abdomen slightly; narrow. The sub-anal plate is prolonged in the form of a short, blunt ovipositor. Antennæ somewhat

clavate, the club commencing with the twelfth or thirteenth joint. Eyes very oblique, elongate-ovate, pointed above.

Color.—Yellowish and brown in stripes. Face yellowish, the corners of the mouth piceous. A narrow, yellow stripe runs back from each eye to the pronotum, bordered on each side with light-brown, the upper fading on the upper edge to yellowish; a pale-brownish stripe along the middle of the occiput. Antennæ pale at base; club black on one side and pale on the other. Carinæ of the pronotum yellow, the interspaces of the disk brownish; posterior lobe on the sides marked with black punctures and minute angular yellow raised lines; some yellow stripes on the sides. Elytra transparent, somewhat fuliginous, with a dusky spot or two on the disk near the base. Wings transparent and almost uniformly fuliginous, though not clouded. Posterior femora yellowish, with two or three oblique dusky bands on the upper portion of the exterior face; apex black. Posterior tibiæ with knee black; a broad white ring just below the knee; rest dusky, but the upper (posterior) side shows minute abbreviated alternate rings of black and white; the base of the spines white, tips black. Tarsi a dusky yellow.

Dimensions.—♀ Length, 1.3 inches; pronotum, 0.23 inch; elytra, 1 inch; posterior femora, 0.86 inch; posterior tibiæ, 0.77 inch. ♂ Length, 1 inch; elytra, 0.75 inch; posterior femora, 0.65 inch; posterior tibiæ, 0.62 inch; pronotum, 0.13 inch.

Hab.—♀ Baltimore, Maryland (Uhler); Northern Illinois (Walsh); Southern Illinois, District of Columbia, Kansas (Thomas). ♂ Southern Illinois (Thomas).

♀ Figured, Glover, Ills. Am. Ent. Orth., Pl iv, Fig. 13.

St. subconspersus, Walk., Cat. Dermap. Salt., iv, 755.

Male.—Tawny, paler beneath. Head and pronotum with several parallel indistinct brownish lines. Head with a pale testaceous line on each side, which is continued on the fore part of each lateral carina of the pronotum; front (face) punctured, with four distinct carinæ, the outer pair more divergent toward the margins of the face than the inner pair; the foveolæ of the vertex distinct, linear. Antennæ nearly cylindrical, testaceous toward the base. Pronotum with three slight carinæ, the lateral pair straight, parallel to the middle one; hind border rounded. Abdomen testaceous, with a short, broad, brown streak on each side proceeding from the base. Hind femora

red beneath and on the inner side, except toward the tips. Hind tibiæ toward the tips and hind tarsi dark-brown. Elytra cinereous, a little shorter than the body, with many indistinct, minute, pale-brownish marks. Wings pale-cinereous, brown toward the tips; veins black, mostly whitish on the basal half.

Dimensions.—Length, 0.75 to 0.77 inch; expansion of the elytra, 1.4 to 1.5 inches.

Florida (Walker).

Section 2.—Lateral carinæ of the pronotum curving or bending inward at or near the middle.

St. speciosus, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 458.

Vertex of the head quite broad, not expanding at the sides; apex not rounded; the sides of the angle straight; edges upturned considerably; a slight median groove; no lateral foveolæ. Sides of the pronotum approximate, constricted in the middle; lateral carinæ not so prominent and sharp as the median. Wings as long as the elytra, extending beyond the tip of the abdomen.

Color.—Brown above, pale-yellow beneath. Face yellowish-brown; parts of the mouth pale-yellow. Antennæ reddish-brown. A narrow, curved streak on the top of the head from the inner edge of the eye to the lateral carinæ; a narrow, straight, white streak from the eye to the lateral carinæ; the upper half of the sides of the pronotum brownish, darkest above. Legs yellowish-brown; spines of the tibiæ tipped with black. Elytra brownish at base; apical half pellucid, with rosaceous nerves, immaculate; wings pellucid, with rosaceous nervures; costa with a dark streak beyond the middle.

Dimensions.—♂ Length, 0.55 inch; antennæ, 0.23 inch; hind femora, 0.34 inch; expanse of the elytra, 1 inch.

Minnesota (Scudder).

St. maculipennis, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 458.

Vertex with the margins raised, the sides very slightly expanded in front of the eyes; apex blunt; lateral foveolæ, when present, very shallow and broader toward the eyes than at the apex, but these are often obliterated by the absence of their lower margin. Face oblique, nearly straight; frontal

costa somewhat prominent, sides parallel, or nearly so, until near the clypeus, where it expands and fades, sometimes sulcate, at others scarcely sulcate; lateral carinæ distinct. Pronotum slightly constricted about the middle; the three carinæ rather slight, the lateral converging at the middle, nearly parallel on front lobe, divergent on the posterior lobe; hind border obtusely rounded. Elytra and wings passing the abdomen.

Color.—Head and disk of the pronotum green (in some individuals brown); a reddish-brown, broad band behind the eyes reaches to the hind edge of the pronotum, limited above by the lateral carinæ, which are white, but partially crossing these near the hind border; sides of the pronotum below the band brownish or dull-yellowish. Elytra green, with a median band of equidistant, square black spots along its whole extent, besides a few irregularly-scattered smaller black spots; sometimes the inner halves of the elytra are entirely of a rust-red color. Legs yellowish-brown; the hind femora sometimes streaked with red or brown; hind tibiæ plumbeous. Antennæ reddish at base, rest brown or fuscous.

The western specimens, as will be seen from following description, vary somewhat from the eastern type.

Dimensions.—♀ Length, 0.75 inch; antennæ, 0.26 to 0.35 inch; hind femora, 0.45 inch; elytra, 0.7 inch. ♂ Length, 0.45 to 0.55 inch.

Massachusetts (Scudder); Wyoming, Minnesota (Thomas).

Figured, Glover, Ills. Am. Ent. Orth., Pl. x, Fig. 14.

Remark.—The following independent description of living specimens procured at Omaha, Nebraska, is inserted that it may be used as a means of comparison with specimens from other localities, as there is much difficulty in distinguishing some of Mr. Scudder's closely-allied species, if in fact they are distinct, which is a matter of some doubt:

Female.—Face dull, rusty-yellow; cheeks and sides of the head brown, darkest immediately back of the upper part of the eye, where it forms an ill-defined stripe which runs back to the pronotum. Occiput and disk of the pronotum pale-brown.

The black or dark-brown stripe running back from the eye continues along the upper portion of the side of the pronotum, passing over the lateral carinæ upon the disk of the posterior lobe; the lateral carinæ yellowish. The elytra have a pale stripe along the lower (or anterior) field, near the margin; a narrow stripe along the middle field is marked with black or

dark fuscous spots, four or five in number; the portion above this and the apical third semi-transparent, distinctly tinged with reddish-purple. Wings transparent but tinged, especially the front and apical portions, with reddish-purple; the nerves and nervules of the front portion dusky. Posterior femora pale yellow; a narrow dusky stripe along the upper carina (or rib) of the disk; two pale dusky spots on the inside of the upper carina. The posterior tibia has the lower two-thirds of the under surface dusky, the rest pale-yellow; spines white at the immediate base, rest black. Antennæ pale rufous.

The pronotum expands but moderately on the posterior lobe, the lateral carinæ curving regularly inward (though moderately), the closest approximation being in advance of the middle; posterior margin obtusely rounded; no entering angle on the posterior lateral margin, though it slightly (very slightly) curves inward between the humerus and lower angle.

The sub-anal plate of the male is slightly elongate, fleshy, entire, and rounded at the tip.

Dimensions.—♀ Length, 0.75 inch; elytra, 0.60 inch; posterior femora, 0.46 inch; posterior tibiæ, 0.38 inch; pronotum, 0.13 inch. ♂ Length, 0.64 inch; elytra, 0.52 inch; posterior femora, 0.40 inch; posterior tibiæ, 0.36 inch.

St. æqualis, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 459.

Very similar in appearance to *St. maculipennis*, but a smaller species, with elytra extending only to the tip of the abdomen. Vertex broad and blunt, the sides slightly swollen at the anterior border of the eyes; apex blunt, and all the angles rounded; the edge slightly but not sharply upturned; foveolæ shallow, short, and nearly equiangular. Lateral carinæ of the pronotum curved inward a little in the middle, not so prominent as the sharp median carinæ; hind border slightly angular, but nearly straight. Elytra and wings just reaching the extremity of the abdomen.

Color.—Much as in *St. maculipennis*. The lateral carinæ of the pronotum are yellow, and the stripe extends forward to the eye; the stripe behind the eye is quite narrow, and the sides below it green, like the parts above, and the triangular dash of black upon the top of the pronotum at the hinder angles is much narrower than there, on account of the lesser divergence of the lateral carinæ. The median stripe of the elytra containing the square

black dots is yellowish-brown, as in *St. maculipennis*, and the extremity is pellucid.

Dimensions.—♂ Length, 0.45 inch; antennæ, 0.24 inch; hind femora, 0.3 inch; elytra, 0.34 inch. ♀ Length, 0.66 inch; antennæ, 0.2 inch; hind femora, 0.38 inch; elytra, 0.46 inch.

Massachusetts, Maine, New York, Minnesota (Scudder).

Mr. Smith (Proc. Port. Soc. Nat. Hist., 1868, p. 148) says that this and *St. bilineatus*, Scudd., are but varieties of *St. maculipennis*, which is probably correct; but as the materials I have are not sufficient to settle this point, I give the description of each, that this may be hereafter determined.

Figured, Glover, Ills. Am. Ent. Orth., Pl. vi, Fig. 21.

St. bilineatus, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 460.

Vertex slightly swollen at the anterior border of the eyes, but rounded, as it is also at the apex; edges not upturned; lateral foveolæ only indicated by a very faint, scarcely perceptible depression. Sides of the pronotum rather suddenly constricted in the middle; the lateral carinæ broader than the sharp median carina; hind border of the pronotum slightly rounded. Elytra as long as the abdomen.

Color.—Brown, generally dark. Face yellowish-brown, blotched with black; a narrow, black stripe extends from the tip of the vertex along each side, extending back on the pronotum by the side of the lateral carinæ to the posterior border, widening on the pronotum; the usual black stripe behind the eye is rather broad, and there is another similar one on the pronotum farther down on the side, with a yellowish streak between them. The elytra are brown, with a median row of darker spots. Legs brownish, with the extremity of the hind femora and the base of the hind tibiæ darker.

Dimensions.—♂ Length, 0.5 inch; antennæ, 0.22 inch; hind femora, 0.32 inch; elytra, 0.36 inch. ♀ Length, 0.65 inch; antennæ, 0.19 inch; hind femora, 0.36 inch; elytra, 0.41 inch.

Massachusetts (Scudder).

St. propinquans, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 461

Very similar to *St. bilineatus*, but of larger size, and has proportionally longer wings. It is also closely allied to *St. maculipennis*. Vertex broad,

expanding but slightly at the anterior border of the eyes; the angle rounded; the apex blunt; edges scarcely, if at all, raised; foveolæ as in *St. maculipennis*, but shallower. Lateral carinæ of the pronotum somewhat convergent in the middle, of equal prominence and sharpness as the median; hind border of the pronotum somewhat rounded. Elytra and wings a little longer than the abdomen.

Color.—Brown. A stripe behind the eye quite broad; lateral carinæ yellowish; a faint, curved, dark stripe from the inner border of the eyes to the lateral carinæ. Antennæ yellowish-brown. Elytra brownish at the base, transparent at the apex, with a middle line of brown spots extending two-thirds of the distance toward the tip. Legs yellowish-brown; hind tibiæ plumbeous, with a broad, pale annulation at the base.

Dimensions.—♂ Length, 0.6 inch; antennæ, 0.26 inch; hind femora, 0.38 inch; elytra, 0.55 inch. ♀ Length, 0.75 inch; antennæ, 0.23 inch; hind femora, 0.48 inch; elytra, 0.68 inch.

Connecticut, Minnesota (Scudder).

This is probably but a variety of *St. maculipennis*, but the description is given here for the reason stated elsewhere.

St. curtipennis, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 456.

Syn., *Stenobothrus longipennis*, Scudd., Bost. Jour. Nat. Hist., 1862, vol. VII, 457.

Locusta curtipennis, Harr., Cat. Ins. Mass., 56.

Chloëaltis curtipennis, Harr., Rep., 3d ed., 184, Pl. 3, Fig. 1.

Vertex expanding on each side, immediately in front of the eyes, into an angular point a little more obtuse than a right angle; margins raised, obtuse, converging in front to a right angle; apex blunt; lateral foveolæ distinct, linear. Face oblique, that of the male more so than that of the female, slightly arcuate; frontal costa very prominent, sides nearly parallel, flat or sub-convex above the ocellus, rest sulcate; lateral carinæ curving regularly from the inner margin of the eyes to the corners of the face. Antennæ passing the thorax, especially in the male; thick, somewhat flattened, and slightly enlarged toward the apex; joints more contracted in the female than in the male. Sides of the pronotum somewhat compressed, especially on the lower posterior portion, giving to this part the appearance of being slightly indented and contracted, nearly parallel, but slightly widest in front; the three carinæ distinct, equal, the lateral approximating in advance of the middle, about one-third the distance from the anterior border; slightly

divergent from this point to the front border, more divergent posteriorly; the three are cut by the posterior incision a little behind the middle; posterior extremity obtusely rounded. Elytra and wings narrow, sometimes shorter than, and sometimes passing, the abdomen. Valves of the ovipositor rather longer and more exerted than usual.

Color.—Head and thorax brown; a broad, shining black stripe on the side behind the eye, extending to the posterior extremity of the pronotum, along the upper margin, a portion of it extending above the lateral carina at the hind extremity; sometimes there is a longitudinal dark streak on the top of the head. Antennæ yellowish-brown at the base, the rest brown or black. Elytra uniform pale reddish-brown; wings pellucid. Hind femora pale-brown or yellowish, except the apex, which is black; hind tibiæ black at the base, rest pale-red or yellow. Under side dull-yellow.

Dimensions.—♀ Length, 0.75 to 0.84 inch; antennæ, 0.27 to 0.30 inch; elytra, 0.36 to 0.66 inch; hind femora, 0.47 to 0.50 inch. ♂ Length, 0.55 to 0.65 inch; antennæ, 0.35 to 0.37 inch; elytra, 0.40 to 0.60 inch; hind femora, 0.42 to 0.44 inch.

Maine, Massachusetts, Connecticut, Red River Settlements in British America (Scudder); Southern Illinois, Colorado, Wyoming, Pennsylvania (Thomas).

I agree with Mr. Smith (Proc. Port. Soc. Nat. Hist., 1868, 147) in considering *St. curtipennis* and *St. longipennis* as varieties of the same species.

Subdivision 3.—Median carina of the pronotum sub-cristiform; posterior femora inflated at the base.

St. occidentalis, Sauss., Rev. et. Mag. Zool., 1861, XIII, 317.

Very similar to *St. mysticus*, but a little less, and the body more compressed. Rostrum of the vertex shorter, sub-deflexed; carinæ of the pronotum straight, or nearly so, acute, the median sub-cristiform. Posterior femora inflated, slender only at the apex, passing the abdomen. Antennæ filiform.

Dimensions.—Length, 0.80 inch.

Tennessee (Saussure).

A description of *St. mysticus*, Sauss., a Mexican species, will be found in the second part of this Synopsis.

Division 2.—Face sub-vertical; head short, obtuse.

St. brunneus, Thos., Geol. Surv. Terr., 1870, 280.

Female.—Vertex broad, part in front of the eyes short and not expanding at the sides, margins but slightly raised; lateral foveolæ very shallow, elongate oblong; the top of the head convex. Face less oblique than usual, slightly arcuate below; frontal costa broad, flat, and not sulcate, margins punctured, obsolete below. Pronotum short, scarcely longer than the head, slightly constricted in the middle; the three carinæ about equal, the lateral rather distant, converging in front, diverging posteriorly, slightly curved; transverse incision distinct, sinuous, situated about the middle; hind border obtusely rounded. Elytra and wings nearly or quite as long as the abdomen. Antennæ reach the tip of the pronotum, filiform, slightly flattened. Upper valves of the ovipositor scarcely, if at all, exerted.

Color (dried after long immersion in alcohol).—Reddish-brown with yellow. A yellow stripe of moderate width extends from the tip of the vertex along the middle of the pronotum and upon the upper margins of the elytra. Lateral carinæ of the pronotum yellow; interspaces of the disk black. Elytra brownish at base, transparent at the apex, the entire middle field marked with brownish spots, a few smaller ones also in the lower field; upper margin yellow. Posterior femora crossed externally by three quite oblique brown bands, which extend over upon the upper portion of the inside. Male much smaller; face more arcuate.

Dimensions.—♀ Length, 1 inch; elytra, 0.70 inch; hind femora, 0.52 inch. ♂ Length, 0.65 inch; hind femora, 0.40 inch.

Colorado, Wyoming (Thomas).

Remark.—This and the next species have been placed in this genus with much doubt, as they appear to approach *Ædipoda* in several respects.

St. quadrimaculatus, Thos., Geol. Surv. Terr., 1870, 280.

Vertex of moderate width, deflexed, margins slightly elevated, no lateral foveolæ. Face sub-oblique or nearly vertical; frontal costa slightly prominent, margins square, nearly parallel, slightly expanding below, flat or very slightly sulcate; lateral carinæ sub-distinct, moderately divergent below. Pronotum short, depth greater than the length, slightly constricted in the middle, tricarinate; the three carinæ about equal, distinct, the lateral approximate a little in advance of the middle, slightly diverging in front, more divergent posteriorly, cut by the posterior sinuate sulcus a little behind the

middle; posterior extremity obtuse-angled. Elytra and wings narrow and shorter than the abdomen; the former not dilated on the costal margin. Male less than half the size of the female. Antennæ filiform, slightly flattened; joints sub-distinct, those of the female about as long as the head and thorax, of the male more than half the length of the body.

Color (dried after immersion in alcohol).—Yellowish with brownish spots and stripes. Face yellow; cheeks yellow and fuscous; in some individuals there is a slight fuscous stripe along the occiput; there is usually a dark stripe behind the eye, extending along the side of the pronotum, but this is very variable and sometimes entirely wanting. Pronotum with alternating dashes of yellow and brown; lateral carinæ yellow; corners of the disk of the posterior lobe dark-brown. Elytra pale reddish-brown, fading toward the apex; four triangular brown spots in a row along the middle field, and a few dots of the same along the lower field. Wings pellucid; nerves mostly white. Abdomen with rings of yellow and brown. Posterior femora with three oblique brown bands more or less distinct. Antennæ yellowish at base, dusky toward the apex. Under surface yellow.

Dimensions.—♀ Length, 0.88 inch; elytra, 0.4 to 0.5 inch; posterior femora, 0.5 inch. ♂ Length, 0.54 inch; elytra, 0.31 inch.

Colorado, Wyoming (Thomas).

Remark.—The living insect is a pale pea-green, where the dry is yellow.

Var. a.—Face nearly vertical; frontal costa more prominent and somewhat sulcate; lateral carinæ not so much curved and less divergent. Lateral carinæ of the pronotum less approximate. The yellow spaces, especially on the elytra, broader and paler; the brown more restricted. Size same as the other variety; locality the same. Position uncertain.

St. gracilis, Scudd., U. S. Geol. Surv. Neb., Final Rep., 250.

Vertex of the head broad, swollen, with elevated anterior border; foveolæ extremely shallow, long, triangular, with the base toward the eye. Lateral carinæ of the pronotum rather prominent, regularly curved, approximate in the middle; median carina slight; hind border of the pronotum a little angulated; middle of the lower border produced into a rounded projection.

Color.—Slightly mottled, pale reddish-brown; a stripe of the deeper tint just behind the eyes, bordered above by the yellowish lateral carinæ of the pronotum. Elytra nearly uniform in color, but with two or three small spots in the central field.

Dimensions.—♂ Length from the vertex to the tip of the elytra, 0.65 inch.

Nebraska (Scudder).

Remark.—It is possible that this is the male of that which I have described as *St. maculipennis* from Omaha, but Mr. Scudder's description is too brief to determine this with certainty. It probably belongs in Section 2, with *St. maculipennis*.

St. pelidnus, Thos.

Syn., *Gomphocerus pelidnus*, Burm., Handb. Entom., II, 2, 650.

The lateral foveolæ at the margins of the vertex distinct. The frontal costa prominent, straight, reaching to the clypeus; very narrow between the antennæ; the lateral carinæ of the face distinct. The antennæ distinctly flattened near the base. The elytra in both sexes somewhat longer than the abdomen.

Color.—Testaceous, often fuscous above; the posterior femora banded or fasciate; tibiæ pale, fuscous at the base, where also there is a whitish band or ring.

Dimensions.—Length, 0.50 to 0.62 inch.

Pennsylvania (Burmeister).

Remark.—I have not met with this species—at least, I have not recognized it among the numerous collections I have examined; in fact, Burmeister's description is so meager that it is doubtful whether it will ever be recognized with satisfactory certainty; but it evidently belongs to *Stenobothrus*.

GOMPHOCERUS, Thunb.

Stenobothrus (in part), Fisch.

Face almost vertical or sub-oblique. Antennæ long, multiarticulate, filiform for three-fourths of the distance from the base, the remaining joints forming a compressed expanded mass, not so large in the female as the male, terminating in a point. Ocelli slightly visible. Eyes oval, slightly prominent. Pronotum short; its disk flat, tricarinate; the lateral carinæ sinuous, curving inward or forming an entering angle near the middle; the posterior border rounded. Elytra and wings as long or a little longer than the abdomen. Abdomen somewhat compressed; sub-anal plate of the male usually convex below, almost triangular. Prosternum unspined, smooth. Legs

of medium length, and posterior femora of the usual form. *G. clavatus* varies slightly from these generic characters, which are taken chiefly from Serville.

The North American species of this genus approach very near to *Stenobothrus*, and might well be placed under that genus, as Fischer has done with most of the European species. I have retained it for the purpose of including Mr. Scudder's species, which I have not seen, and a species discovered in Kansas by Mr. Charles R. Dodge.

G. clavatus, sp. nov.

Male.—Small size; antennæ clavate; elytra without spots. Vertex scarcely expanding in front of the eyes; the margins obtuse, elevated, meeting in front in an angle a little less than a right-angle; apex obtuse; lateral foveolæ distinct, linear. Face oblique and slightly rounded; frontal costa very prominent, not sulcate at any point, gradually expanding below, it and the entire face densely punctured; the lateral carinæ distinct; the sulcus that extends from the eye downward sharp and distinct. Antennæ passing the thorax; the joints in the middle portion somewhat distinct; the apex formed into a flattened club, very distinct; the cylindrical, basal portion consists of about seventeen joints, usual form; the club of about seven joints, much shortened. Pronotum broadest and slightly swollen near the front, somewhat contracted posteriorly; the three carinæ about equally distinct, approximate, the lateral curve inwardly, making the nearest approach to each other a little in advance of the middle; sub-truncate in front, very obtusely rounded behind. Elytra and wings nearly as long as the abdomen; the nervules of the disk and lower field of the former scalariform. Sub-anal plate elongate, prow-shaped, keeled, entire at the tip, which is sub-acute. Venter and pectus densely punctured. Anterior tibiæ grooved externally, and broad toward the apex.

Color (dried after immersion in alcohol).—Face and cheeks mottled with testaceous and brown; back of the head reddish-brown. Disk of the pronotum reddish-brown, with a brassy luster; sides with the upper portion brown, the lower margin testaceous. Elytra pale-brownish, without spots. The abdominal segments marked on each side with a black spot, those on the basal segment largest, decreasing in size toward the apex, where they are almost obliterated. Ventral portion pale-yellow. Anterior legs carneous; posterior femora with the upper portion of the external face rufous, yellow

beneath; internal face black near the base; tibiæ pale reddish-yellow, spines black. Club of the antennæ dusky, rest yellow.

Dimensions.—Length, 0.56 inch; elytra, 0.37 inch; posterior femora, 0.38 inch; posterior tibiæ, 0.32 inch.

Kansas (Dodge).

G. simplex, Scudd., Proc. Am. Ent. Soc., II, 305.

Front of the head dark brownish-yellow, spotted with fuscous; median carina on the summit of the head and approximate lateral carinæ slight, but distinct, testaceous; between the two, brownish-fuscous; a broad, blackish-fuscous streak from the upper edge of the eye backward, bounded above by a black line lying next the lateral carinæ; another broad, dull, blackish-fuscous stripe running backward from the lower edge of the eye. Antennæ testaceous, fuscous at the base, blackish-fuscous at the tip; the terminal eight or nine joints depressed, forming an elongated club. Median carina of the pronotum slight, testaceous; lateral carinæ rather prominent, yellow, bordered on each side, but especially anteriorly, with black; top of the pronotum brownish-fuscous, deepening in tint toward the lateral carinæ; sides of the pronotum brownish-yellow, clouded with fuscous. Elytra testaceous, diaphanous toward the apex; wings pellucid, slightly clouded along the costal border. Hind legs brownish-testaceous; the superior carina of the femora interrupted with black; spines of the hind tibiæ tipped with black.

Dimensions.—♂ Length, 0.68 inch; antennæ, 0.25 inch; elytra, 0.5 inch; hind femora, 0.4 inch.

Delaware (Scudder).

SECTION II.—Face vertical or nearly so, in some genera being somewhat curved under at the lower part. The sides of the head generally more or less convex. The sides of the pronotum sometimes compressed, but usually more or less constricted, and transversely ridged, waved, or rugose; disk seldom regularly flat, as in the previous section; median carina more or less prominent, and generally interrupted or uneven; lateral carinæ absent, interrupted, irregular, or slightly prominent, but seldom right-angled, as in the greater number of the genera in the previous section.

The remaining genera of *Ædipodini* belong to this section; yet *Boöpedon* and *Brachypeplus* vary so far from the type that it is doubtful whether they should be admitted here; the latter genus, and also *Æ. phænicoptera*, *Æ. atrox*, and *Æ. pellucida* approach the previous section in the form of the pronotum.

STETHEOPHYMA, Fisch.

Arcyptera, Serv., Scudd.; *Mecostathus*, Fieb. (*ex parte*); *Gomphocerus*, Burm., Borck.

Head large, gross; the face somewhat oblique. Vertex obtuse or sub-obtuse; the lateral foveolæ triangular or oblong-quadrangular; but these are sometimes indistinct and at others entirely obliterated even in the same species; frontal costa rather broad. Eyes sub-depressed. Antennæ of medium length, filiform. Pronotum flattened above, tricarinate; the median carina somewhat acute, and the lateral rather obtuse, sub-parallel, or slightly divergent posteriorly; the three transverse furrows undulate, the posterior only cutting the median carina; the sides marked more or less with impressed lines. The prosternum furnished with an obtuse tubercle. Elytra and wings perfect in both sexes, or slightly abbreviated in the female. Legs of the usual structure; the posterior femora moderately dilated.

This genus includes the *Arcyptera* of Serville, the name adopted by Scudder; but as that genus depends upon the expansion of the costal borders of the elytra as its chief characteristic, I prefer Fischer's name.

S. lineata, Thos.

Syn., *Arcyptera lineata*, Scudd., Bost. Jour. Nat. Hist., 1862, VII, 462.

Vertex of the head broad, slightly swollen at the front border of the eyes; apex docked; edge raised to a ridge, with a medial ridge extending over the whole top of the head; foveolæ small, shallow, triangular. Pronotum rugose; lateral carinæ parallel on the anterior half, somewhat divergent behind, not so high as the median, and much broken. Elytra long and slender, with no swollen curves; the costal border not so prominent near the base as is usual in this genus.

Color.—Dark-brown. A narrow, curved, dark line extends from the upper border of the eyes to the lateral carinæ of the pronotum, and is the inner limit of a broad, brownish-yellow band, which extends from the eye to the lateral carinæ, whence it continues backward along the carinæ; below this, upon the upper border of the side, extends another broad, black band from the eye to the hind edge of the pronotum; the median carina is black. The elytra have the costal edge dark, beneath which is a yellow streak extending from the base to the costal border at about two-thirds the distance to the apex; beneath this is a band, narrow and black at base, broadening

till it occupies the whole width of the elytra, becoming brown toward the tip, while the inner border is yellowish-brown. The wings dusky, the internal half with a yellowish tinge. Legs dark-brown; hind femora black on the outer and inner surfaces, reddish-brown above, coral-red below, with a white spot near the apex; tip black. Hind tibiæ yellow, with black spines; the base and tips black, and a dusky annulation below the knee.

Dimensions.—♂ Length, 1 inch. ♀ Length, 1.4 inches; elytra, 1.12 inches; hind femora, 0.72 inch.

Massachusetts (Scudder).

S. gracilis, Thos.

Syn., *Arcyptera gracilis*, Scudd., Bost. Jour. Nat. Hist., 1862, VII, 463.

Vertex of the head as in *S. lineata*, except that it is more pointed, narrower, and more rounded at the tip; foveolæ long and narrow, triangular, and rather deep. Pronotum as in *S. lineata*. Elytra as in *S. platyptera*, though the costal border is not so much swollen.

Color.—Dark-brown. Markings of the head and pronotum much as in *S. lineata*, though not so distinct. The band on the upper border of the sides of the pronotum behind the eye is narrow instead of broad. Elytra uniform dusky-brown. Wings as in *S. lineata*. Posterior femora reddish; tips black. Hind tibiæ as in *S. lineata*, with the markings rather more distinct.

Dimensions.—♂ Length, 0.85 inch; elytra, 0.78 inch; hind femora, 0.52 inch.

Maine (Packard); Red River Settlements in British America (Scudder.)

I am unacquainted with these species, yet I feel warranted, from the descriptions alone, in expressing the opinion that this and the following are but varieties of *S. lineata*.

S. platyptera, Thos.

Syn., *Arcyptera platyptera*, Scudd., Bost. Jour. Nat. Hist., 1862, VII, 463.

Vertex of the head much as in *S. lineata*, with the apex more rounded and the edge scarcely prominent; foveolæ only discernible as faint depressions, slightly longer than in *S. lineata*. Sides of the pronotum regularly but slightly divergent posteriorly; median carina more prominent; pronotum

rugose, as in the other species. Elytra short and broad; costal border considerably swollen near the base; the internal border full.

Color.—Dark reddish-brown; marked on the head and pronotum as in *S. lineata*, but with the colors much suppressed. Elytra uniform pale-brownish, transparent. Wings transparent, colorless, with the nervures of the anterior half black.

Dimensions.—♀ Length, 1.2 inches; elytra, 0.83 inch; hind femora, 0.68 inch.

New England (Scudder).

TRAGOCEPHALA, Harr.

Body compressed on the sides, narrow. Head narrow, acuminate in front; the part in front of the eyes about equal to the portion behind them. Vertex elongate-triangular; the front angle generally acute, especially in the males; slightly deflexed; the margins more or less raised; lateral foveolæ, when present, triangular, but when obsolete they are represented by flat, triangular spaces. Eyes sub-globose, rather prominent. Antennæ short, seldom reaching the tip of the pronotum in the female, thick, somewhat flattened, and slightly enlarged toward the tip; joints very short. Frontal costa very prominent above, generally sulcate; face sub-oblique and somewhat curved under toward the breast. Pronotum compressed, slightly constricted near the anterior border; narrowed in front and expanding posteriorly; slightly angled in front, posterior extremity generally acute-angled; median carina somewhat prominent, straight, or very slightly arcuate, usually entire; lateral carinæ sometimes obsolete or indistinct, especially in the females, often distinct throughout in the males; sides of the disk sloping upward to the median carinæ. Elytra and wings rather narrow, passing the abdomen. Middle legs longer than the anterior pair; posterior femora moderately inflated, generally longer than the abdomen. Prosternum unarmed. Species of medium size.

T. obiona.

Syn., *Stenobothrus obionus*, Thos., Geol. Surv. Terr., 1870, 279.

Vertex narrow, somewhat deflexed; margins raised, acute, sub-parallel, acutely rounded at the apex. Face sub-vertical, the lower part curved under toward the breast; frontal costa prominent, expanding slightly below, flat or

slightly sulcate. Pronotum moderately compressed on the sides, slightly constricted in the middle; the three carinæ distinct, the lateral converging in front, diverging posteriorly; the median straight on top, rather prominent, cut by a cross incision a little in advance of the middle; the interspaces of the disk slightly ascending toward the median carina; the angle of the front border very obtuse, scarcely apparent; the posterior extremity about right-angled or slightly obtuse. Antennæ short, thick, somewhat flattened, and slightly enlarged toward the apex; joints short. Elytra and wings passing the abdomen. Cerci of the male rather longer than usual.

Color (dried after immersion in alcohol).—Testaceous-brown, varied with olive or purplish. Face pale-olive or purplish, varied with light and dark shades; cheeks and vertex brown; a very narrow yellow line runs from the hind border of the eye to the lateral carinæ of the pronotum. Pronotum testaceous, the anterior lobes being darkest; sides brown on anterior half, rest olive or pale-purple; disk of the male dark-brown; in the female the margins are striped with paler brown or ash. Elytra pale reddish-brown; apex translucent; the middle field marked with large fuscous or brown spots; some two or three are also on the lower field. Posterior femora with three oblique brown bands.

Dimensions.—♀ Length, 0.8 to 1 inch; elytra, 0.65 inch; hind femora, 0.52 inch. ♂ Length, 0.65 inch; hind femora, 0.4 inch.

Colorado (Thomas).

Remark—This species varies somewhat from the typical form of this genus, approaching very near to *Æ. atrox* and *Æ. pellucida* in general form and appearance; but in the form of the vertex and antennæ approaches nearer to *Tragocephala* than any other genus.

T. pacifica, sp. nov.

Male.—Very narrow, much compressed. Vertex much prolonged in front, the portion in front of the eyes equal one-half the length of the head; margins much elevated, sharp, inclosing a lanceolate foveola, which has a short median carina in the hind portion of it; lateral foveolæ sub-distinct, triangular. Face slightly oblique, nearly straight, the lower part being a little curved; frontal costa very prominent, very narrow at the apex, gradually expanding from there to the base; a sharp, distinct sulcus commences opposite the antennæ and continues to the clypeus; lateral carinæ distinct,

but not prominent. Antennæ short, not reaching the tip of the pronotum, broad and flattened, and slightly enlarged toward the apex; tip acuminate. Pronotum narrow, compressed at the sides, somewhat constricted in advance of the middle, and diverging from this point posteriorly; median carina sharp, somewhat elevated, nearly straight on top, continuous; lateral carinæ distinct but not elevated, somewhat acute and nearly parallel on the front lobe, diverging from thence to the hind border; front margin obtuse-angled; hind margin acute-angled. Elytra and wings extend beyond the extremity of the abdomen about one-fourth their length; the nervules in the apical portion of the elytra rather prominent. Posterior femora extend beyond the apex of the abdomen; upper carina very prominent and sharp.

Color (dried).—Dark ash-brown, with some lighter shades, unspotted. Posterior femora generally dull-yellowish, with a few oblique darker streaks, especially on the upper carina; posterior tibiæ dusky. Wings transparent, with a faint greenish-yellow tinge at the base; apex and anterior portion slightly fuliginous; nerves black, and an opaque, black stripe along the anterior margin.

Dimensions.—Length, 0.54 inch; elytra, 0.44 inch; hind femora, 0.37 inch.

California (Thomas).

T. infuscata, Harr., Rep., 3d ed., 181.

Syn., *Gomphocerus infuscata*, Uhler, in Harr. Rep., 3d ed., 181.

Male.—Head and thorax narrow, and compressed at the sides. Vertex strongly advanced in front of the eyes, acute-angled; margins elevated, sharp; lateral foveolæ almost obsolete. Frontal costa very prominent, narrow; the portion above the ocellus arcuate, solid; slightly bent in at the ocellus, and sulcate. Antennæ rather short, flattened, and slightly enlarged near the apex; the joints much shortened and somewhat distinct. Median carina of the pronotum somewhat prominent, sharp, straight on top, entire; lateral carinæ, sub-acute, but not elevated.

Color (both sexes).—Dusky-brown. Elytra faintly spotted with brown. Wings transparent, pale greenish-yellow at the base, with a large dusky cloud near the middle of the hind (outer) border, and an opaque black line on the front margin. Posterior femora pale, with two large black spots on the inside; posterior tibiæ brown, with darker spines.

Dimensions.—Length, 0.65 to 0.8 inch; elytra, 0.62 to 0.75 inch.

Massachusetts, Maine, New Hampshire, Connecticut (Scudder); Illinois, Nebraska, Colorado (Thomas).

This is very closely allied to *T. pacifica*, and, if it were not for the widely-separated localities in which they are found, they might be considered as varieties of one species.

T. viridifasciata, Harr., Rep., 3d ed., 182, Pl. iii, Fig. 2.

Syn., *Gryllus viridifasciatus*, Geoze., Ent. Beitr., II, 115.

virginianus, Fabr., Syst. Entom., 291.

(*Locusta*) *chrysomelas*, Gmelin, Linn., Syst. Nat., IV, 2086.

virginianus, Goeze., Ent. Beitr., II, 106.

Locusta viridifasciata, Harr., Hitchi., Rep., 583.

Acrydium viridifasciatum, De Geer (Goeze.), Ins., III, 325, Tab. xlii, Fig. 6.

marginatum, Oliv., Enc. méthod., VI, 229.

virginianum, Oliv., Enc. méthod., VI, 225.

hemipterum, Pal. Beauv., Ins., 145, Pl. iv, Fig. 3.

Gomphocerus viridifasciatus, Uhler, in Harr., Rep., 3d ed., 182, note.

Edipoda virginiana, Burm., Handb. Ent., II, 645.

Vertex triangular, acuminate, blunt at the tip, not deflexed; margins slightly elevated; lateral foveolæ very shallow or obsolete, triangular, the apex forward. Frontal costa prominent; sides nearly parallel; solid, and slightly arcuate above the ocellus, punctured; sulcate below it in the males, and slightly sulcate in the females; the margins obtuse; lateral carinæ slightly prominent, arcuate. Median carina of the pronotum prominent, continuous, and slightly arcuate in the female; a dim, transverse incision in front of the middle is visible in some specimens; lateral carinæ obliterated in front, slightly apparent on the posterior lobe; front margin extending on the occiput in an obtuse angle; posterior extremity acute-angled. Elytra and wings pass the abdomen, obliquely sub-truncate at the apex. Upper carina of the posterior femora somewhat elevated near the base; posterior tibiæ deeply channeled exteriorly. Antennæ short, robust, enlarged, and flattened near the apex. Sub-anal plate of the male tumid, ending in a blunt point, entire, hairy; cerci prominent, somewhat flattened, longer than the triangular super-anal plate.

Color.—Head, thorax, exterior face of the posterior femora, and a broad stripe along the lower margin of the elytra grass-green. Parts of the mouth, antennæ entire under surface, and the four anterior legs a shining reddish-brown. The upper or posterior half of the elytra ash-brown, with a narrow

stripe of the same color along the anterior margin; the green of the elytra suddenly decreases a little beyond the middle, the apical third being chiefly brownish. Wings transparent yellow at the base; the apical two-thirds fuliginous; paler at the apex. Posterior tibiæ with a white ring near the base, rest pale vermilion or blue; tarsi reddish.

♀ Figured, Harr., Rep., 3d ed., Pl. iii, Fig. 2.

Var. *radiata*.

Syn., *T. radiata*, Harr., Rep., 3d ed., 183.

Head and thorax ash-brown, streaked and dotted with black and dark-brown. Elytra dark-brown where in the other variety they are green; anterior margin near the base pale, with a black spot at the angular expansion. Exterior face of the posterior femora cinereous; posterior tibiæ dark-blue below the pale ring. The notch in the median carina is more apparent in this variety than the other. Males much smaller, and darker.

Dimensions.—♀ Length, 1.1 to 1.25 inches; elytra, 0.9 inch; posterior femora, 0.6 inch; posterior tibiæ, 0.5 inch. ♂ Length, 0.84 inch; elytra, 0.62 inch; posterior femora, 0.45 inch; posterior tibiæ, 0.42 inch.

Massachusetts, Maine, Connecticut (Scudder); Maryland (Uhler); Illinois, Missouri, Iowa, Nebraska, Minnesota, Florida, Mississippi (Thomas).

TOMONOTUS, Sauss.

The body compressed on the sides. Antennæ flattened or filiform, rather short. Face vertical, more or less curved below. The vertex horizontally produced or sub-deflexed, triangular in front; the median foveola flat or transversely indented, the front part horizontal or slightly elevated, a slight median carina, truncate, and closed in front; margins raised; lateral foveolæ triangular, the inner margin arcuate. The face somewhat compressed, and more or less prismatic; the frontal costa very prominent, its sides parallel, more or less sulcate, and generally bisulcate above the ocellus. The pronotum obtuse-angled in front; hind margin acute-angled; median carina cristate or sub-cristate, continuous; no lateral carinæ on the anterior lobes, obtuse or sub-acute on the posterior lobe. Elytra and wings usually extending beyond the apex of the abdomen. Posterior femora compressed and dilated. Prosternum unarmed.

This genus has much the appearance of *Tropeonotus*, but differs in having the face vertical, and the crest of the pronotum is generally less prominent; the femora are dilated and the prosternum unarmed. It also approaches *Pachytilus*.

T. sulphureus, Sauss., Rev. et Mag. Zool., XIII, 1861, 321.Syn., *Ædipoda sulphurea*, Burm., Handb. Ent., II, 643.*Gryllus sulphureus*, Fabr., Syst. Ent., II, 59.*(Locusta) sulphureus*, Gmel., Linn., Syst. Nat., I, 2079.*Acridium sulphureum*, Oliv., Enc. Meth., VI, 227.*Locusta sulphurea*, Harr., Rep., 177, Pl. i, Fig. 6.

Foveola of the vertex in the female slightly transverse, divided by a median carina, triangular in front, the margins connecting in front or approaching near to each other in a right angle; in the male somewhat elongate; the frontal costa prominent, sub-tricarinate above the ocellus, very slightly sulcate below it; face, seen from the side, slightly arcuate. Median carina of the pronotum prominent, sub-cristate, entire, very slightly arcuate; front margin obtuse-angled, slightly advanced upon the occiput; apex about right-angled; lateral carinæ obsolete; surface rugulose. Elytra and wings passing the abdomen. Posterior femora passing the abdomen. Antennæ in the female scarcely reaching the tip of the pronotum; proportionally longer in the male.

Color.—Dusky-brown, varying from an ashen to a dark hue. Elytra rather paler than the head and thorax, more or less distinctly spotted with brown. Wings deep-yellow at the base and on the basal half of the front margin, bounded externally by a dusky-brown band beyond the middle, which curves and is prolonged on the hind margin, but does not reach the anal angle; a sub-marginal ray of the dark, extending two-thirds the distance to the base, separates the yellow of the margin from that of the disk; apex translucent, dusky. Posterior femora black inside, with two white bands; posterior tibiæ dusky, with a pale ring near the base; middle sometimes bluish.

Dimensions.—♀ Length, 1.10 inches; elytra, 0.95 inch; posterior femora, 0.6 inch; posterior tibiæ, 0.54 inch. ♂ Length, 0.75 to 0.85 inch.

Maine (Packard); Connecticut (Smith); Massachusetts (Harris); Colorado, Southern Illinois, Tennessee, Missouri, Nebraska (Thomas); Florida, Rocky Mountains, Vancouver's Island (Walker).

T. xanthopterus, Thos.Syn., *Ædipoda xanthoptera*, Burm., Handb. Ent., II, 643.*Acridium xanthopterum*, De Haan, Bijdr. Kenn. Orthop., 143.

This is very closely allied to and possibly only a variety of *Æ. sulphurea*; but there are some differences which appear to be permanent, and to consti-

tute it a separate species. These differences, which will sufficiently describe it, are as follows: The margins of the vertex do not connect so closely in front. The median carina of the pronotum is higher and more rounded on top, the southern specimens having it more elevated than the northern; the angle of the anterior margin less obtuse and advanced farther upon the occiput; the posterior angle decidedly acute, and somewhat prolonged.

Color.—Thorax generally, though not always, darker than in the former species; in some specimens there are two yellow dots on the middle of the sides of the pronotum, one above the other, and the front and hind margins are dotted with olive, but these markings are not uniform. The dark ray of the wings, near the front margin, is not more than half as long as in the former species, extending but one-third the distance to the base; this is remarkably uniform. The posterior femora generally have two oblique dull-yellowish bands on the exterior face, and also a paler and more distinct ring near the apex.

Dimensions.—Not very uniform. ♀ Length, 1.12 to 1.25 inches; elytra, 1 to 1.05 inches; ♂ Length, 1 to 1.12 inches.

Massachusetts, Missouri (Scudder); Carolina (Burmeister); Tennessee (De Haan, Thomas); Connecticut (Smith); Missouri (Thomas).

Æ. carinata, Scudd., is very closely allied to this; and although I have described it as a distinct species on the authority of Dr. Scudder, yet I do not think they are different.

T. carinatus, Thos.

Syn., *Ædipoda carinata*, Scudd., Trans. Am. Ent. Soc., II, 306.

Closely allied to and scarcely distinct from *Æ. xanthoptera*, Burm. Face, seen from the side, slightly arcuate; frontal costa but slightly sulcate on lower half; sides parallel. Median carina cristate, sharp, arcuate, entire; lateral carinæ nearly obsolete; anterior margin at the middle projecting slightly on the occiput; apex acute-angled. Elytra and wings passing the abdomen. Posterior femora passing the abdomen in the male.

Color.—Head blackish, profusely streaked, and spotted with dull bluish-white; frontal costa and upper half of the clypeus edged with whitish; palpi blackish, the joints tipped with luteous. Pronotum dull dark-brown with a short pale streak extending from the lower edge of the eye. Basal third of the elytra dark-brownish fuscous; rest an ashy-brown, profusely and

rather regularly sprinkled with small brownish spots. Basal half of the wings pale dull-orange, bordered by a broad fuscous band, occupying the rest of the wing excepting the apex, and encroaching on the orange near the front margin, as in *Æ. xanthoptera*; apex semi-pellucid, a little fuliginous, darkest at the extreme tip. Hind femora dull-hoary outside, black, with three white bands, inside; tibiæ blackish-brown, with black spines, and a broad pale band near the base.

Dimensions.—♀ Length, 1.2 inches; elytra, 1.2 inches; posterior tibiæ, 0.58 inch. ♂ Length, 1.1 inches; elytra, 1.14 inches; posterior femora, 0.65 inch; posterior tibiæ, 0.61 inch.

Iowa (Dodge, Scudder); Missouri (Thomas).

T. tenebrosus, Thos.

Syn., *Ædipoda tenebrosa*, Scudd., U. S. Geol. Surv. Neb., 251.

Tomonotus pseudo-nietanus (var), Thos., Proc. Acad. Nat. Sci. Phil., 1870, 82.

Closely allied to *Æ. sulphurea*, Burm. Upper part of the head regularly convex; central foveola of the vertex sub-elongate, divided by a median carina into two sub-pyriform parts, generally truncate and closed in front; upper part of the frontal costa dimly sub-tricarinate, rest flat, slightly impressed at the ocellus, prominent. Face, seen from the side, arcuate below. Antennæ somewhat flattened and enlarged toward the apex. Median carina of the pronotum distinct, somewhat prominent, nearly straight on top, cut near the middle, but not notched; anterior margin obtusely rounded; apical angle a little more than a right angle; lateral carinæ sub-distinct; disk of the posterior lobe nearly flat. Elytra and wings pass the abdomen.

Color.—Nearly uniform dark-fuscous, males often quite black; front of head with somewhat pale markings. Pronotum above, dull dirty-yellow, with dots and streaks of fuliginous; hind femora banded, with yellow near the apex; hind tibiæ with a dull-reddish band next the base, followed by a darker band. Elytra almost uniformly mottled with fuscous, the outer half interspersed with paler spots. Wings pale-red at the base, the whole outer border obscured by a broad, dark, fuliginous band, slightly paler at the extreme tip, projecting sharply inward almost to the base of the wing near the costal margin. Antennæ fuscous, basal third paler.

Dimensions (according to Scudder).—♀ Length to tip of elytra, 1.8 inches. ♂ Length to tip of elytra, 1.25 inches.

Nebraska (Scudder, Dodge); Colorado, Wyoming, New Mexico, Kansas, Dakota, Missouri (Thomas).

Remark.—It is probable that *Tomonotus nietanus*, *mexicanus*, and *pseudo-nietanus* of my paper, Proc. Acad. Nat. Sci. Phila., 1870, 82, and Geol. Surv. Ter., 1870, 278–279, are but varieties of this species. I am now satisfied, by an examination of a large number of specimens, that the first two are not those of Saussure. Some of the specimens are uniformly pale ash-brown, uniformly dotted with fuscous; others, especially the males, nearly black; others have the disk of the pronotum entirely pale-ashen, others only its margins. As Mr. Scudder's description was probably from an alcoholic specimen, I give the following, taken from fresh specimens:

Face pale-ash, dotted over very thickly with black points; mouth whitish; outer joints of the palpi white. Wings, with the broad, basal portion a clear orange-red, bordered exteriorly with black; apex transparent. Posterior femora crossed on the outside with three pale bands, the one near the apex white and straight. Upper end of the posterior tibiæ black, then a narrow white band, the middle portion bluish-green; tarsi pale yellowish-white. Central portion of the sternum greenish-yellow. My *T. pseudo-nietanus* would probably take precedence of Dr. Scudder's name; but, as it applies only to a variety, and was given under an erroneous impression, I adopt that of Dr. Scudder.

ÆDIPODA, Latr.

Gryllus, Linn., Fabr., Zett., Say; *Acridium*, Oliv., H. Sch., Costa.; *Locusta*, Steph., Harr.; *Ædipoda*, Latr., Burm.

Face vertical or sub-vertical, the lower portion sometimes arcuate; tricarinate; the median carina (frontal costa) generally more or less sulcate, somewhat prominent; lateral carinæ more or less distinct, divergent. Vertex deflexed, with a central foveola, sometimes divided by a median carina; on each side of this, near the eye, is a small, triangular foveola, sometimes almost obliterated, but the outlines, at least, always observable. Eyes ovate, and then not very prominent, or sub-globose and then generally prominent; with the latter there is generally an ascending or convex occiput. Pronotum of moderate length, truncate or sub-angulate in front; apex angulate; anterior lobes contracted, more or less transversely wrinkled, with the humeral angles rounded; the transverse incisions close together, the first and second sub-dis-

tinct, third at or before the middle generally distinct; median carina distinct, varying from a slightly elevated line to a moderate crest, sometimes without any transverse incision, sometimes with one notch, sometimes with two; lateral carinae sub-distinct on the posterior and anterior lobes or obsolete, generally obsolete on the middle lobe; disk somewhat flat, or with the sides deflexed. Elytra and wings always as long as the abdomen, generally passing it. Posterior femora considerably dilated near the base, compressed laterally; disk flat. Pulvilli of the tarsi small. Prosternum unarmed. Sub-genital plate of the male conical, rounded at the apex. Antennae as long or longer than the head and thorax, filiform, sometimes slightly flattened.

This generic description is intended only for the species found in the United States.

Table of species.

- A. Wings colored :
- B. Wings with the disk black or fuliginous:
- a.** Elytra and wings longer than the body *longipennis.*
- aa.** Elytra and wings passing the abdomen, but not longer than the body:
- b.** Body of the wings black, with a narrow yellow border *carolina.*
- bb.** Wings with the inner half fuliginous, the apical half transparent *carlingiana.*
- BB. Wings with the disk red :
- a.** Antennae with alternate rings of brown and red *haydenii.*
- aa.** Antennae not annulate with brown and red :
- b.** Antennae almost as long as the body *fenestralis.*
- bb.** Antennae of medium length :
- c.** Disk of the pronotum rugose and more or less tuberculate :
- d.** Elytra with somewhat straight sub-elongate rather large brownish spots placed irregularly; femora deep-blue inside *discoidea.*
- dd.** Spots of the elytra large, sub-quadrangle, very irregular; femora yellow inside *paradoxa.*
- ddd.** Spots of the elytra small, dim, cellular, or obsolete *montana.*
- cc.** Disk of the pronotum smooth or nearly so :
- d.** Elytra with large brown spots *phaenicoptera.*
- dd.** Elytra marked with small, dilute, fuscous spots; the apical third transparent *venusta.*
- BBB. Disk of the wings yellow :
- a.** Median carina of the pronotum cut by but one transverse incision :
- b.** Apical half of the wings fuliginous *sordida.*
- bb.** A dark band across the wings :
- c.** Thorax very broad, robust; vertex very broad; disk of the pronotum tuberculate; median carina slight :
- d.** Elytra ash-brown, spots small, in groups, forming three indistinct bands *neglecta.*

- dd. Elytra with large, brownish, irregular spots :
 - e. Inside of the posterior femora coral-red, not crossed by black bands } *haldemanni.*
corallipes.
 - ee. Inside of the posterior femora yellow, crossed by three black bands *rugosa.*
 - cc. Thorax not very broad; vertex of moderate width; disk of the pronotum not tuberculate; median carina more or less prominent :
 - d. Elytra marked with groups of fuscous spots, forming about three irregular bands :
 - e. General color ash-gray, mottled with dusky-brown and white... *equalis.*
 - ee. General color dark reddish-brown *collaris.*
 - dd. Elytra in no way banded :
 - e. Elytra marbled with large whitish and black spots *marmorata.*
 - ee. Elytra ash-yellow, with a broad stripe of fuscous dots and small spots along the middle *wyomingiana.*
 - aa. Median carina of the pronotum cut by two transverse incisions :
 - b. Elytra crossed by three distinct, well-defined, dark bands* *trifasciata.*
 - bb. Elytra not thus distinctly three-banded :
 - c. Antennæ very long, especially in the male *eucerata.*
 - cc. Antennæ of medium length :
 - d. Wings with distinct dark or fuscous bands across them :
 - e. Back of the head very convex, elevated *plattei.*
 - ee. Back of the head of the usual form :
 - f. Elytra having on the lower field two sub-quadrate black spots, separated by an oblong whitish space *cincta.*
 - ff. Elytra otherwise marked :
 - g. Elytra marked with dark spots, which run together at the base and form an irregular band across the middle *verruculata.*
 - gg. Elytra sprinkled with minute brown dots chiefly along the middle and lower half *maritima.*
 - dd. Wings without distinct dark or fuscous bands across them :
 - e. Apical half of the wings dusky or clouded; border not regularly undulated *gracilis.*
 - ee. Apical half of the wings cloudy or semi-transparent; border regularly undulated *undulata.*
 - AA. Wings pellucid :
 - a. Median carina of the pronotum equal, or nearly so, throughout; not much interrupted :
 - b. Wings slightly clouded at the outer and along the costal border. *costalis.*
 - bb. Wings not clouded :
 - c. Median carina of the pronotum solid, not severed *atrox.*
 - cc. Median carina of the pronotum cut by a cross incision *pellucida.*
 - aa. Median carina of the pronotum not equal throughout; much interrupted :
 - b. Back of the head elevated; clay-yellow, with fuscous spots and dots *kiowa.*
 - bb. Back of the head as usual; testaceous *parviceps.*

* *C. hoffmanni*, Thos., is closely allied to *C. trifasciata*; but the only specimen seen is too imperfect to give the species a place in the table with sufficient certainty.

Division 1.—The head somewhat narrowed above, the back of it not elevated; the vertex somewhat narrow or of but moderate width, slightly advanced in front of the eyes. Eyes more or less ovate. Median carina of the pronotum somewhat elevated, more or less notched; sides of the disk somewhat sloping; lateral carinae sub-obsolete or indistinct and obtuse on the anterior lobes; in a few cases they re-appear near the front margin in a sub-acute form. Posterior femora broad at the base, but less so than in the third division of the genus, the maximum of this division being found in *Æ. carolina* and *Æ. collaris*. This division, in the form of the head and thorax, is closely allied to *Tomonotus*.

Æ. venusta, Stål., Eug. Resa., 103.

Female.—Sordid; yellowish-gray. Pronotum behind the middle punctate, rugose; median carina moderately elevated, acute, continuous, a slight incision before the middle. Wings dilute roseate at base; an arcuate fuscous band across the middle.

Head obtuse in front, slightly prominent; vertex smooth, flat in front, somewhat deflexed; margins acute; a very slight median carina; face remotely punctate; frontal costa slightly sulcate; lateral carinae distinct, divergent. Antennae filiform, slightly flattened, compressed at the apex, equal head and thorax in length. Pronotum very obtuse in front; posterior margin obtuse-angled, somewhat narrowed in front; the disk behind the middle, and the lateral lobes punctate; median carina moderately elevated, acute, with a somewhat deep and sharp incision in advance of the middle. Elytra passing the posterior femora, but slightly narrowed near the apex; ornamented with small dilute fuscous spots, the apical third transparent. Wings dilute roseate in advance of the middle; behind the middle transparent, hyaline, with an arcuate fuscous band across the middle. Posterior femora not passing the abdomen; spotted with black on the inner face; spines of the posterior tibiae black at the tips.

Dimensions.—Length, 1 inch; expansion of elytra, 2.12 inches.

San Francisco, California (Stål.)

Æ. marmorata, Uhler, Harr., Rep., 179.

Syn., *Locusta cerineipennis*, Harr., Cat. Ins. Mass., 56.

marmorata, Harr. Rep., 179.

“Ash-colored, variegated with pale-yellow and black. Thorax suddenly narrowed before the middle, and the slightly elevated longitudinal carina on

the top is cut through in the middle by a transverse fissure. Elytra marbled with large whitish and black spots, and semi-transparent at the end. Wings light-yellow on the half next the body, transparent near the end, with two black spots on the tip, and a broad intermediate black band, which, narrowed and curving inward on the hind margin, nearly reaches the inner angle. Hind femora pale-yellow, black at the extremity, and nearly surrounded by two broad black bands; hind tibiæ coral-red, with a black ring immediately below the knee, and followed by a white ring, black at the lower extremity also, with the tip of the spines black. In some individuals there is an additional black ring below the white one on the tibiæ; is marked on the wings somewhat like *Æ. aequalis*, but is invariably smaller, with the thorax much more contracted before the middle.

Dimensions.—Length, 0.75 to 1.25 inches; expansion of the elytra, 1.1 to 2.75 inches.”

Massachusetts (Harris).

I have not seen this species, nor does it appear to have been noticed by any one except Dr. Harris.

Æ. costalis, Scudd., Bost. Jour. Nat. Hist., VII, 473.

Female.—Brownish-yellow, profusely mottled with reddish-brown; a broad yellowish band extends from each eye to the opposite outer posterior angle of the pronotum, crossing at the middle of the pronotum, bordered outside with a broad band of black, narrowing posteriorly to a line, and inside, behind the intersection, by a broad black band, which has another narrow short black line parallel to it at the hind border of the pronotum; median carina of pronotum equal, rather sharp, not high. Elytra as in *Æ. sordida*. Wings pellucid, with a faint cloudy patch at the middle of the outer border, and a dark streak along the costal border toward the apex. Hind femora yellowish, with two transverse dark annulations; the tips brown; hind tibiæ bluish, with black spines, and a yellowish annulation at the base. It differs from *Æ. sordida* in the markings and lowness of the median carina of the pronotum, and in the shorter and fuller wings.

Dimensions.—Length, 1.05 inches; expansion of wings, 1.75 inches; depth, 0.46 inch.

Texas (Scudder).

Æ. wyomingiana, Thos., Geol. Surv. Terr., 1871, 462.

Very similar to *Æ. collaris*, Scudd., but differs in size, vertex, and the distribution of the spots on the elytra. Central foveola of the vertex slightly elongate; the sharp margins not quite meeting in front, but continuous with the sides of the frontal costa; frontal costa narrow, rather deeply sulcate, expanding below, reaching the clypeus. Median carina of the pronotum prominent, sub-cristate, with a very narrow, but deep, oblique notch, a little in advance of the middle, the top slightly arcuate; anterior margin slightly angled, posterior extremity acute-angled; lateral carinæ distinct. Antennæ slightly passing the thorax.

Color (dried after immersion in alcohol).—Dull clay-yellow, mottled and spotted with brown and fuscous. Face and sides of the head and pronotum minutely dotted with brown; two short brown stripes on the side of the pronotum reaching from the front to the third incision. Elytra pale ashen-yellow, semi-transparent at the apex, with a broad stripe of fuscous dots and small spots along the middle field from the base to the apex; an indistinct pale line along the dorsal angle; the dorsal margin near the base dotted with brown or fuscous; lower margin faintly dotted. Wings transparent-yellow at base, apical third transparent, with dusky nerves; a moderately broad black band between, its width equal one-fourth the length of the wing, curving round the hind margin to the anal angle; a short blunt ray extends up the front margin a very short distance toward the base—one-third the distance. Hind femora and tibiæ as in *collaris*.

Dimensions.—♀ Length, 1 to 1.05 inches; elytra, about equal the body; hind femora, 0.62 inch; hind tibiæ, 0.54 inch. ♂ Length, 0.8 inch; elytra, 0.85 inch.

Eastern Wyoming (Thomas).

This may be but a variety of *Æ. collaris*, and I give it as distinct with considerable doubt.

Æ. collaris, Scudd., Hayden's Geol. Surv. Neb., 250.

Central foveola of the vertex rather broader than long in the female; in the male very slightly elongate; frontal costa flat or convex above the ocellus, with a shallow sulcus below; sides nearly parallel. Median carina of the pronotum prominent, sub-cristate, with a very narrow but deep oblique notch a little in advance of the middle; the top slightly arcuate; lateral carinæ

indistinct; sides of the disk ascending. Elytra and wings pass the abdomen about one-third their length.

Color.—Dark reddish-brown. Lower half of the head and a broad band along the posterior edge of the pronotum a clay-yellow, sprinkled with a few fuscous dots. Elytra mottled somewhat uniformly with fuscous blotches and dots, which form three irregular bands, one at the base, which is broad, the middle one narrowest, the apical one sometimes lost in the nearly equal mottling of the tip. Wings pale-yellow at base; a broad median black band occupying the middle third, crossing the wing at right angles, decreasing along the posterior margin, around which it curves to the anal angle, throwing out a short, blunt, sub-frontal spur about one-third the distance to the base; apical portion transparent, nerves dusky, and tip clouded or with dusky spots. Hind femora clay-yellow, with two bands and apex fuscous externally and black internally; hind tibiæ reddish. Antennæ fuscous at the apex.

Dimensions.—♀ Length, 1.25 inches; elytra, equal the body; hind femora, 0.7 inch; hind tibiæ, 0.64 inch. ♂ Length, 0.9 to 1 inch.

Nebraska (Dodge, Scudder); Colorado (Thomas).

C. æqualis, Uhler, Harr., Rep., 178.

Syn., *Gryllus æqualis*, Say, Ent., II, 237.

Locusta æqualis, Harr., Rep., 178.

Vertex of moderate width; foveola very shallow, especially in the female, slightly elongate, and in the male divided by a dim carina; lateral foveolæ almost obsolete; frontal costa sulcate, slightly in the female, more distinctly in the male, reaching nearly or quite to the clypeus. Median carina of the pronotum prominent on the anterior lobes, distinct but less prominent on the posterior lobe, severed once near the middle, with a notch; front part compressed as usual, but less wrinkled than many other species; posterior lobe nearly flat on the disk, slightly rugulose, especially the female; anterior margin slightly angled; posterior extremity about a right angle; lateral carinæ sub-distinct, rounded. Elytra and wings passing the abdomen about one-fourth their length. Posterior femora in the female about as long as the abdomen. Antennæ passing the thorax.

Color.—Ash-gray mottled with dusky-brown and white. Face white mottled with fuscous, or fuscous mottled with white; occiput dark-fuscous. Pronotum dusky-brown, with a dim, pale, broad stripe along the margins of

the disk, bending inward at the middle with the lateral carinæ, sprinkled over with darker dots. Elytra semi-transparent at the tip, with numerous dusky spots, which run together so as to form three transverse bands, the outer one indistinct, apical portion with a few spots. Wings yellow at base; a broad, black, well-defined band occupying the penultimate fourth, curving and decreasing along the posterior margin, reaching the anal angle; apical portion transparent, with dark nerves; apex with one or two dusky spots. Posterior femora with three white bands; posterior tibiæ red, with a white ring near the base.

Dimensions.—♀ Length, 1.12 to 1.25 inches; elytra, 1.10 inches; posterior femora, 0.62 inch; posterior tibiæ, 0.56 inch. ♂ Length, 0.9 to 1 inch; elytra about equal the body.

Connecticut (Smith); Massachusetts, Minnesota, British America (Scudder); Illinois, Dakota, Minnesota (Thomas); Florida (Walker).

Remark.—I have specimens from Colorado and Wyoming which I believe belong to this species; but as they vary somewhat from the type, I hesitate to decide until I have had further opportunity for comparison

Æ. verruculata, Scudd., Bost. Jour. Nat. Hist., VII, 471.

Syn., *Locusta verruculata*, Kirby, Faun. Bor. Am. Ins., 250.

latipennis, Harr., Rep., 179.

Ædipoda latipennis, Uhler, Harr., Rep., 178.

Acridium verruculatum, De Haan, Bijdr. Kenn. Orthop., 143.

Closely allied to *Æ. æqualis*, from which it differs as follows:

Frontal costa of the female rather more distinctly sulcate. Middle carina of the pronotum less distinct on the posterior lobe, and a little less elevated on the anterior lobes, notched and severed in two places, the middle portion the shortest. Elytra and wings appear to be a little longer compared with the length of the body, and the wings more distinctly papilioform.

Color.—Ash-brown, varied with dusky-brown. Face ash-brown, with dusky dots, male darkest. Pronotum a little darker, dusky spots larger than on the face; lateral stripes scarcely distinguishable. The black band of the wings is narrower, the outer and inner borders more irregular, somewhat broken at the first sub-frontal nerve, does not reach the anal angle; the sub-frontal space dusky nearly to the base; apex dusky, with a few small fuscous dots. Base and apex of the posterior tibiæ black; middle portion yellowish or plumbeous generally, with a dusky annulation near the middle.

Dimensions.—♀ Length 1.10 inches; elytra, long as the body; posterior femora, 0.57 inch; posterior tibiæ, 0.5 inch. ♂ Length, 0.9 to 1 inch.

Maine (Smith); New Hampshire, Massachusetts, Canada (Scudder); United States (Walker); British America (Kirby).

Æ. sordida, Burm., Handb. Ent., II, 643.

Syn., *Locusta periscelidis*, Say, MSS. Harr., Cat. Ins. Mass., 56.
nebulosa, Harr., Harr., Rep., 181.

Acridium sordidum, De Haan, Bijdr. Kenn. Orthop., 143.

Ædipoda nebulosa, Uhler, Harr., Rep., 181.

sordide, Walk., Cat. Dermap. Salt., IV, 732.

Form of the head and pronotum much as in *Æ. sulphurea*. Central foveola of the vertex broad, slightly transverse in the female, triangular and closed in front, median carina sub-distinct; lateral foveolæ shallow, slightly enlarged, elongate-triangular, indistinct in the male; frontal costa prominent, narrow, sulcate, obliterated before reaching the clypeus; face, seen from the side, arcuate. Median carina of the pronotum prominent, sub-cristate, severed about the middle and slightly notched, anterior portion in the female arcuate, both parts somewhat arcuate in the male; lateral carinæ sub-distinct on the front and posterior lobes; anterior margin slightly angled, and extending slightly upon the occiput; apex right-angled. Elytra and wings passing the abdomen; wings rather narrow. Antennæ short, somewhat flattened, and enlarged near the apex.

Color.—Dusky-brown. Head and thorax varied with patches of lighter and darker shades. Elytra fuscous, with two pale fasciæ on the middle portion, sometimes only crossing the lower half, at others crossing the entire width. Wings transparent-yellow on the inner half; apical half fuliginous; front margin dusky. Posterior femora indistinctly banded with yellowish and brown; posterior tibiæ dusky-brown, with a pale ring near the base. Antennæ pale at base, fuscous at the apex.

Dimensions.—♀ Length, 1.2 inches; elytra, 0.95 inch; posterior femora, 0.67 inch; posterior tibiæ, 0.56 inch. ♂ Length, 0.88 inch; elytra, 0.75 inch.

Maine (Packard); Massachusetts (Scudder); Connecticut (Smith); Tennessee (De Haan); Nebraska (Dodge); New York (Emmons).

Æ. longipennis, Thos., Geol. Surv. Terr., 1871, 463.

Elytra and wings longer than the body; elytra spotted; wings black at the base.

Male.—Vertex not very broad; middle foveola elongate, elliptical, with a slight median carina, open in front; frontal costa rather narrow, slightly expanded at the ocellus, sulcate, not expanding below. Median carina of the pronotum somewhat crested, as in *Æ. carolina*, cut near the middle by the last transverse incision, the two parts arcuate; anterior margin angled, extending slightly on the occiput; posterior extremity rather sharply angulate; apparently without punctures on the disk. Elytra narrow, straight, sides parallel, longer than the body; wings about the same length. Posterior femora not channeled below. Cerci rather long, sub-cylindrical, terete. Antennæ longer than the head and thorax.

Color (dried after immersion in alcohol).—Reddish-yellow. Head and pronotum, especially on the upper portions, pale-reddish, dotted with pale-brown. Elytra reddish-yellow next the base, apical portion pellucid; marked throughout with dark-brown spots somewhat in the form of bands. Wings transparent-yellow for a little space at the immediate base; a triangular space at the apex, reaching inward about one-third the length, pellucid, sprinkled at the immediate apex with fuscous dots; the posterior margin pellucid; disk dark, fuliginous. Posterior femora with two oblique, brownish bands on the external face; within are two black bands; apex black internally. Venter and pectus dull yellowish-white. Antennæ pale at base, apical portion dusky.

Dimensions.—Length, 1.14 inches; elytra, 1.27 inches; posterior femora, 0.64 inch; posterior tibiæ, 0.55 inch.

Kansas (Thomas, through the Agricultural Department).

Female unknown.

Æ. carolina, Serv., Hist. Orthop., 722.

Syn., *Gryllus (Locusta) carolina*, Linn., Syst. Nat., I, 2, 701.

carolinus, Fabr., Ent. Syst., II, 58.

Acrydium carolinum, Deg., Ins., III, 491, Pl. 41, Figs. 2, 3.

carolinianum, Pal. Beauv., Ins., 147, Pl. 4, Fig. 6.

Locusta carolina, Harr., Rep., 176, Pl. 3, Fig. 3.

caroliniana, Catesby, Nat. Hist. Car., II, 89, Tab. 89.

Vertex rather broad; foveola slightly elongate, open in front, with a slight depression at the tip; lateral foveolæ minute, shallow; frontal costa sulcate from the ocellus down; slightly contracted immediately below the ocellus. Pronotum contracted and wrinkled in front; last transverse incision distinct, severing and notching the median carina; median carina slightly

crested, posterior portion arcuate, anterior portion nearly straight on top anterior margin somewhat angled at the middle; posterior margin acute-angled. Elytra and wings passing the abdomen about one-third their length. Posterior femora shorter than the abdomen.

Color.—Dull ashy-brown, sprinkled with small, dusky spots. Spots on the head and thorax minute, sometimes absent; on the elytra a little larger, sometimes aggregated in the middle portions, sometimes almost or quite obsolete. Wings deep-black, except the outer margin, which is pale greenish-yellow; the apex dusky, with a few spots. Posterior femora mostly black inside; a pale annulation near the apex.

Dimensions.—♀ Length, 1.5 to 1.75 inches; elytra, length of the body; posterior femora, about half the length of the body. ♂ Length, 1 to 1.25 inches

Maine, Massachusetts, Connecticut (Scudder); North America, (Linnaeus); New York (Fitch); South Carolina (De Haan); Pennsylvania, Tennessee, Nebraska, Kansas, Missouri, Dakota, Minnesota, Mississippi, Nevada, New Mexico, Colorado, Wyoming, Utah, Illinois (Thomas); Georgia, Indiana, Vancouver's Island (Walker).

Æ. fenestralis, Serv., Hist. Orthop., 726.

Male.—Head pale in advance and on the sides; brown above. Pronotum brownish; dorsal carina a little elevated, cut near its anterior part. Elytra of the length of the abdomen; opaque and brown for the basal half, rest transparent; the anterior or lower border brown, with small, hyaline spots; costal border uncolored. Wings a little shorter than the elytra; interior portion next the base vermilion-red; this color occupies more than one-third of the wing; the rest is black, except near the apex there is a rounded, transparent space, with dusky nerves; front border with a short, red band at the base, which is separated from the red disk by an internal arm of the black. Abdomen yellowish. The four anterior legs varied with brownish and yellowish; femora of the posterior pair have both faces yellowish, with two transverse, dusky bands, those of the internal face prolonged upon the channel beneath; posterior tibiæ yellowish, having two broad, bluish annulations, one near the base, the other at the apex. Antennæ fuscous, of a remarkable length, almost equaling that of the entire body. With the exception of the color of the wings, it is much like *Æ. eucerata*, Harr.

Dimensions.—Length, 0.67 inch.

North America (Serville); Florida (Walker).

Division 2.—Top of the head convex and somewhat elevated; vertex broad between the eyes and strongly deflexed; eyes globose and prominent. Median carina moderately but less elevated than in the preceding division; but in this respect there is some variation, as in some species it is very slight and can scarcely be considered as elevated; the lateral carinæ are somewhat distinct, but not acute. The head is usually broader than the front of the thorax, which is considerably constricted near the front.

This division appears to be more closely allied to *Stauronotus* than either of the preceding or following divisions; it is difficult, therefore, to arrange the species in a regular, continuous series.

Æ. eucerata, Uhler, Harr., Rep., ed. 1862, 180.

Syn., *Locusta eucerata*, Harr., Rep., 180.

Occiput ascending, short; vertex broadly triangular, the central foveola being almost as large as the occiput, a regular triangle, the base forming a transverse ridge between the eyes, opening in front into the narrow sulcus of the frontal costa; frontal costa very narrow above, expanding slightly below, sulcate throughout. Antennæ very long, especially in the male, somewhat enlarged, and slightly flattened near the base. Eyes quite prominent, subglobose. Median carina of the pronotum somewhat prominent, nearly straight on top, twice notched, the posterior one about the middle, middle part shortest; lateral carinæ distinct on the posterior lobe; apical angle slightly acute; rather more than usually contracted a little in advance of the middle. Elytra and wings narrow, passing the abdomen.

Color.—Ash-colored, variegated with gray and dark-brown. In the males the disk of the pronotum is dark-brown in the middle, margined with yellowish; sides yellowish, with one or two dusky stripes on the front border. Elytra yellowish-brown, the lower half sprinkled with small fuscous or brown spots; upper half unspotted. Wings yellow at base, varying from pale to deep-yellow; a broad, black band, occupying the middle third, rather broadest where it strikes the hind border, curves round nearly to the anal angle; front margin dusky nearly to the base; apical angle pellucid, except a dusky spot at the tip, sometimes almost obsolete. Hind femora yellow, with three dark bands; apex dark; posterior tibiæ whitish, with a dark ring at each end, a broad one of the same color just above the middle.

Dimensions.—♀ Length, 0.7 to 0.95 inch; elytra, 0.7 to 0.8 inch; hind femora, 0.52 inch; hind tibiæ, 0.46 inch. ♂ Length, 0.65 inch.

Massachusetts (Harr.); Connecticut (Scudder).

C. haydenii, Thos., Geol. Surv. Terr., 1871, 460.

Head and thorax somewhat wrinkled. Vertex rather narrow; central foveola somewhat elongate; margins prominent, sharp, open in front, continuous with the sulcus of the frontal costa; median carina distinct. Frontal costa sulcate throughout, very narrow above the ocellus; eyes prominent, sub-globose. Antennæ rather long. Pronotum tricarinate; median carina distinct, but not prominent; lateral carinæ distinct only on the posterior lobe; third incision very distinct, nearly straight, cuts the median carina about the middle; anterior lobes with irregular raised lines; posterior lobe elongate-tuberculate; apex blunt, right-angled. Elytra and wings passing the abdomen, narrow. Posterior femora slender.

Color (dried after immersion in alcohol).—Dull clay-color, dotted with fuscous. A transverse, fuscous stripe in front between the eyes. A small, fuscous spot about the middle of each side of the pronotum. Upper and lower margins of the elytra marked with small, fuscous spots; middle field nearly clear, a few minute, pale dots visible. Wings pale-yellow at base (red when living), with a tolerably broad, fuscous band, narrowed in front and behind, not reaching the anal angle; a sub-frontal ray of this band extends nearly to the base; apex pellucid, with nerves partly ochreous and partly dusky. Anterior and middle tarsi with two black annulations. Antennæ with alternate rings of yellow and fuscous; the fuscous bands are much broader than the yellow, and the single joints which the yellow occupy appear to be smaller in diameter than the others; the yellow portion is red in the living insect, and the fuscous portion brown.

Color (of living insect).—Wings red at base. Antennæ with alternate rings of brown and red. General color, ash-gray, mottled with fuscous dots and spots.

Dimensions.—♀ Length, 0.9 to 1 inch; elytra, 0.87 inch; posterior femora, 0.54 inch; posterior tibiæ, 0.45 inch. ♂ Length, 0.62 to 0.7 inch; elytra, 0.7 inch.

Colorado, Eastern Wyoming (Thomas).

Named in honor of Dr. F. V. Hayden, United States geologist.

Æ. gracilis, Thos., Geol. Surv. Terr., 1871, 461.

Male.—Small size, slender. Vertex narrow; the central foveola elongate, open in front; the sharp margins continuous with the likewise sharp margins of the narrow and deeply-sulcate frontal costa. Pronotum tricarinate; median carina slightly prominent, twice notched, front portion most elevated, middle section very short, tuberculiform; posterior incision a little in advance of the middle; lateral carinæ distinct; apex right-angled. Elytra and wings long and narrow. Antennæ slender, passing the pronotum. Eyes sub-globose, prominent.

Color (dried after immersion in alcohol).—Ash-gray, mottled with fuscous, which pervades nearly uniformly head, thorax, and elytra; sometimes two yellowish stripes are more or less distinct on the disk of the pronotum, one along each lateral carina. Wings pale transparent-yellow next the base (possibly pale-red when living); apical half dusky, the inner portion darkest, and forming a rather narrow, irregular band, which curves but slightly on the lateral margin, approaching but very little toward the anal angle; the rest of the apical portion clouded; the intermediate portion between the band and apex somewhat transparent. Lower channel and inside of the posterior femora black; a pale ring near the apex. Antennæ fuscous, with yellow annulations.

Dimensions.—Length, 0.85 inch; elytra, a little longer than the body, 0.9 to 0.95 inch; hind femora, 0.46 inch; posterior tibiæ, 0.4 inch.

Colorado, Wyoming (Thomas).

I have specimens which are probably females of this species, but am in doubt in regard to them.

Æ. kiowa, Thos., Geol. Surv. Terr., 1871, 461.

Size small, and the top of the head convex and elevated, as in *Æ. longipes*, Sharp. Vertex broad; central foveola quadrate or sub-hexagonal, with a channel in front, connecting with the sulcus of the frontal costa; lateral foveolæ distinct; frontal costa rather narrow, distinctly sulcate throughout. Eyes very prominent, slightly oblong. Pronotum more than usually contracted a little in advance of the middle, tricarinate; the median carina distinct, but not very prominent, twice notched, the posterior notch about the middle; lateral carinæ distinct on the posterior lobe, indistinct on the front portion; disk somewhat rugose; angle of the hind border a little larger than a right angle. Elytra and wings rather narrow, passing the abdomen.

Color.—Parts of the mouth, pectus, and venter pale-yellow. Face ash-brown; cheeks dusky; from the upper edge of the eyes a pale stripe runs back to the pronotum; the occiput fades backward from brown to yellow. Pronotum dusky, with paler spots. A narrow, yellow stripe along the angles of the elytra; the upper field dusky; three fuscous bands across them, the one nearest the apex generally more or less obliterated by the transparency of this part. Wings pellucid, with a few dusky dots near the apex; nerves of the apex dusky. Posterior femora, with three oblique, indistinct, brown bands, black inside at base; tibiæ blue; tarsi yellow.

Dimensions.—♀ Length, 0.87 inch; elytra, 0.86 inch; hind femora, 0.52 inch.

Colorado, Nebraska (Thomas).

C. cincta, Thos., Proc Acad. Nat. Sci. Phila., 1870, 80.—Geol. Surv. Terr., 1870, 275.

Female.—The head, seen from the side, shows the crown somewhat elevated, the eyes also standing high. Vertex deflexed, broad, sub-hexagonal; the front portion prolonged; the margins continuous with the sides of the frontal costa. Frontal costa narrow above, gradually expanding below, and sulcate throughout. Pronotum short, the length not exceeding the depth, strongly contracted a little in advance of the middle; the disk somewhat rugose, that of the posterior lobe nearly flat; the median carina slightly elevated on the front lobes, twice distinctly notched, the middle portion shortest and rounded; the whole of the disk, especially the posterior lobe, more or less covered with small tubercles; lateral carinæ obsolete on the anterior lobes, and obtuse and indistinct on the posterior lobe; the posterior angle a little larger than a right angle. Elytra and wings extend beyond the apex of the abdomen. Posterior femora rather short, not reaching the tip of the abdomen in the female; broad at base, with a sharp, elevated upper carina, which suddenly decreases about one-third the length from the apex; the lower edge generally hairy. Antennæ longer than the head and pronotum, filiform.

Color.—Fuscous and pale yellowish-brown or ash, about equally distributed in stripes and spots, the ash or yellowish-brown portions more or less mottled with fuscous dots and points. The dark on the head as follows: two stripes running back from each eye, one from the upper, the other from the lower

corner; the lower portion of the cheeks and the lower margin of the face; and some dots on the margins of the frontal costa. On the pronotum a broad, pale stripe runs along each lateral carina, converging in front of the middle; the margins of the posterior lobe are pale, joined interiorly by a black stripe; the central space pale; the sides marked with alternate stripes of pale and fuscous. Elytra fuscous at the base, becoming transparent a little beyond the middle, where the netted nervules suddenly cease; a narrow, whitish line along the angle; the lower field has two sub-quadrangle black spots separated by an elongate, whitish spot. Wings transparent; base greenish-yellow; a narrow, fuscous band across the middle; apex pellucid, with a few fuscous dots at the tip. Posterior femora ash-colored, with three black spots on the upper margin of the outer face; base and a band on the inside black. Posterior tibiae with a broad, white ring near the base, rest blue; tarsi yellow. Venter and pectus white.

Dimensions.—Length, 1 inch; elytra, 0.92 inch; posterior femora, 0.56 inch; posterior tibiae, 0.48 inch.

Colorado, Wyoming, Southern Illinois (Thomas).

Æ. plattei, sp. nov

Somewhat like *Æ. eucerata*, but invariably larger.

Head large; front of the occiput elevated; vertex broad, much deflexed; median foveola sub-quadrangle, transverse in the female, opening in front, connecting with the sulcus of the frontal costa; frontal costa of moderate width, sulcate throughout, expanding slightly at the ocellus. Eyes slightly oblong, sub-globose, prominent. Antennae slender, passing the pronotum. Median carina distinct, not prominent on the posterior lobe, slightly prominent on the anterior lobes, notched twice; middle part very short; posterior incision about the middle of the pronotum; front margin slightly angled; apical angle slightly obtuse, pointed. Elytra and wings about as long as the body.

Color (dried after immersion in alcohol).—Clay-yellow, varied with brown and fuscous. Lower portion of the face, the cheeks, and lower margin of the sides of the pronotum pale-yellowish; two or three rows of brown dots on the occiput; a broad stripe along the middle of the pronotum, brown. The male generally has two oblique, brownish stripes on the sides of the head and pronotum, the upper one embracing the lower portion of the eye. Elytra, with the upper half and apical third, sprinkled with small fuscous

spots; lower half with two broad fuscous bands, behind each a pale-yellow immaculate space, appearing as two oblong, fuscous spots, alternating with two pale spots. Wings pale transparent-yellow at the base (color when living unknown); a moderately broad band crosses just beyond the middle, curving abruptly upon the posterior margin to the anal angle; tip more or less clouded, rest pellucid; nervules pale-yellow (tip of the male fuscous). Posterior femora with two or three dim, oblique bands outside; inside blackish next the base; a pale ring near the apex.

Dimensions.—♀ Length, 1 inch; elytra, same; hind femora, 0.55 inch; hind tibiæ, 0.5 inch. ♂ Length, 0.75 inch.

Near Platte Rivers in Colorado and Wyoming (Thomas).

Division 3.—Head usually as narrow as the front of the thorax; the occiput not or but slightly elevated; eyes less prominent than in the preceding division, and generally rather small compared with the size of the head, sub-globose. Thorax broad and massive; disk of the pronotum nearly flat, especially on the posterior lobe; median carina but slightly elevated, sometimes simply a raised line; pronotum usually short and rapidly expanding posteriorly; the hind border generally right-angled or sub-acute. Posterior femora broad and compressed.

Sub-division 1.—The pronotum short, rapidly expanding posteriorly from near the front border; disk flat and smooth; median carina very slight, consisting simply of a raised line; lateral carinæ distinct on the posterior portion, but obtusely rounded, and in no way elevated.

E. maritima, Uhler, Harr., Rep., 178.

Syn., *Locusta maritima*, Harr., Rep., 178.

Central foveola of the vertex slightly elongate; middle line seldom present in the female, absent in the male; open in front, and the margins continuous with the margins of the frontal costa. Frontal costa sulcate, slightly in the female, distinctly in the male. Median carina of the pronotum simply a raised line on the posterior lobe, slightly more elevated on the middle and anterior lobes, twice severed by transverse incisions; lateral carinæ sub-distinct; disk of the posterior lobe flat; apex right-angled. Elytra and wings passing the abdomen; posterior femora about equal to it. Antennæ rather longer than usual.

Color.—An ash-gray, tinged with brownish. Face variegated with white,

or pruinose. Pronotum sometimes striped on the sides with brown, especially in the male, sometimes brown throughout. Elytra sprinkled with minute, brownish spots, chiefly along the middle and lower half; dorsal margin somewhat pale, unspotted; the dorsal angle tinged with reddish; semi-transparent at the apex. Wings a transparent-yellow at base; a narrow, curved, fuscous band across the middle, interrupted near the front margin, where it bends in toward the base a short distance, but does not reach the anal angle; apical portion transparent. Posterior femora with two brown bands on the upper half inside and outside, ringed with pale-yellow near the apex; tibiæ yellowish.

Dimensions.—♀ Length, 1.25 inches; elytra, 1.15 inches; posterior femora, 0.63 inch; posterior tibiæ, 0.56 inch. ♂ Length, 0.75 to 0.9 inch.

Massachusetts (Harris, Scudder); Connecticut (Smith).

C. undulata, Thos., Geol. Surv. Terr., 1871, 460.

Middle foveola of the vertex somewhat elongate, elliptical, with a median carina through it, and generally a depression at the front; lateral foveolæ very shallow, small, trigonal; frontal costa expanding just above the ocellus and at the base, sulcate in the middle portion. Pronotum contracted on the anterior lobes; posterior lobe flat on the disk, rapidly expanding posteriorly, punctured; median carina a dim line, slightly raised on the front lobe, twice severed; apex right-angled. Elytra and wings passing the abdomen about one-third their length. Wings papilioform,* very broad; the exterior margin regularly and beautifully undulated; anterior sub-marginal space almost as broad as the elytra; nervules prominent, regularly and remarkably parallel.

Color (dried after short immersion in alcohol).—Ashy-brown. Head and thorax sometimes mottled with darker-brown or fuscous. Elytra marked with dusky spots, presenting a basal group and an irregular middle band, but on the apical portion they are sporadic. Wings transparent-yellow on the inner half, the outer half more or less dusky; the inner margin of this dusky portion generally forms an irregular, interrupted stripe, parallel with the body when the wing is fully expanded, not bending in at the hind margin; at other times the dusky portion is indicated only by a transverse cloud, or by the dark

* This term is used to distinguish the butterfly-form of the wing from that with regularly convex margins. In this form there is a slight re-entering of the margin a little behind the front; this applies to the general contour, and not to the smaller scallops.

nerves and nervules, those of the inner half always being yellowish-white. Posterior femora with two black spots inside; inferior channel black, or marked with two large, black spots; posterior tibiæ *probably* bluish.

Dimensions.—♀ Length, 1.05 inches; elytra, 1.12 inches; posterior femora, 0.54 inch; posterior tibiæ, 0.47 inch. ♂ About same size and proportions.

Eastern Wyoming, Colorado, Nevada (Thomas); Colorado (Dodge).

C. carlingiana, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 81.—Hayden's Geol. Surv. Terr., 1870, 275.

Vertex broad; central foveola shallow, about as broad as long, somewhat hexagonal, a median carina divides it into two parts; lateral foveolæ very shallow; at the top of the frontal costa a lunate depression; frontal costa sulcate below the ocellus, contracted in the middle, expanded and obliterated near the clypeus; lateral carinæ reaching the corners of the face. Antennæ slender, somewhat flattened. Posterior lobe of the pronotum broad, disk flat; median carina simply a raised line; lateral carinæ distinct on the anterior lobe and anterior portion of the posterior lobe; posterior lobe densely but minutely punctured; apical angle about a right angle. Elytra and wings extend slightly beyond the abdomen. Posterior femora not reaching the extremity of the abdomen.

Color (dried after immersion).—Ash-colored. Head and thorax uniform, varying from an ashy-yellow to an ashy-brown. Elytra darkest near the base; transparent at the apex, sometimes without spots, and sometimes with two irregular, pale, fuscous bands, and a few fuscous spots near the apex. Wings with the inner half fuliginous, the strong, radiating nerves extending as dark lines to the margin; apical half (except the dark nerves) transparent; sometimes the interspaces of the inner half and only the nerves and nervules fuliginous; the nervules of the disk are very regularly parallel, but curved slightly outward. Lower channel of the posterior femora and two spots inside black. When living the color differs but little from this description; sometimes a purplish tint pervades the whole insect.

Dimensions.—♀ Length, 1.4 inches; elytra, 1.3 inches; posterior femora, 0.63 inch; posterior tibiæ, 0.55 inch. ♂ Length, 1.15 to 1.2 inches.

Colorado, Wyoming, Montana (Thomas).

Æ. trifasciata, Walk., Cat. Dermap. Salt., IV, 729.

Syn., *Gryllus trifasciatus*, Say, Ent., ed. Lec., I, 78, Pl. 34.

Ædipoda pruinosa, Thos., Proc. Acad. Nat. Sci. Phila., 1870, p. 80.

Vertex broad; foveola shallow, scarcely longer than wide, the margins continuous with those of the frontal costa; frontal costa narrow, deeply sulcate, contracting immediately below the ocellus, suddenly obliterated before reaching the clypeus; lateral carinæ not prominent. Anterior lobes of the pronotum compressed; disk of the posterior lobe flat; the median carina reduced to an almost imperceptible line; anterior margin obtusely rounded; posterior margin about right-angled, minutely punctured. Elytra and wings pass the abdomen about one-fourth their length. Antennæ, especially of the male, large and long, equal to or longer than half the body.

Color.—Lower portions of the head and thorax dull greenish-yellow; occiput and disk of the pronotum an ashy or olive-brown, sometimes slightly pruinose. Elytra dull-yellowish, with three broad, transverse, dark-brown bands, the middle one the broadest; sometimes the outer band is somewhat irregular. Wings slightly papilioform; basal portion greenish-yellow, with a tolerably broad, black band, narrowed and marginal behind, continued to the anal angle; usual width, one-fifth to one-fourth the extent of the wing; apex transparent-yellow. Posterior femora dull-yellow, with an oblique, brown band on the outside, and basal half of the inside black; posterior tibiæ bright-fulvous.

Dimensions.—♀ Length, 1.4 inches; elytra, 1.4 inches; posterior femora, 0.6 inch; posterior tibiæ, 0.58 inch. ♂ Length, 1.10 to 1.2 inches.

Arkansas (Say); Northern New Mexico, Colorado, Wyoming, Utah, Dakota (Thomas); Nebraska, Kansas (Dodge).

Æ. hoffmanii, Thos., in Expl. Nev. and Ariz., Wheeler, 1871, MSS.

Very closely allied to *Æ. trifasciata*, and possibly it may be but a variety; but there are some variations which appear to mark it as distinct. The only specimen is so badly damaged that it is impossible to do more than indicate its chief characters. Sex unknown, as the apex of the abdomen has been broken off; the antennæ and legs also wanting. The occiput ascending; the top of the head somewhat elevated; eyes ovate, large, prominent; vertex slightly elongate and expanding slightly in front of the eyes; margins raised; a dim median carina; frontal costa sulcate, very slightly contracted

below the ocellus; lateral carinæ arcuate, but not angled, reaching the corner of the face. Pronotum as in *Æ. trifasciata*, except that at each posterior lateral angle there is a minute tooth pointing downward. Elytra, when closed, presenting an unusually flat surface on the dorsum. The metasternum appears to be shorter than is usual in the other species.

Color.—The color and markings are very much like the other species, except that the middle and outer bands of the elytra are less distinct, and the middle and apical spaces have a few brown dots in them.

I have described this as a new species with much doubt, as it is quite possible it is but a variety of *Æ. trifasciata*; but the elevated occiput, spine, or tooth on the pronotum, and short metasternum would appear to separate it from that species.

Subdivision 2.—Head and thorax, especially the latter, of more than usual depth, massive; vertex broad, deflexed, more or less rugose, and often somewhat tuberculate; eyes rather small, and not prominent. Pronotum short, but rather longer in proportion than in the preceding subdivision; rugose and generally more or less tuberculate; median carina distinct and slightly raised, usually distinctly notched; lateral carinæ sub-acute on the posterior lobe, and generally obliterated or sub-distinct on the anterior lobe; anterior margin sub-angulate or rounded.

a. Of large size; disk of the pronotum tuberculate; lateral carinæ obliterated or indistinct on the front lobes by the convexity. Posterior femora rather short, much compressed, very broad. Elytra marked with large, fuscous spots.

I think it very probable that some of the species included in this subdivision should be transferred to *Eremobia*, Serv. (*Thrinchus*, Fisch.) *E. clavelii*, Lucas (Ann. Soc. Ent. Fr., 2d ser., IX, 364, Pl. 8, Fig. 1), is certainly very closely allied in shape, size, carvings, markings, and color to the western variety of *Æ. phænicoptera* and to *Æ. discoidea*.

Æ. neglecta, Thos., Proc. Acad. Nat. Sci. Phil., 1870, 81.—Geol. Surv. Terr., 1870, 276.

Somewhat like the male of *Æ. corallipes*, Hald. Vertex broad, transverse; the large central foveola is divided by a single or double carina, which runs from the center of the front margin back two-thirds across it; when double, the infolding of the margin, seen from the front, resembles a W;

lateral foveola shallow, but distinct; frontal costa bi-sulcate above the ocellus, slightly sulcate below. Median carina of the pronotum simply a raised line, distinctly severed by the third cross incision; lateral carinæ sub-distinct, anterior portion rugose on the dorsum, and wrinkled on the sides; disk of the posterior lobe flat, covered with elongate tubercles, sides granulose; anterior margin sub-truncate; apex about a right angle. Elytra and wings extend beyond the abdomen. Antennæ slightly passing the thorax.

Color (dried after immersion in alcohol).—A pale ash-brown, mottled with fuscous. Head and face pale dirty-yellow. Each elytron has a narrow, yellow stripe near the dorsal border, along the angle; brownish at base, fading toward the apex, which is semi-transparent; marked with groups of fuscous spots, so as to form about three irregular bands. Wings yellow at base; a broad, blackish band (occupying the third fourth), crossing just beyond the middle, curves inward to the anal angle; a sharp ray runs up the frontal space to the base; apex transparent. Posterior femora yellowish, with the base and two oblique bands pale reddish-brown, inferior margin and lower part of the inside orange-yellow; tibiæ pale or orange-yellow (possibly red when living).

Dimensions.—♀ Length, 1.16 to 1.35 inches; elytra, 1.05 to 1.15 inches; posterior femora, 0.65 inch; posterior tibiæ, 0.55 inch. ♂ Length about 1 inch.

Northeastern New Mexico, Colorado, Wyoming (Thomas).

Æ. montana, Thos., Geol. Surv. Terr., 1871, 462.

Female.—In form and size much like *Æ. corallipes*. Vertex and foveolæ much as in *Æ. haldemani*, those of the tip sometimes wanting; frontal costa the same. Pronotum rugose, tuberculate, but not so rough as in *Æ. haldemani*. Posterior femora rather short, and not so broad as in either of the two species just named.

Color (dried after immersion in alcohol).—Pale reddish-brown. Elytra brownish at the base, paler and semi-pellucid toward the apex, with dim, brown, cellular spots scattered somewhat equally over it, fading toward the apex; in some specimens these spots are almost or quite obsolete; in others they are distinct, somewhat fuscous, and partially run together. Wings pale-red at base (orange-red when living); crossed by a narrow, somewhat broken, cellular, dark band beyond the middle, which curves round the posterior border,

decreasing rapidly, and not quite reaching the anal angle; a broad ray of the same running up the front margin to the base. Posterior femora dull-yellow, with no distinct bands.

Dimensions.—Length, 1.4 to 1.6 inches; elytra, 1.25 to 1.3 inches; hind femora, 0.7 to 0.75 inch; hind tibiæ, 0.62 inch.

Southern Montana, Southeastern Idaho (Thomas).

I have not seen the male.

Æ. corallipes, Hald., Stansb. Rep. Salt Lake, 371, Pl. x, Fig. 2.

Female.—Very closely allied to *Æ. haldemanni*, from which it may be distinguished by the following characters: The characters not given are as in that species. Central foveola of the vertex very shallow, less deflexed, more rounded; frontal costa very slightly sulcate at the ocellus. Antennæ slightly flattened; the joints sub-distinct. Disk of the pronotum rather less rugose, the tubercles not so high, but the sides equally rugose. The depth of the head and thorax rather greater in this than in the former species. Yellow stripe of the elytra along the dorsal angle more distinct; brown below this stripe not so distinctly separated into spots. Basal segment of the abdomen with a sharp, somewhat elevated carina. The mouth-parts not bent so horizontally backward toward the breast.

Males with a more compressed thorax, the sides of the pronotum being perpendicular and nearly smooth; disk less rugose than in the female. Antennæ large, flattened; joints short and distinct. Central foveola of the vertex very shallow, sub-hexagonal, with a slight median carina along the middle of the posterior half.

Dimensions.—♀ Length, 1.75 to 2 inches; elytra, 1.5 to 1.7 inches; hind femora, 0.85 to 0.9 inch; hind tibiæ, 0.77 to 0.80 inch. ♂ Length, 1.25 inches; elytra, 1.13 inches.

Utah (Haldeman, Thomas).

Remark.—I have described *Æ. haldemanni* fully, therefore give here only the apparent differences, as is also the case with *Æ. paradoxa*, believing all three to be but varieties of one species.

Æ. haldemanni, Scudd., Hayden's Geol. Surv. Neb., 251.

Female.—Large size; thorax broad. Vertex broad; central foveola sub-quadrangle, transverse, its inner portion more or less interrupted by small tuber-

cles; the lateral foveolæ distinct; tip depressed, sometimes forming two small foveolæ. Frontal costa vertical, broad, expanding considerably at the ocellus and at the base, more or less sulcate. Pronotum sub-cylindrical in front, transversely depressed in the middle; disk scabrous, covered with tubercles, nearly flat; median carina distinct, not prominent, cut by the last incision in advance of the middle, sometimes a slight notch in front of this; lateral carinæ distinct on the posterior lobe; anterior margin obtusely rounded; apex right-angled. Meso-thorax very broad. Elytra and wings passing the abdomen. Posterior femora very broad; lower carina sharp, lamelliform. Antennæ slender, of moderate length.

Color.—Yellowish-gray, varied with brown, mostly in large spots. Vertex and frontal costa pale ash-color, tinged with blue, the latter margined with yellow; occiput mottled with brown; cheeks and a spot behind the eyes whitish; parts of the mouth carneous; the neck (hid by the pronotum) with a blue ring. Disk of the pronotum dark-brown, with a yellow stripe along each margin. All that part of the elytra below the dorsal angle covered with large, dark-brown spots, separated by irregular, tortuous, yellow stripes; a narrow, yellow stripe along the dorsal angle; the inner margin brownish. Wings transparent, lemon-yellow at base; a rather narrow, fuliginous band crosses just beyond the middle, curving round the posterior margin to the anal angle, a broad ray of the same running up the front margin nearly to the base, this part separated from the rest by a transparent line at the first nerve; apex transparent, with black nerves. Base of the abdomen fuscous, tinged with blue. Four anterior legs pale ashy-blue; inside of the posterior femora and the posterior tibiæ a bright coral-red; exterior face of the posterior femora yellowish, crossed by three oblique, brownish bands. Under side of the body pale brownish-yellow; the pits of the sternum generally red. Sometimes the whitish and ash-color of the head, pronotum, elytra, and legs varies from a dirty-white to a bright-yellow. After long immersion in alcohol but two colors remain, brown and yellow; the brown remains as in the living specimens, the other colors fade to a dull yellowish-white.

Male.—The male varies but slightly from the female, except in size. The central foveola is more regular; the depressions of the tip generally absent; the frontal costa sulcate throughout; pronotum less scabrous. Brown of the elytra not so thoroughly divided into spots.

Dimensions.—♀ Length, 1.5 to 2 inches; elytra, nearly as long as the

body; posterior femora, 0.75 to 0.9 inch long, 0.20 to 0.22 inch wide; posterior tibiæ, 0.62 to 0.75 inch. ♂ Length, 1.2 to 1.3 inches.

Texas, Colorado, New Mexico, Wyoming, Dakota (Thomas); Kansas, Nebraska (Dodge).

I have always included this under *Æ. corallipes*, Hald., from which it does not appear to be distinct. I am inclined to believe that this and *Æ. pardalina*, Sauss., are varieties of the same species; the "seven foveolæ of the vertex" are sometimes dimly outlined in specimens of *Æ. haldemanni*, which I have from Wyoming and Colorado.

Æ. paradoxa, Thos., Geol. Surv. Terr., 1871, 457.

This species is very closely allied to *Æ. corallipes*, Hald.; from which it differs in but few characters, but these are rather important.

Vertex rather more deflexed and prominent in front. A reddish tinge prevails on the lighter parts of the whole insect. The lateral carinæ of the pronotum are bordered internally with a broad, whitish stripe; the whitish stripes along the dorsal angles of the elytra are quite distinct, and the dorsal portion appears to be without spots. The wings are of an orange-red (sometimes cinnabar-red) at the base; the dark band crosses about two-thirds the distance from the base to the extremity; a dark stripe runs up the anterior border; apex transparent, with dark nerves. The inside of the posterior femora and the posterior tibiæ a bright-yellow; the exterior face of the femora crossed by three irregular, quite oblique, dark bands. Antennæ slightly enlarged and somewhat flattened near the apex.

Dimensions.—Same as *Æ. corallipes*.

Northern Utah, Southeast Idaho (Thomas).

Remark.—There are no permanent characters by which to distinguish alcoholic specimens of *Æ. corallipes*, *haldemanni*, *paradoxa*, and *rugosa* from each other; I have, therefore, in another place, (Hayden's Geol. Surv. Terr., 1872, p. 720), given my reasons for believing they are but varieties of one species. I have there also included *Æ. discoidea*, but it is probable that this is distinct. Yet I have thought it best to describe each here as a separate species, leaving this question to be determined by future investigations.

Æ. rugosa, Scudd., Bost. Jour. Nat. Hist., VII, 469.

Head and thorax of unusual depth in the female; head rather broader than the middle of the pronotum. Vertex broad, transverse, with two rather

distinct sub-pentagonal foveolæ, the sharper angle directed obliquely backward toward the eye; lateral foveolæ small; frontal costa flat or convex above the ocellus, scarcely sulcate in the lower part; face seen from the side arcuate. Antennæ of the female small, not reaching apex of the pronotum; those of the male flattened and longer. Pronotum rugose, with small tubercles and raised lines; less so in the male; median carina distinct, but not elevated, cut rather behind the middle; posterior lobe with the disk flat; lateral carinæ sub-distinct on the anterior and posterior lobes. Wings and elytra a little longer than the abdomen. Posterior femora very broad, about as long as the abdomen in the female.

Color.—Yellowish-brown, varied with fuscous. Head and thorax brown, mottled with darker brown; males sometimes reddish-brown, not mottled. Two yellowish bands run from behind the eyes backward and inward, nearly or quite meeting one another a little in advance of the middle of the pronotum, where they diverge and strike the hind margin of the pronotum at the outer angles; two or three dull-yellowish spots on the sides. Elytra pale ash-brown, with large fuscous spots, and a narrow pale stripe along the dorsal angle. Disk of the wings yellow, varying in different specimens from pale-transparent to orange-yellow; a moderately broad dusky band across the middle, curving round the hind margin nearly to the anal angle, and extending up the sub-frontal space to the base; apex transparent; veins dusky. Posterior femora crossed externally and internally by three black bands; posterior tibiæ reddish-yellow, with a broad, pale ring near the base.

Dimensions.—♀ Length, 1.4 to 1.5 inches; elytra, 1.28 inches; posterior femora, 0.90 inch; posterior tibiæ, 0.82 inch. ♂ Length, 1 to 1.12 inches.

Maine (Packard); Massachusetts (Scudder); New Jersey, Vancouver's Island (?) (Walker); Illinois, District of Columbia, Nebraska, Dakota, Missouri (Thomas).

The specimens marked by Walker (Cat. Dermap. Salt., IV, 731) *Æ. corallipes*, from Indiana and Massachusetts, probably belong to this species; the two are closely allied, and probably but varieties of one species.

Æ. discoidea, Serv. Hist. Orthop., 724.

Syn., *Acridium tuberculatum*, Pal. Beauv. Ins., 145, Pl. 4, Fig. 1.

Female.—Of large size. Vertex broad, the slightly elevated margins suddenly curved outward opposite the eyes; a slight median line, with

minute tubercles at the tip. Face slightly curved under; frontal costa prominent, broad, somewhat expanding below, and obtusely sulcate; lateral carinæ distinct, curving outward to the corners of the face. Pronotum covered somewhat regularly with small tubercles, otherwise not very rugose, being but slightly wrinkled transversely; median carina moderately elevated, nearly straight on top, interrupted only by one slight notch; lateral carinæ wanting on the anterior lobes, distinct, but obtuse on the posterior lobe. Elytra and wings longer than the abdomen; there is, in the female, a distinct expansion of the lower border of the elytra near the base, the nerves of the dorsal field ramose and prominent. Posterior femora very broad, the width near the base being about equal to the width of the elytra; upper and lower carinæ much elevated and sharp; not reaching the tip of the abdomen. Valves of the ovipositor very robust, elongate.

Color.—Pale-reddish or yellowish-brown, with dark-brown or fuscous spots. Head and thorax (in dried specimens) dark reddish-brown, the sides of the pronotum nearly black; it is probable that this, in living specimens, is paler and tinged with olive-green. Elytra roseate and somewhat opaque at the base, transparent at the apex, marked with tolerably large dark-brown spots, somewhat elongate transversely, placed irregularly; one of the largest crosses the lower field at the expansion near the base. Wings with the disk and basal portion a bright, deep orange-red (Serville says cinnabar-red), semi-opaque; exterior to this and just beyond the middle they are crossed by a rather narrow fuscous band, which curves round on the posterior margin to the anal angle; it also curves slightly inward in front; exteriorly it fades into the black-nerved, transparent, apical portion; the anterior margin is bordered with a red stripe, which extends to the base; this is separated from the red of the disk by a black ray, which also extends nearly to the base. Abdomen glabrous, much more so than the rest of the body. Legs glabrous, of a clear reddish-brown; the posterior femora internally deep-blue, with a yellow ring near the apex; external face with three indistinct oblique bands. Posterior tibiæ yellowish, slightly tinged with red. Antennæ fuscous.

Serville states that the apex of the wing of the male is marked with small, obscure, dusky stripes; the inside of the posterior femora yellow; external face with three black bands.

Dimensions.—♀ Length, 1.75 inches; elytra, 1.5 inches; posterior femora,

length, 0.93 inch, width, 0.3 inch; posterior tibiæ, 0.76 inch. Serville gives the length 1.5 inches.

Georgia, Philadelphia (Serville); North Carolina, Southern States (Scudder); United States (Pal. de Beauvois); Mississippi (Thomas).

Remark.—Walker (Cat. Dermap. Salt., IV, 730) marks this species as a variety of *Æ. phænicoptera*. I noticed in Nebraska what appeared to be specimens of this species with the inside of the posterior femora yellow, and in other respects forming an intermediate link between this and *Æ. rugosa*.

Æ. phænicoptera, Germ., Burm. Handb. Ent., II, 643.

Syn., *Locusta apiculata*, Say, MSS., Harr. Cat. Ins. Mass, 56.

corallina, Harr., Rep., 176.

Ædipoda obliterata (?), Germ., Burm. Handb. Ent., II, 643.

corallina, Erichs., Archiv f. Nat., IX, 2, 229.

Aceridium phænicopterum, De Haan, Bijdr. Kenn. Orthop., 144.

Vertex rather broad; central foveola slightly elongate, divided into two parts by a median carina; lateral foveolæ nearly obsolete; frontal costa closed above the ocellus, sulcate from the ocellus down, not reaching the clypeus. Median carina of the pronotum distinct, and slightly elevated, but not cristate, upper margin slightly depressed and severed a little before the middle; lateral carinæ distinct; disk flat; anterior margin sub-truncate; apical little less than a right angle; disk granulose. Elytra and wings passing the abdomen. Antennæ of the male somewhat flattened, joints sub-distinct. Posterior femora remarkably broad.

Color.—Testaceous-brown. Face ashy-brown, cheeks paler; occiput dark-brown. Pronotum sometimes almost uniformly brown; at others, the disk has on each side a broad testaceous stripe, also a spot of the same near the front margin, and another near the center of the sides. Elytra with the costal margins pale and unspotted; middle field fuscous, with a testaceous stripe along the middle nerve near the base, which bends upward near the center; beyond this is a triangular spot of the same, with the base on the middle nerve; varied with fuscous spots and testaceous near the apex. Wings with the disk vermilion-red, a tolerably broad, fuscous, arcuate band beyond this, marginal behind, reaching the anal angle; a broad marginal ray of the same extends along the front to the base, separated from the red by a narrow transparent ray; apex dusky. Posterior femora testaceous, crossed externally by three narrow curved bands, spotted inside with black; tibiæ dusky.

Dimensions.—♀ Length, 1.45 inches; elytra, 1.24 inches; posterior femora, 0.87 inch long, 0.25 inch wide; posterior tibiæ, 0.73 inch. ♂ Length, 1.05 inches.

Maine (Packard); Connecticut (Norton); Massachusetts (Scudder); Colorado, Dakota, Nebraska (Thomas); Carolina (De Haan); New York, New Jersey, Florida, Rocky Mountains (Walker).

Æ. parviceps,* Walk., Cat. Dermap. Salt., IV, 732.

Male.—Testaceous. Head small, slightly ascending; fore part whitish, roughly punctured; the two keels between the eyes connected at the tip and joining the inner keels of the front; outer keels of the latter diverging much toward the face. Prothorax short, flat, contracted, and transversely furrowed in front; dorsal keel very slight, obsolete on the fore part; hind border rounded, slightly elongated. Abdomen a little longer than the hind femora. Hind femora slightly pilose, and with two blackish bands above. Hind tibiæ whitish, much shorter than the hind femora, their spines broadly black toward the tips. Elytra cinereous, somewhat shorter than the body, with several blackish spots, which are of various sizes and irregularly placed; veins tawny. Wings pellucid; veins black, blue toward the base.

Dimensions.—Length, 0.88 inch; expansion of elytra, 1.67 inches.

West coast of North America (Walker).

Although not positively stated to belong to the United States, I have given the description as it probably belongs to our insect-fauna.

b. Of small size. Pronotum moderately divergent posteriorly; median carina continuous; lateral carinæ acute, not obliterated in front; disk flat.

Æ. atrox, Scudd., Hayden's Geol. Surv. Neb., 253.

Size small. Carvings of the head as in *Æ. pellucida*; pronotum the same, except that the median carina is cut, but not notched, a little in advance of the middle. Elytra and wings a little longer than the abdomen. Antennæ as long as the head and thorax.

Color.—Head pale brownish-yellow; the raised edge of the vertex dotted with fuscous; a triangular, black spot behind each eye, the apex touching the eye. Pronotum brownish-yellow, with a quadrate, black spot

* I have not seen this species, therefore cannot determine its position with any certainty.

on the front part of the sides; sometimes a darker stripe each side of the median carina. Elytra marked as in *Æ. pellucida*, except that the yellow stripes and spots are more extensive. Wings pellucid; nervules dusky on the apical half. Hind femora and tibiæ as in that species, except that the colors are paler.

Dimensions.—Same as *Æ. pellucida*.

California, Montana (Thomas).

I give this species as distinct from *Æ. pellucida* on the authority of Dr. Scudder, but I consider the two as identical, the only difference that I can see being that the median carina of *atrox* is severed, while that of *pellucida* is continuous. The coloration shows less difference than is often observed between different specimens of the same species from the same locality. In fact, my specimens of *atrox* agree more exactly with Dr. Scudder's description of *pellucida* than with that of *atrox*, with the exception given.

Æ. pellucida, Scudd., Bost. Jour. Nat. Hist., VII, 472.

Size small. Foveola of the vertex distinct, sub-elongate, triangular; apex closed and rounded; frontal costa narrow and convex above, expanding below, impressed at the ocellus, not sulcate. Pronotum much like that of the *Stenobothri*; tricarinate; median carina distinct and slightly prominent, continuous and solid, straight on top; lateral carinæ distinct, but not raised, slightly arcuate along the posterior lobe, most convergent near the front margin; disk nearly flat; no transverse impressions distinct on the disk; anterior margin slightly angled; posterior extremity also obtuse-angled. Elytra and wings pass the abdomen slightly. Posterior femora about as long as the abdomen in the female.

Color.—Ash-brown. Face reddish-brown; antennæ yellowish at base, dark-brown toward the apex; a triangular, black spot behind the eye, apex touching the eye. A quadrate, transverse, black spot on the anterior part of the sides of the pronotum; disk sometimes has a dark band along the middle. Elytra fuscous-brown; a yellow stripe along the dorsal angle; a yellow line reaches from the base along the sub-frontal nerve to a yellow spot on the lower (or front) margin, near the middle; apical half and lower margin marked with yellow lines and fuscous spots. Wings pellucid, with black nervules. Legs dark-brown; the hind femora yellowish or reddish-brown, with two or three rather broad, oblique, dark-brown streaks, dark at the

apex; hind tibiæ yellowish-brown, reddish toward the tip, with a very narrow, generally faint, annulation of dark-brown at the base; spines tipped with black.

Dimensions.—♀ Length, 0.9 to 1 inch; elytra, 0.75 inch; hind femora, 0.55 inch; hind tibiæ, 0.50 inch. ♂ Length, 0.65 to 0.70 inch.

Maine (Smith, Packard); Massachusetts, Vermont, Connecticut (Scudder).

TROPIDOLOPHUS, nov. gen.

Medium size, slender. Head short, depth about twice the length; width about equal the length, sides parallel; front straight, nearly vertical; occiput rounded; eyes elliptical; antennæ robust, passing the thorax, about 22-jointed. Pronotum compressed, slightly converging in front; the dorsum elevated into a strong arcuate crest, equaling one-third the entire depth of the pronotum; the front advanced in an angle upon the occiput, the posterior extremity extending in an acute angle upon the base of the elytra; no lateral carinæ; no transverse sutures crossing the crest; the posterior lateral margins regularly rounded inwardly from the lower angle to the apex. Elytra and wings ample, rather narrow. Abdomen slender; apex of the male sub-conical, with a minute, rounded notch at the tip. Legs long and slender; posterior femora slender, but slightly enlarged at the base; posterior tibiæ spined almost their entire length; first joint of the posterior tarsi elongate, nearly twice the length of the ultimate joint. Prosternum smooth, not spined.

T. formosus, Thos.

Syn., *Gryllus formosus*, Say, Am. Entom., Le Conte's ed., vol. I, 78, Pl. xxxiv, Fig. 2.

Occiput elevated, convex; vertex much deflexed, margins elevated and continuous with the sides of the frontal costa; no lateral foveolæ. Face straight; frontal costa deeply sulcate; sides parallel; lateral carinæ distinct, rather prominent. Antennæ longer than the head and pronotum, sub-cylindrical. Sides of the pronotum marked with irregular impressed lines; sides of the crest minutely tuberculate; the posterior half of the top denticulate; anterior and posterior margins acute-angled. Elytra and wings extend about one-fourth their length beyond the abdomen.

Color.—Pale-green. Antennæ yellowish. Head ashy-yellow; the lower sides of the pronotum pale-green or cinereous; the crest green, with two

yellow radii each side, and the anterior and posterior margins yellow. Elytra pale-green, with about six large brown spots on each, which are paler in the center than near the circumference. Wings pellucid, with a pale greenish-yellow tinge on the basal portion. Hind tibiæ carneous.

Dimensions.—♂ Length, 1.1 inches; elytra, 1.1 inches; hind femora, 0.76 inch; hind tibiæ, 0.75 inch.

Upper Arkansas (Say); Colorado, Wyoming (Thomas).

STAURONOTUS, Fisch.

Body small or medium size. Head large, globose; face high, slightly deflexed; vertex very obtuse; lateral foveolæ broad and short, almost contiguous in front, usually quadrilateral; from these, on each side between the eyes, little, short carinæ run backward. The frontal costa is obliterated near the clypeus; the lateral carinæ distinct; the cheek carinæ abbreviated above. Eyes oblong, somewhat globose. Antennæ sub-cylindrical or sub-compressed. Pronotum sub-truncate in front; posterior angle obtuse or sub-acute; distinctly constricted before the middle; median carina distinct, entire; lateral carinæ only distinct posteriorly (the humeral angles tumid), sub-converging near the middle; on the anterior portion there is often a pale cross in the form of an X; the transverse sulcus in front of the middle. The prosternum sub-tumid in the middle. Elytra and wings full-sized. Legs pilose, of the usual form. Abdomen sub-carinate above.

Hippopedon, Sauss., approaches rather too near this genus to be distinguished as a separate group.

St. elliotti, Thos., Proc. Acad. Nat. Sci. Phil., 1870, p. 82, and Hayden's Geol. Surv. Terr., 1870, p. 277.

Male and female.—Head large, widest below; face sub-vertical; vertex slightly deflexed; foveolæ shallow, the central one broad, the lateral sub-triangular, the points of the three meeting in a sharp angle midway between the upper angle of the eye and the base of the antennæ; frontal costa not sulcate, narrowed above; lateral carinæ distinct, strongly divergent. Eyes medium size, ovate. Pronotum short, sub-truncate in front; posterior angle obtuse and rounded; the three transverse incisions distinct and closely approximate, first shortest, second and third connected at their termini on the sides by an oblique impression; the median carina distinct, not elevated; lateral carinæ distinct on the posterior lobe, and sub-distinct on the front of the anterior lobe; the

spaces on the anterior lobe between the median and lateral carinæ depressed like shallow basins. Elytra and wings about as long as the abdomen. Posterior femora inflated near the base, attenuate near the tips. Pectus not broader than the head. Antennæ filiform, as long as the head and pronotum. Anal appendages of the female very short and blunt.

Color (siccus).—Yellow, varied with brown. Head yellow; occiput dotted with brown, sometimes forming imperfect, wavy lines; antennæ pale at the base, the remainder brown. Pronotum with a pale-yellow cross on the back; beginning at the posterior lateral angles of the disk, the stripes converge anteriorly, and, crossing about the middle, fade on the anterior lobe; there is a triangular brown spot between these stripes on the posterior lobe; sides brownish, fading below. Elytra brown; a yellow stripe along the inner margin; lower half dotted with dark-brown. Wings transparent; veins white, except at the apex, where they are dusky (it is possible these are slightly tinged with blue when living). Posterior femora yellow, with two or three oblique brownish spots near the upper edge, which cross and become distinct bands on the inside; knee brown; tibiæ dusky above and at the tips, rest yellow (bluish in living specimens).

Dimensions.—♀ Length, 1.07 inches; to tip of elytra, 1.10 inches; to end of pronotum, 0.34 inch; posterior femora, 0.62 inch. ♂ Length, 0.88 inch; posterior femora, 0.60 inch.

Colorado, Wyoming, and Montana (Thomas).

BOÖPEDON, Thos.

Head large, exceeding the thorax in width, widest below; seen from the side presents a somewhat semicircular outline; deflexed below; occiput large, convex; vertex sloping; broad, sometimes exhibiting a shallow foveola or depression, usually rhomboidal, with a slight median carina; frontal costa prominent, not sulcate, margins obtuse, and nearly parallel. Antennæ nearly as long as the head and thorax, filiform, inserted in deep oblong foveolæ. Pronotum of medium length; sides parallel; sub-truncate in front; posterior margin obtusely rounded; three transverse incisions sub-distinct, the posterior about the middle, cutting the median carina; median carina distinct, lateral obsolete. Elytra shorter than the abdomen in the female, about the length of the abdomen in the male; inflated near the base, narrowed at the apex; two longitudinal nerves dividing the entire surface into three nearly equal fields. Posterior femora stout, passing the abdomen; tibiæ enlarged at the

tip. Ultimate joint of the maxillary palpi enlarged at the tip, truncate. Prosternum unarmed; anterior half tumid. Anal appendages of the female short and obtuse; sub-anal plate of the male keeled, trigonal, and turned up.

B. nubilum, Thos., Hayden's Geol. Surv. Ter., 1870, 272.

Syn., *Gryllus nubilus*, Say, Ent. N. Am. Ed'n Lec., II, 237.

Boöpedon nigrum, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 83.

Medium size; female much larger than the male.

Female.—Occiput smooth, a few punctures on the vertex, a faint median line visible; eyes about midway between the front and back margins of the head; frontal costa convex, with a very slight indentation at the ocellus, punctured on the margins, reaching nearly to the clypeus, suddenly expanding below; lateral carinae distinct, obtuse, sinuate, and divergent; a deep sulcus below each eye. Pronotum nearly as broad as the head; median carina distinct; posterior lobe punctate; central portions of the sides levigate; cross incisions one and two not reaching the median carina. Elytra narrow, about two-thirds the length of the abdomen, lanceolate; the two longitudinal veins strong, approaching each other, at the apex, along the external margin; the nervules coarse. Wings shorter than the elytra.

Color (dried after immersion).—Dark, shining, almost uniform ferruginous; lower angles of the face and sides of the labrum black; tips of the elytra black; apex of the wings dusky, rest transparent; two reddish spots inside the posterior femora; tibiae a transparent-red. When living the color is the same, except that the disk of the wings is a greenish-blue; in one variety there is a white ring around the posterior femora near the apex.

Male.—Similar only darker. Elytra black, somewhat paler at the base; wings transparent, tinged with blue, clouded at the apex.

Dimensions.—♀ Length, 1.5 inches; pronotum, 0.35 inch; elytra, 0.55 inch; hind femora, 0.95 inch; hind tibiae, 0.80. ♂ Length, 0.87 inch; pronotum, 0.25 inch; elytra, 0.55 inch; hind femora, 0.62 inch; hind tibiae, 0.56 inch.

Near the Rocky Mountains (Say); Southeastern Colorado, Northern New Mexico, and Western Kansas (Thomas).

B. flavo-fasciatum, Thos., Proc. Acad. Nat. Sci. Phila., 1870, 84.—Hayden's Geol. Surv. Ter., 1870, 273.

Female.—Carving and figure much the same as the female of *B. nubilum*,

differing only in this, that the anterior transverse incision is less distinct, and the impressed line on the side of the pronotum near the front is more distinct; foveola of the vertex very shallow, divided into two parts by a slight median carina; frontal ridge convex, sparsely punctured.

Color (dried after immersion).—Yellow, varied with brown. Head yellow; lower angles of the face black; a very distinct yellow line, starting from the upper corner of each eye, extends back to the posterior margin of the pronotum, bowing inward near the middle, bordered on each side by an irregular, dark-brown line; a dark line borders each eye posteriorly. Median carina of the pronotum dark-brown or piceous; the transverse incisions blackish; rest of the pronotum brownish, palest on the sides. Elytra formed as in *B. nubilum*, brown, a pale-yellow stripe near the upper and lower margins of each, the upper one having a notch on its lower margin; three oblong yellow spots in a row along the middle, and a few smaller spots of the same near the apex; they reach the third abdominal segment. Wings transparent, dusky at the apex. A brown stripe along each side of the abdomen, near the dorsum; a yellow spot in it on each segment, near the upper border. Venter yellow. Male unknown.

Dimensions.—Length, 1.5 inches; pronotum, 0.38 inch; elytra, 0.5 inch; hind femora, 0.85 inch; hind tibiæ, 0.76 inch.

Southeastern Colorado, Northern New Mexico (Thomas).

BRACHYPEPLUS, Charp.

Body very robust, acridoid. Occiput broad, convex, smooth; vertex margined; frontal costa broad, short, slightly sulcate, expanding below; lateral carinæ distinct, with a sulcus behind them; antennal foveolæ deep, oblong; cheeks prominent. Pronotum large, elongate; tricarinate; carinæ equally distinct, slightly elevated, continuous; widest below and expanding posteriorly; sides straight, flat; disk shagreened; sides glabrous; no transverse incisions on the disk; anterior margin rounded, extending slightly on the occiput; posterior margin round. Elytra and wings rudimentary (in the known species). Legs very robust; posterior femora as long as the abdomen swollen; tibiæ strongly spined nearly their entire length. Antennæ filiform joints distinct; long as the head and thorax. Sub-anal plate of the male tumid, entire; cerci very short; female appendages stout, broad. Palpi short, joints all enlarged at the tip; the three outer joints of the maxillary

palpi nearly equal, the ultimate a little the longest. Prosternum neither spined nor tuberculate. Abdomen somewhat compressed, carinated above.

B magnus, Girard, Marcy's Expl. Red Riv. La., 260, Pl. xv., Figs. 1-4.

Occiput very slightly irregular, an indistinct line running along the middle to the vertex, a few minute shallow punctures visible; the elevated margins of the vertex meet in about a right angle at the front; the frontal costa, although narrowest above and gradually expanding as it descends, is not narrowed opposite the antennæ; margins distinct, obtuse; sulcus shallow, expanding and fading below, punctured. Disk of the pronotum strongly shagreened. Elytra squamæform, ovate, reaching the third abdominal segment; nerves longitudinal, slightly branching near the apex; wings minute. Posterior femora very thick.

Color (dried after immersion in alcohol, yet varying but slightly from the living insect).—Yellow, spotted with brown. Carinæ of the pronotum glabrous, sometimes piceous, at others paler, even to yellowish-white; the disk sometimes pale-brownish, with a paler broad stripe each side; at others, yellowish, and often with an æneous luster; sides purplish at the upper margin, yellowish below. Elytra light-brown, spotted with black; wings yellow. Abdomen with a brown spot each side of each segment; each segment is also margined with a ring of whitish dots. Antennæ dull purplish-brown. Posterior femora somewhat variable from yellowish to pale-brown, some specimens exhibiting tolerably distinct stripes.

Dimensions.—♀ Length, 2 inches; pronotum, 0.55 inch; elytra, 0.3 inch; posterior femora, 1.25 inches. Males about one-fourth less.

Eastern Wyoming, Eastern Colorado, Nebraska, Texas (Thomas); Kansas (Dodge); near Wachita Mountains (Girard).*

GROUP 5.—ACRIDINI.

Mucronati, Serv., Scudd.; *Acrididæ*, Walk.

This group is distinguished by the vertical face, filiform antennæ, and the spine, which protrudes from the middle of the prosternum. It contains some of the largest species belonging to the family, as well as some of the most destructive. It is in this group that we find the gigantic species of

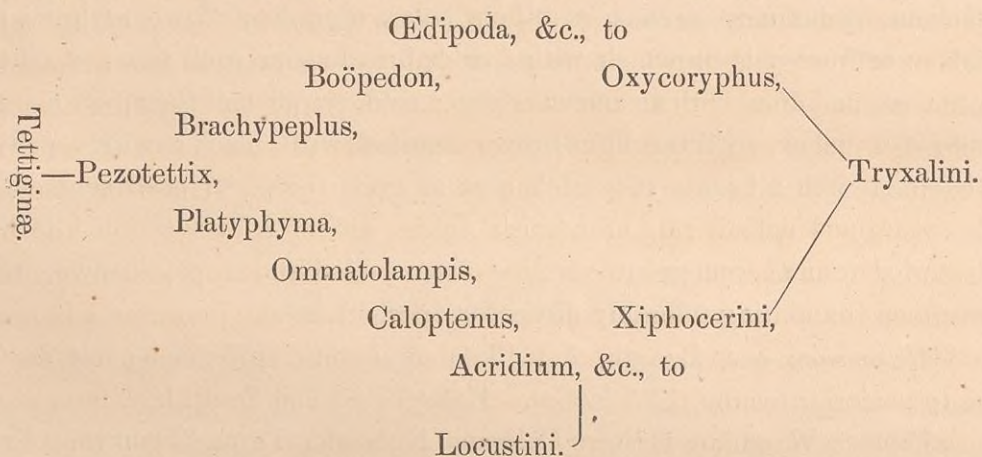
* There are two varieties of this species—I do not think they are distinct—one a dull-green, the other an orange-brown when living.

tropical America; and to this group also belong the injurious species of the Eastern States (*Caloptenus femur-rubrum*), and the destructive, migratory species of the West (*Caloptenus spretus*). Most of the species possess ample wings, yet there are many which have them aborted, and some are wholly without wings or elytra.

It is represented in the United States by but seven genera, which I have arranged in the following order:

Pezotettix, Platyphyma, Ommatolampis, Caloptenus, Chromacris, Acridium, Tropidacris.

It is true that an examination of the species will satisfy any one that here I have not maintained my descending series; but I have been compelled, in one sense, to vary my plan, in order to bring as near together as possible the closely-allied forms. In fact, the order in which I place the genera in this group may be considered ascending, and the relations may be represented thus (Tryxalini at the head and Tettiginæ at the foot):



As a matter of course, this applies only to the genera found in the United States; if the exotic genera were introduced, the transition would probably be more apparent, yet the difficulty in arranging the Tettiginæ would not be entirely overcome.

Synoptical table of the genera.

- A. Front border of the pronotum notched..... *Chromacris.*
- AA. Front border of the pronotum entire:
 - a. The dorsum of the pronotum more or less arched from the sides; no lateral carinæ; extremity of the male abdomen not swollen:
 - b. Pronotum crested, species very large..... *Tropidacris.*
 - bb. Median carina of the pronotum not crested..... *Acridium.*

- aa.** The dorsum of the pronotum flat or obtusely rounded; median carina of the pronotum slight; lateral carinae somewhat distinct, though obtusely rounded; abdomen of the male swollen at the extremity:
- b.* Wings usually as long or longer than the abdomen:
- c.* Eyes closely approximate above; vertex sub-hexagonal; pronotum sub-cylindrical..... *Ommatolampis.*
- cc.* Eyes less approximate above; vertex longitudinally channeled; lateral carinae sub-distinct..... *Caloptenus.*
- bb.** Wings absent or aborted:
- c.* Prosternal spine truncate at the apex; lower border of the sides of the pronotum angulate..... *Platyphama.*
- cc.* Prosternal spine acute or rounded at the apex; lower border of the sides of the pronotum straight or obtusely rounded.... *Pezotettix.*

PEZOTETTIX, Burm.

Podisma, Latr. Fieb. De Borck.; *Acridium (Podisma)*, Serv.

Body medium size; female narrow posteriorly. Head large; face perpendicular, or nearly so; occiput short, convex; vertex between the eyes narrow, in front of these short, somewhat deflexed, concave, no lateral foveolae; frontal costa, lateral carinae, and cheek carinae distinct; the frontal costa generally convex above the ocellus; eyes sub-ovate or sub-globose; antennae cylindrical, reaching the tip of the pronotum; joints somewhat distinct. Pronotum sub-cylindrical, the humeral angles rather more rounded and less distinct than in *Caloptenus*; disk sub-convex; median carina generally obliterated on the anterior lobes, more or less distinct on the posterior lobe, subtruncate in front, truncate or rounded behind, sometimes obtuse-angled, but in the latter instances the posterior lateral margin ascends from the lateral angle to the apex without any entering angle at the humerus; the three transverse impressions distinct, cutting the median carina; the intermediate one sub-bisinate; posterior lobe punctured. Prosternal spine rather short, obtuse; pectus broad as the head. Elytra and wings wanting or abbreviated. Four anterior legs short; in the male the middle femora much swollen; posterior femora moderately dilated at the base. Extremity of the male abdomen somewhat swollen and turned up; cerci generally slender.

This genus is sometimes divided into sub-generic groups.

Synoptical table of the species.

- A. Without elytra or wings:
- a.** Body slender; lateral carinae obsolete; median carina very minute..... *glacialis.*

- aa.** Body obese; thorax broad and fleshy; lateral carinae sub-distinct; median carina distinct..... *obesa.*
- AA.** Elytra present:
- a.** Elytra more than half the length of the abdomen:
- b.** Prosternal spine large, acute, bent on the meso-sternum; elytra grayish-yellow..... *edax.*
- bb.** Elytra dirty yellowish-brown; spotted irregularly with darker brown..... *borealis.*
- aa.** Elytra not more than half the length of the abdomen:
- b.** Pronotum cylindrical, without carinae; elytra squamæform. *picta.*
- bb.** Pronotum more or less carinated:
- c.** Antennæ very long, equal to the hind femora; disk of the pronotum flat, margins acute..... *longicornis.*
- cc.** Antennæ of ordinary length:
- d.** Wings entirely absent..... *manca.*
- dd.** Wings present, though sometimes minute:
- e.** Sides of the pronotum parallel:
- f.** Three carinae equal, distinct; head not large..... *unicolor.*
- ff.** Lateral carinae obtusely rounded; head large and unusually long behind the eyes, the cranium prominent..... *nebrascensis.*
- ee.** Sides of the pronotum more or less divergent:
- f.** Anterior border of the pronotum rounded; posterior border truncate..... *zimmermanni.*
- ff.** Anterior border of the pronotum sub-truncate; hind border rounded or angulate:
- g.** Elytra squamous, rotundate, broader than long..... *borckii.*
- gg.** Elytra oblong-ovate:
- h.** Posterior femora with three white bands..... *doggii.*
- hh.** Posterior femora as in *C. femur-rubrum*..... *scudderii.*

P. obesa, Thos., Geol. Surv. Terr., 1871, 454.

Prosternal spine very short and obtuse; body of the female fleshy; elytra and wings absent.

Vertex broadly sulcate; margins prominent, slightly angulate in front of the eyes, and continuous with the margins of the frontal costa; frontal costa broad, flat, slightly sulcate at the ocellus, not reaching the clypeus; lateral carinae distinct, but not prominent. Pronotum short, expanding slightly posteriorly; tricarinate; median carina distinct, continuous; lateral carinae more distinct on the front lobes; transverse-impressed lines indistinct; truncate in front and behind; posterior lateral margin straight; not covering the mesonotum. Prosternal spine shortened to a simple tubercle. Posterior femora short. Antennæ short, sub-moniliform; joints very short.

Color (of the living insect, taken from notes in the field).—General color dull olive-brown. Disk and sides of the pronotum and abdomen olive. A

black line on the occiput; lateral carinæ of the face and margins of the frontal costa black. Female appendages tipped with red. Posterior legs are colored as follows: Femora dark olive-green to black, a pale-yellowish stripe along the lower exterior margin, the lower, outer carina olive-red, channel black, inner portion yellow, with two oblique, black bands; tibiæ black at the base, patella red, upper part of the exterior dark-blue, changing downward to purplish, vermilion at the apex, inside yellow; spines yellowish at base, tipped with black; tarsi red above, whitish beneath. The other tibiæ colored as the posterior one.

Dried specimens, after immersion in alcohol, are about as follows: Dorsum dark reddish-brown; head and face paler, black markings of the carinæ remaining. Lower portions of the sides of the pronotum a shining, yellowish color. A pale line along the median carina of the abdomen. Disk of the posterior femora dark-brown; upper and lower exterior margins yellow; channel beneath black; upper carina black; two bands and spot at the base and apex internally, black. Patella (or tubercle at base of the tibiæ) yellow, and a narrow, black band just below this; remainder of the tibiæ brownish-purple. Beneath dull-yellow.

Dimensions.—♀ Length, 1.05 to 1.12 inches; posterior femora, 0.5 inch; posterior tibiæ, 0.43 inch. ♂ Length, 0.76 inch.

Found on the dividing range of the Rocky Mountains between Idaho and Southern Montana, and a ridge 8,000 feet above the level of the sea, about forty miles southwest of Virginia City, Montana (Thomas).

It appears to be closely allied to *Dactylotum*, Charp., but that author has not given the generic characters with sufficient accuracy for me to decide the point. I have given the characters somewhat fully to enable those who have not specimens to judge as to its proper generic position.

P. picta, Thos., Proc. Acad. Nat. Sci. Phil., 1870, 78.—Geol. Surv. Terr., 1870, 270.

Medium size; body elongate, sub-cylindrical. Vertex deflexed, flat, and narrow between the eyes, suddenly expanding in front of them, this advanced portion transverse and triangular; the frontal costa somewhat convex, with a very slight depression at the ocellus. Eyes somewhat large, prominent, and oval. Antennæ filiform, nearly as long as the head and thorax. Pronotum sub-cylindrical, dorsal portion cylindrical, without carinæ; sides parallel

in the male, slightly divergent posteriorly in the female; posterior margins of the sides sloped, but not sinuous; apex rounded; transverse incisions distinct, crossing the dorsum in the female, the posterior only crossing in the male; anterior margin and posterior lobe densely punctate, remainder smoother and sparsely punctate. Elytra very small, oblong-ovate, reaching the tip of the second segment, not meeting on the back; nerves reticulate, prominent. Wings minute. Posterior femora stout, short, not reaching the extremity of the abdomen. Sub-anal plate of the male curved upward, tuberculiform; upper plate triangular; cerci small, rather slender. Prosternal spine stout, conical. Abdomen of the female elongate.

Color (dried after immersion in alcohol).—Alternating rings of dark-purple and white. The dark stripes are placed as follows: Down the frontal costa; on the occiput; down each cheek; two interrupted broad stripes running obliquely upward and backward from the anterior margin of the sides of the pronotum; four spots on the base of each abdominal, and two on each ventral, segment (sometimes uniting into a continuous ring); posterior femora crossed by three broad bands. Nerves of the elytra white; spaces black. Colors of the male and female the same. When living the white stripes are partly or entirely bright-red, and the dark-purple a shining black.

Dimensions.—♀ Length, 1.3 inches; posterior femora, 0.6 inch; pronotum, 0.28 inch. ♂ Length, 0.95 to 1 inch; posterior femora, 0.5 inch; pronotum, 0.26 inch.

Eastern Colorado (Thomas); Kansas (Dodge).

P. glacialis, Scudd., Bost. Jour. Nat. Hist., VII, 630.

Head not large; vertex sulcate; frontal costa with a deep sulcation and depression at the ocellus; eyes not prominent, not elongate, docked anteriorly and very slightly above. Pronotum a little widest posteriorly; anterior and posterior margins truncate; lateral carinæ almost obliterated, obtusely rounded; median very slight. Prosternal spine rather short and blunt, compressed laterally. Apterous, having neither elytra nor wings.

Color.—Female. Vertex, disk of the pronotum, and abdomen olivaceous-green; a broad, black band behind the eye, crossing the sides of the pronotum to the tip, extending upon the abdomen in the form of transverse streaks; pronotum, below this, greenish-yellow, with a medial black spot. Vertex and pectus greenish-yellow; prosternum dusky. Front and sides of the head

yellowish-green, with a greenish stripe down the middle of the frontal ridge. Sulcus and interior carina of the under side of the hind femora coral-red; remainder yellowish-green, with two broad bands of dark-green across the outside; apex black; tibiæ green.

Male differs as follows: meso-notum and meta-notum bright-green; whole dorsal surface black, with a dorsal row of yellowish-green spots, and a triangular spot of the same color between the middle and posterior coxæ; a lateral row of greenish-yellow spots on 1-8 abdominal segments.

Dimensions.—♀ Length, 0.82 inch. ♂ Length, 0.65 inch.

White Mountains, New Hampshire (Scudder).

P. manca, Smith, Proc. Portland Soc. Nat. Hist., 1868, 149.

Vertex sulcate, narrow between the eyes, expanding in front; frontal ridge sulcate and depressed at the ocellus; eyes but little elongated, not very prominent; antennæ not passing the thorax. Pronotum slightly divergent behind, front truncate, apex slightly rounded; lateral carinæ indistinct, median small but distinct; posterior lateral margins very oblique. Prosternal spine prominent, blunt. Elytra very small, oval, not crossing the first abdominal segment, and not meeting on the back; wings wanting. Abdomen carinate.

Color (siccus).—Occiput, disk of pronotum, and elytra brown. Sides of the pronotum smooth and shining in front of the last transverse impression; behind it thickly punctate; a broad, black band extending from the eyes over the upper half of the pronotum, and continued upon the other thoracic segments and along the side of the abdomen, inclosing on the thorax an oblique whitish spot, which extends from the base of elytra to the posterior coxæ. Hind femora brown, yellow below, banded with black above; tibiæ bright-red.

Dimensions.—♀ Length, 0.81 inch; elytra, 0.17 inch; posterior femora, 0.42 inch. ♂ Length, 0.65 inch; elytra, 0.16 inch; posterior femora, 0.35 inch.

Speckled Mountain, Maine (S. I. Smith).

P. boreckii, Thos.

Syn., *Acridium* (*Podisma*) *boreckii*, Stål, Eugen. Resa., 80.

Dark-testaceous; antennæ and posterior femora paler, the latter with two shining, fuscous spots on the internal face and disk of external face.

Pronotum distinctly carinate throughout; the transverse impressions distinct. Elytra abbreviated, a little broader than long, rotundate, densely reticulate, contiguous at the base. Vertex of the head sub-convex, sub-impressed, and slightly produced in front of the eyes; face somewhat oblique, punctate; frontal costa broad, obtuse; lateral carinæ very obtuse, or obsolete, sub-evanescent near the apex, divergent. Antennæ not reaching the tip of the pronotum, filiform, pale. Pronotum narrowed in front; anterior border sub-truncate; hind border obtusely rounded, sub-angulate; the disk slightly convex; before the third transverse sulcus sparsely punctate, behind it densely punctate; median carina distinct throughout, behind the middle acute. Elytra abbreviated, contiguous at the base, rounded at the apex, somewhat broader than long, scarcely longer than half the pronotum, densely and reticulately veined. Prosternal spine obtuse, conical. Pectus on each side above the posterior coxæ fusco-olivaceous, with a pale-yellow oblique stripe. Posterior femora testaceous-yellow above, rufous beneath; one of the dark spots at the base, the other interior in front of the middle, and the dorsal carina behind the middle fuscous; spines of tibiæ pale at base, apex fuscous.

Dimensions.—♀ Length, 0.95 inch; width, 0.28 inch.

San Francisco California (Stål).

P. zimmermanni, Sauss., Rev. et Mag. de Zool., 2d ser., XIII (1861), 159.

Female.—Face broad, vertical, quadricarinate; carinæ distinct; front above somewhat prominent. Vertex not inflated; foveola in front deflexed and slightly emarginate; eyes globose, distant. Pronotum compressed, broad, carinate, gibbous in front of the middle; posterior lobe flat; lateral carinæ acute, densely punctate; anterior margin arcuate, produced upon the occiput; posterior margin truncate, sub-arcuate; posterior transverse impression situated behind the middle as in *P. alpina*. Prosternal spine pyramidal, acute. Elytra rudimentary. Legs very slender.

Dimensions.—Length, 1 inch.

Carolina (Saussure).

P. longicornis, Sauss., Rev. et Mag. de Zool., 2d ser., XIII (1861), 159.

Male.—Size small. Antennæ very long, the length of the posterior femora. Vertex not prominent, carinate; foveola narrow, elongate; eyes large, inflated, approximate at the vertex. Pronotum compressed, disk flat,

margins acute, especially in the anterior part, parallel; anterior margin sub-emarginate; posterior margin sub-angulate. Posterior transverse impression situated behind the middle, and a little less than in *P. zimmermanni*. Sides of the pronotum shining; a posterior punctate band. Elytra short, reaching the second abdominal segment. Prosternal spine pyramidal. Four anterior femora inflated; posterior femora scarcely passing the abdomen.

Dimensions.—Length, 0.64 inch.

Carolina (Saussure).

P. nebrascensis, Thos., Geol. Surv. Terr., 1871, 455.

Female.—Occiput and head behind the eyes unusually long; upper, convex portion of the frontal costa very prominent; the frontal costa suddenly expands in width immediately above the ocellus, and is slightly sulcate from this point to the lower extremity near the clypeus; face slightly oblique, curving under toward the breast; eyes slightly elongate, somewhat oblique, and nearly straight in front. Pronotum sub-tricarinate; median carina distinct; lateral carinae obtusely rounded, nearly obliterated; sides parallel; narrower than the head; rounded at the apex; posterior lateral margin without any notch or inward curve at the humerus. Elytra ovate-lanceolate, nearly half the length of the abdomen. Abdomen carined; posterior femora not extending beyond the extremity of the abdomen.

Color (after immersion in alcohol).—Reddish-brown. Face testaceous-brown; occiput brown, with a yellowish stripe each side; a glabrous, black spot behind each eye, extending along the side of the pronotum to the posterior incision. Disk of the pronotum brown; a pale-testaceous spot on the sides below the black stripe. Elytra brown and unspotted, though in a few specimens dusky dots can be seen. Posterior tibiae rufous.

Dimensions.—Length, 0.94 inch; elytra, 0.25 inch; hind femora, 0.50 inch; hind tibiae, 0.45 inch.

Nebraska (Dodge).

P. unicolor, sp. nov.

Female.—Occiput short; vertex rather broad, elongate, channeled, the slightly-elevated margins continuous with the margins of the frontal costa; frontal costa prominent, slightly sulcate, and somewhat expanding at the ocellus; lateral carinae distinct, but not very prominent; eyes sub-elongate, acu-

minate at the apex. Pronotum regularly angled; sides parallel; tricarinate; carinae equally distinct; sides flat, compressed; the two sides of the disk flat, but slightly ascending to the median carina; posterior sulcus situated behind the middle, distinct; the first and second indistinct; all somewhat distantly separated. Elytra about half as long as the abdomen, oblong-ovate; wings minute. Abdomen compressed, pisciform. Posterior femora passing the abdomen slightly. Prosternal spine of moderate length, very broadly transverse, the width nearly equaling the length, blunt and rounded at the apex.

Color (dried after immersion in alcohol).—Reddish-brown throughout, varying slightly in depth of color. Elytra unspotted. The hind femora have the spaces between the ribs of the disk marked with minute, elongate, red spots, which are surrounded by testaceous rings (these can be seen distinctly only with a magnifier). The posterior lobe of the pronotum and a ring round the front sub-margin rather coarsely punctured; the sides glabrous.

Dimensions.—Length, 0.88 inch; elytra, 0.26 inch; posterior femora, 0.55 inch; posterior tibiae, 0.46 inch.

Jackson County, Illinois (Thomas).

P. edax, Sauss., Rev. et Mag. de Zool., 2d ser., XIII (1861), 161.

Medium size; body elongate, crassate, but not deep; in the female depressed. Head broad; frontal costa flat in the middle, sulcate at the ocellus; eyes large, short, broad, equally convex, sub-reniform, acuminate above, somewhat distant. Vertex sub-carinate; foveola in the female obsolete. Pronotum with the disk flat; carinate; margins acute, straight; posterior margin obtuse-angled; posterior sulcus situated in the middle, cutting the median carina; posterior lobe densely and minutely punctate. Prosternal spine large, acute, bent upon the meso-sternum. Elytra grayish-yellow, long as the posterior femora. Sub-anal plate of the male tuberculiform; the disk of the pre-anal segment coarsely punctured; cerci lamelliform, curved only at the apex.

Color of the body in dried specimens testaceous, variegated with rosaceous; two testaceous fasciae above, (sometimes fuscous, and variegated with divers colors) (?).

Dimensions.—Length, 1.3 inches.

Carolina (Saussure).

P. scudderi, Uhler, Proc. Ent. Soc. Phil., II, 555.

Ferrugineo-fuscous; form and general appearance of *Caloptenus femur-*

rubrum. The cranium is, however, less prominent, the thorax slightly broader, and in the female the black spot on the sides, just below the dorsal surface, is much narrower, sometimes entirely obsolete; the whitish spots upon the middle of the sides are indistinct, and sometimes entirely obsolete. The elytra do not reach beyond the apex of the second abdominal segment. The under side of the posterior femur is yellow, and the tibiæ have a black dot upon the knee, and a black ring just below it. The tip of the last ventral segment of the male is more narrowed, acute, and conically produced than in *C. femur-rubrum*. In its other characters it agrees with that species.

Dimensions.—♀ Length, 0.88 to 0.90 inch. ♂ 0.64 to 0.66 inch.

About Baltimore, Maryland (Uhler); Rock Island, Illinois (Walsh).

P. borealis, Scudd, Bost. Jour. Nat. Hist., VII, 464.

Vertex of the head with a broad, longitudinal furrow in advance of the middle of the eyes. Sides of the pronotum very nearly parallel, slightly wider at the hind border, which is arcuate; median carina slightly higher than the lateral, not prominent. Elytra longer than the wings, not quite reaching the extremity of the abdomen.

Color.—Dark-brown, darkest above. A broad, black band behind the eye, extending over the upper portion of the sides of the pronotum to the hind border. Face dark yellowish-brown. Hind femora streaked with black, with the tip black; hind tibiæ reddish, with a faint, paler annulation near the base; the spines tipped with black. Elytra dirty yellowish-brown, spotted irregularly with darker brown. Wings pellucid, a little dusky at the costal border.

Dimensions.—Length, 0.65 inch; elytra, 0.4 inch; posterior femora, 0.4 inch.

Minnesota (Scudder).

P. dodgei, Thos.

Syn., *Caloptenus dodgei*, Thos., Canad. Entom., 1871, 168.—Geol. Surv. Terr., 1871, 451, Pl. ii, Figs. 4, 5, 9.

Male.—Small size. Vertex elongate, distinctly channeled; frontal costa broad, flat, and squarely margined above the ocellus; margins punctured. Antennæ thick, passing the pronotum; joints distinct, and somewhat obconic. Transverse incisions of the pronotum distinct; posterior lateral margins very

slightly incurved at the humerus; median carina distinct only on the anterior and posterior lobes. Elytra about half the length of the abdomen, oblong-ovate. Posterior femora about as long as the abdomen. Prosternal spine thick, obtuse, and transverse. Cerci slender; sub-anal plate somewhat pointed; the apical margin entire.

Color.—Brown, varied with white. Face cinereous. Occiput and disk of the pronotum dark-brown, mottled with light and dark shades, except the posterior lobe, which is brown. Elytra brown; lower half very dark. Each side there is a dark spot or broad line reaching from the eye to the third incision of the pronotum; an oblique, white spot above the posterior coxæ. Posterior femora with three white bands, the one nearest the apex much the smallest; the middle dark band bends abruptly forward in the middle of the disk. Abdomen pale, mottled with brown. Antennæ pale at base, rest rufous.

Female.—Pronotum uniform dark-brown, except the spot on the side. Elytra extend over but two segments.

Dimensions.—♀ Length, 0.85 inch; elytra, 0.20 inch; hind femora, 0.40 inch; hind tibiæ, 0.32 inch. ♂ Length, 0.56 inch; elytra, 0.18 inch; hind femora, 0.37 inch.

Pike's Peak, Colorado (Dodge).

PLATYPHYMA, Fisch.

Body small. Head short, slightly oblique; vertex narrow between the eyes, carinated, sub-deflexed in front, sub-foveolate, margins obtuse; frontal costa and lateral carinæ distinct. Eyes large, sub-ovate. Antennæ short, not equaling the head and pronotum. Pronotum longer than wide, sub-truncate in front, hind border rounded; median carina sub-distinct; lateral carinæ sub-distinct, obtusely rounded; the three transverse impressed lines distinct in the male, undulate; lateral lobes suddenly deflexed, inferior margin obtuse-angled in the middle; besides the two impressed lines, which descend to the side, there is another near the anterior margin. The prosternal spine singularly broad, cuneiform, truncate or sub-truncate at the apex; the pectus broader than the head. Elytra abbreviated; wings none or minute. The four anterior femora swollen; posterior femora short, much enlarged near the base; pulvilli large. Abdomen carinated above.

Pl. montana, sp. nov.

Has much the appearance of *Caloptenus spretus*, with abbreviated wings.

In the female the foveola of the vertex is slightly elongate and sub-hexagonal; more elongate and narrow in the male; median carina, through it, minute; deflexed. Face somewhat curved under toward the breast; frontal costa broad, sides parallel, not sulcate, punctured; lateral carinae obtuse. Clypeus very short, and from it to the labrum there is a very distinct offset, the lip standing farther in; the middle quadrate piece of the lip has a very distinct perpendicular sulcus across it. Antennae of the female not reaching the tip of the pronotum; of the male longer. Pronotum slightly expanding posteriorly in the female; nearly parallel in the male; median carina distinct throughout in the female, obliterated on the middle lobes in the male; lateral carinae distinct, but obtusely rounded; the three transverse-impressed lines distinct in the male, the posterior only in the female, which is situated behind the middle; the posterior lateral margins ascend obliquely to the obtusely-rounded apex, without any entering angle. Elytra cross the third segment in the male, the second in the female; not meeting on the back at the base. Abdomen elongate; apex of the male somewhat enlarged, turned up; cerci acuminate; tip of the sub-anal plate entire. Prosternal spine broadly transverse, distinctly truncate in the male, obtusely rounded at the apex in the female.

Color (after immersion in alcohol).—Fuscous and rufous. Front and lower portions of the sides of the head and pronotum in the male olive, in the female rufous; a broad, shining, blackish or brownish stripe runs from the eyes along the upper margin of the sides of the pronotum. Disk of the pronotum reddish or dark-brown. Elytra obscure dark-brown, unspotted. Posterior femora bright-red, with indistinct oblique bands of light and darker shades; a yellow annulation above the knee; knee black; tibiae yellow, probably plumbeous when living; anterior legs rufous.

Dimensions.—♀ Length, 1 inch; elytra, 0.14 inch; hind femora, 0.52 inch. ♂ Length, 0.75 inch; elytra, 0.18 inch; hind femora, 0.42 inch.

Montana (Hayden).

OMMATOLAMPIS, Burm.

This small genus, which belongs apparently to the western hemisphere only, is at once easily distinguished by its semi-globose eyes, which are quite prominent, and have a metallic luster. They extend far into the vertex* (top of the head), and are situated so close together that only a small strip of the vertex runs between them from the occiput to the short rhomboidal top (vertex in front of the eyes) of the head, which has on it a longitudinal-impressed line. The antennæ are situated immediately adjoining the vertex; and the facial carinæ are wanting here, which leaves the forehead tolerably smooth. The antennæ are filiform, rather long, and consist of 20-24 joints, somewhat flattened, especially near the base. The pronotum is cylindrical, without distinct carinæ; the transverse impressions distinct, the posterior situated near the hind margin; the posterior margin nearly straight, very obtusely angled. Elytra narrow, generally opaque, closely netted, sometimes abbreviated, or altogether wanting in the female. Hind femora robust, generally longer than the abdomen. The sexual organs of the male large; the terminal segment of the abdomen slightly enlarged. The prosternal spine short, conical, pointed.

O. viridis, Thos.

Syn., *Caloptenus viridis*, Thos., Geol. Surv. Terr., 1871, 450, Pl. ii, Fig. 3.

Vertex slightly expanding in front of the eyes, channeled (in dried specimens); when living, the part between the eyes presents a dim, hexagonal outline, with a slight central depression; frontal costa sulcate, and narrowed below the ocellus, sides punctured; lateral carinæ but slightly divergent. Eyes elongate, large, acuminate above, and approaching unusually near to each other. Pronotum sub-cylindrical; lateral carinæ obliterated; median carina scarcely perceptible; slightly divergent posteriorly; posterior margin obtusely angled; posterior lateral margins ascend somewhat obliquely, with a very slight inward curve at the humerus; the posterior transverse incision is much behind the middle. Cerci of the male regularly acuminate; sub-anal plate with the margin entire, sub-truncate at the apex; super-anal plate with two sub-median convergent carinæ. Elytra and wings about as long as the abdomen. Posterior femora reach the tip of the abdomen.

* Burmeister applies this term to the top of the head, and not to the front part between the eyes, as I have usually done.

Color.—Bright pea-green, except the following markings: Antennæ rufous, except the basal joint, which is green; a small spot between the eyes dusky; a dark spot beneath each eye bounded in front by a white stripe. A narrow, white stripe runs along the upper margin of each eye, and extends backward along the lateral carinæ of the pronotum. A median, dusky stripe runs along the disk of the pronotum; this stripe is sometimes pale, almost white, especially the middle portion; a black stripe on the sides of the anterior lobes bordered by white; the lateral margins have a minute, white line running along them occasionally. Elytra semi-transparent, almost uniform green, sometimes a pale, ash-brown shade on the upper portion. Wings pellucid, front portion tinged with pale bluish-green, hind part tinged with red. The four anterior femora either banded with or entirely pale-rufous. The posterior femora are green, except a rufous ring above the knee, and a thread-like, white line along the margin of the disk. Posterior tibiæ green; spines tipped with black; tarsi green; pulvilli rufous. Cross-incisions of the pronotum are black only in the dried specimens.

Dimensions.—♀ Length, 0.85 to 1 inch; elytra, 0.62 to 0.76 inch; hind femora, 0.5 to 0.63 inch; hind tibiæ, 0.58 inch. ♂ Length, 0.62 inch.

Colorado, Wyoming, Nebraska (Thomas); Kansas (Dodge).

CALOPTENUS, Burm.

Calliptamus, Serv., Fisch. de W.

Body medium size. Head large; face vertical or nearly so; occiput quite short, convex, triangular; vertex narrow between the eyes, deflexed, and somewhat channeled; frontal costa not sulcate above the ocellus, more or less sulcate below; eyes large, oval, somewhat prominent, perpendicular, nearly straight in front, much rounded behind; antennæ of medium length, cylindrical; palpi short. Pronotum of medium length, sub-cylindrical or sub-quadrate; somewhat tricarinate, the lateral carinæ consisting only of the obtuse humeral angles, the median simply a line; the three transverse impressions generally distinct, placed close together on the second fourth of the pronotum; the last, which is situated a little behind the middle, cutting the median carina; dorsum flat or nearly so; the front margin truncate; posterior margin rounded; the deflexed lateral lobes sub-quadrate. Elytra and wings generally as long or longer than the abdomen, but sometimes aborted.

Prosternal spine stout, straight or slightly bent backward, obtuse; pectus broad as the head. Legs of but moderate length; the posterior femora considerably swollen next the base; the disk convex. The male abdomen much swollen at the apex, which is turned up; the cerci long, flat, moderately broad, curved upward, and bent more or less over on the top.

The group to which this genus and the preceding two belong needs revision, but I have not the materials to do this properly. Some of the species of this genus are given as distinct with considerable doubt.

Synoptical table of the species.

- A. Elytra unspotted, as long as the abdomen:
- a. A broad yellow stripe each side..... *bivittatus.*
 - aa. Without stripes..... *differentialis.*
- AA. Elytra with spots more or less distinct:
- a. Elytra longer than the abdomen:
 - b. Elytra much longer than the abdomen; last ventral segment of the male notched at the tip..... *spretus.*
 - bb. Elytra a little longer than the abdomen; last ventral segment of the male entire at the tip:
 - c. Spots of elytra small and confined to median line along the disk. *femur-rubrum.*
 - cc. Spots somewhat larger, and equally distributed over the elytra. *griseus.*
 - aa. Elytra about as long as the abdomen:
 - b. General color pale-yellow:
 - c. Hind femora with two oblique streaks outside..... *bilituratus.*
 - cc. Hind femora with three black patches outside..... *scriptus.*
 - bb. General color other than pale-yellow:
 - c. Hind femora with three straight black bands; lower valves of the ovipositor nearly straight at the apex. *punctulatus.*
 - cc. Hind femora with oblique brown bands; lower valves of the ovipositor bent at the apex..... *occidentalis.*
 - aaa. Elytra shorter than the abdomen:
 - b. A pale stripe along each angle of the pronotum; color pale olive-green, spots indistinct *turnbullii.*
 - bb. Head and thorax with two broad, black stripes; color tawny.. *repletus.*

C. *turnbullii*, Thos., Hayden's Geol. Surv. Terr., 1871, 452.

Pale olive-green, with a white stripe along each side of the dorsum. Elytra and wings shorter than the abdomen.

Closely allied to *Ommatolampis viridis*, Thos. Vertex with a broad, shallow sulcus, into which a minute carina (not always apparent) enters from the rear; frontal costa flat, slightly depressed at the ocellus. Sides of the pronotum slightly divergent on the posterior lobe; lateral carinae obtuse, somewhat more distinct than in *viridis*. Elytra and wings a little shorter

than the abdomen. Cerci of the male flat, narrow, tapering; last ventral segment with a blunt tubercle below the margin. Posterior femora rather more than usually enlarged near the base, about as long as the abdomen. Prosternal spine somewhat quadrate, tapering rapidly.

Color (dried after immersion in alcohol).—Dull-yellow or testaceous. A broad, yellow stripe on each side from the upper angle of the eye to the tip of the pronotum; inclosed space of the disk pale-brown; median carina yellowish; below the yellow stripe is a broad, irregular, brownish stripe, reaching from the eye to the tip of the pronotum. A bright-yellow stripe runs from the base of the elytra to the posterior coxæ. Elytra pale ashy-brown; an irregular row of rather small, dim, brown spots along the disk, one or two sometimes distinguishable above and below; nervules mostly yellow. Wings pellucid, with some dark nerves near the apex. Posterior femora crossed by three oblique, dim, brown bands. Tibiæ bluish.

When living, is pea-green; the stripes along the sides whitish; hind tibiæ blue.

Dimensions.—♀ Length, 0.76 inch; elytra, 0.43 inch; posterior femora, 0.43 inch. ♂ Length, 0.56 to 0.60 inch.

There is a strongly-marked variety, which I have included in this species, but which may be distinct.

Var. a.—Paler throughout; space between the stripes almost uniform in color with the stripes; lateral brown stripes often narrow or obliterated. Elytra narrower and longer, reaching nearly or quite to the extremity of the abdomen. The males appear to be uniformly longer and larger.

Between Red Buttes and Independence Rock, Wyoming (Thomas)

C. repletus, Walk., Cat. Dermap. Salt., IV, 678.

Female.—Tawny, rather slender. Head and pronotum with two broad, black stripes (which include a few tawny dots), and with two intermediate black lines. Head smooth, moderately long; tip of the vertex depressed, sub-elliptical; carinæ slight, inner carinæ converging toward the face, outer diverging. Eyes very much rounded on the hind side. Antennæ piceous toward the tips. Pronotum finely punctured, widening slightly hindward; disk nearly flat, with three slight carinæ; transverse-impressed lines distinct; fore border nearly straight; sides rounded; hind border much rounded, slightly elongated, occasionally marked with black lines. Prosternal spine

pale-testaceous, stout, elongate-conical. Hind femora a little longer than the abdomen, whitish, and with two rows of black streaks on the outer side, with a black stripe on the inner side, reddish beneath; hind tibiæ red, a little shorter than the hind femora; spines black. Elytra cinereous, rather shorter than the body, with an abbreviated, discoidal stripe, composed of black dots. Wings pellucid; veins white, black along the costa and at the tips.

Dimensions.—Length, 0.92 inch; expansion of the wings, 1.84 inches.

United States, Vancouver's Island (Walker).

C. scriptus, Walk., Cat. Dermap. Salt., IV, 680.

Female.—Pale-yellow, rather slender. Head and pronotum with two broad, black stripes, which, on the latter, are much excavated, and do not extend beyond the fourth transverse-impressed line. Head smooth, rather short, partly tinged with red; tip of the vertex flat, elliptical; front with four slight carinæ, which diverge slightly toward the face. Eyes ferruginous, sub-elliptical, straight on the fore side, much rounded on the hind side. Antennæ tawny, slender. Pronotum very finely scabrous; disk flat, with three very slight carinæ; transverse-impressed lines well defined; fore border nearly straight; sides slightly rounded; hind border slightly elongated, hardly angular. Prosternal spine stout, elongate-conical, a little broader than thick. Four anterior legs tawny above. Hind femora as long as the abdomen, with three blackish patches above, and with three on the outer side, which is mostly tinged with red; hind tibiæ red, a little shorter than the hind femora, their spines tipped with black. Wings pellucid, extending to the tip of the abdomen. Elytra with many black spots and dots, most of the spots forming a discoidal stripe; veins tawny. Wings with black veins.

Dimensions.—Length, 1 inch; expansion of the elytra, 1.67 inches.

Vancouver's Island (Walker).

C. bilituratus, Walk., Cat. Dermap. Salt., IV, 679.

Female.—Pale-yellow, rather slender, sometimes tinged with red. Head and pronotum with two broad, irregular, black stripes, which extend from the eyes to the fourth transverse line of the pronotum. Head smooth; tip of the vertex depressed, sub-fusiform; front with four distinct carinæ, inner parallel, outer diverging toward the face. Eyes ferruginous, straight in front, much rounded on the hind side. Palpi with black tips. Pronotum short, sub-

sellate, finely punctured, widening hindward; disk flat, with three slight carinæ; transverse-impressed lines distinct; fore border nearly straight; sides slightly rounded; hind border much rounded. Prosternal spine stout, conical, hardly broader than thick. Hind femora a little longer than the abdomen, with two oblique, interrupted, black streaks on the outer side; hind tibiæ a little shorter than the hind femora; spines black. Elytra pale-cinereous, as long as the body, with several irregular spots in the disk; veins mostly whitish.

Dimensions.—Length, 0.84 inch; expansion of the elytra, 1.84 inches.
Vancouver's Island (Walker).

C. occidentalis, Thos., Hayden's Geol. Surv. Terr., 1871, 453, Pl. ii, Fig. 2.

Much like *C. femur-rubrum*; male cerci very broad, flat. Hind femora banded; tibiæ blue. Frontal costa generally flat above the ocellus and sulcate below, but sometimes sulcate above; lateral carinæ sharp, divergent. Median carina distinct on the posterior lobe of the pronotum, barely visible in front; transverse impressions very distinct. Elytra and wings as long as the abdomen. Anterior and middle femora rather small and slender; posterior femora in the female a little shorter than the abdomen. Valves of the ovipositor, especially the upper ones, long, deeply excavated. The cerci of the male are unusually broad and flat, enlarged at the base and suddenly decreasing in width near the middle; the last ventral segment apparently terminates at the tip with a broad, blunt tooth. Prosternal spine broad at base, blunt, transverse.

Color (dried after immersion in alcohol).—Much like *C. femur-rubrum* but more of a pale, ashy hue. Face dull, brownish-yellow; a triangular, dusky spot on the occiput, apex forward; margins round the back part of the eyes dotted with black. Dark stripe behind the eye as usual. Pronotum pale reddish-brown above. Elytra ashy-brown; disk with a row of small brown spots, nearly two-thirds their length, to the point where the nervules grow suddenly less distinct; here they are fainter; a few dots of the same color are found above and below. Wings transparent, nerves yellowish, except at the apex, where they are dusky. Posterior femora crossed by three oblique brownish bands; inside yellowish, apex dusky; tibiæ a bluish-yellow; when living, blue.

Dimensions.—♀ Length, 0.88 inch; elytra, 0.6 inch; posterior femora, 0.47 inch. ♂ Length, 0.69 inch.

Eastern Wyoming, from Laramie River to Red Buttes, Minnesota (Thomas).

Remark.—In the Minnesota portion of Red River Valley, at Glyndon, on the Northern Pacific road, and near Morris, on the Saint Paul and Pacific road, I found a small variety of this genus quite abundant, which, though differing slightly from *occidentalis*, appears to belong to that species.

Foveola of the vertex elongate, rounded in front; frontal costa solid above the ocellus and slightly sulcate below it, with a row of punctures each side. The pronotum has the lateral carinæ tolerably well-defined and almost right-angled, especially in the male. Elytra and wings about as long as the abdomen in the female. Posterior femora reach the tip of the abdomen. Antennæ extend to the posterior extremity of the pronotum. Prosternal spine broadly transverse at the base. The cerci of the male are short and tapering, turning up very slightly; the tip of the sub-anal plate is entire, not notched.

Color of the living insect.—The face is sometimes almost milk-white, with a few luteous or purplish dots sprinkled over it; the cheeks are pale, but a black stripe, quite narrow, runs down the sulcus below the eye; the usual black stripe behind the eye, extending upon the pronotum, is present, but is very variable. The lateral and posterior margins of the pronotum are bordered by a broad, pale, purplish band; a very narrow white stripe extends down the side of the thorax from the base of the elytra to the insertion of the posterior legs. The elytra are almost uniform in color; sometimes a few dim dots can be seen along the middle field, yet many specimens appear to have them unspotted; the general color is a dark ash-brown, wings transparent, tinged with blue; this bluish cast is very evanescent, almost wholly disappearing from a specimen kept for ten hours, though not immersed in any liquid. The external face of the posterior femora is crossed by three oblique dark and two intermediate white bands; the dark bands cross over to the upper margin of the inner face; inner face and under side yellow. The posterior tibiæ pale greenish-blue, generally with a dark ring near the base; spines black. Tarsi dark above, white beneath. Abdomen dark, mottled above; the posterior margins of the segments bluish-white; venter yellowish-white.

Length about 0.8 or 0.9 of an inch. July 5–11.

C. punctulatus, Uhler, in Scudd. Bost. Jour. Nat. Hist., vii, 465.

This species is very closely allied to *C. femur-rubrum*, from which it is to be distinguished by the greater prominence of the front; by the greater globosity of the eyes; by the markings of the elytra and hind legs, and the sculpture of the female abdominal appendages. The elytra are the same color as in *C. femur-rubrum*, with the square, dark spots not limited to a medial band, but found equally above and below this, extending nearly to the tip. The hind femora have, on the outside, alternate, straight bands of black and brownish-yellow, three of each in number; hind tibiæ brownish-red, with black spines, a narrow black annulation at the base, followed by a wider yellowish one. The upper corniculi of ovipositor not curved so deeply upon their upper surface, nor so upturned and pointed at their tip as in the *C. femur-rubrum*; the lower corniculi much straighter, scarcely bent down at the tip; and the lateral tooth, so apparent in *C. femur-rubrum*, is here almost obsolete. Possibly a variety of the latter species.

Dimensions.—♀ Length, 1.1 inches; elytra, 0.69; posterior femora, 0.48 inch.

Maine (Packard).

C. femur-rubrum, Burm., Handb. Ent., II, 638.

Syn., *Acridium femur-rubrum*, Deg., Ins., III, Pl. 42, Fig. 5, p. 498.

femorale, Oliv., Encyc. Meth., 121 (Ins. VI), 228.

Gryllus (Locusta) erythropus, Gmel., Linn. Syst. Nat., I, iv, 2086.

“Grizzled with dirty olive and brown; a black spot extending from the eyes along the sides of the thorax; an oblique yellow line on each side of the body beneath the wings; a row of dusky, brown spots along the middle of the wing-covers; and the hindmost shanks and feet blood-red, with black spines. The wings are transparent, with a very pale greenish-yellow tint next to the body, and are netted with brown lines. The hindmost thighs have two large spots on the upper side, and the extremity black; but are red below, and yellow on the inside. The appendages at the tip of the body in the male are of a long triangular form. Length from 0.75 to 1 inch; expansion of wings 1.25 to 1.75 inches.”

As this species, which is so common, varies considerably, I have concluded to give Dr. Harris's description without change, adding the following: Vertex but slightly depressed, with a minute angular expansion in front of

the eyes; frontal costa usually but slightly sulcate; sides parallel. Eyes large and rather prominent. Elytra and wings generally a little longer than the abdomen. The cerci of the male rather broad and flat; apex of last ventral segment is entire and truncate. The yellow stripes on the side extend from the base of the wing to the insertion of the posterior femora. The ground color varies with localities and age, and most of the specimens from one or two sections appear to have unspotted elytra; sometimes a reddish-brown tint prevails; at others a dark-olive; at others a dark purplish-brown; yet the markings generally remain the same.

Localities.—Maine, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, Tennessee, Illinois, Minnesota, Ohio, Nebraska, Missouri, Kansas, Colorado, Wyoming, Vancouver's Island (?), west coast of America (?).

C. spretus, Uhler, MSS.

Syn., *Acridium spretum*, Thos., Trans. Ill. St. Ag. Soc., V, 450.

Very much like *C. femur-rubrum*, Burm., the principal difference being in the length of the elytra and wings; a notch at the tip of the last ventral segment. Posterior lobe of the pronotum slightly expanding; median somewhat distinct. Elytra and wings pass the abdomen about one-third their length. The last ventral segment, which is turned up almost vertically, is somewhat tapering, and is notched at the apex, which distinguishes it from the *femur-rubrum*; the notch is small, but is distinct. Prosternal spine robust, sub-cylindrical, transverse. Migratory.

Color.—Scarcely distinct from the *C. femur-rubrum*. The occiput and disk of the pronotum generally reddish-brown; the posterior lobe somewhat paler than the anterior and middle. Spots, as in *femur-rubrum*, arranged in a line along the middle of the elytra; these are a little larger and more abundant toward the apex. The head and thorax are sometimes a very dark olive-brown; at others, reddish-brown, and even brownish-yellow, the color deepening with age. The wings are pellucid, nerves dusky toward the apex; when flying high and against the sun, their wings look like large snow-flakes.

Dimensions.—♀ Length, 1 to 1.2 inches; elytra, as long as the body; posterior femora, 0.55 inch; posterior tibiæ, 0.5 inch. ♂ Length, 0.85 to 1 inch; elytra, 0.9 to 1.05 inches.

Illinois, Iowa, Missouri, Nebraska, Kansas, Colorado, Wyoming, Utah, Idaho, Nevada, Montana, Minnesota, and Dakota (Thomas, by examination and

collections in person); Minnesota, Wisconsin, Dakota (Scudder); Texas, Arizona, British America (Thomas).

Remark.—I have traced this species from Texas northward to the north shore of Lake Winnipeg, in British America, and from the Mississippi River westward to the Sierra Nevada range. It does not appear to be found in California, and but a short distance southward in Arizona.

I am half-way inclined to the opinion that future investigations will show that this is really the destructive species in California, and not *Ædipoda atrox*, for it would seem impossible for the latter to sustain itself during a lengthened flight with its short wings.

C. griseus, Thos., Geol. Surv. Terr., 1871, 454.

Head quite large; occiput elevated. Dark-gray, with fuscous and yellowish spots.

Female.—Occiput unusually convex and prominent; seen from the side, the top of the head rises considerably above the disk of the pronotum; lateral carinæ of the face but slightly divergent. Posterior lobe of the pronotum densely punctured. Elytra passing the abdomen one-fourth their length. Upper and lower valves of the ovipositor slender, without any lateral angulations, not much excavated. Posterior femora passing the abdomen. Prosternal spine short, obtuse, and slightly transverse.

Color.—Face lurid, with numerous small, black spots. Occiput and pronotum gray, with a brassy tinge, irregularly spotted with black; behind each eye, reaching to the last transverse incision of the pronotum, is an interrupted broad piceous stripe; the sides of the pronotum below this somewhat lurid. Elytra dark-gray; nervules whitish; marked somewhat regularly with subquadrate, black, or fuscous spots, not confined to the disk, but extending equally above and below, becoming dimmer toward the apex, but distinct. Wings (not spread in only specimen seen) appear to be dusky toward the apex. Posterior femora with three yellowish bands; rest of the disk black, sulcus and interior carina beneath bright-red; tibiæ purplish-red beneath, with a paler ring near the base; spines black; legs hairy. Venter yellowish.

Dimensions.—Length to tip of elytra, 1.08 inches; elytra, 0.76 inch; posterior femora, 0.62 inch; posterior tibiæ, 0.45 inch.

Ohio (Dodge).

C. bivittatus, Uhler, Say's Ent., ed. Lec., II, 238; Harr. Rep., 3d ed., 174.

Syn., *Gryllus bivittatus*, Say, Jour. Acad. Nat. Sci. Phila., IV, 308; Ent., ed. Lec., II, 237.

Locusta leucostoma, Kirby, Faun. Bor. Am. Ins., 250.

Aceridium sanguinipes, Harr., Hitch., Rep., 583; Cat., 56.

flavovittatum, Harr., Treat., ed. 1862, 173.

bivittatum, Thos., Trans. Ill. Agl. Soc., V, 449.

leucostomum (?), De Haan, Bijdr. Kenn. Orthop., 143.

femoratum (?), De Haan, Bijdr. Kenn. Orthop., 144.

Caloptenus femoratus, Burm., Handb. Ent., II, 368.

Vertex of the female convex or but slightly depressed, and the frontal costa not sulcate; frontal costa of the male sulcate. Elytra and wings but little longer than the abdomen. The last ventral segment of the male has the apical margin entire, circular. Pronotum with the sides straight, slightly converging anteriorly; posterior cross-incision distinct. Posterior femora equal to or passing the abdomen.

Color.—Dull-green or olive-brown, with a yellowish stripe along each lateral angle from the upper angle of the eye to the extremity of the elytra. Mouth pale; face varies from yellowish to olive-brown; the disk of the pronotum from pale reddish-brown to dark olive-brown; as also do the elytra. The elytra sometimes have a few small, dusky spots on the disk, but generally they are unspotted. Wings transparent, tinged with green; nerves greenish-brown or blackish. Hind femora generally with a dark stripe along the upper edge of the disk, yellow below; upper edge with two pale spots; posterior tibiae red.

Dimensions.—Varies much in size. ♀ Length, 1 to 1.62 inches; elytra, 0.76 to 1.20 inches; hind femora, 0.62 to 0.90 inch. Male a little smaller.

It has been found in Maine, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, Carolina, Mississippi, Tennessee, Texas, Arkansas, Illinois, Missouri, Kansas, Nebraska, Iowa, Minnesota, Dakota, Colorado, Wyoming, Utah, Idaho, and Montana.

C. differentialis, Thos., Proc. Acad. Sci. Phila., 1871.

Syn., *Aceridium differentiale*, Uhler, MSS., Thos., Trans. Ill. St. Agl. Soc., V, 450.

Cyrtacanthaeris differentialis, Walk., Cat. Dermap. Salt., IV, 610.

Large size, robust; elytra passing the abdomen, unspotted; olive-brown above, yellow beneath.

Vertex elongate, depressed, broadly sulcate, closed in front; frontal costa

broad, flat, or slightly sulcate; sides parallel; lateral carinæ distinct, slightly divergent. Antennæ of the males half as long as the body. Pronotum quadrate; sides perpendicular, parallel; lateral carinæ or humeral angles obtusely rounded; median carina distinct, except on the post-median lobe of the female; third transverse incision very distinct and deeply indented, others distinct. Posterior femora much enlarged near the base, the disk convex, about as long as the abdomen; posterior tibiæ enlarged toward the apex, hairy. Prosternal spine cylindrical, bent slightly backward. Sub-anal plate of the male triangular; apex blunt, entire; cerci with basal half broad, an obtuse tooth about the middle of the posterior margin, above this bent and tapering.

Color.—Male. Head and anterior lobes of the pronotum reddish or olive-brown; sides paler, with from one to three oblique, black lines; transverse incisions dark on the sides. Elytra unspotted, olive-brown, reddish at the base, semi-transparent. Wings pellucid; nerves of the apical and front portions dark, rest yellowish. Posterior femora yellow; three black spots on the upper edge; interspaces of the disk black, ribs pale-yellow; tibiæ yellow, spines black. Abdomen yellow, with small, black spots and stripes. Venter and pectus yellow.

Female.—Head and thorax olive; legs and venter a brighter yellow than the male.

Colors after immersion in alcohol are only duller and darker.

Dimensions.—♀ Length, 1.5 to 1.7 inches; elytra, 1.25 inches; posterior femora, 0.92 inch; posterior tibiæ, 0.81 inch. ♂ Length, 1.2 inches; elytra, 1 inch.

Southern Illinois, Missouri, Nebraska (Thomas); Kansas, Iowa (Dodge).

Remark.—There is a dark variety of this species found in Kansas and Nebraska; the general color is quite dark (almost black), the hind femora are crossed by broad, black bands; the lighter color is bright-yellow.

CHROMACRIS, Walk.

Body rather slender, nearly cylindrical. Head smooth; tip of the vertex conical, depressed, with two converging keels, which are continued in the abbreviated inner keels of the front; front (face) roughly punctured; outer keels slightly diverging toward the corners of the face. Eyes elliptical, slightly prominent. Antennæ filiform, long, slender. Pronotum sub-sellate;

front portion nearly smooth; hind part scabrous, wider, and with a well-defined carina; transverse-impressed lines very strongly marked; front border slightly notched in the middle; sides rounded; hind border much rounded. Prosternal spine long, slender, slightly acute and oblique. Hind femora generally longer than the abdomen; hind tibiæ a little shorter than the hind femora. Elytra generally as long as the body.

C. colorata, Walk., Cat. Dermap. Salt., IV, 644.

Syn., *Acridium coloratum*, Serv., Hist. Orthop., 674.

Male.—Body of an olive-green; the head of this color. Pronotum notched at the middle of the anterior border; the transverse impressions very distinct upon the dorsum, which has a small spot of yellow on each side; the posterior lobe with a median carina; posterior border margined with yellow. Elytra much longer than the abdomen, almost linear, of a somber-green, nerves yellow. Wings nearly as long as the elytra; base to the middle rosaceous, rest fuscous; at the anterior border near the extremity, there is a rosaceous spot. Legs the color of the body; posterior femora with a yellow ring near the middle and a small spot of the same on the disk. Antennæ long, their two first joints greenish; the eight or ten following yellowish; the others black.

Dimensions.—Length, 1 inch.

South Carolina (Serville).

ACRIDIUM, Geoff.

Gryllus, Linn., Fabr.; *Locusta*, Leach.

Body elongate, sub-cylindrical, or somewhat compressed. Occiput short convex; vertex depressed, somewhat hexagonal; face nearly vertical, tricarinate; the carinæ reaching the clypeus, the middle one broad, sometimes deeply sulcate, appearing as two carinæ; eyes oblong-oval, prominent; antennæ filiform; the penultimate joint of the palpi shorter than the ultimate. Pronotum of medium length, sides somewhat compressed on the anterior lobes, the posterior expanding more or less; lateral carinæ obliterated, the dorsum ascending to the rather prominent median carina; the three transverse incisions not always distinct; a fourth sometimes present, near the anterior margin; front sub-truncate; apex terminating in a rounded angle. Elytra and wings equal to or longer than the abdomen. Extremity of the male.

abdomen not inflated; sub-genital plate somewhat elongate; cerci flat. Sub-genital plate of the female has a tringular tooth at the middle of the apex. Legs rather robust; posterior long, the femora reaching to or passing the apex of the abdomen. Prosternal spine stout, prominent, straight or curved backward.

Synoptical table of the species.

- A. Elytra longer than the abdomen:
- a. Elytra with spots:
 - b. General color bright reddish-brown; wings with dark nerves... *americanum*.
 - bb. General color light yellowish-brown:
 - c. Spots on the elytra large and distinct..... *ambiguum*.
 - cc. Spots on the elytra small and indistinct..... *alutaceum*.
 - aa. Elytra without spots:
 - b. General color green:
 - c. A yellow stripe along the dorsum..... *obscurum*.
 - cc. Without any stripe along the dorsum..... *shoshone*.
 - bb. General color yellowish-brown; a yellow dorsal stripe..... *emarginatum*.
- AA. Elytra about as long as the abdomen:
- a. Uniform light rust-red; dim spots sometimes visible on the elytra, generally without them..... *ruginosum*.
 - aa. Small size; elytra greenish, unspotted:
 - b. Piceous patches on the sides of the pronotum; wings cinereous.. *unilineata*.
 - bb. Sides of the pronotum green with glabrous spots; wings transparent..... *frontalis*.

A. *frontalis*, Thos., Hayden's Geol. Surv. Terr., 1871, 448, Pl. ii, Fig. 1.

Vertex sub-conical. Small size. Elytra and wings not passing the abdomen. General color green.

Closely allied to *A. unilineatum*, Walk.; caloptenoid in general appearance. Vertex regularly hexagonal, standing out in the form of a very short, truncated cone, the tip depressed in the center; face slightly oblique, straight, quadricarinate; carinae nearly parallel, middle pair approach each other immediately below the ocellus. Eyes elongate, oblique, straight in front. Pronotum scarcely enlarged behind; anterior lobes reticulately, and posterior lobe longitudinally, rugulose; median carina very distinct. Elytra and wings narrow, rather shorter than the abdomen. Valves of the ovipositor prominent, lower pair much slenderer than the upper pair, and much exerted. Male cerci slender, tapering, and turned up; sub-anal plate narrow, tapering, sub-truncate at the apex, entire. Prosternal spine sub-quadrate, pointed, and

straight. Antennæ passing the pronotum slightly. Posterior femora passing the abdomen.

Color (dried after immersion in alcohol).—Nearly uniform greenish-yellow. Face and pronotum sprinkled with dusky dots. The elevated lines of the pronotum pale-yellow; depressed portions in the alcoholic specimens testaceous-green, but in the living insect may be colored quite differently; some specimens have the middle carina and portions of the pronotum tinged with red; posterior femora pale-reddish along the upper edge. Elytra a transparent green; wings pellucid.

Dimensions.—♀ Length, 1.06 inches; elytra, 0.63 inch; posterior femora, 0.72 inch; posterior tibiæ, 0.66 inch. ♂ Length, 0.82 inch; elytra, 0.5 inch. Kansas (Dodge).

A. unilineatum, Thos.

Syn., *Cyrtacanthacris unilineata*, Walk., Cat. Dermap. Salt., IV, 611.

Male.—Dull-green, rather slender. Head and pronotum with a slender, yellow stripe. Head smooth, short; vertex piceous, tip depressed, hexagonal; face tawny, coarsely punctured; carinæ well defined, the frontal pair (the frontal costa sulcate, and counted as two carinæ) nearly parallel, slightly curved inward in the middle, the lateral diverging. Eyes lurid, fusiform. Antennæ tawny, rather stout. Pronotum scabrous, with a well-defined median carina, five or six fuscous patches on each side; transverse-impressed lines distinctly marked; front border and sides very slightly rounded; hind border much rounded. Prosternal spine pale-yellowish, stout, oblique, extending to the meso-sternum. Legs tawny; hind femora longer than the abdomen, whitish, with testaceous ridges on the outer side; hind tibiæ almost as long as the hind femora; spines whitish, with black tips. Wings cinereous, a little shorter than the body; veins piceous.

Dimensions.—Length, 0.84 inch; elytra, 0.75 inch. Indiana (Walker).

A. rubiginosum, Harr., MSS. (Scudd., Bost. Jour. Nat. Hist., VII, 467).

Syn., *A. damnificum* (?), Sauss., Rev. et Mag. Zool., 2d ser., XIII (1861), 164.

Facial carinæ prominent, diverging but slightly; frontal costa sulcate its entire length, thickly punctured. Pronotum with a prominent median carina, continuous and slightly arched; scarcely expanding posteriorly; transverse

impressions dim. Elytra and wings about as long as the abdomen; posterior femora of the female a little shorter. Eyes very long, straight in front.

Color.—Light rust-red, somewhat uniform. Elytra opaque, rather paler on the over-lapping portion, without spots, or sprinkled over with dim, small, dusky spots. Wings transparent, slightly reddish toward the tip; veins blackish. Posterior femora reddish; the flat disk whitish, with a row of black dots above and below; apex with a lunate, black spot on the side. Spines of the tibiae whitish, tipped with black.

Dimensions.—♀ Length, 1.4 to 1.6 inches. Male much smaller.

South Carolina (Harris); Cape Cod, Connecticut, Southern States, and Alabama (Scudder); Southern Illinois, Tennessee, Maryland (Thomas).

A. alutaceum, Harr., Rep., 3d ed., 173.

Syn., *A. torvum*, Say, MSS. (Seudd., Bost. Jour. Nat. Hist., VII, 466).
rusticum, Burm., Handb. Ent., II, 633.

Female.—Frontal costa and fastigium thickly punctured. Lobes of the pronotum equally and roughly punctured; median carina somewhat prominent. Elytra and wings much longer than the abdomen; posterior femora shorter. Cerci short, of moderate width, narrowed toward the tips. Pectus punctured. Prosternal spine large, slightly flattened laterally, straight.

Color.—Dirty brownish-yellow; a paler stripe on the top of the head and thorax. Elytra semi-transparent, with irregular, pale-brownish spots; the sutural margin pale-yellow. Wings transparent-yellowish; nerves and nervules pale-brown or dirty-yellow. Posterior margin of each abdominal segment with a ring of black dots. Posterior femora whitish within and without; the disk margined above and below by a row of distant, black dots, and crossed herring-bone fashion by numerous brown lines. Posterior tibiae reddish; spines yellowish-white, tipped with black.

Male.—Cerci nearly as broad as long, obtusely and roundly notched at the tip. Sub-anal plate hairy; notch broad, and not so deep as in *A. americanum*. Spots on the elytra more obscure than in the female; dorsal stripe and stripe on the upper margin of the elytra sometimes wanting.

Dimensions.—♀ Length, 1.75 to 2 inches; elytra, 1.6 inches; posterior femora, 1.05 inches; posterior tibiae, 1 inch. ♂ Length, 1.25 inches; elytra, 1.10 inches.

Martha's Vineyard (Harr.); Connecticut (S. I. Smith); Massachusetts (Erichson); Carolina (De Haan); Florida (Walker).

A. emarginatum, Uhler, in Scudd. Notes Geol. Surv. Neb., 250.

Closely allied to *A. alutaceum*, Harr., which it resembles very much.

Frontal costa sparsely punctured; lateral carinæ of the face slightly divergent. Pronotum densely, and on the anterior lobes coarsely, punctured; posterior lobe expanding moderately. Elytra passing the abdomen one-fourth their length; nervules prominent. Posterior femora about as long as the abdomen. Prosternal point stout, cylindrical, obtuse, slightly bent backward. Cerci very broad, somewhat notched at the apex; sub-anal plate with a broad, square notch at the apex. Pulvilli remarkably large, oblong-ovate.

Color.—A pale reddish-brown, tinged with green. A distinct, yellow stripe reaches from the vertex to the tip of the pronotum, and extends upon the suture of the elytra. A row of distant, black punctures on each margin of the frontal costa, and a row across the upper part of the clypeus. Palpi and antennæ yellow. Sides of the pronotum sparsely sprinkled with yellow dots. Elytra translucent, pale reddish-brown; nerves darkest. Wings transparent, tinged with greenish-yellow at the base; nerves and nervules dull-yellow, darkest near the middle of the outer border, slightly tinged with red near the anterior border. Anterior and middle legs greenish externally, striped with black internally. Posterior femora pale-green; upper margin of the disk marked with a row of black dots. Posterior tibiæ with the inner face black; outer face greenish-purple. Posterior margin of each abdominal segment marked with a ring of black dots.

Dimensions.—♀ Length, 1.5 inches; elytra, 1.3 inches; hind femora, 0.8 inch. ♂ Length to tip of elytra, 1.4 inches.

Colorado, Nebraska, Dakota (Thomas).

A. americanum, Scudd., Bost. Jour. Nat. Hist., VII, 466.—Thos., Trans. Ill. St. Ag. Soc., V, 448, 452.

Syn., *Gryllus americanus*, Drury, Ill. II, App. Descr., and Fig. 1, 128, Pl. 49, Fig. 2 (ed. 1773).

Locusta tartarica, West, in Drury Ill., I, 121, Pl. 49, Fig. 2 (ed. 1837).

Acridium rusticum, Prof. Glover's Fig. 15, Pl. I. In Drury, Ill. Nat. Hist., ed. 1770, 128; it is described and figured (Pl. 49, Fig. 2), without name.

Female.—Large size. Vertex hexagonal, with a central depression; frontal costa solid and somewhat prominent above the ocellus, sulcate at the ocellus, sides nearly parallel. Eyes elongate-oval, rounded behind, straight

in front. Pronotum expanding at the posterior lobe; median carina but slightly prominent; humeral angles sub-distinct on the posterior lobe, obtusely rounded; anterior and middle lobes marked with minute, shallow cells, each having a very minute tubercle in the center; posterior lobe densely punctured; posterior margin about right-angled; apex rounded. Elytra and wings passing the abdomen one-third their length. Posterior femora reaching the apex of the abdomen. Prosternal spine large, curved backward, hairy.

Color.—Reddish-brown, with a slight vermilion-tint. A yellow stripe extends from the vertex along the middle of the head and pronotum, and also upon the suture of the closed elytra as far as the tip of the abdomen. A dark-brown line down the cheeks below the eyes. On the sides of the pronotum is a yellow stripe extending from the sub-marginal to the last cross-incision, directed a little obliquely downward; below this is a brown stripe; then a narrow yellow stripe directed obliquely upward; lower margin yellow. Elytra opaque and reddish at base, rest semi-transparent; a narrow, white stripe on the lower margin, next the base; the disk and apical half marked with large, cellular, fuscous spots. Wings transparent; nerves at the base and inner portion yellowish-white, of the other portions black. Legs bright vermilion-red. Posterior femora have a row of black dots along the upper and lower margins of the disk, and one through the middle; spines of posterior tibiæ yellow, tipped with black. Each segment of the abdomen has a ring of dusky dots on its posterior margin.

Male.—Much smaller. Sub-anal plate prolonged, deeply notched at the apex; cerci very broad, straight, and truncate at the apex.

Dimensions.—♀ Length, 2 inches; elytra, 2.1 inches; posterior femora, 1.15 inches; posterior tibiæ, 1.05 inches. ♂ Length, 1.7 inches; elytra, 1.65 inches; posterior femora, 1 inch; posterior tibiæ, 0.9 inch.

North Carolina, Southern States, Florida, Alabama, Texas (Scudder); Illinois, Tennessee, Mississippi, District of Columbia (Thomas); Virginia, New York (?) (Drury).

A. ambiguum,* Thos., Geol. Surv. Terr., 1871, 447.

Male and female.—Very similar in size, markings, and carvings to *A.*

* There has been much confusion in regard to the *A. americanum*, with which this has doubtless been confounded, notwithstanding its large size, distinct markings, and the very full description given by Drury as early as 1770. The markings and carvings

americanum, with which it has long been confounded, and from which it differs chiefly and almost exclusively in the general color. The former (*americanum*) is more deeply and closely punctured about the head than the latter. In the former the frontal costa, besides the smaller punctures, has, along each margin, a row of regularly-spaced, large, black punctures, which are wanting or less distinct in the latter. The spots of the latter are scarcely as large and paler than in the former.

Color.—Yellow or brownish-yellow. Face yellow; occiput pale-brown. Dorsum of the pronotum light-brown; the dorsal stripe dim, and sometimes, especially in the male, absent. Sides of the pronotum yellow; a dusky spot in the middle, with a yellow stripe through it. Wings transparent-yellow at the base; veins of the apex and of the anterior portions black. Abdomen greenish-yellow. Legs bright-yellow; femora reddish above.

Dimensions.—♀ Length, 2 inches; elytra, 1.95 inches. ♂ Length, 1.6 inches; elytra, 1.74 inches; posterior femora, 1 inch; posterior tibiæ, 0.9 inch.

Southern Illinois, Kansas, Tennessee (Thomas).

A. obscurum, Burm., Handb. Ent., II, 632.

Syn., *Gryllus obscurus*, Fabr., Ent. Syst., suppl., 191.—Figd. Glov. Ills. Ent. Orth., Pl. v, Fig. 12.

Female.—Body large, robust. Vertex hexagonal, bordered behind by a transverse line running from the upper canthus of one eye to that of the

are nearly exactly alike, but the general or ground color is different; and a close personal observation of the two in Illinois, for several years, inclines me to consider them as distinct species. One always appears in the spring, April or May; the other never earlier than the middle of July. And from specimens received from Tennessee and Kansas, I am satisfied the same thing is true there, and it is, as I know from personal observation, true in the District of Columbia. The two species also differ in appearance when on the wing; the *A. americanum* having the appearance and bright silvery wings of the *Caloptenus spretus*, while the other has not.

De Geer (Mem. Ins., III, Pl. 40, Fig. 8) figures probably a specimen of my *ambiguum*, which he names *A. flavo-fasciatum*; but Serville's description applies to another species. Olivier's *A. vittatum*, which he makes synonymous with De Geer's species, is also a different insect (Encyc. Method. Ins. VI, 221). De Haan (Bijdr. Kenn. Orthop., 143), who received specimens from Tennessee, undoubtedly of my *ambiguum*, says that *A. carneipes*, Serv., is but a variety of *A. flavo-fasciatum*. Westwood, in his edition of Drury, gives the name *Locusta tartaricus* to his figure, thus identifying it with *Gryllus tartaricus*, Linn., one of the destructive oriental species.

In this state of confusion, I have concluded to give a name to the yellow species, as it does not clearly appear to have been distinguished from the *A. americanum*.

other; almost horizontal; center depressed and smooth. Frontal costa moderately broad, sides parallel or nearly so; margins somewhat acute; flat, with a slight depression at the ocellus; lateral carinæ distinct, acute. Pronotum but slightly expanded posteriorly; median carina somewhat distinct; densely punctate, posterior lobe shagreened. Prosternal spine cylindrical, slightly bent backward. Elytra and wings extend beyond the extremity of the abdomen about one-fifth their length. Posterior femora scarcely reaching the tip of the abdomen; the upper carina minutely serrate.

Color.—Olive-green, with fuscous dots. An irregular stripe of fuscous dots extends from the eye down the cheek; antennæ yellow. A yellow stripe extends along the occiput and median carina of the pronotum, bordered each side with fuscous; a yellowish stripe also along the humerus of the pronotum, not always present. Elytra fuscous, the upper margin pale-yellow, forming a sutural stripe when closed. Wings transparent, yellowish. A yellow stripe reaches from the base of the wings to the middle coxa. Legs olive-green or blackish; anterior pair palest; the posterior femora have short, oblique, fuscous lines on the disk, the inferior lobes of the apex yellow; posterior tibiæ blackish, spines yellow, tipped with black. Posterior margins of the abdominal segments tipped with yellow, and marked with a ring of regularly-placed fuscous dots.

Dimensions.—♀ Length, 2 inches; elytra, 1.75 inches; hind femora, 1.15 inches; hind tibiæ, 1.08 inches. ♂ Length, 1.35 inches.

South Carolina (Burmeister); Carolina (De Haan); North America (Guérin-Méneville); Texas (Scudder); Florida (Glover).

A. shoshone, Thos., Phil. Acad. Nat. Sci., 1873, p. 296,

Large size; green, without dorsal stripe.

Female.—Vertex nearly horizontal, distinctly hexagonal; sides angularly expanding in front of the eyes; flat. Frontal costa prominent; sides parallel; sulcate from the ocellus downward, above this somewhat gibbous and punctured; lateral carinæ very prominent, parallel. Pronotum slightly expanding posteriorly, coarsely and reticulately punctured; median carina distinct, severed by the three transverse incisions. Elytra and wings passing the abdomen. Cerci very short, broad at base, narrowed and rounded at the tip. Posterior femora much enlarged at the base, posterior tibiæ considerably enlarged at the apex. Prosternal spine robust, cylindrical, and nearly

straight. Pectus punctured. Abdomen of the male somewhat elongate; cerci very broad and flat, very slightly and obtusely notched at the apex, which is bent upward and over the last segment; sub-anal plate elongate, turned upward, with a deep, square notch at the apex.

Color.—Dark-green. Ocelli bright, transparent-amber; eyes brown; cheeks yellowish, with a dark-green stripe extending downward from the eyes. The pronotum has some pale spots on the sides, and sometimes the posterior lobe is tinged with brown. Elytra uniform green, semi-transparent toward the apex, and sometimes faintly tinged with brown. Wings hyaline; nerves and nervules dark-brown. Posterior femora greenish above and below; pinnæ of the disk alternately white and green, the white occupying the flat interspaces; inner face greenish-yellow. Posterior tibiæ bright-vermilion, the under surface being striped with yellow; spines yellow at the base, tipped with black. Venter and pectus dark-green, sometimes varied with dark-brown.

Dimensions.—♀ Length, 2 to 2.5 inches; elytra, 1.7 to 2 inches; posterior femora, 1.25 inches; posterior tibiæ, 1.2 inches. ♂ Length, 1.6 to 1.75 inches.

Arizona (Thomas).

This fine, large species in some respects is closely allied to *A. obscurum*, Burm., in others to *A. emarginatum*, Uhler, but appears to be distinct. It differs from both in wanting the stripe on the pronotum and the dark dots or stripes on the hind femora.

TROPIDACRIS, Scudd.

Species very large. Head large, compressed; space between the eyes equal to the shorter diameter of the eye; median frontal ridge broader than the length of the first joint of the antennæ; the breadth of the labrum is equal to the distance from the upper edge of the clypeus to the upper limit of the frontal costa; the lateral carinæ of the front are distinct, divergent. Pronotum tapers moderately, anterior width to the posterior as 1 to 1.20; posterior angle a right angle or less; median carina cristate, more prominent anteriorly than posteriorly, sometimes obsolete behind. Prosternal spine rather slender, slightly compressed laterally, slightly curved backward. Elytra fully five and one-half times longer than broad; nervules prominent. Wings long and broad, largely spotted with dusky colors. Abdomen comparatively

slender. Outer surface of the hind femora flat or barely convex. Terminal segment of the male nearly as narrow at the base as at the tip, greatly produced and tapering, compressed into a dull carina along the lower edge.

T. dux, Scudd., Proc. Bost. Soc. Nat. Hist., XII, 347.

Syn., *Gryllus dux*, Drury, Ins., II, Pl. 40.

(*ex parte*), Fab., Sp. Ins., I, 362.

(*Locusta*) *dux*, Stoll, Saut. et Grill., Pl. 1b, Fig. 1.

Acridium dux, Oliv., Enc. Meth., VI, 215, Pl. 126, Fig. 21.

Locusta dux, Duncan., Intr. Ent., 257, Pl. 15, Fig. 2.

(*Rutidoderes*) *dux*, West, ed. Drury, II, 92, Pl. 44.

Gryllus cristatus, Thunb., Mem. Acad. St. Petersburg., V, 224; IX, 402.

Acridium latreillei, Fitch, Trans. N. Y. St. Ag. Soc., XVI, 507; Third Rep., 172, Pls. 3, 4.

Crest of the pronotum tipped with black; first and second lobes as distinct as the others; on the posterior half of the pronotum the crest anteriorly is elevated considerably, more than in the allied species. Elytra greenish-griseous; the veins luteous and luteo-fulvous, variegated with pale blotches, small and frequent on the basal half, confluent about the middle and apically, forming very irregular, rather broad, and distant, zigzag bands parallel with the outer border. Wings brick-red, rather broadly bordered with black at the hind margin, and furnished with multitudinous black spots over the whole wing; these spots are ordinarily quadrate, transverse, but near the middle of the outer border they become confluent, forming wavy bands along the longitudinal veins, and toward the hind border they form confluent or broken bands sub-parallel to the hind border; these spots are less frequent and often very indistinct in the male. Hind femora marked externally with a double row of roundish spots, merging into one toward the apex; spines of the hind tibiae greenish-black; claws tipped with black.

Dimensions.—Expansion of the elytra, ♀ 9 inches; ♂ 5.2 inches. Length of the female about 4 inches.

Texas (Scudder).

DIVIS. III.—XIPHOCERIDES.

Conophori, Serv. and Scudd.

Antennæ acuminate; joints distinct. The face vertical or sub-oblique; the front advanced between the antennæ in the form of a short, blunt cone or pyramid, but not prolonged as in *Conocephalides*. It contains, according to the present arrangement, but two groups, *Xiphocerini* and *Phymatini*, and corresponds exactly with the *Conophori* of Serville and Scudder.

A. Joints of the antennæ more or less flattened..... *Xiphocerini*.
 AA. Joints of the antennæ terrete..... *Phymatini*.

GROUP 6.—XIPHOCERINI.

Xiphoceridæ and *Pamphagidæ*, Scudd., Walk.

Antennæ acuminate; the joints distinct and more or less flattened. The vertex flat, triangular; front advanced between the antennæ in the form of a short, triangular pyramid. It is represented in the United States by but one genus, *Rhomalea*, which is by no means a true type of the group, but approaches in several respects the gigantic *Acridii*.

RHOMALEA, Burm.

Romalea, Serv.; *Dictyophorus*, Brullé; *Rutioderes*, Westw.

Large size. Vertex pyramidal, slightly produced in front of the eyes; margins raised. Face sub-vertical; frontal costa prominent, sulcate, not reaching the clypeus; lateral carinæ obtuse, sinuous. Maxillary palpi short; ultimate joint longest, slightly obconic, obliquely truncate. Pronotum long; median carina very prominent; lateral carinæ obliterated on the front lobes, obtuse, but distinct on the posterior; the three cross-incisions distinct, cutting the median carina; a fourth near the front margin on the sides; sub-truncate in front; posterior extremity prolonged, angled. Elytra and wings shorter than the abdomen; the former with two strong nerves dividing each into three nearly equal fields. Abdomen carinated; anal appendages of the female large; sub-anal plate of the male triangular. Posterior femora but moderately enlarged at the base, reaching the apex of the abdomen. An-

tennæ acuminate somewhat flattened, joints distinct, third and sixth longest. Prosternal spine prominent, large at base.

R. centurio, Burm., Handb. Ent., II, 620.

Syn., *Locusta* (*Rutioderes*) *centurio*, Drury, Ill. Exot. Ent., II, 88, Pl. 41, Fig. 3, *Gryllus centurio*, Drury, App., II.—Stoll, Rep. d. Spect., 15, Pl. vi b. Fig. 19.

Acridium centurio, De Haan, Bijr. Kenn. Orthop., 144.

(*Rhomalea*) *micropterum*, De Haan., Verz. Nat. Gesch. Ned. Ind. Bez. Ins., 151.

micropterum, Pal. Beauv., Ins. Afr., 146.

Romalea microptera, Serv., Hist. Orthop., 622; Charp., Orthop., Tab. 49.

Gryllus (*Locusta*) *punctatus*, Stoll, Saut. et. Grill., Pl. 10, Fig. 34.

Dictyophorus guttatus, Blanch., Hist. Nat. Ins., III, 40.

Female.—Head testaceous; middle part of the labrum black; occiput varied with black lines and irregular dots. Pronotum shagreened on the posterior lobe, testaceous; disk varied with fuscous. Elytra much shorter than the abdomen, ovate, pale rufo-testaceous, covered with small black spots and dots. Wings long as elytra, base and disk red; external border black; the nervules run obliquely from one nerve to another, forming narrow quadrangular cells. Abdomen black; carina and junctions of the segments testaceous. Venter testaceous; the segments have an oval black spot each side at the base. Anterior and middle legs testaceous; posterior femora with numerous black dots on the margins of the disk.

Male.—Smaller; occiput blackish, with a median line, testaceous.

Dimensions.—♀ Length, 2.25 inches. ♂ 2 inches.

North America, Carolina (Serville); Florida (Thomas). Figd., Glov., Ills. Am. Ent. Orth., Pl. III, Fig. 4.

Remarks.—The following description is from living specimens:

Female.—Vertex broad between the eyes; advanced and forming a right angle in front of the eyes; surface flat and nearly horizontal; margins slightly elevated. Frontal costa narrow, slightly expanding below, extending only about two-thirds the distance toward the clypeus; slightly sulcate. Antennal foveolæ profound. Antennæ but slightly enlarged near the base, slightly flattened; joints very distinct, somewhat obconic; third and sixth longest. Pronotum slightly widening hindward, median carina distinct and somewhat prominent; lateral carinæ obliterated on the front and middle lobes, distinct, but obtuse on the posterior lobe; anterior lobes sub-cylindrical, rounded up-

ward regularly to the median ridge, the posterior lobe with the disk flat; anterior margin truncate, posterior margin prolonged, a little less than a right-angle, but obtusely rounded at the tip; posterior lateral margins much sloped, very slightly curving inward, but not angulate. Elytra ovate-lanceolate with two very strong longitudinal nerves dividing them into three sub-equal fields; nervules prominent and reticulate; extend about two-thirds the length of the abdomen. Posterior femora quite thick near the base, shorter than the abdomen; tibiae enlarged at the apex; first joint of the tarsi very long, second very short.

Color.—Yellow and black. Head is bright-yellow, except as follows: eyes black; two stripes on the occiput reaching as far forward as the eyes, a semicircular dotted stripe behind each eye, the margins of the vertex, and inside of the antennal foveolæ, black. Palpi, base of the mandibles and lateral margins of the clypeus, frosty-white. Pronotum yellow-olive, with an interrupted black stripe along the lateral carinæ and a black stripe along the middle, which is divided into two parts or stripes by the olive-colored median carina. Elytra dull olive-yellow on the prominent reticulate nervules; the two longitudinal nerves and cellular spaces black; the middle field is tinged with red. Wings with the base and disk a bright crimson-red, with the outer margin black. Abdomen bright-yellow, each segment with a large, black spot on each side; these are less on the basal than the apical segments. Venter and sternum almost entirely pale-yellow. Posterior femora dull orange-yellow, marked with black, as follows: A narrow stripe each side of the upper carina, alternate rays or pinnæ of the disk, with corresponding marks on the inner face, black. Tibiæ bright-yellow, inferior and external face marked with a narrow black stripe at the apex. Tarsi yellow above; joints, claws, and pulvilli black. Antennæ yellow, striped with black on the under side.

R. marci, Serv., Hist. Orthop., 623.

Syn., *Aceridium (Romalea) giganteum*, De Haan, Bijdr. Kenn. Orthop., 143.

Rhomalea gigantea, Burm., Handb. Ent., II, 619.

Dictyophorus reticulatus, Thunb., Mem. Acad. St. Petersburg., V, 259.

Female.—Body black, varied with yellow. Face olive; labrum tipped with black; clypeus fuscous; lateral carinæ yellow. Occiput and vertex black, a yellow line reaching from the vertex to the pronotum; a yellow spot

each side near the hind margin, and a yellowish spot behind the eyes. Pronotum slightly arched, the three cross-incisions cutting the median carina; a fourth incision each side near the front margin; posterior lobe thickly punctured, transversely slightly rugulose. Median carina yellow, bordered each side by black; central portions of the sides yellow; posterior lobe yellow on the outer portions of the disk, lateral margin yellow. Carina of the abdomen, sutures, and lower lateral margins of the segments yellow. Elytra reaching the fifth segment, the two chief nerves brown; rest yellowish, thickly dotted with brown. Wings a little shorter than the elytra; base and disk red, bordered externally with a black band. Venter yellow; an oval black spot on each side of each segment at the base. Posterior and middle legs yellow beneath, darker above; middle femora striped with black; posterior femora with a black stripe above, disk varied with black.

Dimensions.—Length, 2.5 inches; elytra, 1 inch; posterior femora, 1.25 inches; posterior tibiæ, 1.25 inches.

Tennessee (De Haan); Western America (Thunberg); South Carolina (Serville, Burmeister); Southern States (Thomas); Missouri (?) (Walker).

Remark.—I think it very probable that this is but a variety of *R. centurio*.

GROUP 7.—PHYMATINI. (?)

There are no representatives of this group found in North America. (?)

SUB-FAM. II.—TETTIGINÆ.

Peritrachelia, Fieb.; *Tetricidites*, Serv.; *Tetricides*, Scudd.; *Tettigida*, Walk.

This sub-family is distinguished from the preceding by the following prominent characters: The pronotum extends back over the abdomen to or beyond its extremity. The elytra are rudimentary, in the form of scales, and placed on the sides of the body. Without any pulvilli between the claws of the tarsi. The prosternum not truncate, but advanced and inclosing the mouth in the form of a muffler.

The United States species of this sub-family have been arranged in three genera by Mr. Scudder as follows: *Tettix*, *Tettigidea*, *Batrachidea*.

Synoptical table of the genera.

| | |
|--|---------------------|
| A. Pronotum arched roundly..... | <i>Batrachidea.</i> |
| AA. Pronotum nearly or quite horizontal: | |
| a. Antennæ 13 or 14 jointed..... | <i>Tettix.</i> |
| aa. Antennæ 22 jointed..... | <i>Tettigidea.</i> |

Remark.—I have not studied the species of this sub-family with sufficient care to determine their relations, and therefore will not attempt to arrange them with more accuracy than what is indicated by the short descriptions found in the writings of the entomologists by whom they have been described. I have placed in *Tettix* those species in which there is no mention of characters which indicate that they belong to other genera.

TETTIX, Fisch. de W.

Gryllus bulla, Linn.; *Tetrix*, Latr.; *Peritrachelia*, Fieb. (Ent. Mon.); *Platyparyphea*, Fieb. (Kelch., Orth. Obeschl).

Head generally small; face more or less unicarinate; eyes globular, somewhat prominent; palpi short, filiform. Antennæ filiform, consisting of thirteen or fourteen joints, slightly distinct. Pronotum more or less horizontal, extending back over the abdomen to or beyond its extremity; the lower anterior angle of the sides angulated and bent inward; the lateral carinæ somewhat prominent, and convergent near the front border. Elytra short, squamous, in the form of oval scales. Wings well developed, usually as long or longer than the abdomen and slightly curving upward at the extremity. Pronotum without any spine or tubercle. Species small.

T. granulata, Scudd., Can. Nat., VII, 288.

Syn., *Acrydium granulatum*, Kirby, Faun. Bor. Am. Ins., 251.

Tetrix ornata, Harr., Rep., 3d ed., 186.

(Not *Acrydium ornatum*, Say.)

Cinereous, obscurely clouded with black, with the whole body granulated with very minute, elevated, whitish points. Pronotum longer than the abdomen, tricarinate. Tibiæ reddish, obscurely banded with white.

Body black, sprinkled with numberless very minute, elevated points or granules. Pronotum cinereous, clouded obscurely with black; the middle carina straight, and the lateral ones curved at the base. The rudiments of the elytra cinereous, ridged, punctured with excavated punctures; nerves of

the wings black, those of the costal area white. The four anterior tibiæ are reddish, obscurely banded, or, rather, annulated, with white.

Length, 5 lines. Arctic America (Kirby).

Dark ash-colored; a large, white patch between four black spots on the top of the pronotum. A white spot on the top of the hind femora. Pronotum nearly or quite as long as the wings; sometimes varies in wanting the white spot on the top of the pronotum.

Length, 0.55 to 0.6 inch. Massachusetts (Harris).

It is distinguished from *T. ornata* by its longer pronotum and greater size, and also by the prominence of the vertex, which advances considerably in front of the eyes, having the front border granulated; this latter feature also distinguishes it from *T. cucullata* and *T. rugosa*. The males are much narrower than the females. (Scudder.)

Massachusetts, Maine, New Hampshire, Minnesota (Scudder); Arctic America, Hudson's Bay, Lake Huron (Walker).

T. ornata, Scudd., Bost. Jour. Nat. Hist., VII, 474.

Syn., *Acrydium ornatum*, Say, Am. Ent., Le Conte ed., I, 10, Pl. v, Fig. 1.

Tetrix arenosa, Burm., Handb. Ent., II, 659.

dorsalis, Harr., Rep., 3d ed., 186.

quadrifasciata, Harr., Rep., 3d ed., 186.

bilineata, Harr., Rep., 3d ed., 186.

sordida, Harr., Rep., 3d ed., 187.

(Not *T. ornata*, Harr.)

This species is smaller than *T. granulata*; has the vertex but little thrust forward in advance of the eyes, and the front border nearly straight instead of angulated. The pronotum is shorter than in the preceding, and the wings are smaller. Both this and the preceding species have almost every conceivable variation of ornamentation, upon which, almost exclusively, Harris established his specific differences; but, as Uhler has remarked, "Color and style of marking are of very little value in separating the species of *Tettix*." (Scudder.)

Massachusetts, New Hampshire, Maine, Vermont, Connecticut, Missouri (Scudder); Southern Illinois (Thomas).

I give herewith the descriptions of the various synonyms:

Acrydium ornatum, Say.

Whitish; fuscous beneath. Pronotum nearly as long as the wings,

spotted with black. Head blackish; vertex with an elevated longitudinal line, which extends down over the front, where it is grooved, but this groove does not reach the acute ridge which divides the vertex from the front. Thorax (pronotum) flattened, somewhat granulated and whitish, laterally projecting a little over the origin of the elytra; a slightly elevated, longitudinal, central line, and two oblique, abbreviated, elevated lines near the head. A velvet-black spot each side over the tip of the elytra. Pleura, elytra, and pectus black-brown.

Length to the tip of the wings, half an inch.

Near Philadelphia, Pennsylvania (Say).

T. arenosa, Burm.

Vertex broad at the front border, somewhat truncated; margins sharp, broader through the middle, though not so prominent as at the eyes.

Fuscous, sometimes variegated with paler. Head elongate; eyes prominent, and placed at the apex of the front.

Length, 3.7 to 5 lines. South Carolina (Burmeister).

T. dorsalis, Harr.

Rusty-black, with ocher-yellow spots on the sides and legs, and a large, rusty-red spot on the top of the thorax. Wings extending beyond the apex of the thorax.

Length, half an inch. Massachusetts (Harris); New York (Fitch).

T. quadrimaculata, Harr.

Ash-colored, with dark-gray above, variegated with black; four velvet-black spots on the top of the thorax. Wings projecting beyond the extremity of the thorax.

Length, 0.4 to 0.5 inch. Massachusetts (Harris).

T. bilineata, Harr.

Ash-colored; thorax paler, with a narrow, angular, whitish line on each side, extending from the head beyond the middle, the angular portion including a long, blackish patch on each side. Wings in the male rather shorter than the thorax (pronotum); in the female longer.

Length, 0.35 to 0.45 inch. Massachusetts (Harris).

T. sordida, Harr.

Yellowish ash-colored; thorax with minute, elevated, black points. Wings in both sexes rather longer than the thorax (pronotum).

Length, 0.45 to 0.5 inch. Massachusetts (Harris).

All these are placed by Harris under the following division :

Antennæ 14-jointed. Eyes very prominent, with a projecting ridge between them, formed by a horizontal extension of the flat top of the head. Thorax (pronotum) prolonged beyond the extremity of the body.

T. cucullata, Scudd., Bost. Jour. Nat. Hist., VII, 475.

Syn., *Tetrix cucullata*, Burm., Handb. Ent., II, 658.

Vertex at the front border smaller than across the middle of the prominent eyes. Testaceous-fuscous, granulose. Pronotum dilated in front, advanced upon the head to the eyes. ♀ 4 to 5.5 lines. South Carolina (Burmeister).

Differs from *T. granulata*, which it most resembles, in having the vertex very narrow, slightly less than the diameter of the much-inflated eyes, the front cut off square and slightly hollowed, not projecting outward so far as the eyes. The pronotum is broader and more compact over the thorax, more suddenly sloped off behind, and extending backward nearly twice the length of the abdomen, the wings overreaching slightly. The punctures upon the elytra are of the same size, but not so deep, as in *T. granulata*.

Length of pronotum, ♀ 0.5 inch; ♂ 0.4 inch.

Massachusetts, Missouri (Scudder).

T. femorata, Scudd., Trans. Am. Ent. Soc., II, 305.

Vertex but little broader than one of the eyes, barely projecting in advance of them; the front scarcely rounded. Pronotum reaching to the tip of the abdomen, not including the ovipositor; median carina very prominent, slightly arched; surface arenose. Elytra small, well rounded, with shallow punctures. Wings not longer than the elytra. Hind femora very broad and stout.

♀ Length, 9.5 millimeters; pronotum, 8 millimeters; elytra, 1.6 millimeters; hind femora, 5.2 millimeters.

Maryland (Scudder).

T. triangularis, Scudd., Bost. Jour. Nat. Hist., VII, 475.

Allied to *T. ornata*, and agreeing with it in ornamentation, in the character of the vertex and prominence of the eyes, but differing in the length of

the pronotum and wings. As in both of the preceding species, the pronotum and wings are of equal length, but in this the pronotum is scarcely longer than the body, and is not produced backward into such a slender point, the sides being straighter. The breadth is contained three times in the length. It is a smaller species than the preceding.

Length of pronotum, 0.17 inch.

Massachusetts, Maine, New Hampshire (Scudder).

T. rugosa, Scudd., Bost. Jour. Nat. Hist., VII, 476.

Closely allied to *T. cucullata*, agreeing with it in general form and size, shape and length of the pronotum, and length of the wings. The front border of the vertex is as in *T. cucullata*, but it is broader, and the eyes are scarcely as prominent. The whole surface of the pronotum, instead of being delicately granulated as in *T. cucullata*, with the medial and marginal carinae faint, has the carinae quite prominent, and the whole surface rugose, deeply scarred and pitted with irregular, granulated depressions; the wing-covers are punctured as in *T. granulata*.

♀ Length of pronotum, 0.54 inch.

Florida (Scudder).

T. oxycephala, Burm., Handb. Ent., II, 659.

The front border of the vertex narrower than the width of one of the prominent eyes. Fuscous, granulose.

Length of the body, 3.3 lines; pronotum, 4.75 lines.

South Carolina (Burmeister).

T. harrisii, Pack.

This species is mentioned by Dr. Packard in Rep. Nat. Hist. Maine, 1861, 375-376, but I can find no description of it anywhere, and suppose it is but a synonym of one of the species before described.

TETTIGIDEA.

This genus, when compared with *Tettix*, will be found to differ in having a more robust and clumsy form, a larger head, more swollen upon the top, and less sloping down the front, the medial ridge in front more prominent. The antennae consist of 22 joints, which are cylindrical and not flattened.

The joints of the maxillary palpi, which here have the fourth joint much larger at the apex than at the base, somewhat swollen, with a sharp, medial, external ridge, and the fifth much swollen, flattened, with a faint similar ridge, and slightly docked at the tip; as in *Tettix* and *Batrachidea*, the first joint is longer than broad, cylindrical, the second slightly shorter than broad, cylindrical, both together equaling the third, which is of the same length as the fourth or fifth, and cylindrical. The lower anterior angle of the sides of the pronotum; which is angulated and bent inward in *Tettix*, is here rounded and straighter; the lateral carinæ are not so prominent as there, or so strongly bent inward in advance of the broader portion; the front border is thrust forward at an angle partially concealing the head. The prosternum is very strongly folded transversely, forming a very deep, sharp, angulated groove, which in *Tettix* is not nearly so deep, nor are its sides so nearly approximated. Wing-covers considerably longer and narrower than in *Tettix*. This genus further differs from *Tettix* in that there is a small, circular, swollen space, devoid of facets, set off from the upper inner border of the eye. The same is true of *Batrachidea*, but much more indistinctly, since it cannot be discovered without the aid of such a lens as will readily separate the facets of the eye.

T. lateralis, Scud., Bost. Jour. Nat. Hist., VII, 477.

Syn., *Tettix lateralis*, Harr., Rep. 3d ed., 187.

polymorpha, var. A, Burm. Handb. Ent., II, 659.

Acrydium laterale, Say, Ent., ed. Le Conte, I, 10, Pl. v, Figs. 2, 3.

Pale brownish-testaceous, with a lateral broad fuscous line. Pronotum shorter than the wings.

Vertex with an elevated longitudinal line, commencing near the tip and extending down over the front where it is canaliculate the whole length, and terminates beneath the antennæ. Antennæ reddish-brown, blackish at tip. Pronotum flattened, with small longitudinal lines or wrinkles, and a more obvious, continuous, elevated central line extending the whole length. Wings brown on the anterior margin toward the tip, and extending at least the twentieth of an inch beyond the pronotum. Pleura with a dilated blackish-brown line or vitta, beginning at the eye and including the abdomen above and each side. Legs brown, more or less annulated with pale; venter pale-yellowish or testaceous.

Length to the tip of the wings, 0.45 inch.

Georgia and East Florida (Say); Massachusetts, Maine, New Hampshire, Connecticut (Scudder); Southern Illinois (Thomas); New York, Florida (Walker).

I give herewith the descriptions of the various synonyms:

T. lateralis, Harr.

Pale-brown; sides of the body blackish; thorax (pronotum) yellowish clay-colored, shorter than the wings, but longer than the body; elytra with a small white spot at the tips; male with the face and edges of the lateral margins of the pronotum yellow.

Length, 0.45 to 0.6 inch.

Massachusetts (Harris).

T. polymorpha, Burm.

Var. A. Pronotum elongate, extending considerably beyond the abdomen.

a. Fuscous; the head and the sides of the pronotum of the male testaceous.

b. Fuscous; pronotum and the femora of the female testaceous.

T. polymorpha, Scudd., Bost. Jour. Nat. Hist., VII, 477.

Syn., *Tetrix polymorpha*, Burm., Handb. Ent., II, 659.

parvipennis, Harr., Rep. 3d ed., 187, Fig. 82.

In this species the wings are almost abortive, and the pronotum extends only to the tip of the abdomen, while in *T. lateralis* the wings extend beyond the pronotum, which is itself much longer than the body. *T. polymorpha* is the more abundant species. (Scudder).

Massachusetts, Maine, New Hampshire, Connecticut, Missouri, Alabama (Scudder); Southern Illinois (Thomas).

I give also the descriptions of the synonyms of Burmeister and Harris:

T. polymorpha, Burm.

Fuscous, varied with testaceous; pronotum arenose, scabrous; with furcate, sub-elevated lines on the disk; median carina straight, it and the lateral margins somewhat prominent.

Length, 3 to 4 lines.

Var. B. Pronotum short, reaching the apex of the abdomen.

a. Fuscous; head below and sides of the pronotum testaceous in the male.

b. Fuscous; dorsum, the entire head, and the sides of the pronotum testaceous in the male.

c. Fuscous; symmetrically clouded with testaceous; three bands on the upper part of the posterior femora, and a ring at the base of the tibiæ, pale in the female.

South Carolina (Burmeister).

T. parvipennis, Harr.

Dark-brown; sides blackish; pronotum clay-colored or pale-brown, and about as long as the body. Elytra with a small white spot at the tips; wings much shorter than the pronotum. Male with the face and edges of the lateral margins of the pronotum yellow. This species is much shorter and thicker than *T. lateralis*. (Harris).

Length, 0.35 to 0.45 inch.

Massachusetts (Harris).

BATRACHIDEA, Serv.

This genus differs from *Tettix* in its more solid and compact form; in the larger head, the more distant eyes, the less sloping front, and in the smaller number of joints in the antennæ, these having but twelve joints, while in *Tettix* there are thirteen or fourteen, generally the latter; and here the joints are cylindrical instead of being flattened, and more swollen than in *Tettix*. The maxillary palpi in *Tettix* have the fourth joint cylindrical, very slightly largest at the apex, and the fifth cylindrical and slightly swollen, while here the fourth is somewhat larger at the apex than at the base, broadly but faintly ridged outside, and the fifth swollen considerably, especially on the anterior border, with a broad faint ridge outside. It differs also in the more swollen and crested summit of the head; in having the lower posterior lobes of the sides of pronotum thrust downward and outward, but slightly backward, and the lower anterior angle rounded; in having a very high arched median carina on the pronotum, and the lateral carinæ only indicated in front; in having the front border of the pronotum thrust forward over the head a little; in having on the prosternum only a broad, shallow, rounded, transverse hollowing; in having the notches on the under side of the first joint of the pos-

terior tarsi only very slight, instead of being prominent, as in *Tettix* and in *Tettigidea*; in the shorter valves of the ovipositor; and in having stouter legs than in the two genera just mentioned.

B. cristata, Scudd., Bost. Jour. Nat. Hist., VII, 478.

Syn., *Tetrix cristata*, Harr., MSS.

Vertex projecting beyond the eyes, front border well rounded, a little angulated; the medial carina sharp, prominent, sloping downward posteriorly, the front deeply notched immediately in front of the eyes; eyes rather prominent, scarcely more than half as broad as the vertex; the pronotum, with sides neither swollen nor hollowed, of the length of the body; the medial carina high, regularly arched; the lateral border with two shallow grooves, one anterior and the other posterior, overlapping one another in the middle; the whole pronotum is minutely scabrous, and there is generally a dark quadrate or triangular spot on either side, above the terminal half of the wing-covers; wings reaching tip of pronotum.

Length of pronotum, 0.33 inch.

Massachusetts, Maine, New Hampshire, Connecticut (Scudder).

B. carinata, Scudd., Bost. Nat. Hist., VII, 479.

The head much as in *B. cristata*, with the eyes slightly larger and more prominent; the medial carina of the pronotum sharp, regularly arched, the pronotum extending backward a good ways behind the tip of the abdomen, a little upturned toward the tip, with slightly longer wings; the lateral grooves are narrower and less distinct than in *B. cristata*, and the upper surface is more coarsely scabrous than there; marked as in *B. cristata*.

Length of body, 0.32 inch; of pronotum, 0.43 inch.

Massachusetts (Scudder).

PART II.

ACRIDIDÆ OF NORTH AMERICA NOT FOUND IN
THE UNITED STATES.

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ACRIDIDÆ OF NORTH AMERICA NOT FOUND IN THE UNITED STATES.

This part contains descriptions of the genera and species of *Acridida* which are found in North America, but not in the United States. It includes not only those found on the continent, as in British America, Mexico, Honduras, &c., but also those found in the West Indies. Many species found in the United States and described in the first part are also found beyond the limits either north or south; none of these are included in this part, as it is intended to contain only those not found in the United States. It will be seen, by an examination, that although but ninety-four species are described, yet these belong to thirty different genera, more than the number belonging to the United States fauna. This would indicate that when these regions, especially the tropical ones, are thoroughly explored, the number of species will be largely increased.

As I have had an opportunity of seeing but few of these species, I have in most cases copied the fullest and most complete description I could find, preferring those by the most recent authorities. Where they are represented by good figures, I have in some cases—as those in Charpentier's "Orthoptera descripta et depicta"—added some characters from these figures when the author has omitted to mention them in his description.

I have arranged the genera according to the plan adopted in the first part so far as it was possible for me to do this without specimens; but I have not attempted to arrange the species in this order, nor have I attempted to add synoptical tables.

TRYXALINI.

TRYXALIS, Charp.

Division *Achurum*, Sauss.

Head horizontal; rostrum in no way excavated. Eyes inserted scarcely beyond the middle of the head. Pronotum compressed, but not excavated, selliform; posterior extremity rounded, scarcely coarctate in front. Elytra very long, passing the wings. Legs very short; posterior femora about half as long as the elytra.

T. sumichrasti, Sauss., Rev. et Mag. Zool., XIII (1861), 313.

Female.—Slender, compressed. Rostrum of the head elongate, carinate in the middle; apex rounded. Eyes slightly prominent. Pronotum tricarinate, alutaceo-granulose. Elytra passing the wings about 0.18 inch. Posterior femora much compressed, lamelliform, not more than half the length of the elytra, much shorter than half the length of the body; the exterior V-shaped laminæ of the disk in the form of imbricated scales. Color fusco-testaceous.

Length of the body, 1.5 inches; elytra, 1.36 inches.

Mexico temperata (Saussure).

OPOMALA, Erichs.

O. varipes, Serv., Hist. Orthop., 588.

Female.—Head greenish; the lateral carinæ yellow; frontal cone long and pointed. Prothorax shagreened, greenish, the side having a yellow border slightly prominent; the carinæ slightly distinct; the four transverse impressions profound and quite apparent. Prosternal point large, yellowish. Elytra opaque, of a uniform green; nervules prominent. Wings transparent, cloudy at the anterior margin and at the apex, as long as the elytra. Abdomen of a shining yellowish-green. The four anterior legs greenish; the femora yellowish beneath; the posterior femora green, with the inner face and lower edge yellowish. The posterior tibiæ red at the base and tip, and greenish in

the middle; the spines correspond in color to the parts. The posterior tarsi have the first two joints red, the last green. Antennæ ensiform, of a somber-green, yellowish at the extremity; the first two joints green.

Length of the body, 2.25 inches. (Twice inserted).

North America (Latreille). Probably to be found in United States.

O. punctipennis, Serv., Hist. Orthop., 590.

Female.—Body of a yellowish-green. The head of the same color, flat above, having on the sides (laterally) a longitudinal, yellow band; frontal cone short, margined laterally, round, and obtuse at the tip. Disk of the pronotum flat, and slightly tricarinate. Elytra as long as the body, slightly opaque at the base of the anterior border, rest transparent; internal margin gray; a series of obscure (dusky), unequal dots along the chief longitudinal nerve, but these grow dim toward the extremity. Wings as long as the elytra, transparent, slightly tinged with yellow. Abdomen large. Legs yellowish-green.

Length, 1.25 inches. (Twice inserted).

North America (Latreille).

It is possible this belongs to the United States fauna.

O. marginicollis, Serv., Hist. Orthop., 591.

Female.—Head and body of a grayish-green. Frontal cone obtuse at the tip; from the lower border of each a longitudinal, yellow stripe extends back upon the sides of the pronotum. Eyes oblong, straight. Disk of the pronotum punctured; the carinæ scarcely apparent. Elytra straight, lanceolate, terminating in a sharp point, as long as the abdomen, grayish, transparent. Wings pellucid, as long as the elytra; irised. The legs the color of the body. Antennæ yellowish, somewhat ensiform.

♀ Length, 1.25 inches. ♂ Length, 1 inch. (Twice inserted).

North America (Latreille). Probably to be found in United States.

O. crassipes, Walk., Cat. Dermap. Salt., III, 507.

Male.—Green, slender, apterous. Head and pronotum minutely punctured. Head much shorter than the pronotum, elongate-conical in front of the eyes; front with four keels, of which the middle pair are approximate, almost parallel. Eyes piceous, elliptical, prominent, oblique. Antennæ pice-

ous, filiform, slightly flattened, green at the base, as long as the head and pronotum together. Pronotum with three slight transverse-impressed lines; anterior border much rounded; posterior border hardly excavated (?); sides very slightly rounded. Prosternum with a transverse ridge. Femora and four anterior tibiæ thick; spines of the latter extremely minute; posterior tibiæ with two rows of rather long, black-tipped spines.

Length, 0.93 inch.

Vera Cruz (Walker).

This evidently does not belong to *Opomala*, and Mr. Walker places it here with a mark of doubt. It probably should be placed in Saussure's genus *Ichthydion*, which will be found described below.

O. mexicana, Sauss., Rev. et Mag. Zool., XIII (1861), 156.

Slender, linear, testaceous-yellow beneath, obscure-roseate above. Antennæ scarcely flattened, rotundate, whitish, moderately dilated at the base. Rostrum of the vertex trigonal, broad as long. Pronotum rotundate, without carinæ, densely punctate, with a yellow fascia on the lower margin. Elytra much longer than the abdomen, narrow, acuminate at the tip. Posterior femora about half as long as the elytra; the pinnate furrows of the disk obtuse-angled (scarcely V-form at the base).

Length of the body, 1.65 inches; elytra, 1.32 inches.

Mexico (Saussure).

This is probably the same as my *Mesops chlorizans* and Walker's *Stenacris chlorizans*.

O. stenobothroides, Walk., Cat. Dermap. Salt., V, supp, 52.

Male.—Tawny, slender, testaceous beneath. Head and pronotum with two blackish very irregular stripes on the outer sides of the lateral keels. Head elongate; tip of the vertex conical, prominent, with a conical-shaped furrow; front punctured, oblique, with four well-defined keels, which diverge toward the face. Eyes pyriform. Antennæ flat, slightly dilated toward the base. Pronotum minutely punctured, with a slight dorsal keel; lateral keels sharply defined. Hind femora a little longer than the abdomen, with a blackish stripe on the outer side. Hind tibiæ a little shorter than the hind femora; spines black at the tips. Elytra pale-green, with several black dots, which

are in a single row toward the base; a hinder black streak near the base. Wings pellucid.

Length of the body, 1.33 inches; expansion of elytra, 2.33 inches.
Chontales, Nicaragua (Walker).

ICHTHYDION, Sauss.

The body similar to that in the genus *Opomala*, except that the elytra and wings are wanting, and the face is less oblique, Antennæ 13-jointed, triquetrous, slightly dilated. The fastigium of the head as in *Opomala*. Eyes oval, in the male large and prominent. Face quadricarinate. Body compressed, elongate, slender; prosternum tuberculate. Legs short.

I. mexicanum, Sauss., Rev. et. Mag. Zool., XI (1859), 390.

Olivaceous, varied with scarlet; the lateral margins of the pronotum striped with white. Body of the female carinated above. Fastigium of the vertex sub-carinate above, the apical foveola furnished internally with two minute arcuate carinæ. The pronotum of the male granulose. Genital apparatus large. The posterior femora with the upper carina cristate near the base; shorter than the abdomen.

♀ Length, 1.1 inches. ♂ Length, 0.5 inch.
Mexico calida (Saussure).

PEGASIDION, Sauss.

Body slender, compressed, elongate. Head slightly deflexed. Antennæ broad, ensiform; eyes prominent, elongate-ovate; vertex in front of the eyes slightly prominent, foveolate, somewhat deflexed, truncate. Facial carinæ elevated, not obsolete below. Pronotum but slightly carinate, truncate in front. Prosternum armed with a cylindrical spine. Posterior legs slender, very long; spines on the inner side of the tibiæ largest. Elytra narrow and quite long.

P. volitans, Sauss., Rev. et. Mag. Zool., XIII (1861), 319.

Head narrow; vertex short; face sub-deflexed, sub-rugose, strongly quadricarinate; intermediate carinæ sub-parallel; costa above the ocellus not excavated, with large punctures. Pronotum compressed, with large punctures throughout, sub-scabrous, scarcely carinated; anterior angle of the

lateral lobe acute, arcuate; posterior transverse sulcus situated a little in front of the middle. Elytra passing the posterior femora considerably; apex rounded. Color a whitish-fulvous.

Length to the tip of the elytra, 1.5 inches.

Eastern Mexico (Saussure).

SPHENARIUM, Charp.

This genus, which is very briefly described by Charpentier, appears to be allied to *Pyrgomorpha* in the form of the head, but varies considerably from that genus in the form of the pronotum and body. The head is conical; the occiput horizontal or sub-ascending; the vertex somewhat prolonged in advance of the antennæ, slightly ascending. Face oblique, and slightly curved inward. Eyes oval. Antennæ consisting of 12 to 14 joints; sub-cylindrical, somewhat acuminate, with distinct joints. Pronotum sub-elongate, expanding posteriorly, and slightly selliform; sub-cylindrical and obtusely rounded behind. Thorax long in proportion to the body, and broad at the posterior extremity. Abdomen short, tapering rapidly to the posterior extremity; apex of the male curved upward. Posterior legs somewhat elongate, the femora passing the abdomen. Elytra minute, not meeting on the back; wings wanting. Whether the prosternum is spined or not is not mentioned in any description that I have seen.

S. purpurascens, Charp., Orthop., Tab. 31.

Sexes alike in color and size. Vertex rounded, ascending in front of the eyes, apex broad and blunt; it is almost divided by an impressed line. The eyes are somewhat angular and projecting. Face deflexed at about 45 degrees; broader below than above; frontal costa distinct and sulcate; lateral carinæ distinct. Antennæ scarcely reaching the posterior extremity of the pronotum; slightly flattened. Pronotum nearly three times as long as the crown of the head; expanding considerably posteriorly; the sides extend farther down behind than in front. Elytra rudimentary, placed low on the sides, not meeting above; very narrow, reaching the second abdominal segment. Abdomen short, broad at base, narrow at the apex; that of the male curved upward; cerci conical.

Color.—Yellow beneath; sides and above purplish-red, which is the

general color; a narrow dorsal line, and a quadrate spot each side of the base of the abdomen bright-yellow.

The figure shows the length about 1 inch.

Mexico (Charpentier); Cuba (Guérin Méneville).

S. mexicanum, Sauss., Rev. et Mag. Zool., XI, 39.

Green, body punctate. Antennæ 12-jointed. Pronotum granulose, the posterior margin granulate, that of the female sub-emarginate in the middle, that of the male truncate. The posterior margin of the mesonotum sinuate in the middle.

Length, 0.75 inch.

Mexico calida (Saussure).

ÆDIPODINI.

HIPPISCUS, Sauss.

Body robust, crassate, but much compressed. Head much compressed, sub-vertical; face arcuate; frontal costa very prominent. Antennal foveolæ large, extending downward as far as the frontal costa; antennæ slender, flattened. Pronotum in no way constricted; disk flat; margins with acute carinæ, which curve inward. It resembles *Stauronotus* in the thorax, and *Stenobothrus* in the head.

This is given by Saussure as a sub-genus of *Ædipoda*.

H. ocelote, Sauss., Rev. et Mag. Zool., XIII, 398.

Body large, but compressed; yellow, marbled with fuscous. Antennæ flattened. Head much compressed; face much curved, scarce oblique; frontal costa prominent, smooth; margins acute, but not elevated; antennal foveolæ deep, and descending to the clypeus. Vertex arcuate in front, compressed; the foveolæ not conspicuous; an arcuate sulcus at the base. Pronotum compressed; disk flat, slightly excavated, scabrous, with elongate tubercles; posterior angle slightly acute; median carina linear, somewhat elevated, and severed in the middle by the transverse sulcus; lateral carinæ somewhat acute, curved inward, making the nearest approach to each other about one-third the length from the front, and divergent from there to the anterior border. Posterior femora slender for this genus; carinæ cristate.

Elytra short, marked with ocellate, grayish spots. Wings sanguinous at base, with a fuscous band, and fuscous near the costa.

Length, 1.1 inches.

Mexico (Saussure).

MACHÆROCERA, Sauss.

In general form very closely resembling *Xiphocera*, but the prosternum is unarmed. Antennæ elongate, depressed, and narrow. Head rostrate; face somewhat deflexed, the upper portion oblique, the under portion sub-vertical, quadricarinate. Pronotum rugose, elevated, compressed; posterior portion flat above, carinated; apex angulate and emarginate. Elytra longer than the abdomen. Posterior tibiæ slender, normal.

M. mexicana, Sauss., Rev. et Mag. Zool., XI (1859), 391.

Fuscous, with a pale, longitudinal stripe. Pronotum granulose, rugulose, and carinated; the carinæ interrupted in the middle; posterior margin angulate; apex sub-emarginate; the posterior area (disk of the posterior lobe) flat above, each side carinated. The posterior femora marked with three yellow bands; posterior tibiæ blue, with a testaceous ring at the base. Wings fuscous; the base and posterior portion bluish. The sub-anal plate of the male tricuspidate.

♂ Length, 1.2 inches. ♀ Length, 1.8 inches.

Mexico calida (Saussure).

OXYCORYPHUS, Fisch.

Saussure establishes two new divisions in this genus as follows:

Division I.—Rostrum of the vertex sub-acute. Pronotum not constricted; apex obtuse-angled; posterior sulcus situated behind the middle; lateral carinæ acute, continued to the posterior margin.

Subdivision 1.—Foveolæ of the rostrum obliterated; rostrum convex above. (Approaches *Chrysochraon*).

O. toltecus, Sauss., Rev. et Mag. Zool., XIII (1861), 314.

Size of *O. mexicana*. Closely allied to it, but differs as follows:

Color green throughout. The flat portion of the dorsum less narrow; the lateral carinæ behind the posterior sulcus not arcuate, scarcely divergent.

Face deflexed. Antennæ very short, not longer than the pronotum, flattened, considerably dilated, acuminate. Elytra green; the middle field narrow, pellucid, with fuscous dots at the base. Wings as in *O. mexicana*; anterior field partitioned by the longitudinal nerve, and densely reticulate. Antennæ and vittæ on the lateral carinæ running to the eye, fulvous.

Mexico altior (Saussure).

O. burkhartianus, Sauss., Rev. et Mag. Zool., XIII (1861), 314.

Testaceous; head and pronotum with a fuscous fascia on the upper portion of the sides. Head flat above, scarcely convex, bi-carinate upon the sides; rostrum rounded; face slightly deflexed, not concave; intermediate carinæ sub-distant. Antennæ elongate, flattened. Eyes pyriform, oblique. Pronotum compressed throughout; discal area flat, tricarinate, acutely marginate; posterior extremity obtuse-angled. Elytra as long as the body; upper area flat, elongate; apex obliquely truncate. Posterior femora passing the abdomen considerably, compressed.

Length of body, 1.08 inches; elytra, 1.04 inches; posterior femora, 0.74 inch. Male smaller.

Mexico (Saussure).

Subdivision 2.—Margin of the rostrum acute, emitting two lateral branches, which run back to the ocellus, forming on each side a triangular faveola, in a manner situated below the lateral margin of the vertex. Rostrum more or less excavated above.

O. mexicanus, Sauss., Rev. et Mag. Zool., XIII (1861), 314.

Rather small. Body much compressed, a pale fascia above. Head much compressed, acute-trigonal; vertex horizontal, elongate; face much deflexed, not arcuate. Vertex elongate, narrow, with a slightly-elevated convex carina; rostrum in front trigonal-acute; carinate margins; margins acute; without lateral foveolæ;* four facial carinæ conspicuous, the median pair close together, above the ocellus parallel, divergent below it. Pronotum with three distant carinæ, cut by the posterior sulcus behind the middle; the lateral carinæ parallel on the anterior lobes, divergent and arcuate on the posterior,

* It is difficult to understand this description of Saussure, when we remember it is one of the species upon which the second subdivision, as given above, was founded. But as I am unacquainted with the species, I give his description as I find it.

exteriorly convex. Elytra passing the abdomen. Wings somewhat fuscous, yellowish at the base. Posterior femora slender. Antennæ of the female flattened, dilate; of the male sub-crassate, acuminate; joints conspicuous.

Length, 0.83 inch.

Mexico (Saussure).

O. aztecus, Sauss., Rev. et Mag. Zool., XIII (1861), 315.

Quite small, fuscous. Body varied with fuscous and bay. Closely allied to *O. mexicanus*; very similar in stature and form, but the antennæ elongated; apex scarcely acuminate, and the head more deflexed. Lateral carinæ of the pronotum less divergent posteriorly, and scarcely arcuate. Elytra longer, black; a vitta upon the posterior margin green; anterior field of the wings not parted by the longitudinal vein, hyaline; the transverse nervures widely separated. Body fuscous, ornamented above with a green fascia. Head testaceous.

Mexico (Saussure).

O. totonacus, Sauss., Rev. et Mag. Zool., XIII (1861), 315.

Green, with two yellow lines running from the eyes along the carinæ of the pronotum. Very much like *O. mexicanus* in size and form, but less compressed. Antennæ filiform, somewhat crassate, those of the female shorter than the head and pronotum united. Rostrum of the vertex excavated, marked with a transverse sulcus. Dorsal area of the pronotum broader, strongly tricarinate; lateral carinæ cut by the second and third transverse furrows, or by all three, slightly divergent posteriorly, arcuate inward, as in *O. toltecus*. Elytra much longer than the abdomen, sub-membranaceous, fuscous; apex rounded; marginal areas green, opaque; anterior area spotted with gray, and a sub-basal sinus gray; a series of fuscous spots along the disk. Wings fuscous at the apex.

Mexico (Saussure).

O. zapotecus, Sauss., Rev. et Mag. Zool., XIII (1861), 316.

Quite small, moderately compressed. Rostrum of the vertex flat, sub-excavated, a narrow, transverse sulcus at the base; margins scarcely elevated. Antennæ flattened. Face deflexed, but not arcuate; frontal costa above the

ocellus strongly projecting, not channeled. Pronotum moderately broad above, tricarinate; lateral carinæ cut thrice by the transverse furrows. Elytra not passing the abdomen, narrow; apex rounded, dotted with fuscous in the middle at the base. Wings hyaline, densely reticulate. Posterior femora moderately broad, not slender at the apex. Eyes approach each other at the vertex.

Length, 0.68 inch.

Mexico (Saussure).

Division II.—Body compressed. Head acute. Posterior sulcus of the pronotum situated about the middle. Antennæ filiform, sub-acute (sub-clavate?) at the apex. Approaches *Gomphocerus*.

O. montezuma, Sauss., Rev. et Mag. Zool., XIII (1861), 316.

Slender, much compressed, green, with a fuscous dorsal stripe, and a stripe and spots of the same color on the sides. Head longer than the pronotum, conical, and acutely trigonal; rostrum flat, margins elevated and divided by a carina, but not foveolate; face much deflexed, with four distinct carinæ, the lateral straight, the median sub-parallel, somewhat approximate at the ocellus. Eyes narrow, elongate, oblique. Antennæ elongate, filiform, incrassate near the apex. The three carinæ of the pronotum cut by the middle transverse sulcus, somewhat approximate, sub-parallel; the lateral carinæ in front of the middle slightly sinuate; the posterior sulcus situated a little behind the middle. Elytra dilated in front, elongate-ovate, transparent-fuscous, posterior margin opaque; the front ornamented in its first part with a fuscous fascia, and a sub-marginal green vitta next the base; mediastine are prolonged beyond the middle of the margin; scapular and discoidal areas dilated, parted by scalariform veinlets; the externo- and interno-median areas narrow, scalariform-reticulate. Wings an obscure fuscous, densely reticulate. Posterior femora quite slender; tibiæ fuscous. Abdomen of the male very slender, the sub-anal plate elongate, compressed, acuminate.

Length, 0.92 inch.

Mexico (Saussure).

O. tibialis, Walk., Cat. Dermap. Salt., IV, 787.

Male and female.—Ferruginous, tawny beneath. Disk of the vertex and of the fore part of the pronotum tawny. Tip of the vertex lanceolate,

depressed; lateral furrows lanceolate; front (face) erect, slightly tuberculate, with four well-defined keels; inner keels parallel toward the vertex, slightly diverging toward the face. Outer keels very slightly curved inward. Antennæ tawny, flat, setaceous, much longer than the head and the pronotum together. Pronotum tuberculate, with a slight middle keel; lateral keels slightly apparent toward the hind border, which is slightly elongated and forms a truncated angle. Hind femora on the inner side black, with two pale yellow bands; first band post-medial, second sub-apical. Hind tibiæ blue, with a white band near the base; base black; spines white, with black tips. Elytra ferruginous; costa rounded near the base. Wings blackish.

Length of body, 0.67 to 1 inch; expansion of elytra, 1.58 to 2 inches. Oajaca, Mexico (Walker).

STENOBOTHRUS, Fisch.

Saussure places under the following division and subdivisions the four following North American species of this genus:

Division I.—Antennæ filiform or sub-filiform—*Rhammatocerus*, Fisch.:

1. *Lateral carinæ of the pronotum straight or nearly straight:*

St. mystecus, Sauss., Rev. et Mag. Zool., XIII (1861), 317.

Medium size, green or testaceous-bay. Head large, conical, punctate; vertex much produced in front of the eyes, rounded, and destitute of foveolæ; the rostrum convex above, in no way excavated. Face much deflexed, but scarcely arcuate, rugulose; costa moderately prominent, punctate, marginate with parallel carinæ, these evanescent above. Pronotum punctate throughout, but slightly angulate posteriorly; posterior sulcus situated considerably behind the middle; lateral carinæ straight, parallel, obsolete behind the posterior sulcus, cut by the penultimate sulcus a little in front of the middle, and produced in front, indistinctly upon the head, to the eyes. Posterior legs slender. Elytra a little shorter than the abdomen. Antennæ filiform.

Length, 1.12 inches; elytra, 0.68 inches.

Mexico (Saussure).

2. *Lateral carinæ of the pronotum arcuate or broken, and more or less approximate before the middle:*

a. *Rostrum of the vertex obtuse, apex rounded:*

St. viatorius, Sauss., Rev. et Mag. Zool., XIII (1861), 317.

Large, green (when dried, fuliginous), varied with fuscous; body much compressed, a green fascia above. Head narrow; vertex horizontal; apex furnished with a sub-cycloidal foveola; lateral foveolæ obliterated; face deflexed, convex, and mottled; no intermediate carinæ; costa strongly arcuate, somewhat prominent above, but not below, convex, not sulcate even at the ocellus. Disk of the pronotum fuscous; posterior margin angulate; lateral carinæ slender, indicated by a green fascia, before the middle angulate, somewhat approximate, and then obsolete. Posterior femora much inflated at the base. Elytra elongate, gray; marked on the posterior margin with green; anterior margin near the base enlarged; spotted or fasciate with green or pellucid, the discal field marked with fuscous spots. Wings hyaline, greenish; veins fuscous toward the apex, often clouded at the apex. Posterior tibiæ yellow; apex blue. Posterior femora bluish or yellowish internally, trifasciate with fuscous. Antennæ as long as the head and pronotum together.

Length of the body, 1.50 inches.

Occurs in all Mexico, abundant in the fields, and injurious (Saussure).

St. gregarius, Sauss., Rev. et Mag. Zool., XIII (1861), 318.

Closely allied to *St. viatorius*, but less; body more compressed. Head narrow, seen from the side trigonal or conical; face much deflexed, scarcely arcuate; frontal costa very prominent, punctate, not channeled, narrow above, obsolete below, but in the male reaches to the clypeus; cheek-carinæ distinct throughout; vertex strongly produced in front of the eyes, narrow; apex trigonal, foveolate; lateral foveolæ obsolete; eyes large, elongate, sub-oblique, acuminate above. Antennæ filiform, flattened. Pronotum as in *St. viatorius*, but narrower. Anterior femora less inflated. Externo-median vein of the elytra retrorse, sub-arcuate. Color as in *St. viatorius*. Tibiæ red, blue at the apex. Wings hyaline.

Length, ♂ 1 inch. ♀ 1.25 inches.

Islands of Saint Thomas and Hayti (Saussure).

b. Rostrum of the vertex trigonal, angulate, distinctly foveolate:

St. tepanecus, Sauss., Rev. et Mag. Zool., XIII (1861), 319.

Rather small, testaceous; two fuscous fascia on the sides. Head trigonal; face much deflexed, not arcuate; an acute fronto-vertical girdle; facial

costa narrow, sulcate; carinæ straight, approximate above, slightly divergent below. Rostrum of the vertex trigonal, foveolate; margins acutely carinate, distinctly angulate (as in *Tomonotus*); lateral foveola almost linear, situated under the margin of the rostrum somewhat in front. Pronotum compressed, posterior extremity obtuse-angled; lateral carinæ slightly arcuate, somewhat distant; transverse furrows sinuous, the posterior deeply impressed, situated a little behind the middle; posterior lobe slightly punctate. Posterior femora sub-inflated. Elytra much longer than the abdomen. Wings fuscous.

Length to tip of elytra, 0.96 inch.

Mexico (Saussure).

St. mexicanus, Walk., Cat. Dermap. Salt., IV, 756.

Male.—Grass-green. Head and pronotum marked on each side with a whitish, brown-bordered line, which extends from the eye to the base of the elytra. Head elongate; tip of the vertex concave, nearly triangular; the furrow (foveola) on each side linear; front (face) oblique, with four distinct keels, which diverge toward the face, the inner pair connected at their junction with the tip of the vertex. Pronotum with three very slight keels; lateral keels occupied by the two lines, parallel from the fore border to the first transverse furrow, very slightly diverging from thence to the hind border, which is rounded. Abdomen testaceous, a little shorter than the hind femora. Hind femora with a brown stripe beneath; hind tibiæ with a paler band near the base. Elytra nearly pellucid, with a grass-green, lanceolate stripe on the costa and another on the hind border; a row of pale-brown dots between the stripes, and three very irregular rows of very pale-brown dots in the exterior part. Wings slightly cinereous, brownish about the apical part of the exterior border; a brown streak along the exterior part of the costa; veins black, testaceous at the base and along the interior border.

Length of the body, 0.79 inch; expansion of elytra, 1.25 inches.

Oajaca (Walker).

Remark (Walker).—The structure of the tip of the vertex will distinguish it from *St. viatorius*, and the slight transverse furrows of the pronotum from *St. tepanecus*. The lateral keels of *St. mystecus* are parallel.

St. decisus, Walk., Cat. Dermap. Salt., IV, 757.

Male.—Pale-testaceous. Head and pronotum have on each side a black stripe, which is concise on the inner side and diffuse on the outer side, and

is on the outside of the lateral keel, except near the hind border of the pronotum, where it appears also on the inner side. Tip of the vertex flat, conical, with slight elevated border; furrow on each side nearly obsolete; front (face) punctured, very oblique, the four keels diverging toward the face, the two inner keels connected between the sockets of the antennæ, where they form a ridge. Antennæ slender, nearly cylindrical, rather longer than the head and the pronotum together. Pronotum with three very slight keels; lateral keels slightly converging from the fore border to the first transverse furrow, where they are slightly angular, and whence they diverge slightly to the hind border, which is rounded; the two transverse furrows approach each other on the disk. Abdomen somewhat shorter than the hind femora. Hind femora with an irregular and interrupted blackish stripe on the outer side, with an entire blackish stripe beneath, and with a blackish spot on the disk of the inner side; hind tibiæ and hind tarsi whitish, the former with an irregular, blackish band near the base. Elytra with a blackish costal stripe. Wings pellucid.

Length of the body, 0.55 inch.

San Domingo (Walker).

Remark (Walker).—The wings of the specimen described are only slightly developed. The color and markings distinguish it from *St. viatorius*.

St. arctatus, Walk., Cat. Dermap. Salt., IV, 761.

Grass-green, testaceous beneath. Head and pronotum with a broad, blackish stripe on each side, which is partly on the inner side of the stripes (?) (carinæ) of the pronotum, toward the hind border. Tip of the vertex flat, elongate-conical; furrow on each side nearly linear; front very oblique, with four slight, diverging keels; inner keels connected and forming a ridge between the sockets of the antennæ. Antennæ slender, filiform. Pronotum with three very slight keels; lateral keels white, slightly converging from the fore border to the first transverse furrow, diverging from thence to the hind border, which is rounded. Legs testaceous; hind femora with a paler band near the tips, which are blackish; hind tibiæ blackish toward the base, near which there is a pale-yellow band. Elytra brown, with a grass-green, lanceolate stripe along the hind border; exterior part of the latter cinereous. Wings cinereous, brownish about the tips, with a black costal streak; veins black, testaceous at the base and along the interior border.

Length of the body (supposed), 0.67 inch; expansion of elytra, 1.25 inches.

The abdomen of the specimen described was mutilated. The converging lateral keels of the pronotum distinguish it from *St. concinnulus* and *rugulosus* (South American species).

Honduras (Walker).

St. viridissimus, Walk., Cat. Dermap. Salt., IV, 761.

Female.—Vivid grass-green. Head and pronotum on each side with a whitish, slightly brown-bordered line. Head with a linear and very narrow furrow on each side of the tip of the vertex; front with four slight, diverging keels, the inner pair nearly contiguous where they join the tip of the vertex. Pronotum with three very slight keels, the lateral pair very slightly curved inward, bearing the lines before mentioned; hind border rounder. Abdomen pale-testaceous, a little shorter than the hind femora. Hind tibiæ shorter than the abdomen, their spines with black tips. Elytra pale rose-color, this hue diminishing toward the tip; costa rounded near the base. Wings pellucid; veins black.

Length of body, 0.75 inch; expansion of elytra, 1.17 inches.

Honduras (Walker).

St. nobilis, Walk., Cat. Dermap. Salt., V, suppl., 79.

Male.—Pale-green. Head and pronotum with two irregular brown, more or less interrupted stripes, which widen hindward. Head conical; tip of the vertex nearly round, with a curved transverse furrow; front (face) thinly punctured, with four very slight diverging keels. Eyes tawny, pear-shaped. Antennæ brown, testaceous toward the base. Pronotum with a well-defined middle keel, and with two slight lateral keels, which are angular and diverge hindward; fore border and sides nearly straight; hind border much rounded. Hind femora a little longer than the abdomen, with a black patch on the inner side near the base; under side red. Hind tibiæ red, nearly as long as the hind femora, pale-yellow on each side at the base; blackish on each side at the tips; spines black, except at the base. Elytra nearly pellucid, with a discal stripe of spots and patches, which are formed by brown or blackish veins; a sub-costal line of transversely-elongated brown

or blackish points. Wings pellucid; veins black, pale-yellow at the base and along the interior border.

Length of body, 1.33 inches; expansion of elytra, 2.75 inches.

Oajaca, Mexico (Walker).

STETHEOPHYMA, Fisch.

S. variegata, Fisch., Orth. Europ., 358, Pl. 16, Fig. 2.

Syn., ———, Stoll., Saut. et Grill., Pl. 106, Fig. 36.

Gryllus, variegatus, Sulz., Abgek. Gesch., 84, Pl. 9, Fig. 4.

cothurnatus, Creutzer, Ent. Versuch., 139, Pl. 3, Fig. 32.

Gomphocerus cothurnatus, Burm., Handb. Ent., II, 647.

Ædipoda (Arcyptera) cothurnata, Serv., Hist. Orthop., 743.

Arcyptera cothurnata, Fisch. de W., Orth. Ross., 333, Pl. 22, Figs. 1 and 2.

Calliptamus morio, Serv., Rev. Meth., 94.

Body greenish-yellow; the head of this color, smooth, shining, thick, especially in the female; antennal foveolæ profound; the four carinæ of the face somewhat obliterated. Pronotum of a blackish-brown, a little downy or velvety; the disk much contracted anteriorly; the three carinæ greenish, the median reaching from the front to the posterior border; the sides compressed, spotted with greenish. The prosternum has, in the middle, a slight swelling. Elytra much longer than the abdomen; rounded at the apex, contracted at the base; anterior margin dilated in both sexes, but much more so in the male than in the female; transparent in the center; the two parts strongly reticulated, forming a peculiar net-work; the base and extremity less transparent, of the same brown color as the wings; nervules of the ordinary form; internal border of a greenish-yellow. Wings as long as the elytra, transparent, of a clear brown throughout, with a violet reflection. Legs the color of the body; the inner face of the posterior femora and some large spots on the external face black; lower sulcus of a coral-red; the lower border of the inner face also of the same color. Posterior tibiæ of a shining black at the base, immediately below which there is a broad, yellow annulation; the rest of a coral-red; the tips of the spines black. Sub-anal plate of the male long and pointed.

Length, ♀ 1.2 to 1.25 inches; ♂ 0.92 to 1 inch.

Walker (Cat. Dermap. Salt., IV, 781) gives North America as the locality from which a number of his specimens were obtained. It is a European species, and I therefore consider it doubtful whether he is correct,

but would rather suppose he is mistaken as to the locality of his specimens, or in identification. But that this may be tested hereafter, I have added a description of the species from Serville.

TOMONOTUS, Sauss.

I give here Saussure's generic description, that his divisions may be better understood.

Body compressed. Antennæ dilated or filiform. Head vertical; vertex horizontally produced, trigonal in front; plane of the foveola elevated, emarginate, frequently transversely sulcate; front elevated; face much compressed, prismatic; lateral carinæ antrorsely arcuate, produced to the clypeus; costa very prominent, its sides vertical, obliquely truncate. Pronotum in front and behind angulate, cristate; no lateral carinæ in front, acute on the posterior part. Elytra full size. Posterior femora compressed, dilated. Much like the genus *Tropeonotus* (*Tropinotus*, Serv.), but differs in the head, being vertical; femora dilated and the prosternum unarmed. Somewhat similar to *Pachytylus*, but the fronto-vertical angle is straight, and differs also in the foveolæ of the vertex and the prominent facial costa being narrow above. (*Ædipoda sulphurea*, Burm., agrees accurately with this genus.)

Division 1.—Fastigium of the vertex not deflexed, sometimes sub-ascending, terminating in a V-form trigonal angle, margins acutely elevated (head like *Tropeonotus*):

- a. Antennæ slender, *T. sulphureus*, Burm.
- b. Antennæ flattened, *T. zimmermanni*, Sauss.

Division 2.—Apex of the vertex flat, furnished with a more or less distinct foveola, sub-deflexed, truncate:

- a. Face much elongated, prismatic; costa straight; lateral foveolæ of the vertex conspicuous; dorsal carina elevated into a strong crest (pronotum like *Tropeonotus*).

T. mexicanus, Sauss., Rev. et Mag. Zool., XIII (1861), 321.

Fuscous or bay, granulose-scabrous, and punctato-pilose. Foveola of the vertex not deflexed, rugose; the margins carinated; of the female broad, sub-pyriform, flat; of the male excavated, narrower, tri-lobed; median lobe elongate, reaching to the frontal costa; lateral foveolæ very distinct. Face somewhat deflexed, prismatic; the costa very prominent, coarsely punctate,

flat, sulcate below the ocellus. Pronotum compressed, anteriorly and posteriorly acute-angled; carina much elevated, cristate, arcuate, produced, and slightly parted by the sulcus a little in front of the middle. Antennæ flattened, dilate, acuminate. Elytra longer than the abdomen, grayish, each with fuscous points sprinkled over it, and two fascia of the same color; apex obliquely truncate, with a pellucid spot. Posterior femora much inflated, inflated below, only cristate above, the crest abbreviated; posterior tibiæ fasciate, with fuscous and testaceous.

Length of body, 1.08 inches.

Mexico temperata (Saussure).

b. Head somewhat rounded; face arcuate; fastigium rounded; face compressed (approaches *Pachytylus*):

T. nictanus, Sauss., Rev. et Mag. Zool., XIII (1861), 321.

Fuscous-gray, or a brownish-fuscous, tessellated with blackish. Body much compressed. Vertex narrow, rugose, carinate through its whole length, trigonal, and projecting in front; foveola scarcely deflexed, flat, sub-pyriform; margins elevated, partitioned by a profound, transverse sulcus. Face perpendicular, strongly quadricarinate, and punctate; costa elevated, sub-sulcate, narrow, and tricarinate above; lateral foveolæ conspicuous, flat, quadrate, carinated in the middle; eyes flattened. Pronotum flat and granulated above, sub-excavated and somewhat rugose; carina cristate, equal throughout, divided into two parts by the posterior sulcus a little in front of the middle; lateral carinæ acute. Elytra slightly passing the abdomen, sparsely punctate. Wings scarlet; margin and a sub-costal fascia fuscous. Tibiæ pale-red.

Length, 1.2 inches.

Mexico (Saussure).

Division 3.—Antennæ crassate; head convex, as in *Stenobothrus*, arcuate; pronotum strongly carinated longitudinally:

T. otomitus, Sauss., Rev. et Mag. Zool., XIII (1861), 322.

Male.—Small, fuscous or bay. Head convex; face deflexed, arcuate, quadricarinate; vertex convex, carinated, advanced in front of the eyes in an acute rostrum, but only slightly deflexed, with a deep, narrow foveola, carinate-margined; apex acuminate; lateral foveolæ distinct, short, triangular

Antennæ elongate, filiform, crassate, flattened, and somewhat enlarged near the apex. Pronotum narrow and flat above, tricarinate; median carina sub-elevated, distinctly severed by the posterior sulcus before the middle; even the lateral carinæ are cut by the posterior sulcus. Posterior femora rather broad, not slender behind the middle. Elytra bay; apex pellucid, trifasciate, with fuscous. Wings pellucid; nerves black; veinlets scalariform, transversely reticulate; an elongate, black stigma on the anterior border.

Length, 0.74 inch.

Mexico (Saussure).

ÆDIPODA, Latr.

SUB-GENUS I.—*Sphingonotus*, Fieb.

Æ. haitensis, Sauss., Rev. et Mag. Zool., XIII, 1861, 323.

Closely related to *Æ. cærulans* but less, the body and pronotum acutely rugose. Medium size; testaceous-gray. The vertex somewhat broad between the globose eyes, excavated, strongly deflexed, and drawn out in advance; foveola with a median carina; lateral margins elevated and continuous with the margins of the frontal costa; no lateral foveola. Antennæ annulated. Pronotum constricted in front; the posterior sulcus considerably in front of the middle, slightly carinated above; the carina obliterated between the cross-furrows; posterior margin produced, sub-acute, punctate. Elytra somewhat longer than the abdomen, bay, bi-fasciate, and spotted, pellucid near the apex. Wings pale-blue, with a broad, fuscous fascia; apex hyaline. Posterior tibiæ blue, frequently testaceous at the base (when dried these are testaceous).

Length, 0.94 inch.

Hayti (Saussure); San Domingo (Walker).

SUB-GENUS II.—*Ædipoda*, Fieb.

Æ. pardalina, Sauss., Rev. et Mag. Zool., XIII, 1861, 324.

Robust, dull-yellowish, or castaneous, marbled with yellow; pronotum margined with yellow. Antennæ elongate, acuminate, and obscure at the apex. Head broad plicate-rugose; vertex very rugose, sub-carinate, furnished with seven foveolæ, of which the principal one is broad and short. Thorax very rough, tuberculate; the median carina slightly elevated; twice severed;

the anterior margin advanced upon the occiput, frequently angulate; the posterior extremity produced into an acute triangle; the lateral carinæ very acute, extending almost to the anterior margin. Elytra fulvous ocellate, with numerous grayish spots (but not fasciate). Wings yellow at the base, pellucid at the apex, a median, arcuate, fuscous fascia. Posterior femora very broad, lamelliform-cristate beneath; trifasciate, with the interior face of the posterior femora and the tibiæ sanguineous.

Length, 1.05 to 1.6 inches.

Mexico (Saussure).

I have but little doubt that this is a small-sized variety of *Æ. coralipes*, Hald., but I have given the description in full, as I may be mistaken in this opinion.

Æ. sumichrasti, Sauss., Rev. et Mag. Zool., XIII, 1861, 324.

Rather robust; fuscous or fusco-ferruginous, sprinkled with gray; antennæ annulate. Vertex narrow; foveola elongate, narrowed anteriorly; margins elevated, continuous with the margins of the frontal costa; the frontal costa elevated, but obsolete or none near the mouth. Eyes prominent. Pronotum very broad, coarctate at the front, arcuate, but not constricted; the small carina not elevated; the posterior transverse sulcus situated a little in front of the middle; the posterior part very broad, short, and obtuse-angled at the apex; the (lower) posterior angles of the sides produced in the form of a tooth, or sub-spiniform. The elytra longer than the abdomen, sprinkled with fuscous dots, but not fasciate; apex sub-hyaline. Wings at the base scarlet; the rest infuscate, or spread over with fuscous clouds, reticulate, with fuscous on the scalariform nervules. Posterior femora within testaceous, trifasciate with black; posterior tibiæ before the middle testaceous, bifasciate with black, then red.

Length, 1.12 inches.

Mexico calida (Saussure).

Æ. mexicana, Sauss., Rev. et Mag. Zool., XIII, 1861, 397.

Medium size, dull-gray. Eyes large, but not prominent. Vertex broad; foveola broader than long, truncate in front, and with three contiguous furrows (fossulæ). Pronotum much compressed, flattened, terrose; the dorsum elongate-tuberculate, tricarinate; narrowed in front, but not constricted;

median carinæ deeply incised considerably in front of the middle; near the sulcus are two foveolæ (fossulæ); truncate in front; posterior extremity acute-angled; sides granulose; the posterior lateral angles sub-rotundate. Elytra longer than the abdomen, grayish, sparsely marked with blackish dots, and frequently with two obscure oblique lines; a pellucid space at the apex. Wings roseate or scarlet; a broad margin and sub-costal fascia of fuscous; a hyaline space at the apex. Femora much dilated, the lower carina sub-excised behind the middle; trifasciate with black, yellow, or bluish within. Tibiæ blue or testaceous, trifasciate with black.

Length, 1.05 inches.

Mexico (Saussure).

Æ. tolteca, Sauss., Rev. et Mag. Zool., XIII, 1861, 397.

Very similar to *Æ. pallidipennis*, Burm., but the antennæ longer. Foveola of the vertex broader between the eyes, somewhat polygonal, cut off from the frontal foveola. The face furnished with distinct vertical carinæ. Pronotum flat above, carinate; coarctate in front, but not constricted, scabrous, everywhere thickly covered with tubercles; posterior angle acute; transverse-impressed lines not conspicuous; the carina bilobate and often trilobate in the front part; humeral angles acute. Elytra spotted, not fasciate; apex scarcely pellucid. Wings beyond the yellow disk up to the apex fuscous.

Length of elytra, 1.1 inches.

Mexico (Saussure).

Æ. azteca, Sauss. Rev. et Mag. Zool., XIII, 1861, 397.

Small, similar in form to *Æ. sumichrasti*, but the body more compressed and more rugose. Vertex narrower; foveola narrow, canaliculate; margins continuous with the margins of the frontal costa; not truncate in front; no fronto-vertical foramen; lateral foveolæ conspicuous. Pronotum with posterior extremity acute. Elytra scarcely fasciate; apex somewhat hyaline. Wings yellow, banded with fuscous and a sub-costal fuscous fascia; apex clouded, somewhat dusky. Posterior tibiæ blue.

Length of elytra, 0.67 inch.

Mexico (Saussure).

E. tentatrix, Walk., Cat. Dermap. Salt., V, Suppl. 75.

Male.—Testaceous or tawny. Head small; fastigium short, with two parallel keels, which are continuous with the inner pair of the four slight diverging keels of the front. Eyes elliptical. Prothorax short, sub-sellate, widening hindward, with a very slight keel, and with slight transverse-impressed lines, occasionally with some small black marks. Hind femora with two irregular black bands. Hind tibiæ reddish, as long as the hind femora, pale-yellow at the base, near which there is a blackish band. Fore wings with many partly-confused brown marks; apical part obliquely pale cinereous, with some brown points. Hind wings rose-color; apical half obliquely pellucid; an irregular, oblique, brown band, which tapers hindward, and is much abbreviated toward the costa.

Length of the body, 7 to 12 lines; expansion of the fore wings, 17 to 24 lines.

Oajaca (Mexico).

E. speciosa, Walk. Cat. Dermap. Salt., IV, 735.

Male.—Pale-testaceous, with white hairs. Head and pronotum with two irregular black stripes, which on the pronotum are dilated and emit a fork. Head tawny above; fore part whitish; a band of four black points between the eyes; the two carinæ of the tip black, slightly angular; face with four slight carinæ, which disappear below. Antennæ tawny, blackish toward the tips. Eyes short, elliptical. Pronotum short, with a very slight carina and with four transverse furrows; first furrow widely interrupted in the middle; second and third undulating; fourth straight; hind border obtusely angular. Hind femora a little longer than the abdomen, with two black bands, which are indeterminate on the outside. Hind tibiæ bright-red, much shorter than the hind femora, black, with the exception of a broad white band for nearly half the length from the base. Four anterior legs with irregular blackish bands. Elytra with two large brown patches, which are accompanied by brown dots and are partly cinereous; first patch near the base, second slightly antemedial; two exterior brown spots and a few more exterior brown dots; costa round near the base. Wings pellucid with black veins; veins toward the base and along the inner border rosy, and bordered with roseate; a pale-brownish space along the hinder part of the outer border.

Length of the body, 0.69 inch; expansion of the elytra, 1.67 inches.

Female.—Body tawny, except the fore part of the head. Head and pronotum without markings. Abdomen much longer than the hind femora. Elytra pellucid, with the exception of an abbreviated irregular and interrupted tawny stripe, which is broadest near the base; a hinder stripe formed by pale-yellow veins, as are also some marks in the tawny stripe. Wings with the basal part more completely roseate than in the male, and without a brown tinge along the exterior border.

Length of the body, 1.1 inches; expansion of the elytra, 2.25 inches.

Honduras (Walker).

Æ. transtrigata, Walk., Cat. Dermap. Salt., IV, 733.

Male.—Brown, shining, testaceous beneath. Head smooth; fore part thinly punctured; tip of the vertex conical, excavated on each side, with a very slight carina, which disappears in front; the four carinæ of the face very slightly defined, diverging below. Antennæ blackish, luteous toward the base. Pronotum finely rugulose, with two testaceous spots on each side, and with a well-defined testaceous carina, which is slightly interrupted in the middle by a transverse furrow; hind border with a vein forming a rounded and slightly obtuse angle. Abdomen and legs testaceous. Hind femora a little longer than the abdomen; four or five black streaks on the outside; inside black, with two testaceous bands beyond the middle. Hind tibiæ much shorter than the hind femora, with a faint brownish streak on each side before the middle; spines black at the tips. Four anterior legs partly clouded with brown. Elytra testaceous; basal half mostly occupied (with the exception of a testaceous stripe) with brown spots and large patches; apical half cinereous, with some interrupted brown bands. Wings blackish, with a large cinereous patch and with some posterior cinereous streaks; basal part bright-red, except along the costal border, where there is a red streak. Carina of the pronotum is much more defined than in *Æ. sumichrasti*. From *Æ. mexicana* it may be distinguished by the hind tibiæ without bands and by the markings of the elytra.

Length, 0.88 inch; expansion of elytra 1.8 inches.

Oajaca, Mexico (Walker).

C. pallidipennis, Burm., Handb. Ent. II, 641.

Rufo-testaceous. Elytra bifasciate at the base, sprinkled with fuscous at the apex. Wings yellow at the base, with a fuscous band across it.

Length of body, 1 inch.

Mexico (Burmeister).

HIPPOPEDON, Sauss.

Has the appearance of *Stauronotus*. Antennæ elongate, filiform. Back of the head elevated; occiput ascending, descending at the vertex; foveola channeled, strongly deflexed, thrust down upon the frontal costa; margins acute; no lateral foveolæ present. Face vertical; frontal costa equally prominent; lateral carinæ distinct, angulate above. Pronotum sub-constricted, furnished above with a median carina; truncate in front; posterior extremity triangular, tip acute-angled; humeral angle obtuse, with carinæ in front, not continuous, but descending obliquely upon the sides of the pronotum, and there forming acute carinæ, produced almost to the anterior margin of the lateral lobes; dorsal carinæ anteriorly distinct, converging, and approximate posteriorly, but not extending beyond the posterior transverse sulcus. Posterior femora slender. Elytra longer than the abdomen, narrow. (A white cross on the pronotum.)

Remark.—This appears to form the connecting link between my second division of *Ædipoda* and *Stauronotus*. (Thomas.)

H. saltator, Sauss., Rev. et Mag. Zool., XIII, 1861, 323.

Green, varied with fuscous. Frontal costa channeled, obsolete below, prominent above between the antennæ. Antennæ equal to the head and pronotum, slender. Pronotum punctate behind the posterior sulcus; a white cross on the dorsum; two fuscous spots under the anterior dorsal carinæ; median carina distinctly severed before the middle by the transverse sulcus; lateral lobes with the posterior corners acute-angled. Elytra narrow, subpellucid; marginal areas green, opaque, a series of fuscous spots in front. Wings hyaline; upon the margin beyond the middle a black line.

Length, 1.04 inches.

Mexico (Saussure).

LEPRUS, Sauss.

Body very robust; head large. Vertex very broad, descending vertically in front. Face vertical, flat, and convex.* Pronotum not coarctate, flat above and rugose. Posterior femora greatly dilated. Antennæ slender and filiform. (Approaches *Thrinchus* in the form of the posterior femora).

L. elephas, Sauss., Rev. et Mag. Zool., XIII, 1861, 398.

Grayish-brown; body very robust. Head large, convex; face perpendicular, arcuate; the intermediate carinæ obliterated near the mouth; the costa above the ocellus verrucose. Vertex very broad, with conspicuous lateral foveolæ; the median foveola almost obsolete, and descending in a plane upon the front. Pronotum much enlarged; the posterior part much produced, distinctly and prominently verrucose; flat above; acute-angled at the apex; median carina slender; the anterior portion is separated from the posterior part by a profound sulcus; not constricted, and without lateral carinæ. Elytra a little longer than the abdomen, with large grayish spots. Wings yellow, with a broad fuscous band; apex sub-pellucid.

Length, 1.6 inches.

Mexico (Saussure).

ACRIDINI.**DACTYLOTUM, Charp.**

This genus, which has been established by Charpentier, is closely allied to *Pezotettix*. The head appears to be short, obtuse, and rounded; the vertex rather broad, slightly grooved, and deflexed; the eyes large, sub-rotund, and slightly prominent; the frontal costa somewhat prominent and sulcate throughout. Antennæ of medium length, filiform, slightly compressed. Pronotum cylindrical; anterior margin obtusely rounded, subtruncate (Charpentier says it is slightly notched in the middle, but his figure does not show it thus; on the contrary, the figure shows a very slight notch in the middle of the hind border); hind border rounded; the

* I suppose this means that it is flat transversely, and arcuate perpendicularly. This genus appears to be closely allied to my Sec. a, Sub-divis. 2, Divis. 3, of *Ædipoda*, and should probably be united with *Eremobia*.

posterior lateral margins are slightly oblique, and curved inward at the humerus; without any apparent carinæ; the three transverse furrows profound, dividing the middle portion, especially of the disk, into obtuse, transverse ridges; the anterior sulcus much the shortest. Posterior legs of medium length; the femora thick, and a little more than usually inflated. Elytra abbreviated. Abdomen of the female rather large; valves of the ovipositor conspicuous; abdomen of the male much smaller; cerci broad at base, acuminate at the apex; within the upper cavity of the sub-anal plate is a folding apparatus, which can be raised and lowered posteriorly, much like the large end of a bellows. Prosternum furnished with a strong spine. Face sub-vertical, the lower part curving slightly under.

D. bicolor, Charp., Orthop., Tab. 52.

Yellow, with black markings, and greenish elytra.

The head, pronotum, legs, and abdomen orange-yellow, marked with black and brown, as follows: Antennal foveolæ, a stripe on the cheeks, and two spots on the occiput dark-brown. A black line on the anterior margin of each side of the pronotum; the transverse furrows dark-brown; the disk is more or less marked with brown; the slight median carina on the posterior lobe yellow. Each abdominal segment has a small, brown spot each side of the base. The posterior femora with alternate pinnæ of yellow and dark-brown; they are equal in length to the abdomen in the female, a little longer proportionally in the male. The elytra not quite half the length of the abdomen, oblong-ovate, of a greenish olive-color; veins prominent, yellowish; the cells blackish; they do not meet on the back.

♂ Length, 1 inch. ♀ Length, 1.2 inches.

Mexico (Charpentier).

Remark.—I have seen no specimen of this species, my generic and specific descriptions being made up from Charpentier's description and figures. I think it probable it should be placed in *Pezotettix*, (*Podisma*), unless all the species of that genus which have a cylindrical pronotum are separated into a distinct genus.

PEPEDETES, Sauss.

Antennæ elongate, flattened. Head vertical, convex; vertex not rostrate; front deflexed; face bi-carinate; a vertical sulcus under the eyes;

eyes distant, convex. Pronotum scarcely produced posteriorly; transverse furrows large and very deep, the posterior one situated considerably behind the middle; posterior part flat above, carinate; anterior part cylindrical above. Anal appendages of the female short, stout; sub-anal plate of the male infundibuliform, acuminate. Posterior femora compressed, short, with margins cristato-carinate. Elytra very short.

Closely allied to *Ommatolampis*, but differs from that genus in having the vertex not rostrate, head and eyes convex.

Remark.—In my introduction I have placed this and the following genus after *Caloptenus*; but further examination of Saussure's descriptions appears to indicate this as their proper position. (Thomas.)

P. corallinus, Sauss., Rev. et Mag. Zool., XIII (1861), 158.

Medium size, somewhat graceful. Body black. Vertex with a transverse sulcus or two punctate impressions between the eyes. Posterior part of the pronotum densely punctate; posterior angle very obtuse, in the male sub-emarginate. Posterior femora half as long as the body, moderately dilated, but not narrowed at the apex, bi-fasciate, with scarlet. Elytra very short, crossing the first abdominal segment, reticulate, with olivaceous. Head and pronotum with an arcuate, scarlet fascia above, and various scarlet spots.

Length of body, 1.67 inches.

Mexico temperata (Saussure).

PEDIES, Sauss.

Prosternum furnished with a wedge-shaped, compressed spine. Head convex; face strongly deflexed and convex; frontal costa smooth, compressed, sub-bicarinate; cheeks convex; top of the head conoid-arcuate; vertex deflexed, without foveolæ; eyes scarcely convex, broad, short. Pronotum tricarinate above; front and apex truncate, emarginate. Legs short. Abdomen acuminate at the apex; cerci of the male arcuate, obtuse at the apex. Elytra rudimentary.

This genus may possibly form but a sub-genus of *Pæpedetes*.

P. virescens, Sauss., Rev. et Mag. Zool., XIII (1861), 157.

Of an obscure-green. First and second tibiæ and femora yellow beneath. Abdomen of the male yellow beneath. Posterior femora green exteriorly,

yellow beneath, and red interiorly. Anus of the male above and posterior tibiæ red. Facial carinæ of the cheeks distinct. Posterior area of the pronotum punctate; sides and carinæ smooth, shining; the posterior sulcus only cuts the dorsal carina. Sub-anal plate of the male acute; supra-anal lamina trigonal, bi-carinate. Elytra not passing the first abdominal segment.

Length, 1 inch.

Mexico (Saussure).

PEZOTETTIX, Burm.

Division 1 (Sauss).—Body short, robust. Face slightly deflexed. Eyes large, rather short. Pronotum coarctate in front, short; lateral carinæ, and sometimes even the middle one, evanescent. Antennæ short. Abdomen of the male convex beneath; cerci very short. (*Pezotettix proprie dicta.*)

1. *Wings and elytra more or less obliterated.*

P. septentrionalis, Sauss., Rev. et Mag. Zool., XIII (1861), 159.

Fuscous-red; punctate. Foveola of the vertex small, deflexed; eyes large, elongate, acuminate above and below; anterior margin truncate. Pronotum carinate, interrupted in the middle by the posterior sulcus; lateral margins acute(?); posterior margin obtuse-angled. Elytra shorter than the abdomen; front margin dilated near the base; apex attenuate, fuscous, tinged with roseate. Wings pellucid, sub-roseate. Posterior femora with two yellow fasciæ; in the female shorter than the abdomen. Tibiæ red; spines black.

Length, 1.12 inches.

Labrador (Saussure).

2. *Wings and elytra complete; equal to or longer than the abdomen.*

P. mexicana, Sauss., Rev. et Mag. Zool., XIII (1861), 160.

Of small size, fuscous and gray. Prosternal spine conoid, acuminate. Occiput convex; eyes large, broad; anterior margin straight; foveola of the vertex ovate, deflexed, with raised margins. Pronotum flat above, carinate throughout; carina interrupted only by the posterior sulcus; posterior portion of the sides punctate; anterior portion polished, with a fuscous spot running nearly to the eye. Elytra a little longer than the abdomen, gray and fuscous, a row of fuscous dots along the disk. Wings hyaline, bluish at the

base. Sides of the body and posterior femora with two yellow fasciæ. Posterior femora beneath, tibiæ, and tarsi red; tibial spines black at the apex. Pronotum of the male less distinctly carinate. Posterior tibiæ of both sexes sometimes blue.

Length of the body, 1 inch.

Mexico temperata (Saussure).

Division 2.—Body slender, elongate. Antennæ very long. Lateral carinæ of the pronotum distinct only on the anterior portion. Foveola of the vertex slightly deflexed. Abdomen of the male at the end very much inflated; apex recurved; sub-anal lamina very broad and very convex; cerci lamelliform. Elytra passing the abdomen.*

1. *Body compressed. Face deflexed. The posterior sulcus of the pronotum situated behind the middle.*

P. sumichrasti, Sauss., Rev. et Mag. Zool., XIII (1861), 160.

Of medium size, obscure olive-color. Frontal costa bi-carinate; foveola of the vertex narrow; margins raised. Pronotum elongate, compressed; margins acute, carinate throughout, punctate; sides fuscous above, with a brassy luster; carinæ interrupted by three profound, transverse furrows, the posterior one situated behind the middle. The anterior and middle femora much swollen. Antennæ very long, yellow, obscure at the apex. Elytra gray. Wings greenish at the base. Posterior femora with a horizontal, yellow fascia. Tibiæ below the middle red; above the middle black, with a yellow ring; spines black. Tarsi obscure; pulvilli black.

Length of the body, 1.08 inches; antennæ, 0.67 inch.

Mexico (Saussure).

PLATYPHYMA, Fisch.

1. *Pronotum with the hind border truncate; wings abbreviated.*

2. *Pronotum with the hind border angulate; elytra full size, equal to or longer than the abdomen.* (Saussure.)

P. aztecum, Sauss., Rev. et Mag. Zool., XIII, 161.

About equal in size to *P. mexicana*, and very similar to it, yet different.

* This division of Saussure appears to me to belong more properly to *Caloptenus* than to *Pezotettix*. As he expands Fischer's generic distinctions, it is impossible to say what are his boundaries for this genus.

Prosternal spine enlarged at the apex, transversely compressed, lamelliform. Frontal costa flat, punctured, not sulcate. Foveola of the vertex scarcely distinct; margins somewhat elevated or carined; and occiput sub-carinate. Pronotum flat above, everywhere punctate, without any white, glabrous spot on the side; posterior margin yellow, with black points. On each side of the thorax there are two oblique, yellow stripes. Tibiæ blue, yellow at the base, spotted with black. Sub-anal lamina of the male not emarginate.

Length, 0.75 inch.

Mexico temperata (Saussure).

P. mexicana, Brunn., Verh. Zool.-Bot. Ver. Wien, XI, 224.

Female.—Fuscous-brown. Carinæ of the face obtuse. Pronotum emarginate posteriorly; the three carinæ distinct; the third transverse sulcus situated a little behind the middle; a median, indistinct, yellow spot on the sides. Posterior femora beneath and posterior tibiæ red.

Length, 1 inch; elytra, 0.2 inch; hind femora, 0.48 inch.

Mexico (Brunner de Wattenwyl).

OMMATOLAMPIS, Burm.

1. Thorax selliform, more or less excavated; body slender. Elytra as long as the abdomen; male abdomen armed with a forceps. (*Proctolabrus*), (Sauss.)

O. mexicana, Sauss., Rev. et Mag. Zool., XI, 393.

Male.—Obscure olive-color. Face spotted with testaceous; pronotum with a longitudinal testaceous stripe; meso- and meta-notum with white spots on the sides. Posterior femora with a white interruption on the upper margin. Abdomen crimson, varied with black. Elytra as long as the abdomen, reddish-green; wings roseate.

Length, 1.15 inches.

Toluca, Mexico (Saussure).

CALOPTENUS, Burm.

C. fasciatus, Walk., Cat. Dermap. Salt., IV, 680.

Syn., *Aceridium fasciatum*, Barnston, MSS.

Male and female.—Piceous, moderately stout, tawny beneath. Head and pronotum with two broad blackish stripes; exterior part tawny. Head short,

smooth; tip of the vertex depressed, fusiform; front tawny, thinly punctured, with four well-defined keels; inner keels parallel; outer keels diverging toward the face. Eyes livid, much rounded on the hind side. Antennæ tawny, piceous toward the tips; longer than the head and pronotum together. Pronotum very finely scabrous, slightly widening hindward; disk nearly flat, with three slight keels; transverse-impressed lines distinct; fore border straight; sides slightly rounded; hind border more rounded. Prosternal spine conical, thick, broader, and more obtuse in the female than in the male. Legs tawny; hind femora as long as the abdomen, with three irregular piceous bands, red beneath; hind tibiæ red, shorter than the hind femora; spines black; hind tarsi red. Elytra tawny, shorter than the abdomen, with some small indistinct piceous spots; veins piceous. Wings pellucid-cinereous; veins whitish, black along the costa and toward the tips. In the male, the pronotum has a testaceous oblique streak on each side in front.

Length of body, 0.75 to 0.93 inch; expansion of elytra, 0.83 to 1.17 inches.

Saint Martin's Falls, Albany River, Hudson's Bay (Walker).

C. extremus, Walk., Cat. Dermap. Salt., IV, 681.

Female.—Tawny, moderately stout, testaceous beneath. Head and pronotum with a broad, blackish stripe on each side. Head short, smooth; tip of the vertex depressed, elliptical; front (face) thinly punctured, with four well-defined keels; inner keels parallel; outer keels diverging toward the face. Eyes very much rounded on the hind side. Antennæ piceous at the tips. Pronotum very finely scabrous, slightly widening hindward; disk nearly flat, with three slight keels; transverse-impressed lines well defined; fore border nearly straight; sides slightly rounded; hind border more rounded. Prosternal spine whitish, stout, conical, slightly transverse. Hind femora as long as the abdomen, with two irregular, piceous bands; hind tibiæ testaceous, shorter than the hind femora, their spines black toward the tips. Elytra cinereous, a little shorter than the abdomen; veins ferruginous. Wings pale-cinereous; veins black, white toward the base and along the anterior border.

Length of body, 0.83 inch; expansion of elytra, 1.25 inches.

Arctic America (Walker).

C. arcticus, Walk., Cat. Dermap. Salt., IV, 681.

Female.—Tawny, slender, testaceous beneath. Head and pronotum with a broad, black stripe on each side. Head short, smooth; tip of the vertex depressed, sub-elliptical; front punctured, with four distinct keels; inner keels parallel; outer keels diverging toward the face. Eyes sub-elliptical, much rounded on the hind side. Pronotum short, very finely scabrous, the stripe on each side extending to the fourth* transverse line; disk flat, with three slight keels; transverse-impressed lines well defined; fore border nearly straight; sides slightly rounded; hind border much rounded. Prosternal spine conical, rather long, much broader than thick. Hind femora as long as the abdomen; hind tibiæ rather shorter than the hind femora, their spines tipped with black. Elytra and wings cinereous, nearly as long as the body. Elytra with tawny veins. Wings with black veins.

Length of body, 0.87 inch; expansion of elytra, 1.67 inches.

Arctic America (Walker).

C. selectus, Walk., Cat. Dermap. Salt., IV, 682.

Female.—Tawny, slender. Head and pronotum with a blackish stripe on each side. Head smooth, slightly elongate; vertex with a broad, blackish stripe; tip depressed, elliptical; front with four keels, which are less distinct toward the face; inner keels nearly parallel; outer keels diverging slightly. Eyes sub-elliptical, much rounded on the hind side. Antennæ slender, piceous toward the tips. Pronotum very finely scabrous; disk flat, with three distinct keels; transverse lines well defined; stripe on each side limited by the fourth line; fore border nearly straight; sides slightly rounded; hind border slightly elongated, hardly angular. Prosternal spine stout, elongate-conical, rather long. Hind femora a little longer than the abdomen, partly tinged with green on the outer side, with three blackish patches above, bright-red beneath; hind tibiæ glaucous-green, a little shorter than the hind femora, their spines black toward the tips. Elytra pale-cinereous, a little shorter than the body, with a row of black dots in the disk, and with a broad, interrupted, piceous stripe along the costa. Wings with black veins.

Length of body, 0.84 inch; expansion of elytra, 1.67 inches.

Oajaca (Walker).

* Walker counts the transverse incision, which is near the front margin, as one; but this is usually, when present, called the *submarginal* incision or sulcus.

C. mexicanus, Walk., Cat. Dermap. Salt., IV, 682.

Male.—Greenish, slender, yellow beneath. Head smooth, slightly elongated; vertex with two curved, brown lines, which are approximate in front; tip flat, fusiform; front slightly oblique, with four slight keels; inner keels nearly parallel; outer keels diverging toward the face; an oblique, brown streak between each eye and the face. Eyes testaceous, straight in front, very much rounded on the hind side. Antennæ piceous, tawny at the base. Pronotum very finely scabrous, partly brown; disk flat, with three distinct keels; transverse-impressed lines very slight; fore border, sides, and hind border slightly rounded. Prosternal spine stout, conical, moderately long, about twice as broad as thick. Legs ferruginous, yellowish beneath; hind femora as long as the abdomen; hind tibiæ much shorter than the hind femora, their spines with black tips.

Length of body, 0.75 inch.

Orizaba, Mexico (Walker).

Remark (Walker).—Wings of the specimen described are rudimentary, it not being fully developed.

C. borealis, Fieb., Verhandl. zool.-bot. Vereins Wien, XI, 1861, 223.

Female.—Olivaceous-red; a black vitta running from the eyes to the third transverse sulcus of the pronotum. Pronotum has the posterior extremity somewhat produced and angulate, convex in front of the third sulcus; lateral carinæ conspicuous on the posterior portion. Elytra and wings fuscous, a little shorter than the abdomen. Posterior femora yellow internally, marked with two black vittæ; laminæ of the knees black; lower channel red; base and apex yellow. Tibiæ red.

Length of body, 0.97 inch; elytra, 0.67 inch; pronotum, 0.20 inch; posterior femora, 0.52 inch.

Labrador (Fieber).

CALACRIS, Walker.

Body slender, nearly cylindrical. Head and prothorax with a slight keel. Head smooth; tip of the vertex depressed, widening toward the antennæ; space between the eyes narrow; front with four distinct keels nearly parallel, slightly approximating in the middle; outer keels slightly diverging toward the face. Eyes elliptical, rather prominent. Antennæ filiform, long, slender.

Prothorax scabrous, slightly widening hindward; transverse-impressed lines strongly marked; borders slightly rounded. Prosternal spine long, slender, acute. Hind femora longer than the abdomen; hind tibiæ rather shorter than the hind femora. Elytra a little shorter than the body.

C. pudica, Walk. Cat. Dermap. Salt., IV, 641.

Male.—Black. Head thinly punctured; tip of the vertex flat, hexagonal, with a green stripe; front with an oblique green streak on each side, proceeding from the socket of the antenna; four slight keels; inner keels converging slightly toward the face; outer keels slightly diverging; clypeus green. Eyes tawny, elliptical, oblique, prominent. Antennæ black, slender, much longer than the head and prothorax together, green at the base. Prothorax short, thickly punctured, slightly widening hindward; hind part green, with a red longitudinal streak on each side; keel extremely slight; transverse-impressed lines distinct; fore border and sides slightly rounded; hind border more rounded. Prosternal spine green, thick, rounded at the tip. Abdomen piceous. Legs dark-green, pilose; hind femora shorter than the abdomen; hind tibiæ a little shorter than the hind femora; spines red, with black tips; hind tarsi red. Elytra reddish, a little shorter than the body, with a piceous costal streak and a pale testaceous streak near the hind border. Wings red, purplish toward the tips; veins black, red toward the base and along the interior border.

Length of body, 1.16 inches; expansion of elytra, 1.92 inches.

Mexico (Walker)

ACRIDIDIUM, Geoff.

A. inscriptum.

Syn., *Cyrtacanthacris inscripta*, Walk., Cat. Dermap. Salt., III, 550.

Female.—Tawny, rather slender. Head smooth, with two lines of black dots converging from the hind border to the hexagonal, depressed compartment in front of the eyes; front almost perpendicular, with four keels, of which the outer pair diverge toward the face (corners), and the inner pair are almost parallel. Eyes oblique, elongate-oval. Antennæ piceous, slender, filiform, tawny at the base. Pronotum minutely scabrous, with six black stripes, the inner pair much interrupted, the two outer pair much abbreviated; dorsal ridge slight, most distinct toward the hind border; four trans-

verse lines, the front (submarginal) one interrupted in the middle; the breadth increasing backward from the posterior line; sides almost straight; hind border slightly conical. Prosternal spine lanceolate, slightly curved, extending to the fore border of the mesosternum. Abdomen slightly compressed and ridged; supra-anal lamina short; cerci and sub-genital lamina with black tips, the former curved upward, the latter curved downward. Hind femora a little longer than the abdomen, with black points on both sides, and with two black streaks on the inner side; first streak very broad, second very small. Hind tibiae as long as the hind femora. Spines with black tips, those on the inner margin longer than those on the outer. Elytra cinereous, rather longer than the wings; veins testaceous; a discoidal, interrupted stripe, emitting four broad branches in front, formed by blackish veins, and most apparent toward the base, the areolets being there smaller; two dots in the interrupted part of the stripe and some sub-costal dots also formed by blackish veins. Wings pale-cinereous, brownish about the tips; veins black, whitish at the base.

Length of the body, 1.5 inches; expansion of elytra, 3.1 inches.

Jamaica (Walker).

Walker adds: "The shorter tibiae of this species and *C. sub-spurcata* distinguish them from *C. americanum*."

I have given his lengthy description of this species, but must confess that it contains but few distinguishing characters.

A. pectoralis.

Syn., *Cyrtacanthaeris pectoralis*, Walk., Cat. Dermap. Salt., III, 551.

Female.—Testaceous, slender. Head smooth, with two slender black stripes, which are abbreviated toward the mouth; vertex convex, depressed in front of the eyes and with six angles, of which the four anterior are rounded; front oblique, thinly and minutely punctured, with four slight keels, the inner keels diverging a little toward the face (corners), the outer bordered with black; two blackish stripes proceeding obliquely from the eyes to the mouth. Eyes red, fusiform, oblique. Antennae yellow, slender, filiform, luteous toward the tips. Pronotum finely scabrous, with two broad ferruginous stripes, which include some black pustules; dorsal keel very slight; four transverse-impressed lines, the front one widely interrupted in the middle; front border rounded; hind border much rounded. Prosternal spine pale-

yellowish, elongate-conical, very slightly curved, extending to the meso-sternum, which is piceous. Hind femora a little longer than the abdomen, with three rows of black points above. Hind tibiæ as long as the hind femora; spines white, with black tips, those of the inner row longer than those of the outer row. Elytra pale-cinereous, rather longer than the wings; veins white, here and there black, and thus forming a discoidal stripe, which is composed of streaks and patches. Wings pellucid, longer than the abdomen; veins white, black toward the tips.

Length of body, 2 inches; expansion of the elytra, 4.1 inches.

San Domingo (Walker).

A. concolor.

Syn., *Cyrtacanthaeris concolor*, Walk., Cat. Dermap. Salt., IV, 610.

Female.—Tawny, rather slender. Head short, smooth; tip of the vertex flat, sub-hexagonal; front thickly punctured; the four keels well defined, diverging toward (the corners of) the face. Eyes elongate-elliptical. Antennæ slender, cylindrical. Pronotum finely scabrous, reddish toward the hind border, with a slight keel, and with four well-defined transverse lines; fore border and sides slightly rounded; hind border elongated, angular. Prosternal spine thick, oblique, rounded at the tip, extending to the meso-sternum. Hind femora as long as the abdomen; hind tibiæ red, rather shorter than the hind femora; spines pale-yellow with black tips. Elytra and wings cinereous, as long as the body; the veins of the elytra tawny red toward the base.

Length of the body 2 inches; expansion of the elytra, 4.3 inches.

Mexico (Walker).

A. simulatrix.

Syn., *Cyrtacanthaeris simulatrix*, Walk., Cat. Dermap. Salt., IV, 610.

Male.—Tawny, slender. Head and pronotum with two slender interrupted black stripes. Head smooth; fore part of the vertex depressed, hexagonal; front largely punctured, with four well-defined keels, which diverge slightly toward the face. Eyes ferruginous, elliptical. Pronotum finely scabrous, with a slight keel, and with two much-abbreviated black stripes in addition to the inner pair before mentioned; keel not rounded, interrupted by the transverse-impressed lines, which are distinctly marked; front border and sides slightly rounded; hind border much rounded. Prosternal spine oblique,

rather slender, slightly bent, extending nearly to the front border of the meso-sternum. Hind femora as long as the abdomen; hind tibiae red, a little shorter than the hind femora; spines whitish, with black tips. Elytra pellucid (?), as long as the body; markings blackish; a row of dots along the costa; some large patches in the disk and some spots toward the tips; veins whitish, black in the markings. Wings pellucid; veins black, tawny toward the base.

Length of the body. 1.33 inches; expansion of elytra, 2.95 inches.
Saint Domingo (Walker).

A. diversiferum.

Syn., *Cyrtacanthacris diversifera*, Walk., Cat. Dermap. Salt., IV, 611.

Female.—Testaceous, rather stout. Head red, smooth, paler in front; fore part of the vertex depressed, elongate-quadrate; front thinly punctured, with four distinct keels; inner keels very slightly converging from the middle to each end; outer pair diverging toward the face. Eyes piceous, irregularly oval, tessellated with testaceous. Pronotum finely scabrous, red between the fore border and the fourth transverse-impressed line, with a slight keel, which is slightly interrupted by the distinct transverse-impressed lines; keel not rounded; three black spots forming a short stripe on each side; fore border hardly rounded; sides slightly rounded; hind border much rounded. Prosternal spine stout, curved, oblique, extending to the fore border of the meso-sternum, which has a blackish spot on each side. Borders of the pectoral segments black. Abdomen with various black marks. Hind femora as long as the abdomen, with angular black bands, and with lower black spots on the outer side; hind tibiae rather shorter than the hind femora, their spines black. Elytra cinereous, shorter than the body; veins tawny, reddish toward the base. Wings pale-cinereous; veins black.

Length, 1.56 inches; expansion of elytra, 2.83 inches.
North America (Walker).

Mr. Walker, from whom the preceding descriptions of species of *Acridium* have been copied, remarks that the last species, like *Cyrt. munda*, represents a transition from the *Acridium* type to the *Caloptenus* type. The anterior vertex is between a hexagonal and an elliptical form, and the upper part of the front is not excavated.

A. cubense, Sauss., Rev. et Mag. Zool., XIII (1861), 163.

Closely allied to *A. flavo-fasciatum*, but a little smaller. Prosternal point acuminate, oblique, bent backward nearly to the meso-sternum.

Cuba (Saussure).

A. toltecum, Sauss., Rev. et Mag. Zool., XIII (1861), 163.

Slender, grayish-brown, a pale oblique fascia on the sides. Antennæ of medium length, yellow, obscure at the apex. Elytra with numerous gray spots; wings hyaline, somewhat greenish at the base. Posterior femora fuscous, a longitudinal yellow fascia on the outside; ferruginous above. Posterior tibiæ yellowish; spines black. Body much compressed; the face forming an angle with the vertex. Eyes ovate, sub-elongate, almost contiguous at the vertex. Fastigium of the vertex without any foveola; an elevated line in front, broken, passing to the margin. Pronotum much narrower than the head, very slenderly carinated; punctate margins not acute; four brassy spots on the upper portion of the sides; posterior impressed lines situated in the middle. Prosternal point spiniform. Sub-anal plate canaliculate at the base; the pre-anal segment produced at the apex, not emarginate.

Length, 0.96 inch; antennæ, 0.3 inch.

Mexico temperata (Saussure).

The last two species are placed by Saussure under the following division and subdivision of this genus:

Division II.—Prosternal point straight or oblique. Pronotum in the anterior portion volutiform or tectiform; the posterior part more or less flattened above; carinate the entire length. Eyes elongate.

Subdivision 1.—Pronotum before the middle slightly constricted, behind the middle moderately dilated; carina slender. Elytra longer than the abdomen.

A. piccifrons, Walk., Cat. Dermap. Salt., III, 578.

Male.—Luteous. Head and pronotum with two ferruginous black-bordered stripes. Head smooth; front of the vertex depressed, sub-hexagonal; a blackish lanceolate streak extending from each eye to the mouth; front and face mostly piceous, thinly punctured; front with four well-defined keels, the inner pair most approximate in the middle, the outer pair diverging toward the face. Eyes elliptical. Prothorax finely scabrous, with an ex-

tremely slight dorsal keel and with the four usual transverse-impressed lines; a large blackish patch on each side, including an irregular spot of the ground hue; fore border and sides slightly rounded; hind border elongated, rounded. Prosternal spine pale-yellow, rather slender. Legs red. Hind femora as long as the abdomen, longer than the hind tibiæ; spines of the latter white, with black tips. Elytra cinereous, longer than the body, with many darker black-veined spots; veins elsewhere whitish. Wings pale-cinereous; veins black.

Length of body, 1.83 inches; expansion of elytra, 4 inches.

Orizaba (Walker).

A. vitticeps, Walk., Cat. Dermap. Salt., III, 579.

Female.—Tawny. Head smooth; vertex with a broad, pale-yellow stripe, its fore part depressed and hexagonal; front with four well-defined keels, which diverge toward the face, the inner pair partly black. Eyes elongate-elliptical. Prothorax scabrous, with a slight dorsal keel, with transverse-impressed lines, with an incomplete pale-yellow stripe, which is most apparent near the fore border, and with some yellow marks on each side; some slight indications of black stripes; fore border slightly rounded; sides nearly straight; hind border slightly rounded. Prosternal spine moderately stout, rather long. Hind femora a little shorter than the abdomen, longer than the hind tibiæ, with some black marks. Hind tibiæ red; spines white, with black tips. Elytra cinereous, almost as long as the body, with many indistinct spots, which are formed by brownish veins. Wings pale-cinereous; veins black, pale toward the base and toward the interior border.

Length of the body, 1.92 inches; expansion of elytra, 3.83 inches.

Oajaca (Walker).

A. scutellare, Walk., Cat. Dermap. Salt., III, 579.

Female.—Testaceous, rather slender. Head smooth; front of the vertex depressed, hexagonal; front punctured, with four strongly-marked keels slightly divergent. Eyes fusiform. Pronotum scabrous, with a slight dorsal keel, and with the usual four impressed transverse lines; hind part red; front and sides slightly rounded; hind border much elongated, hardly rugulose. Prosternal spine stout, slightly oblique. Hind femora a little longer than the abdomen, and than the tibiæ; hind tibiæ and hind tarsi red; spines black at

the tips. Elytra rather longer than the body, with several indistinct dots, which are formed by the brown-clouded, transverse sectors; veins elsewhere reddish or testaceous. Wings pellucid; veins testaceous.

Length of body, 1.75 inches; expansion of elytra, 3.75 inches.

Mexico (Walker).

A. vicarium, Walk., Cat. Dermap. Salt., III, 580.

Female.—Testaceous, rather slender. Head smooth, with two yellow streaks each side between the eye and mouth; front of the vertex flat, hexagonal; front punctured, with four keels, the inner pair most approximate in the middle, the outer pair diverging toward the face. Eyes fusiform. Antennæ tawny. Pronotum finely scabrous, hardly keeled, with the usual four transverse-impressed lines; fore border and sides very slightly rounded; hind border elongated, much rounded; disk partly reddish; a pale-brownish patch on each side, including a yellow streak. Prosternal spine whitish, rather slender. Hind femora shorter than the abdomen, longer than the hind tibiæ; spines of the latter whitish, with black tips. Elytra cinereous, longer than the body, with numerous cinereous, black-veined spots; veins elsewhere pale. Wings pellucid; veins black, pale toward the base.

Length of body, 1.75 to 1.9 inches; expansion of elytra, 4 to 4.2 inches.

Orizaba (Walker).

Var. β.—Head with a ferruginous, lanceolate streak from each eye to the mouth. Pronotum with four piceous, slender, parallel, abbreviated lines.

Oajaca (Walker).

A. strenum, Walk., Cat. Dermap. Salt., III, 580.

Female.—Testaceous, rather stout. Head smooth; front of the vertex flat, hexagonal; front with four well-defined keels, the inner pair hardly diverging, the outer pair much diverging toward the face. Eyes tawny, elongate-elliptical. Antennæ tawny. Pronotum finely scabrous, with a distinct dorsal keel, and with transverse-impressed lines; fore border slightly rounded; sides nearly straight; hind border rounded. Prosternal spine stout. Hind femora stout, as long as the abdomen, a little longer than the hind tibiæ, the latter reddish; spines black at the tips. Elytra cinereous, very nearly as long as the body; veins tawny. Wings pellucid; veins black, pale toward the base and toward the interior border.

Length of body, 1.92 inches; expansion of elytra, 4 inches.

Oajaca (Walker).

The dorsal ridge of this species is higher than that of *A. scutellare*, and is notched by the transverse-impressed lines.

A. varipes, Walk., Cat. Dermap. Salt., III, 581.

Female.—Tawny. Head smooth; vertex with a brown, oblique streak on each side, front part hexagonal; front with four well-defined keels, the inner pair parallel, the outer pair slightly diverging. Eyes piceous, elongate-elliptical. Pronotum scabrous, with three paler, abbreviated stripes, with a slight dorsal keel, and with the usual transverse-impressed lines; front border slightly rounded; sides nearly straight; hind border rounded. Prosternal spine testaceous, stout, straight, slightly oblique. Hind femora with some black marks on each side, as long as the abdomen, a little longer than the hind tibiæ. Hind tibiæ reddish; spines whitish, with black tips. Elytra a little shorter than the body, pellucid, with several sub-costal dots and discoidal spots or incomplete bands, which are distinguished by black veins; veins elsewhere pale-testaceous. Wings pellucid; veins black.

Length of body, 1.96 inches; expansion of elytra, 3.67 inches.

San Domingo (Walker).

A. luridescens, Walk., Cat. Dermap. Salt., III, 583.

Male and female.—Tawny. Head smooth, with two irregular, black stripes; fore part of the vertex flat, hexagonal; front punctured, mostly black, with four keels, the inner pair hardly diverging, the outer pair slightly diverging. Eyes livid, fusiform. Antennæ piceous. Pronotum scabrous, with a very slight dorsal keel, and with the usual four transverse-impressed lines; fore border rounded; sides slightly rounded; hind border hardly angular. Prosternal spine stout, straight, hardly oblique. Hind femora with very indistinct, blackish lines, as long as the abdomen, longer than the tibiæ. Spines of the tibiæ white, with black tips. Elytra cinereous, almost as long as the body, with numerous spots, which are formed by black veins, and which are very slight toward the tips; veins elsewhere pale. Wings lurid; veins black, tawny toward the base.

Length of body, 1.41 to 2.25 inches; expansion of elytra, 3.16 to 4.5 inches.

Honduras (Walker).

A. proprium, Walk., Cat. Dermap. Salt., IV, 621.

Male—Ferruginous, slender, testaceous beneath. Head and pronotum with a testaceous stripe, which is broadest and blackish-bordered on the head, and there extends to the tip of the vertex. Head smooth; tip of the vertex flat, hexagonal; front thinly punctured, with four strongly-marked keels, which diverge slightly toward the face. Eyes lurid, elliptical. Antennæ testaceous. Pronotum finely scabrous, slightly widening hindward; keel very slight, interrupted by the distinct, transverse-impressed lines; fore border and sides slightly rounded; hind border slightly elongated and angular. Prosternal spine slender and slightly acute. Abdomen whitish-testaceous, with a narrow, ferruginous band on the hind border of each segment. Hind femora as long as the abdomen, with whitish, angular bands on each side; hind tibiæ a little shorter than the hind femora, their spines white, with black tips. Elytra cinereous, as long as the body; veins ferruginous. Wings pellucid, pale-yellow toward the base and along the interior border.

Length of body, 1.2 to 1.25 inches; expansion of elytra, 2.67 to 2.83 inches.

Oajaca (Walker).

A. pantherinum, Walk., Cat. Dermap. Salt., IV, 623.

Luteous, slender. Head smooth; tip of the vertex hexagonal, bordered with black; front with six well-defined black-dotted keels, the four inner keels diverging toward the face. Eyes testaceous, elliptical. Pronotum slightly scabrous, irregularly black-dotted, hardly wider hindward; keel not apparent; transverse-impressed lines well defined; fore border and sides almost straight; hind border much rounded. Prosternal spine slender, acute. Legs pale-green. Femora luteous, black-dotted; hind femora as long as the abdomen; four anterior tibiæ with black bands; spines of the hind tibiæ with black tips. Wings pellucid; veins pale-green or pale-testaceous. Elytra a little shorter than the body.

Length of body, 1.1 inches; expansion, 2 inches.

Mexico (Walker).

A. olivaceum, Serv., Hist. Orthop., 666.

Female.—Head and body of an olive-brown, except the abdomen, which is smooth and shining. Head smooth, with a greenish-yellow longitudinal ray in the middle, reaching from the extreme front to the pronotum; carinæ

of the face prominent. Pronotum shagreened, the transverse furrows slight; dorsal carina very feeble, covered by a ray following suit to that of the head, and of the same color. Elytra straight, opaque at the base; rest transparent, of a uniform olive-brown, bordered posteriorly by a yellowish band, largest at the base. Wings transparent, uncolored, tinged with clear greenish at the base; nervules brownish. Dorsal plates of the abdomen of a clear shade posteriorly, frequently with spots of black in this part; terminal pieces short. Legs of the color of the body; the posterior femora having their external face between the two carinæ whitish, intersected by pinnate green nerves, a black arc on the laminæ of the knees, with the center part ochre-yellow. Posterior tibiæ bluish above; spines whitish at base, black at the tips. Antennæ greenish.

Length, 2.5 inches (and 1.25 inches) (?).

Cuba (Serville).

Remark (Serville).—Two other females, marked as from North America by Latreille, differ only in being not more than half the size of the one described.

I am inclined to think this is but a variety of *A. alutaceum*, Harr. (Thomas).

LOPHACRIS, Scudd.

Head large, full; space between the eyes equal to or surpassing the shorter diameter of the eyes; median frontal ridge broader than the length of the first joint of the antennæ; breadth of the labrum equal to the distance from the edge of the clypeus to the upper limit of the median frontal ridge, or one and a half times the longer diameter of the eye, or broader than long; lateral angles (carinæ) of the front (face) not very distinct, barely divergent. Pronotum tapering but little, the anterior breadth being to the posterior as 1 to 1.13; angle of the posterior border a right angle; median crest forming a regular curve from the front to the hind edge, but rather more prominent anteriorly; prosternal spine stout, straight, blunt, rather short, and not compressed laterally. Elytra a little more than four times as long as broad; costal edge narrow; outer border not so obliquely docked as in *Tropidacris* and *Titanacris*; secondary veins indistinct. Wings short and broad, immaculate. Abdomen heavy; terminal segment of the male somewhat produced, broad, swollen beneath at the base; much broader at the base than at the tip; compressed on the apical half into a dull carina. Outer surface of the hind femora swollen.

L. velasquezii, Scudd., Proc. Bost. Soc. Nat. Hist., XII, 354.

Syn., *Acridium velasquezii*, Nieto, Rev. et Mag. Zool., 1857, 360.—Nouv. Orth. de Mex., 2.

olfersii, Sauss., Rev. et Mag. Zool., XIII, 162.—Orth. Nov. Amer., II, 13.

Head small, green, strongly punctate; thorax (pronotum) green, granulate; median carina cristate, much compressed, somewhat rufous. Elytra and wings narrower than in *Acridium flavicorne* (with which this has sometimes been confounded); the former green, the latter translucent, roseate, the external margin greenish. Abdomen compressed, slightly carinate, greenish-yellow. Legs greenish; the posterior femora with two lines of white spots; tibiæ roseate above, greenish below. The pronotum is large, very rough; the median carina, which is much more elevated than in *A. flavicorne*, is arcuate, deeply lobed, that part in advance of the last transverse furrow having four distinct lobes; that behind this furrow is serrated, but not lobed. The first ten joints of the antennæ are a clear-green, rest pale-green. The denticulation of the crest of the pronotum rufous. Elytra nearly of the same width throughout, green, with pale nerves. Disk of the wings roseate, with a violet tinge; the nerves of the apical portion dark. The sternum punctured, greenish-yellow. The legs have the femora green, and the tibiæ and tarsi rufous; the spines of the posterior tibiæ are greenish at the base, and black at the tips.

Length, 70 to 75 millimeters (2.8 to 3 inches); expansion of elytra, 135 to 145 millimeters (5.4 to 5.8 inches).

State of Vera Cruz, Mexico (Nieto).

MONACHIDIUM, Serv.

Face vertical, quadricarinate; the middle pair approach each other only at the middle. Eyes large, oval. Palpi of ordinary form. Antennæ filiform, slender, almost twice the length of head and thorax. Pronotum without transverse impressions; posterior extremity triangular, sloped obliquely to the sides; the apex sharp at the point, and a little advanced upon the elytra; the central portion much elevated and compressed, the upper edge of the crest trenchant and arcuate, reaching to the extreme posterior point. Elytra ample, passing the abdomen, round at the apex. Wings ample, about as broad as long. Legs long and smooth; spines of the posterior tibiæ small;

terminal article of the tarsi longer than the other two united. Prosternum armed with a slender spine. Abdomen long; cerci short; pieces of the ovipositor long and triangular; sub-anal plate of the male triangular, terminating in a point.

M. superbum, Stål, Öfv. Kongl. Vet. Akad. Forhandl., 1855, p. 352.

Female.—A dull testaceous-yellow. Head and antennæ yellowish; the first article of the antennæ above and the three last articles of the palpi dark-fuscous. Vertex with a slender, longitudinal carina at the base; front between the antennæ produced, the produced part sulcate; each side below the antennæ longitudinally carinated. Pronotum produced in the form of an obtuse angle in front, strongly cristate; the crest strongly emarginate in the middle, so that two crests stand out, of which the anterior is twice slightly emarginate; behind the middle each side is crenulato-carinate; the posterior extremity extends upon the elytra. Elytra yellow, marked with a few black spots; the apex bordered with black. Wings white and dusky in pale-roseate; anterior and posterior margins bordered with fuscous; the veins, except in the basal area, fuscous. The abdominal sutures black. Femora and tibiæ more or less marked with black.

Length, 2.5 inches; width, 0.55 inch.

Honduras (Stål).

XIPHOCERINI.

RHOMALEA, Burm.

Section 1.—Pronotum carinated in front, angulate:

a. Posteriorly strongly cristate; elytra short.

b. Posteriorly carinated, but equally elevated throughout:

R. eques, Burm., Sauss., Rev. et Mag. Zool., XI (1859), 392.

Green, testaceous, or somewhat fuscous. Pronotum punctate, strongly carinated (the front part of the carina in the female more elevated and arcuate, in the male equal). Thorax, abdomen, and legs varied with black. Elytra black, with numerous testaceous-green nerves; as long as the abdomen (frequently shorter in the female and longer in the male). Wings cochineal-red, with a black border, the median area, pellucid.

Length, 1.6 to 2.4 inches.

Mexico calida (Saussure); Honduras (Walker).

Section 2.—Pronotum rounded in front, emarginate, posteriorly carinated :

R. pedes, Sauss., Rev. et Mag. Zool., XI (1859), 392.

Green. Antennæ black, yellow at the base. The vertex and front of the head with two yellow stripes. Pronotum with two spots, and the margins yellow. Legs banded with yellow. Elytra slender at the apex, and tessellated with black. Wings black; posterior portion roseate; margin black, and two roseate fasciæ or spots at the apex.

Length, 1.75 inches.

Mexico calida (Saussure).

I am of the opinion that this is the *Locusta (Rutioderes) miles*, Drury, Ill. Exot. Ent., II, p. 89, Pl. 42, Fig. 2; but not the *Romalea miles*, Burmeister, which is a South American species. I therefore add the description of Drury, with the probable synonyms:

Gryllus (Locusta) miles, Drury, Ill. Nat. Hist., II, 79, Pl. 42, Fig. 2.

Goeze, Ent. Beytr., II, 102.

Gmelin, Linn. Syst. Nat., I, iv, 2082.

Locusta (Rutioderes) miles, Westw., Drury, Ill. Exot. Ent., II, p. 89, Pl. 42, Fig. 2.

“Head green. Face striped on each side with yellow. Antennæ black. Thorax dark-green; the posterior edges yellow. Abdomen black, but when the insect is living probably green. Tegmina (elytra) entirely reddish-brown. Wings black, with a scarlet patch near the tips, running from the anterior almost to the posterior edges; another considerable part of the wings is likewise scarlet, running from the body to the middle, and from thence to the abdominal corners, the posterior and anterior edges being black. Legs dark-green, almost black, and variously spotted with yellow, the fore and middle ones having a spot on each femur and tibia, the hinder ones having three on each femur and two on each tibia.”

The size, from the figure, appears to be about 1.75 inches in length; the expansion of the wings is given at 3.75 inches. The elytra and wings as long as the abdomen. Antennæ filiform.

Bay of Honduras (Drury).

R. pecticornis, Walk., Cat. Dermap. Salt., III, 538.

Male and female.—Deep-green. Head minutely punctured, with two keels, which converge between the antennæ, and are approximate and parallel

on the front. Eyes piceous, elliptical, prominent. Antennæ bright-red or yellow, black at the base and toward the tips; joints with black tips. Prothorax thickly punctured, with a distinct testaceous keel and a prolonged and testaceous hind border. Abdomen black; under side and pectus greenish. Hind tibiæ with two equal rows of spines. Fore wings pale-green, with numerous black dots and points of various size. Hind wings black, more or less bright-red toward the interior border, this hue extending to a patch in the disk near the tip.

Length of the body, 1.5 to 2 inches; expansion of the elytra, 3.1 to 3.25 inches.

Most nearly allied to *R. miles* (Burm.), which may be distinguished from it by the spots on the prothorax.

Mexico, Oajaca (Walker).

R. auricornis, Walk., Cat. Dermap. Salt., III, 538.

Male and female.—Luteous. Head thinly punctured, occasionally with a brown patch on each side. Eyes piceous, elliptical, prominent. Antennæ bright-yellow, black toward the tips. Prothorax (pronotum) thickly punctured, more or less tinged with brown on each side; in structure like that of *eques*; the keel with three notches, of which the hinder one is broad and deep. Abdomen with two broad black bands, and with exterior black spots. Femora and tibiæ black on the inner side; the four anterior with a row of black spots on the outer side; hind femora with two rows of black spots on the outer side; hind tibiæ with black spines; tarsi black toward the tips. Elytra with numerous black dots of various size; extending nearly to the tip of the abdomen in the male, rather shorter in the female. Wings crimson, tessellated with black along the black border; a cinereous stripe in the disk.

Length of the body, 1.5 to 1.83 inches; expansion of the elytra, 2.3 to 2.4 inches.

Oajaca, Vera Cruz (Walker).

XIPHOCERA, Burm.

Head, with the vertex advanced in the form of an obtuse cone; vertex flat and triangular; face vertical, middle costa single or double. Antennæ long, setaceous, ensiform, consisting of 20 or more joints. Pronotum shagreened or rugose; four transverse-impressed lines more or less apparent; the posterior

half usually triangular; sides sloped obliquely; apex pointed, advanced upon the elytra, tricarinate, more or less denticulate. Elytra usually longer than the abdomen; wings same length. Sub-anal plate of the male large, convex, unicarinate in the middle, terminated in a point. The posterior legs long; femora but moderately swollen; the posterior tibiæ have the external row of spines much smaller than the internal row. The tarsi have the terminal joint as long or longer than the other two united. Prosternum armed with a straight and sharp point. This genus has two divisions:

Division 1.—*The pronotum with three distinct carinæ, denticulate, and the apex pointed and advanced upon the elytra.*

Division 2.—*Pronotum without apparent carinæ; apex not advanced upon the elytra.* (Saussure).

X. pygmea, Sauss., Rev. et Mag. Zool., XIII (1861), 156.

Small, fuscous, much compressed. Face deflexed, quadricarinate; intermediate pair parallel, coarctate in the middle. Rostrum of the vertex sub-elongate, rounded at the tip, sub-bicarinate, and carinated on the margin. Antennæ filiform, prismatic, long as the head and pronotum. Eyes inflated, approaching at the vertex. Pronotum carinated, margins parallel, not acute, rugose; carinæ thrice interrupted; posterior margin abbreviated, rounded. Elytra longer than the abdomen, rounded at the apex; fuscous-brown, punctate, pale on the posterior margins; wings fuscous, yellowish at the base. Body fuscous, with a yellow fascia on the sides. Posterior femora fasciate; internal surface red; tibiæ red.

Length of the body, 0.68 inch.

Mexico (Saussure).

X. inclarata, Walk, Cat. Dermap. Salt., III, 523.

Male.—Ferruginous, thinly pilose. Head and pronotum with two blackish stripes. Head in front of the eyes elongate-conical, slightly acute; under side slightly tuberculate, with two approximate keels. Eyes elongate-elliptical, transverse, prominent. Antennæ piccous, flat, tapering, slightly dilated, longer than the pronotum. Thorax and hind femora with black tubercles. Pronotum with an indistinct oblique keel on each side, and a slight crest; crest yellow, with three notches, forked on the fore border; hind border elongated and rounded. Prosternum with an acute and erect spine. Hind femora dentate beneath along the inner keel; outer side with angular

transverse ridges. Hind tibiæ with tawny black-tipped spines, those on the inner side twice longer than those on the outer side. Wings truncated at the tips. Elytra with a greenish-yellow stripe, tapering along the hind border from the base for half the length. Wings black, a little shorter than the elytra, with some luteous spots along the costa.

Length of body, 1.2 to 2 inches; expansion of elytra, 2.5 to 3.5 inches.

Orizaba (Saussure).

TETTIGINÆ.

TETTIX, Fisch. de W.

1. *Pronotum elongate, straight or sub-ascending; the wings elongate, equal to or longer than the pronotum:*

a. *Pronotum truncate in front; vertex narrower than the eye (Sauss.):*

T. mexicana, Sauss., Rev. et Mag. Zool., XIII, 40.

Gray or yellow, reticulated with fuscous, a series of spots upon the carina of the pronotum and two marmorate spots behind the shoulders; legs annulate. Head short; vertex much narrower than the eyes, acute, truncate and sub-bilobed. Carinæ of the face sub-cristiform. Pronotum flat above, roughly punctate; in the front only with a sub-elevate, arcuate carinæ; the posterior extension narrow. The wings passing the pronotum considerably; margin clouded with fuscous, base iridescent. Anterior and middle femora cristate; the posterior femora in front of the knee emarginate and furnished with a minute tooth. Valves of the ovipositor denticulate, pilose.

The male is smaller, slenderer, less rugose, and the carinæ less.

♀ Length, 0.5 inch. ♂ 0.4 inch.

Mexico calida (Saussure).

T. azteca, Sauss., Rev. et Mag. Zool., XIII, 400.

Similar to the preceding. It differs from that species in having a smaller, narrower, and shorter body; granulose, but not scabrous (except on the sides, which are perceptibly different). Vertex narrower than the eyes, and distinctly carinated. Pronotum not constricted; furrows equally distinct; carina less elevated. First and second femora not dilated or lobate. Color fuscous; lower margins of the sides of the pronotum frequently yellow.

Mexico calida (Saussure).

b. Pronotum slightly produced upon the head; this margin angular:

T. chichimeca, Sauss., Rev. et Mag. Zool., XIII, 400.

A fuscous bay; very similar in form to *T. azteca*, but a little larger and narrower. Pronotum sub-elevated, densely punctate, but not granulose; on the upper part there are sub-elevated, longitudinal ridges; not constricted in front, the humeral carinæ bent forward, and continuous with the front carinæ; median carina perspicuous, not interrupted, scarcely acute in front; cross-incisions perspicuous. Anterior and middle femora not dilated.

Length of pronotum, 0.5 inch.

Mexico calida (Saussure).

T. purpurascens, Serv., Ann. Sci. Nat., XXII, 291.

Syn., *Acridium purpurascens*, Oliv., Enc. Meth., VI, 234.

It is a little narrower and a little longer than *Acrid. subulatum* (5 lines). Antennæ minute. Pronotum carinated, twice as long as the abdomen, and terminated in a point. Wings reach to the tip of the pronotum, and are tinged with purple.

Island of Trinidad (Serville).

BATRACHIDEA, Serv.

B. tolteca.

Syn., *Tettix tolteca*, Sauss., Rev. et Mag. Zool., XIII, 401.

Small, robust, dark-gray, legs annulate. Vertex narrow, truncate, carinate. Pronotum terrose, granulose, sub-constricted in front; the furrows conspicuous; anterior margin truncate, reaching or slightly passing the tip of the abdomen; in the female sub-arcuate; in the male flat; median carina sub-cristate, equal throughout, but in the male somewhat arcuate between the cross furrows; the margins of the posterior process deflexed, narrow, broader in the male than in the female, obliquely truncate at the apex. Elytra distinct; wings shorter than the pronotum.

Length, 0.3 inch.

Mexico calida (Saussure).

CHORIPHYLLUM, Serv.

Rhombea, Felt.; *Hymenotes*, West.

Body entirely hid by a membraneous expansion, elevated, foliaceous and very much compressed, which forms the pronotum, and extends beyond the

head in advance, and passes the extremity of the abdomen in the rear, bearing a strong resemblance to some of the species of Homoptera. Apparently without elytra or wings. Legs short; the four anterior angular. Tarsi short; without pulvilli. The head very small, scarcely visible; eyes prominent. Antennæ small, filiform, of medium length. Prosternum not truncate, but advanced upon the mouth.

C. rhombeum, Walk., Cat. Dermap. Salt., V, 845.

Syn., *Rhombea cicada*, Felt., Phil. Trans., LIV, 55, Fig. 6.

Cicada rhombea, Linn., Syst. Nat. I, 2, 704.

Acridium compressum, Thunb., Nov. Act. Upsal., 1815, 162.

(*Hymenotes*) *rhombeum*, Haan, Verz. Gesch. Ned. Ind. Bez. Ins., 165.

Hymenotes rhombea, West., Proc. Zool. Soc. Lond., 5, 130.

Choriphyllum sagrai, Serv., Hist. Orthop., 755, Pl. 8, Fig. 5.

It is entirely of an earthy gray; the foliaceous portion of the pronotum is elevated about four lines above the body; each lateral face presents some six or seven prominent transverse nerves, which are equally spaced; this membrane is the color of a brown dead leaf, the first third transparent; the rest opaque, its upper edge arcuate; the part which borders the head ends in an acute point; the posterior part, which passes the abdomen, is squarely truncate at its extremity. Antennæ and feet of the color of the body. The posterior femora inflated; the posterior tibiæ spined.

Length, 0.67 inch.

Cuba (Serville).

C. plagiatum, Walk., Cat. Dermap. Salt., V, 845.

Female.—Testaceous or dead-leaf color, wingless. Antennæ very long and slender. Crest of the pronotum foliaceous, extending much beyond the head and the tip of the abdomen, adorned with various black spots of different size and shape; its edge slightly undulating, forming, a little behind the middle, a rounded angle. Legs slender; four anterior femora bidentate beneath; hind tibiæ with very short spines.

Length of body, 0.46 inch.

Jamaica (Walker).

ADDENDA AND ERRATA.

Since the first part of the foregoing work was in type, I have received the following works on Orthoptera :

Skandinaviens Rätvingade Insecters Natural-historia. By J. B. v. Borck. Lund., 1848.

Orthoptera Sveciæ; deposita et descripta. By Joh. Wilh. Zetterstedt. Lundæ, 1821.

These contain some items in regard to the classification of Orthoptera which I deem of sufficient interest to be inserted here. As they relate only to the Swedish Orthoptera, the *Phasmidæ* and *Mantidæ*, which are not represented in the Scandinavian fauna, are omitted.

Zetterstedt arranges the families as follows :

SECTION I. Hemelytra and wings horizontal. Body flattened; femora simple:

Division 1. Trimera. Tarsi triarticulate :

Fam. 1 *Forficulariæ.*

Division 2. Pentamera. Tarsi 5-jointed :

Fam. 2 *Blattariæ.*

SECTION II. Hemelytra and wings vertical. Body sub-cylindrical. Posterior femora incrassated, fitted for leaping :

Division 1. Trimera. Tarsi triarticulate :

Antennæ setaceous. Pectus without laminæ. Wings subulate :

Fam. 3 *Achetariæ.*

Antennæ usually filiform, rarely clavate. Wings simply plicate :

Fam. 5 *Gryllides.*

Division 2. Tetramera. Tarsi 4-jointed :

Fam. 4 *Locustariæ.*

His family *Gryllides*, which is synonymous with our *Acrididæ*, he subdivides and arranges as follows :

I. GRYLLUS.—Antennæ inserted in foveolæ between the eyes. Eyes ovate, not prominent. Thorax (pronotum) rounded posteriorly, or slightly pro-

duced. Hemelytra often ample. Pulvilli between the claws of the tarsi. (Corresponds with my *Acridinae*.)

Sec. 1. Hemelytra as long or longer than the abdomen:

A. Antennæ in each sex filiform:

a. Thorax unicarinate:

b. Thorax tricarinate:

* Lateral carinæ straight or nearly straight.

** Lateral carinæ curved or angular.

B. Antennæ of the males clavate.

Sec. 2. Hemelytra very short.

II. ACRIDIUM.—Antennæ inserted under the eyes, sub-approximate in front.

Eyes globose, somewhat prominent. Thorax (pronotum) prolonged posteriorly. Hemelytra rudimentary. Pulvilli absent. (My *Tettiginae*.)

Sec. 1. Antennæ 14-jointed.

Sec. 2. Antennæ 12-jointed.

Borck's arrangement is as follows:

1. Cursoriæ:

a. Tarsi 3-jointed:

Fam. I. *Forficulina*.

b. Tarsi 5-jointed:

Fam. II. *Blattina*.

2. Saltatoriæ:

* Tarsi not uniform; the first joint of the posterior pair being unlike the others:

Fam. III. *Gryllodea*.

** All the tarsi normal; similar in form:

a. Tarsi 4-jointed:

Fam. IV. *Locustina*.

b. Tarsi 3-jointed:

Fam. V. *Acridiodea*.

He considers the variations in the tarsi of more importance in classification than the difference in the genital organs, and therefore places the *Gryllidæ* and *Locustidæ* in different sections.

As his work contains but few species of *Acrididæ*, his subdivision of this family is simple, and scarcely indicates what it would have been had the number been greater and the forms more varied. It is as follows:

1. Pronotum extending back only on the base of the elytra :
 - a. Prosternum armed with a strong spine. Elytra and wings rudimentary :
 - Gen. 1.....*Podisma*.
 - b. Prosternum unarmed :
 - * Face vertical; pronotum unicarinate :
 - Gen. 2.....*Ædipoda*.
 - ** Face deflexed; pronotum tricarinate :
 - Gen. 3.....*Gomphocerus*.
2. Pronotum extending to the tip of the abdomen :
 - Gen. 4.....*Tetrix*.

Remark.—I have not examined these works sufficiently to ascertain whether the authors consider their arrangements as ascending or descending. I may as well remark here that, while I let my view as to the relative position in the scale of being have what I consider its due weight in my arrangement of the groups, yet while so much uncertainty exists in regard to it, I consider it of subordinate importance in classification. I am satisfied that the *Acrididæ* should connect with the *Phasmidæ* through *Proscopia*. I am also satisfied that the saltatorial families must remain together, consequently my arrangement, or exactly the reverse—that of Burmeister and Scudder—must be adopted; and in either case the arrangement of the subdivisions of the *Acrididæ* should be the same.

It is my intention, if life and health are granted me, to supplement the foregoing synopsis with a discussion of the generic forms of the North American *Acrididæ*, especially with reference to their relations to exotic forms.

EPHIPPIGERA (?), Hald.

I have omitted this genus from the list, and have assigned it no regular place in my synopsis, for the following reasons: I am wholly unacquainted with it; there is a genus of this name belonging to the *Locustidæ*, but I know of no such genus in *Acrididæ*; and because I am well satisfied, from an inspection of the figure given by Haldeman, that his insect is but the pupa of some species of *Ædipoda*, and, I am strongly inclined to believe, of *Æ. corallipes* or one of the closely-allied species found in Mexico. Yet, in order to make my work as complete as possible, I insert Haldeman's description.

E. tschivavensis, Hald., Stansb. Rep. Salt Lake, 371, Pl. x, Fig. 3.

Robust, dull-brown, beneath yellowish; head rough; antennæ deep set, filiform, shorter than the pronotum, inserted opposite the lower canthus of the eyes, upon each side of a double vertical frontal carina; labrum transverse, and with the palpi flavous. Pronotum ample, coarsely scabrous, blackish, changing to yellowish posteriorly. Elytra and wings rudimentary, the former gray, mottled with black. Inside of the posterior femora and tibiæ black, the former interrupted near the apex. The posterior tibiæ have a row of spines upon each side above.

♀ Length, 1.25 inches; antennæ, 0.5 inch; pronotum, 0.58 inch; elytra, 0.33 inch; posterior femora, 0.58 inch; posterior tibiæ, 0.58 inch.

Chihuahua (Haldeman).

Remarks.—The shape of the pronotum is that common to the pupæ of that subdivision of *Ædipoda* to which *Æ. corallipes* belongs; the color as described is also very much the same; the inside of the posterior femora, it is true, is black, but this is not rare; at least, the pupæ, in this respect, seldom correspond with the perfect insects. Haldeman's figure shows his specimen was an immature female; the posterior femora show plainly the *Ædipodoid* type.

Note to O. PUNCTIPENNIS, page 64.—My *Opsomala punctipennis*, (Trans. Ill. State Agl. Soc., vol. 5, p. 447), I am now satisfied, is a misnomer. I have no specimens remaining, all having been destroyed several years ago; but, from my description and memory, I am now inclined to believe they belonged to *Pyrgomorpha punctipennis*, Thos.

Page 75.—Add as a synonym to *C. viridis* the following: *Opsomala brevipennis*, Thos., Trans. Ill. State Agl. Soc., vol. 5, p. 451.

Pages 195–196.—*O. varipes*, *O. punctipennis*, and *O. marginicollis* have been inadvertently inserted here as well as in Part I (see pages 64, 65 and 66); they are given as belonging to the United States fauna on the authority of De Haan, which I consider as doubtful.

Page 200.—*Hippiscus* ought probably to be placed in the vicinity of *Stauronotus*.

Brachypeplus virescens, Charp., Orthop., Pl. 51.

Has been unintentionally omitted. It is very similar to *B. magnus*, a little smaller and uniform green. Mexico (Charpentier).

DESCRIPTION OF THE PLATE.

The accompanying plate is intended to show, so far as can be done by simple outline-figures, the distinguishing characteristics of a few of the genera mentioned in this work, especially those not so generally known, those peculiar to the United States, or those but recently ascertained to belong to its fauna:

1. *Tropidolophus formosus*, Thos.
♀ From nature.
2. *Rhomalea centurio*, Burm.
From nature.
3. *Tragocephala viridifasciata*, Harr.
♀ After the figure in Flint's edition of Harr. Rep.
7. Same. Var. *infuscata*.
From nature. Given to show the prominent frontal costa and vertex, but the lower part of the face should be as in Fig. 3.
4. *Brachypeplus magnus*, Girard.
From nature.
5. *Caloptenus differentialis*, Thos.
♀ From nature. The *Calopteni* are generally considerably smaller than this, as this represents our largest species.
6. *Oxycoryphus compressicornis*, Latr. (European.)
From Fischer's Orth. Europ.
8. Pectus of *Acridium americanum*, showing the prosternal spine, *sp.*
9. *Stenobothrus*. Given to show the lateral foveolæ of the vertex.
From Fischer's Orth. Europ.
10. *Pyrgomorpha punctipennis*, Thos.
From nature.
11. *Boöpedon nubilum*, Thos.
From nature.
12. *Tryxalis brevipennis*, Thos.
From nature.
13. *Acrolophitus hirtipes*, Thos.
From nature; but the vertex is not as prominent as it should be. It should round upward from the occiput, so as to be about half the length of the eye higher at the tip than is shown in the figure.
14. *Tettix* ———.
Copied from Fischer's Orthop. Europ., to show the general form.

15. *Pezotettix* ——.

Copied from Fischer's Orthop. Europ., to show the general form, but is almost an exact figure of the smaller specimens of *P. picta*, Thos.

16. *Opomala* ——.

This was taken from a male specimen of *O. bivittata*, in which the lateral carinae of the pronotum were unusually rounded; hence do not appear as prominent as they should.

17. Head of *Stauronotus*, from Fischer's Orthop. Europ.

a. The lateral foveolæ of the vertex; *b.* the clypeus; *c.* the labrum.

GLOSSARY.*

- Abbreviated.** When applied to the elytra and wings signifies that they are shorter than the abdomen.
- Abdomen.** Posterior part of the body. (See page 20.)
- Abdominal appendages.** The *ovipositor* and *cerci*.
- Acuminate.** Tapering gradually to a point.
- Adult.** The fully-matured state of an insect.
- Anal.** At or pertaining to the anus.
- Anal angle.** The posterior inner corner of the wing.
- Angulate.** Angled; presenting an angular margin or surface.
- Annulated.** Ringed; furnished with ring-like bands.
- Antennæ.** Two jointed, thread-like appendages on the front of the head. (See page 13.)
- Anterior.** Before; toward the front.
- Apex.** The extremity opposite the base. (See page 18, note.)
- Apical.** At or pertaining to the apex.
- Approximate.** Close together; placed near.
- Arcuate.** Curved like a bow.
- Article or Articulation.** A joint or segment.
- Basal.** At or pertaining to the base.
- Base.** The foundation; the part which connects with the thorax, directly or indirectly; as, *base* of the abdomen, the part that joins the thorax; *base* of the tibia, the part that joins the femur. (See page 18, note.)
- Bilobed.** Furnished with or divided into two lobes.
- Bivittate.** Marked with two longitudinal stripes.
- Blotch.** An irregular spot. (See *Spot*.)
- Carina** (plural **Carinæ**). A keel or ridge; this term is sometimes applied to minute slightly-raised lines, as well as to more distinct keels and ridges.
- Carinate.** Furnished with a *carina*.
- Carneous.** Flesh-colored.
- Caudal.** At or pertaining to the end of the abdomen.
- Cephalic.** Pertaining to the head.
- Cerci.** The small appendages or processes issuing from the sides of the last abdominal segment. (See page 21.)
- Chagrined.** (See *Shagreened*.)
- Cinereous.** An ash-gray color.
- Clavate.** Having a thickened club-like extremity.
- Claviform.** Somewhat clavate.
- Clypeus.** The quadrate piece immediately below and connecting with the face. (See page 13.)
- Corneous.** Horny, or a hard substance resembling horn.

*This is only intended as an explanation of the technical terms employed in the present work. The words in *Italics* will be found explained in this Glossary.

- Corniculi.** The little horny tips or pieces of the ovipositor.
- Costa.** A rib; in the preceding work it is usually applied to the median *carina* of the face (see *Frontal costa*); it is also occasionally applied to the front marginal nerve of the wings and elytra.
- Costal.** Pertaining to the *costa*.
- Costate.** Ridged or *carinate*.
- Crenate.** Indented, scolloped, or angularly bent.
- Cristate.** Elevated in the form of a crest or high sharp ridge.
- Cuneiform.** Shaped like a wedge.
- Deflexed.** Sloped or bent downward; when applied to the vertex, it signifies that it slopes downward and forward; when applied to the face, it signifies that it slopes under and backward toward the breast.
- Dentate.** Furnished with a tooth or teeth.
- Denticulate.** Furnished with minute teeth.
- Depressed.** Flattened.
- Dilated.** Widened or expanded.
- Discoidal.** Pertaining to the disk.
- Disk.** The middle surface; the disk of the elytra is the middle field (see page 20); the disk of the wing is the central portion (see page 20); the disk of the pronotum is the dorsal surface; the disk of the femur is the external face contained between the first upper and lower *carinæ* or angles, and is usually *pinnate*.
- Dorsum.** The upper surface of the thorax, abdomen, &c. (See page 10.)
- Dorsal.** Pertaining to the *dorsum* or back.
- Dot.** (See *Spot*.)
- Dotted.** Furnished with dots.
- Dusky.** Pale *fuscous*.
- Elliptical.** Elongate-oval.
- Elongate.** Signifies that the part or area is longer than it is wide.
- Elytra** (singular **Elytron**). The anterior or upper wings. (See page 19.)
- Emarginate.** Notched; but once or twice (page 74) it is improperly used for *marginated*, or having the margins swollen.
- Ensiform.** Sharp on both edges and tapering to a point.
- Externo-median nerve.** (See page 19.)
- Falcate.** Sickle-shaped; curved like a sickle.
- Fascia.** A band or stripe broader than a line.
- Fastigium.** Extreme point or front of the vertex. (See page 12.)
- Femora.** The thighs.
- Femur.** The thigh.
- Ferruginous.** Rust-colored.
- Filiform.** Slender and cylindrical like a thread; uniform in size.
- Fore-wings.** The *elytra*.
- Foveola** (plural **Foveolæ**). A cavity or cellular depression.
- Foveolate.** Furnished with *foveolæ*.
- Front.** The face. (See page 12.)
- Frontal.** Pertaining to the face.
- Frontal costa.** The *carina* extending down the middle of the face. (See page 12.)
- Fuliginous.** Of the color of dark smoke.
- Fulvous.** Tawny, or light yellowish-brown.
- Fuscous.** Dark-brown, or sooty color.
- Fusiform.** Spindle-shaped.

- Ganglion** (plural **Ganglia**). A nervous mass or enlargement.
- Genital organs**. Those organs that participate in the act of reproduction; when used in the present work, generally refers to the parts of the *ovipositor*.
- Gibbous**. Evenly and broadly convex.
- Glabrous**. Smooth or polished.
- Glaucous**. A shining sea-green color.
- Granulated**. Furnished with minute prominences like grains of sand. (See *Rugose*.)
- Hab.** Abbreviation of *habitat*.
- Habitat**. The place or region which an insect inhabits.
- Hemelytra**. The upper wings; the *clytra*.
- Humerus**. The shoulder; used in the present work to designate the lateral ridges or angles of the pronotum, especially when they cannot properly be designated as *carinae*.
- Humeral**. At or pertaining to the *humerus*.
- Hyaline**. Transparent; the color of water; having a faint greenish tinge, which distinguishes it from *pellucid*, which has more of a whitish tinge, but the two are often used as synonymous.
- Imago**. The perfect insect, which has passed through the preparatory stages *larva* and *pupa*.
- Immaculate**. Unspotted; marked with neither spots nor dots.
- Impressions**. Used as equivalent to *incisions*.
- Incision**. A sharp linear indenture.
- Interno-median nerve**. (See page 19.)
- Interrupted**. Suddenly stopped, or broken; when used with reference to the *carinae* of the pronotum it signifies that they are not continuous, notched, disappearing, or sub-obsolete at points.
- Labial**. Pertaining to the lips.
- Labium**. The lower lip. (See page 14.)
- Labrum**. The upper lip. (See page 13.)
- Laminate**. Provided with a thin plate-like expansion of the margin.
- Lanceolate**. Spear-shaped.
- Larva** (plural **Larvæ**). The insect in its first stage after its exclusion from the egg.
- Lateral**. At or pertaining to the side.
- Lateral carinae**. Of the face (see page 13); of the pronotum (see page 15).
- Lateral lobes**. The lateral lobes of the pronotum are the deflexed portions that cover the sides of the thorax, extending from the *lateral carinae* to the lower margins.
- Laterally**. Toward the side; sideways.
- Linear**. Shaped like a line; very narrow.
- Lunar-shaped**. In the form of a half-moon.
- Lurid**. Bright colors obscured.
- Maculate**. Spotted.
- Mandibles**. The corneous, biting-jaws immediately below the *labrum*. (See page 14.)
- Margined**. Provided with a slightly-elevated or swollen margin.
- Maxillæ**. The lower or anterior jaws. (See page 14.)
- Maxillary palpi**. The jointed appendages attached to the *maxillæ*. (See page 14.)
- Median** or **Medial**. Occupying the middle.
- Mesonotum**. The upper or dorsal surface of the *mesothorax*. (See page 15.)
- Mesosternum**. The under surface of the *mesothorax*. (See page 15.)

- Mesothorax.** The middle piece or part of the *thorax* to which the *elytra* and middle pair of legs are attached. (See page 14.)
- Metanotum.** The upper or dorsal surface of the *metathorax*. (See page 15.)
- Metasternum.** The under surface of the *metathorax*. (See page 15.)
- Metathorax.** The posterior part or piece of the *thorax* to which the *wings* and hind pair of legs are attached. (See page 15.)
- Moniliform.** Distinct rounded joints resembling a string of beads.
- Multiarticulate.** Composed of many joints.
- Mutici.** Unarmed; without a *prosternal spine*.
- Nasal suture.** The *suture* between the *clypeus* and face. (See page 13.)
- Nerves.** The larger ribs or veins of the *elytra* and wings extending from the base toward the apex.
- Nervules.** The smaller connecting veins of the *elytra* and wings.
- Oblique.** When applied to the face, denotes that it slopes under and backward toward the breast.
- Obsolete.** Indistinct, or almost lost to view.
- Occiput.** The upper or back part of the head. (See page 11.)
- Ocelli** (singular **Ocellus**). The three simple or little eyes. (See page 13.)
- Ochreous.** Ocher-colored.
- Oculi** (singular **Oculus**). The eyes. (See page 13.)
- Ovate.** More or less egg-shaped.
- Oviduct.** The *ovipositor*.
- Ovipositor.** The part used in depositing eggs, placed at the apex of the female abdomen; it consists of four corneous pieces, two of which curve upward and two downward. (See page 22.)
- Palpi.** The four jointed appendages attached to the mouth. (See page 14.)
- Papilioform.** Having the form of a butterfly's wing.
- Pectus.** The breast, or under surface of the *thorax*; the same as *sternum*.
- Pellucid.** Transparent.
- Piceous.** Color of pitch.
- Pinnæ.** The minute oblique ridges or rays of the external face of the posterior *femora*. (See page 18.)
- Pinnate.** Furnished with *pinnæ*.
- Planate.** Flattened.
- Plications.** The folds of the wings.
- Posterior and Posteriorly.** Behind. (See page 10.)
- Posterior lateral margins.** The posterior margins of the sides of the *pronotum* extending downward from the tip to the lower posterior corners.
- Pre-anal.** Above or before the anal opening; usually applied to the triangular piece or plate that rests on the upper surface of the last abdominal segment. (See page 22.)
- Process.** A prolongation of the surface or margin; as, a tooth, &c.
- Produced.** Drawn out; applied to the head, it signifies that the upper part of the front extends forward.
- Pronotum.** The shield which covers the front part of the *thorax*, extending down the sides nearly to the legs. (See page 15.)
- Prosternum.** The under surface of the *prothorax*. (See pages 15 and 16.)
- Prothorax.** The anterior division of the *thorax*; the part with which the head is connected. (See page 15.)

- Pulvilli** (singular **Pulvillus**). The little pads between the claws of the *tarsi*. (See page 18.)
- Punctate** and **Punctured**. Containing numerous small point-like depressions or punctures.
- Pyriiform**. Pear-shaped.
- Quadrata**. Having four sides; somewhat resembling a square.
- Quadricarinate**. Having four carinae or keels. (See page 13.)
- Recurved**. Curved over or backward.
- Reniform**. Kidney-shaped.
- Reticulated**. Furnished with veining or marking like network.
- Rufous**. Reddish.
- Rugose**. Rough; wrinkled; furnished with numerous small elevations. This is a general term for all sharply uneven surfaces. For the different grades and forms of unevenness there are specific terms; as, *granulated*, *shagreened*, *tuberculate*, *scabrous*, *rugulose*, *wrinkled*, &c.
- Rugulose**. Slightly rugose; minutely wrinkled or roughened.
- Sanguineous**. Blood-red.
- Scabrous**. Covered with small, slight elevations.
- Scalariform**. Placed regularly like the rounds of a ladder. (See page 20.)
- Semilunar**. Somewhat half-moon shaped.
- Serrated**. Having prominences like saw-teeth.
- Seta** (plural **Setae**). A bristle-like appendage.
- Setaceous**. Bristle-like; resembling a bristle.
- Sinuate**. Winding in and out; twice or more curved.
- Smooth**. Without elevations or wrinkles; applied to the *prosternum*, signifies that it is unspined.
- Spatulate**. Flattened, and broader at the apex than at the base.
- Spot**. A colored mark. A minute rounded spot is termed a *dot*; a large spot with very irregular outlines is sometimes called a *blotch*.
- Spotted**. Containing or marked with spots or dots.
- Spurs**. The strong spines at the apex of the tibiae.
- Sternite**. The *ventral* part of each abdominal segment. (See page 21.)
- Sub**. Somewhat; under.
- Sub-anal plate**. (See page 21.)
- Sub-frontal**. Close to the front; immediately behind the front margin.
- Sub-genital lamina**. Same as *sub-anal plate*.
- Sub-marginal**. Just behind or within the margin.
- Sulcate**. Channeled; grooved; having a *sulcus*.
- Sulcus**. A linear groove or channel.
- Super-anal plate**. (See page 22.)
- Suture**. A seam or impressed line; generally used in reference to the junction of two pieces or plates.
- Tarsus** (plural **Tarsi**). The jointed foot. (See page 17.)
- Tegmina**. The *elytra*.
- Terete**. Sub-cylindrical; straight, without enlargements.
- Tergite**. The dorsal portion of each abdominal segment. (See page 21.)
- Terminology**. An explanation of the peculiar terms and names employed.
- Thoracic**. Relating to the *thorax*.
- Thorax**. The middle portion of the body to which the legs and wings are attached. (See page 14.)

Tibia (plural **Tibiae**). The shank; the part of the leg between the thigh and foot.
(See page 17.)

Tip. The apex or end opposite the base.

Translucent. Semi-transparent.

Transverse. Signifies that the part or area is broader than it is long.

Transverse incisions or impressions. Generally used with reference to the cross impressed lines of the *pronotum*.

Tricarinate. Having three keels or *carinae*.

Trigonal. Triangular; three-sided.

Triquetrous. Having three faces, with the margins or angles sharp.

Trochanter. The second piece of the leg. (See page 17.)

Truncate. Limited at the extremity by a straight, exactly transverse line or surface; cut off squarely.

Tuberculate. Covered with tubercles.

Tuberculiform. In the form of a tubercle.

Tympanum. The opening on each side of the basal segment of the abdomen. (See page 21.)

Unarmed. Without a spine; unspined.

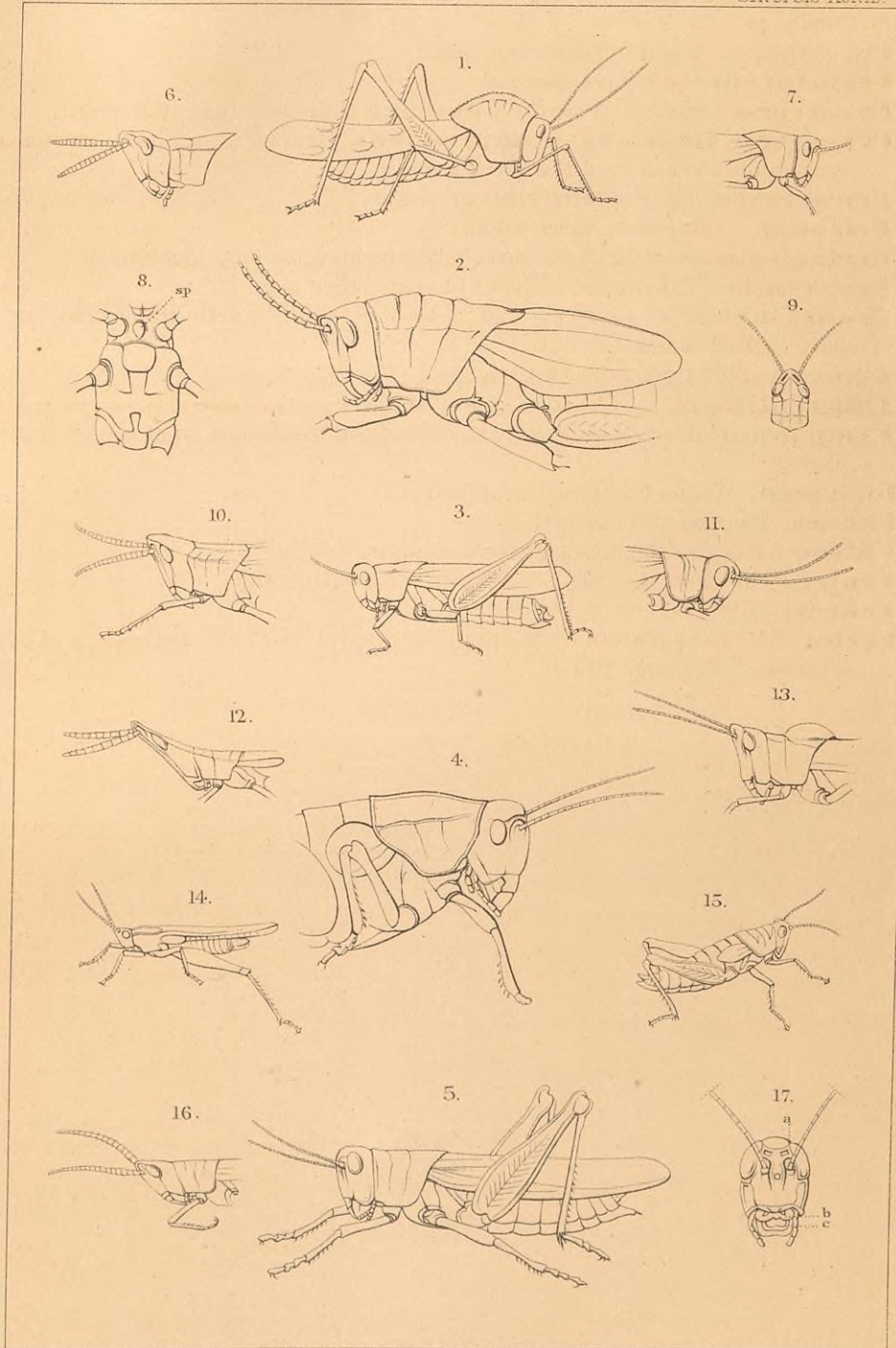
Ungues. The claws of the *tarsi*.

Valves. The corneous pieces of the *ovipositor*.

Venter. The under side of the abdomen. (See page 21.)

Ventral. Pertaining to the *venter*.

Vertex. The front portion of the upper surface of the head between and in front of the eyes. (See page 12.)



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