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By

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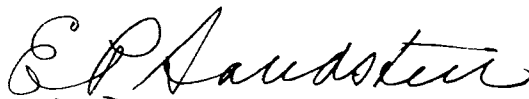
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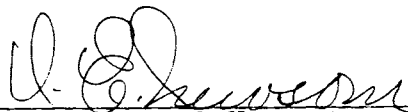
  
Head of Department of  
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COLORADO AGRICULTURAL COLLEGE  
FORT COLLINS, COLORADO  
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Pathology

COLORADO AGRICULTURAL COLLEGE

FORT COLLINS, COLORADO

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C O N T E N T S

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## Introduction

The study of the taxonomic value of the tergite preceding the supra-anal plate in males of the Acridinae was begun at the University of Montana in the fall of 1920 as graduate work of that institution. Professor R. A. Cooley should be given the credit of the guiding and directing influence in the prosecution of the study of Montana species.

The examination of the taxonomic value of the supra-anal plate in the males of the Oedipodinae has been the by-product of the above-mentioned paper. The work is original in nature and therefore limited to Colorado species. It is presented as a possible forward step toward a better systematic conception of this group.

The systematic study of the genera and species of the Oedipodinae of Colorado is presented as a guide to the student and worker in entomology in the determination of species of this difficult group. It has seemed wise to include descriptions

based entirely upon Colorado specimens. These may not conform to original descriptions but are based upon typical examples as determined by Professor Lawrence Bruner, Dr. C. P. Gillette and myself.

The bibliography of each species has been gleaned from the writings of other entomologists. It is not intended to be complete, but to be a guidance in locating some of the earlier descriptions.

The data on localities are largely taken from Dr. Gillette's records, with a few from recent personal collections or the works of other writers, to whom credit is given in the manuscript.

For the shortcomings in the keys and the descriptions of species, the author is wholly responsible.

To Dr. C. P. Gillette should be given great credit for his inspirational supervision in the preparation of these papers. The author also here wishes to thank Professor A. N. Cudell for allowing the study of Colorado specimens in the National Museum and for assistance in straightening out some difficulties in synonymy.

ON THE TAXONOMIC VALUE OF THE TERGITE PRECEDING  
THE SUPRA-ANAL PLATE IN MALES  
OF THE ACRIDINAE

While preparing from the collection and notes in the Montana State College a list of the Orthoptera of the state, the writer found that the tergite preceding the supra-anal plate was of considerable taxonomic value in males of the Acridinae. The use of this segment, because of the furculae, in separating the species of the Melanopli has become general and well understood. The existence and value of a homologous structure in the Acridinae has not been considered. Yet an examination of the males of fifteen Montana species represented by nine hundred thirty-seven individuals has shown this character to be of as constant taxonomic value as its homologue in the Melanopli.

The tergite preceding the supra-anal plate in males of the Acridinae is separated on the mid-dorsal line, either by a complete division or a distinct suture, into two lateral plates. (Fig. 1) Some species have paired, node-like processes on each of the lateral plates of the tergite, with the nodes overlying the supra-anal plate. In the case of the furculae of the Melanopli, the paired processes may be attenuated and finger-like on one species, only node-like on another or entirely wanting on yet another. The furculae of the Acridinae examined are never more than node-like. However, the structure of the nodes



varies so greatly as to make them of as much use as if they were attenuated. Likewise, as in the Melanopli, the furculae may be entirely wanting. In such a case the structure of the lateral plates usually, not invariably, is sufficiently different to make a separation of the species possible.

The usage of the furculae in the classification of the Melanopli is general. That is, not all species can be determined by them, for many are alike in this respect. However, this character in the group as a whole materially aids in the differentiation of the species. This is also true of the Acridinae. This one character has been of more use to the writer in accurately separating the Montana species of the group than has any other one used in a formal key.

Since the compilation a year ago of the notes on the taxonomic value of the tergite preceding the supra-anal plate of the Acridinae of Montana, the writer has had the opportunity of further observation on this point of additional species in the collection of the Colorado Agricultural College. These studies further indicate that this structure is reasonably constant, and does have a distinct value in classification as set forth in the first paper. Only in the genus Ageneotettix, does there seem to be a lack of constancy of the structure of the furculae of the Colorado species. Because the determinations of these species were doubtful, and the series incomplete, they have been omitted at this time. The author feels certain

that a large series of specimens may show some graduation of the form of this tergite from the typical, but no more so than is the case with many other structural characters of taxonomic importance.

These further studies have indicated very clearly that the structure of the supra-anal plate, in addition to or in conjunction with the furculae, may often be of definite service taxonomically. For this reason, a short description of this tergite will also be given.

#### Descriptions

The descriptions which follow are supplementary to the plates. They are given for the purpose of better familiarizing the user with the many differences which occur in this structure.

##### Mermiria bivittata Serv. (Fig. 2)

Presence of furculae but faintly indicated by the incurving of the caudal margins of the lateral plates. Lateral plates narrowly separated on the median line.

Supra-anal plate long, extending distinctly beyond the end of cerci. An indication of a transverse suture first curving caudad and then cranial, nearly bisects the plate. The lateral margins unbroken. The tip broadly rounded.

##### Mermiria neomexicana Thom. (Fig. 3)

Furculae absent. Lateral plates narrowly separated on the median line. Median margins of the lateral plates narrow and convex. Caudal margins concave.

Supra-anal plate long, extending beyond the tips of the cerci. Lateral margins broken caudally by a notching into the plate. Tip narrowly rounded.

Acrolophitus hirtipes Say. (Fig. 4)

Furculae distinctly present, of medium size. The lateral plates attingent or subattingent on the median line. Median margins of the furculae strongly concave. Caudal margins nearly straight. Notching not abrupt but cutting almost through the lateral plates. Lateral plates beyond the furculae broadening abruptly, the margins straight.

Amphitornus bicolor Thom. (Fig. 5)

Furculae distinctly present. Median margins of the furculae convex and meeting each other for a short distance from their origin. Caudal margins also convex. Notching not abrupt and cutting only slightly into the lateral plate. Lateral plates beyond the furculae abruptly broadening, the margins convex.

Opeia obscura Thom. (Fig. 6)

Presence of the furculae but very faintly indicated. Lateral plates pointedly attingent or subattingent on the median line. Lateral and caudal margins of the furculae convex. Notching only indicated by a slight incurving of the caudal margins.

Cordillacris affinis Morse.\* (Fig. 7)

Furculae faintly indicated by a slight incurving of the caudal margins of the lateral plates. Lateral plates on the median line pointed and widely separated. Caudal margins of the plates first convex and then slightly concave.

Supra-anal plate short, not extending to the tips of the cerci. An indication of a transverse suture curving cranial, nearly bisects the plate. The lateral margins unbroken. The tip broad and almost a straight line.

Cordillacris cinerea Brun. (Fig. 8)

Furculae absent. Lateral plates pointedly attingent or subattingent on the median line. Lateral margins of the lateral plates concave.

Supra-anal plate relatively short, not reaching the tips of the cerci. An indication of a transverse suture curving cranial occurs about one-fourth of the distance caudad. Lateral margins of irregular curvature and finally broken caudally by a notching into the plate. Tip pointed, the portions of the lateral margins forming it being slightly convex.

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\*The determination of a single male of this species in the collection is doubtful according to Dr. C. P. Gillette, who listed it in Bulletin 94 of the Colorado Agricultural Experiment Station.

Since first writing this paper, Mr. Morgan Hebard examined the specimen of C. affinis above described and pronounced it C. cinerea. Our specimens determined as C. cinerea are distinctly different from this, and are possibly some other species.

Cordillacris crenulata Brun. (Fig. 9)

Presence of furculae indicated only by an incurving of the caudal margins. Lateral plates widely separated on the median line. The median margins of the furculae a straight line and strongly divergent. Lateral plates beyond the furculae scarcely broadening at all.

Cordillacris occipitalis Thom. (Fig. 10)

Presence of furculae but faintly indicated by a slight incurving of the otherwise unbroken line of the medio-caudal margin of the lateral plates. Lateral plates pointedly attingent or subattingent on the median line.

Phlibostroma quadrimaculatum Thom. (Fig. 11)

Furculae distinctly present. Lateral plates pointedly attingent on the median line. Median margins of the furculae straight or slightly concave. Caudal margins straight or slightly convex. Notching into the lateral plates abrupt and cutting about one-half the way through. Lateral plates beyond the furculae broadening abruptly, the margins convex.

Orphulella pelidna Burm. (Fig. 12)

Furculae absent. Median margins of the lateral plates but slightly convex. Caudal margins first gently convex and then varying to gently concave. Lateral plates broadly attingent on the median line.

Orphulella salina Scudd. (Fig. 13)

Furculae faintly indicated by a slight incurving of the caudal margins of the lateral plates. Lateral plates broadly attingent on the median line. Caudal margins first convex, then, near the cerci, concave.

Supra-anal plate short, not reaching the tips of the cerci, and shield shaped. An indication of a transverse suture curving gently cranial occurs about one-third of the distance caudad. Lateral margins from their points of origin, first concave then strongly convex, and later strongly concave, forming a pointed tip.

Chloealtis abdominalis Thom. (Fig. 14)

Presence of furculae faintly indicated. The lateral plates attingent or subattingent on the median line. Median and caudal margins of the furculae strongly divergent, continuous, nearly straight lines. A slight notching is made by the caudal margin of the lateral plate beyond the furculae becoming strongly convex, thus resulting in a broadening of the plate.

Chloealtis conspersa Harr. (Fig. 15)

Furculae absent. Lateral plates on the median line pointed and narrowly separated. Caudal margins from the median line are first concave, then slightly convex and again concave in proximity to the base of the cerci.

Supra-anal plate short, not reaching the tips of the cerci. Lateral margins unbroken and slightly convex. Tip sharply pointed.

Chorthippus curtipennis Harr. (Fig. 16)

Furculae absent. The lateral plates pointedly attingent or subattingent on the median line. The medio-caudal margins are first gently concave, varying to gently convex and are strongly divergent. The lateral plates grow rapidly in width from the points of their origin on the median line.

Platybothrus brunneus Thom. (Fig. 17)

Furculae distinctly present. The lateral plates broadly attingent on the median line. The median and caudal margins of the furculae convex. Notching into the lateral plates abrupt and cutting in about one fourth of the distance. The margin of the lateral plates extends immediately laterad from the deepest portion of the notch.

Gomphocerus clavatus Thom. (Fig. 18)

Furculae absent. Lateral plates on the median line pointed and narrowly separated. Caudal margins from the median line first concave, then strongly convex, and finally in proximity to the base of the cerci, concave.

Supra-anal plate short, not quite reaching the tips of the cerci. A strong indication of a transverse suture curving cranial occurs about two-thirds of the distance caudad. The lateral margins are broken by a notching into the plates at the points of origin of this suture. Tip broadly pointed.

Gomphocerus clepsydra Scudd. (Fig. 19)

Furculae moderately distinct and small. The lateral plates pointedly attingent or subattingent on the median line. Notching into the lateral plates gradual and shallow. Lateral plates beyond the furculae much broadened, the margins convex.

Coopedon nubilum Say. (Fig. 20)

Furculae distinctly present and lobe-like. Lateral plates narrowly separated on the median line. Median margins of the plates convex. Caudal margins first convex in continuity with the median margins, then notching abruptly into the plates, cutting about one-half of the distance through.

Supra-anal plate relatively short, not reaching the tips of the cerci. A strong indication of a transverse suture curving slightly cranial, almost bisects the plate, the lateral margins being broken at this point. Otherwise, the lateral margins are unbroken and are slightly convex. The tip is broadly pointed.

Stirapleura decussata Scudd. (Fig. 21)

Furculae distinctly present and large. The lateral plates pointedly attingent or subattingent on the median line. The median margins of the furculae almost a straight line and divergent. The caudal margins slightly convex or straight. The notching into the lateral plates abrupt and cutting about one-half of the way through. The lateral plates beyond the furculae broadening, the margins convex.



Ageneotettix deorum Scudd. (Fig. 22)

Furculae absent. The lateral plates distinctly separated on the median line. The median margins straight and but slightly divergent, almost parallel. The caudal margins slightly concave, the lateral plates broadening but little laterally.

Aulocara ellioti Thom. (Fig. 23)

Furculae indistinctly present because of a very gradual incurving of the caudal margin beyond the lobe. The curving into the lateral plates deep, cutting about one-third the way through.

Aulocara femoratum Scudd. (Fig. 24)

Furculae distinctly present. Median margins concave. Caudal margins convex. Lateral plates narrowly separated on the median line. Notching into the lateral plates abrupt and cutting about one-half the way through. Lateral plates beyond the furculae broadening, the margins convex.

Heliaula rufa Scudd. (Fig. 25)

Furculae distinctly present, end lobe-like. Lateral plates narrowly separated on the median line. Median margins of the plates from the median line first convex, then concave. Caudal margins first convex to form the lobes of the furculae, then notching about one-half of the distance through the plate.

Supra-anal plate of medium length, reaching the tips of the furculae. An indication of a transverse suture

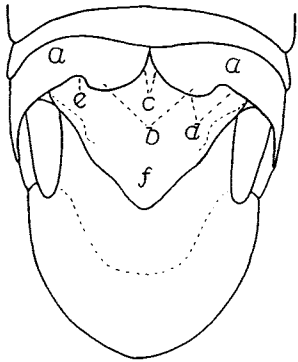
occurs across the plate about one-third of the distance caudally. The lateral margins slightly convex, terminating in a broadly pointed tip.

#### Acknowledgments

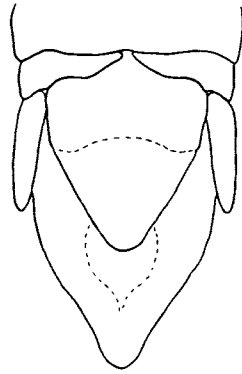
The writer wishes to acknowledge his deep gratitude to his professor, Mr. R. A. Cocley, under whom this paper was prepared as a part of graduate work, for his inspiring interest and timely suggestions. He also wishes to thank Mr. Morgan Hebard for correcting the manuscript, Dr. C.P. Gillette for the courtesy of permitting the study and inclusion of Colorado species, and Mr. A. W. Caudell and Dr. G. C. Crampton for help received.

## Key to Plates

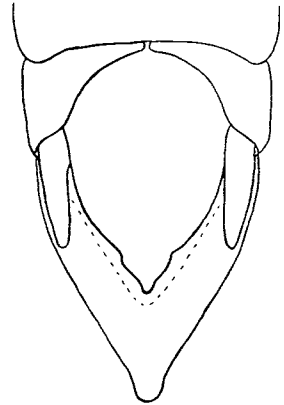
- Figure 1. *Platybothrus brunneus*. Showing structure of the terminal dorsal segment of the abdomen. (a) Lateral plates; (b) furculae; (c) median margin of the lateral plate; (d) caudal margin of the lateral plate; (e) notching into lateral plate to form the furcula; (f) supra-anal plate.
- Figure 2. *Mermiria bivittata*. (Colorado)
- Figure 3. *Mermiria neomexicana*. (Colorado)
- Figure 4. *Acrolophitus hirtipes*. (Montana)
- Figure 5. *Amphitornus bicolor*. (Montana)
- Figure 6. *Opeia obscura*. (Montana)
- Figure 7. *Cordillacris affinis*. (Colorado)
- Figure 8. *Cordillacris cinerea*. (Colorado)
- Figure 9. *Cordillacris crenulata*. (Montana)
- Figure 10. *Cordillacris occipitalis*. (Montana)
- Figure 11. *Phlibostroma quadramaculatum*. (Montana)
- Figure 12. *Orphulella pelidna*. (Montana)
- Figure 13. *Orphulella salina*. (Colorado)
- Figure 14. *Chloealtis abdominalis*. (Montana)
- Figure 15. *Chloealtis conspersa*. (Colorado)
- Figure 16. *Chorthippus curtipennis*. (Montana)
- Figure 17. *Platybothrus brunneus*. (Montana)
- Figure 18. *Gomphocerus clavatus*. (Colorado)
- Figure 19. *Gomphocerus clepsydra*. (Montana)
- Figure 20. *Boopedon nubilum*. (Colorado)
- Figure 21. *Stirepleura decussata*. (Montana)
- Figure 22. *Ageneotettix decrum*. (Montana)
- Figure 23. *Aulocara elliotti*. (Montana)
- Figure 24. *Aulocara femoratum*. (Montana)
- Figure 25. *Heliaula rufa*. (Colorado)



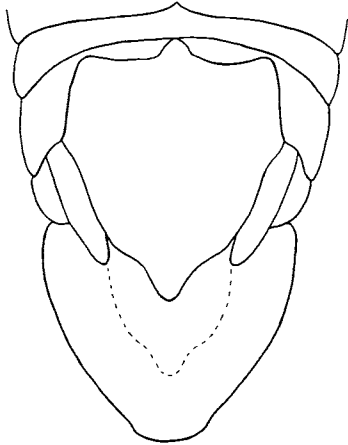
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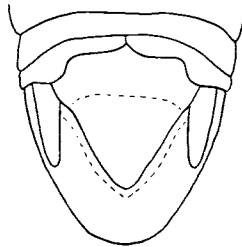
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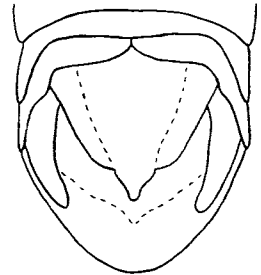
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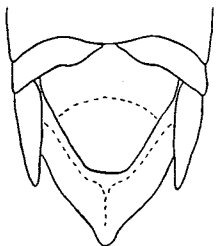
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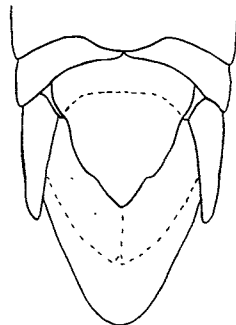
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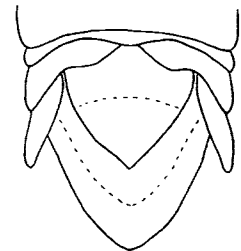
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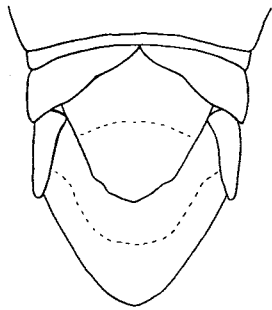
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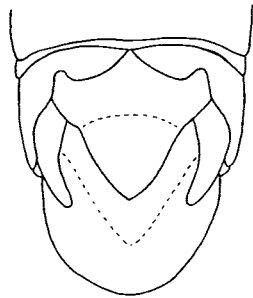
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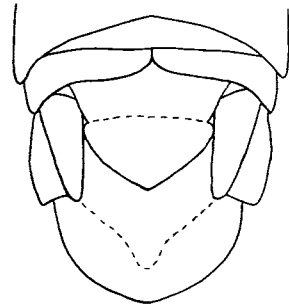
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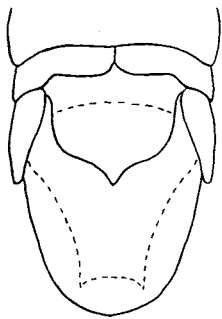
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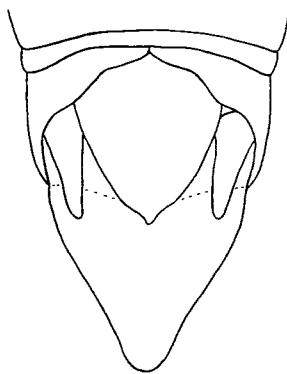
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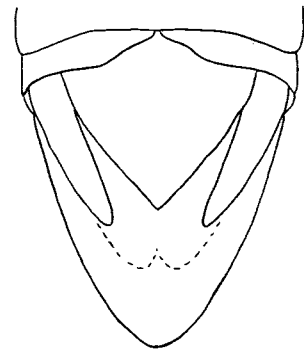
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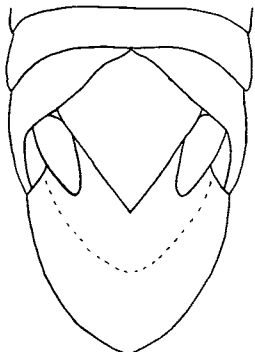
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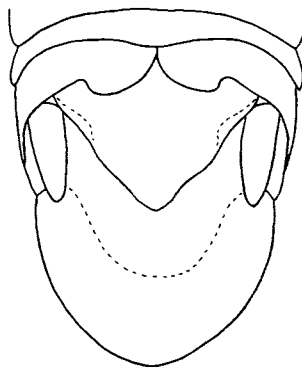
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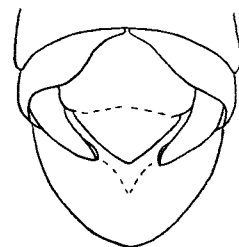
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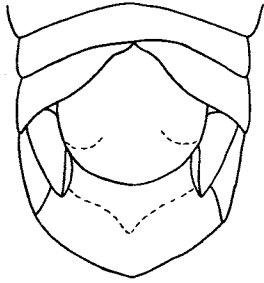
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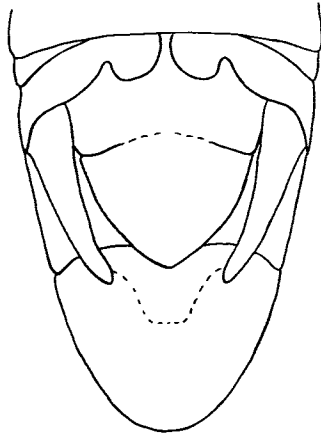
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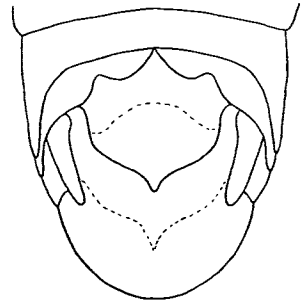
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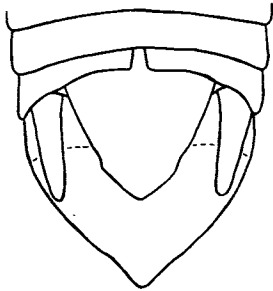
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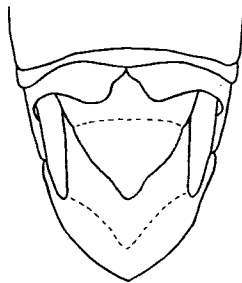
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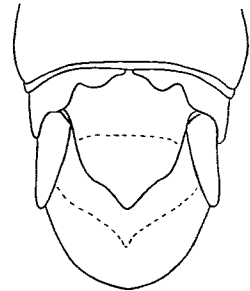
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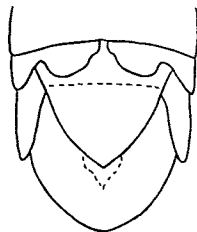
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ON THE TAXONOMIC VALUE OF THE SUPRA-ANAL  
PLATE IN MALES OF THE OEDIPODINAE

This study of the taxonomic value of the supra-anal plate in males of the Oedipodinae has been the outgrowth of the similar previous work on the Acridinae. There being no furculae present in the Oedipodinae, attention was naturally drawn to the succeeding tergites.

It has been found that the supra-anal plate in this group has considerable systematic specific value in some genera and very little in others. The general structure of this plate is also remarkably alike within a valid genus. Most genera can be separated by these tergites alone. However, a few very closely related genera, such as Trimerotropis and Cirootettix, are closely alike in this respect. Therefore, on the whole, the supra-anal plate, as is the case with the furculae in the Acridinae, is of general, rather than special taxonomic importance. It has been used when particularly serviceable in both the specific and generic keys.

The supra-anal plate, to facilitate better description, has been divided into a proximal and distal tergite the two being separated by the transverse carinae or suture. I agree with Walker that this structure was

originally made up of at least two segments. In some examples, as will be noted in the descriptions, the distal plate arises from underneath the proximal plate, a distinct infolding discernible.

Descriptions of the Supra-anal Plate of the  
Colorado Oedipodinae

Arphia Stal.

frigida Scudd.

General appearance shield shaped.

Transverse carina on the median line a low, nearly straight ridge, practically bisecting the length of the supra-anal plate; from the points where it meets the lateral carinae, it becomes a higher, more conspicuous ridge, angling somewhat caudad to the lateral margins of the plate. Lateral carinae two prominent, parallel ridges, continuous with the outer portions of the transverse carina and trisecting the proximal plate into three sub-equal sunken areas. Lateral margins of proximal plate slightly convex, strongly carinate, and continuous with the transverse carina.

The distal plate originates underneath the transverse carina, thus resembling an invagination. Its lateral margins are strongly convex, except for a slight incurving next to the tip of the plate; not carinate except at tip. The tip of the plate narrowly rounded, and surrounded by carinae, which extend cranial nearly to the transverse



carina, the bounded area being sub-spatulate.

pseudonietana Thom.

Same as preceding species.

teporata Scudd.

Same as preceding species.

Chortophaga Saussure

viridifasciata DeGeer.

Proximal Plate: On the median line about two-thirds as long as the distal plate. Lateral margins short and nearly straight. Transverse carina from the margins to the lateral carinae distinct but low, right angulate with the margin, slightly convex posteriorly, faint between the lateral carinae. Lateral carinae broad ridges, separated by a distance half as wide as the area on either side, deeply sulcate between, and slightly convergent both anteriorly and posteriorly.

Distal Plate: Lateral margins very slightly convex except just before the tip where they notch in slightly to form the latter, which is narrow and bluntly pointed. Lateral carinae, hardly discernible, placed close to the margins near the tip.

Encoptolophus Scudder

costalis Scudd.

Proximal plate slightly shorter than the distal plate. Transverse carina absent on the median line, making its

appearance slightly on either side and becoming more prominent as it nears the lateral margins of the plate, and running in a straight line strongly caudad. Lateral margins of proximal plate nearly straight and moderately carinate. Lateral margins of the distal plate slightly convex, notching slightly into the caudal margin. Caudal margin forming a broad tip nearly as broad as the distal plate, and but faintly convex.

Camnula Stal.

pellucida Stal.

Proximal plate approximately one-third as long as the distal plate. Transverse carina with strong convexity caudad, the carina itself formed by a sinking of the distal plate below the level of the proximal plate. Lateral margins of the proximal plate slightly convex, meeting the transverse carina well within the lateral margins of the distal plate, and there forming a distinct spine on either side of the plate. Lateral carina on proximal plate absent. Lateral margins of the distal plate first strongly convex, then concave, cutting into the plate to form a long, narrow, sharply-pointed tip, fully one-third as long as the plate itself. A distinct lateral carina originates on the distal plate underneath each spine of the proximal plate and runs at a slight angle outward, meeting the lateral margin. The distal plate, especially on the margins, originates

beneath the proximal plate, suggesting intersegmental invagination.

Hippiscus Saussure

montanus Thom.

Distinct transverse carina absent, but there is a distinct cutting in of the strongly carinate lateral margins of the proximal plate well inside the distal plate, designating the boundaries of these areas. Lateral carinae of the proximal plate prominent, the area between them only about one-half as wide as the areas on either side and narrower caudad than cranial. Lateral margins of the distal plate at origin strongly elevated, dropping to the level of the plate at the tip; strongly convex except just before the tip, where occurs a slight incurving to form a short, narrowly rounded tip. Lateral carinae on the distal plate less prominent than on the proximal plate, and closer together.

conspicuous Scudd.

Essentially the same as H. montanus.

neglectus Thom.

Essentially the same as H. montanus except that the lateral carinae on both the proximal and the distal plates are more widely separated in this species, making the area between them as wide as the area on either side.

paradoxus Thom.

Differs from H. montanus in that the lateral carinae are more nearly separated on both the proximal and distal plates.

variegatus Scudd.

In general appearance the plate of this species agrees with Hippiscus, but is unique in itself. It differs from H. montanus in that the lateral margins of both plates are not elevated, the entire plate is flat except that in place of lateral carinae, there is a shallow furrow on both the proximal and distal plates, and instead of there being a transverse carina, the proximal and distal plates are separated by a shallow suture.

zapotecus Sauss.

Agrees closely with H. montanus except that the tip of the distal plate is broader, nearly as broad as its base, and the point of the tip shorter, broader, therefore, blunter.

#### Leprus Saussure

cyaneus Ckll.

It seems probable that this genus should merge with Hippiscus. This species compares very closely with Hippiscus montanus, and differs from it only in that the lateral carinae on both the proximal and distal plates are more widely separated, the space between them as wide

as the area on either side. The plate is of a dark purple tinge.

Tropidolphus Thomas

formosus Say.

The entire plate is remarkably void of carinae, but is sparsely tuberculose.

Proximal Plate: Lateral margins straight or slightly convex. Transverse carina slight, forming a constant arc, convex craniad. Lateral carinae absent.

Distal Plate: First two-thirds of lateral margins strongly convex, followed by a concave indentation to form a broad, though sharply-pointed tip. Lateral carinae absent.

Dissosteira Scudder

carolina Linn.

Proximal plate distinctly less than half as long as the distal plate. Transverse carina prominent, separating the plates by a constant arc with a convexity craniad. Lateral margins of the proximal plate either straight or slightly convex, strongly carinate, meeting the transverse carina well within the lateral margins of the distal plate and forming a distinct point sub-spuriform. Lateral carinae on proximal plate absent. The first third of the lateral margins of the distal plate elevated and gently convex; the caudal two-thirds but slightly elevated and slightly

concave, terminating in a narrow, sharp point. Lateral carinae on the distal plate distinctly present caudad, parallel, and narrowly separated. Distal plate arises beneath the proximal plate.

longipennis Thom.

Conforms to the description of the preceding species save that the transverse carina is distinct for but a short distance on either side of the point formed by its junction with the lateral margins of the proximal plate, and is but faintly discernible mediad.

Spharagemon Scudder

aequale Say.

Compares favorably with S. cristatum. However, the proximal plate on the median line is one-half as long as the distal plate; lateral carinae on proximal plate, strongly divergent caudad.

collare Scudd.

This species is identical with S. cristatum.

cristatum Scudd.

Proximal plate on the median line only one-third to one-half as long as the distal plate. Lateral margins of proximal plate straight or slightly convex, moderately carinate, and meeting the transverse carina just inside of the distal plate. Transverse carina not prominent,

separating the two plates by an arc of sub-constant convexity craniad. Lateral carinae on the proximal plate indistinctly present, widely separated, the width between them two-thirds as great as that of the area on either side, and slightly divergent caudad. Lateral margins of the distal plate slightly convex, except just before the tip where they are slightly concave forming a rather broad yet sharply pointed tip. Lateral carinae evident only on the caudal one-half of the distal plate, converging and approximating each other at the tip.

humile Morse.

Differs from S. cristatum only in the more strongly carinate lateral margins of the proximal plate, the more prominent transverse carina, the lateral carina of the proximal plate either sub-parallel or slightly convergent caudad, and the lateral carinae of distal plate sub-parallel.

pallidum Morse

Agrees with the foregoing species closely, though the lateral carinae of the distal plates are divergent craniad.

Derotmema Scudder

haydeni Thom.

This is the most unique supra-anal plate yet studied.

**Proximal Plate:** The proximal plate on the median line one-half as long as the distal plate. Lateral margins carinate, first gently convex, and then, near the tip, concave, making the junction with the transverse carina, narrowly

pointed. Lateral carinae short, sub-parallel, and separated by a distance about one-half as wide as the area on either side. Transverse carinae absent on the median line, present only as a junction between the tips of the lateral margins and the caudal extremity of the lateral carinae, thus progressing as far cranial as medial.

Distal Plate: First one-third of the lateral margins convex, carinate, and progressing strongly cranial, only slightly medial. Final two-thirds of the lateral margins strongly convex, not carinate, progressing more medial than caudal, terminating in a fairly broad, pointed tip. Lateral carinae present on distal one-half of the plate where they are more narrowly separated than on the proximal plate, and approximate caudal. Distal plate distinctly arising beneath the proximal plate.

#### Mestobregma Scudder

proximal Plate: On the median line two-thirds as long as the distal plate. Lateral margins carinate, straight or slightly convex, and meeting the transverse carina just inside the lateral margins of the distal plate, forming an elevated, prominent spine on either side. Transverse carina not prominent, forming an arc, convex cranial. Lateral carinae indistinct, separated by a space two-thirds as wide as the area on either side, slightly convergent caudal.



Distal Plate: Lateral margins first strongly convex, then gently concave, forming a broad pointed tip. The lateral carinae indistinct, arising only a short distance anterior to the transverse carina and progressing to the tip of the plate as narrowly separated, sub-parallel raises. Distal plate arising beneath the proximal plate.

mexicanum Sauss.

Same as preceding species except that proximal plate is relatively shorter, being from one-third to one-half as long as the distal plate on the median line, and the tip of the distal plate rounded, rather than pointed.

plattei Thom.

Essentially the same as the preceding species, except that there is a tendency for the proximal plate to be relatively longer on the median line, and the lateral margins of the distal plate, about one-half the distance posteriorly, cut straight in a slight amount mediad and then progress in a straight line caudo-mediad to form a broadly rounded tip. Thus it can be readily separated from either of the foregoing species.

pulchella Bruner.

Close to M. kiowa. Tip of distal plate broader and blunter, resulting from more convex margins.

## Metator

pardalinum Sauss.

Proximal Plate: Nearly as long as the distal plate on the median line. The lateral margins convex, greatly elevated above the plane of the plate, and forming a broad, blunt spur at their junction with the transverse carina. Transverse carina indistinct except at its junction with the lateral margins of the plate, yet discernible even on the median line; bent in a strongly convex arc anteriorally. Lateral carinae absent, yet the plate is broadly sunken medially, thus outlining their probable position.

Distal Plate: Lateral margins neither elevated nor carinate, first so strongly convex that at a point halfway caudad they cut into the plate directly mediad, from this point they progress in a straight line to a broad, rounded tip. Lateral carinae indistinctly present on the entire plate, broadly separated, the area between them as wide as the area on either side.

## Conozoa Saussure

deltei new species.

Proximal Plate: On the median line about half as long as the distal plate. Lateral margins slightly convex and moderately elevated. Transverse carina from the lateral margins to the juncture with the lateral carinae, prominent, progressing more craniad than mediad, thus making them longer than the lateral margins;

between the lateral carinae, not carinate and only indicated by the pronounced declivity of the distal plate. Lateral carinae prominent, widely separated so that the distance between them is greater than the width of the plate on either side, very slightly divergent posteriorly, forming a blunt tubercle where they meet the transverse carina.

Distal Plate: Lateral margins almost straight, slightly concave just before the tip, making the latter sharply pointed. Lateral carinae prominent only on the posterior half, separated by half the distance between those of the proximal plate, and converging slightly at the tip.

wallula Scudder.

This differs from the preceding species in a number of respects, chief of which are that the lateral carinae of the proximal plate are obsolete, the transverse carina across the entire plate only indicated by the steep declivity of the distal plate, lateral carinae of the distal plate distinct but nearly twice as broadly separated as in deltai. Tubercles present as in the preceding species at a point where the lateral carinae of the proximal plate should meet the transverse carina.

#### Trimerotropis Stal.

There is a marked similarity between this genus and

the genus Circotettix. Descriptions of the species will indicate some minor points of differentiation.

agrestis McNeill

Agrees with T. monticola, except that all carinae are less prominent, those of the distal plate inconspicuous and the lateral carinae of the proximal plate very widely separated, making the area between them distinctly wider than that of the area on either side.

bruneri McNeill

Differs from C. azurescens in that the lateral margins of the distal plate are less convex, making this plate less shield-shaped, the tip is more sharply pointed and the lateral carinae are convergent posteriorly. This species more closely resembles T. gracilis.

cincta Thom.

This species seems to be characterized by a broad, short supra-anal plate. It differs from C. azurescens in that the lateral margins of the distal plate are nearly straight their entire length, making a sharply-pointed tip and the lateral carinae of this plate are indistinct.

citrina Scudd.

This species differs from C. azurescens in that

the lateral margins of the distal plate are convex only at their origin, are then straight until just before the tip where they are concave, forming a fairly broad, though sharp point. The lateral carinae of this plate are absent.

gracilis Sauss.

Proximal Plate: One-half as long as the distal plate on the median line. Lateral margins straight or slightly convex, strongly carinate and meeting the transverse carina at a right angle, though the point is rounded, just inside the lateral margins of the distal plate. Transverse carina from the lateral margins to the junction with the lateral carinae, prominent, convex caudad, and progressing more mediad than craniad. Transverse carina between the lateral carinae, indistinct and made recognizable only by the declivity of the distal plate along its margin. Lateral carinae prominent, widely separated, making the area between them as wide as the area on each side and slightly convergent posteriorly.

montana McNeill

This closely resembles the T. monticola (see figure) except that the lateral carinae of the distal plate are present only near the tip of the plate.

monticola Sauss.

Conforms closely to C. azurescens except that the lateral margins of the distal plate are only moderately convex, and the lateral carinae arise close to the transverse carinae and are markedly convergent, while those on the proximal plate are slightly divergent posteriorly. It more closely resembles T. bruneri and T. gracilis. (This is the ~~spec~~ species figured.)

obscura Scudd.

Almost identical with T. montana.

vinculata Scudd.

Differs from C. azurescens in that the lateral margins of the distal plate are convex only at their origin, and are then straight out to the sharply pointed tip, and the lateral carinae of this plate are widely separated, the area between them nearly as wide as the area on either side, and convergent posteriorly.

Circotettix Scudder

This genus has not been figured because the supranal plate so closely resembles in general structure those of Trimerotropis. The species of this genus will be compared to T. monticola.

azurescens Brun.

Proximal Plate: Half as long as the distal plate on the median line. Lateral margins strongly carinate, straight or slightly convex, meeting the transverse carina at a right angle, forming a sharp point well inside the lateral margins of the distal plate. Transverse carina from the lateral margins to the juncture with the lateral carinae, strongly carinate, nearly straight or slightly convex caudad, and progressing more mediad than craniad. Transverse carina between the lateral carinae indistinct and made recognizable only by the declivity of the distal plate along its margin. Lateral carinae prominent, widely separated, making the area between them nearly as wide as the area on each side and slightly convergent posteriorly.

Distal Plate: Lateral margins moderately carinate, strongly convex except near the tip where they become concave to form a fairly broad, rounded point. Lateral carinae distinct on the posterior two-thirds of the plate, separated by an area one-half as wide as the area on either side, and slightly divergent posteriorly.

carlinianus Thom.

Differs from T. monticola in that the lateral carinae on the distal plate are either absent or when indistinctly recognizable, widely separated so that the distance between them is greater than the width of the

area on either side.

suffusus Scudd.

Agrees with T. monticola except that the area between the lateral carinae of the proximal plate is slightly narrower than the area on either side, and the carinae are convergent posteriorly; the lateral carinae of the distal plate inconspicuous, sub-parallel when recognizable.

undulatus Thom.

Conforms closely to T. monticola, except that the lateral carinae on the proximal plate are strongly convergent posteriorly.

verruculatus Thom.

Conforms closely to T. monticola except that the lateral carinae on the proximal plate are moderately convergent posteriorly.

Hadrotettix Scudder

trifasciatus Say.

Proximal Plate: Two-thirds as long as the distal plate on the median line. Lateral margins moderately convex, slightly elevated and meeting the transverse carina at a right angle well inside the lateral margins of the distal plate. Transverse carina not prominent, sharply defined only by the declivity of the distal plate



along its margin and forming an unbroken arc with the convexity anteriorally. Lateral carinae indistinct, separated by an area one-half as wide as the area on either side.

Distal Plate: Lateral margins first strongly convex, notching into the plate to form a long, broadly rounded tip. Lateral carinae absent.

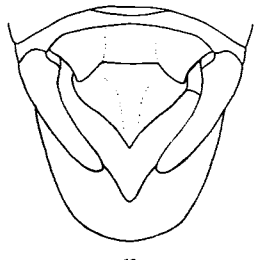
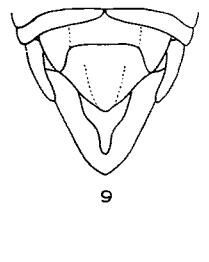
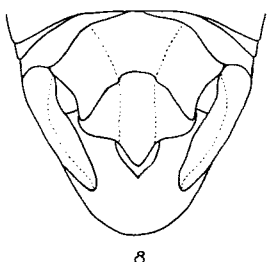
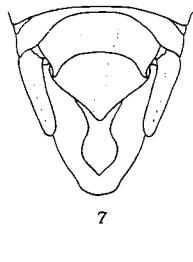
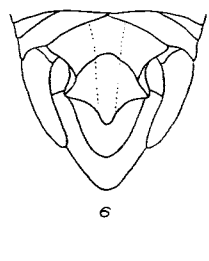
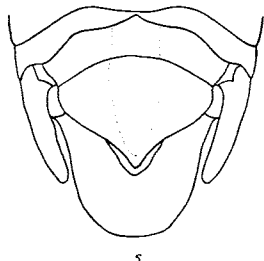
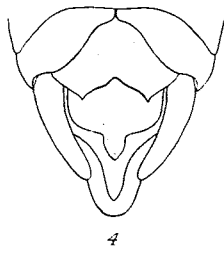
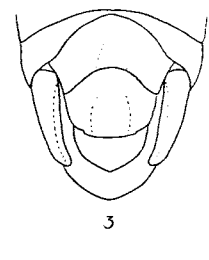
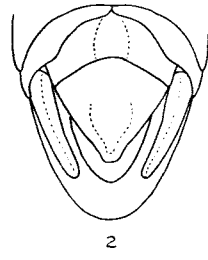
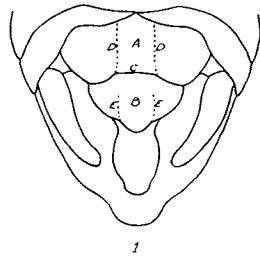
Brachystola Scudder

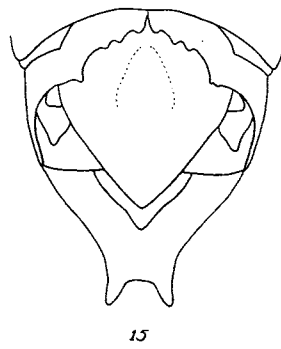
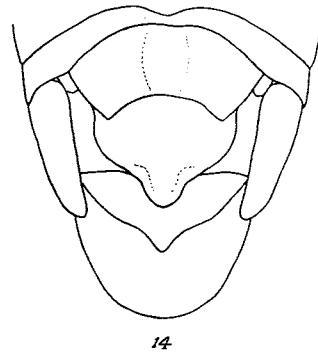
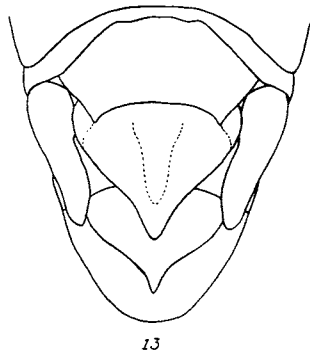
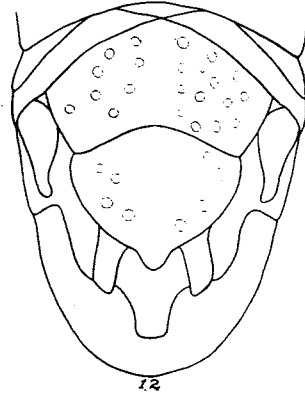
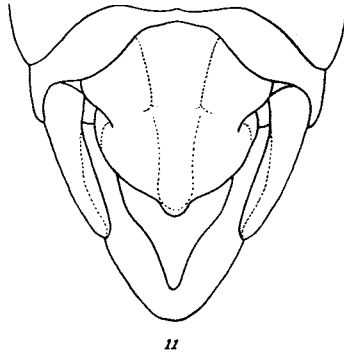
magna Gir.

Proximal and distal plates not separated by a transverse carina. Entire supra-anal plate flat, being void of any distinct carinae. Lateral margins almost straight, broken shortly back of the paenultimate segment by a sharper angling mediad. Tip of plate sharply pointed.

### Explanation of Plates

- Figure 1. *Arphia frigida*. A, Proximal plate of supra-anal plate; B, Distal plate of supra-anal plate; C, Transverse carina; D, Lateral carinae of proximal plate; E, lateral carinae of distal plate.
- Figure 2. *Chortophaga viridifasciata*.
- Figure 3. *Encoptolopus costalis*.
- Figure 4. *Cannula pellucida*.
- Figure 5. *Spharogemon cristatum*.
- Figure 6. *Derotmema haydeni*.
- Figure 7. *Mestobregma kiowa*.
- Figure 8. *Metator pardalinum*.
- Figure 9. *Conozoa deltei*.
- Figure 10. *Trimerotropis monticola*.
- Figure 11. *Hippiscus montanus*.
- Figure 12. *Tropidolophus formosus*.
- Figure 13. *Dissosteira carolina*.
- Figure 14. *Hadrotettix trifasciatus*.
- Figure 15. *Brachystola magna*.





## THE OEDIPODINAE OF COLORADO

### Key to Genera and Species with Descriptions of Species.

#### Introduction

The five life zones of Colorado, namely, the Upper Sonoran, the Transition, the Canadian, the Hudsonian and the Arctic-Alpine, give rise to a rich and varied insect fauna. This is especially true of the order Orthoptera. The present paper deals with seventeen genera and fifty-four species of but one sub-family, the Oedipodinae.

The members of the sub-family Oedipodinae are commonly known as the Band-winged Locusts. This is due to the fact that many species have the tegmina cross-banded with alternate light and dark hues. These locusts, almost without exception, are brown, grayish or black in color, thus harmonizing them when at rest with barren ground, rocky slopes or spots where vegetation is sparse. Such is their favored habitat and they are admirably selected by nature to survive in their environment. They are scarcely noticeable when at rest but when disturbed, there will be a flash of color from

the under wings, and the locust is quickly lost from sight as the wings are folded in midair and it drops to the ground.

These are the "clacking" grasshoppers, the males of most of them and the females of a few of them stridulating while on the wing. This is accomplished by the rattling of the under surface of the tegmina against the veins of the upper surface of the hind wings. A few stridulate while at rest by rasping the spines of the hind femora against the intercalary vein of the tegmina.

#### Characteristics of the Oedipodinae

The subfamily Oedipodinae is characterized by a nearly vertical face, the head rounded at the junction of the frontal costa with the vertex, the eyes very little, if any, longer than broad, the antennae filiform or sub-filiform and inserted above the middle of the eyes; prosternum unarmed with a tubercle or spine; lateral carinae of prothorax low or wanting, median carina present, sometimes very high, often cut by one or two sulci.

#### Key to the Tribes of Oedipodinae

- A. Outer margin of the hind tibiae without an apical spine next the spurs .....Oedipodini
- A.A. Outer margin of the hind tibiae with an apical spine next the spurs .....Eremobiini

Key to the Genera of Oedipodinae

A. Median carina of pronotum distinctly present, or if indistinct, then the pronotum is rugose.

B. Pronotum either strongly rugose or spinose.

C. Pronotum rugose, the median carina low or indistinct.

D. Median carina of pronotum distinctly present ..... Hippiscus

D.D. Median carina of pronotum very slight ..... Leprus

C.C. Pronotum spinose, the median carina very highly crested .... Tropidolophus

B.B. Pronotum usually smooth, never strongly rugose or spinose.

C. Median carina of pronotum either entire or cut by one sulcus.

D. Median carina of pronotum divided by a shallow sulcus, not cutting entirely through to the base of the carina.

E. Lateral margins of distal plate of supra-anal plate strongly convex.

F. A pair of spines between the proximal and distal plate of supra-anal plate, tip of plate long and sharp.... Camnula

F.F. Supra-anal plate without  
spines, tip short and  
blunt ..... Arphia

E.E. Lateral margins of distal plate  
of supra-anal plate either straight  
or but slightly convex

F. Tip of supra-anal plate  
narrow and pointed.. Chortophaga

F.F. Tip of supra-anal plate  
broad, nearly as broad as the  
plate itself, and not  
pointed ..... Encoptolophus

D.D. Median carina of pronotum divided by  
a deep sulcus, cutting entirely through  
the base of the carina.

E. Lateral margins of the proximal  
plate of supra-anal plate ~~cutting~~  
far within the margins of the distal  
plate, and at the juncture with the  
transverse carina forming a prominently  
raised sharp point..... Dissosteira

E.E. Lateral margins of the proximal  
plate of the supra-anal plate ending  
near the margins of the distal plate;  
at their juncture with the transverse  
carina, not forming a raised,  
sharp point ..... Spharagemon



C.C. Median carina of pronotum cut by two sulci.

D. Circus somewhat flattened, concave on the inner surface.

E. Junction of the lateral margins of the proximal plate of the supra-anal plate, spuriate.. Mestobregma

E.E. Not spuriate.

F. Lateral margins of proximal plate of supra-anal plate greatly elevated, and those of distal plate concave only at tip; circus broad and leaflike ..... Metator

F.F. Lateral margins of proximal plate of supra-anal plate not greatly elevated, and the caudal two-thirds of those of the distal plate strongly concave; circus not leaflike ..... Derotmema

D.D. Circus cylindrical or conical.

E. Inferior margin of lateral lobes of pronotum posteriorly produced, the posterior angle, therefore, being acute ..... Conozoa

E.E.\* Inferior margin of lateral lobes of pronotum not posteriorly produced, the posterior angle a right to obtuse angle.

F. Wings with some of the veins of the radiating field swollen ..... Circotettix

F.F. Wings with radiating veins of anal field not swollen ..... Trimerotropis

A.A. Median carina of pronotum absent, or only faintly indicated; pronotum never rugose ..... Hadrotettix

#### The Genera of Erembiini

But one genus represented ..... Brachystola

#### Key to the Species of Oedipodinae

##### Arphia Stal.

A. Hind wings yellowish ..... frigida (p. 55)

A.A. Hind wings reddish.

B. Hind wings dragon's blood red, with wide fuscous border ..... pseudonietana (p.56 )

B.B. Hind wings pale crimson red, with narrow gray border ..... teporata (p. 57)

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\*Except Trimerotropis agrestis and montana, in which case these can be distinguished by the absence or lowness of the carina of the prozona, in contrast to the conspicuous carina of the prozona in the genus Conozoa.

Chortophaga Saussure

Only one species ..... viridifasciata (p.58)

Encoptolophus Scudder

A. Dark markings on tegmina sharply defined and greatly in contrast with the lighter bands. .... coloradensis\* (p.60)

A.A. Dark markings of tegmina not sharply defined and not greatly in contrast with the lighter bands .....  
..... costalis (p.62)

Camnula Stal.

Only one species ..... pellucida (p.63)

Hippiscus Saussure

A. Semi-brachypterous, wings reaching tip of hind femora, or extending but shortly beyond it ...  
.....altivolus (p.65)

A.A. Wings normal, extending far beyond the tip of the hind femora.

B. Hind wings coral red ..... tuberculatus (p.73)

B.B. Hind wings yellowish.

C. Prozona nearly as long as the metazona ..  
..... variegatus (p. 75)

C.C. Metazona much longer, usually twice as long as the prozona.

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\*It seems doubtful if coloradensis is a valid species. More likely it is a variety of costalis. Only one female and no males in our collection.

D. Lateral carinae of proximal plate of supra-anal plate approximate or narrowly separated ..... paradoxus (p.73)

D.D. Lateral carinae of proximal plate of supra-anal plate separated by a distance from one-third as wide to fully as wide as the area on either side.

E. Locusts large and robust, the males 36 to 43 mm., and females 45 to 53 mm. in length including tegmina.

F. Light colored in general appearance, especially the head and thorax, the markings therefore indistinct .....  
..... montanus (p. 69 )

F.F. Dark colored in general appearance, the markings sharply contrasted and distinct ..... conspicuous (p.67)

E.E. Locusts of medium size and slender, the males less than 30 mm., and the females less than 35 mm. in length including tegmina.

F. Mesosternal lobes entire ..... zapotecus (p.76 )

F.F. Mesosternal lobes divided  
by a caudo-cranial suture .....  
..... neglectus (p. 71 )

Leprus Saussure

A. Hind wings blue ..... cyaneus (p. 78 )  
A.A. Hind wings yellow ..... wheeleri\*

Tropidolophus Thomas

Only one species ..... formosus (p. 80 )

Dissosteira Scudder

A. Color of uniform brown or yellowish tinge...  
..... carolina (p. 82)  
A.A. Color of brown or yellowish tinge flecked  
with fuscous blotches, especially on the  
wings ..... longipennis (p. 83 )

Spharagemon Scudder

A. Median carina of pronotum low, not  
crisate ..... humile (p. 91)  
A.A. Median carina of pronotum high,  
crisate ...  
B. Tips of the dorsal horns of the ovipositor  
short and stubby ..... pallidum (p. 93)

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\*I am giving distinction on wheeleri because Scudder lists this species from Colorado in his catalogue of described Orthoptera. It is very likely, however, that Scudder examined L. cyaneus, for we have not taken wheeleri in the State.

B.B. Tips of the dorsal horns of the ovipositor long, slender and sharp.

C. Locusts large, robust, and males 30 to 34 mm., females 37 to 41 mm. in length, including the tegmina, median carina of pronotum especially high and cristate .. cristatum (p.89)

C.C. Locusts slightly smaller and slenderer than in the alternate category, the median carina slightly less prominent, especially in the females.

D. Carina of metazona lower than the carina of the prozona ..... aequale\* (p.86)

D.D. Carina of metazona and prozona of equal prominence.

E. Metazona much lighter than and contrasting sharply with the prozona ..... collare (p.88)

E.E. Metazona and prozona concolorous ..... wyominganum (p.93)

Derotmema Scudder

Only one species ..... haydeni\*\* (p.94)

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\*This does not conform to the types of aequale, yet those which do conform to the types, I cannot distinguish from wyominganum.

\*\*Following Dr. Gillette's statement that seemingly

Mestobregma Scudder

A. Median margins of the mesosternal lobes strongly angulate with the transverse suture, not lobiform ..... mexicanum (p.99 )

A.A. Median margins of the mesosternal lobes typically lobiform.

B. Inferior margin of lateral lobes of the pronotum strongly declivate near the posterior margin, at the junction forming a strongly acutangulate process.

C. Color uniform ash gray or yellowish brown, markings indistinct ..... cinctum (p.96)

C.C. Color pale yellow, with distinct fuscous markings ..... pulchella (p.102)

B.B. Inferior margin of the lateral lobes of the pronotum, though declivent posteriorally, at the junction not forming a strongly acutangulate process.

C. Size of males small, of females medium, lateral carinae of the distal plate of the

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true specimens of cupidineum grade insensibly into haydeni, I am giving only one species. Mr. Caudell distinguishes cupidineum by the narrower black band of the wings, but after examination of his specimens from the National Museum and comparing them with our intergrading varieties, we are yet unable to recognize two species. There are, however, two distinct varieties of haydeni, those which have yellow hind wings, and those which have red hind wings.

supra-anal plate narrowly separated.. kiowa (p.97)  
C.C. Size of males medium, of females,  
large, lateral carinae of the distal plate  
of the supra-anal plate broadly sepa-  
rated ..... plattei (p.101)

Metator

A. Pronotum and head highly rugose, hind tibiae yellowish ..... boreale\* (p.104)  
A.A. Pronotum and head not highly rugose, hind tibiae bluish ..... pardalinum\*\* (p.105)

Conozoa Saussure

A. Color ashy gray, void of prominent fuscous markings, body and hind femora slender ..... deltei, n.sp. (p.107)  
A.A. Color darker, flecked with fuscous markings, body and hind femora stouter ..... wallula (p.108)

Trimerotropis Stal.

A. Tegmina plain, not banded and with spots not segregated into groups extending across the wing.  
B. Crest of pronotum prominent, body slender..  
..... gracilis (p.116)  

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B.B. Crest of pronotum moderate, body

\*Only one specimen examined, this being a female taken at Golden by Mr. Caudell, who kindly loaned it to us for inspection.

\*\*There are two varieties of this species, being characterized by red wings or yellow wings.



robust ..... obscura (p. 120)

A.A. Tegmina banded, or with spots segregated into groups extending across the wing.

B. Posterior tibiae blue or bluish.. cincta (p. 113)

B.B. Posterior tibiae not blue or bluish.

C. Posterior tibiae red or orange.

D. Inferior margin of the lateral lobes of pronotum posteriorally produced, the posterior angle being therefore acute.

E. Carina of prozona absent ..... montana (p. 117)

E.E. Carina of prozona present, though low ..... agrestis (p. 110)

D.D. Inferior margin of the lateral lobes of pronotum not posteriorally produced, the posterior angle being, therefore, right or obtuse.

E. Disk of the metazona distinctly lighter in color than the prozona ..... monticola (p. 118)

E.E. Disk of the prozona and metazona concolorous.

F. Median and basal bands of the tegmina solid and very distinct..... bruneri (p. 111)

F.F. Median and basal bands  
of the tegmina indistinct,  
made up <sup>of</sup> fuscous annuli.

G.\*Posterior femora with  
the disk of the inner face  
yellow or red at the base,  
with black bands beyond,  
rarely the complete disk  
is suffused with fuliginous,  
obscuring the markings.

H. Metazona with its  
process acute..modesta

H.H. Metazona with its  
process a right angle or  
obtuse..... citrina (p.114)

G.G.\*Posterior femora with  
the disk of the inner face  
black basally, with one or  
two light bands on the apical  
half..... latifasciata

H.H. Posterior tibiae  
yellowish or brownish..  
..... vinculata\*\* (p.122)

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\*The three species in this group apparently merge,  
but the key is given to differentiate the typical forms.

\*\*Prof. Laurence Bruner has erected a new species

Circotettix Scudder

A. Hind wing blue ..... azurescens (p.133)

A.A. Hind wing yellow.

B. Tegmina relatively broad and short.

C. Hind wing hyaline, except for fuscous main veins; no yellow ..... carlinianus (p.134)

C.C. Hind wings with basal half yellow, indistinctly crossed medially by a fuscous band, hyaline apically ..... undulatus (p.127)

B.B. Tegmina relatively narrow and long.

C. Hind tibiae dark, grayish blue; apical margin of hind wing more or less suffused with fuscous ..... suffusus (p.128)

C.C. Hind tibiae yellowish with black base and apex; apical margin of hind wing hyaline ..... verruculatus (p.129)

Hadrotettix Scudder

Only one species ..... trifasciatus (p.130)

Brachystola Scudder

Only one species ..... magna (p.132)

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in the vinulata group, which he calls inconspicua. I believe this but a color variation of vinulata, and have therefore not recognized it. For description of Bruner's inconspicua, see Colorado Exp.Sta.Bul.No. 94.

Description of the Species of Oedipodinae

Arphia Stal.

Arphia frigida Scudd.

Daws., Rep. geol. 49th par., 344 (1875)  
Caulf., Can. rec. sc. ii, 400 (1887) - Oedipoda  
(Arphia)

General coloration varying from an ashy gray to a dark gray, lighter below. Head sometimes lighter than the rest of the body, flecked with minute black pits, often whitish along the base of the clypeus. Pronotum slightly rugulose, the median carina moderate, lateral carinae apparent only on the metazona. Elytra with a prominent light band along the costal margin. Hind wings yellowish at the base, with a pale fulgurous band on the outer one-third, extending nearly to the base of the wing on the costal margin, and running out on the anal margin. Outer face of hind femora lighter than the general coloration of body; inner face black except for flecks of yellow along the dorsal margin and a preapical yellow band. Hind tibiae yellowish, though dark on the proximal and distal portions; the spines yellow at the base with black tips; abdomen yellowish-brown or dark brown, lighter than rest of body, darker along the lateral surface, especially cranial.

Measurements: Length of body, male, 20 mm., female, 27 mm.; of antennae, male, 6 mm., female, 7 mm.; of tegmina, male, 20 mm., female, 23 mm.; of hind femora,

male, 11 mm., female, 14 mm.

This is a foothills and mountain form, alpine in some instances.

Localities: Rist Canyon, Marshall Pass, Westlake, Little Beaver, North Park, Glendevy, Home, Sedalia, Denver, Platte Canyon and Boulder.

Arphia pseudonietana Thom.

Proc. acad.nat.sc. Philad., 1870,82 (1870) - Tomonotus.

tenebrosa Scudd., Rep.U.S.geol.surv.Nebr., 251 (1871) - Oedipoda.

tenebrosa Thom., Rep. U.S.geol.surv.terr.,v.167 (1873) - Tomonotus.

tenebrosa Caulf., Can.rec.sc.,ii,400 (1887) - Oedipoda (Arphia)

mexicana Thom. (nec.Sauss.), Ibid.,1870,82 (1870) - Tomonotus.

sanguinaria Stal, Rec.Orth.,i,119 (1873)

General coloration mottled grayish-black. Head mottled gray-black. Antennae yellowish at base, fuscous at tip. Prothorax sometimes lighter, especially on the dorsum of the pronotum on either side of the median carina. Pronotum slightly rugulose, the median carina moderate, and the lateral carinae apparent only on the metazona. Sternum of thorax dark. Base color of tegmina ashy gray, but sometimes almost solidly covered with fuscous, other times, specked with fuscous. Hind wings coral red on the basal half, the outer half fuscous, except

at the margin of the median veins, where they are fuliginous. Hind femora on the outer face fuscous, with irregular ashy-gray markings; on the inner face, shiny black except for a preapical yellowish band. Hind tibiae fuscous or black, lighter proximad. Abdomen, dark brown to black.

Measurements: Length of body, male, 26 mm., female, 35 mm.; of antennae, male and female, 8 mm.; of elytra, male, 29 mm., female, 32 mm.; of hind femora, male, 14 mm., female, 18 mm.

Localities: Fort Collins, La Porte, Dutch George's, Livermore, Sterling, Home, Windsor, Greeley, Orchard, Merino, Pinewood, Denver, Boulder, Palmer Lake, Colorado Springs, Pueblo, Rocky Ford, Las Animas and Lamar.

Arphia teporata Scudder

Ann.rep.chief eng., 1876, 508 (1876)

General coloration varying from ashy-gray to dark gray, lighter below. Head lighter, spotted with fuscous and covered with numerous minute black pits. Eyes inconspicuous, carinae of vertex prominent, area posterior to vertex slightly rugulose. Pronotum dark or ashy-gray, slightly rugose; prosternum brownish. Median carina of pronotum moderate, posterior angle of metazona acute. Base color of elytra ashy-gray, flecked or more or less solidly marked with fuscous; costal margin sometimes lighter. Hind wings with basal two-thirds pale red, banded by pale

fuscous, the region of the medians more or less hyaline. Outer face of hind femora ashy-gray to fuscous, irregularly marked; inner face with basal half black, followed by two narrow yellow bands, separated by a narrow black band. Hind tibiae yellowish to bluish, darker distally, occasionally two darker areas on the proximal one-third, separated by a lighter band. Abdomen yellow to brown, darker laterad, especially cranial.

Measurements: Length of body, male, 21 mm., female, 27 mm.; of antennae, male, 7 mm., female, 8 mm.; of tegmina, male, 21 mm., female, 25 mm.; of hind femora, male, 12 mm., female, 15 mm.

Localities: Fort Collins, LaPorte, Greeley, Pueblo, Dunkley.

Chortophaga Saussure

Chortophaga viridifasciata DeGeer

Mem., iii, 498, pl. 42, fig. 6 (1773) - Acrydium.  
Goeze, Ent. beytr., ii, 115 (1778) - Gryllus (Locusta).  
Harr., Ins. inj. veg., 147 (1841) Locusta (Tragocephala).  
Uhl., Harr., Ibid., 3d ed., 181 (1862) - Gomphocerus.  
Scudd., Bost. journ. nat. hist., vii, 461 (1862) - Tragocephala.  
Scudd., Ann. rep. chief eng., 1876, 508 (1876) - Chimarocephala.  
Sauss., prodr. Oedip., 72-73, pl., figs. 7, 12 (1884).  
Blatch., Orth. of Ind., 26 rep. geol., 258-259 (1902)

radiata Harr., Cat. ins. Mass., 56 (1835) - Locusta.

infuscata Harr., Ins. inj. veg., 147 (1841) - Locusta (Tragocephala).

zimmermanni Sauss., Rev. mag. zool., 1861, 320 (1861) - Tomonotus.

doranii God., Ent. amer., vi, 13-14 (1890) - Stethophyma.  
viridis Osb., Ins. life, v, 323 (1893) - Tragocephala.

Color dimorphic, either with green in preponderance infuscated with brown (viridifasciata) or entirely brown (inifuscata). Head, prothorax and femora sometimes partially or wholly purplish-red. Head triangulate, face therefore somewhat retreating, and the vertex angulate. Eyes of medium size, widely separated. Antennae reddish-brown. Pronotum minutely rugulose; the median carina prominent, straight, not cristate; the lateral carinae apparent on the prozona, prominent on the metazona; posterior angle of metazona strongly acute. Thorax darker on the sternum. Tegmina variously marked with light brown, brown and fuliginous blotches. Hind wings almost hyaline, the basal half tinged with pale yellowish-green, the outer half pale fuliginous, the apex paler. Outer face of hind femora fairly uniform of color, agreeing with the predominating body color; the inner face fuscous on the proximal two-thirds, one or two lighter bands distally, the knees usually dark. Hind tibiae usually brownish, or sometimes pale blue, lighter basally. Abdomen usually slightly darker than the rest of the body.

Measurements: Length of body of male, 19 mm., of female, 26 mm.; of antennae of male, 7 mm., of female, 7 mm.; of tegmina of male, 18 mm., of female, 25 mm.;



of hind femora of male, 11 mm., of female, 15 mm.

Dr. C. P. Gillette states that this species winters in the nymph stage, adults being taken as early as April 23 and as late as July 2. Both the green and the brown varieties are common, the green predominating in females and the brown in males.

Localities: Fort Collins, Denver, Platte Canyon and Golden.

Encoptolophus Scudder

Encoptolophus coloradensis Bruner.

Rpt. of Ento. Colo. Exp. Sta., Bul. 24 (1904)

\*Somewhat resembling E. sordidus in general form, but differing from it in a number of respects. The chief of these variations are a lower median carina of the pronotum in which the two sections are about equal in height, glaucous instead of fuliginous hind tibiae, and a prevailing pale grayish testaceous color with decided dark markings on the tegmina, hind femora and posterior half of pronotal disc.

Head unusually large and gross, quite distinctly broader than the front edge of the pronotum and higher than the general depth of the body; the vertex between the eyes about as wide as the shortest diameter of the latter, the scutellum broadly pyriform, rather shallow and provided in its posterior half with a well defined longitudinal carina which is continuous over the occiput

\*This is the original description given by Prof. Lawrence Bruner.

to the front edge of the pronotum; lateral foveolae small, triangular, scarcely sulcate; frontal costa rather prominent, the sides evenly diverging downward, quite deeply sulcate in the vicinity of the ocellus, the bounding walls heavy; antennae about reaching the hind edge of the pronotum. Pronotum somewhat stragulate in advance of the principal sulcus, the lateral carinae not much interrupted though bowed, fairly prominent; the median carinae straight, of median height, cut a little in advance of its middle; hind edge of the disk somewhat obtuse-angled. Tegmina and wings about equalling the abdomen in length, the apex of former broadly rounded. Hind femora normal, not quite reaching the tip of the abdomen.

General color pale grayish testaceous, the sides of the pronotum obscurely banded with dull black or brown, the disk of pronotum with the X-shaped pale marking of sordidus, costalis and parvus. Tegmina crossed with four heavy dark bands and marked basally with irregular small blotches. Hind femora decidedly trifasciate with fuscous externally; hind tibiae largely glaucous, the base pale. Sutures of the abdomen narrowly black.

**Measurements:** Length of body of male, 19 mm., of female, 28 mm.; of antennae of male, 7 mm., of female, 8 mm.; of tegmina of male, 17 mm., of female, 20 mm.; of hind femora of male, 11 mm., of female, 14 mm.

Encoptolophus costalis Scudder

Bost. Journ. Nat. Hist., vii, 473 (1862)-Oedipoda.  
Stal, Rec. Orth., i, 119 (1873)-Tragocephala.  
Scudd., Proc. Bost. Soc. Nat. Hist., xvii, 480 (1875).

Color dusky, grayish brown, mottled with lighter and darker markings. Head large and prominent; the eyes moderate, the antennae long, ferruginous; the carinae of the vertex moderate, not extending over the occiput, separated the width of the shortest diameter of the eye; the frontal costa prominent, the carinae but slightly divergent ventrad; the occiput globose, rising above the pronotum and with a faint indication of a median carina from the vertex caudad. Pronotum irregularly marked, often lighter dorsally and with a blotch of black on the center of the sides; prozona not greatly exceeding the length of the metazona, the latter right-angulate or moderately obtuse-angulate on the posterior margin; lateral carinae prominent on the prozona, but irregular, prominent and straight on the metazona; the median carina moderate, straight, not as high as the occiput. Tegmina pale and but slightly marked on the anal border, the sides darker with two contrasting, transverse pale bars on the middle, separated and bounded by patches of fuscous. Hind wings hyaline on the basal half and along the posterior half of the anal margin, the balance smoked with pale fuliginous. Outer face of hind femora ashy-gray with two indistinct fuscous transverse bars, the knees dark; inner face with basal half black, the outer half with two distinct, pale

yellow bands separated by a narrow black band, the knees dark. Hind tibiae bluish on the distal two-thirds, the spines blue at the base and black tipped; the basal portion pale yellow, spotted with fuscous. The abdomen pale yellow or brown, darker brown on the sides.

Measurements: Length of the body of the male, 19.5 mm., of the female, 27.5 mm.; of the antennae of the male, 8.5 mm., of the female, 9.5 mm.; of the tegmina of the male, 17 mm., of the female, 21 mm.; of the hind femora of the male, 11.5 mm., of the female, 13 mm.

Localities: Fort Collins, Greeley, Antonito and Golden.

Camnula Stal.

Camnula pellucida Scudder

Bost. journ. nat. hist., vii, 472 (1862) - Oedipoda.  
Scudd., Hitchc., Rep. geol. N.H., i, 378 (1874).  
Prov., Faune ent. Can., ii, 40 (1877) - Oedipoda (Camnula).  
Blatch., Orth. Ind., 26 rpt. geol., 262-263 (1902).

abiona Thom., Ann. rep. U.S. geol. surv. terr., ii, 266, 279, (1871) - Stenobothrus.

atrox Scudd., Rep. U.S. geol. surv. Nebr., 253 (1872) - Oedipoda.

tricarinata Stal., Rec. Orth., i, 120 (1873).

General color light brown, marked with fuscous. Head of moderate size, varying in color from dark brown to ashy-gray, covered with minute, fuscous pits, a band of fuscous originates at the base of the frontal carinae in the region of the lateral ocelli and extends to the

eye and posterior to it, joining a larger fuscous area on the side of the prothorax. Antennae long, brownish distally, lighter basally. Frontal costa prominent, rapidly divergent near the base of the antennae, parallel ventrad, the bordering carinae not prominent. Vertex of moderate width, the eyes separated by a distance less than (males) or equal to (females) their shorter diameter; shallowly sulcate, the carinae not prominent. The occiput not rising above the median carinae of the pronotum. Pronotum varying in color as the head, but with a prominent fuscous blotch on the sides; lateral carinae evident and fairly regular on both the prozona and the metazona; median carina moderate, straight; the metazona half again as long as the prozona, its posterior margin obtuse-angulate. Tegmina irregularly blotched with fuscous on the sides, the fold light yellowish brown, bordered on the basal half of the costal margin by brown, thus forming two light stripes, converging posteriorally. Hind wings pale yellowish basally, more or less hyaline on the outer half with the nervules dark. Hind femora on the outer face light brown with more or less distinct darker diagonal stripes; the inner face irregularly marked, usually yellow with two fuscous bands, and the knee fuscous. Hind tibiae yellowish or brownish, lighter basally. Abdomen yellowish or light brown below, darker on the sides.

Measurements: Length of the body of the male, 18 mm.,

of the female, 27 mm.; of the antennae of the male, 8 mm., of the female, 8 mm.; of the tegmina of the male, 17 mm., of the female, 21 mm.; of the hind femora of the male, 11 mm., of the female, 13.5 mm.

Although this is a very common species in the State and has been severely epidemic in some of the northern states and Canada, it has not as yet been of economic importance in Colorado. It is found most abundantly in the foothills and mountains. It is commonly known as the clear-winged locust or warrior grasshopper.

Localities: Home, North Park, Virginia Dale, Dutch George's, Little Beaver, Pike's Peak, Walden, Westlake, Sterling, Livermore, Stove Prairie, Cameron Pass, Leadville, Marshall Pass, Salida, Ward, Estes Park, Gunnison, Grand Junction, Rico, Hamilton, Steamboat Springs, Dolores, Glenwood Springs, Montrose and Cripple Creek.

#### Hippiscus Saussure

##### Hippiscus altivolus Scudder

Psyche, vi, 272,347-348 (1892)

\*Dark obscure brownish fuscous, not very robust and of small size. Head dull dirty cinereous with numerous more or less clustered blackish points, most abundant above; summit relatively broad, scarcely at all tumid, sub-rugulose, the vertical fastigium indistinct from the low and dull bounding walls, closed behind by the arcuate incurving of the lateral walls, separated distinctly from

\*This is a copy of Scudder's original description, since we have no specimens in our collection.

the tolerably deep, biareolate median foveola; lateral foveolae rather small, triangular, subequiangular; frontal costa of moderate breadth, fading and not expanding below, but little contracted at summit, broadly and shallowly sulcate throughout. Prothorax but slightly expanding on the metazona, the dorsal area plane, scarcely indentate at the front margin of the metazona, sparsely verrucose and in addition abundantly but bluntly and obscurely arenaceous; process rectangulate; median carina low, sub-equal, not arched; lateral carinae tolerably pronounced; lateral lobes bluntly subrugulose on the metazona, marked with a large sub-quadrate blackish spot on the prozona. Tegmina very short, extending when at rest but little beyond the hind femora, dirty cinereous with obscure dark brownish fuscous transverse more or less blended bands, broader than the intermediate ashen ground, and therefore occupying much of the larger space even on the apical half which is scarcely at all vitreous; sutural stripe obscure testaceous, wings dull citron at base with similar reticulation, sub-vitreous apically with black reticulation and between a strongly arcuate, moderately narrow, blackish fuliginous band which narrows in passing toward the anal angle, which it fails to reach, and does not narrow above; it lies entirely in the apical half of the wing, leaves four marginal lobes free, and appears to be not all separated from the humeral vitta whose outer limit is in oblique continuation of its outer

curve and which reaches almost to the base; the basal half of the costal margin is testaceous. Hind femora brownish cinereous externally, with rather obscure oblique brownish stripes, the inferior surface dull coral red like the tibiae, which are more or less pallid on the sides and basally above; spines black tipped.

Described from one female.

Measurements: Length of body of male, 20 mm., of female, 32.5 mm.; of tegmina of male, 19 mm., of female, 20 mm.

This species with sub-brachypterous wings appears to be a true alpine form, having been taken only above timberline.

Localities: Mt. Lincoln (Scudder) and Como (Bruner).

Hippiscus conspicuus Scudd.

Psyche, vi, 271, 319-320 (1892).

Ashy-gray, variegated with more or less regular light fuscous markings. Head rather prominent and tumid, usually lighter in color below than at the vertex. Antennae moderately long, bluish-gray. Frontal costa not especially prominent, narrow above the antennae, rapidly broadening below, but again converging slightly at a point about half way to the clypeus; shallowly sulcate above, and deeply sulcate below the antennae. Vertex low; the carinae low, irregular, sub-pentagonal, the disk slightly rugulose. The eyes separated by a distance as wide as (males) or wider than (females) their longer diameter.



Occiput tumid, rising to or above the level of the median carina of the prothorax, and often rugulose. Prothorax varying from slightly to strongly rugose, especially dorsad, light fuscous, usually marked with a distinct band of ashy-gray inside the lateral carinae, about the periphery of this plate and a distinct lighter spot on the sides nearer to the inferior margin than to the lateral carinae; prozona one-half the length of the ~~meta~~zona, the lateral carinae on the former, dorsad to those on the latter, and less distinct; median carina low, most conspicuous just behind the principal sulcus on the metazona, fading caudally until it is scarcely apparent at the acutangulate posterior margin of the plate. Tegmina ashy-gray, with distinctly outlined light fuscous spots on the sides, a narrow light stripe occurs on the fold, more or less uniformly light fuscous above the fold. Hind wings with basal two-thirds light citron yellow, bordered by a narrow band of fuscous which scarcely reaches the costal margin but extends to the border of the wing on the anal margin, outer costal and median margin hyaline. Hind femora with outer face pale cinereous with more or less distinct, strikingly oblique pale fuscous bands; inner face blood-red. Hind tibiae blood-red on the inner surface, outer surface pallid at base, pale blood-red distally, the spines black tipped. Abdomen light brown.

Measurements: Length of the body of male, 33 mm., of female, 51.5 mm.; of the antennae of the male, 13 mm., of the female, 15 mm.; of the tegmina of the male, 34 mm., of the female, 44 mm.; of the hind femora of the male, 19 mm., of the female, 24 mm.

Localities: Fort Collins, Snyder, Sterling, Lamar, Pueblo, Trinidad, Antonito and Gunnison.

Hippiscus montanus Thom.

Ann. rep. U.S. geol. surv. terr., v, 462 (1872) -  
Oedipoda.

Brun., Can. ent., xvii, 12 (1885) - Hippiscus.  
Scudd., Psyche, vi, 273, 361 (1892).

Pale cinereous with obscure pale fuliginous. Head moderate, pallid with an occasional trace of darker markings on the occiput. Antennae long, bluish fuscous, paler at the base. Frontal costa moderately prominent, the bordering carinae prominent, sub-attinent near the vertex, diverging rapidly below the antennae forming a broad, moderately sulcate depression, which converges and disappears near the base of the clypeus. Vertex not prominent, sub-pentangulate; an inconspicuous median carina present. Eyes separated by about the width of their shorter diameter. Occiput moderately tumid, rising on a level with or above the level of the median carina of the prothorax, minutely verrucose. Prothorax pallid cinereous, the pronotum light brown, bounded by a lighter band, especially noticeable inside the lateral carinae;

moderately rugose on the sides, heavily rugose on the pronotum; a lighter spot occurs sub-mediad on the sides. Prozona usually only one-third, always less than half, as long as the metazona; lateral carinae indistinct on the prozona, prominent on the metazona; median carina low, no higher on the prozona than on the metazona, and apparent on the latter to the tip of its strongly acutangulate posterior process. Tegmina pallid cinereous, indistinctly marked with pale fuliginous, a narrow light stripe occurs on the fold, pale fuliginous above, without variegation. Hind wing basal two-thirds conspicuous citrine yellow, bordered by a broad band of fuscous, hyaline beyond on the costal and median border. Hind femora on the outer face pale cinereous, obliquely crossed by very indistinct pale fuscous markings, more distinct above; inner face coral red, very indistinctly and irregularly marked with fuliginous. Hind tibiae coral red on the inner surface, pallid on the outer basal portion, distal half pale coral red, or frequently pallid with slight traces of pale coral red; spines black tipped, abdomen varying from cinereous to light brown.

Measurements: Length of the body of the male, 32 mm., of the female, 50 mm.; of the antennae of the male, 15 mm., of the female, 16 mm.; of the tegmina of the male, 30 mm., of the female, 43 mm.; of the hind femora of the male, 17.5 mm., of the female, 21 mm.

Localities: Lamar, Wray and Denver.

Hippiscus neglectus Thom.

Proc. acad. nat. sc. Philad., 1870, 81-82 (1870) -  
Oedipoda.  
Thom., Proc. Dav. acad. nat. sc. i, 254 (1876) - Arphia.  
Scudd., Bull. U.S. geol. surv. terr., ii, 264 (1876) -  
Hippiscus.  
Sauss., Prodr. Oedip., 94-95 (1884) - Xanthippus.  
Scudd., Psyche, vi., 273, 360-361 (1892).

putnami Thom., Proc. Dav. acad. nat. sc., i, 257, pl. 36,  
fig. 6, (1876) - Cratypedes.

lineatus Scudd., Proc. Bost. soc. nat. hist., xix, 31 (1877)  
- Hippiscus.

Color gray or light brown heavily marked with fuscous. Head of moderate size, varying from light-gray to light brown, sometimes with traces of purple or red, sprinkled with minute fuliginous spots. Antennae varying from light bluish brown to dark brown and fuscous, very little, if any, lighter basally. Frontal costa moderate; above the antennae broadly and shallowly sulcate; diverging in the region of the antennae and more deeply sulcate, the carinae more prominent; converging below the median ocellus, only to diverge again and fade out near the base of the clypeus. The vertex not prominent, sub-pentangulate, the carinae low, minutely rugulose. The eyes separated by the width of their shorter diameter in the males, and by the width of their longer diameter in the females. Occiput moderately tumid, rising to a level with the median carina of the prothorax, and

minutely rugulose. Prothorax concolorous, or variegated, no characteristic markings, except the ever-present, lighter submedio-laterad spot; minutely rugulose, laterally, very moderately rugose dorsally. Prozona scarcely half as long as the metazona; lateral carinae on the prozona absent, scarcely apparent, and then only anteriorally, on the metazona; the median carina low, higher on the prozona, fading caudally being only a line at the posterior rectangulate (usually in females) or acutangulate (usually in males) process. Tegmina varies from gray to dark brown, with conspicuous fuscous markings in the first instance, and obscure fuscous markings in the second instance; a pale yellowish gray line generally marks the fold, usually solid fuscous above, but sometimes variegated. Hind wing with basal half pale yellow, bounded by a broad fuscous band, a small portion beyond on the median margin dusky hyaline, with black nervules. Hind femora with outer face gray with obscure, oblique fuscous bands; inner face pale coral red, sometimes darkened with fuliginous on the basal half, with a fuliginous preapical band, the knees dark. Hind tibiae pale coral red, lighter apically on the outer surface, the spines black tipped. Abdomen gray or light brown.

Measurements: Length of body of male, 24 mm., of the female, 31.5 mm.; of the antennae of the male, 10 mm., of the female, 10 mm.

of the tegmina of the male, 24 mm., of the female, 29.5 mm.; of the hind femora of the male, 12.5 mm., of the female, 15 mm.

This is a very common species in the mountain regions of the State.

Localities: Fort Collins (foothills), Livermore, Virginia Dale, Westlake, Dutch George's, Estes Park, Home, North Park, Pike's Peak, Alder, Gunnison, Dolores, Steamboat Springs and Walden.

Hippiscus paradoxus Thom.

Ann.rep.U.S.geol.surv.terr.,v,457 (1872)-Oedipoda.  
Scudd.,Psyche,vi,271,335-336 (1892).

Because of doubtful determination, the description of this species is omitted. Reference can be made to either of the above descriptions.

Hippiscus tuberculatus Poliset de Beauvais

Ins.Afr.Amer.,145,pl.4,fig.1 (1817)-Acridium.  
Harr.,Cat.ins.Mass., 56(1835)-Locusta.  
Sauss.,prodr.Oedip.,87-88 (1884).  
Blatch.,Orth.Md.,26 rpt.geol.,265-267 (1902).

apiculatus Say, Harr.,Cat.ins.Mass.,56(1835)-Locusta.

obliteratus Germ., Burm.,Handb.ent.,ii,643(1838)-Oedipoda.

corallinus Harr.,Ins.inj.veg., 142 (1842)-Locusta.

phoenicoptera Scudd. (nec Germ.),Bost.journ.nat.hist., vii,468-469 (1862)-Oedipoda.

Color brownish, marked with fuliginous. Head cinereous, often heavily marked with dark brown, covered with

minute, fuscous dots. Antennae cinereous or light brown basally, darker brown apically. Frontal costa low, separated at the vertex by a distance greater than the width of the basal antennal joint, tumid, the carinae obscure; divergent in the region of the antennae and shallowly sulcate, very slightly convergent at the median ocellus, slightly diverging below, fading out before reaching the base of the clypeus. Vertex low, the carinae low and triangulate, the interspace moderately sulcate. The eyes separated by a distance barely as great as their shorter diameter. Occiput slightly tumid in the males, conspicuously tumid in the females. Prothorax usually of a quite uniform brownish color, darker medio-laterad with a light spot above and below; the sides slightly rugulose, the dorsum moderately rugose. Metazona but  $1\frac{1}{2}$  times as long as the prozona, moderate on the metazona; median carina low, as prominent on the metazona as on the prozona; the posterior process of the metazona acutangulate. Tegmina pale brown with sharply defined fuliginous spots below the fold; paler above the fold. Hind wing basal portion coral red, bounded by a narrow fuliginous band which extends basally along the entire anal margin; outer third dusky hyaline. Hind tibiae cinereous or pale brown on the outer face, sometimes crossed by obscure, oblique fuliginous bars; inner face basal half fuscous, or at least darker, a preapical fuscous band, the

knees dark. Hind tibiae pale or citrine yellow, brownish distally, the spurs tipped with fuscous. Abdomen varies from a light to a dark brown.

Measurements: Length of body of the male, 30 mm., of the female, 45.5 mm.; of the antennae of the male, 13 mm., of the female, 13 mm.; of the tegmina of the male, 32 mm., of the female, 34 mm.; of the hind femora of the male, 18 mm., of the female, 23 mm.

Localities: No males. Two females, one from Waverly, May 12, 1920, the other marked "Col.". The male measurements were taken from a New Mexico specimen. Caudell took one female at Sedalia, June 15.

Hippiscus variegatus Scudd.

Psyche, vi, 268, 301 (1892).

Color cinereous, marked with pale fuliginous. Head prominent and tumid, darker above. Antennae luteous at base, beyond reddish fuliginous. Frontal costa low, broad and tumid above the antennae, carinae absent; diverging slightly at the antennae; converging slightly and shallowly sulcate at the median ocellus, disappearing immediately below it. Vertex low, carinae feebly discernible, hexagonal in pattern with a median and a forward bent transverse carina. Eyes separated by the distance of their shorter diameter. Occiput tumid and smooth, rising above the median carina of the prothorax. The prothorax cinereous marked with fuliginous,



especially on the dorsum, the sides almost smooth and the pronotum but sparsely rugose. Prozona nearly as long as the metazona; the lateral carinae faint on both; the median carina low, faintly and independently arcuate on both; the posterior process of the metazona obtuse-angulate. Tegmina cinereous or hoary, semi-pellucid apically, the sides distinctly marked with fuliginous, a narrow cinereous band occurs along the fold, above the fold also marked with distinct patches of fuliginous. Hind wings with basal half pale or citrine yellow, bordered with fuliginous, distally smoky hyaline, flecked with fuliginous. Hind femora with outer face cinereous, indistinctly and obliquely banded with light brown; inner face pale citrine yellow thrice heavily banded with fuscous, the knees dark. Hind tibiae pale citrine yellow, cinereous basally, the spines slightly tipped with fuscous. Abdomen luteo-cinereous.

**Measurements:** Length of body of male, 32 mm., of female, 47 mm.; of the tegmina of the male, 30 mm., of the female, 35 mm.; of the hind femora of the male, 20 mm., of the female, 22.5 mm.

**Locality:** Holly.

Hippiscus zapotecus Sauss.

Prodr. Oedip., 91 (1884)-Xanthippus.  
Scudd., Psyche, vi, 270, 319 (1892).

Color gray or light brown heavily marked with fuscous. Head of moderate size, cinereous or light brown heavily marked with fuscous, usually above. Antennae long, fuscous often lighter basally. Frontal costa moderate; above the antennae broadly and shallowly sulcate; diverging in the region of the antennae and more deeply sulcate, the carinae more prominent; converging below the median ocellus only to slightly diverge again and fade out near the base of the clypeus. Vertex not exceedingly prominent, sub-pentangulate, carinae low, sparsely rugose. Eyes separated by the width of their shorter diameter in the males and by the width of their longer diameter in the females. Occiput moderately tumid rising to the level of or above the median carina of the prothorax. The prothorax cinereous or light brown on the sides, with a median fuscous area with a lighter spot on its inferior margin, the dorsum fuscous bounded by a lighter band; the sides minutely rugulose, the dorsum rugose. The prozona about half as long as the metazona; the lateral carinae, though not prominent, distinct on the metazona, inconspicuous on the prozona; the median carina low, higher on the prozona and independently and faintly arcuate on both; the posterior process rectangulate. Tegmina cinereous or light brown, heavily and distinctly marked with fuscous below the fold, the fold luteo-cinereous,

fairly uniform brown above. Hind wings pallid or citrine yellow on the basal half, bounded by a medium or broad band of fuscous, smoky hyaline beyond. Hind femora on the outer face, cinereous or light brown, indistinctly and obliquely crossed with fuscous; inner face pale coral red, sometimes darkened with fuliginous on the basal half, with a fuliginous preapical band, the knees darker. Hind tibiae pale coral red, lighter apically and on the outer face, the spines fuscous tipped. Abdomen gray or light brown.

Measurements: Length of the body of the male, 27.5 mm., of the female, 35.5 mm.; of the antennae of the male, 14 mm., of the female, 11 mm.; of the tegmina of the male, 27.5 mm., of the female, 29 mm.; of the hind femora of the male, 14 mm., of the female, 16.5 mm.

Localities: Palmer Lake, Livermore, Denver, Manitou, Akron and Dunkley.

#### Leprus Saussure

##### Leprus cyaneus Cockerell

Ent. News, xiii, 305 (1902)

Color bluish or pinkish gray, marked with fuscous. Head prominent and tumid, gray with pallid blue or pink. Antennae bluish fuscous, paler basally. Frontal costa low, broadly separated and flat or tumid above the antennae; diverging in the region of the antennae and shallowly sulcate, converging slightly below the median ocellus

and fading out a short ways below it. The vertex low and flat, the carinae indistinct. Eyes separated by a distance slightly less than (males) or about equal to (females) their shorter diameter. Occiput smooth and tumid, rising far above the prothorax. Prothorax varies in color with the rest of the body, but usually fairly concolorous, the sides rugulose, the pronotum rugose. Metazona from one and a half to twice as long as the prozona; lateral carinae absent on the prozona, faint on the metazona; the median carina a faint line, the principal sulcus cutting it shallowly; the posterior process of the metazona acutangulate. The tegmina brownish or dark grayish on the sides, marked with but slightly darker areas, a conspicuous white or gray triangle with the basal portion on the anal margin occurs just beyond the middle; the fold shortly beyond the base a narrow luteo-cinereous stripe; above much of the same general appearance as on the sides. Hind wings with somewhat more than the basal half blue, banded heavily with fuscous, the sub-costal and median margin semi-hyaline with spots of fuliginous. Hind femora with outer face blue-gray or brown, inner face blue, with or without a median cinereous band, but invariably with a preapical cinereous band. Hind tibiae blue, lighter or even cinereous basally, the spines fuscous tipped. Abdomen brown with blue at the folds and on the

dorsum.

Measurements: Length of body of the male, 30 mm., of the female, 44 mm.; of the antennae of the male, 14 mm., of the female, 12 mm.; of the tegmina of the male, 30 mm., of the female, 37 mm.; of the hind femora of the male, 18 mm., of the female, 21.5 mm.

Localities: Nepesta, Pueblo, Trinidad, Delta, Grand Junction and Salida.

Tropidolophus Thomas

Tropidolophus formosus Say.

Amer. ent., iii, pl. 34 (1828)-Gryllus.  
Thom., Rep. U.S. geol. surv. terr., v, 138, pl., fig. 1  
(1873).

This is the most unique species of our Oedipodinae being characterized by a spinose, foliaceous pronotal crest and exceedingly long and slender legs. General color is pea green. Head slender and long, pallid, tinged with orange and green; sparsely tuberculose. Antennae quite long, pinkish brown on the apical two-thirds, basally luteous. Eyes ovate, prominent, widely separated, color pinkish brown to fuscous. Frontal costa prominent, exceedingly sulcate, the carinae high and reaching the base of the clypeus, moderately broad, wider in the region of the antennae, the sides parallel below the median ocellus. Vertex prominent, the carinae high and continuous with those of the frontal costa,

triangulate, the disk deeply hollowed out on a level with the sulcus of the frontal costa. Occiput somewhat tumid but sharply declivent posteriorally. Prothorax slender with an exceedingly high, arcuate, foliaceous median carina, spinose on the crest; sparsely, though more thickly tuberculose than the head, especially on the sides of the crest; often marked with vertical light bars on the crest and sometimes a like bar occurs transversely on the sides; not cut with a sulcus; posterior process very acutangulate. Tegmina pea-green with several brown or fuscous spots circumscribed with a light band. Females semi-brachypterous, the hind wings mere pads. Hind wings of the male bright orange on the basal half narrowly banded with fuliginous, the apex brownish hyaline; of the female, dark orange colored pads. Hind tibiae on the outer face luteous, thrice indistinctly, obliquely banded with green; inner face likewise, the knees dark. Hind tibiae luteous, the spines barely tipped with black. Abdomen greenish brown.

Measurements: Length of the body of male, 32 mm., of the female, 52 mm.; of the antennae of the male, 16.5 mm., of the female, 16 mm.; of the tegmina of the male, 36.5 mm., of the female, 20 mm.; of the hind femora of the male, 22 mm., of the female, 22 mm.

Localities: Fowler, Fountain, Nepesta, Windsor and Rocky Ford.

Dissosteira Scudder

Dissosteira carolina Linnaeus

Syst.nat., 10 ed., i, 433 (1758)-Gryllus (Locusta)  
DeGeer, Mem., iii, 491, pl. 47, fig. 2, 3 (1773)-Acrydium.  
Fabr., Syst.ent., 291 (1775)-Gryllus.  
Harr., Hitchc., Rep.geol.Mass., 583 (1833)-Locusta.  
Burm., Handb.ent., ii, 643 (1838)-Oedipoda.  
Scudd., Proc.Bost.soc.nat.hist., xix, 89 (1877).  
Prov., Faune ent.Can., ii, 39 (1877)-Oedipoda (Dissosteira).  
Caulf., Can.Orth., 12, 13 (1887)-Oedipoda (Hippiscus).  
Townsend, Proc.ent.soc.Wash., i, 266-267 (1890)-  
Dissosteira (Oedipoda).  
Blatch, Orth.of Ind., 26 rpt.geol., 273-275 (1902).

caroliniana Catesby, Carol., ii, 89, pl. 89 (1743)-Locusta.

Color varying from cinereous and light brown to fuscous, fairly concolorous. Body long and slender. Head of moderate size, usually lighter than the rest of the body, minutely flecked with darker spots. Antennae light brown, but slightly lighter basally. Frontal costa moderate, in the females broader above the antennae than elsewhere, very tumid, in the males, though broad and tumid, yet narrower than in the region of the antennae; shallowly sulcate at the antennae; below the median ocellus, converging to a deeply sulcate, narrower groove, again diverging and disappearing just above the base of the clypeus. Vertex low, the disk sub-pentagonal, the bounding carinae low, a median carina faintly present. The eyes separated by a distance slightly greater than their shorter diameter. Occiput smooth, low and strikingly declivent posteriorly. Prothorax lighter on the sides, inferior margins strongly declivent posteriorly;

rugulose. Metazona  $1\frac{1}{2}$  times as long as the prozona; lateral carina of prozona absent, indicated on the metazona only by the fold; median carina strongly cristate, and distinctly arcuate on the metazona, the principal sulcus deep and widely separated; the posterior process of the metazona acutangulate. Tegmina sprinkled with numerous small dusky spots not greatly in contrast to the general color, lighter apically. Hind wings black or dark fuscous, with a narrow luteous band on the anal border, the apex smoky gray with a few fuliginous spots. Hind femora on the inner face with basal half black, a preapical black band bounded with luteo-cinereous bands, the knees black; outer face varies from cinereous to fuscous. Hind tibiae luteo-cinereous or dusky, the spines fuscous tipped. Abdomen gray or brown.

Measurements: Length of the body of the male, 34 mm., of the female, 41 mm.; of the antennae of the male, 12.5 mm., of the female, 13 mm.; of the tegmina of the male, 37 mm., of the female, 44 mm.; of the hind femora of the male, 16 mm., of the female, 20 mm.

Localities: Generally distributed over the State up to an altitude of 8000 feet.

Dissosteira longipennis Thomas

Ann.rep.U.S.geol.surv.terr.,v,463(1872)-Oedipoda.  
Scudd.,Ann.rep.chief eng.,1876,511 (1876).



Riley, Stand. nat. hist., ii, 202 (1884)-Oedipoda.  
(Dissosteira).

nebrascensis Brun., Can. ent., viii, 123 (1876)-Oedipoda.

Color cinereous or luteous, spotted with strikingly contrasted fuliginous spots, especially on the tegmina; characterized by exceedingly long wings. Head lighter than the rest of the body, fairly prominent. Frontal costa moderately prominent, above the antennae about the width of their base and tumid, diverging and shallowly sulcate in the region of the antennae; convergent and deeply sulcate at the median ocellus, diverging slightly beyond and fading out just above the base of the clypeus. Vertex low, somewhat ovate, the bounding carinae low, the disk sulcate. Eyes separated by a distance greater than their shorter diameter. Occiput, though somewhat tumid, strongly declivent posteriorly. Prothorax variegated, usually with two light spots on the sides, separated by a darker area, the pronotum usually darker except for light bands along the lateral carinae; smooth or somewhat rugulose. The metazona but slightly longer than the prozona, lateral carina obscure; median carina highly cristate, the two portions together arcuate, the principal sulcus deep, the posterior lobe of the carina of the prozona, overlapping the carina of the metazona; the posterior margin of the metazona acutangulate. Tegmina cinereous or luteous, irregularly infuscated, semi-pellucid apically.

Hind wings with small basal area of pale purplish blue, fuscous beyond except for a moderate band of smoky pallid blue on the anal margin, broadening perceptibly and becoming more pellucid with occasional fuliginous spots at the apex. Outer face of hind femora varies from cinereous to dark brown, sometimes marked with darker, oblique bands; inner face, basal half black, with a preapical black band, bordered by two luteo-cinereous bands, the knees black. Hind tibiae pallid, citrine yellow, cinereous basally, the spines fuscous tipped. Abdomen gray or brown, bluish above.

Measurements: Length of the body of the male, 33 mm., of the female, 45.5 mm.; of the antennae of the male, 14 mm., of the female, 15 mm.; of the tegmina of the male, 36.5 mm., of the female, 55 mm.; of the hind femora of the male, 16.5 mm., of the female, 23 mm.

This is our only Oedipodine of any great economic importance. (See 13th State Entomologist Report, 1930, 35-39, Corkins.) It is easily controlled if poisoned before reaching the adult stage.

Localities: Fort Collins, Greeley, Snyder, Sterling, Fort Morgan, Denver, Pueblo, Canon City, Rocky Ford, Las Animas, La Junta, Lamar, Holly, Tacony and Kendrick.

Spharagemon Scudder

Spharagemon aequale Say.

Journ. acad. nat. sc. Philad., iv, 307 (1825) - Gryllus.  
Harr., Cat. ins. Mass., 56 (1835) - Locusta.  
Scudd., Hitchc., Rep. geol. N. H., i, 377 (1874) -  
Trimerotropis.  
Scudd., Proc. Bost. soc. nat. hist., xvii, 468 (1875).  
Sauss., Prodr. Oedip., 139-140 (1884) - Dissosteira  
(Spharagemon).  
Morse, Psyche, vii, 292 (1895).

Color cinereous flecked with fuscous. Head of moderate size. Antennae long, brown or fuscous apically, lighter basally. Frontal costa quite prominent, the carinae conspicuous, above the median ocellus subparallel about as wide as the basal antennal joint and shallowly sulcate, below the median ocellus deeply sulcate but gradually diverging and becoming shallower, the carinae almost reaching the base of the clypeus. Vertex fairly prominent, the carinae distinct, the disk pyriform. Eyes separated by the distance of their greater diameter. Occiput slightly tumid, strongly declivent posteriorly. Prothorax with a darker medio-laterad area, a lighter spot above and below; faintly rugulose. Metazona one and a third times as long as the prozona; the lateral carinae of the prozona distinct anteriorly and above those of the metazona, which are likewise stronger anteriorly; median carina highly cristate, the two sections together arcuate, the principal sulcus deep, the posterior lobe of the prozonal

carina overlapping the metazonal carina; the posterior process of the metazona strongly acutangulate. The tegmina cinereous, irregularly flecked with fuscous. Hind wings with basal third dusky, middle third fuscous, apical third hyaline. Hind femora on the outer face cinereous or dusky, infuscated; inner face basally black, a black preapical band, bounded by two luteous or reddish bands, the knees black. Hind tibiae orange or coral red, dusky basally. Abdomen gray or brown.

The above description is based on eastern forms. Our Colorado specimens and examples from Montana determined by Professor R. A. Cooley, do not agree closely with these. The frontal costa narrows above the antennae; the median carina of the prothorax lower, not arcuate, the principal sulcus broadly separated; the tegmina distinctly, though faintly, banded with fuliginous; the inner face of the hind femora, cinereous or luteous with two narrow fuscous bands, the knees black; the hind tibiae usually orange.

Measurements: Length of the body of the male, 25 mm., of the female, 26 mm.; of the antennae of the male, 14 mm., of the female, 15 mm.; of the tegmina of male, 25.5 mm., of the female, 28 mm.; of the hind femora of the male, 14 mm., of the female, 16 mm.

Localities: Fort Collins, Fort Morgan, Boulder, Colorado Springs, Rocky Ford and LaJunta.

Spharagemon collare Scudder

Rep. U.S. geol. surv. Nebr., 250 (1871) - Oedipoda.  
Scudd., proc. Bost. soc. nat. hist., xvii, 470 (1875).  
Sauss., Prodr. Oedip., 139 (1884) - Dissosteira (Spharagemon).  
Morse, Psyche, vii, 296 (1895)

Color, infuscated cinereous. Head moderately prominent, light on the sides and the front, dark above. Antennae long, reddish brown in color. Frontal costa prominent, above the antennae, strongly convergent and flat in the females, in the males, moderately convergent, though narrow, shallowly sulcate; divergent and deeply sulcate at the antennae the carinae very prominent; slightly converging at the median ocellus, broadening again below, the carinae discernible down to the base of the clypeus. Vertex prominent, subtriangular, the carinae prominent, the disk deeply sunken. Eyes separated by the distance of their shorter diameter in the males and by their longer diameter in the females. Occiput strongly declivent posteriorally. Prothorax with a broad light band on the posterior margin, in sharp contrast to the color of the prozona; **fugulose**. Metazona one and a half times as long as the prozona; lateral carinae apparent on the anterior portion of the prozona, obsolete posteriorally, similar on metazona; median carina highly cristate, the two sections taken together arcuate, the principal sulcus deep, the posterior lobe of the prozonal carina overlapping the

metazonal carina; the posterior angle of the metazona strongly acutangulate. The tegmina cinereous, irregularly infuscated, no bands, semi-pellucid apically. Hind wings with basal half pallid citrine yellow, bounded by a broad fuscous band, apically hyaline with traces of fuliginous along the nervules. Hind femora on the outer face cinereous irregularly and obliquely crossed with darker bands; on the inner face luteo-cinereous, dark basally, two black bands, the knees black. Hind tibiae coral red, the spines black tipped. Abdomen gray or brown.

Measurements: Length of the body of the male, 22 mm., of the female, 27.5 mm.; of the antennae of the male, 13 mm., of the female, 13 mm.; of the tegmina of the male, 21.5 mm., of the female, 28 mm.; of the hind femora of the male, 13 mm., of the female, 15 mm.

Localities: Fort Collins, Greeley, Orchard and Pueblo.

Spharagemon cristatum Scudder

Proc.Bost.soc.nat.hist.,xvii,470(1875).  
Sauss.,Prodr.Oedip.,138-139(1884)-Dissosteira  
(Spharagemon).  
Brun.,Publ.Nebr.acad.sc.,iii,24(1893)-Arphia.  
Morse,Psyche,vii,295(1895)

Color cinereous or light brown. Head prominent, light on the sides and front, darker above. Antennae long; reddish brown, paler at the base.

Frontal costa prominent, the carinae distinct; above the antennae about as wide as the basal antennal joint and tumid in the females, in the males much narrower and shallowly sulcate; diverging and deeply sulcate in the region of the antennae, converging at the median ocellus, broadening slightly beyond and disappearing above the base of the clypeus. Vertex fairly prominent, carinae distinct, sub-pentangulate, the disk shallowly sunken, a faint median carina present. Eyes separated in the males by their shorter and in the females by their longer diameter. Occiput strongly declivent posteriorally. Prothorax somewhat concolorous, seldom with contrasting markings; faintly rugulose except on either side of the median carina on the pronotum, rugose especially so in the males. Metazona about one and a half times as long as the prozona; lateral carina indistinct on both the pro- and metazona; the median carina especially cristate, the two sections together arcuate, the principal sulcus deep, the posterior lobe of the prozonal carina touching or overlapping the metazonal carina; the posterior process of the metazona strongly acutangulate. Tegmina cinereous somewhat irregularly but not strikingly infuscated, semi-pellucid apically. Hind wings with basal third pallid citrine yellow, bordered by a very broad band of fuscous, apically semi-hyaline, smoked along some of the veins and nervules with fuliginous.

Hind femora with outer face cinereous or brownish, sometimes crossed obliquely with slightly darker markings, inner face yellowish, sometimes red tinted, basally darker, two black bands, the knees black. Hind tibiae coral red, luteo-cinereous basally. Abdomen gray or brown.

Measurements: Length of the body of the male, 25 mm., of the female, 32 mm.; of the antennae of the male, 12.5 mm., of the female, 13 mm.; of the tegmina of the male, 26.5 mm., of the female, 34 mm.; of the hind femora of the male, 16 mm., of the female, 19 mm.

Localities: Fort Collins, Wray, Pueblo, Rocky Ford and Lamar.

Spharagemon humile worse

Psyche, vii, 292 (1895).

Gillette, Rpt. Ent. Colo. Exp. Sta. Bull. 94, 33 (1904).

Characterized by the very low median carina of the pronotum. Color cinereous or dusky brown, irregularly infuscated or strikingly banded with fuscous. Head moderately prominent, bluish cinereous on the sides and front, darker above. Antennae long, bluish brown, paler basally. Frontal costa prominent, the carinae distinct, above the antennae about as wide as the basal joint and flat or tumid in the females, narrower and moderately sulcate in the males; diverging and deeply sulcate in the region of the antennae, converging at the



median ocellus, broadening a little below and disappearing above the base of the clypeus. Vertex fairly prominent, carinae distinct, sub-pentangulate, the disk shallowly sunken, a faint median carina present. Eyes separated in the males by their shorter and in the females by their longer diameter. Occiput strongly declivent posteriorally. prothorax somewhat concolorous, seldom with striking markings; faintly rugulose. Tegmina of males (in our collection at least) cinereous with three very sharply contrasted fuscous bands, females less strikingly marked, semi-pellucid apically. Hind wings basal half pallid citrine yellow with a moderately broad bordering band of fuscous, smoky hyaline apically. Hind femora outer face cinereous or brownish sometimes twice banded only slightly obliquely with fuscous; inner face luteo-cinereous, darker basally, twice black banded, the knees black. Hind tibiae, orange, pallid on the basal third, the spines fuscous tipped. Abdomen gray or brown.

Measurements: Length of body of male, 27.5 mm., of the female, 35 mm.; of the antennae of the male, 14 mm., of the female, 15.5 mm.; of the tegmina of the male, 25 mm., of the female, 31.5 mm.; of the hind femora of the male, 15.5 mm., of the female, 17.5 mm.

Localities: Fort Collins, Livermore, Dutch George's, Sterling, Fort Morgan, Snyder, Wray, Orchard, Denver, Pinewood, Buena Vista and Golden.

Spharagemon pallidum Morse

Psyche, vii, 299 (1895).

Gillette, Rpt. Ent., Colo. Exp. Sta. Bull. 94, 33 (1904).

Morse treats this as a race of S. collare. It is true that the males of this variety closely resemble that species except for the more pallid, uniform coloration. However, I find that the females of typical pallidum have the tips of the dorsal horns of the ovipositor short and stubby, as contrasted with a longer, slenderer, more sharply pointed analagous structure in typical collare. I am therefore removing some specimens from this species in our collection, which were darker and which Dr. Gillette considered pallidum, because the females do not agree in this respect.

Measurements: Length of the body of the male, 24.5 mm., of the female, 30.5 mm.; of the antennae of the male, 14 mm., of the female, 13.5 mm.; of the tegmina of the male, 26 mm., of the female, 28 mm.; of the hind femora of the male, 14.5 mm., of the female, 16.5 mm.

Localities: Lamar, Greeley, Canon City, and (Scudder) White River.

Spharagemon wyomingianum Thomas

Ann. rep. U. S. geol. surv. terr., v, 462 (1872) - Oedipoda.

Scudd., Proc. Bost. soc. nat. hist., xvii, 470 (1875)

Morse, Psyche, vii, 298 (1895).

wyomingense Blatchl., Orth. Ind., 2 (1897).

oculatum Morse, proc. Bost. soc. nat. hist., xxvi, 232-234, 237-240 (1894).

oculatum Blatchl., Can. ent., 1894, 218.

collare McNeill, Psyche, vi, 64.

wyomingiana Thom., Syn. Acrid. N. A., 113- Oedipoda.

This is undoubtedly a race of the species collare, which is void of the pallid collar on the posterior margin of the prothorax. At least it will here be so considered, since typical wyomingianum grade insensibly into typical collare.

Localities: Delta, Livermore, (Caudell) Fort Collins and Golden.

Derotmemæ Scudder

Derotmema haydeni Thomas.

Ann. Rep. U. S. geol. surv. terr., v, 460 (1871)-Oedipoda.  
Brun., Ann. rep. Nebr. bd. agric., 1896, 132 (1897).

brunnerianum Sauss., Prodr. Oedip., 155-156 (1884).

Color infuscated light brown. Head large, eyes prominent, globose, widely separated. Antennae long and slender, color dark brown to fuscous, lighter basally. Frontal costa prominent, the carinae high, narrowly separated above the antennae and deeply sulcate; widening at the antennae to converge again at the median ocellus, broadening beyond and disappearing far above the base of the clypeus. Vertex strongly carinate, the lateral carinae parallel to the anterior margin of the eyes, then arcuate inward to meet the frontal costal carinae; a transverse posterior carinae occurs at direct

right angles to the lateral carinae; the median carina prominent anteriorly. Occiput low, somewhat flat. Prothorax with a medio-lateral dark area, lighter below, the pronotum light; rugulose on the sides, sparsely rugose dorsally. The prozona is nearly as long as the metazona; lateral carinae obscure on the prozona, pressing anteriorly on the metazona; median carinae prominent on the prozona, where it is deeply and broadly bisected, lower on the metazona; the principal sulcus shallower than the one cranial; posterior process of the metazona strongly obtuse-angulate. Tegmina very narrow, cinereous, flecked with brown, especially above the fold. Hind wings either coral red or pale citrine yellow on the basal half, a narrow or broad band of fuscous beyond, the apex hyaline the nervules somewhat bordered with fuliginous. Hind femora on the outer face cinereous or light brown, seldom striped; inner face likewise. Hind tibiae luteous flecked with fuscous, the spines fuscous tipped; abdomen brown.

Measurements: Length of the body of the male, 15 mm., of the female, 24 mm.; of the antennae of male, 11 mm., of the female, 11 mm.; of the tegmina of the male, 16 mm., of the female, 22 mm.; of the hind femora of the male, 12 mm., of the female, 13 mm.

Localities: This locust is very common over all the State up to an altitude of 9000 feet. Dr. Gillette records it from 32 localities.

Mestobregma Scudder

Mestobregma cinctum Thomas

Proc. acad. nat. sc. Philad., 1870, 80 (1870) - Oedipoda.  
Thom., Bull. Ill. mus. nat. hist., i, 65 (1876).  
Brun., Publ. Nebr. acad. sc., iii, 25 (1893) - Trachyrachis.  
Blatch., Orth. Ind. 279 (1902)

thomasi Caud., Gillette Rpt. Ent., Colo. Agr. Exp.  
Sta. Bull. 94, 34 (1904).

Color dull grayish brown, fairly concolorous. Head prominent, eyes sub-globose, separated by their longer diameter. Frontal costa with carinae high, deeply sulcate, even above the antennae, where it becomes very narrow, the carinae almost attingent, faintly reaching the base of the **clypeus**. Vertex low, though the carinae are distinct, sub-quadrate, the disk deeply hollowed out anteriorally. Occiput low and more or less flat. Prothorax darker medio-laterad, a light spot ventrad, the inferior margin strongly declivent posteriorally, meeting the posterior margin at a sharp angle forming an acutangulate tooth; pronotum sparsely rugose. Metazona one and a third times as long as the prozona, lateral carinae present only as rugulae; median carina prominent on the prozona, low on the metazona, the two sulci deep and widely separated; posterior process of the metazona acutangulate. Tegmina brownish cinereous, fairly concolorous except for pale fuliginous markings along the anal portion. Hind wings pallid citrine yellow on the basal fourth, hyaline beyond.

Hind femora with outer face brownish gray, sometimes faintly and irregularly marked with black; inner face dark on the basal half, a fuscous preapical band, the knees dark. Hind tibiae bluish gray, lighter basally, the spines fuscous tipped. Abdomen brown.

Measurements: Length of the body of the male, 16 mm., of the female, 20.5 mm.; of the tegmina of the male, 17 mm., of the female, 22 mm.; of the hind femora of the male, 10 mm., of the female, 13.5 mm.

Localities: Steamboat Springs. Dr. Gillette records this species as thomasi Caud., from Colorado Springs, Pueblo and Nepessta.

Mestobregma kiowa Thomas

Ann. rep. U.S. geol. surv. terr., v, 461 (1872) - Oedipoda.  
Thom., Rep. U.S. geol. surv. west 100 mer., v, 885 (1875) -  
Psinidia.

Thom., Proc. Dav. acad. nat. sc., i, 256 (1876).

Sauss., Prodr. Oedip., 164 (1884) - Psinidia  
(Trachyrachis).

Sauss., Add. prodr. Oedip., 59, 168 (1888) - Trachyrachis.

Color gray marked with fuscous. Head prominent, eyes sub-globose, separated by their longest diameter. Frontal costa with carinae high, deeply sulcate, even so above the antennae where it becomes very narrow, the carinae almost attingent, faintly reaching the base of the clypeus. Vertex low though the carinae are distinct, sub-quadrate, the disk deeply hollowed out, median carina faint. Occiput slightly tumid, strongly declivent posteriorly. Prothorax variegated, usually darker medio-

laterad; pronotum with a light border on posterior margin, a conspicuous cream spot below the medio-laterad fuscous area; rugose on the pronotum of the prozona, very sparsely so on the pronotum of the metazona. Prozona almost as long as the metazona; the lateral carinae appear as irregular rugulae on the prozona, quite distinct anteriorly on the metazona; median carina high on the prozona, lower on the metazona, the sulci deep and widely separating the parts; posterior process of the metazona acutangulate. Tegmina gray, crossed on the sides by at least two distinct fuscous bars and other smaller irregular fuscous areas, sometimes a luteous stripe along the fold, usually lighter without variegations above the fold than below. Hind wings with small basal portion hyaline, though of a citrine yellow tinge, the nervules citrine yellow; hyaline beyond with the nervules black. Hind femora on the outer face gray, irregularly infuscated, inner face with basal half fuscous, a fuscous preapical band, bordered with luteous, sometimes reddish, the knees dark. Hind tibiae bluish, dusky basally, fuscous apically, the spines black tipped. Abdomen brown.

Measurements: Length of the body of the male, 17 mm., of the female, 22 mm.; of the antennae of the male, 9.5 mm., of the female, 9 mm.; of the tegmina of the male, 17.5 mm., of the female, 19 mm.; of the hind femora of the male, 11 mm., of the female, 12 mm.

Localities: This is the most common species of this genus in the State, occurring in all localities up to an elevation of at least 10,000 feet. Dr. Gillette records it from 29 different places in the State.

This locust is of some economic importance as a component of the many species which are present in an outbreak on the pasture lands of the State, especially in the foothills. Our experimental work indicates that it can be controlled with standard poison bran mash as readily as most epidemic species.

Mestobregma mexicanum Saussure

Prodr.Oedip., 164(1884)-Psiniidia(Trachyrachys).  
Sauss., Add.prodr.Oedip., 59(1888)-Trachyrachys.

Color gray or light brown marked with fuscous.

Head fairly prominent, gray marked with black blotches in front of the eyes, and along the base of the clypeus; eyes sub-globose, separated by the distance of their greatest diameter. Frontal costa prominent, the carinae high, converging above the antennae until nearly attinent, less sulcate than below, though again deeply sulcate where it joins the vertex; slightly divergent from the antennae to the median ocellus, there again narrowing, only to moderately diverge and disappear just before reaching the base of the clypeus. Vertex prominent, with peculiar sculpturing, the carinae high, sub-pentangulate, the disk deeply hollowed out, a carinal



loop extends back into the disk from the anterior margin of the vertex forming an oblong, deeply sulcate area on the front of the vertex, transverse carinae appear at the base of the lateral carinae running slightly mediad, but not meeting, extending farther laterad. Occiput mildly tumid, usually roughened and in some cases rugose. Prothorax rugulose on the sides, strongly rugose on the pronotum, dark medio-laterad and on the pronotum, except for a usually present bounding gray band. Metazona from one and a third to one and a half times as long as the prozona, lateral carinae appearing as irregular rugulae, the median carina prominent, about equally high on both the pro- and the metazona, the sulci deep, narrowly separated, especially the anterior one; posterior process of the metazona strongly acutangulate. Tegmina cinereous, infuscated with several heavy spots, but not distinctly banded. Hind wings semi-hyaline, pale citrine yellow on the basal half, bordered by a wide semi-hyaline fuliginous band, hyaline apically. Hind femora on the outer surface cinereous or light brown, infuscated on the margins but not distinctly banded; inner face fuscous except for a preapical luteous band. Hind tibiae bluish, dusky basally, fuscous apically, the spines fuscous tipped. Abdomen brown.

Measurements: Length of the body of male, 17.5 mm.,

of the female, 20 mm.; of the tegmina of the male, 18 mm., of the female, 19 mm.; of the hind femora of the male, 11.5 mm., of the female, 12.5 mm.

Localities: Fort Collins, Dutch George's, Palmer Lake, Pueblo and Trinidad.

Mestobregma plattei Thomas

Rep. U.S. geol. surv. terr., v, 123 (1873) - Oedipoda.  
Scudd., Bull. U.S. geol. surv. terr., ii, 264 (1876).  
Sauss., Add. prodr. Oedip., 170-171 (1888) Trachyrachis.  
Brun., Ann. rep. Nebr. bd. agric., 1896, 132 (1897) -  
Psinidia.

Color cinereous or light brown, with distinctive fuscous and cream markings. Head very prominent, light on the genae and front, darker above, a dark spot at the lower front margin of the eyes. Eyes globose and widely separated. Frontal costa prominent, the carinae distinct, shaped as in the preceding species. Vertex, though not exceedingly high, yet the carinae are distinct, sub-pentangulate, the disk shallowly hollowed out, a slight tubercle occurring cranio-mediad. Occiput moderately tumid, somewhat rough. Sides of the prothorax characterized by a cream patch on the inferior margin, a fuscous band above, then grayish to the lateral carinae. Pronotum dark brown within the gray band along the lateral carinae, sparsely rugose especially on the prozona. Metazona slightly longer than the prozona, lateral carinae irregular rugulae on the prozona, indistinct on the

metazona; median carina high, more pronounced on the pro- than on the metazona, the sulci moderately deep and usually broadly separated; the posterior margin of the metazona strongly acutangulate. Tegmina with a distinct cream band on the middle, bounded by two fuscous bands, usually a second cream or grayish band beyond the outer one, irregularly infuscated above the fold. Hind wings pallid yellow on the basal half, bordered by a moderately wide band of fuscous, hyaline apically with some fuscous spots. Hind femora on the outer face cinereous or light brown, sometimes irregularly infuscated, inner face fuscous save for a preapical luteous band. Hind tibiae blue. Abdomen brown.

Measurements: Length of the body of male, 22 mm., of the female, 29 mm.; of the antennae of the male, 14.5 mm., of the female, 12 mm.; of the tegmina of the male, 24 mm., of the female, 28 mm.; of the hind femora of the male, 14 mm., of the female, 16 mm.

Localities: Fort Collins, Dutch George's, Sterling, Wray, Home, Pinewood, Boulder, Colorado Springs, Pueblo, Rocky Ford, Nepesta, Las Animas, Lamar, Trinidad and Antonito.

Mestobregma pulchella Bruner

Proc.U.S.Nat.Mus.,xii,64-65(1890).

Caudell,Proc.U.S.Nat.Mus.,xxvi,790(1903).

Color light greenish gray, conspicuously marked

with fuscous. The head light except for a fuscous stripe extending from the frontal costa at the base of the antennae across the lower half of the eye, broadening slightly before reaching the prothorax, a narrow transverse fuscous stripe across the vertex and a few fuscous dots along the carinae of the frontal costa. Frontal costa as in the preceding species. Vertex not prominent, the carinae low, fading posteriorly, subpentangulate, the disk shallowly hollowed out and smooth. Occiput somewhat tumid, strongly declivent posteriorly. Metazona of the prothorax pale green, the prozona fuscous except for a wide pale-green band along the lateral carinae. Prothorax fairly smooth on the sides, pronotum of prozona sparsely rugose, of metazona rugulose. Metazona from one and a third to one and a half times as long as the prozona; the lateral carinae irregular rugulose on the prozona, slight on the metazona; median carina prominent on the prozona, low on the metazona, the sulci shallow; the posterior process of the metazona acutangulate. Tegmina irregularly banded with fuscous, a median pale green separating band, above the fold fairly uniform pale green. Hind wings semi-hyaline citrine yellow basally, hyaline beyond. Hind femora on the outer face pale green with fuscous spots on the edges; the basal half of the inner face fuscous, with a preapical fuscous band bordered by luteous. Hind

tibiae blue, greenish gray basally, fuscous apically, the spines fuscous tipped. Abdomen reddish or bluish brown.

Measurements: The length of the body of the female, 22 mm.; of the antennae of the female, 9 mm.; of the tegmina of the female, 23 mm.; of the hind femora of the female, 13 mm. No males available.

Localities: Fort Collins and Virginia Dale.

### Metator

#### Metator boreale Saussure

Prodr.Oedip.,164(1884)-Painidia (Trachyrachis)  
Sauss.,Add.prodr.Oedip.,59(1888)-Trachyrachis.  
Scudd.,Proc.Dav.acad.nat.sc.,39(1899)-Mestobregma.

Color light brown, variegated with dark brown. Head of moderate size, uniform brownish color. Eyes globose, separated by the distance of their shorter diameter. Antennae bluish brown. Frontal costa prominent, deeply sulcate, the carinae high, narrowly bridged just above the median ocellus, the carinae reaching the base of the clypeus. On either side and adjacent to the frontal costa half way between the median ocellus and the base of the clypeus, occurs a small tumid area. Vertex prominent, carinae high and forming a characteristic architecture, a transverse carina between the eyes bending cranial, and another on the posterior margin of the vertex bending caudad, forms a hexagonal, sulcate disk on the posterior half. Occiput rugose anteriorally. Prothorax light brown,

somewhat darker medio-laterad and on the pronotum. Pronotum rugose. Metazona but slightly longer than the prozona; lateral carinae present as very irregular rugulae; median carina prominent on the prozona, lower on the metazona, somewhat warped; posterior process of the metazona rectangulate. Tegmina light brown, spotted with dark brown, a light brown narrow stripe occurs along the fold. Hind wings with basal half citrine yellow, bordered by a broad band of fuliginous, apically exceedingly hyaline. Hind femora on the outer surface grayish brown; inner face fuscous basally, a fuscous preapical band, bordered with luteous, the knees fuscous. Hind tibiae luteous, the spines fuscous tipped.

Described from a single female taken by A.N.Caudell at Golden, Colorado.

Measurements: Length of the body of the female, 23 mm.; of the tegmina of the female, 23.5 mm.; of the hind femora of the female, 13 mm.

Metator pardalinum Saussure.

Rev.mag.zool.,1861,324(1861)-Oedipoda.  
Sauss.,Prodr.Oedip.,162(1884)-Psiniidia(Trachyrachis)  
Brun.,Ann.rep.Nebr.bd.agri c.,1896,132(1897)-  
Mestobregma.  
Scudd.,Proc.Dav.acad.nat.sc.,viii,40(1899)-  
Mestobregma.

Color dark brown marked with fuliginous. Head prominent, not strikingly marked, though darker above; eyes globose, separated by the distance of their greater

diameter. Antennae long, bluish brown, lighter basally. Frontal costa as in the preceding species, except not so deeply sulcate and not nearly reaching the base of the clypeus. Vertex low, carinae distinct anteriorly, absent posteriorly, though deeply hollowed out. Occiput somewhat tumid and smooth. Prothorax dark brown medio-laterad and on the center of the pronotum; smooth except for slight rugulae near the lateral and median carinae. Metazona distinctly longer than the prozona; the lateral carinae prominent irregular rugulae; the median carina prominent on the prozona, lower on the metazona, the two sulci deep and widely separating the parts; the posterior process acutangulate. Tegmina grayish with many fuliginous areas, though not banded, a narrow luteous stripe along the fold. Hind wings either citrine yellow or blood red on the basal one-third to one-half, bordered with a broad band of fuscous, apically more or less hyaline with fuliginous along the nervules. Hind femora on the outer surface brown, irregularly marked with fuscous; the inner face blue, basally black, with a preapical black band broadly bordered with blue, the knees black. Hind tibiae blue or bluish gray darker apically, the spines fuscous tipped. Abdomen gray ventrally, brown laterally, blue dorsally.

Measurements: Length of the body of the male, 26 mm., of the female, 33 mm.; of the antennae of the male, 13 mm., of the female, 14 mm.; of the tegmina of the

male, 24 mm., of the female, 30.5 mm., of the hind femora of the male, 15 mm., of the female, 18 mm.

Localities: Fort Collins, Virginia Dale, Dutch George's, Sterling, Steamboat Springs, Boulder, Morrison and Golden.

### Conozoa Saussure

Conozoa deltei, New species.

Color ashy brown, body slender. Head moderate, slender, pinkish brown; eyes very prominent, sub-globose, narrowly separated, the distance between them two-thirds their shorter diameter. Antennae moderately long, reaching beyond the prothorax, striped with alternating bands of light brown and fuliginous. Frontal costa prominent, the carinae distinct, narrowly separated, especially above the antennae where the interspace is flat, shallowly sulcate at the antennae, more deeply so below the median ocellus. Vertex prominent, carinae high, sub-pyriform, the disk deeply hollowed out, long and narrow, only twice as wide posteriorly as anteriorly; a median carina faintly present. Occiput flat and sharply declivent posteriorly. Prothorax ashy brown, concolorous except for a slightly darker medio-laterad area; inferior margin strongly declivent posteriorly forming an angulate point at the junction with the posterior margin of the metazona twice as long as the prozona; the lateral carinae present, though low,



and somewhat broken on prozona; median carina moderately prominent on the prozona, low on the metazona, the sulci fairly deep and widely separating the parts; posterior process of the metazona strongly acutangulate. Tegmina ashy brown except along the anal border where there occurs three dull fuliginous spots separated by luteous, the apical third semi-pellucid. Hind wing with basal half pallid citrine yellow, bordered by a broad band of fuliginous, hyaline beyond. Hind femora on the outer face reddish gray; inner face basal half fuscous, a fuscous preapical band separated by reddish yellow, the knees fuscous. Hind tibiae pallid orange red, lighter basally, spines fuscous tipped. Abdomen yellowish brown.

Described from one male.

Measurements: Length of the body, 16 mm.; of the antennae, 8.5 mm.; of the tegmina, 19 mm.; of the hind femora, 10 mm.

Type Locality: Delta, Colorado, July 14, 1901.

Conozoa wallula Scudder

Rep.U.S.ent.comm.,ii,app.,27-28,pl.17,figs.13,14  
(1881)-Psinidia.  
Sauss.,prodr.Oedip.,166(1884).

Color cinereous, heavily infuscated. Head slender, heavily speckled with greenish gray and some fuscous spots, eyes prominent, ovate, narrowly separated by a distance less than their shorter diameter. Antennae moderately long, alternating bands of gray and fuliginous.

Frontal costa prominent, the carinae high, narrowly separated, especially above the antennae where it is shallowly sulcate, deeply sulcate, below. Vertex prominent, the carinae very high, ovate, the disk deeply hollowed out, a low median carina present. The occiput rough a median and two lateral low but broad ridges. Prothorax grayish brown, heavily infuscated especially on the prozona, the metazona usually lighter and somewhat concolorous; rugulose; metazona one and a half times as long as the prozona; lateral carinae irregular rugulae on the prozona, apparent on the anterior portion of the metazona only; median carina moderately high on the prozona, low on the metazona, sulci moderately deep, widely separated; the posterior process acutangulate in the males, rectangulate in the females. Tegmina grayish with two shallow fuscous bands along the anal margin separated by light gray, semi-pellucid apically. Hind wings with basal half pallid citrine yellow, a broad band of fuscous, hyaline on the outer fourth. Hind femora on the outer face cinereous, obliquely marked with one dark band, otherwise irregularly infuscated; inner face with basal half black, a black pre-apical band, bordered with luteous, the knees black. Hind tibiae reddish orange, grayish basally, the spines fuscous tipped. Abdomen yellowish brown.

Measurements: Length of body of the male, 19 mm., of the female, 25.5 mm.; of the tegmina of the male, 19 mm., of

the female, 25 mm.; of the hind femora of the male, 12 mm., of the female, 14 mm.

Localities: Grand Junction and Montrose (Caudell).

Trimerotropis Stal.

Trimerotropis agrestis McNeill

Psyche, ix, 32 (1900).

McNeill, Proc. U.S. Nat. Mus. xxiii (1901).

Color light brown, males slender, females somewhat robust. Head cinereous on the genae and front, brown above. Eyes semi-globose, prominent, narrowly separated, the distance between them much less than their shorter diameter. Antennae reddish brown. Frontal costa prominent, the carinae high, narrowly separated, especially so above the antennae where it is but shallowly sulcate, more deeply sulcate below, carinae faintly reaching the base of the clypeus. Vertex low, the carinae low, sub-ovate, the disk shallowly hollowed out. Occiput slightly tumid, smooth, strongly declivent posteriorly. Prothorax light brown, prozona with light spots separated by a darker brown medio-laterad. Metazona about twice as long as the prozona; lateral carinae faintly indicated on the prozona, present only anteriorly on the metazona; median carina low even on the prozona, a mere line on the metazona, the sulci therefore shallow; the posterior process of the metazona slightly acutangulate in the males, rectangulate in the females. Tegmina light brown with a few slightly darker spots. Hind wings citrine yellow on the basal half

bordered by a broad fuscous band, dusky hyaline apically. Hind femora on the outer face grayish brown, sometimes slightly banded obliquely with brown; inner face with basal half black, a black preapical band separated by reddish yellow. Hind tibiae orange, the spines black tipped. Abdomen brown.

Measurements: Length of the body of the male, 23 mm., of the female, 28 mm.; of the tegmina of the male, 26 mm., of the female, 28.5 mm.; of the hind femora of the male, 13.5 mm., of the female, 15 mm.

Localities: Julesburg, Orchard, Greeley, Rocky Ford, LaJunta and Lamar.

Trimerotropis bruneri McNeill

Psyche, ix, 31 (1900)

Scudd., Proc. Dav. acad. nat. sc., ix, 37 (1902).

gracilis Scudd., Psyche, ix, 67-68 (1900)-Hadrotettix.

Color grayish brown, body semi-robust. Head large and tumid, cinereous on the genae and front, brown above. Eyes quite prominent sub-ovate, separated by the distance of their shorter diameter. Antennae long and fuscous. Frontal costa wide, carinae low, narrow above the antennae and tumid, wider and shallowly sulcate at the antennae, first converging then diverging below the median ocellus, more deeply sulcate. Vertex low, carinae reaching only the middle of the eyes posteriorly, sub-pyriform, shallowly hollowed out. Occiput smooth and

tumid. Prothorax pinkish brown, fairly concolorous, lateral carinae absent, median carina very low, almost obsolete on the metazona. Prozona half as long as the metazona, the posterior process broadly rounded, obtuse-angulate. Tegmina basally brown, then thrice fuscous banded, set off sharply with cinereous. Hind wing with basal half yellow, bordered with a broad fuscous band, apex hyaline. Hind femora on the outer face grayish brown on the basal half, bounded by a fuscous band adjacent to the second fuscous band of the tegmina, a preapical luteous band, the knees dark brown; the inner face with basal half black, a preapical fuscous band bounded on either side by luteous, the knees black. Hind tibiae orange, grayish basally on the outer face. Abdomen brown.

Measurements: Length of the body of the male, 24 mm., of the female, 33 mm.; of the antennae of the male, 13 mm., of the female, 13 mm.; of the tegmina of the male, 24 mm., of the female, 28 mm.; of the hind femora of the male, 13 mm., of the female, 13 mm.

Localities: Fort Collins, Greeley, Fort Morgan, Sterling, Pueblo, La Junta, Antonito, and Sedalia.

Trimerotropis cincta Thomas

Proc. acad. nat. sc. Philad., 1870, 80 (1870) - Oedipoda.  
Sauss., Prodr. Oedip., 171-172 (1884).  
Brun., Publ. Nebr. acad. sc., iii, 25 (1893) - Trachyrachis.

Color **dark** gray, form slender, especially the males. Head large, light gray, heavily infuscated with small spots, a fuscous band runs from the frontal costa below the antennae, across the base of the eye and joins a like band occurring along the lateral carinae of the prothorax. Eyes prominent sub-globose, narrowly separated by much less than their shorter diameter. Antennae annulated with light and dark brown bands. Frontal costa low, quite widely separated, tumid from the antennae upward, sulcate below, narrower near the vertex. Vertex low, narrow and long, sub-pyriform, the disk shallowly sulcate posteriorally, median carina faint. Occiput slightly tumid. Prothorax variegated usually lighter on the metazona, fuscous medio-laterad on the prozona. Metazona from one and a half to two times as long as the prozona; lateral carinae obsolete on the prozona, apparent only on the anterior portion of the metazona; median carina on the prozona moderate, a low line on the metazona; posterior process of the metazona rectangulate or obtuse-angulate. Tegmina approaching fuscous, with two poorly defined lighter bands. Hind wings basal half citrine yellow, semi-hyaline **smoked** with fuliginous on the outer half. Hind femora on the outer

face dark gray or brown, twice banded obliquely with fuscous; inner face with basal half black, a black pre-apical band bounded on either side by luteous, the knees black. Hind tibiae pale blue somewhat infuscated a short distance below the knees, grayish basally, the spines almost wholly black. Abdomen light brown below, dark brown on the sides.

Measurements: Length of the body of the male, 22 mm., of the female, 29 mm.; of the antennae of the male, 12 mm., of the female, 14 mm.; of the tegmina of the male, 22.5 mm., of the female, 29 mm.; of the hind femora of the male, 11 mm., of the female, 14.5 mm.

Localities: Dr. Gillette records this species as general over the State in the foothills and mountains from 6,000 to 10,000 feet in elevation.

Trimerotropis citrina Scudder

Bull. U. S. geol. surv. terr., ii, 265 (1876).

Color ash-gray, body somewhat slender. Head usually cinereous (sometimes brown) on genae and front, brownish above, speckled all over with dark bluish gray. Eyes moderately prominent, sub-ovate, separated by a distance less than their shorter diameter. Antennae dark brown, often annulated with lighter rings. Frontal costa prominent, narrowing but little above the antennae and there flat or slightly tumid, shallowly sulcate at the antennae, more deeply hollowed out below. Vertex low, carinae

low reaching to or a little beyond the middle of the eye, sub-pyriform, the disk very shallowly hollowed out and smooth. Occiput slightly tumid, smooth and strongly declivent posteriorally. Prothorax almost concolorous. Metazona about twice as long as the prozona; the lateral carinae feebly present on the prozona and the anterior margin of the metazona; the median carina low, higher on the prozona and anterior portion of metazona, disappearing posteriorally; posterior process rectangulate. Tegmina ash brown, faintly banded by a darker brown. Hind wings citrine yellow on basal third, bordered by a broad band of fuscous, hyaline on the apical third. Hind tibiae on the outer face ash brown, twice duskiy banded; inner face reddish orange, twice banded with fuscous, the knees fuscous. Hind tibiae orange, cinereous basally on the outer face, spines black tipped. Abdomen grayish brown.

Measurements: Length of the body of the male, 23 mm., of the female, 26 mm.; of the antennae of the male, 11 mm., of the female, 12 mm.; of the tegmina of the male, 23 mm., of the female, 27.5 mm.; of the hind femora of the male, 11.5 mm., of the female, 12 mm.

Localities: Fort Collins, Greeley, Virginia Dale, Dutch George's, Fort Morgan, Livermore, Pueblo, Rocky Ford, La Junta, Lamar, Dolores and Durango.



Trimerotropis gracilis Thomas

Ann.rep.U.S.geol.surv.terr.,v,461(1871)-Oedipoda.  
Sauss.,Prodr.Oedip.,171(1884).  
Brun.,Publ.Nebr.acad.sc.,iii,25(1893)-Conozoa.

lichenosum Scudd., Proc.Amer.acad.arts,sc.,xxxv,  
394-395(1900)-Derotmema.

Color cinereous heavily speckled with light brown and fuscous, body long and slender. Head prominent, lighter on the genae and front, more heavily speckled with light brown than with fuscous. Eyes prominent, sub-globose and separated by a distance slightly less than their shorter diameter. Antennae annulated light and dark brown. Frontal costa prominent, the carinae high, narrowly separated above the antennae and there shallowly sulcate, deeply sulcate below, the carinae reaching the base of the clypeus. Vertex prominent, carinae high, narrowly sub-pyriform, disk deeply hollowed out, a faint median carina present. Occiput low, slightly rough, median carina indistinct. Prothorax with fuscous stripe medio-laterad on the lateral carinae and the median carina. Metazona about twice as long as the prozona; the lateral carinae present as irregular rugulae on both the pro- and metazona; median carina moderately high on the prozona, the notchings deep and widely separated, lower on the metazona, and reduced to a line posteriorally; posterior process of the metazona acutangulate. Tegmina cinereous irregularly speckled with fuscous. Hind wings with basal half citrine

yellow, bordered by a narrow band of fuliginous, apically hyaline with fuliginous spots along the nervules. Hind femora on the outer face cinereous, two faint fuscous areas on the dorsal sulci; inner face with basal half fuscous, a preapical fuscous band, sometimes partially continuous with the basal fuscous area, usually bounded by luteo-cinereous bands, the knees fuscous. Hind tibiae cinereous, the spines fuscous tipped. The abdomen speckled grayish brown.

Measurements: Length of the body of the male, 23 mm., of the female, 29 mm.; of the antennae of the male, 11 mm., of the female, 12 mm.; of the tegmina of the male, 26 mm., of the female, 30 mm.; of the hind femora of the male, 12 mm., of the female, 13.5 mm.

Localities: Greeley, North Park, Pueblo, Alder, Alamosa, Durango, Cortez, Dolores, Gunnison, Rifle, Paonia, Grand Junction, Steamboat Springs, Walden, Maybell, Hamilton, Glendevy, Lay, Dunkley and Craig.

Trimerotropis montana McNeill

Psyche, ix, 32 (1900).

McNeill, Proc. U.S. nat. mus., xxiii, (1901).

Color luteo-cinereous with fuscous markings. Head prominent, luteo-cinereous often with a bluish tinge and speckled with dark gray, darker above. Eyes prominent, sub-ovate, narrowly separated by a distance much less than their shorter diameter. Antennae dark reddish brown. Frontal costa low, the carinae fairly widely separated,

shallowly sulcate below the antennae, flat above. Vertex low, carinae sub-parallel except for the anterior convergence, disk very shallow. Occiput smooth and almost flat. Prothorax usually darker on the pro- than on the metazona. **Metazona** about one and a half times as long as the prozona; lateral carinae obsolete; median carina low on the prozona, only a faint line on the metazona; posterior process of the metazona obtuse-angulate. Tegmina, although somewhat irregularly infuscated, yet with two distinct narrow fuscous bands separated by a broader cream colored band. Hind wings citrine yellow on the basal half, bordered by a wide band of fuscous, luteous apically. Hind femora on the outer face luteo-cinereous, indistinctly twice banded with fuscous, inner face with basal half largely fuscous, some luteous, with a preapical fuscous band bordered with luteous, the knees dark. Hind tibiae orange, gray basally on the outer face, spines black tipped. Abdomen grayish brown.

Measurements: Length of the body of the male, 24.5 mm., of the female, 28.5 mm.; of the tegmina of the male, 28.5 mm., of the female, 28.5 mm.; of the hind femora of the male, 12.5 mm., of the female, 13.5 mm.

Localities: Durango, Grand Junction and Delta.

Trimerotropis monticola Saussure

Prodr.Oedip.,170(1884).

Color grayish brown, heavily infuscated, body semi-robust. Head cinereous on the genae and front, somewhat speckled with light bluish-gray, above brown or fuscous. Eyes prominent, sub-globose, separated by a distance less than (males) or about equal to (females) their shorter diameter. Antennae dark brown. Frontal costa fairly prominent, carinae moderately high, narrower and somewhat tumid above the antennae, broader and sulcate below. Vertex moderate, carinae low, sub-pyriform, the disk fairly broad and shallowly hollowed out. Occiput smooth, very slightly tumid. Prothorax with a medio-laterad fuscous stripe, a white spot below, sometimes light colored on the metazona. Metazona one and a third times as long as the prozona; metazona dorsally sparsely and minutely bullate; lateral carinae obscure on the prozona, scarcely indicated on the anterior margin of the metazona; median carina low even on the prozona, lineate behind the anterior margin of the metazona; posterior process of the metazona rectangulate. Tegmina in most cases very irregularly and heavily infuscated, often more or less distinctly twice or thrice banded with fuscous. Hind wings pallid citrine yellow on the basal third, bordered by a broad fuscous band, apically hyaline. Hind femora with outer face cinereous, twice banded with fuscous; inner face, reddish orange, a broad median fuscous band, a narrow preapical fuscous band, the knees dark. Hind

tibiae orange, slightly grayish basally on the outer face, spines black tipped. Abdomen grayish brown.

Measurements: Length of the body of the male, 24 mm., of the female, 31 mm.; of the antennae of the male, 13 mm., of the female, 13.5 mm.; of the tegmina of the male, 26 mm., of the female, 27 mm.; of the hind femora of the male, 12.5 mm., of the female, 13.5 mm.

Localities: Fort Collins, Livermore, Dutch George's, Virginia Dale, Estes Park, North Park, Greeley, LaSalle, Colorado Springs, Fort Morgan, Palmer Lake, Trinidad, Alder, Canon City and Buena Vista.

Trimerotropis obscura Scudder

Ann.rep.chief.eng.,1876,514(1876).

Color, dark, dirty gray, body somewhat robust. Head moderately prominent, cinereous speckled with a darker bluish gray, dark brown and fuscous. Eyes prominent, sub-ovate, separated by a distance slightly less than their shorter diameter. Antennae dark brown. Frontal costa moderately high and broad, narrowing slightly and about the same amount above and below, tumid above, sulcate below. Vertex moderate, carinae low, sub-pyri-form, the disk fairly wide and shallowly hollowed out. Occiput smooth and slightly tumid. Prothorax an almost concolorous dark, dirty gray, fuscous medio-laterad. Metazona two and a half times as long as the prozona;

lateral carinae broken rugulae on the prozona, present only anteriorly on the metazona; median carina low even on the prozona, diminishing posteriorly on the metazona until lineate; posterior process of the metazona rectangulate. Tegmina dark, dirty gray, heavily and irregularly infuscated, though two bands are faintly indicated. Hind wings citrine yellow on basal third, bordered by a narrow band of scant fuliginous, which is wider on the margins, outer half hyaline, most of the nervules black. Hind femora on the outer face dark gray or fuscous, faintly banded; inner face with basal half black, a black preapical band, bounded by two narrow luteous bands, the knees black. Hind tibiae dusky gray, lighter basally, darker, often fuscous, apically; spines heavily tipped with black. Abdomen dark brown below, black above.

Measurements: Length of the body of the male, 26 mm., of the female, 28.5 mm.; of the antennae of the male, 10 mm., of the female, 11 mm.; of the tegmina of the male, 29.5 mm., of the female, 30 mm.; of hind femora of the male, 13 mm., of the female, 13.5 mm.

Localities: Palmer Lake, Salida, Antonito, Silverton (13,000 feet), Pike's Peak at 11,000 feet, Steamboat Springs, Pagoda, Hamilton, Hebron and Lay.

Trimerotropis vinculata Scudder

Proc. Bost. soc. nat. hist., xviii, 270 (1876).

Color brownish gray, body somewhat slender. Head moderately prominent, cinereous on the genae and front, speckled with bluish gray spots, darker above. Eyes prominent, sub-globose, narrowly separated, the distance between them about two-thirds of their shorter diameter. Antennae annulated light and dark brown. Frontal costa moderately high, carinae low, narrower above the antennae and flat or tumid, broadening at the antennae and sulcate; converging and then again diverging below the median ocellus and disappearing far above the base of the clypeus. Vertex moderate, carinae low, narrowly pyriform, disk quite deeply hollowed out, a faint median carina present. Occiput smooth and slightly tumid. Prothorax brownish gray, two light spots separated by dark brown on the sides. Metazona twice (females) or twice and a half as long as the prozona; lateral carinae irregular rugulae on the prozona, present only anteriorly on the metazona; median carina moderate on the prozona, scarcely at all raised on the anterior portion of the metazona, lineate posteriorly; posterior process of metazona acute (males) or rectangulate (females). Tegmina brownish or grayish, indistinctly twice banded with darker hues, in some cases fuscous. Hind wings with basal half pallid yellow, bordered by

a median band of fuscous, apically hyaline, the nervules also clear. Hind femora on the outer face brownish gray, twice indistinctly banded with a darker hue; inner face, basal half black, a black preapical band separated by luteo-cinereous, knees black. Hind tibiae pale citrine yellow with brownish spots, the spines black tipped. Abdomen yellowish-brown.

Measurements: Length of the body of the male, 22 mm., female, 26 mm.; of the antennae of the male, 11.5 mm., of the female, 12 mm.; of the tegmina of the male, 27.5 mm., of the female, 30.5 mm.; of the hind femora of the male, 12 mm., of the female, 14 mm.

Localities: Fort Collins, Greeley, Pueblo, Colorado Springs, La Junta, Nepesta, Lamar, Durango, Cortez, Dolores, Antonito, Alamosa, Palisade, Delta, Steamboat Springs, Craig, Maybell and Hamilton.

Circotettix Scudder

Circotettix azurescens Bruner

Proc.U.S.nat.mus.,xii,69-70(1890)-Trimerotropis.

perplexa Bruner, Proc.U.S.nat.mus.,xii,74-75(1890),  
Trimerotropis.

Caudell,Proc.U.S.nat.mus.,xxvi,793(1903).

Color dusky brown. Head prominent, bluish gray spotted with darker shades of the same color, eyes ovate, prominent, narrowly separated. The antennae annulated with bands of light brown and fuscous. The frontal costa prominent, widely separated, narrower



above the antennae and then tumid, also tumid in the females at the antennae, deeply sulcate and broadening below the median ocellus. Vertex prominent, long and narrow, the carinae moderate, their sides sub-parallel, disk shallowly hollowed out, a faint median carina present. Occiput flat and low. Prothorax mottled gray, two light spots on the sides of the prozona. Metazona twice as long as the prozona; lateral carinae barely recognizable on the prozona and on the anterior portion of the metazona; median carinae low even on the prozona, a line on the metazona; posterior process of the metazona acutangulate. Tegmina dusky gray without bands. Hind wings azure blue, lighter and more hyaline on the costal half. Hind femora dusky gray on the outer face; inner face with basal half black, a black preapical band bounded by luteous, the knees black. Hind tibiae pale citrine yellow, cinereous basally. Abdomen brown.

Measurements: Length of the body of the male, 21 mm., of the female, 30 mm.; of the antennae of the male, 9 mm., of the female, 11 mm.; of the tegmina of the male, 24 mm., of the female, 31 mm.; of the hind femora of the male, 11 mm., of the female, 15 mm.

Localities: Rifle, Paonia, Delta, Steamboat Springs, and Hamilton.

Circotettix carlinianus Thomas

Proc. acad. nat. sc. Philad., 1870, 81 (1870) - Oedipoda.

Thom., Proc. Dav. acad. nat. sc., i, 254 (1876).  
Riley, Stand. nat. hist., ii, 202-203 (1884) - Oedipoda  
(Circotettix).

Color grayish brown, mottled with reddish brown, body robust. Head moderate, cinereous on the genae and front speckled with reddish brown, darker above. Eyes fairly prominent, semi-globose, widely separated, the distance between them equal to their shorter diameter in the females. Antennae annulated with light and dark brown rings. Frontal costa low and wide, narrower above the antennae and there tumid, flat and broad at the antennae, narrowing and sulcate below. Vertex low, carinae sub-quadrate, disk wide and shallowly hollowed out, a faint median carina present. Occiput low and flat. Prothorax concolorous grayish brown except for occasional medio-lateral whitish spots. Metazona two and a half times as long as the prozona; lateral carinae on the prozona indistinct and broken, present only on the anterior portion of the metazona; median carina low on the prozona, lineate on the metazona; posterior process of the metazona slightly acutangulate. Tegmina grayish brown flecked with slightly darker brown spots. Hind wings smoky hyaline basally and on the anal margin, clearer apically, the main veins heavily infuscated. Hind femora on the outer face grayish brown; inner face with basal half black, a narrow black preapical band bordered with luteous bands, the knees dark. Hind tibiae pale

citrine yellow, grayish basally, dusky apically, the spines black tipped. Abdomen varies from grayish brown to fuscous, darker laterad and dorsad.

Measurements: Length of the body of the male, 31 mm., of the female, 37 mm.; of the antennae of the male, 11 mm., of the female, 13 mm.; of the tegmina of the male, 27.5 mm., of the female, 33 mm.; of the hind femora of the male, 14 mm., of the female, 16.5 mm.

Localities: Fort Collins, Livermore, North Park, Dunkley, Palmer Lake, Colorado Springs, Durango, Grand Junction and Gunnison.

Circotettix suffusus Scudder

Bull. U.S. geol. surv. terr., ii, 265 (1876) Trimerotropis.  
Scudd., Appal., viii, 308-309 (1898).

Columbia Scudd., Rept. Ent. Soc. Ont., xxiii, 77 (1893).

Color black, specked with gray, body long and slender. Head more gray than black on the genae and below the base of the clypeus, black above. Eyes small but prominent, sub-globose, separated by the distance of their shorter diameter. Antennae somewhat annulated with dark brown and fuscous. Frontal costa as in the preceding species. Vertex low, sub-pyriform, the disk shallowly sulcate, a faint median carina present. Occiput slightly rough and flat. Prothorax black with two medio-laterad grayish spots. Metazona twice as long as the prozona; lateral carina present but broken on the prozona, apparent on

the anterior half of the metazona; median carina very low even on the prozona, barely raised anteriorally in the metazona, lineate caudally; posterior process of the metazona very slightly acutangulate. Tegmina dark dirty gray, heavily marked with black, no banding. Hind wings with basal half citrine yellow, bordered by a narrow light fuliginous band, smoky hyaline beyond, the nervules fuscous. Hind tibiae on the outer face dark gray, sometimes twice obliquely banded with fuscous; inner face black except for a narrow cinereous band. Hind tibiae dark gray, lighter basally, fuscous apically, the spines wholly black. Abdomen dark brown flecked with fuscous.

Measurements: Length of the body of the male, 24.5 mm., of the female, 27.5 mm.; of the tegmina of the male, 27 mm., of the female, 30 mm.; of the hind femora of the male, 12 mm., of the female, 14 mm.

Localities: Walden, Steamboat Springs, Dunkley, Estes Park, Palmer Lake, Durango, Hamilton and Pagoda.

Circotettix undulatus Thomas

Ann. rep. U.S. geol. surv. terr., v, 460 (1871) - Oedipoda.  
Scudd., Bull. U.S. geol. surv. terr., ii, 265 (1876).

Color light grayish brown, body semi-robust. Head fairly prominent, lighter colored than the rest of the body, especially on the genae and front. Eyes semi-ovate separated by the distance of their shorter diameter.

Antennae annulated with gray and grayish brown. Frontal costa and vertex as in the two preceding species. Occiput smooth and tumid. Prothorax grayish brown, darker medio-laterally, sometimes with a lighter spot above and below this area. Metazona twice as long as the prozona in males, slightly less in females, lateral carinae almost absent, a slight ridge anteriorly on the metazona; median carina but very slight on the prozona, lineate on the metazona; posterior process of the metazona rectangulate or slightly acutangulate. Tegmina grayish brown, indistinctly twice banded with darker brown. Hind wings with basal half citrine yellow, slightly fuliginous medially, especially near the two margins, hyaline beyond. Hind femora on the outer face grayish brown, often with an indistinct preapical darker band; inner face basally black, a black preapical band bounded by luteous bands, the knees dark brown. Hind tibiae pal- lid citrine yellow, grayish basally on the outer face, spines fuscous tipped. Abdomen grayish brown, darker above.

**Measurements:** The length of the body of the male, 27 mm., of the female, 33 mm.; of the antennae of the male, 10.5 mm., of the female, 12 mm.; of the tegmina of the male, 28 mm., of the female, 31 mm.; of the hind femora of the male, 12 mm., of the female, 14 mm.

**Localities:** Fort Collins, Dutch George's, Wray, Pueblo, Hague's Peak, Manitou and Rifle.

Circotettix verruculatus Kirby

Faun. bor. amer., iv. 250 (1837) - Locusta.  
Haan, Bijdr. kenn. Orth., 143 (1842) - Acridium (Locusta).  
Scudd., Can. nat., vii, 287 (1862) - Oedipoda.  
Scudd., Hitchc., Rep. geol. N.H., i, 377, fig. 57 (1874) -  
Trimerotropis.  
Prov., Faune ent. Can., ii, 40 (1877) - Oedipoda (Trimer-  
otropis).  
Sauss., prodr. Oedip., 175-176 (1884).

latipennis Harr., Ins. inj. veg., 144 (1841) - Locusta.

Color dusky or infuscated gray, sometimes almost totally black, body somewhat slender and long. Head moderately prominent, often speckled with bluish spots, lighter below than above. Eyes ovate, separated by the width of their shorter diameter. Antennae light or dark brown. Frontal costa low, broad, narrow and flat or tumid above the antennae, shallowly sulcate below. Vertex low, sub-pyriform, with the carinae incurved an unusual amount anteriorly, disk broad and shallowly hollowed out, median carina faint. Occiput low and somewhat flat. Prothorax fairly concolorous dusky or infuscated gray, slightly variegated laterally. Metazona twice as long as the prozona; lateral carinae almost obsolete; median carina very low, lineate on the metazona; posterior process of the metazona rectangulate or slightly acutangulate. Tegmina very indistinctly twice banded with fuscous, semi-pellucid apically. Hind wings with basal third citrine yellow, narrowly bordered with scant fuliginous, heavier on the two margins, outer half hyaline. Hind femora on the outer face dusky gray,

indistinctly or distinctly twice banded with fuscous; inner face basal half black, a black preapical band separated by luteous (though the inner one is often darkened), the knees dark. Hind tibiae dusky gray, the spines black tipped. Abdomen grayish or infuscated brown.

Measurements: Length of the body of the male, 26 mm., of the female, 31 mm.; of the antennae of the male, 11 mm., of the female, 11.5 mm.; of the tegmina of the male, 28.5 mm., of the female, 29 mm.; of the hind femora of the male, 12 mm., of the female, 14 mm.

Localities: Fort Collins (foothills), Estes Park, Golden, Ward, Palmer Lake, Salida, Marshall Pass, Pike's Peak, Buena Vista, Paonia, Delta, Durango, Dolores, Rico, Steamboat Springs, Pagoda, Dunkley and Hamilton.

Hadrotettix Scudder

Hadrotettix trifasciatus Say.

Amer.ent.,iii,pl.34(1828)-Gryllus.  
Cat.Derm.salt.Brit.mus.,iv,729(1870)-Oedipoda.  
Scudd.,Ann.rep.chief eng.,1876,511(1876)  
Caulf.,Rep.ent.soc.Ont.,xviii,70(1888)-Arphia.

pruinus Thom.,Proc.acad.nat.sc.Philad.,1870,80  
(1870)-Oedipoda.

hoffmanii Thom., Rep.U.S.geol.surv.terr.,v,127(1873)-Oedipoda.

Color grayish brown, body robust, the females especially large. Head moderate, light gray except above, there bluish gray. Eyes ovate, widely separated, the

distance between them nearly as great as their longer diameter. Antennae fuscous, with narrow light rings at the joints. Frontal costa low, short, reaching out little below the median ocellus, narrow above the antennae and tumid, broad below and shallowly sulcate. Vertex low, carinae indistinct, disk broad and not hollowed out. Occiput smooth and tumid. Prothorax light bluish gray on ventral half laterad, light brown above. Metazona half again as long (males) or twice as long (females) as the prozona; lateral carinae absent; median carinae on both the pro- and metazona linear; posterior process of the metazona usually acutangulate. Tegmina thrice distinctly banded with fuscous separated with cream, gray or light brown. Hind wings with basal half hazy hyaline, bordered with a broad fuscous band, apex clear hyaline. Hind femora on the outer face gray or brown, once obliquely banded with fuscous; inner face ~~dead~~ black except for a preapical dusky luteous band, the knees fuscous. Hind tibiae bright orange, pallid gray basally on the outer face. Abdomen light or dark brown.

Measurements: Length of the body of the male, 33.5 mm., of the female, 39.5 mm., of the antennae of the male, 15 mm., of the female, 16 mm.; of the tegmina of the male, 27.5 mm., of the female, 36 mm.; of the hind femora of the male, 15 mm., of the female, 20.5 mm.

Localities: Fort Collins, Dutch George's, Livermore,



Pinewood, Greeley, Wray, LaSalle, Sterling, Golden,  
Pueblo, Canon City, Rocky Ford, La Junta, Lamar, Holly,  
Antonito and Salida.

Brachystola Scudder

Brachystola magna Girard

magnus Girard, Marcy, Expl. Red River, 260, pl. 15,  
fig. 1-4 (1853) - Brachypeplus.

Scudd., Bull. U.S. geol. surv. terr., ii, 267 (1876).

Color variegated gray, brown, green, red and blue; body large and robust, the hind legs especially large; brachypterous. Head moderate, cinereous below, reddish brown above. Eyes sub-ovate, comparatively small and very widely separated, the distance between them twice their shorter diameter. Antennae dark bluish brown, approaching fuscous. Frontal costa low and short, reaching just below the median ocellus, very broad and shallowly sulcate below the antennae, converging considerably and flat or slightly sulcate above. Vertex moderate, carinae broadly divergent posteriorally and just reaching the eyes, disk broad and tumid. Occiput smooth and tumid. Prothorax very long and sub-quadrate, pronotum regularly rugose, comparatively smooth laterad, lateral and median carinae low but distinct and unbroken; color, laterad, a greenish brown, the carinae black, a narrow brick-red stripe just within the borders of the lateral carinae on the pronotum with a broader

dark green stripe lying next the median carina. Tegmina reddish brown with round fuscous spots; sub-attinent on male, widely separated on females. Hind femora on the outer face yellowish brown on lower half, bluish green on upper half; inner face on the disk reddish, upper sulci blue-green, lower sulci yellowish. Hind tibiae pallid reddish gray, the spines black tipped. Abdomen variegated, usually with light and dark longitudinal stripes dorsally.

Measurements: Length of the body of the male, 52 mm., of the female, 53.5 mm.; of the antennae of the male, 21 mm., of the female, 21 mm.; of the hind femora of the male, 30 mm., of the female, 27 mm.

Localities: Common over eastern plains and in the foothills. Fort Collins, Wray and Fowler.